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PANORAMA of EU INDUSTRY 94

European Commission

An extensive review of the situation and outlook of the manufacturing and service industries in the European Union

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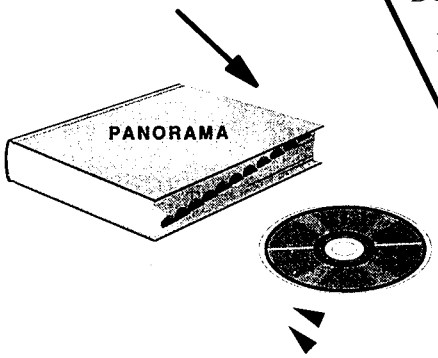

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PANORAMA of EU INDUSTRY 94

An extensive review of the situation and outlook of the manufacturing and service industries in the European Union

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All professional associations/organisations known to the Commission which represent industry at the European level were asked to contribute material on their sector. At the end of each monograph, addresses and telephone and fax numbers of the respective professional association concerned are indicated.

The many consultants and associations that contributed to this edition of Panorama are listed in the introduction section of the publication.

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Message from Mr Jacques Delors

President of the European Commission

In adopting the White Paper on "Growth, competitiveness, employment", the European Council took a decision of a more complex nature than the many others taken along the road of European construction since its revitalization with the 1992 project. Earlier decisions had been aimed at overhauling the way in which the Community works, but the White Paper is both a plan of action and an invitation to thought and debate on the challenges facing us in the coming decade.

An invitation to thought in that it evokes a new economic model, one that is respectful both of human diversity and natural resources. This is going to involve major changes. An attitude of considerable openness and innovation will be needed to keep abreast of these changes.

A plan of action in that it proposes measures aimed at furthering competitive growth in Europe, while steering this in the direction of a new form of economics, perhaps even of society.

As responsible individuals, we have an immense obligation, while remaining faithful to the ideals which make up Europe's personality and are its hall-mark, to work out a new synthesis between the aspirations of our society - employment as a means of social integration, equality of opportunities - and economic imperatives - competitiveness and job creation.

It is in this context that the Union must face up to international competitiveness, while providing each individual with a place from which to contribute to the improvement, inter alia, of the position of industry within markets as a whole.

The White Paper maps out the territory for the 21st Century, one full of challenges which we will have to meet. The consolidation of industrial potential is one, the creation of large trans-European networks is another, the enhancement of research and the putting in place of an information society - all must serve this objective.

This 5th edition of the "Panorama of EU Industry" fits into this context by virtue of its thoroughness and the exhaustiveness of the information which it provides. It represents an extremely useful tool for a better understanding of the needs of industry in the face of future changes.

Jacques Delors

Preface by Martin Bangemann

Member of the European Commission

With the entry into force of the Maastricht Treaty the European Community was transformed from a purely economic community into a European Union the citizens of which now expect, more than ever before, practical answers to today's major economic and political problems.

In this connection, the European Commission plays an important role since, as the "voice of reason", it must point the way towards more growth, greater competitiveness and more jobs. There can be no doubt that the economic and social policy pursued so far needs to be radically redirected since drastic cost-cutting and modernization measures no longer suffice on their own to bring about a considerable improvement in European industry's international competitiveness. We really must concern ourselves more with the markets of the future. I am referring in particular to the modern information and telecommunications technologies which in future will form the principal basis for innovation and greater productivity, especially as our new competitors on the world markets use the most modern technologies from the outset. The decisive factor in international competition is the productive application of knowledge, i.e. we must be quicker than the others to turn our knowledge into successful innovations, an objective which can only be achieved if we focus on the technologies of the future, e.g. the development and extension of European telecommunications networks. Otherwise European industry runs the risk of losing the international race towards the "information society".

An essential task of European industrial policy is to continue to provide an optimum environment for European industry. For example, the cost of using new telecommunications services is the biggest obstacle to the creation of new jobs in the information and telecommunications sector. This obstacle can only be removed if the national monopolies are completely dismantled. The rapid development of mobile communications is an impressive example of the commercial potential that can be released if the Member States allow more competition in the telecommunications sector. However, the intention is not that European industrial policy should pick the winners, since the responsibility for commercial success must continue to lie with enterprises themselves.

In close consultation with European industry, the European Commission will take all necessary measures to maintain the international competitiveness of European enterprises. That is why in the fourth research framework programme we are focusing on "generic technologies" which can be widely applied in various areas rather than the prestigious megaprojects of the past which have failed to produce significant results. However, we must also take the pains to ensure that European research findings are circulated more quickly and in a more targeted fashion, so that the knowledge acquired through research can be exploited to the full in order to promote innovation and improve productivity.

Last but not least, we must step up industrial cooperation with our European partners. The Central and Eastern European countries are counting on us to provide them with all possible assistance with the economic and political reform process in their countries. It would be quite wrong to regard such assistance as a threat to our own industry. Instead we should see it as a contribution towards strengthening Europe's position as an industrial region, since the only way that Europe can have a decisive influence on world competition is to achieve a judicious mix of lower wage costs and advanced technologies.

Martin Bangemann

Preface by Henning Christophersen

Vice-President of the European Commission

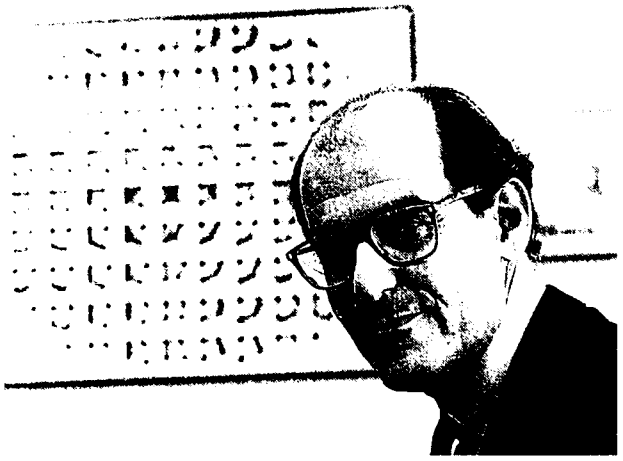
The December 1993 White Paper on Growth, Competitiveness and Employment emphasizes at one and the same time the need for a macro-economic policy and a structural policy approach to promote growth, competitiveness and employment in the Union. Particularly the objective of facilitating structural adjustment presents a demanding task to policy makers in finding innovative and effective policy instruments. Successful structural policy in turn requires access to much information which has not traditionally been readily available.

One of the strong points of the Panorama of EU Industry is exactly the wealth of statistics that it presents. These are vital for effective analysis. The publication gives up-to-date statistics on employment, output, trade and other key variables for nearly 200 manufacturing and service industries, making it an invaluable source for analysts and policy makers.

The collection of such detailed statistics involves a long-term commitment from all the participants in the process. The enterprises wich supply the information devote time and resources to complete questionnaires. The statistical agencies which collect and process the data have to plan the operation meticulously in order to minimize the cost of collection. Furthermore, efforts are needed to harmonize methods of collection of information and its presentation. This is part of the ongoing work of Eurostat, the National Statistical Institutes in the Member States, and with the European trade associations.

This publication is a result of collaborative effort by a large number of people, and a considerable effort has gone into assembling timely and relevant statistics and analyses. I hope that this new edition of Panorama of EU Industry will help towards meeting the information needs of all those concerned with European industry.

Henning Christophersen



Introduction by Riccardo Perissich

Director-General for Industry of the European Commission

"The wealth of nations is increasingly based on the creation and exploitation of knowledge. Optimum advantage must be taken of this new form of progress available to Union firms since it is an area in which the Union enjoys a substantial head start."

This sentence from the section on competitiveness in the Commission's White Paper on "Growth, competitiveness, employment" is especially relevant to this new edition of the "Panorama of EU Industry".

With the accelerating globalization of the world's economies and markets and the intensification of competition world-wide for a growing array of goods, services and factors, the performance of businesses is going to depend increasingly on specific competitive advantages rather than on traditional comparative advantages.

And whereas the latter depend directly on socio-economic-cultural circumstances in the different regions and are thus largely preordained, the latter are the product of the savoir-faire, imagination and dynamism of individuals.

Many in positions of authority still tend to explain the success or failure of businesses, and by extension of the economies of the countries in which they are located, in terms of variations in the cost of traditional factors (exchange rates, cost of manpower/energy/capital, taxation, legislation). I hold with those who see this interpretation as no longer adequate to the realities of today's economic structures, because it conceives of world trade as based essentially on the exchange of goods. The role of services and of immaterial factors is expanding rapidly in our increasingly technology-based society, in which geographical markets are becoming an increasingly vague concept.

Without wishing to under-estimate the impact that major variations between the levels of such factors can have on the profitability of businesses, I am convinced that narrowing these differences significantly is not in itself any guarantee of success in the long term. Success must also, indeed above all, depend on the individual strategies of businesses to optimize the most qualitative elements available to them so that differences vis-à-vis competitors can be fully exploited.

It is up to public authorities to create an environment propitious to the development of such strategies. Amassing and disseminating information which otherwise would be unobtainable is one element of the approach which the Commission intends to follow.

The "Panorama of EU Industry" is an example of the tools which the Commission is making available to business circles to help them direct their own strategies. The ambition of this publication - which will act both as reference work and working tool for numerous people involved in political, economic and academic life - is to help expand our knowledge of the different industrial sectors in the Union.

Its originality resides in its methodology, which is based on close cooperation between the specialized departments of the Commission and trade associations representing industry.

Many associations have continued to update and expand their previous year's contribution. Many others have provided statistics or partial reports. All the associations whose names feature at the end of the sectoral studies were consulted on the contents of the texts now being published and were thus able to make comments and observations.

This also explains why the opinions expressed in a number of analyses do not necessarily coincide with the views held at the Commission and therefore commit only the authors, whose names are given at the end of the monographs.

Forecasts were difficult to make for many sectors, but they will help clarify future prospects and facilitate business decisions. They were produced thanks to the joint efforts of the authors of the monographs, trade associations and Eurostat (the Statistical Office of the European Communities), whose help and statistical knowledge greatly helped the authors in their work.

Overall responsibility for this edition lay with the Unit for competitiveness and general questions of industrial and technological policy of the Directorate-General for Industry, which contracted the technical coordination and editing to an outside consultancy.

As in earlier editions, the opening section contains analyses covering questions of topical interest (this time: the investment strategies of European companies outside the Union, the restructuring of industries in Eastern European countries, the sectoral characteristics of strategic alliances, the economic aspects of quality policies, trends in the services sectors and in the area of the internationalization of SMEs). The results of these analyses provide significant indicators on how the relevant public and private entities might adjust their operations.

I remain convinced that the information contained herein will continue to guide the activities of all those for whom a better knowledge of industry in the Union is a vital asset.

Riccardo Perissich

Time frames and statistics

Panorama 1994 provides a comprehensive picture of industry and services within the European Community. It is intended for all those requiring an update on the present situation and probable future developments in manufacturing and service industries in the EC.

Panorama opens with a "special features" section, which takes a global approach to a number of horizontal subjects of topical interest. The main part of the book - the industry reviews - provides a macroeconomic survey of EC industry and services, tracing the major developments in production, employment, trade and structural change and includes, in most cases, detailed statistical data and forecasts.

Time frame

The industry reviews and forecasts were written during the third and fourth quarters of 1993 (explaining why texts, tables and graphics refer to EC and not EU). Time series run from 1983 to 1992. Gaps in the data were filled by estimates wherever information was available, and these estimates are footnoted in the tables.

For the main indicators table, 1993 estimates have also been added. Forecasts, if available, were provided by the professional trade associations or consultants involved in the compilation of individual reports.

Industry classification system

The selection and ordering of industries and services included in Panorama is based on the NACE coding system. This system classifies economic activity in terms of the nature of goods and services produced or by the nature of the production process employed. It is arranged on the decimal system and is subdivided into divisions (1-digit codes), classes (2-digit codes), groups (3-digit codes), sub-groups (4-digit codes) and items (5-digit codes). Panorama is primarily focused on the 3-digit level.

More detailed information on the NACE codes is contained in the General Industrial Classification of Economic Activities within the European Community published by Eurostat (1985 reprint of the 1970 edition). This publication is available from the usual outlets for Community publications.

Although most chapters are headed by the appropriate NACE code, some do not have a NACE code indicated as the sector represents too small a fraction of the total NACE group. This is particularly common in the service sectors.

Revisions to the NACE classification have been incorporated in a Council Regulation (OJ L293, 24th October 1990) and will start being used for data collection over the next few years. One of the objectives of this revision is a further breakdown of some service and industrial categories.

Even when a NACE code appears beneath the sector title this should be viewed with caution. In some cases the NACE classification does not exactly coincide with the industrial sector under discussion. Each chapter includes a preliminary section explaining the sectoral coverage of the chapter in question, and indicating the extent to which this deviated from the NACE classification. There are cases where an overlap occurs between sectors and therefore data cannot be cumulated.

Statistical data

The three main sources of data are Eurostat, DEBA (Data for European Business Analysis, which contributed estimates for recent years) and the professional trade associations. Data sources are indicated for each statistical table.

For manufacturing industries most chapters include a summary table containing the main indicators for the industry. These cover apparent consumption (defined as production + extra-EC imports - extra-EC exports), production, extra-EC exports, net exports (the trade balance of the Community with the rest of the world) and employment.

Data in the tables are current ECU unless otherwise stated. Indices (reference year: 1985=100) have been calculated for production and trade data providing easier reference for trend changes. The productivity measure used in certain monographs is based on deflated value added at factor cost per person employed, and expressed in 1992 prices using the most appropriate producer price index as deflator.

Every effort has been made to include data for all 12 Member States. All figures are on a pre-unification basis, and exclude East Germany unless otherwise stated. However, where data are not available for the EC-12, country coverage is clearly indicated in the footnotes appearing below each table. The statistical data in Panorama should be regarded with some caution, particularly for the more recent years where data have often been estimated. Production figures for the USA derived from the census of manufactures have also been included, as have Japanese data from Nikkei. To compare the Panorama of EC Industry with the US Industrial Outlook, Eurostat can provide you with a table correlating NACE to the US SIC.

Production and employment

Data for production and employment come from annual enquiries conducted by Member States relating to **all enterprises with 20 or more employees**. The exceptions to this are Spain and Portugal where the coverage is for firms of all sizes. Figures are generally available at the NACE 3-digit level. The production data exclude VAT, and the employment data relate to persons employed excluding home workers. The definitions are standardised, and so the figures are comparable across industries and countries.

Estimates are not supplied to Eurostat by Member States for the firms not covered by the enquiries, and the figures under-report actual employment and production. Where this is significant, either industry association sources are used or note is made in the commentary. Derived statistics which are calculated from both production and trade statistics will also be affected. Apparent consumption will be understated, and import penetration ratios and export rates will be overstated.

Gaps in Eurostat's data for production and employment sent by the Member States have where possible been filled using estimation techniques by DEBA. Denmark and Greece provided final data up to 1991, Germany, Spain, France, the Netherlands, and the United Kingdom up to 1990; and the remaining countries provided data up to 1989 (except Luxembourg, up to 1988). EC totals contain estimates for missing countries. Estimates are derived from short-term indicators such as indices of production, producer prices and employment. Data for 1992 are based on monthly indicators for the

majority of the year, but also take into account independent sectoral forecasts. DEBA's estimates are only made for the NACE 2-digit and 3-digit level. Gaps in industry association figures at the 4 or 5-digit level have normally not been filled due to the scarcity of statistics at this level.

Exchange rate conversion and deflators

All data are reported in ECU, and national currencies have been converted at the average exchange rate prevailing for the year in question. The exchange rates used for the conversions are stated in the 'Annex' section at the end of the 'Highlights' chapter. With the large fluctuations seen in currency markets at the end of 1992 and the beginning of 1993, the reader should consider such effects on ECU values (especially at an individual country level).

Producer price indices have been used to deflate production and value added data. It should be noted that the constant price value added data found in National Accounts publications is often calculated by deflating output and costs separately, and so may differ from the industry series given. In the cases where the corresponding NACE 3-digit index has not been available, the NACE 2-digit index has been used. For Portugal, where such indicators are not yet available, the corresponding retail price indices have been taken.

Trade data

The trade data are reported in terms of Community trade flows with the rest of the world. In most cases, these data are based on Eurostat figures. Exports valuations are generally fob (free on board, i.e. excluding freight and insurance costs) whereas import data are c.i.f. (i.e. inclusive of carriage, insurance and freight). Import statistics may generally be regarded as slightly more accurate than export statistics due to greater ease of data collection in the former case.

All trade figures are in current ECU. For comparative purposes, the ratio of exports to imports (X/M) has been calculated for each set of trade data.

Trade figures for Spain and Portugal for 1983 have been estimated from non-Eurostat sources.

Abbreviations

A	Austria
AAGR	Annual Average Growth Rate
ABS	Anti-lock Braking System
AC	Alternate Current
ACP	African, Caribbean and Pacific countries
ASEAN	Association of South East Asian Nations
ASICS	Application Specific Integrated Circuits
ATC	Air Traffic Control
B	Belgium
Benelux	Belgium, Netherlands and Luxembourg
BLEU	Belgo-Luxembourg Economic Union
CAD	Computer Aided Design
CAM	Computer Aided Manufacturing
CAP	Common Agricultural Policy
CD	Compact Disc
CD-I	Compact Disc-Interactive
CD-ROM	Compact Disc - Read Only Memory
CEC	Commission of the European Communities
CEN	Comité Européen des Normes (European Committee for Standardisation)
CENELEC	Comité Européen des Normes Electroniques (European Electronics Standard Committee)
CFC	Chlorofluorocarbons
CGT	Compensated Gross Tonnes
CGRT	Compensated Gross Registered Tonnes
CH	Switzerland
CHP	Combined Heat and Power
cif	cost, insurance and freight
CIM	Computer Integrated Manufacturing
CIS	Commonwealth of Independent States (former USSR)
CMEA	Council of Mutual Economic Assistance
CNC	Computerised Numeric Control
COCOM	Coordinating Committee for Multilateral Security Controls
CRS	Computer Reservation System
D	Federal Republic of Germany
DAT	Digital Audio Tape
DC	Direct Current
DCC	Digital Compact Cassette
DG	Directorate-General
DIY	Do-It-Yourself
DK	Denmark
DPP	Direct Product Profitability
DRAM	Dynamic Random-Access Memory
E	Spain
EAF	Electric Arc Furnace
EC	European Community (now European Union)
ECSC	European Coal and Steel Community
ECU	European Currency Unit
EDI	Electronic Data Interchange
EDM	Electrical Discharge Manufacturing
EDP	Electronic Data Processing
EEA	European Economic Area
EFT	Electronic Funds Transfer
EFTA	European Free Trade Association
EFT-POS	Electronic Funds Transfer at the Point Of Sale
EOTA	European Organisation for Technical Approvals
EPA	Environmental Protection Agency
EPOS	Electronic Point Of Sale System
EU	European Union
Eurostat	Statistical Office of the European Communities
F	France
FAO	Food and Agriculture Organisation
FDI	Foreign Direct Investment
FGD	Flue Gas Desulphurisation
FMS	Flexible Manufacturing System
fob	free on board
FTE	Full-Time Equivalent
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GNP	Gross National Product
GR	Greece
GSM	Groupe Spécial Mobile
GSP	Generalised System of Preferences
GVW	Gross Vehicle Weight
GW	Gigawatt
HCFC	Hydrochlorofluorocarbons
HDPE	High-Density Polyethylene
HDTV	High Definition Television
HFC	Hydrofluorocarbons
I	Italy
IAEA	International Atomic Energy Agency
IC	Integrated Circuits
ICA	International Coffee Agreement

ICO	International Coffee Organisation
IDN	Integrated Digital Network
IEA	International Energy Agency
IGCC	Integrated Gasification Combined Cycle
IMF	International Monetary Fund
IRL	Ireland
ISDN	Integrated System Digital Network
ISO	International Standards Organisation
IT	Information Technology
JPN	Japan
kW	Kilowatt
L	Luxembourg
LAN	Local Area Network
LCD	Liquid Crystal Display
LDC's	Less Developed Countries
LDPE	Low-Density Polyethylene
LME	London Metals Exchange
LNG	Liquefied Natural Gas
LP	Long Playing
LPG	Liquefied Petroleum Gas
LWR	Light Water Reactor
M&A	Mergers and Acquisitions
MD	Mini Disk
mdf	medium-density fibreboard
MFA	Multi-Fibre Arrangement
MNCs	Multinational Corporations
MSW	Municipal Solid Waste
MW	Megawatt
N	Norway
N/A	Not Available
NACE	General industrial classification of economic activities within the European Community
NAFTA	North American Free Trade Agreement
NATO	North Atlantic Treaty Organisation
NBP	Net Banking Products
NCM	Numerically-Controlled Machinery
NHS	National Health System
NICs	Newly Industrialised Countries
NL	The Netherlands
NVOCC's	Non-Vessel-Owning Common Carriers
OE	Original Equipment
OECD	Organisation for Economic Cooperation and Development
OEM	Original Equipment Manufacturer
OJ	Official Journal of the European Communities
OPCVM	cooperative savings banks
OPEC	Organisation of Petroleum Exporting Countries
osb	oriented strand board
OTC	over the counter
P	Portugal
PBX	Private Branch Exchange
PC	Personal Computer
PCI	Pulverised Coal Injection
PR	Public Relations
PVC	Polyvinyl Chloride
PWR	Pressurised Water Reactor
QWPDR	Quality Wines Produced in Determined Regions
RAM	Random Access Memory
R&D	Research and Development
R,D&D	Research, Development and Demonstration
S	Sweden
SCMS	Serial Copy Management System
SF	Finland
SHG	Special High Grade
SICAV	deposit certificate
SITC	Standard International Trade Classification
SMEs	Small and Medium-sized Enterprises
SWU	Separative Work Units
TEU	Twenty-foot Equivalent Unit
TGV	Train à Grande Vitesse (High Speed Train)
TJ	Terajoule
toe	tonne of oil equivalent
TPA	Third Party Access
TQM	Total Quality Management
tU	tonne of uranium
TW	Terawatt
UHT	Ultra-High Temperature
UK	United Kingdom
UN	United Nations
USA	United States of America
USD	US Dollar
USSR	Union of Socialist Soviet Republics
VAT	Value-Added Tax
VCR	Video Cassette Recorder
WHO	World Health Organisation
X/M	Exports/Imports ratio

Contributors

The following list provides the names of the trade associations and consultants that contributed to this edition of Panorama. Associations are listed in alphabetical order according to their acronym, together with an indication of the chapter of pertinence. The full address details of the trade associations can be found at the end of their respective monograph. Independent consultants are listed with their full address.

Associations

ACE Architects' Council of Europe
Chapter 24

ACE Association des Compagnies Aériennes de la Communauté Européenne
Chapter 22

ACEA Association des Constructeurs Européens d'Automobiles
Chapter 11

ACEM Association des Constructeurs Européens de Motocycles
Chapter 11

ACI EUROPE Airports Council International / European Region
Chapter 22

AEA Association of European Airlines
Chapter 22

AEC-CEMBUREAU Association Européenne du Ciment
Chapter 5

AECMA Association Européenne des Constructeurs de Materiel Aérospatial
Chapter 11

AEEBC Association of European Building Surveyors
Chapter 24

AESGP European Proprietary Medicines Manufacturers' Association
Chapter 6

AFACSOLE Association des Fabricants de Café Soluble des pays de la CEE
Chapter 13

AIBI Association Internationale de la Boulangerie Industrielle
Chapter 13

AIIC Association Internationale des Interprètes de Conférence
Chapter 24

AIPCEE Association des Industries du Poisson de la CEE
Chapter 13

AIS Association Internationale de la Savonnerie et de la Détergence
Chapter 6

AITC Association Internationale des Traducteurs de Conférence
Chapter 24

APAG/FEEM European Association of Fatty Acid Producing Companies/European Fragrance and Flavour Association
Chapter 6

APPE Association of Petrochemicals Producers in Europe
Chapter 6

ASSILEC Association de l'Industrie Laitière de la CEE
Chapter 13

AVEC Association des Centres d'Abbattage de Volailles et du Commerce d'importation et d'exportation de Volailles des pays de la CE
Chapter 13

BIBM Bureau International du Béton Manufacturé
Chapter 5

BLIC Bureau de Liaison des Industries du Caoutchouc de la Communauté européenne
Chapter 17

CAEF Comité des Associations Européennes de Fonderie
Chapter 7

CAFIM Confédération des Associations des Facteurs d'Instruments de Musique de la CE
Chapter 18

CAOBISCO Association des Industries de la Chocolaterie, Biscuiterie, Biscotterie et Confiserie de la CEE
Chapter 13

CAPIEL Comité de Coordination des Associations de Constructeurs d'Appareillage Industriel Electrique du MC
Chapter 9

CBMC Confédération des Brasseurs du Marché Commun
Chapter 13

CCBE Conseil des Barreaux Européens
Chapter 24

CDL Comité de Liaison de l'Industrie du Tube d'Acier de la Communauté européenne
Chapter 3

CEA Comité Européen des Assurances
Chapter 23

CEC Confédération Européenne de l'industrie de la Chaussure
Chapter 14

CECED	Conseil Européen de la Construction Electrodomestique Chapter 9
CECIMO	Comité Européen de Coopération des Industries de la Machine-Outil Chapter 8
CECIP	European Committee of Weighing Instrument Manufacturers Chapter 12
CECM	Convention Européenne de la Construction Metallique Chapter 7
CECT	Comité Européen de la Chaudronnerie et de la Tuyauterie Chapter 7
CEEC	Comité Européen des Economistes de la Construction Chapter 24
CEES	Comité Européen d'Etude du Sel Chapter 2
CEFIC	European Chemical Industry Council Chapter 6
CEFS	Comité Européen des Fabricants de Sucre Chapter 13
CEHP	Comité Européen de l'Hospitalisation Privée Chapter 26
CEI-BOIS	European Confederation of Woodworking Industries Chapter 15
CELCAA	Comité Européen de Liaison des Commerces Agro-Alimentaires Chapter 20
CEMA	European Committee of Agricultural Machinery Manufacturers Chapter 8
CEMATEX	Comité Européen des Constructeurs de Materiel Textile Chapter 8
CEO	Comité Européen de l'Outillage Chapter 7
CEPCEO	Comite d'Etude des Producteurs de Charbon d'Europe Occidentale Chapter 1
CEPE	Comité Européen des Associations de Fabricants de Peintures, d'Encres d'Imprimerie et de Couleurs d'Art Chapter 6
CEPI	Confederation of European Paper Industries Chapter 16
CEPT	Conférence Européenne des Administrations des Postes et des Télécommunications Chapter 22
CER	Community of European Railways Chapter 22
CERAME-UNIE	Bureau de Liaison des Industries Céramiques Européennes Chapter 5
CERP	Confédération Européenne des Relations Publiques Chapter 24
CESA	Committee of EC Shipbuilders' Associations Chapter 11
CET	Comité Européen de la Trefilerie Chapter 3
CET/ETC	Comité Européen du Thé Chapter 13
CIAA	Confédération des Industries Agro-Alimentaires de la CE Chapter 13
CIBJO	International Confederation of Jewelry, Silverware, Diamonds, Pearls and Stones Chapter 12 and 18
CIELFFA	Comité International d'Etude du Laminage à Froid du Feuillard d'Acier Chapter 3
CIETT	Confédération Internationale des Entreprises de Travail Temporaire Chapter 24
CIPF	Comité International du Profilage à Froid Chapter 3
CIRFS	Comité International de la Rayonne et des Fibres Synthétiques Chapter 6
CITPA	International Confederation of Paper and Board Converters in the EC Chapter 16
CLEPA	Comité de Liaison de la Construction d'Equipements et de Pièces d'Automobiles Chapter 11
CLGEE	Comité de Liaison des Geomètres-Experts Européens Chapter 24
CLITRAVI	Centre de Liaison des Industries Transformatrices de Viandes de la CE Chapter 13
CoESS	Confédération Européenne des Services de Sécurité Chapter 24
COLIBI	Comité de Liaison des Fabricants de Bicyclettes Chapter 11
COLIPA	Comité de Liaison des Associations Européenes de l'Industrie de la Parfumerie, des Produits Cosmetiques et de Toilette Chapter 6
COMITE VINS	Comité de la Communauté économique européenne des Industries et de Commerce des Vins Chapter 13
COMITEXTIL	Comité de Coordination des Industries Textiles de la CE Chapter 14
COPAMA	Confederation of Packaging Machinery Association Chapter 8

COTANCE Confédération des Associations Nationales de Tanneurs et Mégissiers de la CE
Chapter 14

COTREL Comité des Associations de Constructeurs de Transformateurs du marché commun
Chapter 9

CPDP Comité Professionnel du Pétrole
Chapter 1

CPHE Permanent Committee of European Watch and Clock Makers Secretariat
Chapter 12

CPIV Comité Permanent des Industries du Verre
Chapter 5

CPIV Comité Permanent International du Vinaigre
Chapter 13

E.S.O.M.A.R. European Society for Opinion and Marketing Research
Chapter 24

EAAA European Association of Advertising Agencies
Chapter 24

EACEM European Association of Consumer Electronics Manufacturers
Chapter 10

EAZA European Association Of Zoos and Aquaria
Chapter 21

EBA European Bright Bar Association
Chapter 3

EBEMA European Bakery Equipment Manufacturers Association
Chapter 8

ECATRA European Car and Truck Rental Association
Chapter 24

ECLA European Clothing Association
Chapter 14

ECPA European Crop Protection Association
Chapter 6

ECSA European Community Shipowners' Association
Chapter 22

ECSA European Computing Services Association
Chapter 25

ECTAA Group of National Travel Agents Associations within the EC
Chapter 21

ECTEL The European Telecommunications and Professional Electronics Industry
Chapter 10

ECWITA European Community Wholesalers and International Traders Association
Chapter 20

EDMA European Direct Marketing Association
Chapter 24

EECA European Electronic Component Manufacturers Association
Chapter 10

EEO The European Express Organisation
Chapter 22

EFCA European Federation of Engineering Consultancy Associations
Chapter 24

EFFA European Fragrance and Flavour Association
Chapter 6

EFMA European Fertilisers Manufacturers Association
Chapter 6

EFPIA European Federation of Pharmaceuticals Industries' Association
Chapter 6

EGGA European General Galvanizers Association
Chapter 7

EIFI European Industrial Fasteners Institute
Chapter 7

EIGA European Industrial Gases Association
Chapter 6

EIIA European Information Industry Association
Chapter 25

EISA European Independent Steelworks Association
Chapter 3

ELC European Lighting Council
Chapter 9

ELCA European Landscape Contractors Association
Chapter 24

ENPA European Newspaper Publishers' Association
Chapter 16

ERA European Regional Airlines Association
Chapter 22

ERMCO European Ready Mixed Concrete Organization
Chapter 5

ESTA Association Européenne du Transport et Convoyage de Valeurs
Chapter 24

ETOA European Tour Operators Association
Chapter 21

EUCA Fédération Européenne des Associations de Torrefacteurs de Café
Chapter 13

EUCHEMAP European Committee of Chemical Plant Manufacturers
Chapter 8

EUMABOIS Comité Européen des Constructeurs de Machines à Bois
Chapter 8

EuPC European Plastics Converters
Chapter 17

EURO-ROC European International Federation of Natural Stone Industries
Chapter 2

EUROALLIAGES Comité de Liaison des Industries de Ferro-alliages
Chapter 4

EUROBAT Association of European Accumulator Manufacturers
Chapter 9

EUROBIT European Association of Manufacturers of Business Machines and Information Technology
Chapter 10

EUROCOMMERCE The Retail, Wholesale and International Trade Representation to the EC
Chapter 20

EUROFER Association Européenne de la Sidérurgie
Chapter 3

EUROFINAS Fédération Européenne des Associations des Instituts de Crédit
Chapter 23

EUROFORGE Comité de Liaison des Industries Européennes de l'Estampage et de la Forge
Chapter 7

EUROGAS European Union of the Natural Gas Industry
Chapter 1

EUROGLACES Association of the Ice Cream Industries of the EC
Chapter 13

EUROM Fédération Européenne de l'Industrie de l'Optique et de la Mécanique de Précision
Chapter 12

EUROMALT Comité de Travail des Malteries de la CE
Chapter 13

EUROMAP European Committee of Machinery Manufacturers for the Plastics and Rubber Industries
Chapter 8

EUROMETAUX Association Européenne des Métaux
Chapter 4

EUROMINES International Association of European Mining Industries
Chapter 2

EUROPACABLE European Confederation of Associations of Insulated Cables and Wires
Chapter 9

EUROPARKS European Federation of Leisure Parks
Chapter 21

EUROPIA European Petroleum Industry Association
Chapter 1

EUROPILE Association of European Dry Battery Manufacturers
Chapter 9

EUROPLANT European Committee of Plantmakers
Chapter 19

EUROPUMP European Committee of Pump Manufacturers
Chapter 8

EUROTRANS European Committee of Associations of Manufacturers of Gears and Transmission Parts
Chapter 8

EUSIDIC The European Association of Information Services
Chapter 25

EWA European Welding Association
Chapter 9

FAFPAS Fédération des Associations des Fabricants de Produits Alimentaires
Chapter 13

FAIBP Fédération des Associations de l'Industrie des Bouillons et Potages de la CE
Chapter 13

FBE Fédération Bancaire de la Communauté europeenne
Chapter 23

FEACO Fédération Européenne des Associations de Conseils en Organisation
Chapter 24

FEBMA Federation of European Bearing Manufacturers Association
Chapter 8

FEDIOL Fédération de l'Industrie de l'Huilerie de la CE
Chapter 13

FEDOLIVE Fédération de l'Industrie de l'Huile d'Olive de la CE
Chapter 13

FEE Fédération des Experts Comptables Européens
Chapter 24

FEF Fédération Européenne de la Franchise
Chapter 24

FEFAC Fédération Européenne des Fabricants d'Aliments Composés pour Animaux
Chapter 13

FEJ Fédération Européenne du Jouet
Chapter 18

FEM European Federation of Handling Industries
Chapter 8

FEMB Fédération Européenne du Mobilier de Bureau
Chapter 18

FENI Fédération Européenne du Nettoyage Industriel
Chapter 24

FESI Federation of the European Sporting Goods Industry
Chapter 18

FHCEE Fédération Hypothécaire auprès de la CEE
Chapter 23

FIABCI Fédération Internationale des Professions Immobilières
Chapter 23

FIEC Fédération de l'Industrie Européenne de la Construction
Chapter 19

FIFE Fédération Internationale des Associations de Fabricants de Produits d'Entretien
Chapter 6

FIT Fédération Internationale des Traducteurs
Chapter 24

FORATOM Forum Atomique Européen
Chapter 1

GAM Groupement des Associations Meunières des Pays de la CE
Chapter 13

GBCEE	Groupement des Banques Coopératives de la CEE Chapter 23
GCCEE	Groupement des Caisses d'Epargne de la CEE Chapter 23
GPCE	Groupement Pharmaceutique de la CE Chapter 26
HOTREC	Confédération des Associations Nationales de l'Hôtellerie et de la Restauration de la CE Chapter 21
IFPI	International Federation of Phonographic Industries Chapter 27
IFTO	International Federation of Tour Operators Chapter 21
IMACE	Association des Industries Margarinières des Pays de la CE Chapter 13
INTERGRAF	International Confederation for Printing and Allied Industries Chapter 16
IRU	International Road Transport Union Chapter 22
LEASEUROPE	European Federation of Leasing Company Associations Chapter 24
OEITFL	Organisation Européenne des Industries Transformatrices de Fruits et Légumes Chapter 13
ORGALIME	Organisme de Liaison des Industries Mécaniques, Electriques, Eléctroniques et Transformatrices des Métaux européennes Chapter 7, 8 and 9
POSTEUROP	Association of European Public Postal Operators Chapter 22
SEFEL	Secretariat Européen des Fabricants d'Emballages Métalliques Lègers Chapter 7
TBE	Fédération Européenne des Fabricants de Tuiles et de Briques Chapter 5
TME	Toy Manufacturers of Europe Chapter 18
UEA	Union Européenne de l'Ameublement Chapter 18
UEAES	Union Européenne des Alcools, Eaux-de-vie et Spiritueux Chapter 13
UEEA	Union Européenne des Exploitants d'Abattoirs Chapter 13
UEPG	Union Européenne des Producteurs de Granulats Chapter 2
UIHJ	Union Internationale des Hussiers de Justice et Officiers Judiciares Chapter 24
UITP	Union Internationale des Transports Publics Chapter 22
UNEBIF	Union Européenne des Fabricants de Bijouterie Fantaisie Chapter 18
UNESDA	Union des Associations des Boissons Rafraichissantes des Pays Membres de la CE Chapter 13
UNIFE	Union des Industries Ferroviaires Européennes Chapter 11
UNILC	International Union of the Notary Profession Chapter 24

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Highlights

INTRODUCTION

This edition of the Panorama of EU Industry has been prepared during the second half of 1993, in the midst of the most severe recession that hit European economies since the oil crisis of the 1970s. Output suffered its biggest decline for nearly 20 years, and profits fell almost everywhere in Europe, while unemployment continued to increase, reaching 10.6% of the labour force in the EU-12, compared to 8.8% in 1991. Ireland and Spain presently report the worst employment situations, with their 1993 unemployment rates at 18.4% and 21.2% respectively. In 1994 it is expected that a timid recovery will eventually take place. However, the effects of the currency turmoil of 1993 combined with competitiveness problems and political uncertainty in some Member States still cast a shadow over the future of the EU economy.

Some important pending issues have been resolved during 1993:

- At political level, the ratification of the Maastricht Treaty by all Member States has been successfully completed, albeit not always without difficulty. The creation of the European Union establishes the political framework for Europe.
- At trade level, the last minute positive conclusion of the GATT Uruguay Round has set the basis for an increase in global economic welfare. The ratification of the NAFTA Treaty between the USA, Canada and Mexico is to be seen in the same context.
- At the exchange rate level, the widening of the ERM bands has temporarily given relief to European central banks and governments in their fight with speculators. The creation of the European Monetary Institute is to be interpreted as a signal of the political will to continue on the road to European Monetary Union.

The positive conclusion of the Uruguay Round has been achieved thanks to a last minute decision to leave out some sensitive areas upon which no agreement could be found, namely audio-visual services, sea transport, financial services and aerospace. These issues will inevitably be the subject of the next round of negotiations. The last bargaining marathon has also spurred a debate on the necessity to reform the GATT to make it more effective.

On the monetary front, the troubles on currency markets have been smoothed down, but not solved, by the widening of the ERM bands. As this book went to press the pound sterling and the Italian lira had not yet re-entered the system, such that the road to EMU still looks very long and full of obstacles. The role which can be played by the European Monetary Institute is, at present, somewhat limited.

It is in this highly uncertain environment that the fifth edition of the Panorama of EU industry tries to give its readers an overall picture of the present situation of European industry. The publication provides an overview of the main factors affecting the activity of about 200 manufacturing and service sectors. Several "horizontal" issues (i.e. which are relevant for a number of different sectors) are discussed in the first part of the book: these cover a wide spectrum of subjects and range from an analysis of recent patterns in strategic alliances and of the investment strategies of EU firms in non-European countries, to a discussion of the economic importance of total quality management and a review of the eco-industries in the EU.

THE ECONOMY IN 1994 AND BEYOND

1994 will be a year of transition, as the European economies gradually move from recession to recovery. In addition to economic uncertainty, this year will also see elections in Germany and Italy, both driving forces of the European Union. To complete the global picture, recession is also looming in Japan, while the USA are entering their third consecutive year of (slow) growth. In 1994, the Commission services expect GDP growth of 1.3% in the European Union, followed by 2.1% in 1995.

Table 1: EC macroeconomic trends

(% annual change)	1986-90 (1)	1991	1992	1993 (2)	1994 (3)	1995 (3)
GDP at constant market prices	4.1	1.4	1.1	-0.4	1.3	2.1
Employment	1.7	0.2	-1.2	-1.8	-0.5	0.2
Inflation (4)	4.1	5.4	4.6	3.8	3.5	3.2
Gross fixed capital formation in current prices	11.7	-0.3	0.0	-4.6	2.0	4.5
Gross fixed capital formation in constant prices - equipment	9.0	0.4	-3.2	-8.6	1.8	N/A
Real unit labour costs	-1.0	0.4	0.0	-0.9	-1.2	-1.1

(1) Average rate of growth over the period.
(2) February 1994 estimates.
(3) February 1994 forecasts.
(4) Deflator of consumer prices
Source: Commission Services

Table 2: Fast growth/high export intensive sectors, 1992

(%)	Production growth (1986-92)	Export intensity	Import penetration
Pharmaceuticals	7.3	15.4	8.9
Medical & surgical equipment	6.2	31.5	33.7
Telecom equipment	5.4	15.7	14.4
Computer & office equipment	5.1	21.6	40.3

Source: Eurostat

In **Germany**, the end of the tunnel does not look near yet, despite some encouraging signs that the worst might have been over in the last months of 1993. In 1993 the country suffered from the worst recession since the oil crisis in the 1970s: consumer demand was squeezed by rising taxes (to finance the rebuilding the eastern part of the country), combined with falling employment and lower wage increases. This in turn caused serious overcapacity problems for most industries in the manufacturing sector, which were forced to implement further restructuring. No relief could be provided by export markets, once the pride of German industry, because the high cost of labour combined with unfavourable exchange rate developments gave way to foreign competition. On the brighter side, inflation sensibly decreased because of reduced domestic demand. This allowed the Bundesbank to ease its tight monetary policy and reduce interest rates. Another timidly positive note comes from the eastern German economy, which showed the first signs of sustained growth in the past two years. Although vast problems remain (high unemployment, low productivity), there is hope that the situation is finally on its way to improvement. In 1993, German GDP fell by 2.0%, and DRI estimates that it will stagnate in 1994 (0.1%).

In **France**, the elections of March 1993 saw the collapse of the Socialist party and the return to power of a centre-right coalition guided by Mr Balladur. The new government's most immediate concern has been and continues to be the rising unemployment, which reached 12% of the active population at the end of 1993. The main reason behind the decline in employment lies in the decreasing demand, a phenomenon which has been accelerated by recession. In August 1993, the government launched a five-year unemployment plan which aims at reducing labour costs and introducing more flexibility into the labour market. Apart from the fight against unemployment, the government has launched a far-reaching privatisation programme which should help to alleviate the budget deficit. The first privatisations have been quite successful (Banque Nationale de Paris, Rhône-Poulenc). The privatisation of Elf Aquitaine started in early 1994, and more such moves expected to take place, particularly in the financial services sector. In 1994, the French economy is expected to grow by a sluggish 0.7%, just offsetting the 1993 fall, while inflation should decrease further mainly because of reduced demand.

In **Italy**, 1993 has been a revolutionary year indeed: the mounting corruption scandals have wiped out the old political class which ruled the country since the end of World War II, and have thrown Italy into a chaotic political environment. A general election is now to be held in March (the first one with a past-the-post system). On the economic level, the country has taken good advantage of the devaluation of the Lira after it left the ERM in September 1992: thanks to a low inflation rate generated by reduced domestic demand, Italian manufacturers have been able to reap the full benefits of the improved competitiveness of their products abroad (particularly outside the EU). Getting the inflation under control has allowed the Central Bank to reduce its interest rate from 15% to about 8%, with beneficial effects on the public debt. The government has also embarked on a long awaited privatisation programme which aims to reduce the heavy presence of the state in the Italian industry: the privatisation plan is well underway and has already put onto the market several firms (particularly in the credit and food and drink sectors) which encountered the favour of domestic and foreign investors. DRI expects real GDP in Italy to grow by 1.0% in 1994, following a 0.4% contraction in 1993.

The **United Kingdom** is the only large European country to have shown positive growth during 1993 (1.9%). The main reason behind this good performance is that the UK went down into recession before the rest of Europe, and therefore it could recover first. The recession which affected most European markets reduced the gains of the expected export-led recovery following the devaluation of the pound sterling, but sustained domestic demand compensated for this drawback. At the top of government's agenda is the problem of reducing the public deficit, which has reached disturbing levels: the way which seems to be preferred to tackle the problem is a mix of tax increases (particularly VAT) and spending cuts (mainly in defence and social benefits). Additionally, the drive towards privatisation / deregulation will continue, and will include the railways and the health care system. In 1994, we expect the recovery to consolidate, with GDP growing by 2.5%.

Contrary to Europe, the recovery in the **USA** looks quite stable since 1992. At the beginning of 1994 employment was still growing, inflation was at its lowest point since 20 years and interest rates low enough to stimulate investment and

Table 3: Fast growth/low export intensity sectors, 1992

(%)	Production growth (1986-92)	Export intensity	Import penetration
Plastics processing	7.1	9.0	7.1
Secondary transformation of metal	5.7	4.8	4.5
Rubber & plastics	5.3	10.0	8.1
Soft drinks, mineral water	5.0	2.2	0.4

Source: Eurostat

Table 4: Medium growth/high export intensity sectors

(%)	Production growth (1986-92)	Export intensity	Import penetration
Electric lighting	4.6	17.5	12.7
Electrical engineering	4.0	17.7	19.4
Domestic electrical appliances	3.8	16.0	11.3
Chemicals & man-made fibres	3.5	16.9	13.0
Consumer electronics	3.2	22.4	40.1

Source: Eurostat

spending. The present situation is a direct consequence of the general business restructuring process which took place starting from the beginning of the 1990s, which greatly enhanced the competitiveness of US firms in both the domestic and foreign market. The ratification of the NAFTA Treaty is expected to have only a marginal impact on the short term future of the US economy. The major concern for the country in 1994 is thus the effectiveness of the reform of the health care system. In 1994, real GDP in the USA is expected to grow by 3.0%.

On the other hand, **Japan** is going through a painful recession. The strong yen hampered the once flourishing export sector, so that any buoyancy in the economy could only come from domestic demand. However, beside the relatively small size of the domestic market, the unprecedented threat of increasing unemployment has kept consumer spending down. Additionally, low productivity in some markets closed to foreign and even domestic competition (in particular in the food and drink segment) is taking its toll. As a result, Japanese firms, which traditionally operate at comparatively low profit margins, have seen profits coming down even further and have started a general re-thinking of their strategies. Life-long employment is being questioned, as well as market penetration based on volumes only. Moreover, as the drive towards relocation of production facilities in neighbouring countries is well underway, this further reduces potential employment growth within Japan. In response, the Japanese government released an emergency package in April 1993 which was aimed at stimulating the recovery. After falling by 0.6% in 1993, Japanese GDP is forecast to stage a mild recovery in 1994, growing by 1.2%.

In 1993, and surely in the next future as well, it is **East Asia**, and in particular China, which attracted most of the attention from investors. The introduction of market economy measures (in China) and good government management of the economy (in South Korea, Malaysia) have paved the way for buoyant growth in the area: some estimates indicate a steady 6.5% annual growth rate of GDP for the developing countries of the region. At present, however, as reported in another chapter in the first part of this Panorama, EU companies are far behind the Japanese companies in terms of foreign direct investment in East Asia. They are thus failing to take full advantage of the possibility to build a strategic competitive position in this increasingly important region of the world.

The situation in **Eastern Europe** is characterised by political and economic mess in Russia and by the difficulties experienced by the ancient Soviet Union's satellites of transforming into a market economy. The EU has concluded association agreements with Poland, the Czech and Slovak Republics, Hungary, Romania and Bulgaria, as a preliminary step towards

Table 5: Medium growth/low export intensity sectors

(%)	Production growth (1986-92)	Export intensity	Import penetration
Fruits & vegetables processing	4.9	8.4	17.7
Motor vehicle components	4.8	11.3	7.2
Semi-finished wood products	4.6	5.8	21.2
Cocoa & sugar confectionery	4.5	6.9	2.3
Wooden containers	4.4	2.0	1.8
Constructional steelwork	4.4	7.3	3.7
Paper, printing & publishing	4.3	6.1	11.0
Oils & fats	4.3	8.8	19.3
Sawing & first processing of wood	4.3	4.4	50.6
Bread & flour	4.3	2.8	0.8
Meat	4.2	4.7	5.1
Soaps, detergents, perfumes & toiletries	4.0	10.9	2.3
Pulp, paper & board	4.0	8.7	34.3
Forging	3.9	3.7	2.8
Motor vehicles & parts	3.8	11.5	8.8
Compound feed	3.7	3.6	2.5
Processing & preserving of fish	3.7	8.2	27.3
Metal products	3.6	7.7	5.3
Paper & board processing	3.5	7.5	6.5
Glass	3.3	11.2	8.2
Wooden furniture	3.3	9.1	7.2
Food, drink, tobacco	3.0	6.2	4.8

Source: Eurostat

Table 6: Slow growth/high export intensity sectors

(%)	Production growth (1986-92)	Export intensity	Import penetration
Basic industrial chemicals	2.7	18.7	17.7
Optical & photographic equipment	2.6	50.3	60.4
Footwear	2.6	22.3	23.5
Instrument engineering	2.5	34.7	41.7
Shipbuilding	2.0	25.8	14.4
Ceramic goods	1.6	20.4	9.1
Aersopace equipment	1.6	39.5	35.0
Toys & sports goods	1.2	27.8	60.1
Railway rolling stock	1.2	29.3	8.7
Mechanical engineering	0.9	31.5	17.7
Measuring & precision instruments	0.8	20.8	16.7
Knitting	0.3	22.1	38.7
Textile machinery	-0.2	61.6	26.4
Alcohol & spirits	-0.2	26.0	3.4
Leather & leather goods	-0.2	31.8	35.2
Transmission equipment	-0.3	25.8	17.7
Musical instruments	-1.4	36.0	55.7
Machine tools	-1.6	28.1	18.8
Clocks & watches	-2.9	73.5	88.2
Agricultural machinery	-4.0	22.0	11.5
Furs & furs goods	-5.3	65.1	59.4

Source: Eurostat

full membership. The agreements arranged a timetable to shelve trade barriers for manufactured products to ease these countries' transition to market economies. At the meeting in Copenhagen in June 1993, the Council adopted a number of additional measures aimed at speeding up the trade liberalisation process in order to further assist the economic restructuring of these countries.

The fact that Western Europe is in the midst of recession is, however, not contributing favourably to the process, as Western demand for those products that are exported from the East is low. Furthermore, the fact that there are serious problems of overcapacity in the same sectors in western Europe (steel, basic chemicals, ...) makes acceptance within the EU of the need to open markets difficult.

PERFORMANCE OF EU INDUSTRY

Figure 1 ranks 76 industrial sectors of the European industry on the basis of the average annual growth of production over the 1986-92 period. A quick look at the data presented by the chart reveals that the large majority of investment goods sectors (with the notable exception of medical and surgical equipment, telecommunications equipment and computer and office equipment) enjoyed slow growth over the period considered. On the other hand, most of the intermediate goods producing sectors rank amongst the medium to strong growth sectors from 1986 to 1992, the best ranked sectors being rubber and plastics processing and the secondary transformation of metals. Consumer goods sectors are more evenly distributed in the chart, and take the first place with the fast growing segment of pharmaceuticals.

The weakness of the EU investment goods producing sectors is thus continuing, and is a main concern for public authorities which are aware of the need to maintain a strong capital goods sector to stay competitive in the world market.

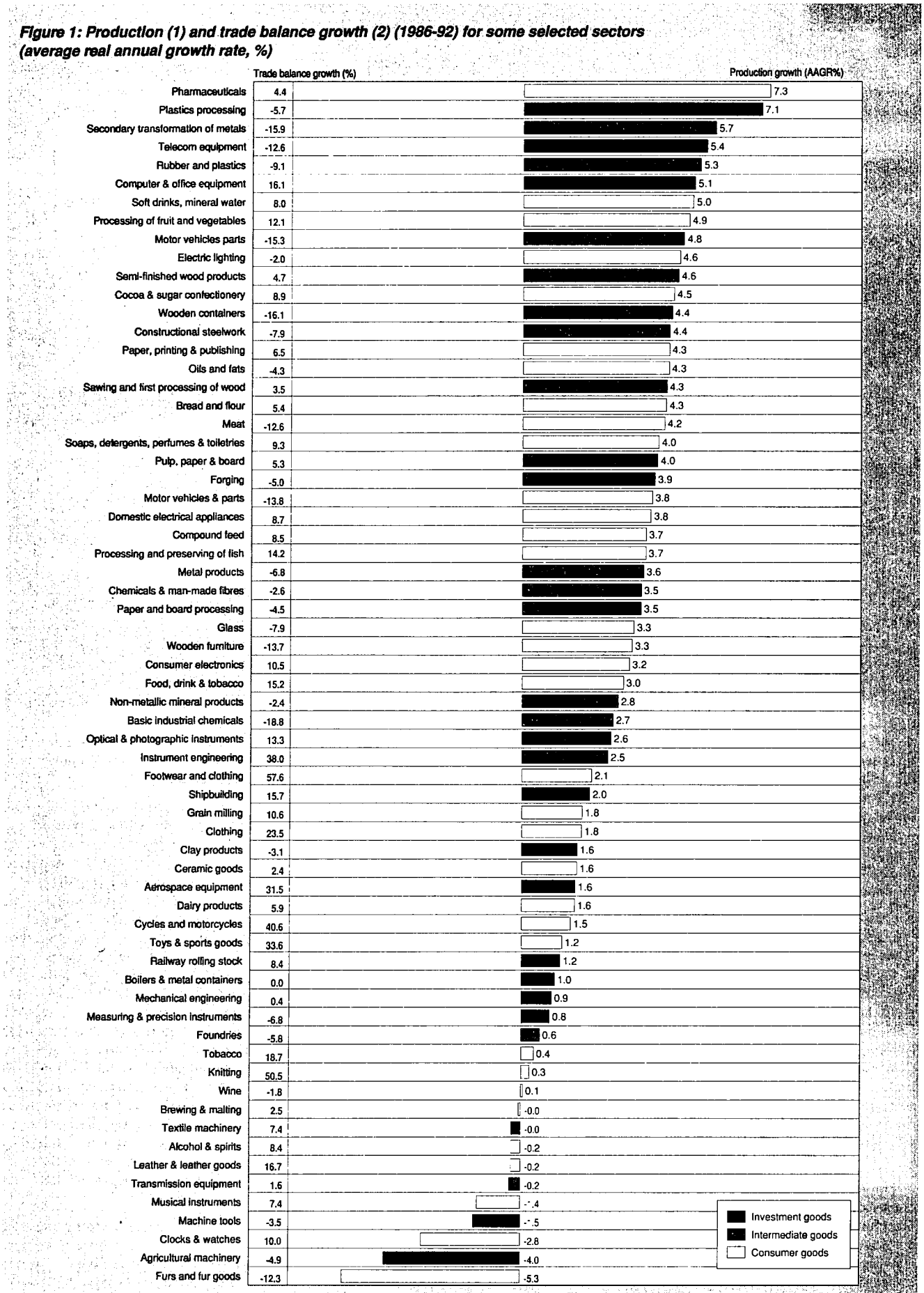
In Figure 1, most of the sectors enjoying strong growth are high technology sectors which have been characterised by increasing demand at world level within the last few years.

Table 7: Slow growth/low export intensity sectors

(%)	Production growth (1986-92)	Export intensity	Import penetration
Non-metallic mineral products	2.8	8.6	4.5
Cement, lime, plaster	1.9	2.3	2.4
Grain milling	1.8	8.0	0.4
Clothing	1.8	14.9	29.8
Clay products	1.6	3.9	0.7
Dairy products	1.6	5.9	1.2
Cycles & motorcycles	1.5	12.5	42.6
Boilers & metal containers	1.0	7.3	2.2
Foundries	0.6	5.2	3.3
Tobacco	0.4	3.7	1.3
Wine	0.1	6.9	0.6
Brewing & malting	0.0	4.5	0.4

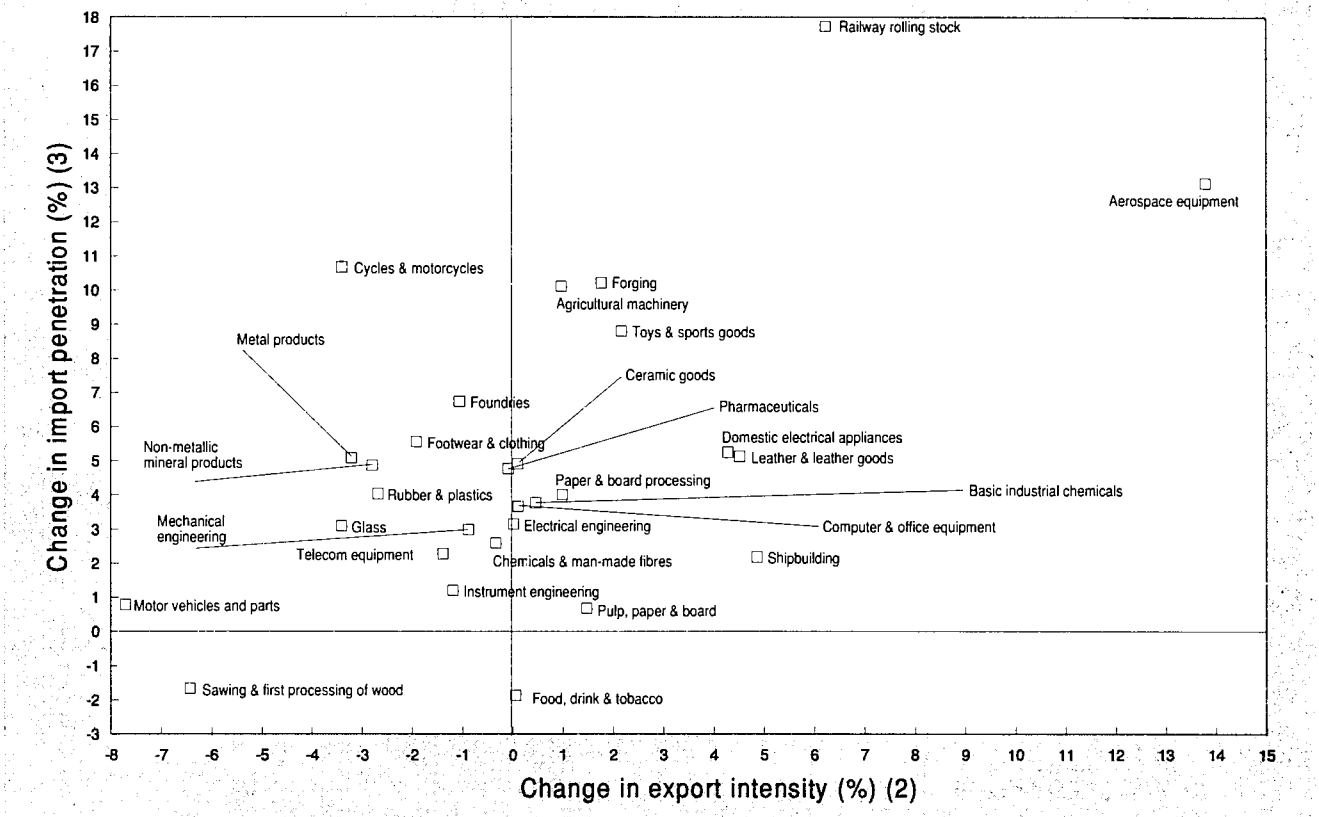
Source: Eurostat

Figure 1: Production (1) and trade balance growth (2) (1986-92) for some selected sectors (average real annual growth rate, %)



(1) Estimated; calculated using production in constant prices (1985=100).
(2) In current prices.
Source: DEBA

Figure 2: Change in export intensity / import penetration by sector 1986-92 (1) for some selected sectors



(1) Estimated.
(2) Calculated as extra-EC exports / production.
(3) Calculated as extra-EC imports / apparent consumption.
Source: DEBA

At the other end of the spectrum, many of the sectors which recorded the slowest and sometimes negative growth during the 1986-92 period are consumer goods producing sectors. The stalemate in production reflects either changes in consumer tastes (e.g. furs and furs' goods, all sorts of alcoholic drinks, tobacco products) or the take-over of large market shares by foreign competitors (e.g. musical instruments, clocks and watches, toys and sports goods) to the detriment of EU producers.

Among the eight sectors which experienced fastest growth (i.e. above 5%) during the 1986-92 period, two, pharmaceuticals and medical and surgical equipment, are strictly linked to the rapid rise in demand for health services. Another two, telecommunications equipment and computer and office equipment, have profited from buoyant demand for industrial services and the drive towards "electronification". Another three, rubber, plastics and secondary transformation of metals, owe their growth to the rapid expansion of the transport equipment sector during the period considered. Finally, growth in the soft drinks and mineral waters sector has to be interpreted in the light of the above-mentioned changes in consumer preferences.

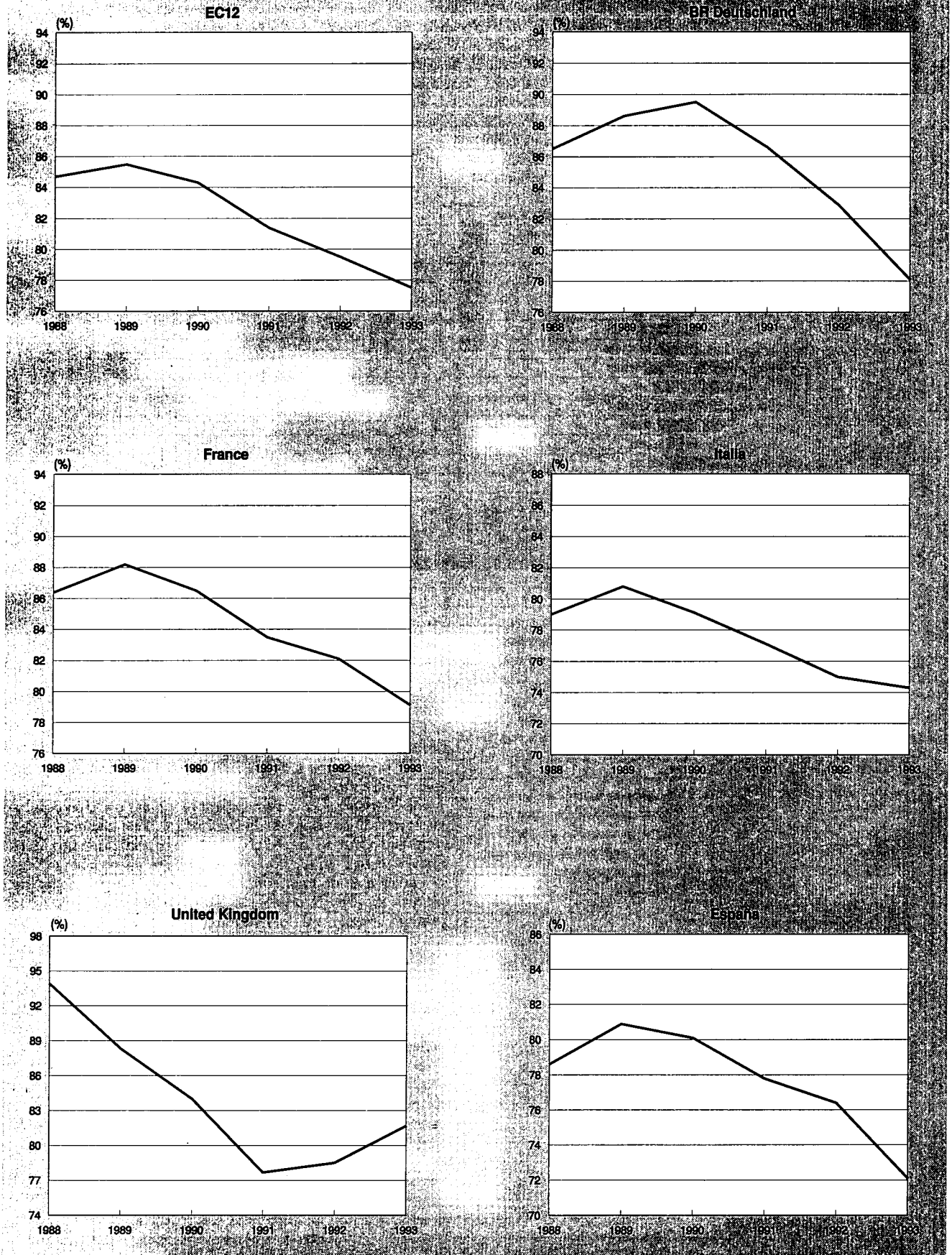
Figure 4 ranks 65 industrial sectors in the EU by the number of employees. According to the figures presented in the chart, electrical and electronic engineering, food, drink and tobacco, mechanical engineering and metal products are the largest employers, followed by the motor vehicles industry. The chart also shows for each sector the variation in employment for the period 1987-92. Although productivity growth has not been homogeneous throughout industry, most of the sectors in which the largest cuts in employment have taken place over the period are the same which experienced low or negative growth during the past five years.

Tables 2 to 7 classify the sectors under consideration into six categories, on the basis of their average real annual growth of production and their export intensity.

Table 2 lists those sectors which recorded strong output growth (in excess of 5% per year) during the 1986-92 period and which export a relevant share of their production (in excess of 15%). These sectors are therefore heavily dependant on world market conditions, particularly demand and changes in international competitive and regulatory environment. The four sectors listed in Table 2 are high-tech sectors, and three out of four are investment goods sectors. For two sectors, i.e. medical and surgical equipment and computer and office equipment, the import penetration rate is also high, indicating a strong presence of foreign producers in the EU market. On the employment side, the strong demand for these sector's products on both domestic and foreign markets has translated into new jobs in the pharmaceuticals (1.7%) and medical equipment (1.9%) sectors. The maintenance of the EC's market position in the two other sectors, telecommunications equipment and computers and EDP, which are exposed to fierce competition at world level has, however, required some rationalisation moves and increased focus on product efficiency and productivity. This has caused employment in the telecommunications equipment (-0.5%) and computer (0.0%) sectors to stagnate over the 1987-92 period.

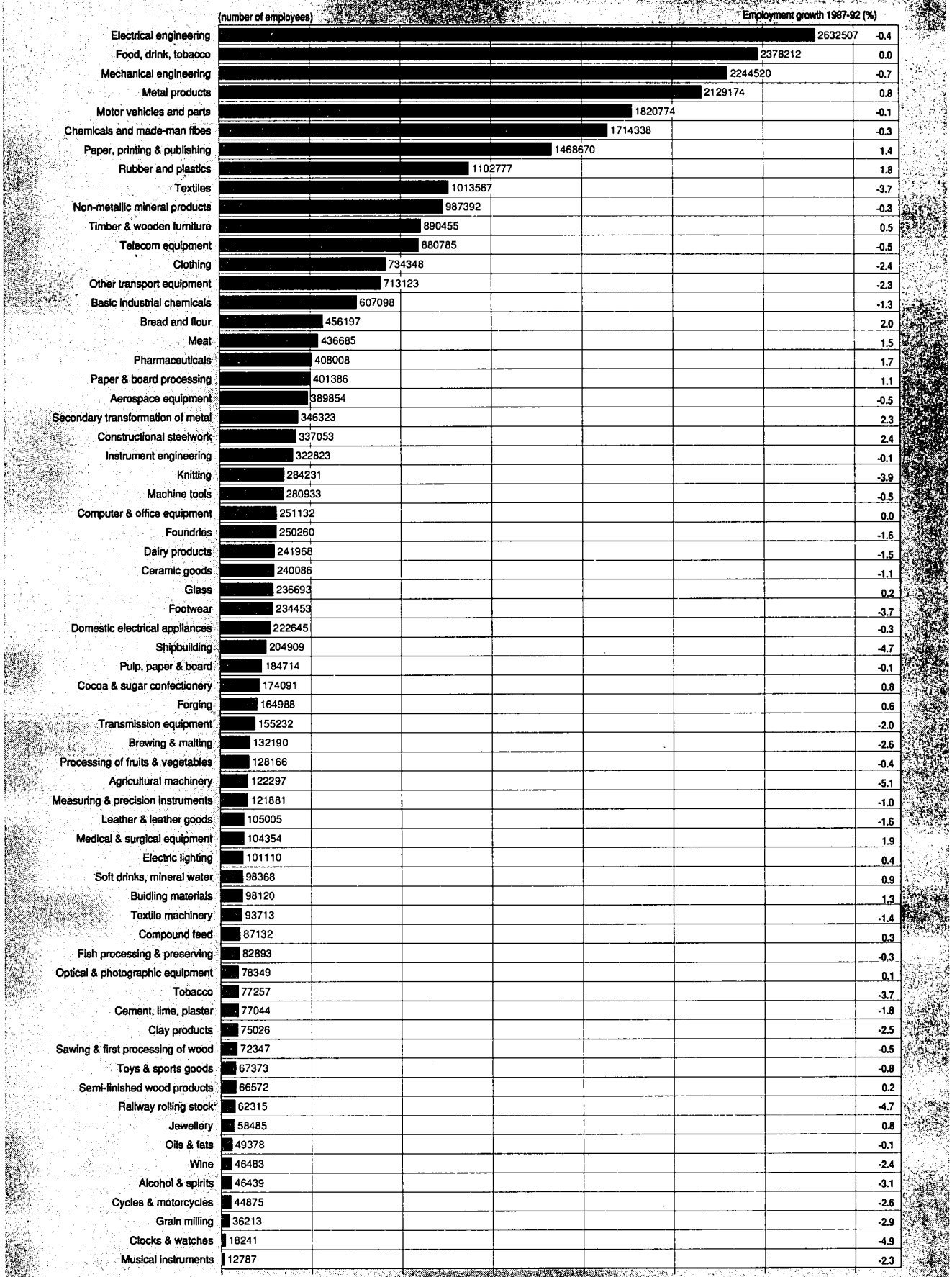
In Table 3 are those sectors which posted a strong increase in production over the 1986-92 period, but whose export intensity is low (less than 15%). The main engine of growth for these sectors is thus domestic demand, as opposed to exports. Three out of four sectors are intermediate goods sectors (linked particularly to the transport equipment sector): all four sectors are also characterised by low import penetration rates, a situation which reinforces the mainly domestic nature of

Figure 3: Capacity utilisation rates in EC manufacturing industry (1)



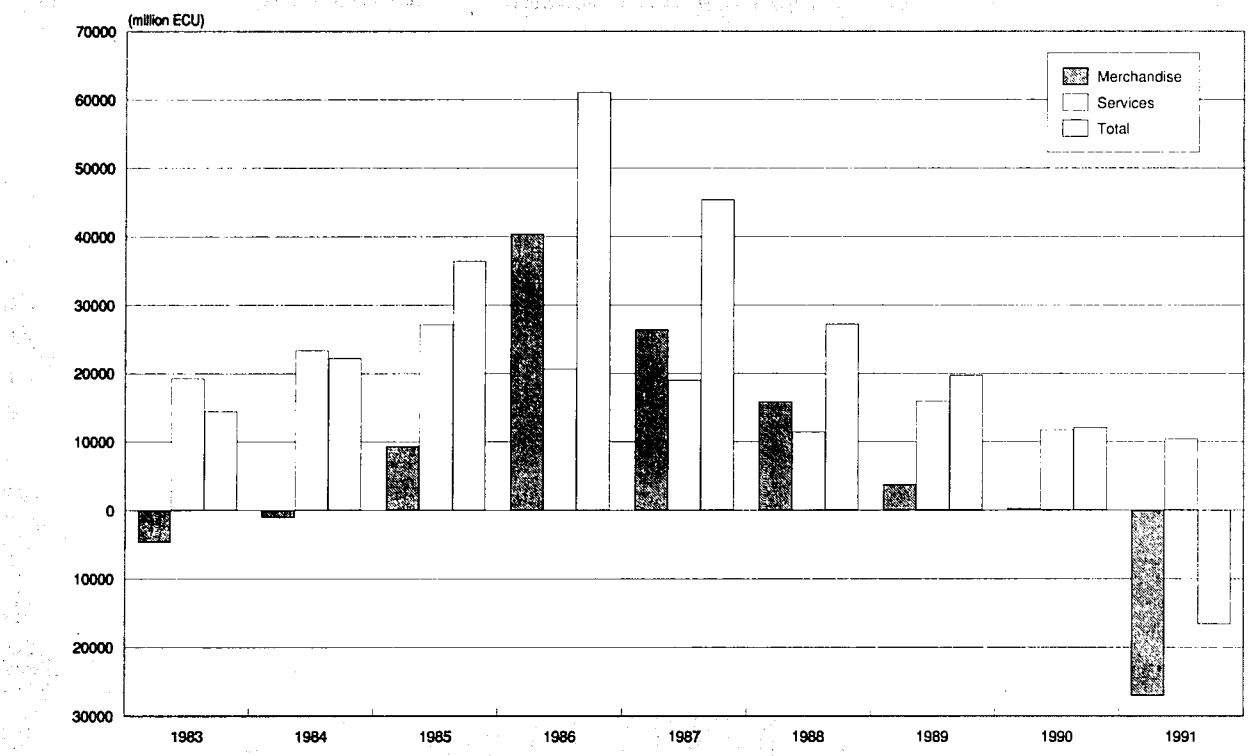
(1) Seasonally adjusted data for fourth quarter
Source: Commission Services

Figure 4: Employment in selected EC industrial sectors, 1992 (1)



(1) Estimated.
Source: DEBA

Figure 5: Total EC trade balance



Source: Eurostat

these industries. Employment in these industries has enjoyed healthy growth over the 1987-92 period, particularly in the secondary transformation of metals (2.3%) and rubber and plastics (1.8%) sectors.

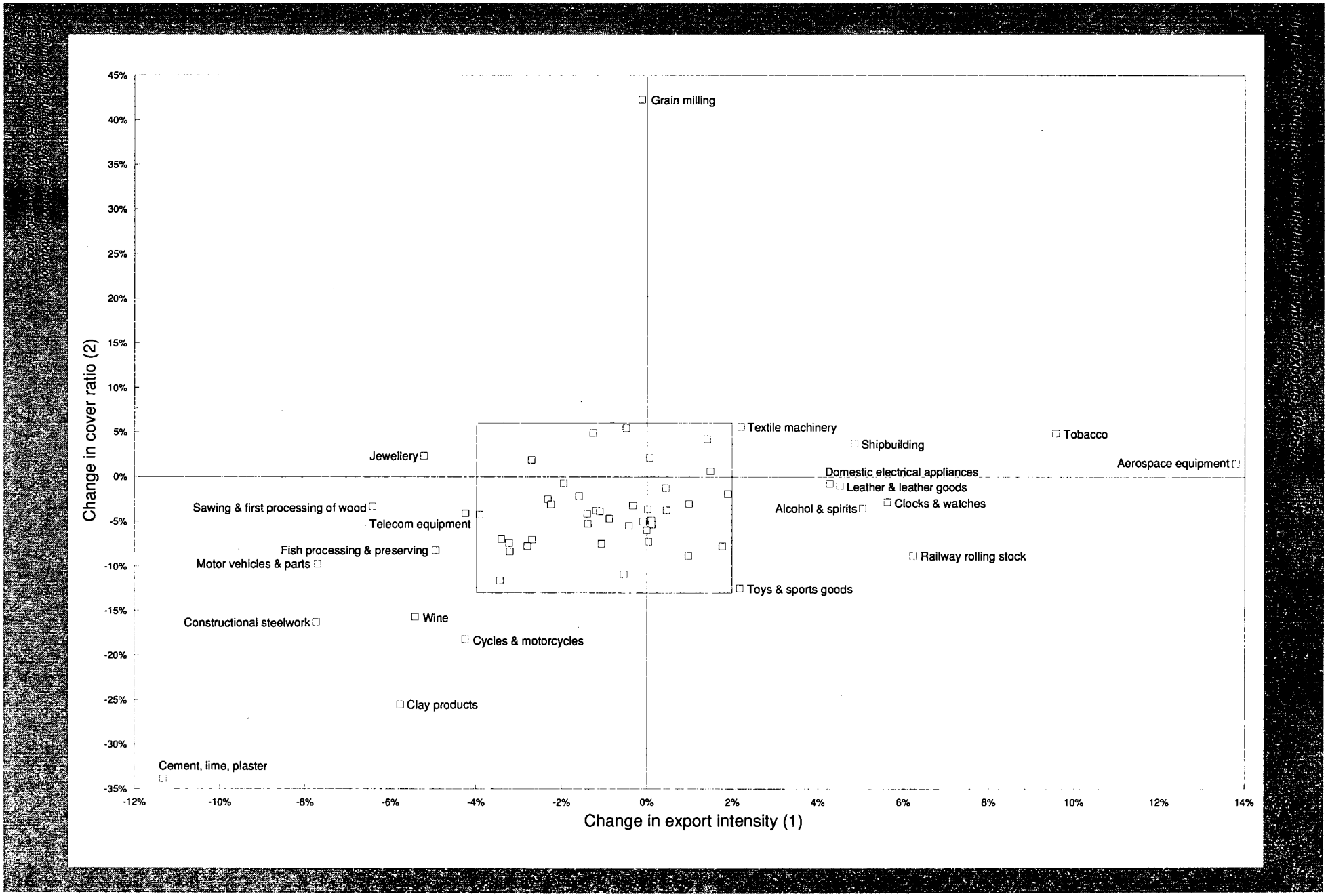
The sectors listed in Table 4 are characterised by medium growth rates of production (between 3% and 5%) over the 1986-92 period and high export intensity. The presence of the electrical engineering industry and some of its subsectors (electric lighting and domestic electrical appliances) is relevant. Additionally, we find the chemical industry which owes its good position mainly to the positive development of downstream branches such as pharmaceuticals, soaps and detergents, paints and varnishes, and man-made fibres. Import penetration rates in this group are not particularly high, except for the consumer electronics sector. Employment in this group of sectors generally stagnated or decreased slightly during the 1987-92 period, with the exception of the electric lighting segment (0.4%). This group of sectors thus achieved important gains in labour productivity over the period, which contributed to their remaining competitive on world markets.

Table 5 lists the sectors characterised by medium growth and low export intensity. Among these are food products, along with the food, drink and tobacco industry as a whole. This group of sectors also includes most of the wood processing activities, as well as constructional steelworks and other sectors whose development is strictly linked to the activity in the construction sector. Import penetration in this category is generally low, apart from some segments of the wood and food industries which import some of their raw materials from abroad. As for employment, no general trend can be detected in this large group, which includes many different industry sectors. More specifically, it is interesting to note the positive growth in employment in several food segments (e.g. bread and flour with 2.0%, meat with 1.5%, etc.), while total employment in the food, drink and tobacco industry stagnated over the 1987-92 period.

In Table 6 are those sectors whose growth has been slow (less than 3%) over the 1986-92 period, and which are highly export oriented. These sectors suffered from sluggish demand both at domestic and at world level (e.g. basic industrial chemicals, shipbuilding, railway rolling stock, agricultural machinery) and/or saw important losses in market shares by EU producers both at domestic and at world level (e.g. footwear, toys and sports goods, leather and leather goods, machine tools). This group is also characterised by high import penetration rates (e.g. clocks and watches, toys and sports goods, musical instruments, optical and photographic equipment), which underlines the lack of competitiveness of EU producers vis-à-vis their international counterparts. Unsurprisingly, the employment trends in all sectors considered in this group have been negative during the 1987-92 period with the exception of a marginal increase of 0.1% in the optical instruments segment.

Finally, Table 7 ranks those sectors which suffered from slow growth over the 1986-92 period and which are characterised by a low export intensity. For most of these sectors, the main cause of their decline is to be found in the slow domestic demand growth, since their import penetration rate is generally also quite low. The exception is provided by the sectors of clothing and cycles and motorcycles, where EU producers have list significant market shares to foreign competitors. The rest of the category is mainly formed by sectors which are ancillary to the construction sector and which have thus hardly felt the effects of the crisis, and by some food products which witness a shift in consumer taste. Once again, as in the case of the sectors listed in Table 6, slow growth has negatively affected employment in all of the sectors during the period under consideration.

In order to complete the analysis of the performance of the EU industry over the 1986-92 period, we have calculated a "vulnerability index" which measures the relative change of the EU's net trade position with the rest of the world. The index is calculated as the change in the rate of export intensity


45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
-5%
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-25%
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-12%
-10%
-8%
-6%
-4%
-2%
0%
2%
4%
6%
8%
10%
12%
14%
Change in cover ratio (2)
Change in export intensity (1)
Grain milling
Textile machinery
Shipbuilding
Tobacco
Jewellery
Aerospace equipment
Domestic electrical appliances
Leather & leather goods
Clocks & watches
Alcohol & spirits
Sawing & first processing of wood
Telecom equipment
Fish processing & preserving
Motor vehicles & parts
Railway rolling stock
Toys & sports goods
Wine
Constructional steelwork
Cycles & motorcycles
Clay products
Cement, lime, plaster

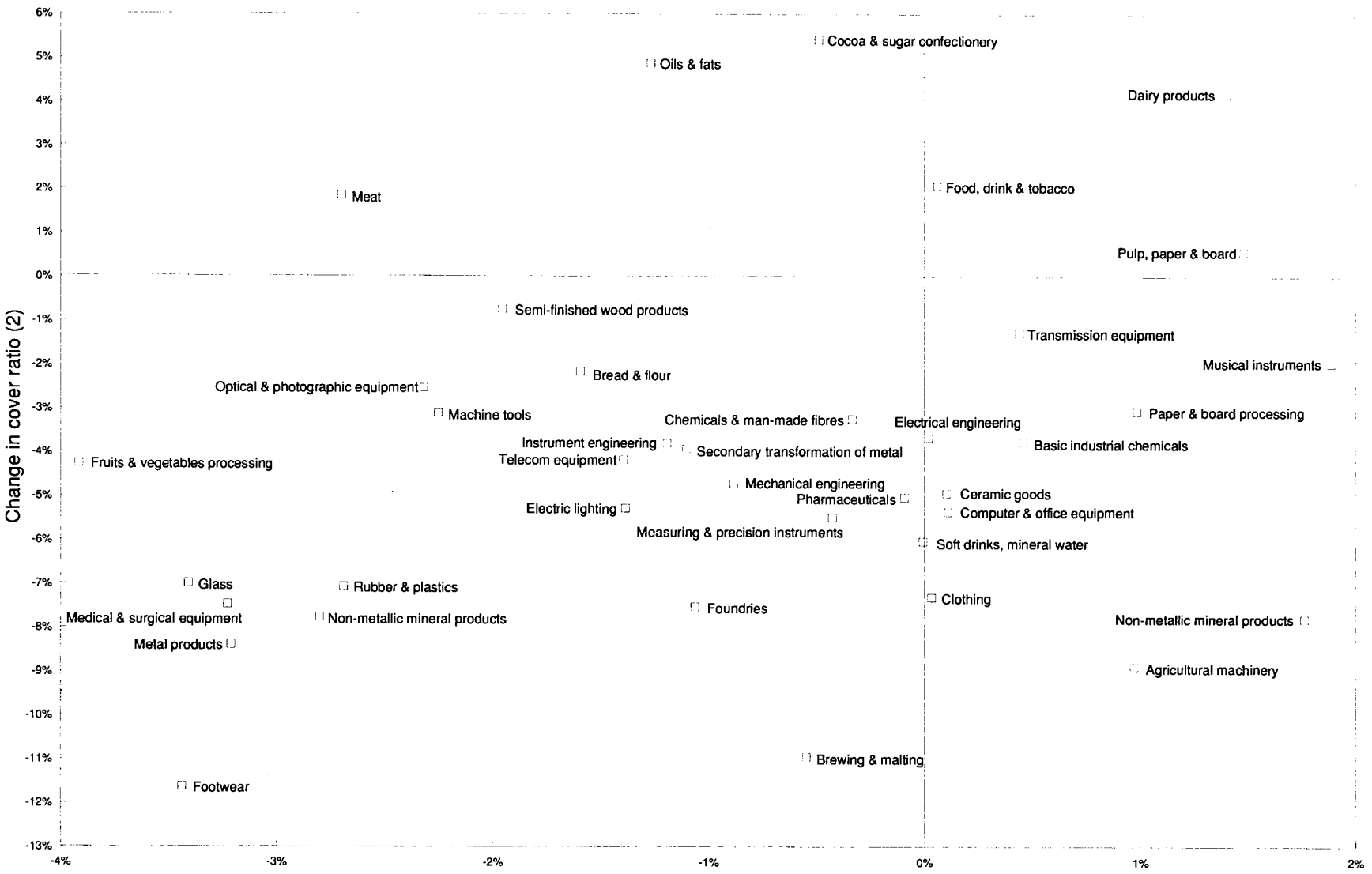
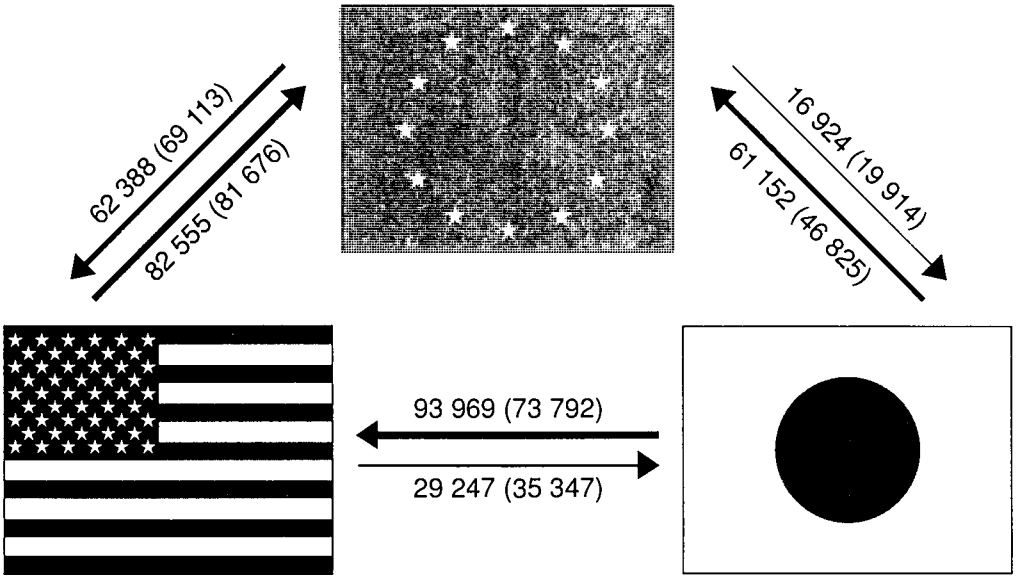

Change in cover ratio (2)
Change in export intensity (1)
6%
5%
4%
3%
2%
1%
0%
-1%
-2%
-3%
-4%
-5%
-6%
-7%
-8%
-9%
-10%
-11%
-12%
-13%
-4%
-3%
-2%
-1%
0%
1%
2%
Cocoa & sugar confectionery
Oils & fats
Dairy products
Meat
Food, drink & tobacco
Pulp, paper & board
Semi-finished wood products
Transmission equipment
Musical instruments
Bread & flour
Optical & photographic equipment
Machine tools
Chemicals & man-made fibres
Electrical engineering
Paper & board processing
Instrument engineering
Secondary transformation of metal
Basic industrial chemicals
Telecom equipment
Fruits & vegetables processing
Mechanical engineering
Pharmaceuticals
Ceramic goods
Computer & office equipment
Electric lighting
Measuring & precision instruments
Soft drinks, mineral water
Glass
Rubber & plastics
Clothing
Medical & surgical equipment
Foundries
Non-metallic mineral products
Non-metallic mineral products
Metal products
Agricultural machinery
Brewing & malting
Footwear

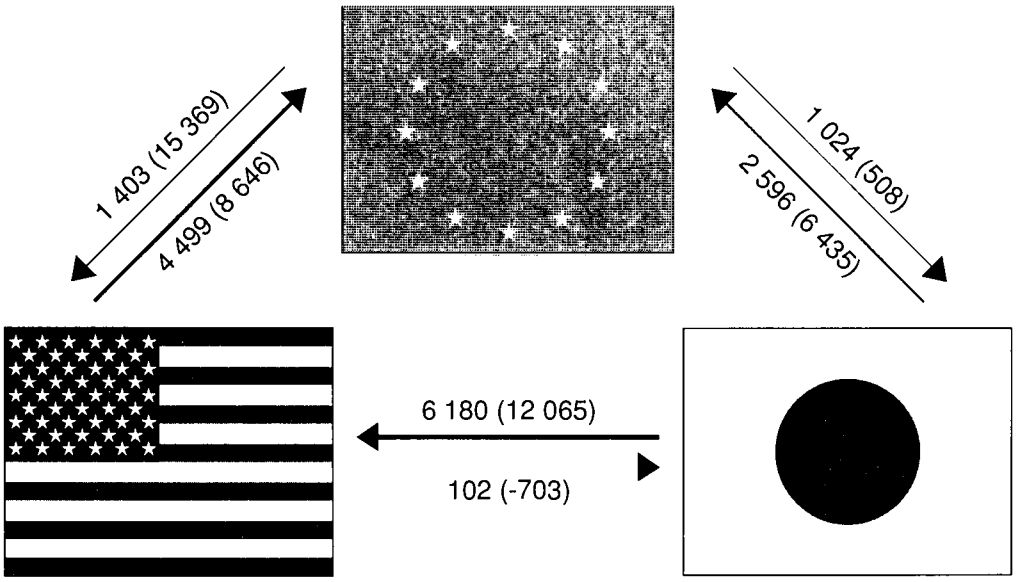
Figure 7: EC, USA and Japan, 1992 (million ECU)

Exports (1)



(1) Manufactured goods, corresponding to SITC 5+6+7+8
Note: the figure between brackets is the 1991 value.

Foreign direct investment (2)



(2) Including reinvestment profits
Note: the figure between brackets is the 1991 value.

Source: UN (Comtrade), Survey of Current Business, Bank of Japan

during the 1986-92 period minus the change in the rate of import penetration over the same period.

A high negative value of this index points to a deterioration of the net trade position of the EU vis-à-vis the rest of the world, hence a loss of competitiveness. Vice versa, a positive value of the index means an improvement of the competitive position of EU producers on world markets. Taking into account only the sectors which have a high degree of export intensity, we found that over the 1986-92 period the two sectors which had their competitive position most negatively affected were cycles and motorcycles and motor vehicles parts and components. On the other hand, the sectors which marginally improved their relative trade position over the same period were shipbuilding, textile machinery and the food, drink, tobacco industry.

Figure 2 indicates the reasons behind the change in the net trade position of several manufacturing sectors: change in export intensity, change in import penetration or a combination of both factors.

Figure 6 visualises the performance of various industrial sectors according to the combination of two factors, i.e. change in the cover ratio (exports/imports) and in export intensity, in order to define both the intensity of trade and the competitive position of the sectors considered.

One of the most notable consequences of the need to further enhance competitiveness in order to maintain and hopefully increase market share in an increasingly competitive world environment has been the recent upward trend in alliance formation. As explained in the horizontal chapter on strategic alliances, this surge in alliances can be explained by three main factors: first, companies are no longer able to lead in all areas of their activities; secondly, there is less capital available for acquisitions; and thirdly, already high concentration makes acquisitions very expensive.

Trade creation

The upper right quadrant of Figure 2 contains the majority of sectors under consideration. These sectors experienced a growth in both their export intensity and in the rate of import penetration during the 1986-92 period, indicating the increasing degree of openness of trade. Among the sectors which enjoyed the strongest trade creation effect over the 1986-92 period, we find several transport equipment industries: aerospace equipment, railway rolling stock and shipbuilding. To a large extent, the trade creation in these sectors reflects the increased specialisation of production across producers located in different regions of the world, combined with the Single Market incentived transformation of national champions into truly European producers. Another homogeneous grouping is formed by the electrical and electronic engineering, and the subsectors of computer and office equipment and domestic electrical appliances, again sectors where technology is key to competitiveness and where massive R&D costs can only be covered through specialisation on a limited number of standardised items, each of which can then be sold on a large end-market.

The difficulties experienced by the EC producers in these technology intensive market segments are illustrated by the fact that for most of the sectors in this quadrant, the rise in export intensity has been offset or exceeded by the increase in import penetration (with the notable exception of the European shipbuilding industry, which has completed its restructuring and is now specialising in a limited number of market segments in which its technological leadership is well recognised). The location of the sectors in this quadrant thus reflects a growing specialisation of the EC industry in some sections of the market, together with decreasing market share in other segments.

Increased competitiveness

The lower right hand quadrant of Figure 2 comprises those sectors which enjoyed rising export intensity along with declining import penetration. The only industry included in this quadrant is the food, drink and tobacco sector, which has been concentrating its activity on the European market, and slightly turned away from extra-EC imports in favour of increasing intra-EC trade.

Trade destruction

In the lower left quadrant of Figure 2 are those sectors which saw both export intensity and import penetration decrease during the 1986-92 period. The only sector included in this category is sawing and first processing of wood. The main reason behind this situation, given the simultaneous healthy growth rate of output, is an increase in intra-EC trade.

Loss of competitiveness

The second largest group in Figure 2 is represented by sectors which suffered from increasing competition abroad and at home, with decreasing export intensity and growing import penetration: some large sectors such as chemicals, mechanical engineering and rubber and plastics are included in this group. The reasons behind this negative result can be very different: unfavourable cost structure vis-à-vis foreign competitors (e.g. footwear and clothing, motor vehicles), or unfavourable exchange rate developments and problems of overcapacity (e.g. chemicals). It is interesting to note that two transport equipment sectors (motor vehicles and parts, cycles and motorcycles) are contained in this quadrant. However, whereas the cycles and motorcycles industry is clearly facing a loss of competitiveness both at home and abroad, the automotive industry's problem chiefly reflect a loss in market share of EU producers on foreign markets, as the rise in import penetration within the EU has been somewhat contained through trade agreements and inward investment of foreign producers within the domestic market.

THE EU AND INDUSTRY RESPONSE

At the end of 1993, the EU response to the challenges ahead became apparent, with two documents being issued which outline the future direction that economic policy should take in the EU: the Commission's White Paper on Growth, Competitiveness and Employment, and the broad guidelines which were adopted by the Council on December 22, 1993. The White Paper, which was prepared by the European Commission at the invitation of the European Council in Copenhagen in June 1993, presents an analysis of the economic situation in the Community and outlines a medium-term strategy for growth, competitiveness and employment. The broad guidelines effectively translate some of the actions suggested in the White Paper into operational policy recommendations.

Starting from the observation that the EU's competitive position with respect to Japan or the US has deteriorated on many fronts, the White Paper sets forth a series of structural recommendations which can be grouped under four major themes:

- Macroeconomic policies;
- Competition/industrial/enterprise policy;
- Employment/labour market policies;
- TransEuropean networks.

Some of the policy recommendations that are made can be followed up directly by the Commission, but most are under the direct responsibility of the Member States.

On the macroeconomic policy front, the White Paper sets a macroeconomic reference framework to be implemented in two stages - the first stage would aim at pulling the EU out of recession, while the second aims at achieving greater stability as well as long term macroeconomic and monetary con-

vergence. The medium-term economic policy objective is to foster investment-led growth through measures permitting increases in investment profitability and contributing to improving business confidence. A careful balancing of competition policy in order to encourage co-operation between firms, while ensuring that a healthy competitive climate is maintained, will also have a positive effect on investment, in particular in R&D. The White Paper underlines the importance of SMEs, and outlines a set of measures that would strengthen SMEs and facilitate the start-up of new businesses. On the employment/labour market policy front, the White Paper endorses many of the conclusions of the study on Employment and Structural Change in EC Industry and Services which is summarised elsewhere in this Panorama, by stressing the importance of on-going education and training, of enhancing both the internal and external flexibility of the workforce and of adapting national social legislation in order to contribute to a greater mobility of labour.

One of the recommendations of the White Paper which received much attention when the report was published was the development of pan-European information networks. The development of such networks is expected to enhance the competitiveness of European businesses, by reducing transaction and transport costs and facilitating the exchange of information at all levels.

Last but not least, it is important to note that the measures proposed by the European Commission will be effective only if the European industry acts simultaneously on its own. The recent industrial philosophy of the European Commission is based on the assumption that the EU's role is to provide a stable operating framework for the industry, within which companies have to do their best to remain competitive. Other initiatives by firms to complete the EU's action include developing medium and long-term strategies for markets outside the EC; and improving productivity of both capital and labour, respectively by introducing modern management and training practices, which are already widely used in the USA or Japan.

Written by: DRI Europe

Statistical annex

Table 1: GDP at constant market prices

(% annual change)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (1)
Belgique/België	0.4	2.2	0.8	1.4	2.0	5.0	3.6	3.2	1.8	1.4	-1.6	0.5
Danmark	2.5	4.4	4.3	3.6	0.3	1.2	0.6	2.0	1.2	1.2	0.0	2.6
BR Deutschland (2)	1.8	2.8	2.0	2.3	1.5	3.7	3.6	5.7	4.5	1.6	-2.2	0.0
Hellas	0.4	2.8	3.1	1.6	-0.7	4.1	3.5	-0.1	1.8	1.3	-0.2	0.9
España	1.8	1.8	2.3	3.2	5.6	5.2	4.7	3.7	2.3	0.8	-0.9	1.1
France	0.7	1.3	1.9	2.5	2.3	4.5	4.3	2.5	0.7	1.4	-0.9	1.0
Ireland	-0.2	4.4	3.1	-0.4	4.5	4.2	6.2	9.0	2.6	4.8	2.0	3.3
Italia	1.0	2.7	2.6	2.9	3.1	4.1	2.9	2.1	1.3	0.9	-0.3	1.6
Luxembourg	3.0	6.2	2.9	4.8	2.9	5.7	6.7	3.2	3.1	1.9	0.7	2.0
Nederland	1.4	3.1	2.6	2.7	1.2	2.6	4.7	4.1	2.1	1.4	-0.3	0.9
Portugal	-0.2	-1.9	2.8	4.1	5.3	3.9	5.2	4.4	2.1	1.1	-0.5	1.4
United Kingdom	3.7	2.3	3.7	4.1	4.8	4.3	2.1	0.5	-2.2	-0.5	1.9	2.5
EC	1.7	2.3	2.5	2.9	2.7	4.1	3.5	3.1	1.6	1.0	-0.6	1.1
United States	3.5	6.1	3.0	2.6	3.0	3.9	2.6	0.7	-1.3	2.6	2.7	2.6
Japan	2.7	4.3	5.0	2.6	4.1	6.2	4.7	5.2	4.4	1.4	-0.1	1.3

(1) December 1993 forecasts.
(2) Excluding former East Germany.
Source: Commission Services

Table 2: Deflator of private consumption (1)

(% annual change)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)	1994 (2)
Belgique/België	7.1	5.7	5.9	0.7	1.9	1.6	3.4	3.6	2.5	2.1	2.8	3.2
Danmark	6.8	6.4	4.3	2.9	4.6	4.0	4.3	2.6	2.5	1.9	1.4	2.6
BR Deutschland (3)	3.2	2.4	1.8	-0.3	0.7	1.4	3.0	2.8	3.8	4.0	3.6	3.0
Hellas	18.1	17.9	18.3	22.1	15.7	14.3	15.2	19.7	18.4	14.9	13.7	11.1
España	12.3	11.0	8.2	9.4	5.7	5.0	6.6	6.4	6.2	6.4	4.7	4.4
France	9.7	7.7	5.7	2.7	3.2	2.7	3.4	2.9	3.0	2.4	2.3	2.2
Ireland	9.2	7.3	5.0	4.6	2.6	2.9	3.6	1.6	2.3	2.6	2.3	3.5
Italia	14.8	12.1	9.0	6.2	5.3	5.7	7.2	5.2	6.9	5.4	4.4	4.0
Luxembourg	8.3	6.5	4.3	1.3	1.7	2.7	3.6	3.6	2.9	2.8	3.6	3.2
Nederland	2.9	2.2	2.2	0.3	0.2	0.5	1.2	2.2	3.4	3.0	2.1	2.4
Portugal	25.8	28.5	19.4	13.8	10.0	10.0	12.1	12.6	11.1	9.7	6.7	5.6
United Kingdom	4.8	5.0	5.3	4.3	4.4	5.1	5.9	5.3	7.2	4.7	3.4	3.6
EC	7.9	6.7	5.5	3.5	3.3	3.5	4.8	4.3	5.1	4.3	3.6	3.3
United States	3.9	4.1	3.3	2.3	4.2	4.2	4.8	5.0	4.2	3.3	2.9	2.9
Japan	2.0	2.5	2.2	0.4	0.2	-0.1	1.8	2.6	2.6	2.0	1.3	1.6

(1) In national currency.
(2) December 1993 forecasts.
(3) Excluding former East Germany.
Source: Commission Services

Table 3: Number of unemployed as a percentage of the civil working population

(% annual change)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (1)
Belgique/België	12.5	12.5	11.8	11.7	11.3	10.2	8.6	7.6	7.5	8.2	9.5	10.7
Danmark	9.2	8.7	7.2	5.5	5.6	6.4	7.7	8.1	8.9	9.5	10.5	10.1
BR Deutschland (2)	6.9	7.1	7.1	6.5	6.3	6.3	5.6	4.8	4.2	4.5	5.6	6.9
Hellas	7.9	8.1	7.7	7.4	7.4	7.7	7.5	7.0	7.7	7.7	7.8	8.3
España	17.8	20.6	21.6	21.0	20.4	19.3	17.1	16.1	16.3	18.0	21.2	22.4
France	8.2	9.7	10.1	10.3	10.4	9.9	9.4	9.0	9.5	10.0	10.8	11.6
Ireland	15.2	16.8	18.2	18.2	18.0	17.3	15.7	14.5	16.2	18.7	18.4	18.7
Italia	8.8	9.4	9.9	10.5	10.8	10.9	10.9	10.0	10.0	10.3	11.0	11.3
Luxembourg	3.5	3.1	2.9	2.6	2.5	2.0	1.8	1.7	1.6	1.9	2.6	2.6
Nederland	12.4	12.3	10.5	10.3	10.0	9.3	8.4	7.5	7.0	6.7	8.2	9.1
Portugal	8.1	8.7	8.8	8.3	6.9	5.7	5.0	4.6	4.1	4.7	5.2	6.2
United Kingdom	11.0	11.0	11.4	11.4	10.4	8.5	7.1	7.0	8.8	10.0	10.4	9.9
EC	9.9	10.6	10.8	10.7	10.4	9.8	8.9	8.3	8.7	9.3	10.4	11.0
United States (3)	9.6	7.5	7.2	7.0	6.2	5.5	5.3	5.5	3.7	7.4	6.7	6.1
Japan (3)	2.7	2.7	2.6	2.8	2.8	2.5	2.3	2.1	2.1	2.2	2.4	2.5

(1) December 1993 forecasts.
(2) Excluding former East Germany.
(3) OECD data.
Source: Commission Services

Table 4: Net lending or net borrowing of general government

(% of GDP at market prices)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (1)
Belgique/België	-11.9	-9.6	-9.1	-9.4	-7.5	-6.8	-6.7	-5.8	-6.6	-6.9	-7.4	-6.4
Danmark	-7.2	-4.1	-2.0	3.4	2.4	0.6	-0.5	-1.5	-2.2	-2.6	-4.4	-4.9
BR Deutschland (2)	-2.6	-1.9	-1.2	-1.3	-1.9	-2.2	0.1	-2.1	-3.5	-2.3	-3.8	-3.3
Hellas	-8.4	-10.0	-13.8	-12.0	-11.6	-13.8	-17.7	-18.6	-16.2	-13.2	-15.5	-15.4
España (3)	-4.7	-5.4	-6.9	-6.0	-3.1	-3.3	-2.8	-3.9	-5.2	-4.6	-7.2	-7.2
France	-3.2	-2.8	-2.9	-2.7	-1.9	-1.7	-1.3	-1.5	-2.1	-3.9	-5.9	-5.9
Ireland	-11.3	-9.4	-10.7	-10.6	-8.5	-4.5	-1.7	-2.2	-2.0	-2.2	-3.0	-3.2
Italia	-10.6	-11.6	-12.6	-11.6	-11.0	-10.7	-9.9	-10.9	-10.2	-9.5	-10.0	-8.9
Luxembourg	2.3	3.7	7.2	5.1	3.3	5.2	6.8	3.3	-1.0	-2.5	-2.5	-2.3
Nederland (3)	-6.4	-6.3	-3.6	-5.1	-5.9	-4.6	-4.7	-5.1	-2.5	-3.5	-4.0	-4.1
Portugal	-9.0	-12.0	-10.1	-7.2	-6.8	-5.4	-3.4	-5.5	-6.4	-5.2	-8.9	-8.2
United Kingdom	-3.3	-3.9	-2.8	-2.4	-1.4	1.0	0.9	-1.2	-2.7	-5.9	-7.6	-6.8
EC	-5.1	-5.1	-4.8	-4.5	-4.0	-3.4	-2.7	-4.0	-4.7	-5.0	-6.4	-5.9
United States	-4.1	-2.9	-3.1	-3.5	-2.5	-2.0	-1.5	-2.5	-3.5	-4.5	-3.6	-2.5
Japan	-3.6	-2.1	-0.8	-0.9	0.5	1.5	2.5	2.9	2.9	N/A	N/A	N/A

(1) December 1993 forecasts.
(2) Excluding former East Germany.
(3) Break in series 1984-85.
Source: Commission Services

Table 5: Total number of employed

(% annual change)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (1)
Belgique/België	-1.0	-0.2	0.6	0.6	0.5	1.5	1.6	1.4	0.1	-0.5	-1.6	-1.0
Danmark	0.3	1.7	2.5	2.6	0.9	-0.6	-0.6	-0.5	-0.9	-0.1	-1.0	0.7
BR Deutschland (2)	-1.4	0.2	0.7	1.4	0.7	0.8	1.5	3.0	2.6	0.9	-2.0	-1.4
Hellas	1.0	0.3	0.9	0.3	-0.1	1.6	0.3	1.2	1.3	2.1	0.0	0.1
España	-0.5	-2.4	-1.3	1.4	5.1	2.8	3.4	3.2	0.5	-1.9	-4.3	-1.3
France	-0.1	-0.9	-0.3	0.4	0.3	0.9	1.3	1.0	0.0	-0.5	-1.4	-0.6
Ireland	-1.9	-1.9	-2.2	0.2	-0.1	1.0	-0.1	3.3	-0.1	0.0	0.2	0.5
Italia	0.6	0.4	0.9	0.8	0.4	0.9	0.1	0.8	0.8	-0.9	-1.5	-0.1
Luxembourg	-0.3	0.6	1.4	2.6	2.8	3.1	3.7	4.3	4.3	1.9	1.1	0.9
Nederland	-1.9	-0.1	1.5	2.1	1.7	1.6	1.9	2.3	1.5	0.8	-0.8	-0.5
Portugal	-1.1	-1.5	0.0	-2.7	0.5	0.1	1.0	0.9	0.9	-0.6	-1.9	-1.3
United Kingdom	-1.2	2.6	1.3	0.1	2.1	3.3	3.0	0.7	-3.1	-2.8	-1.3	-0.9
EC	-0.6	0.2	0.5	0.7	1.3	1.5	1.6	1.6	0.2	-0.7	-1.7	-0.4
United States	1.0	4.9	2.4	1.7	3.5	2.8	2.4	0.8	-1.1	0.2	1.5	2.0
Japan	1.5	0.3	0.6	0.9	0.9	1.7	2.0	2.1	2.1	1.1	-0.3	-0.3

(1) December 1993 forecasts.
(2) Excluding former East Germany.
Source: Commission Services

Table 6: Gross fixed capital formation at constant prices in the construction industry

(% annual change)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (1)
EC	-0.1	-0.1	-1.9	4.0	2.9	6.7	5.4	3.6	1.2	1.1	-2.4	1.4
Belgique/België	-6.4	-6.1	-0.6	3.0	3.0	14.9	9.2	7.9	3.6	2.8	-4.5	1.1
Danmark	1.9	8.8	8.9	18.0	1.1	-5.5	-6.0	-4.6	-10.9	-1.6	1.5	3.6
BR Deutschland (2)	1.6	1.1	-5.8	3.1	0.0	3.1	4.4	4.9	4.1	5.5	-1.0	2.2
Hellas	5.3	-6.9	3.1	-0.8	-5.0	9.2	4.0	5.7	-6.5	-4.0	1.1	2.9
España	-2.0	-5.2	2.0	6.5	9.9	12.4	15.1	10.8	9.7	-4.8	-5.5	1.0
France	-3.4	-2.9	-0.4	3.6	3.2	7.9	5.4	2.4	1.2	1.0	-2.1	0.7
Ireland	-14.3	-2.0	-7.1	-4.6	-8.6	-1.9	11.6	19.7	-1.4	0.3	-1.5	3.8
Italia	1.6	-0.8	-0.5	1.9	-0.7	2.3	3.6	3.5	1.4	-1.8	-5.3	-0.5
Luxembourg	-13.3	-3.7	-2.1	5.3	8.7	12.5	13.8	7.2	9.0	6.4	0.2	-0.8
Nederland	-3.9	3.8	-0.1	4.6	2.0	9.7	2.2	0.1	-2.6	2.8	-2.8	-1.9
Portugal	-3.3	-9.2	-6.0	8.7	9.4	10.1	3.5	5.3	4.5	3.5	1.8	3.8
United Kingdom	5.0	6.1	-2.4	6.1	11.0	13.4	5.4	-0.6	-8.3	0.8	0.1	4.0

(1) December 1993 forecasts.
(2) Excluding former East Germany.
Source: Commission Services

Table 7: Gross fixed capital formation at constant prices in equipment

(% annual change)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (1)
EC	0.9	3.7	8.3	4.2	7.7	9.5	9.2	5.0	0.4	-3.2	-8.6	1.8
Belgique/België	-2.6	13.6	2.3	5.3	7.1	16.1	17.4	9.9	-2.5	-3.4	-8.0	1.2
Danmark	2.2	17.9	16.2	16.6	-8.9	-8.6	9.7	2.7	3.1	-17.9	-9.5	2.5
BR Deutschland (2)	6.2	-0.7	9.7	4.5	5.0	6.7	9.2	13.1	10.3	-3.9	-12.0	0.8
Hellas	-8.5	-4.2	7.7	-12.6	-5.2	8.4	18.1	5.7	3.3	7.0	0.5	1.5
España	-4.7	-7.3	9.1	15.7	23.2	16.6	12.9	1.4	1.4	-2.5	-13.6	-2.0
France	-3.1	-0.6	10.0	4.3	6.7	10.5	8.0	4.6	-4.7	-4.3	-9.4	0.1
Ireland	-3.4	-2.0	-7.4	1.5	0.9	0.2	23.3	1.8	-12.0	-4.4	-1.8	3.0
Italia	-3.3	9.6	1.9	2.6	11.9	11.6	5.2	4.0	0.0	-1.1	-11.1	4.1
Luxembourg	-6.9	2.7	-20.5	87.2	18.7	16.0	4.4	-6.0	11.2	-11.9	13.5	-7.1
Nederland	9.8	8.8	15.5	8.8	0.4	-2.5	7.9	3.7	4.2	-0.9	-3.8	3.1
Portugal	-11.1	-29.6	-4.5	14.2	26.8	23.2	10.0	5.8	1.0	5.6	-2.7	1.5
United Kingdom	4.8	11.3	10.7	-0.7	8.7	13.0	11.6	-3.6	-11.5	-3.5	2.1	4.9

(1) December 1993 forecasts.
(2) Excluding former East Germany.
Source: Commission Services

Table 8: Ranking of EC manufacturing industry by production (2-digit level), 1992 (1)

NACE	Manufacturing sector	Production	Employment (2)	Extra-EC exports	Extra-EC imports	Annual average growth rate (3)
4100	Food, drink & tobacco	337 807	2 376 303	20 701	17 880	3.0
2601	Chemicals and man-made fibres	295 794	1 714 338	50 077	36 855	3.5
3400	Electrical engineering	181 935	2 694 869	32 228	28 735	4.0
3500	Motor vehicles and parts	181 862	1 831 952	33 913	13 532	3.8
3200	Mechanical engineering	166 388	2 340 120	55 204	19 426	0.9
3100	Metal products	124 559	2 032 024	11 739	4 642	3.6
4700	Paper, printing & publishing	110 949	1 347 994	7 136	13 416	4.3
4800	Rubber & plastics	71 169	992 931	8 406	4 301	5.3
2400	Non-metallic mineral products	69 869	1 007 551	7 165	2 222	2.8
3600	Other means of transport	53 601	820 727	9 924	7 835	1.7
4500	Footwear & clothing	52 450	1 227 891	10 223	10 931	2.1
4600	Timber & wooden furniture	48 818	862 781	4 709	8 429	3.7
3300	Computer & office equipment	36 158	251 433	7 753	13 663	5.1
3700	Instrument engineering	17 737	325 364	6 616	7 044	2.5
4900	Other manufacturing	13 585	225 111	15 631	12 587	4.0
4400	Lether & leather goods	8 971	115 781	2 188	2 390	-0.2
4300	Textiles	N/A	1 271 138	12 440	11 676	N/A

Source: DEBA

Table 9: Exchange rates, 1980-1993 (1)

(1 ECU = ...national currency)	BFR	DKR	DM	DR	PTA	FF	£IRL	LIT	HFL	ESC	£UK	USD	YEN
1970	51.11	7.667	3.741	30.67	71.36	5.678	0.4259	638.9	3.700	29.38	0.4259	1.022	368.0
1975	45.57	7.123	3.049	39.99	71.16	5.319	0.5600	809.5	3.135	31.50	0.5600	1.241	367.7
1980	40.60	7.827	2.524	59.32	99.70	5.869	0.6760	1189.2	2.760	69.55	0.5985	1.392	315.0
1981	41.29	7.923	2.514	61.62	102.68	6.040	0.6910	1263.2	2.775	68.49	0.5531	1.116	245.4
1982	44.71	8.157	2.376	65.34	107.56	6.431	0.6896	1323.8	2.614	78.01	0.5605	0.980	243.5
1983	45.44	8.132	2.271	78.09	127.50	6.771	0.7150	1349.9	2.537	98.69	0.5870	0.890	211.4
1984	45.44	8.146	2.238	88.34	126.57	6.872	0.7259	1381.4	2.523	115.68	0.5906	0.789	187.1
1985	44.91	8.019	2.226	105.74	129.16	6.795	0.7152	1448.0	2.511	130.25	0.5890	0.763	180.6
1986	43.80	7.936	2.128	137.42	137.46	6.800	0.7335	1461.9	2.401	147.09	0.6715	0.984	165.0
1987	43.04	7.884	2.072	156.22	142.19	6.928	0.7754	1494.7	2.334	162.58	0.7047	1.154	166.6
1988	43.43	7.952	2.074	167.58	137.60	7.036	0.7757	1537.3	2.335	170.06	0.6644	1.182	151.5
1989	43.38	8.049	2.070	178.84	130.41	7.024	0.7768	1510.5	2.335	173.41	0.6733	1.102	151.9
1990	42.43	7.856	2.052	201.41	129.32	6.914	0.7678	1521.9	2.312	181.11	0.7139	1.273	183.7
1991	42.22	7.909	2.051	225.22	128.47	6.973	0.7678	1533.2	2.311	178.61	0.7010	1.239	166.5
1992	41.59	7.810	2.020	246.98	132.51	6.849	0.7607	1595.3	2.275	174.70	0.7376	1.298	164.2

(1) Annual average exchange rate.
Source: Eurostat

Table 10: Ranking of EC manufacturing sub-sectors by production, 1992 (1)

NACE	Manufacturing sector	Production (2)	Employment (3)	Annual average growth rate (4)
3510	Manufacture of motor vehicles	216 122	1 163 899	3.4
2510	Basic industrial chemicals	112 098	607 098	2.7
3440	Telecom equipment	85 225	880 785	5.4
4830	Plastics processing	84 280	771 598	7.1
4120	Meat	79 382	436 685	4.2
3280	Other machinery	79 341	770 324	1.7
3160	Tools	71 730	781 332	4.2
2570	Pharmaceuticals	68 601	408 008	7.3
4130	Dairy products	67 815	241 968	1.6
3530	Motor vehicle parts	49 521	516 491	4.8
4530	Clothing	45 973	734 348	1.8
4720	Paper & board processing	44 879	401 386	3.5
3640	Aerospace equipment	43 543	389 854	1.6
3250	Iron & steel machinery	41 792	388 144	1.8
3450	Consumer electronics	39 684	356 893	3.2
4670	Wooden furniture	39 171	466 379	3.3
4290	Tobacco	38 992	77 257	0.4
2580	Soaps, detergents, parfumes, toiletries	38 079	196 135	4.0
4230	Other food	36 621	190 045	6.2
4710	Pulp, paper & board	30 453	184 714	4.0
3140	Constructional steelwork	30 203	337 053	4.4
3240	Food and chemical machinery	30 131	277 397	3.1
4220	Compound feed	29 202	87 132	3.7
2430	Concrete, cement, plaster	27 955	242 091	4.2
4190	Bread & flour	27 437	456 197	4.3
4270	Brewing & malting	26 099	132 190	0.0
3130	Secondary transformation of metals	24 525	346 323	5.7
4210	Cocoa & sugar confectionery	24 497	174 091	4.5
3460	Domestic electrical appliances	23 722	222 645	3.8
2470	Glass	22 224	236 693	3.3
3220	Machine tools	20 969	280 933	-1.6
4360	Knitting	20 235	284 231	0.3
3150	Boilers & metal containers	19 498	216 866	1.0
3110	Foundries	19 111	250 260	0.6
4510	Footwear	18 689	234 453	2.6
4140	Fruits & vegetables processing	18 471	128 166	4.9
4280	Soft drinks, mineral waters	18 064	98 368	5.0
3610	Shipbuilding	17 991	204 909	2.0
4110	Oils & fats	17 833	49 378	4.3
4320	Cotton	16 450	221 157	-2.5
2480	Ceramic goods	16 265	240 086	1.6
2420	Cement, lime, plaster	15 103	77 044	1.9
3120	Forging	14 583	164 988	3.9
4240	Alcohol & spirits	13 756	46 439	-0.2
4630	Carpentry	12 643	159 482	3.8
3520	Bodies for motor vehicles	12 611	140 386	4.8
3210	Agricultural machinery	12 026	122 297	-4.0
4370	Textiles	11 768	110 849	7.0
3260	Transmission equipment	11 640	155 232	-0.3
4160	Grain milling	11 567	36 213	1.8
4310	Wool	11 300	123 672	-1.6
4330	Silk	10 111	83 030	0.9
4250	Wine	9 910	46 483	0.1
4400	Leather & leather goods	9 777	105 005	-0.2
3710	Measuring & precision instruments	9 483	121 881	0.8
3470	Electric lighting	9 075	101 110	4.6
4150	Fish	8 836	82 893	3.7
3230	Textile machinery	8 483	93 713	-0.2
4620	Semi-finished wood products	8 128	66 572	4.6
3720	Medical & surgical equipment	7 796	104 354	6.2
4380	Carpets, linoleum	7 697	66 255	3.3
4910	Jewellery	7 326	58 485	8.2
4410	Tanning, dressing of leather	6 094	45 880	-1.1
3730	Optical & photographic equipment	6 090	78 349	2.6
2410	Clay products	6 016	75 026	1.6
4610	Sawing & processing of wood	5 846	72 347	4.3
4940	Toys & sports goods	5 668	67 373	1.2
4170	Pasta	5 551	19 282	3.9
3620	Railway rolling stock	5 349	62 315	1.2
3630	Cycles & motorcycles	4 664	44 875	1.5
4640	Wooden containers	3 198	43 339	4.4
4660	Cork & straw articles	2 146	31 927	1.9
2460	Grindstones	1 577	19 446	0.2
3740	Clocks & watches	1 356	18 241	-2.9
4920	Musical instruments	797	12 787	-1.4
2440	Asbestos articles	637	12 113	-11.9
4560	Furs & fur goods	521	6 985	-5.3

(1) Estimated.
(2) In current prices, million ECU.
(3) Number of employees.
(4) Calculated using production in constant prices (1985=100).
Source: DEBA

Table 11: Ranking of EC manufacturing industry by value-added (2-digit level), 1992 (1)

(million ECU)

NACE	Manufacturing sector	
3400	Electrical engineering	106 765
2601	Chemicals and man-made fibres	103 890
4100	Food, drink & tobacco	101 412
3200	Mechanical engineering	86 873
3500	Motor vehicles and parts	81 219
3100	Metal products	74 229
4700	Paper, printing & publishing	64 248
4800	Rubber & plastics	42 351
2400	Non-metallic mineral products	41 823
3600	Other means of transport	26 897
4600	Timber & wooden furniture	26 637
4500	Footwear & clothing	22 971
3300	Computer & office equipment	17 842
3700	Instrument engineering	12 053
4900	Other manufacturing	8 122
4400	Lether & leather goods	2 761

(1) Estimates.
Source: DEBA

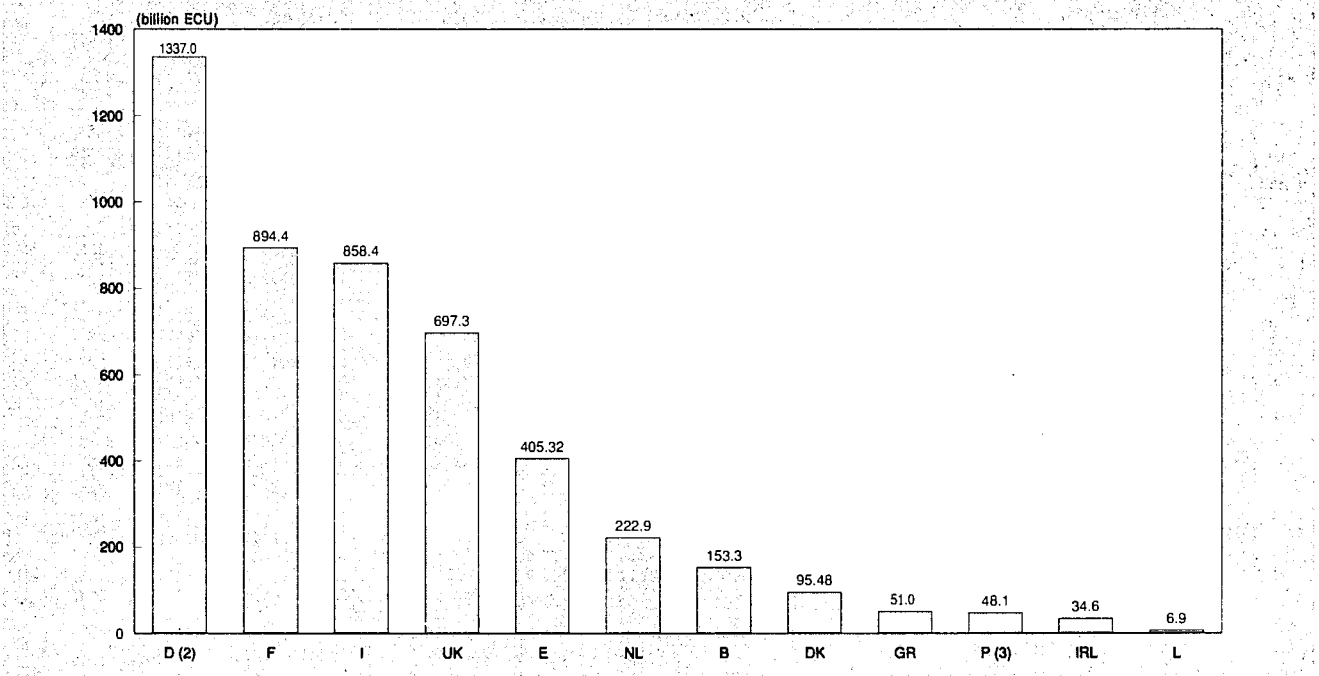
Table 12: Ranking of EC manufacturing industry by labour costs (2-digit level), 1992 (1)

(million ECU)

NACE	Manufacturing sector	
3400	Electrical engineering	83 896
3200	Mechanical engineering	72 141
2601	Chemicals and man-made fibres	67 471
3500	Motor vehicles and parts	62 658
3100	Metal products	58 934
4100	Food, drink & tobacco	58 485
4700	Paper, printing & publishing	43 114
4800	Rubber & plastics	30 152
2400	Non-metallic mineral products	27 332
3600	Other means of transport	23 432
4300	Textiles	21 815
4600	Timber & wooden furniture	19 539
4500	Footwear & clothing	17 315
3300	Computer & office equipment	11 429
3700	Instrument engineering	9 032
4900	Other manufacturing	5 137
4400	Lether & leather goods	2 208

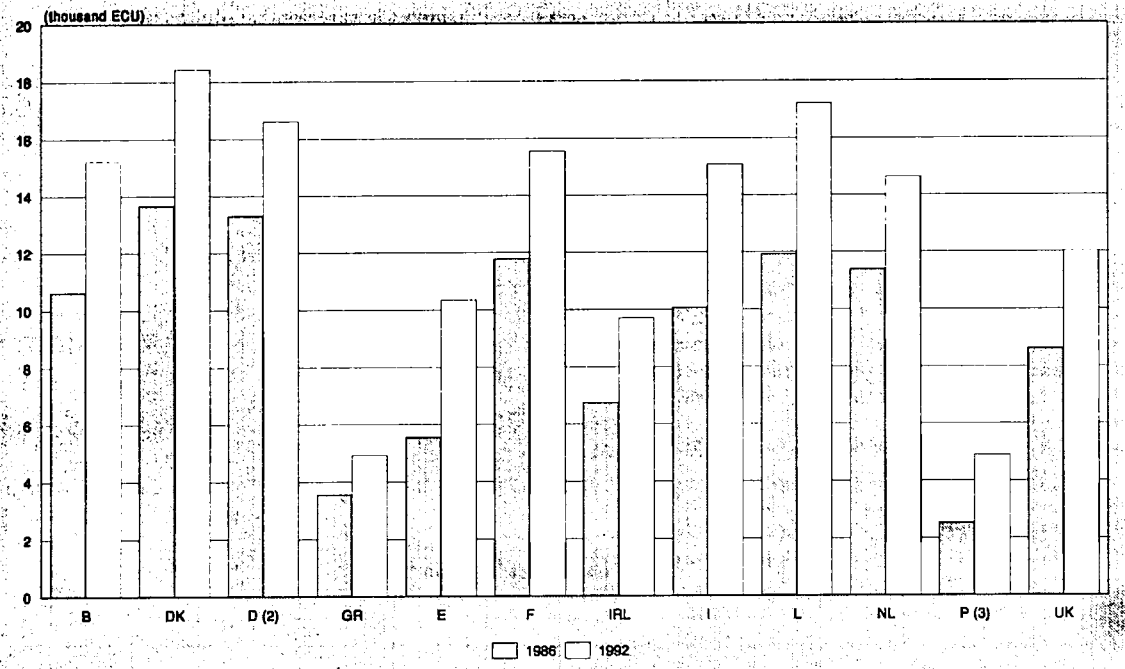
(1) Estimates.
Source: DEBA

Figure 1: GDP by Member State, 1992 (1)



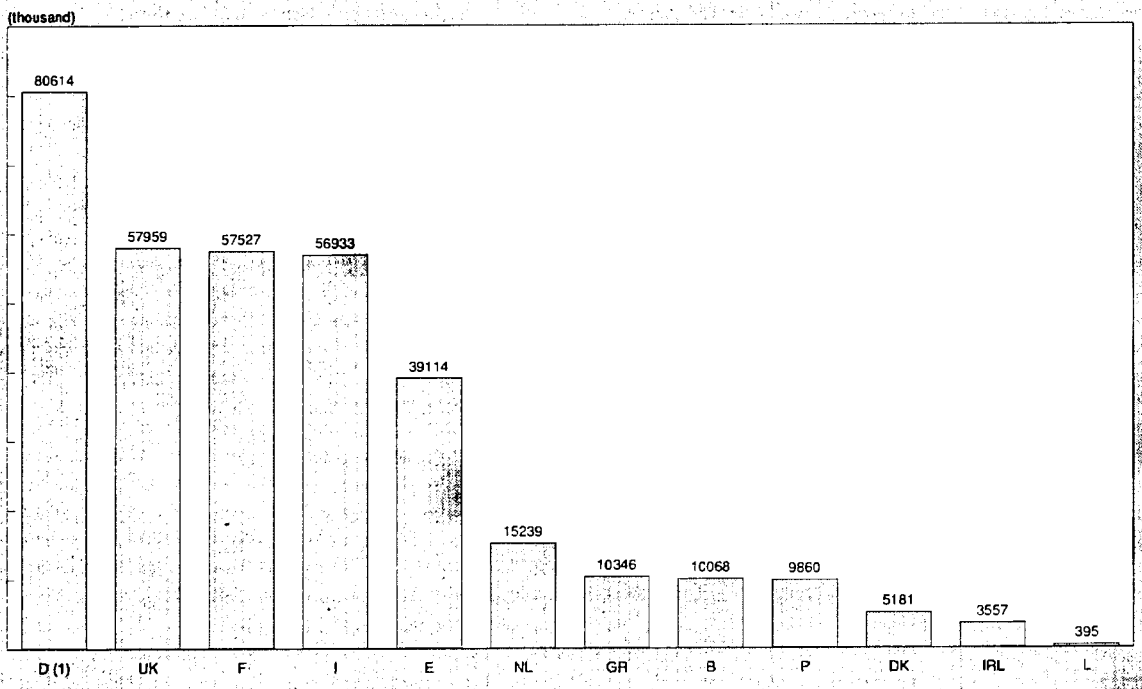
(1) At factor cost, in current prices.
(2) Including former East Germany
(3) 1991
Source: Eurostat

Figure 2: GDP per capita, 1986 and 1992 (1)



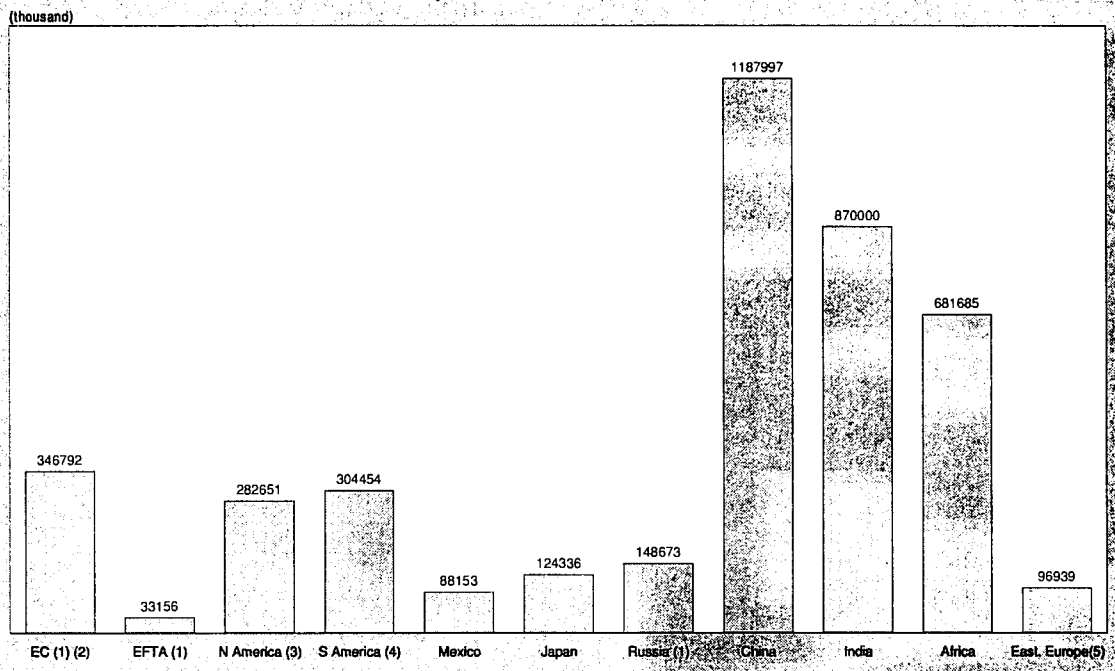
(1) At factor cost; population annual average for 1986 and as of 1/1/93 for 1992.
(2) Including former East Germany
(3) 1991 instead of 1992
Source: Eurostat

Figure 3: EC population by Member State (as of 1/1/93)



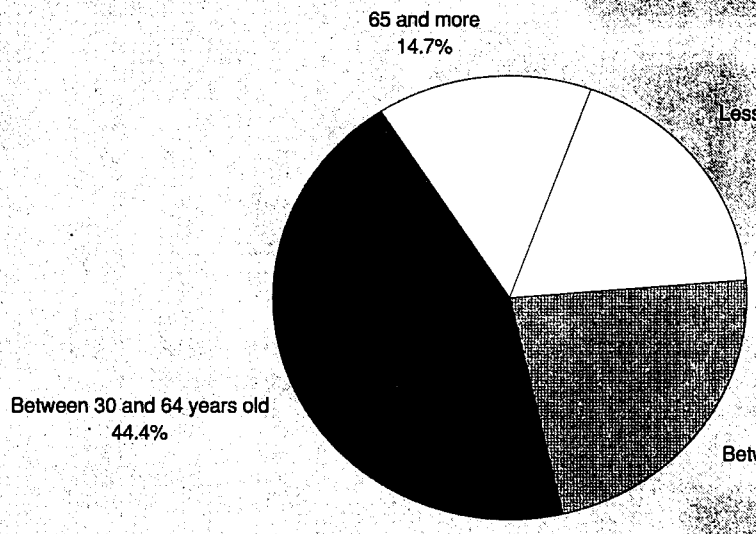
(1) Including former East Germany.
Source: Eurostat

Figure 4: International comparison of population (average annual population, 1992)



(1) As of 1/1/93.
(2) Including former Eastern Germany.
(3) Bermuda, Canada, Greenland, St. Pierre & Miquelon and the United States.
(4) Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, the Falkand Islands, French Guiana, Guyana, Paraguay, Peru, Surinam, Uruguay and Venezuela.
(5) Bulgaria, former Czech Republic, Hungary, Poland and Romania.
Source: Eurostat

Figure 5: Distribution of EC population by age group, 1992 (1)



(1) Including former Eastern Germany; data for Italy is for 1991.
Source: Eurostat

Sectoral patterns in strategic alliances

INTRODUCTION

During the latter half of the 1980s, the business and financial news media were hardly without stories of mergers and acquisitions between companies of all sizes and disciplines. The size of some of those buyouts still sit in the record books as the largest deals ever, with the effects still visible in the balance sheets and cash flow statements of the acquiring company. Lately, however, another form of business "combination" has taken a front seat to predatory acquisitions and highly leveraged equity buyouts: the strategic alliance. Business literature abounds with theories on alliances, methods for managing them and techniques for rescuing them from a premature death. What has been less discussed, however, is how partnerships between businesses differ from industry to industry, how they are typically structured and how they behave.

The following article attempts to analyse the strategic alliance from a sectoral perspective, by addressing the question of whether different industrial sectors exhibit distinctive alliances patterns and how these patterns may have evolved over time. The following ten sectors were examined:

- aerospace;
- computers;
- electronics;
- telecommunications equipment;
- pharmaceuticals;
- automotive equipment;
- basic chemicals;
- biotechnology;
- food & drink;
- airlines.

In addition, we examine possible geographical differences in the formation of strategic partnerships. This is done through an analysis of the frequencies of alliance formations within each sector and of the motivations underlying these alliances, using data on alliances between European and US and European and Japanese firms, and data on alliances between European firms respectively.

BACKGROUND

Due to the internationalisation of markets, rising competition and the increasing complexity and speed of change of technology, the number of strategic alliances has significantly risen since the early 1970's. Companies have turned to alliances to help share the cost and spread the risk of commercialising new products on a global scale.

During the first half of the 1980's, the number of international co-operative agreements signed each year by companies in the USA, Japan and EC increased by more than five times. Europe was the leader in terms of number of agreements, followed by the USA and Japan in third position during the 1978-1989 period. Of course, in interpreting this information one should take account of the fact that Europe is the most fragmented market and thus offers greater numbers of opportunities for alliances.

THEORETICAL FRAMEWORK

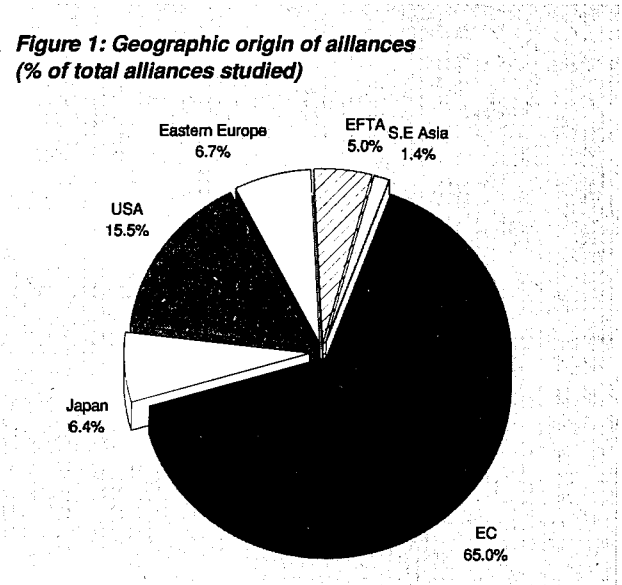
What is an alliance?

Alliances are any form of company cooperation, involving equity investment or not, regardless of the duration and objectives of the partnership. Mergers and acquisitions fall out of the alliance definition because they no longer suppose the cooperation of two distinct companies but aim at forming one aggregate company with total control of the acquired business. Strategic alliances may concern any aspect of company activity from R&D to distribution channels of final product, but rarely involve the entire core business of either participant. Alliances are normally designed to improve or defend the competitive advantage of the participating firms by exploiting new global product and marketing strategies, obtaining or maintaining cost leadership, obtaining access to new technologies or new markets, quickly constructing a presence in a new market, developing a specialisation or re-establishing a minimal operations size as well as to share R&D cost and other risks and to build scale economies. Alliances can also serve the purpose of a growth tool, as they can eventually have an impact on the entire fate of the company.

Tactical alliances should be distinguished from strategic alliances as they typically address a punctual or specific area of the company activity. Strategic alliances are more specifically aimed at defending or improving the participating firms' competitive situation and market positioning.

Strategic alliances can take many forms, but are often classified under three broad categories: the informal cooperation that

Figure 1: Geographic origin of alliances (% of total alliances studied)



Source : R. Veugelers ,K.U. Leuven ,1993 (study of 668 alliances ;1896 -1991)

Table 1: Alliance strategies according to competitive position and market structure

Competitive Position	Nature of Business: Global	Rapidly becoming Pan-European	Local, strong barriers to Europeanisation
Strong	Alliance with non-European Triad player for skill or market access	If possible, aquisition for Pan-European position, otherwise aliance with another European to increase presence	National acquistion/merger to "consolidate the local market;" alliance to sustain niche position
Medium	same	same	same
Weak	---------Sell now or ally with a stronger company----------		

Source: Collaborating to Compete
Bleeke and Earnst, editors. 1993, John Wiley and Sons, Inc.

may or may not involve a contractual agreement; the equity alliance that involves common ownership of the alliance, often referred to as a joint venture (JV); and, the strategic network that may be composed of both of the above types and involve many partners with varying degrees of commitment.

In this article, we mainly focus on joint ventures which are a more elaborate type of commitment between two firms.

There are six interesting questions about alliances that deserve additional discussion:

- what is their average duration?
- what is their rate of success?
- what is the critical recipe for a successful marriage of two or more companies who may actually be competitors in at least one market?
- to what extent do firms in Europe choose alliances over acquisitions, and what are the optimising conditions of adopting one versus the other?
- are there distinct sectoral patterns in the formation of alliances?
- how do alliances influence competition?

Generally speaking, it appears that the average age of alliances is around seven years. There are, of course, important differences around this average as some alliances, such as the one linking Ford and Mazda, existed for more than 13 years whereas others have ended within a few months. Alliances involving Japanese companies exhibit an average life span approximately double that in the rest of the world: 15 to 20 years. This may be a result of the fact that business ventures

Table 2: Partnership types

Field	Cooperation	Equity/ no equity relation between companies	Joint venture or not	Partnership agreement	State involvement
Commercial	joint marketing/ distribution network sharing	x	x	x	
	licensing	x			
Technical	joint manufacturing	x	x	x	
	subcontracting	x		re-enforced relation: vertical alliances	
Technological	transfer of technology	x		x	
	pre-competitive programs				x
	joint development	x	x	x	
	licensing	x			
Clearly strategic	partial merger of companies' entities		x		
Cooperative networking	Cf. Keiretsu	x	x	x	

x : reflects the likeliness to happen
Source: DRI Europe

Table 3: Strategies for the market life cycle

Market life-cycle	Competitive advantage-main criteria	Alliances goals
Development phase	importance of technological innovation	access to new technologies access to market
Growth	market access to finance innovation	access new markets build market position differentiate to survive
Shakeout	technological process innovation	build market position differentiate to survive re-establish critical mass
Maturity	importance of cost reduction	re-establish critical mass achieve cost leadership
Decline	withdraw	withdraw

Source: DRI Europe

in Japan nearly always entail a longer time frame for reaching the required return on investments.

The relatively short life span of alliances involving European firms is, in fact, not necessarily a sign of failure. Alliances are indeed usually intermediate term strategies meant to end once they have successfully reached their objective. Alliances evolve over time and, since they are usually a temporary step in a long-term business strategy, parent companies generally make provisions in their LT plans as to how and when the alliance should be laid to rest. In a majority of cases, the alliance ends with one of the partners acquiring the JV company. In some cases, the trade-off between the advantages one company tries to capture and what it gives in exchange can become unbalanced, placing one partner in a better position to purchase the JV company - an outcome that may not have been planned for at the start.

While the literature reports that although approximately two thirds of alliances run into serious managerial or financial trouble within the first two years, half are eventually successful. This finding stresses the need to build the alliance around the theoretical requirements for a prosperous partnership. These are that partners carry equal financial and managerial strength into the relationship. Equality implies even commitment to, and reliance on, the project, balanced decision making and equal sharing of risk and reward. The strength of the parent companies going into the JV should also be equal, as a partner that is technologically, managerially or financially weak has the potential to drag down the alliance, or to be dragged along by the stronger partner. Another important condition is that the JV must have the ability to adjust and evolve as the business environment changes around it.

A last requirement is that the JV has independence from the parent companies, that it has the potential to adapt to the evolution of the business climate and that it is able to direct and manage change in the relationship between the parent companies (to take credence of the fact that alliances must evolve over time).

The monitoring of alliances also represents a difficult challenge for competition policy makers. Competition varies according to sectors but it certainly constitutes a major issue that the European Commission is focusing on by monitoring co-operative relationships and acquisitions on a case by case basis. The major issue lies in an arbitrage between the viability of an industry and the eventual decrease in competition.

Alliances versus M&A: under which conditions?

Both alliances and M&A provide a vehicle for growth or are parts of defensive strategies. Table 1 for instance presents the theoretical strategy to be followed by firms in Europe depending on their present market position and the nature of the business, as reported by Roger Abravanel and David Ernst of McKinsey & Co. Alliances and M&As, however, have different and sometimes mutually exclusive goals that entail different conditions for success. These differences lie in the scope of activities and geographical requirements.

Mergers and acquisitions typically involve the transfer of a high degree of technologies and skills, either to or from a target. The challenge is when these business competencies have to be transferred across-borders while the companies are still trying to reap synergies from consolidation. The successful M&As are generally between companies with both overlapping activities or product lines and with overlapping

Table 4: Airline sector
Geographic and financial mix of alliances

% of alliances	Domestic	Regional	Intercontinental
Majority equity	79	13	7
Minority equity	10	41	18
Joint venture	4	19	13
Agreements	7	27	62

Source : Airline Business, the Boston Consulting Group, review of 200 alliances, in The Avmark Aviation Economist, Jan/Feb 1993.

Table 5: Main reasons underlying EC alliances by sector

	Identifying & obtaining new technologies	Achieving or retaining cost leadership	Search for innovation even if possible alone	R&D cost sharing	Survival through specialisation on core competences	Exploiting new product opportunities	Exploiting opportunities on new geographical market	Re-establish critical mass	Scale economies	Orderly withdrawal
Air transport							X	O	O	X
Aerospace equipment	X			X				O	X	X
Computers	O					O	X			
Food and drink			X			X	O		X	
Chemicals excl. pharma.		X		X	O					X
Pharmaceuticals	O			O		O				
Biotechnology	O			X		X				
Telecom equipment	X		X	O	X	X	O	X		O
Semi-conductors	X	X		X		X		X		
Auto components	X									
Vehicle assembly		X						O	X	X

O = very important factor
X = important factor
Source: DRI Europe

geographical coverage, and which involve the core business activities. Killing one's acquired competitor can also be the objective of an acquisition, but it is never that of an alliance.

In contrast, alliances meet shorter and more specific requirements and appear far more successful than M&As if the goal is to enter new geographical areas, new business activities or both. In the book "Collaborating to Compete" (Bleeke and Ernst, eds. John Wiley and Sons, Inc. 1993), it is reported that 60% of alliances involving partners in non-overlapping geographic markets succeed, while only 8% of acquisitions succeed. Alliances require complementary activities and well matched functional strengths. The lowest rate of success was with alliances between firms bringing competing products to the same shared distribution channel (this situation in fact leads to acquisition success).

The main conclusion is that to expand core business, alliances and acquisitions are both efficient, but to expand abroad or to edge out into new businesses, alliances work better. Both strategies, given their own requirements, have about the same 50% success rate.

Depending on the competitive situation of the various sectors in Europe and the typical growth strategy of firms in the sector at the present time, it will thus make more sense for companies in certain industries to choose an alliances over an M&A, or vice versa. This will be discussed in more detail in the next section.

SECTORAL ANALYSIS

The sectoral analysis below will address the question of whether sectors show distinct patterns of alliances, depending on the objectives pursued by firms in these sectors.

Because broad theoretical conditions establish a connection between market structure and alliance goals (Table 1), factors such as the degree of concentration in industry, market maturity, internationalisation, capital intensity (for R&D purposes, among others), risk, and market life cycle are to be considered for each sector. There is, in fact, a relation between the optimal (theoretical) form of partnership between firms in one sector and the market life cycle. Indeed, given that each phase of the market life cycle corresponds to a different form of competitive advantage, the life cycle concept is likely

Table 6: Future trends in alliances with EC firms by geographic market

	EC	US	Japan	Other
Air transport	O	X	X	X
Aerospace equipment		X	X	X
Computers		X	X	
Food and drink	O			
Chemicals excl. pharma.	O	X		O
Pharmaceuticals	O	X	X	
Biotechnology		X	X	X
Telecom equipment	X	X	X	
Semi-conductors	X	X	X	X
Auto components	X		O	
Vehicle assembly	O		X	

O = very likely/necessary
X = likely
Source: DRI Europe

to influence the type of alliance that firms in this market will seek to form.

The analysis below will seek to understand whether past trends in alliances involving EC firms have indeed shown distinct sectoral patterns, given past and present market conditions. From this, we will then be able to comment upon the likely future pattern of alliances/JV/M&As by sector in the 1990s, given present and expected future market conditions.

Airlines

The European airline industry is in a maturing stage of development. The top EC companies are British Airways (BA), Air France and Lufthansa. Together, these accounted for nearly 60% of both the total number of passenger-kilometres and revenue of the EC carriers in 1991.

Nearly 90% of EC passenger transport by air is international. More generally, world traffic demand is dominated by six specific traffic flows. These are, in decreasing order of importance, the USA domestic market, the intra-European market, the transatlantic market, the Asian market, the Pacific market and Asia-Europe. Given the above, global operation is perceived by the major international airlines as not only a condition for profitability but also a condition for survival. As a result, the differentiation of services between these companies is mainly done in marketing terms.

Nevertheless, whereas US companies have a relatively homogeneous set of characteristics, as they are all in private ownership and have to conform to the same labour regulations, European companies have very different working practices, ownership structures and cost basis.

Given the effects of globalisation and deregulation in the industry, past trends in alliances can be classified along two dimensions: geographic scope and financial structure. Most early alliances were domestic in scope and represented the initial consolidation of deregulated national markets in the 1970s and 1980s for the USA, and in the late 1980s and early 1990s in Europe and Asia. The next set of partnerships to emerge were in the form of regional alliances in Europe and Asia, as airlines attempted to consolidate their position across a broader market base in anticipation of further deregulation. Most of the recent alliances have occurred in the intercontinental arena to capture the maximum amount of traffic flow expansion, representing the beginning of globalisation during the 1990's.

Given the present market condition, although the corporate strategies of firms in this sector still slightly differ by country, the following appear as core strategies: (i) having a lean and efficient cost base; (ii) having an efficient means of distribution via membership to one of the main computer reservation systems; (iii) achieving domination of a hub where there is a large local population (thus providing a natural source of traffic); and, (iv) being profitable enough to attract capital for fleet renewal.

Alliance objectives can then be grouped into four main categories:

- the most common is traffic feed, both to increase load factors and to improve yield or passenger mix;
- the second is to achieve scale economies through the sharing or pooling of resources across operational areas and costs centres (such as sales/marketing, flight equipment, station or ground facilities, maintenance and purchasing);
- the third is to access new markets by tapping a partner's unused route rights or unused slots; and, finally,
- airlines form alliances to defend current markets by assuming the role of gate-keeper through managing seat capacity of shared operations.

Within Europe, large companies have thus far fully or partially acquired some small and medium sized companies, but co-operation between large companies is still rare. This will change, however, as competition between carriers forces the airlines with relatively high cost structures and smaller domestic markets to co-operate. One example is the now defunct "Alcazar" project of a merger between SAS, KLM, Austrian Airlines and Swissair. Another example is the Air France purchase of an equity stake in SABENA, where the two companies have a similar corporate philosophy, language compatibility and complementary route structures.

Most domestic alliances began simply as co-operative agreements. Mergers and acquisitions then progressively became more numerous and national markets tended to consolidate under the control of dominant flag carriers. Alliances took many forms ranging from the interlining of passengers to equity stakes across national markets as foreign ownership regulations for airlines changed.

In intercontinental cooperation, joint-ventures and non-controlling equity investment are still the norm as merger and acquisition activity is largely restricted by regulatory barriers. Agreements are numerous, however, particularly marketing ones such as code sharing and block spacing. Many alliances have occurred with large US and some East Asian companies to extend market access to a global scale.

The overall importance of equity investments has increased from 40% of all alliances to approximately 55% over recent years. This reflects two major trends: further USA domestic and regional market consolidations, and privatisation activity in Asia, Latin America and Europe. Current EC ownership rules require that the majority ownership and control of an EC airline is by Member States and/or EC nationals. As regulatory frameworks regarding foreign ownership of airlines change, one would expect to see many of the co-operative and minority equity agreements that exist in the regional and international arenas to become increasingly majority control positions or outright acquisitions.

Considering that intercontinental cooperation is now the most frequent, joint agreements are the most numerous alliance process. Common agreements are code sharing and block spacing, methods aimed at giving market access with a minimum investment and relatively little commitment.

Code sharing enables two airlines to offer connecting flights which appear to the public to be all on one carrier as both flights are prefixed by the same code. This is commonly used by long-haul airlines to increase their domestic feed and by niche carriers wanting to tap into new markets without shouldering the expense of launching additional services. Block-spacing, which is a parallel concept where airlines add their code to another carrier's flight and buy seats on its service, is a proven method of gaining valuable access to a market. In June 1993, Swissair bought seats on partner Delta Air Lines' new Cincinnati-Zurich services and Delta took space on Swissair's flights from Zurich and Geneva to New-York. BA and USAir had been code sharing since June 1993 on eight routes and plan to do it on thirty more within twelve months. British Midland-United Airlines and SAS-Austrian Air Lines agreements provide other examples.

Aerospace

The aerospace industry is engaged in the production of aircraft, spacecraft, engines and equipment. Aircraft production represents the main activity of the sector. These products have both civil and military applications, however, civil activities have grown rapidly in importance as military demand was declining.

As far as the fragmentation is concerned, the sector is organised in a pyramid format: a few assembly manufacturers coordinate the work of thousands of sub-contracting companies across

different countries. Concentration is variable according the field and stage of production: Boeing, Airbus and McDonnell Douglas share the large commercial aircraft market. More manufacturers compete in the regional transport aircraft market: ATR (F), British Aerospace, Fokker (NL), CASA (E) and DASA (D) in the EC, de Havilland in Canada, Embraer in Brazil and Saab in Sweden. The engines market is dominated by four manufacturers: General Electric (USA), Pratt & Whitney (USA), Rolls-Royce (UK) and SNECMA (F).

Following a period of sustained expansion, the aerospace industry is currently facing structural adjustment problems. The European aerospace industry continues to suffer from the consequences of having maintained a fragmented industry structure, despite efforts both on national and European levels. R&D expenses are extremely high (approximately 30% of turnover) driving up break-even points on investments: aircraft motors need 2 000 sales and ten years to reach their break-even point, whereas large commercial jets require ten to fourteen years with a minimum output 400 to 500 aircraft. Indeed, the costs are often far greater than the firm's own equity capital.

R&D expenses and risk explain the frequencies and the importance of alliances in this sector. The huge financial involvement of the state in the USA, Europe and Japan should, however, not be underestimated, even if the state intervention does not happen during the same stages of business cycle in the various regions. One characteristic of alliances in the aerospace industry lies precisely in the risk-sharing with companies in other countries through partner ownership structure or in relation to public funding provided.

In addition to the costs reasons for alliances, market reasons should be added given that the government sector is also the largest purchaser of aerospace production.

For 31 of the 46 major worldwide aerospace companies in 1991, there were 35 alliances called "programmes" (cross participation among companies excluded), which aimed at developing and producing a specified set of products from the entire range of the aerospace industry. This makes the rate of alliances quite high relative to fragmentation. As far as the geographical split is concerned, the companies involved in these alliances included seven American companies, three Japanese and about 30 European firms.

All of the seven alliances involving American companies are international and most of them are with European companies. European firms are participating in almost every alliance and, given the preceding results, often tend to ally among themselves; names such as Euromissile or Eurocopter clearly announce the European character of the product. The most famous European alliance, Airbus, embodies the cooperation between British Aerospace (UK), Deutsche Aerospace (D), Aérospatiale (F) and CASA (E). Aérospatiale and several other industrial European companies not listed above cooperate on Arianespace.

The Japanese companies Kawasaki, Mitsubishi and Ihi Ishikawajima Heavy Industries are co-operating on engine projects with European and American companies: two of them in programs to develop the hypersonic aeroplane engine and one on the GE90 engine. Although the Japanese contribution is currently fairly small, the Japanese firms carry the potential to be both future competitors, given their government's focus on the aerospace industry, and attractive to become alliance partners due to their financial strength and government support. In addition, alliances with Japanese firms are the perfect opportunity to penetrate the Japanese market even further while it is expanding.

So far, European firms have usually solved the problem of critical size by co-operating mostly within Europe. Intra-EC cooperation was an alternative to industrial integration which has only occurred within national borders and mostly as a result of M&A that formed companies such as DASA, Aérospatiale, British Aerospace and CASA. These consolidated companies are now forming cross-border alliances, however, no multinational aerospace company yet exists.

Consolidation of the European industry through alliances is expected to grow since the risks are not expected to decrease, especially since the growth in the commercial segment of the space market will not make up for the falloff in government programs. In addition, co-operative initiatives are expected with the Russian aerospace industry given their enormous potential. The collapse in some military markets such as missiles will also accelerate the restructuring of the industry, much of it taking the form of alliances / exchanges of business lines as companies focus on critical size and complementary product lines. Rationalisation through integration or the complete disappearance of some firms is also expected in some sub-sectors until they reach their critical size, such as in the regional aircraft industry where it appears that only about a half dozen companies will be able to succeed in the market.

Computers

The entire industry is undergoing a downturn. Europe's large, indigenous IT suppliers, Siemens Nixdorf (D), Groupe Bull (F) and Olivetti (I), are loosing money and are implementing strenuous restructuring measures. After some improvements in their competitive position (market share) in the second part of the 1980s, they have suffered more than their American competitors from the market slowdown in the early 1990s. The key weakness in Europe seems to lie in its inability to integrate research, development and innovation in an overall strategy which both exploits and orients them.

There are, however, a number of factors which may contribute to a better future for Europe than it has experienced over the recent past:

- Downsizing, moving from mainframe based operations to smaller machine data processing may prove easier in Europe where there are around a fifth as many very large machine sites as in the US (hence there will be proportionally less damage for the European large systems players than for the US players). European computing services capable of advising companies on a downsizing procedure are equal to the world's best and have the advantage of local knowledge.
- Desk top, servers and the integrating architecture will define tomorrow's data processing business; Europe has strength in the second and third of these.
- European computer companies are as advanced as any in software development.

So far, nearly 6 000 enterprises operate in the computer and office equipment sector in Europe but only 3.6% of them account for 92.8% of the industry's 1992 turnover.

Alliances in the computer industry are among the most famous: Olivetti's alliance strategy beginning in 1985 enabled this typewriter company to become of the major computer companies in Europe. IBM has set up 35 alliances, excluding IBM's partnership policy with third party software players.

Given the shake-out the sector is undergoing, alliances are numerous and diversified. It seems that most of them aim first at gaining market access through a marketing JV or marketing agreement. Later they concentrate on core activities and ally with companies capable of providing other elements in vertical alliances. Parallel alliances in the computer industry usually involve the transfer of technology. In addition, many computer companies are forming alliances in more profitable related sectors such as management facilities or customised software applications, to diversify away from the declining main-frame industry or the less profitable, commodity-like PC market. The above is a classic text book example of a

situation in which using alliances to enter product markets that are new to the firm has been more successful than using acquisition strategies to enter new markets. Such an alliance (ESI) was formed in the beginning of 1993 by a group of European companies including Sema Group (UK), Bull (F), Cap Gemini Sogeti (F) and Siemens-Nixdorf Informationssysteme (D), who established a software research group in Spain to seek better ways of writing software.

As IT and electronics are becoming critical components of products in industries ranging from the medical engineering to the automotive industry, alliances across sectors are becoming more common to share rising R&D costs and risk, and to shorten the time needed to bring a product from the drawing board to the market. Vertical alliances between computer companies and semi-conductor producers have also been set up and mainly involve Japanese computers manufacturers.

In the past, the industrial strategies of European companies did not sufficiently exist on the EC level. Largely as a result of the 1992 process, European IT companies now exploit the possibilities of cooperation with other European partners through strategic product marketing alliances, as well as through help from the EC via research programmes like Esprit, Jessi and Eureka.

Food & drink

Demand for processed food products rose significantly between 1982 and 1991. Growth of average income positively influenced consumers' preferences toward high-service content, rather than fresh products. The sector is split among numerous and diversified sub-sectors and, as a whole, is fragmented (the turnover of the top ten companies accounted for 18% of the total market in 1991). Some market segments show, however, a high degree of industry concentration, such as sugar and cocoa. The confectionery and ice cream industries are also amongst the most concentrated. Many of the larger companies are multinational conglomerates that are mostly American or from non-EC countries, with the notable exception of Unilever (NL/UK).

In terms of growth strategies, which are still mainly focused on branding, there are distinct sectoral patterns in the food and in the drinks sectors respectively. The food and soft drinks subsectors have mainly grown through M&A activity, despite the existence of some alliances, whereas the decrease in demand for alcohol and spirits forced companies to invest in quality improvement and marketing differentiation. This was done not only through M&A but also through numerous licensing and product differentiation agreements. The same goes for the wine industry, with advanced co-operative strategies in different European countries. Nonetheless, the aggregate food subsector has shown a growing interest for strategic alliances since the 1980s M&A wave. It is now common to use alliance strategy to enter difficult markets such as those in developing countries. The industry's taste for alliances has steadily grown on both sides of the Atlantic; every year has seen at least one big deal. This trend owes much to the stagnation of traditional food markets in the industrialised countries. To maintain growth, companies have to develop higher-margin products that address new tastes and fashions. These pressures have intensified the search for short cuts to faster innovation, cost reduction and the ability to launch new products on several world markets at once. In addition, strategic alliances partly reflect diminishing opportunities for acquisitions, following the mergers wave that occurred during the 1980s.

Examples of alliances that followed the theoretical keys to success were:

- Nestlé (CH) allied with Baxter Healthcare (USA) in 1989 in a 50/50 JV (Clintec) in clinical nutrition (new but related product market, equal ownership and risk sharing);
- Nestlé and General Mills (USA) formed Cereal Partners Worldwide in 1989, a 50/50 JV to make and sell ready-to-eat breakfast cereals outside US and Canada (same product line for partners with entrance into new geographic markets, equal ownership); the main aim behind this alliance was to challenge the market leader Kellogg's;
- Unilever (UK-NL) set up a JV with BSN (F) in 1993 to produce and market products worldwide combining ice cream and yoghurt (new geographic market, new product).

The goals are diverse but all belong to the willingness and the need to realise rapid innovation, to take a global market approach and to achieve economies of scale.

Branding is seeing a revival in the alcohol and spirits markets. After having experienced a sharp decrease of demand due to changes in consumer tastes and preferences, this subsector has seen a redefinition of consumption with a drift in demand from quantity to quality. This has forced firms to invest in both quality production and building brand image. This has been done through both M&As and JVs, and has led to increased control over distribution and the development of worldwide market networks.

Similarly to the food sector, the drink sector is not a capital intensive sector (in the general sense of the term) and essentially relies on distribution for success. Improvements in the distribution system have initially mainly been done through JV with domestic companies as well as acquisitions, but as premium spirits brands have become more expensive to acquire, the alcoholic drinks groups have turned increasingly towards partnerships. The market is now highly concentrated and controlled by a few large multinationals, but there are still many small firms focused on local production of a specific product. This leaves some room for further alliances and further market concentration.

Chemicals

The EC is the world leader in chemical sales (pharmaceuticals included), ahead of the USA and Japan. The EC accounts for seven of the world's top ten companies. After several years of solid growth (1960s and 1970s), the first half of the 1980s saw some stagnant production and overcapacity that led to drastic restructuring. The industry then posted strong growth in the mid to late 1980s, until prospects changed in 1990 with the economic slowdown. Since then, margins have been continuously squeezed due to falling demand and increased competitive pressures, along with poor performance on foreign markets. Weak demand and over capacity are expected to continue in the short and medium term.

The sector is somewhat concentrated, with the top ten leading companies representing 48.6% of the total turnover in 1990, the top five accounting for 32.6% of it. There are important differences by market segment, however. The speciality chemicals sector is mostly a niches market. In the basic chemicals sector, European and North American markets are highly concentrated, mature markets. Growth in both demand and activity should rise with the industrial growth in the Far East, a region that should account for 34% of the demand by the end of the decade.

As far as the trend in alliances is concerned, during the 1980s many companies moved into speciality chemicals to improve profitability. M&As had been intense, linked to positioning for the Single Market and mostly concentrated on downstream chemicals (plastic container and film, speciality chemicals, pharmaceuticals, cosmetics, etc.) to diversify into supposedly more profitable downstream activities. EC companies also undertook major investments in the USA, encouraged by the dollar fall. In the 1990s, the fall of margins and high interest rates made funding more expensive and in 1991, restructuring and cost reductions made M&A activity even more quiet. Many unprofitable businesses units bought during the M&A

fever of the 1980s were trimmed and went for sale with a new focus on core activities. In 1992 and 1993, the restructuring continued, but this has mainly been an internal restructuring. Extra funds for M&A are indeed still low and there are less and less profitable businesses to buy. Firms concentrate on reorganising the market through portfolio realignment and a focus on core competence and competitive advantage, through moves which often involve a kind of redistribution, or swap of activities between companies. This mostly happens through JVs that are in fact mergers between similar business units from different companies. These intra-sectoral mergers are quite original compared to other sectors. An example of this is the June 1993 alliance between Neste and Statoil who have agreed to merge their petrochemical and polyolefin activities in a 50:50 JV company that will be the largest polyolefins producer in Europe and will rank fifth in the world.

In addition, 1992 and 1993 saw a large number of less strategic alliances mostly through joint ventures aimed at sharing costs and risks of production. The most frequent type of alliance appears to be the JV (production and business) and the reasons are clearly cost oriented.

In 1992, there were around 80 JVs and minority participations (these figures represent only alliances involving a European company). Of these 80 agreements, the majority (32) involved only European countries (EEA), 17 included both American and European firms and 10 involved West European and East European firms. Deals involving Japanese companies involved only 3 alliances. The remainder (18) were set up between European firms and companies from Asian and South American countries.

Pharmaceuticals

The pharmaceutical industry is amongst the fastest growing sectors, has rapidly increasing R&D costs, one of the highest R&D/turnover ratios of EC industries and EC leadership in production and exports (its production was about one third higher than that of the US industry in 1991 and more than double that of Japanese production). Within Europe, the leading companies are from the United Kingdom (Glaxo and Wellcome), Germany (Hoechst and Bayer) and France (Rhône-Poulenc). Glaxo, Hoechst and Bayer are among the world's top ten companies, the remaining seven companies are two Swiss and four are USA-based firms.

The production is quite diversified and, from a global standpoint, the market remains fragmented and not highly concentrated. No company has a dominant position: the ten largest companies account for only 25 % of the world market. A lot of small and middle-sized companies survive in niche or specialised markets. The companies already enjoy a relatively high degree of internationalisation, but this internationalisation needs to shift towards globalisation to recover R&D costs.

Despite its relative good health, the industry has to address new and different challenges such as: a decrease in growth rates, increasing R&D costs, worldwide government pressure to curtail health care costs and the necessity to enlarge and review product portfolios. During the last ten years, drug companies have grown primarily through price increases. As this is no longer possible, they will now have to fill their pipeline with new and highly differentiated therapeutics or diversify into related businesses such as was done by Merck (USA) who acquired the US pharmaceutical distribution firm MedCo, a strategy that matched the textbook recommendation of acquisition strategy for entering related fields in overlapping geographical markets. Branching out into related businesses may be a necessity as some firms may have trouble keeping their new drug pipelines flowing with money makers: twenty-five major pharmaceutical products go off patent by 1995 and as of yet, there are not as many "blockbuster" replacements.

In order to cope with the contradictory requirements of surging R&D to feed the new drug pipeline and lower prices to meet government mandates, the industry that was once considered stable with the same 20 or 30 market leaders for the past 25 years experienced a shake up after 1988, as new groups of companies emerged through M&A. The trend was initiated by the merger of SmithKline Beckman (USA) and Beecham (UK) to form SmithKline-Beecham, Bristol Myers (USA) and Squibb (USA) giving Bristol Myers-Squibb and the acquisition of Rorer (USA) by Rhone Poulenc (F).

As far as alliances are concerned, they can be split into two sets: one aimed at optimising "traditional" pharmaceuticals and the one aimed at giving access to biotechnology. Although biotechnology currently represents only around 5% of the pharmaceutical companies' activity, its importance is growing and attracts a high number of R&D agreements. On the traditional pharmaceuticals side, most alliances are marketing oriented given that global expansion becomes increasingly critical to recover R&D costs. This, however, does not prevent R&D alliances to happen in R&D strategic fields, or fields that a company has decided to specialise in to extend its competitive advantage.

Two of the biggest 1990 deals were JVs: Elf Sanofi with Sterling and DuPont with Merck. The former was supposed to bring geographic market access, R&D synergies and production cost sharing, whereas the latter was partly a product swap. Welcome set up a marketing agreement with Hoechst in Germany, Sigma Tau in Italy and Sumimoto in Japan for an anti-viral medicine. More recently, Merieux (F), a subsidiary of Rhone Poulenc, and Merck (USA) allied in 1993. Merieux wanted to strengthen its leadership in vaccines; and given the trend towards multi-purpose vaccines and the rather low profitability in certain world regions, it needed Merck financial and R&D support; in return, Merck gains access to leading vaccine technology.

It seems that these cooperation processes involve major companies, with smaller ones choosing to invest in niche activities. It does not seem that one type of alliance predominates. As far as a geographical split is concerned, there is a definite trend amongst European companies to cooperate most intensively among themselves. International alliances are more common with American companies.

Thus far, the Japanese pharmaceutical industry has not been a leader due to a number of factors among which the weak government incentive to create other high value differentiated products. Government incentive has changed since 1992 and should generate more Japanese interest in technology transfer through alliances.

Biotechnology

Biotechnology is a diversified sector that is related to pharmacy (38% in 1992), diagnostics (28%), agriculture, food, energy and environmental protection. The development of this high tech-sector is in full progress. In addition, one has to distinguish between classical biotechnology (fermentation and preservation processes mainly used in food) and the modern science, characterised by the use of genetic engineering. The food sector was the first which saw the arrival of biotechnological innovations in the mid-1970s. From its birth, the biotechnology industry's progress has been governed by a unique confluence of factors: massive breakthroughs in science and technology, enormous capital needs and a long horizon to payback, financial markets turning alternatively hot and cold, heavy regulation, uncertainty about intellectual property rights and the cost crisis in its primary market (health care). Despite this whole set of hurdles to surmount, this industry produces high value added products and earns commensurate profits.

The industry is going through an accelerated commercialisation phase, characterised by licensing, acquisitions, partnership, strategic alliances and "swaps". This set of strategies is aimed at embarking companies on courses that will advance

them as commercial entities long before their flagship products are through the development process.

According to report by the Senior Advising Group on Biotechnology (SAGB, March 93), alliances in the biotechnology field are more frequent than acquisitions, at least between Europe and the USA. Most of them are set up between small, technically skilled companies with limited access to capital and large pharmaceutical and chemical groups looking for infusions of new products to branch out into from their mature markets. For both of them, commercialisation is becoming increasingly critical because of the R&D cost factor.

The majority of 1991 alliances involved marketing and distribution. Next in numbers were R&D alliances, and then license agreements. This process should continue into the near future because the market is expected to remain fragmented, as most technologies are still in a development stage.

In the future, there is a predominant attraction for the USA, Japan and Asia, whereas Europe will be worse off than the current situation since Europe is perceived as an environment providing low government encouragement, low public acceptance, high interest group opposition, high trade barriers, still high regulatory bureaucracy and rather poor intellectual property protection relative to the USA and Japan.

From a geographic standpoint, the majority of alliances involving European firms are concluded between European and USA companies. The number of such alliances is higher than those strictly involving European firms.

The general form that inter-company cooperation takes in this sector is a follows:

- few acquisitions and mergers;
- an overwhelming majority of R&D participation agreements with USA companies and some universities, but very few JV and licensing agreements;
- of the European groups, 90 % have started R&D departments of their own in the USA; in fact, European companies have initiated more alliances with American firms than the Americans have with Europeans;
- American companies rank the building of fully integrated resources and strategic partnerships as the most preferred approach, whereas European and Japanese firms prefer to form strategic partnerships, or rely on licensing.

Telecommunications equipment

The main product categories in this sector are public switching, transmission, terminals, private switching, data communications and mobile communications. The technological advances toward full digitalisation has meant that the telecommunications industry has become a multi-product industry closely involving electronic and computers industries.

The sector has experienced high growth rates globally, with the EC being no exception. Supply is very concentrated in the Triad. Although the USA are the most established and liberal services markets, the EC shows advantages in terms of benefits gained from the convergence of the 12 Members States and the resulting strength of standardisation and liberalisation of markets. Of the world's top six firms, two were EC companies in 1991: Alcatel (F) was the leader followed by the USA's AT&T (USA) with Siemens (D) in third place. Other leading companies are Northern Telecom (USA), NEC (JPN), Ericsson (S), Matra (F) and Bosch (D). The Japanese companies are becoming more competitive and are investing heavily in R&D. In some specific sectors such as telephone handsets, the competitiveness of East Asian Four Dragons manufacturers is rising.

During the last 15 years, the industry underwent major changes that changed its competitive and cost environment. It went from a national, mature market environment with a relatively low cost structure to a high-tech industry embracing the computer and electronic industries on an international scale.

As with many industries today, the high fixed costs of R&D are now more important than the variable manufacturing cost, and downward pressure on prices further undermine the smaller companies' ability to fund the high level of R&D required to remain competitive. Opportunities are nevertheless enormous, with the result being the formation of new partnerships that take advantage of the opportunities and adapt to the new market environment. Global coverage in terms of geographic markets became the keyword for most of the strategies in telecommunications. The market, still relatively fragmented given the capital intensity, is becoming more concentrated (from 38 companies in 1988 to 19 in 1990).

Non-EC manufacturers, especially USA and Japanese firms, have been preparing for the Single Market for some years; this has been achieved through locating production in the EC, vertical integration and take-overs (a lot of them in the United Kingdom) to build a local manufacturing base and a competitive advantage for selling to the usually state-owned operators. Against this background, two broad types of strategic partnerships are appearing: the first involves alliances between players already operating in the telecommunications market and the second involves alliances between the latter and companies in other sectors, mainly electronic and computers.

The goals of these partnerships are:

- reciprocal market access, especially when regulation hinders free competition;
- economies of scale in R&D, particularly in the case of large public switch manufacturers;
- divestiture- some forms of partnership provide a relatively painless fadeout strategy i.e. the formation of Alcatel allowed ITT to withdraw from public-switch manufacturing while maintaining a 37% stake in the new venture;
- to fill gaps in the product range (product market access);
- to gain access to new and complementary skills such as software development in the case of PABXs, manufacturing skills in the case of fibre optic cable and microwave technology in the case of cellular radio; and, lastly;
- access to new distribution channels. Firms that develop technology from outside the telecommunications sector will often have to rely on established telecommunications companies to distribute their products.

Semi-conductors

European companies remain competitive in certain segments of the semi-conductors market, with Philips, Siemens and SGS Thomson amongst the leading world producers in 1990. European companies are, however, clearly under threat from USA and Japanese companies in terms of technology and market. The market is very concentrated and most firms in this market have a high degree of downward vertical integration. The economics of the industry is dictated by three fundamental factors: short product lives, continuous innovation that lead to repeated technological discontinuities and high investment costs; this means that survivors exploit new products rapidly, building up maximum sales while margins are still high.

The speed with which a technical lead is eroded, the high R&D expenditures required for technology renewal and the huge investments needed for manufacturing give international market exploitation an urgency almost unparalleled in any other industry. This has led companies to forge extensive networks of global alliances and means that the speed with which new plants are brought on line can be the critical determinant of overall profitability; critical mass is the strategy key point, both in terms of markets and production capacity.

Japanese industry has become a leader in many sub-sectors, owing as usual to their effectiveness in new-process technology, manufacturing performance and high linkage with in-house customers. The VLSI project sponsored by the MITI was crucial in that development. The Japanese market is essentially composed of large electronic groups (NEC, Fujitsu, Toshiba) offering synergies between the semi-conductor sector and their in-house electronic and computers skills. But some new players focused on semi-conductors (NMB) are arriving and doing well using USA licences. Europe resembles Japan more than it does the USA industry structure; while some pure semi-conductor companies have developed (Inmos (UK) and SGS (I)), the major European players are divisions of large, diversified conglomerates (Siemens, Philips, Ericsson, etc.). Europe has also benefited from a long tradition of inward investment by American, and, more recently, Japanese companies both in the form of subsidiaries of companies (Motorola, TI, IBM) in the form of and JVs such as Matra-Harris and Eurotechnique, created in 1980 between National Semiconductor and Saint-Gobain of France. These alliances were typically a marriage of imported technology and European money. They have not been particularly successful, however.

Four patterns of strategic partnerships dominate: pre-competitive collaborative R&D, licensing agreements, alliances involving investment by users (vertical integration moves) and joint ventures to transfer technology.

Given the R&D requirements, there has been a growing trend towards R&D agreements. In theory, these often carry the guise of pre-competitive collaborative R&D (a term that avoids antitrust problems and helps secure government financing), led by the successful Japanese VLSI project in the late 1970's. In practice, the dividing line between these projects and near-market R&D is often obscure. In Europe, the principal example was the Mega Project completed in 1988 (Siemens and Philips), followed by the Siemens-IBM alliance and JESSI (Philips, Siemens SGS-Thomson) operating under the pan-European R&D EUREKA program. In the USA, MCC and Sematech, a consortium of more than a dozen companies are similarly organised. In addition, there are smaller and specialised collaborations as well as collaborations with universities. The patterns of collaboration in the semi-conductor industry is becoming increasingly international.

The most common form of collaboration is licensing in terms of second source agreements. The two reasons are market access and the creation of alternative suppliers to the marketplace. The objective is to encourage a number of second source agreements to impose a technical "de facto" standard without loosing the control or ownership over the technology in order to impose its standard (Intel with Fujitsu, Philips and Thomson, Matra-Harris and Siemens).

Access to secure sources of advanced semiconductor technology can give companies important competitive advantages. This has lead electronic companies to establish alliances or make strategic investments in suppliers (IBM and Intel; AT&T and Sun Microsystems; Fujitsu and Amdahl; Siemens; Apple and Motorola; and Thomson and European Silicon Structures (ES2)).

Joint ventures and licensing or venture capital investments are used to achieve a permanent transfer of technology and are initiated by the new entrants to the industry as well as by companies wishing to catch up in a particular technology. Several JVs have been organised in Europe to build an indigenous semiconductor business: Matra-Harris (F/USA); Austrian Microsystems International (A), American Microsystems (USA) and Voest Alpine (A).

Motor vehicles

This section will be split between alliances among the component manufacturers and alliances among car manufacturers.

Component manufacturers

The business climate of this sub-sector is highly tied to the motor vehicle sector performance, hence the competitive threat from Japanese companies poses the same challenge to EC component manufacturers. This market is highly fragmented and the trend is for increased competition.

The drivers for increased strategic alliances between component companies arise from the changes in relationships taking place between European suppliers and vehicle manufacturers. These changes tend to match Japanese relationships between these two categories of firms (it is generally accepted that the overall level of outside purchasing of components by car manufacturers is the highest among the Japanese car manufacturers, followed by the Europeans with American firms being the most integrated).

A large number of alliances in Europe involve Japanese companies and are established to enable Japanese firms to gain market access in Europe, whereas in exchange Japanese companies offer skills in operations optimisation along with joint development and manufacturing.

In North America, Japanese component companies set up greenfield manufacturing plants and tended to go it alone to support Japanese vehicle transplants set up there. The preference for greenfield investment is attributed to the weakness of the USA component industry and the fact that the latter tended to build components suitable for larger cars and not the smaller Japanese vehicles. In addition, many of the major American companies were owned by major USA vehicle manufacturers, which is not the case in Europe.

Indeed, Europe has a larger, independent, innovative and competitive component infrastructure. Japanese vehicle transplants established in Europe have relied on local sources for the majority of cases. Local sourcing was in fact an important issue to address if Japanese vehicle manufacturers were to meet local content requirements. Also, Japanese component companies tried to avoid exacerbating the political sensitivity through aggressive take-overs.

By the end of 1991, of the 350 components producers supplying Japanese car manufacturers, 41 of them followed the Japanese car manufacturers to Europe. Around half of the components producer's investments have been done through joint-ventures. They occasionally proceeded in steps, first setting up a co-operation or a license agreement.

The European Market is a clear and profitable target. During the past 10 years, the number of alliances has been estimated at around one hundred. Most of them are, of course, initiated by the Japanese suppliers for market access purposes, giving technological but mainly operation optimisation "lessons".

Both the EC and Japan have areas of technological capabilities in components. Neither has clear overall advantage. But the Japanese automotive component industry is more competitive in that it has created speed and productivity advantages (in product development, R&D processes, industry structure, labour productivity, higher quality, JIT, etc.). In addition, Japanese component manufacturers have close organisational and financial links with vehicle manufacturers.

This does not prevent acquisitions, however. In 1988, Calsonic created a JV with TI Group to produce equipment for Nissan. In 1989, it also bought TI Group shares and Lanelli radiators. More recently, Asahi Glass who owned 75% of the Belgian company Glaverbel in 1991 took the opportunity, through a double JV, of devoting itself exclusively to the production of a high quality automobile glass for Japanese production in Europe.

The opposite situation does exist, although the European presence in Japan through alliances and licensing to Japanese companies is weak (Bosch owns a minority stake in Nippondenso). There are at least two major reasons to the difficulties

EC component producers encounter: the first is the long-term relationship Japanese OEMs (original equipment manufacturers) nurture with specific, networked Japanese component producers; secondly, Japanese OEMs cite product development related weaknesses as obstacles to increase purchases from foreign component makers. In that respect, the European automotive industry is gradually moving towards a Japanese-like pattern (R&D, logistics), gradually changing OEMs and component supplier relationships to single or limited sourcing.

For European component suppliers, competition is undergoing a major restructuring that does not seem to entail alliances, although some occur such as the Lucas (UK) and Sagem (F) alliance for the development of petrol fuel systems and for the creation of critical mass, as well. Manufacturers are maintaining a cost pressure on the component suppliers and are lowering their manufacturing costs by increasing sub-contracting, disinvesting from their own components manufacturing to concentrate on their core activity and delegating larger activities to component suppliers. This adds up to the transfer of a rising share of the added-value generation to component manufacturers who are now expecting to bear design, delivery and assembly capabilities that are sometimes developed through vertical R&D and technology transfer alliances. The major trend embodies component suppliers delivering intermediate or fully assembled components.

Vehicle assembly

Europe remains the most competitive automobile market, although it remains relatively fragmented compared to its capital intensiveness. None of the competitors (six Europeans in addition to East Asian and American firms) have a clear market share advantage but they account for 75% of European sales. The EC industry has not yet overcome some of its competitors' advantages in terms of cost and quality; it still has to pursue cost reduction strategies, especially given the recent downturn. In the process of retaining or gaining market share, the EC auto industry must find a trade-off between maintaining marketing differentiation and concentration of the industry to respond to the competitive threat. Concentration did increase during the second half of the 1980s, which saw the nearly complete disappearance of independent luxury car manufacturers. This mainly happened through acquisitions (Fiat bought Alfa Romeo, Ford acquired Jaguar, GM owns up to 50% of Saab). Several companies have resorted to cooperation through alliances, however, especially for the production of commercial vehicles and components: Peugeot and Fiat manufacture vans together and Ford and Iveco joined forces in the United Kingdom.

The number of European alliances is expected to grow, however, because (i) the set of competitors are more or less of equal footing; (ii) acquisitions have become much more expensive; and, (iii) competition is still fierce. The number of European firms operating in this sector is thus expected to shrink some more, presumably by some stronger alliance process. In that respect, the positions of Latin manufacturers are weaker than those of the North Europeans.

The frequency of alliances is expected to be highest among the European (and EFTA) countries. The most ambitious cooperation is still the 1990 alliance between Renault and Volvo. This alliance, which almost resulted in a merger in the fall 1993, foreshadows the types of relationships European manufacturers may develop in the coming years.

Europe is now the clear target for Japanese manufacturers, who were more focused on the USA. Although they directly manufacture in Europe, alliances are also expected since Japanese firms still want to enlarge their market share.

Despite the danger of ultimate acquisition by Japanese manufacturers, European companies should also have technological and operational interests in alliances with Japanese producers. Several alliances have already been or are being established: Honda has an equity stake in Rover, Volvo and Mitsubishi have set up joint ventures in the Netherlands, the same occurred between Volkswagen and Suzuki and between Ford and Nissan in Spain.

As far as the USA is concerned, there should not be major new cooperations or acquisitions in Europe: the American manufacturers invested a lot in their recovery in the USA market and will be focusing on that for now. In addition, the US manufacturers are not doing too badly in Europe with their current investment situation.

SUMMARY PATTERNS OF ALLIANCES BY SECTOR

Table 5 summarises the above analysis. The results are given in terms of intensity rather than in numbers since consistent, comprehensive and recent data on alliances including information by sector are difficult to find. Hence, the fact that there is no sign in a given cell in Table 5 does not mean that the factor considered is irrelevant, but rather that it is not frequent compared to other types of factors driving alliances. Also, in most of the sectors analysed, the results reflect the global sector perspective, i.e. cover both the larger and the smaller companies. It has to be mentioned, however, that in most information sources (and notably in the news media), it is the larger companies which usually receive most of the attention. The results may thus be subject to a slight bias. Finally, as there have been significant changes over time in the patterns of alliances by sector, we have chosen to reflect only the more recent situation in Table 5.

Although, as reported in Table 5, the main reasons underlying alliances vary significantly by sector, market access is one of the most frequent reason throughout the sectors, followed by access to technology and process optimisation and cost sharing. Below, we summarise the results by groups of sectors.

Capital intensive sectors

As expected, the capital intensive sectors appear in the list of sectors which mainly seek alliances for cost and technology sharing. Some less intensive sectors, such as vehicle component manufacturers, also enter this category because of a threat from lower cost Japanese operations. Cost preoccupation appears as well through the market access objective: larger markets are necessary to cover the investment costs and reach critical mass.

Fast changing technology sectors

Product and technology access does not appear to be specifically correlated with the faster changing technology sectors. The speed of technological change may either be technology driven or consumer driven. In the first case, the speed of change is generally correlated to the capital intensiveness, and therefore entails technology access goals in the case of expensive research and current low speeds of technology change within a given company.

Mature sectors

Table 3 presented a somewhat theoretical framework for alliances by market type. The results of the analysis by sector in the previous section seem to be consistent with the expected relation between market maturity and goal specificity as reported in Table 3. Mature markets such as the automotive or chemical sectors seek cost reductions. The computer industry, though not being as mature as a whole, is undergoing a price war in addition to having to adjust to a declining main-frame market (where withdrawal goals are important). The main-frame manufacturers are entering the PC market and other diversified areas such as management facilities and software, where alliance goals include gaining access to technology and to new markets as well as diversification. The pharmaceuticals sector, which is also fairly mature, is now seeing biotechnology as a major field of diversification. In contrast, industry specificity remains dominant in the case of the semi-

conductor industry, a sector where critical mass is important and which has not yet reached maturity.

Market internationalisation

Although there is still room in the EC for strictly national or European-level players, the majority of sectors are undergoing a growing market internationalisation, reinforced by the concentration trend of the past years. In that respect, global market access remains a major alliance goal.

Concentration and fragmentation

Concentration has recently grown in many EC industrial sectors, and is now spreading to the more up-stream market segments. However, alliances are increasingly replacing M&A strategies, especially in mature markets where acquisitions have become too expensive or unmanageable. In heterogeneous markets (i.e. where many SMEs co-exist with a few global players), one sees increasingly alliances between niche and global players (as in biotechnology). According to R. Veugelers (K.U. Leuven, Aug. 1993) the relation between concentration and alliances appears to be of an inverted U-shape: when concentration is very high, there are other means besides alliances to monitor or control the competition. Alliances are most common in moderately-concentrated industries.

As far as the leading firms are concerned, it seems that their alliance goals are consistent with a reinforcement of competitive advantage. This mainly happens through diversification and scale.

Geographical split

The predominance of alliance activity involving European firms is obvious in several studies. This, however, partly reflects the greater fragmentation of the European markets.

Specific reasons by sector have been discussed above, but, from a general standpoint, intra-European alliances aim at strengthening or rebuilding competitive advantage (technological, products, brands, alliances, scale), or at reaching a wider market base within Europe. Alliances between European and USA or Japanese companies are more based on product and operation efficiency goals, except in the airlines sector, and on a desire to establish or re-enforce the European firm's presence in these countries' markets.

This reverses the trend of early alliances with Japanese companies, which mainly sought technology gains.

Access to the USA and mainly to the Japanese market indeed remains difficult for European companies, except in the airline, biotechnology and beverage industries. As far as access to the Japanese market is concerned, given the price and risk of go-it-alone strategies or acquisitions, it seems that the principal requirement for market entry lies in the ability to cooperate with local firms. One exception is in the case of totally new products or the building of new distribution channels (i.e. Avon). Thus, more than half of all foreign entries into Japan have been accomplished through alliances. The essential part of developing a local position is to deal with existing strong Japanese alliance networks that exist within keiretsu or industrial groupings. Japanese companies have in fact been the acquirers in approximately 70% of terminated ventures in Japan.

As far as access to US market is concerned, although it still contains the world's largest share of demand, it remains costly, diverse, competitive and complex. EC companies have thus been more successful using acquisition strategies there than relying on alliances.

Table 6 shows expected future trends in cross-border alliances involving EC firms, by sector.

CONCLUSION

Distinctive sectoral patterns of alliances, both in terms of the type of alliance and the motivations behind them have been identified, although the distinction can really be made between sets of sectors based upon market and competitive advantage similarities. The same holds for geographical differences.

Market structures converge in terms of increasing internationalisation, speed of technological change and competition. Factors explaining the recent upward trend in alliance formation include:

- companies are no longer able to lead in all areas of their activities;
- less capital is available for acquisitions;
- already high concentration makes valuable acquisitions very expensive.

Hence, despite the theoretical requirements for alliances and acquisitions, many alliances now take place where, in the past, efficiently or not, acquisitions would have happened.

An additional question arises: what about intra-European alliance efficiency in retaining or gaining competitive advantage towards USA and Japanese players? In the past, many alliances and acquisitions made by Europe's leading national companies were for defensive reasons and enjoyed formal or informal government protection. This is no longer the case, as companies have come to realise that home centred strategies and defensive M&As often failed because they do not address the fundamental gap in competitiveness which is based on skills and global scale and not on national leadership. Of course, attempted cross-borders partnerships in concentrated sectors can bring organisational problems that go beyond the expected benefits, and thus have to be evaluated in this respect. But, there are also examples of large companies which have pursued cross-border alliances despite the fact that the main synergy opportunities were in narrow geographical markets.

In the present situation, for many of the European companies in need of further restructuring to fully benefit from the Single Market, the critical question is whether an alliance will help them reinforce their market potential or whether they should either sell out, i.e. turn themselves into an acquisition target. This article shows that alliances should address the overall industry dynamics, taking into account such factors as critical size, skills needed to compete and an assessment of how the firm's competitive position will change in the face of heightened competition and more demanding customers. For viable national players, whether their business is global, Pan-European or local is critical in the process of determining the relative attractiveness of alliances and acquisitions, and in selecting the partners.

Written by: DRI Europe

Restructuring industry in Eastern Europe

INTRODUCTION

This chapter of Panorama describes the changes in industry that have accompanied the transition to market economies in Eastern Europe. The chapter first evaluates the "contribution" of industry to the declines in gross domestic product (GDP) reported by these countries during the transition and assesses its role in the current recovery. Subsequently, it analyses the patterns of adjustment within industry with a particular focus on changes in the composition of industrial output and the role of the private sector. In the third section, the paper addresses the issues of ownership and corporate governance in state-owned industry, which has dominated industry heretofore. In this section, the paper evaluates the extent, manner, and success with which state-owned companies have been privatised and briefly assesses the role of foreign investment in industry in the process of transition. The paper concludes with an assessment of revealed comparative advantage in industry in the region, identifying sectors which produced successful exporters and sectors where imports have been more successful than domestic manufactures.

ROLE OF INDUSTRY IN THE ECONOMY

In no other sector has the transition to a market economy in Eastern and Central Europe had such an obvious impact than in industry. Except for the transportation sector and in some instances, construction, the declines in output in industry have been steeper than in any other sector of the economy in these countries (Table 1). Declines in output of some products have been horrific as the numbers of trucks, buses, railroad cars, and machine tools produced have plummeted.

Under the previous regimes, industry was the most highly favoured sector in the economy. Enterprises in industry and in machine-building, in particular, received better access to state investment grants and credits and to imports than other sectors of the economy. Relative wages were higher in industry, especially heavy industry, than in other sectors of the economy. Individuals who made a career in industry (coupled with extensive experience within the communist party apparatus) tended to be more successful politically. Even the statistical apparatus focused more of its energies and resources on reporting on industry than other sectors of the economy.

Because of this pattern of development skewed towards industry, the composition of GDP by sector of origin was more heavily weighted towards industry than in developing or developed market economies. Before the transition, the share of industry in GDP ran from a low of 29.1% of GDP in Hungary to a high of 55.1% in Romania. The latter figure is twice the percentage of industrial output's contribution to GDP in the US or British economies.

Because of the overweening contribution of industry to GDP, the declines in industrial output in recent years have pulled down GDP despite strong growth in services. Declines in industry accounted 50 to 80% of the declines in GDP in Eastern Europe (Table 1).

Industry has declined by more than the decline in GDP in all of the countries. Industrial output figures are reported in two forms: gross and net. Declines in gross industrial output have exceeded declines in net industrial output in all cases, primarily because many industrial activities that generated little, if any, value-added have been those that have declined most sharply. The smallest declines in gross industrial output have been in Hungary and Poland, where output fell 31% before beginning to recover (Table 1). The Czech Republic and Slovenia also report declines of 32-37%. The Balkan countries and Slovakia have suffered the most dramatic declines; gross industrial output has fallen by close to half in all four cases. Patterns for net industrial output are similar.

Table 1: Industry's contribution to the decline in GDP in Eastern Europe

Country	(%) Peak year for GDP	Industry's contribution to GDP	Maximum decline in GDP	Maximum decline in gross industrial output	Maximum decline in net industrial output	Percent of decline in GDP due to industry
Albania	1989	36.3	-42.0	-51.7	-54.8	47.5
Bulgaria	1988	52.4	-23.4	-55.3	-36.8	82.5
Czech Republic	1989	49.3	-21.3	-32.8	-33.0	76.5
Hungary	1989	29.1	-17.5	-30.7	-29.0	48.1
Poland	1989	41.0	-18.2	-30.8	-35.4	79.6
Romania	1987	55.1	-36.6	-50.7	-53.1	79.8
Slovakia	1989	48.3	-25.6	-46.3	-39.2	74.0
Slovenia (1)	1990	34.9	-14.7	-36.7	-24.4	57.8

(1) 1990 is the first year for which GDP was estimated.
Source: PlanEcon, based on national statistical bulletins

Table 2: Maximum declines in gross industrial output by sector through 1992

(%)	Bulgaria	Czech Republic	Hungary	Poland	Romania	Slovakia	Slovenia
Total	-55.3	-32.8	-30.7	-30.8	-50.7	-46.3	-36.7
Electric power	-23.6	-8.1	-16.6	-18.4	-42.5	-18.6	-4.3
Coal mining	-28.4	-23.5	-45.4	-36.2	-50.3	-22.4	-20.1
Refining	N/A	2.9	-19.2	-17.4	-56.6	N/A	26.1
Ferrous metals	-70.5	-32.7	-65.7	-43.6	-65.0	-9.8	-41.2
Non-ferrous metals	-50.2	-58.4	-33.1	-43.6	N/A	-37.9	-25.4
Transport equipment	N/A	-49.1	-75.1	-51.7	-62.9	N/A	-35.9
Electrical machinery	-71.1	-60.1	-55.1	-27.5	-56.0	-53.1	-39.0
Chemicals	-49.2	-35.1	-36.0	-32.5	-57.7	-30.4	-36.4
Construction materials	-57.9	-36.3	-45.9	-20.2	-60.4	-46.8	-35.4
Publishing	14.8	-35.9	-35.8	-23.2	-33.6	4.3	-16.5
Textiles	-36.8	-43.7	-59.4	-48.5	-55.6	-46.0	-45.4
Clothing	-11.8	-51.7	-37.1	-21.3	-53.1	-46.9	-33.4
Food processing	-38.0	-24.8	-21.0	-29.5	-46.4	-35.3	-24.8

Source: PlanEcon, based on national statistical bulletins

Hungarian net industrial output fell 29% from its previous peak before recovering in 1993. Poland, the Czech Republic, Bulgaria, and Slovakia all reported declines in net industrial output of 30-40%. Romania and Albania report declines of over half. Because Slovenia has only been a country since the end of 1991, the reported declines in Slovenian net industrial output only extend back to 1990; gross industrial output figures, however, are available for the period when Slovenia was part of Yugoslavia. The declines in Slovenian gross industrial output has been over 36% since 1990.

On a brighter note, the recent increases in industrial output across the region has spurred the general economic upturn because of the very large contribution of industry to GDP. Growth of 5 and 8% in 1993 in Poland and Albania, respectively, has been driven by very rapid increases in industrial output in these countries. Through the third quarter of 1993 industrial output in Poland was up over 8%. Figures for Romania and Hungary also showed sharp increases in industrial output in comparison with previous year's levels towards the end of 1993.

These increases should continue in 1994 and beyond. Increased competitiveness of the surviving firms, an upturn in domestic demand, a gradual recovery in Western Europe and rapidly rising labour productivity promise increased output. Also, a number of factories have now been closed. Declines in output from these factories accounted for some of the dismal statistics in previous years. As production cannot fall to less than zero, their problems will no longer pull the rest of the industrial output index down.

Because declines in industrial output have accounted for such a large share of the declines in East European GDP, a closer look at the composition of industry's contribution is warranted. In general, the East European statistical authorities still report GDP in prices from the 1980s. A number of industrial products, such as the East German Trabant car or Bulgarian cross-bar telephone switches, are no longer produced because they proved uncompetitive. Because these products accounted for a substantial share of reported output, their disappearance has contributed to the sharp decline in industrial output reported above. As noted by Leszek Balcerowicz, the former Finance Minister of Poland, the high relative values previously ascribed to these products and their subsequent disappearance have resulted in exaggerating reported declines in GDP. Conversely, when the East European statistical authorities eventually revalue past output in prices of the 1990s, the current reported declines in GDP will be much lower because levels of GDP in the 1980s and earlier will be revised downward using the market prices of the 1990s.

SECTORAL PATTERNS OF RESTRUCTURING

As East European industry begins to recover, the market is sorting out the winners from the losers. Table 2 shows the extent of decline by industrial branch and Table 3 shows patterns of recovery. Sometimes the winners are surprising.

In all countries, electric power generation has held up better than other branches. In most countries, output in this sector fell less than in any other despite declines in demand due to falls in output in energy-intensive branches of industry. Import-substitution has contributed to maintaining former output levels. A number of countries, most notably Bulgaria and Hungary, imported up to a quarter of consumption, primarily from Ukraine. As Ukraine raised prices and became an increasingly unreliable supplier, these countries have relied more on domestic production. Output is also up because the burgeoning private sector has increased consumption.

In Bulgaria and Slovakia, publishing activity actually increased during this period of transition, one of the only branches to report increases in output even during the depths of the recession. Publishing has also held up well in Poland, Romania, and Slovenia. The relatively strong performance of publishing possibly reflects the proliferation of new, independent newspapers or the publication of hundreds of pulp novels.

The output of the food processing industries has fallen in every country, but by less than the average declines in industry output. In Poland, the industry shows signs of recovery, running less than 10% below previous peaks. Elsewhere, food processing has yet to show signs of a turnaround (Table 3).

The output of the chemicals industry has more or less followed declines in aggregate industrial output. However, it is one of the sectors that is leading the recovery. Output of the chemical industry was up sharply in Poland and Slovenia in 1993 and up modestly in Bulgaria, Hungary and Romania.

Like chemicals, declines in the output of construction materials have mirrored aggregate declines in GDP. This sector is also pacing the upturn with sharp increases in output in Poland and Hungary in 1993, 10.4 and 18.7% respectively. The increases reflect increasing demand by the construction industry as new businesses renovate retail establishments or set up new facilities. This sector, especially cement and float glass, has been a prime target for foreign investors. Much of the cement industry in the Czech Republic, for example, has been

sold to foreign companies. Major glass companies in the Czech Republic, Hungary and Poland are now foreign-owned.

Light industry has generally done poorly in the transition. Textile output, in particular, has declined sharply. In almost all countries, output has roughly halved. The East European textile industry was focused on the domestic and Soviet markets. With trade liberalisation, better quality Western-made fabrics have been imported by domestic apparel makers. Former Soviet clients have also switched to Western suppliers or have stopped production.

Clothing has performed almost as poorly as textiles with the exception of Bulgaria where output had fallen only 12% through 1992. The clothing industry performed significantly better than textiles in Hungary and Poland as well, declines in output were roughly half of those in textiles.

Output declines in machine-building have been enormous. In Bulgaria, the Czech Republic, Hungary, and Romania, output of the engineering sector fell 60 to 70% below its previous peaks, and in Poland, it halved. In all these cases, declines in output of the engineering sector exceeded those in industry as a whole. Machine-building has been the sector hit hardest by the collapse in trade with the former Soviet Union. In the past, a number of manufacturers exported more than half their output to the former Soviet Union; today, they hardly export anything at all. Soviet enterprises either lack the funds to purchase investment goods from Eastern Europe or have turned to Western suppliers. Machinery producers have also been hurt by the economic changes in Eastern Europe itself. In the past, investment programs were financed by grants or concessionary loans from the national governments and enterprises were often forced to purchase equipment from domestic suppliers or from other manufacturers in the former Council for Mutual Economic Assistance (CMEA). Following cut-offs in government financing, trade liberalisation and greater independence for enterprise managers, demand for CMEA-produced machinery plummeted.

Despite past declines in output, machine-building is one of the most promising sectors in Eastern Europe. The major rebounds in industrial output in 1993 have been in machine building. Within machine-building, automobile producers have done very well. Output of transport equipment in Hungary, Poland and Romania in 1993 was up 42.2, 26.5, and 27.0%, respectively. Production of Skoda automobiles in the Czech Republic were up 24%. Because of Eastern Europe's low labour costs, high skill levels, and established industrial base, metal-working and machine-building appear to be areas in which these countries, especially the northern three, have a comparative advantage.

With the exception of Slovakia, ferrous metallurgy has been devastated by the transition. Output fell by two-thirds in Bulgaria, Hungary and Romania and by over 40% in Poland and Slovenia. The sector shows modest signs of recovery in Bulgaria, Hungary and Slovenia. This sector has been especially hurt by protectionism in the European Union and the United States, where steel has traditionally benefited from inordinately high barriers to trade. On the lower end of the market, Eastern Europe could have a comparative advantage in ferrous metals. Labour costs are much lower than in Western Europe and the technological lag in the production of rods and some other forms is fairly narrow in some plants. Eastern Europe has also shown itself to be competitive in forgings and castings.

Non-ferrous metals output has also been hammered during the transition, falling by three-fifths in the Czech Republic and one-third in Hungary. Only in Slovenia have declines been limited to 25%.

Mining, frequently included in industrial output statistics in Eastern Europe, continues to post sharp declines in output. In many countries this is a positive, not a negative sign. In a misguided attempt to ensure energy self-sufficiency, central planners propped up loss-making coal mines for decades. The planners' fixation on meeting production targets frequently led to the continued operation of highly uneconomic mines. The rationalisation of mining has led to sharp declines in output as well as employment, but has resulted in large savings in subsidies, increased labour productivity, and signs of less environmental degradation.

INDUSTRIAL PRODUCTIVITY AND EMPLOYMENT

The declines in output have partially masked very substantial changes in the operation of East European enterprises. Many of these enterprises have begun to operate as independent firms in a market environment rather than departments of the Ministry of Industry, waiting for orders from on high. These changes have shown up in improvements in efficiency and competitiveness. In particular, productivity is beginning to rise.

Eastern Europe's human capital stock, one of the primary determinants of a country's standard of living, is comparable with that of many West European countries. However, the gap in living standards between the two regions is very wide; West German living standards are on the order of 5 times higher than those in Eastern Europe. The first signs that Eastern

Table 3: Trends in industrial output in 1993

	Bulgaria	Czech Republic	Hungary	Poland	Romania	Slovakia	Slovenia
Total	-7.8	-7.7	2.3	7.0	-2.5	-17.8	-6.3
Electric power	2.2	4.6	3.2	-7.2	3.4	-6.4	-8.5
Coal mining	13.5	-3.3	-14.2	-7.1	2.6	-10.1	-7.0
Refining	2.5	-9.4	4.9	5.4	-0.9	-44.3	5.7
Ferrous metals	13.6	-9.9	1.2	-0.2	-5.7	-4.9	-16.0
Non-ferrous metals	22.4	N/A	5.7	-3.0	N/A	N/A	1.7
Transport equipment	N/A	6.6	42.2	26.5	27.0	N/A	-22.1
Electrical machinery	-12.1	-7.0	4.8	20.9	-6.1	-13.3	-0.8
Chemicals	2.5	-2.6	3.9	10.7	0.7	-13.1	-5.0
Construction materials	-11.0	-10.1	18.7	10.4	-2.5	-8.8	-4.4
Publishing	10.2	-7.4	17.5	21.8	32.4	-15.2	9.1
Textiles	-20.3	-17.8	3.0	11.0	-5.1	-17.8	0.1
Clothing	-18.9	-17.8	6.5	16.8	-18.6	-17.8	-1.1
Food processing	-17.8	-9.4	-7.2	9.3	-12.9	-24.5	-8.0

Source: PlanEcon, based on national statistical bulletins

Table 4: Productivity (1) trends in 1993

	Czech Republic	Hungary	Poland	Romania	Slovakia	Slovenia
Total	-1.7	13.8	11.0	5.8	-11.6	1.6
Electric power	10.6	-1.4	N/A	4.4	-3.4	-5.4
Mining	5.3	33.4	N/A	7.0	-1.7	-5.5
Metallurgy	-3.3	9.1	N/A	0.0	-3.8	-3.8
Machinery	0.8	33.7	N/A	14.7	-8.4	7.2
Chemicals	5.3	5.4	N/A	9.1	-8.5	-3.7
Construction materials	-6.7	20.8	N/A	5.4	-4.8	2.2
Wood, paper and publishing	-5.1	-6.1	N/A	6.3	-14.4	8.1
Textiles and clothing	-12.4	3.4	N/A	7.7	-12.4	9.8
Food processing	-10.0	7.9	N/A	-7.7	-21.3	-1.1

(1) Defined as output in constant prices divided by average employment
Source: PlanEcon, based on national statistical bulletins

Europe is beginning to put its human capital stock to better use have shown up in productivity increases in industry. These have been very strong in 1993, running 11% in Poland and 13.8% in Hungary (Table 4). Even in countries like Romania and Slovenia, where industrial output continues to fall, productivity is up, rising 5.8 and 1.6%, respectively.

Recent reported increases in labour productivity are not just statistical flukes. Western companies have generally declared their pleasure with the quality of the East European labour forces. In factories where Western investors have installed modern equipment and use Western management techniques, productivity levels have been as high as 80% of West German levels despite substantially lower wages. However, many plants are still encumbered with poorer quality equipment and even poorer management systems. As plants continue to adapt, the scope for productivity improvements is great. These increases will generate increases in real incomes or greater industrial output.

A counterpart of the increases in labour productivity has been the continued declines in industrial employment. The recent increases in industrial output have been accompanied by few increases in the industrial labour force. The surviving companies have been able to increase output without hiring additional workers. Nonetheless, labour markets are improving in the region. Unemployment rates have stabilised or even declined, although it continues to be a serious problem in many regions. Many enterprises have completed the first and second rounds of layoffs so further declines in employment in these enterprises will be limited. Rapid employment growth in services and the private sector is absorbing the unemployed, especially new graduates.

The decline in unemployment rates is occurring as real wages are beginning to rise. Those individuals fortunate enough to hold onto their jobs are beginning to benefit from more substantial salary increases at a time of falling or stabilised inflation. Increased job security and fatter wage packets are feeding through into higher retail sales. As productivity continues to rise, this phenomenon will continue through 1994 and beyond.

MANAGEMENT OF STATE-OWNED ENTERPRISES

The changes in labour productivity cited above and the increases in East European export competitiveness assessed below can be traced in part to major changes in the behaviour of East European managers. Both anecdotal and statistical evidence shows that East European managers are adapting to a market environment. Managers in all the countries have had to lay off workers, at times more than half their work forces. Many have successfully sought new markets as shown by the increases in exports to the developed West. They have also begun to invest with an eye to rate of return rather than merely increasing output. Imports of machinery produced in the West are up substantially, by more than 50% in some countries, as managers are replacing existing machinery with more productive Western models. In short, managers have begun to adapt to the market.

The key to changes in managerial behaviour has been to liberalise prices, lower barriers to entry, and cut off subsidies; privatisation of large state-owned enterprises has been of lesser importance. Price liberalisation, the first step towards creating markets in these countries, has eliminated excess demand, forcing managers to focus on sales, rather than production, as consumers exercise their new-found freedoms to pick and choose what they wish to buy. Lower barriers to entry and to trade introduce competition as state-owned enterprises must compete against new, private firms and imports.

Successful enterprise adaptation follows a pattern. Immediately after prices are liberalised, enterprises have initially raised prices more than expected by the authorities. Real wages decline dramatically during this period as prices of goods increase more rapidly than wages. Retail sales plummet and enterprises find that inventories begin to rise. Enterprises usually curtail production as they begin to run out of room to store products. Some workers are placed on short time or leave. During this period, reported enterprise profits are often quite high as wages have yet to rise and because of increases in the value of inventories.

Subsequently, enterprises begin to feel financial pressures. This is the crucial period of the transition. Increased financing costs because of increases in nominal interest rates (part of successful stabilisation polices) and lower sales squeeze profits. Enterprises stretch out payments to suppliers and other creditors. The transition may be stymied at this point, if enterprises continue to receive supplies and finance even though they fail to pay for them. In this case, managers do not adapt. Credit creation balloons. When the central bank eventually bails out the enterprises and commercial banks, stabilisation policies fail and inflation accelerates, derailing the reform.

If, however, enterprises face a "hard" budget constraint, managers begin to adapt. They begin to market to new clients at home and abroad. These activities have led to the substantial increases in exports to western Europe from the successful reformers in Eastern Europe. In some cases, enterprises reduce prices so as to increase sales. Enterprise managers also begin to make selective investments to improve product quality, eliminate bottlenecks, or cut costs. These investments were frequently the first investments that managers had liberty to decide themselves without interference from the supervising ministry, and also the first in which rate of return was the major determinant, as opposed to increasing output. The results of these investment decisions has shown up in the surge of

imports of machinery from Western Europe. Finally, managers begin to reduce the labour force, at first through voluntary departures, but later through forced redundancies.

Changes in managers' behaviour have been reinforced by commercialisation, the process of creating limited liability companies from state-owned enterprises. These new companies are no longer run by a ministry, although ministries continue to have a powerful voice. Managers now answer to a board of directors, created when the enterprise is transformed into a state-owned joint stock company. The boards have made the managers both more accountable and more independent. Managers now produce and report financial results to the board rather than negotiating export or production targets with a ministry. This change has concentrated minds on reducing losses and turning a profit.

When successful, the result has been extensive restructuring. Subsidiaries have become independent companies, units have been bought out by their managers, and loss-making operations have been closed down. Management systems have been revised. Companies set up profit centres and change their accounting systems to provide better information as well as to better conform to Western standards. In most cases, these East European firms still do not operate like their Western counterparts, but their activities are much closer than they were four years ago when the centrally-planned systems were last in place.

Management has changed because of changes in personnel as well as changes in behaviour. The new, non-communist governments have replaced some managers. Others have quit, unable to operate in the new environment, replaced by more dynamic individuals. On the other hand, some former managers have adapted and most new managers are recruited from the ranks of employees, not from outside the company.

THE PRIVATE SECTOR

Despite the improvements in management of state-owned enterprises, a number of indicators suggest that the new private firms and the newly privatised firms operate more efficiently than their state-owned predecessors. Average wages in private firms are higher than in similar state-owned enterprises. Not surprisingly, workers have been migrating to these new employers. Private firms have also been generally profitable, whereas a very large share of state-owned enterprises made losses in 1992 throughout the region.

Despite the benefits of private ownership, industry has been a laggard in privatisation. In Poland, one of the countries most advanced in privatisation, 83.4% of employees in the trade sector and 69.7% in construction worked in the private sector in 1992; 52% of total employment was in the private sector in 1992. In industry, this percentage was only 34.4%.

This pattern is repeated throughout the region; in industry, the state-owned sector remains dominant in every country. The one partial exception is the Czech Republic, where a large share of industrial companies was included in the first voucher privatisation. However, even after voucher privatisation, the state continues to own a majority stake in many of these "privatised" companies.

The smaller share of the private sector in industrial employment than in other sectors stems from the difficulties in privatising state-owned industry. The most effective form of privatisation in all these countries has been through the entry of new private firms into particular markets. Entry is easiest in sectors with few economies of scale and which require little capital, such as retailing and construction, and most difficult in capital-intensive activities such as heavy industry.

Aside from permitting the creation of new private firms, these governments have also adopted a number of programs to privatise existing state-owned assets. All the countries have either used auctions, direct sales, or restored property to former owners to privatise smaller businesses and residential property. These programs have been largely successful. Hungary and Poland have permitted management or employees to buy out their enterprises. This program of "liquidation" of state-owned assets, has been the most successful means of privatising industrial companies in Poland. All the countries have also permitted enterprises to sell specific assets to investors. The Czech Republic, Slovakia and Romania have experimented with mass privatisation programs whereby individuals have been given vouchers with which to purchase stocks or invest in mutual funds in the case of the Czech Republic and Slovakia or have been given shares directly in mutual funds as in Romania. Poland and Hungary have each sold over twenty companies through initial public offerings.

One of the most effective solutions for privatising larger state-owned enterprises has been to sell them to foreign investors. Foreign investors purchased 85% of all privatised assets in Hungary in 1991 and 75% in 1992, far exceeding investments by domestic investors. Sales of enterprises to foreign investors precipitate changes in management and efficiency. These investments have brought in Western management and information systems as well as capital. Cost controls, marketing expertise, ties to international distribution systems as well as new technologies have resulted in substantial improvements in the efficiency and profitability of these firms. Foreign control has often been a crucial goad to improving industrial operations.

Foreign investors are playing an increasingly important role in the economies across the region. Foreign investment in some of the countries has been very large. In Hungary, foreign investment inflows have run 1.5 billion annually, equivalent

Table 5: Composition of industrial output in Eastern Europe

	Bulgaria	Czech Republic	Hungary	Poland	Romania	Slovakia
Electric power	12.7	18.4	18.1	7.2	7.3	12.8
Mining	3.1	6.0	2.6	8.5	8.7	2.9
Metallurgy	10.5	12.6	7.7	7.6	10.5	16.1
Machinery	14.4	20.0	10.8	18.9	20.7	11.6
Chemicals	19.6	11.0	17.9	9.3	16.2	18.7
Construction materials	3.9	3.7	3.7	4.0	3.9	4.2
Wood, paper and publishing	5.2	4.7	6.9	5.1	5.7	6.2
Textiles and clothing	6.9	6.2	4.0	5.8	11.2	6.2
Food processing	22.5	14.8	26.7	24.2	12.8	15.0
Other	1.1	2.6	1.6	9.3	3.0	6.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: PlanEcon, based on national statistical bulletins

Table 6: Total East European trade with the former CMEA and Russia

(million USD)	Bulgaria	Czech Republic	Czecho-slovakia (1)	Hungary	Poland	Romania	Slovakia	Slovenia
1989	13 780	N/A	8 353	3 426	4 712	4 333	N/A	N/A
1990	3 054	N/A	5 192	2 707	3 062	2 281	N/A	N/A
1991	2 048	6 595	3 593	1 981	2 507	741	4 968	4 052
1992	1 242	5 365	2 859	2 076	1 758	1 018	4 186	1 994
Index numbers								
1989	100	N/A	100	100	100	100	N/A	N/A
1990	22	N/A	62	79	65	53	N/A	N/A
1991	15	100	43	58	53	17	100	100
1992	9	81	34	61	37	23	84	49

(1) Czechoslovak figures exclude trade between the Czech Republic and Slovakia.
Source: PlanEcon, based on national statistical bulletins

to 4.6% of GDP at market exchange rates. Inflows into the Czech Republic have also run 1.1 billion, about 4% of GDP. These inflows as a percentage of GDP are very high compared to other countries, including the rapidly developing countries in Southeast Asia. Poland has received less foreign investment (about 700 million in 1992), but inflows are increasing. Foreign investment in Romania and Bulgaria has been small, respectively 128 million and 102 million in 1992.

A very substantial share of these investments were made in manufacturing. Although in terms of numbers most joint ventures and other investments were made in the trade sector, in dollars terms, investment in manufacturing accounted for more than half of all investment in Hungary. A similar story can be told in Poland and the Czech Republic; in dollar terms, manufacturing accounts for most of the foreign investment in Eastern Europe.

The most popular industrial sectors have been automobiles, cement, float glass, food processing, and electric power generating equipment. The largest East European automobile manufacturers, FSM in Poland and Skoda in the Czech Republic, are now under foreign control. Motor vehicle components are becoming an increasingly attractive sector. Publishing has also attracted a large number of foreign investors, especially newspapers and magazines. There have also been substantial investments in the downstream sector of the petroleum industry, especially in retail networks. Industrial gases has attracted foreign investment in Poland. Telecommunications equipment manufacturers have also attracted foreign partners, primarily to increase the likelihood that the foreign partner will win some of the large East European telecommunications orders currently being issued.

Foreign investors have shied away from the steel, truck manufacturing, and chemical industries. Truck manufacturing, in particular, has failed to attract a single foreign investor. Textiles has also failed to attract much interest. However, a number of Western companies have invested in smaller producers of clothing.

In short, industries dominated by a few large multinational companies in Western Europe have attracted substantial amounts of foreign investment in Eastern Europe as well. However, industries that have suffered from overcapacity and losses in Western Europe, such as bulk chemicals and steel, have, not surprisingly, failed to attract foreign investors.

PATTERNS OF TRADE

Since the collapse of central planning, trade in Eastern Europe, especially trade in manufactures, has gone through enormous changes. After the collapse of the communist governments, the northern three (now four countries) in the region, reported large increases in exports to the developed market economies and simultaneous sharp drops in the volume of exports to the countries in the former Council for Mutual Economic Assistance (CMEA), the Soviet Bloc's answer to the European Community, following its collapse. In contrast, the Balkan economies reported declines in both types of trade. The extent of the decline in trade with the former CMEA has been breathtaking, although probably somewhat exaggerated because of valuation problems. Based on official exchange rates, in 1992 Bulgarian exports to the former CMEA were only 9% of their levels in 1989 (Table 6). Czechoslovak and Polish exports were a third and Romanian a quarter. Even using 1990 as a base, by 1992 exports had fallen 60% in Bulgaria, 55% in Romania, 43% in Poland, and 45% in Czechoslovakia. Only Hungary posted more moderate declines, in part because official exchange rates better reflected market realities in 1989.

The increases in exports to developed market economies by some countries during this period were almost as startling as the decline in exports to the former CMEA. Through 1992, Hungary reported the largest increases with exports up by over three quarters in dollar terms (Table 7). Polish exports jumped 42% in 1990, and rose another 17% in 1991, before falling slightly in 1992. Czechoslovak exports to the developed West surged 58.1% over this period. In contrast, Romanian exports plummeted, falling to less than half their level in 1992, as economic reform failed to take hold and the pressure to export imposed by Ceausescu was released following his departure.

The third major shift in Eastern European trade was precipitated by the West European recession in 1993. Every country in the region except Albania reported declines in exports for 1993. Even countries like Romania and Bulgaria where exports had already declined during the transition, suffered another knock in 1993. In fact, after Hungary, Bulgaria reported the sharpest declines in exports. The most important factor in the decline has been the West European recession. DRI/McGraw-Hill estimates that German imports of manufactures fell 15.2% in dollar terms in 1993. As Germany is the most important market for almost every East European country and as a large share of East European exports to Germany are primary or intermediate goods purchased by German manufacturers, the decline in German demand has an immediate impact on East European suppliers. Austria and Italy, two other economies that have been hit hard economically, are also major East European markets.

East European firms are not only hurt because the European recession has been most severe in their major markets. They have also been squeezed because they have traditionally been the marginal suppliers. Since the 1960s, West European firms have turned to Eastern Europe for additional inputs when markets are booming. In recession, they return to traditional suppliers or in-house sources of supply. West European labour

policies probably exacerbate this effect. Although cost pressures increase in a recession, making lower cost East European labour more attractive, the costs of laying off labour in Western Europe are quite high. Many West European firms find it financially more palatable to avoid layoffs rather than continue to use East European subcontractors, even if the East European suppliers are cheaper. The one-off costs of layoffs are so high that many firms wish to minimise these during a recession.

In contrast to the gloomy export picture, import demand has been more mixed. Imports were very strong in Poland in 1993, up an estimated 16.8% for the year in dollar terms. Foreign aid and the recovery in Albania have permitted continued strong imports in that country as well. Excluding imports from Slovakia, which declined an estimated 30%, Czech imports increased 13.9% during the first half of 1993 to 4.577 billion. Hungarian and Slovenian imports were also up

The composition of imports has shifted dramatically, reflecting the restructuring of the economies and the effects of the recoveries. Machinery imports are up sharply in the recovering economies due to increased investment demand. Imports of consumer goods, including clothing, shoes, consumer durables, and food, have also risen as demand recovers. In a number of cases, superior Western products have eliminated domestic products. For example, Japanese and Korean consumer electronics have made great inroads in domestic markets. Branded soft drinks and consumer hygiene products have also eliminated or hurt local manufacturers.

Imports of raw materials, on the other hand, have not recovered. The closure of a number of steel operations has reduced the demand for iron ore and coke. Energy imports have also been tempered due to declining industrial demand.

Restructuring has resulted in a more "developed" pattern of imports; imports of components and subassemblies has increased sharply as the new operations of Western multinationals trade components with the parent companies. Domestically-owned manufacturers are also increasing demand for imports as they improve quality and their competitiveness by substituting superior for inferior components.

Other countries have not been able to afford more imports. Bulgaria, in particular, has been hurt by financing constraints. Financing has been a problem for Slovakia as well. In Slovakia imports are estimated to have declined 22% to 5.69 billion in 1993, compared to 7.32 billion in 1992. Imports from the Czech Republic bore the brunt of the decline.

Despite the increases in exports to developed market economies through 1992, East European exports totalled only 64.1 billion and imports, 70.8 billion in 1992, roughly equivalent to the trade of Switzerland or China in that year. The comparatively low level of East European trade would be even further depressed if intra-Czechoslovak and intra-Yugoslav trade were excluded. This trade added about 10 billion to exports and imports. With a population of over 100 million, Eastern Europe has substantial trade potential. Large increases in the volume of trade conducted by this region are likely over the next 10-15 years. These increases should greatly outstrip the growth of trade within the OECD or Western Europe.

The differing rates of change in trade with the former CMEA and the developed West have resulted in a dramatic shift in the geographical composition of trade. East European trade has shifted decisively in the direction of the developed West. In 1992 the share of the OECD in total East European trade (excluding Serbia and Montenegro) increased to 57.2% of exports and 57.8% of imports. Under the previous system, the developed West accounted for only a third of East European exports; the former CMEA accounted for well over one half. The highest share of OECD trade in total trade in 1992 was registered by Poland (72.2% of exports and 72.5% of imports), followed by Hungary and Slovenia (Table 8). The lowest share was recorded by Slovakia (29.5% of exports and 25.5% of imports). Slovakia still conducts the bulk of its trade with the Czech Republic. The country with the largest concentration of its trade with European Union in 1992 was Poland (57.9% of exports and 53.1% of imports), followed by Slovenia and Hungary. Bulgaria and Slovakia, again, reported the lowest shares, 30.8% and 22.3% of exports, respectively. The share of the EU in imports was similar. The importance of the EU to Eastern Europe is due in large part to increases in trade with Germany. Germany has become by far the most important trade partner of East European countries, accounting for 23.0% of total East European exports and 19.5% of total East European imports in 1992, followed by Russia (6.5%; 10.8%), Italy and Austria. Poland with 31.3% of its exports sold to Germany and 23.9% of its imports from there is the most dependent on Germany trade, followed by Hungary, Slovenia and the Czech Republic.

Although few of the countries provide detailed information on the commodity composition of exports by region, patterns reported by Czechoslovakia, Slovakia and Hungary are illuminating. By volume, Hungarian and Czechoslovak exports of machinery to the former CMEA tumbled 78.7 and 73.3%, respectively, between 1989 and 1991. As machinery accounted for over 60% of Czechoslovak exports to the CMEA in 1989 and 52% of Hungarian exports to this region, the declines in machinery exports accounted for a very large share of the drop in overall exports to this region. Exports of industrial consumer goods followed a similar pattern, although the falls were not quite as precipitous.

The experience of Hungary and former Czechoslovakia was repeated throughout the region. It was a consequence of rectifying the distorted, former patterns of trade. Traditionally, Eastern Europe had been a net exporter to the former Soviet Union of machinery, manufactured consumer goods, and agricultural products and a net importer of energy and raw materials. After the collapse of the CMEA, Soviet demand for machinery plummeted. In fact, much of the decline in industrial output in these countries can be traced to the collapse of trade with their former partners in the CMEA. Declines in exports to the former Soviet Union accounted for the bulk in the fall of this trade.

On the other hand, East European exports of machinery and manufactured products to the West have risen, reversing a decade of decline. In a number of instances, former East European exports to the CMEA were successfully diverted to West European markets, even in the case of such goods as machinery and transport goods. Between 1989 and 1991, Eastern Europe increased its share of the OECD market for imports of manufactures by 41%, from 0.5% in the late 1980s to 0.7% in 1990-91. Hungary and Czechoslovakia reported volume increases of 20.6 and 8.9%, respectively, in machinery exports to OECD countries and increases of 44.8 and 79.4%, respectively, in exports of manufactured consumer goods. In contrast to the 1980s, when raw materials, fuels and food products generated increases in exports, in 1990-91, exports of manufactures accounted for 96% of the increase in Czechoslovak exports to OECD countries. Key exports have been chemicals, garments, paper, construction materials, especially cement and glass, iron and steel products, manufactured metal products, and automobiles.

On the import side, the opposite pattern has occurred, with most countries reporting significant increases in imports of machinery and transport equipment (SITC 7) and miscellaneous consumer manufactures (SITC 8), while imports of fuels (SITC 3) and certain raw materials and semi-manufactures have typically declined. Clearly, the shift in East European imports towards machinery and consumer goods reflects the fact that in 1992 demand for imports was for the first time overwhelmingly driven by market factors and not by government directives in most countries. This change in economic

system also accounts for a broad diversification in East European imports. With a continued fall in GDP and industrial output in all countries except Poland and large increases in relative prices for these goods with the disappearance of implicit Soviet trade subsidies, the demand for imported energy and raw materials continued to shrink. Consequently, the share of imports of machinery and nonfood industrial consumer goods in most East European countries increased sharply in 1992 while the share of fuels, raw materials, and semi-manufactures declined.

Comparative advantage and changes in the composition of trade

Although every East European country has experienced sharp declines in exports of manufactured goods to the former CMEA and most have increased exports to developed market economies, changes in export patterns and the significance of particular commodity groups varies from country to country. Below, major changes in the commodity composition of trade are analysed for each individual country so as to provide an indication of revealed comparative advantage, especially in the case of manufactured products.

Bulgaria's most important exports in 1992 were plastics and plastic articles - 11.0%, followed by tobacco and tobacco manufactures - 7.2%, iron and steel - 6.8%, mechanical machinery - 6.2%, and electrical machinery - 6.0%. Apparel and textiles were also important, the former accounting for 2.5% of total exports. As elsewhere in Eastern Europe, the share of machinery and equipment in exports has declined dramatically, from 30.6% in 1991 to about 15.6% in 1992, because of the collapse of machinery and equipment exports to the former Soviet Union. Total machinery exports fell about 48% in dollar value terms in 1992 from 1990. Industrial non-food consumer goods still accounted for 22.3% of total Bulgarian exports in 1991, but in 1992 their share declined to about 11%. The relative importance of chemicals in Bulgarian exports has clearly risen dramatically - in 1991 these accounted for 10.9% of total exports and in 1992 they accounted for approximately 22.0% of total exports, i.e. their share almost doubled.

There was a notable increase in the share of machinery and equipment in imports over the last few years - from only 15.8% in 1991 to 23.0% in 1992, with the percentage rise in these imports reaching an impressive 86%. The share of imports of industrial consumer goods which amounted to 4.4% in 1991, rose to the 7-8% range. Imports of fuels and raw materials have fallen sharply.

Croatia's most important export category in 1992 was manufactured consumer goods (19.8% of total exports), followed by machinery and transport equipment (19.0%); and basic chemicals and chemical products (15.8%). Croatian imports in 1992 were quite diversified. Basic chemicals and chemical products were the most important, accounting for 18.0% of imports, followed by machinery and transport equipment (16.7%), and intermediate manufactures (14.0%).

The largest increase in **Czech** exports in 1992 was reported for intermediate manufactured products which rose 18.4%, primarily because of a sharp rise in exports of steel and steel products to the developed West, especially Germany. Exports of miscellaneous consumer manufactures were also up, 5.7%. However, exports of machinery and transport equipment and chemicals fell 15.3% and 5.4%, respectively. This pattern of shifts in export structure was definitely a major disappointment to the Czech government officials, who had hoped that the continued shift away from manufactured products to semi-manufactures and raw materials would be arrested in 1992. In 1992, the most important export category was intermediate manufactured products (32.2% of total exports), followed by machinery and transport equipment (25.2%), and miscellaneous consumer manufactures (11.5%).

With a 25.7% increase in total Czech imports (excluding imports from the Slovak Republic) in dollar value terms in 1992, imports of most products increased proportionately. By far the most rapid growth occurred in imports of machinery and equipment and miscellaneous consumer manufactures which were up 49.5% and 47.7%, respectively. One factor affecting growth in imports of machinery and equipment was the purchase of several Boeing aircraft from the United States towards the end of 1992. Imports of crude materials were up only slightly - 1.9% - reflecting further contraction in domestic industrial output and slow substitution of cheaper imported materials for certain more expensive domestic substitutes. With the sharp rise in imports of Western machinery and equipment, the share of these products in total Czech imports in 1992 reached 38.5%, becoming the dominant import item by a wide margin. The role of machinery in trade with Germany was especially strong. Roughly half of Czech imports from Germany were machinery and transport equipment; a little less than a fifth of its exports to Germany fell into this category.

Hungarian exports of industrial consumer goods rose 23.2% in 1992, with very dramatic increases in exports of clothing, footwear, and household textiles (53.4%). Exports of machinery, transport equipment, and other capital goods increased slightly - 1.0%. Notable increases were reported in exports of telecommunications equipment and products - 23.7%. Hungary's exports in 1992 were broadly dominated by raw materials and semi-finished products (28.7% of total exports), closely followed by industrial consumer goods - 26.3% and agricultural and food products - 24.0%. The share of machinery and equipment, including spare parts, was a comparatively low 18.4%.

On the import side, total Hungarian imports declined by 2.5% in current dollar terms in 1992 and similar declines were experienced in most key commodity categories. However,

Table 7: Total East European trade with developed market economies

(million USD)	Bulgaria	Czech Republic	Czecho-slovakia	Hungary	Poland	Romania	Slovakia	Slovenia
1989	1 301	N/A	4 741	4 249	6 667	4 417	N/A	N/A
1990	1 161	N/A	5 580	5 197	9 438	2 746	N/A	N/A
1991	902	4 414	5 656	6 922	11 029	2 040	1 452	3 061
1992	1 479	5 570	7 494	7 516	10 263	2 053	1 924	4 418
Index numbers								
1989	100	N/A	100	100	100	100	N/A	N/A
1990	89	N/A	118	122	142	62	N/A	N/A
1991	69	100	119	163	165	46	100	100
1992	114	126	158	177	154	46	132	144

Source: PlanEcon, based on national statistical bulletins

there were large shifts in imports within major commodity categories, with some imports up sharply and others down sharply. For example, imports of raw materials declined 20.7% while imports of semi-finished products increased 5.4%; imports of new machinery and equipment declined only 1.2% (with large increases in imports of transport machinery (up 22.9%) and other capital goods (up 63.9%), and large declines in imports of tractors and agricultural machinery (down 50.2%). There was a major change in the pattern of imports of industrial consumer goods, with substantial declines in imports of appliances and accessories (down 23.6%), radios, TV sets, and domestic electrical appliances (down 20.3%), and clothing, footwear, and household textiles (down 4.5%), while imports of other goods increased sharply, including furniture (up 83.6%) and detergents and cosmetic products (up 36.7%). The most important broad import category in 1992 was still raw materials and semi-finished products (excluding spare parts), which accounted for 30.6% of total imports, followed by machinery and equipment (including spare parts) (26.6%), and industrial consumer goods (22.3%).

As noted above, Hungary registered the worst export performance in Eastern Europe in 1993 with the possible exception of Bulgaria. Exports in dollar terms declined by over one fifth in 1993, reversing a number of the gains in exports made in 1992. The largest declines in exports were in exports to the EU which fell almost 30% in dollar terms. Exports of machinery actually rose during the year, up a scant 1-2%, but exports of industrial consumer goods were down sharply, by about a third, wiping out many of the gains of 1992. Within industrial consumer goods, the sharpest declines were registered in clothing and footwear, especially clothing manufactured on consignment, packaged pharmaceuticals, and household chemicals. Exports of transport equipment, on the other hand, were up sharply due to exports of automobiles from the assembly operations of General Motors and Suzuki.

Poland's most important export category in 1992 was intermediate manufactures, accounting for 27.2% of total exports, followed by machinery and transport equipment (19.1%). Miscellaneous consumer manufactures comprised 11.7% of total exports. The changes in the structure of Polish exports in 1992 were notably different from most other East European countries, which experienced large declines in exports of machinery and equipment (in Poland the decline was more modest) and non-food industrial consumer goods (in Poland, these exports actually increased significantly.

The pattern of change in Polish commodity imports in 1992 also departed in significant ways from the patterns observed elsewhere in Eastern Europe. In most East European countries in 1992, imports of machinery and equipment and non-food industrial consumer goods imports increased. In Poland, imports of machinery and equipment declined. Polish imports of crude materials actually increased, while most East European countries experienced declines in imports of crude materials. The most important import commodity category in 1992 remained machinery and equipment (29.8% of total imports). Chemicals and intermediate manufactures were also important, accounting for 13.5% and 11.8%, respectively. Miscellaneous consumer manufactures, accounting for 10.3% of total imports, were also important.

The commodity composition of Polish trade varies sharply between the developed market economies and the former CMEA. Intermediate manufactured goods accounted for 28.7% of exports to developed market economies in 1992; steel and non-ferrous metals exports were important products within this commodity group. In contrast, intermediate manufactured products accounted for only 12.4% of exports to the former CMEA. Machinery and transport equipment accounted for roughly the same shares of exports to both geographical regions in 1992, 17.2% to the developed market economies and 21.8% to the former CMEA. Food's share in exports to the former CMEA was almost double that to developed market economies. The share of consumer goods in total exports to developed market economies, on the other hand, was 14.1%, substantially more than the 7.8% share in exports to the former CMEA.

The most important commodity groups in **Romanian** exports in 1992 were: base metals (17.1% of the total), mechanical and electrical machinery (10.8%), textiles (10.6%), transport equipment - 10.4%, and chemicals - 9.7%. There were more dramatic shifts in the commodity structure of Romanian convertiblecurrency imports. Exceptionally large increases occurred in imports of hides and skins - up 359%, animal and vegetable oils and fats - 183%, wood pulp and cellulosic materials - 147%, plastics and rubber products - 140%, textiles and textile articles - 134% (this is a real surprise since this turned Romania into a net importer of textiles to the tune of 106 million in 1992, compared to net exports of 86 million in 1991), transport equipment - 63%, and mechanical and electrical machinery - 57%. With total convertible currency imports up only 11.3% and two or three-digit growth rates for the above, the Romanians cut other imports, primarily fuels. The extreme swings in the commodity composition of imports which occurred in 1992 reflected the process of "normalisation" of the import commodity structure from the Ceausescu days, in which energy imports swallowed an overwhelming share of the total. In terms of relative importance, fuels and mineral products still dominated imports in 1992 - they had a 32.0% share in total imports (down from 48.7% in 1991), followed by mechanical and electrical machinery - 15.3% (up from 10.8% in 1991), textiles - 9.5% (up from 4.5% in 1991), and chemicals - 7.0%.

In 1992, total **Slovak** exports (excluding exports to the Czech Republic) increased by 6.9% in dollar value terms, but as in the case of the Czech Republic there were rather diverse developments in individual commodity categories. Notable increases occurred in Slovak exports of crude materials (up 31.4%) and intermediate manufactured products (up 25.8%). The rapid increase in exports of intermediate manufactured products reflected large increases in exports of steel and steel products from the Kosice Steel Works. Kosice steel exports accounted for most of the 45% increase in exports of intermediate manufactures to the developed West in 1992. The Kosice Steel Works is undoubtedly the most modern and efficient steel producer in Eastern Europe and in terms of price it may be one of the most competitive (in its range of steel products) in all of Europe. Unfortunately for the Slovaks, it is also a major threat to less efficient Western European steel makers with high labour costs. The EU, in particular, has made it a target of quantitative restrictions on imports.

The expansion of exports in the above three categories was critical to offset significant declines in export earnings in other areas, notably from exports of machinery and equipment (down 17.7%) and fuels (down 24.4%). With significant losses from declining exports of manufactured products, the developed market economies of "containment" of Slovak steel and intermediate manufactured products is causing serious injury to the Slovak economy. The rise in exports of steel and other semi-manufactures pushed the share of this category in total Slovak exports to 42.6% in 1992, decisively overshadowing exports of machinery and transport equipment with its 17.3% share. Other important export categories for Slovakia in 1992 were miscellaneous consumer manufactures (14.4%) and chemicals (11.4%).

The pattern of changes in Slovak imports, excluding imports from the Czech Republic, in 1992 was quite similar to that in the Czech Republic with one major difference - whereas total Czech imports were up 25.7% in dollar value terms, total Slovak imports declined by 4.6%. Despite the overall decline, substantial increases took place in imports of machinery and transport equipment (up 27.4%), and miscellaneous consumer manufactures (up 26.8%). As in the Czech

Table 8: Share of trade with West in total East European trade, 1992

(%)	Share of exports	Share of imports
Poland	72.2	72.5
Hungary	70.5	69.2
Slovenia	66.1	66.3
Croatia	55.9	52.9
Romania	47.9	52.8
Czech Republic	47.3	50.2
Bulgaria	42.3	46.5
Slovakia	29.5	25.5

Source: PlanEcon, based on national statistical bulletins

Republic, significant contraction occurred in imports of fuels and crude materials. The combination of a substantial increase in imports of machinery and equipment and a contraction in imports of fuels caused the former - with a 31.9% share in total 1992 imports - to overtake the latter as the most significant import category.

The unusual aspect of **Slovenian** exports is their extreme concentration in three commodity categories - SITC 6, 7, and 8 - which together accounted for 79.7% of total Slovenian exports in 1992. The largest of the three is machinery and transport equipment which accounted for 29.4%, followed by manufactured goods classified by material (27.1%), and miscellaneous manufactured consumer products (23.2%). The extremely high share of manufactured products in exports - 88.8% if chemicals are added to the above three groups - sets Slovenia apart from the rest of Eastern Europe, showing that Slovenia's economy is much more West European in its industrial and trade orientation than other economies of Eastern Europe, with considerable similarity to Austria or Switzerland.

Slovenian imports were considerably more diversified than exports. The largest import item in 1992 was machinery and transport equipment (26.4%), followed by manufactured goods classified by material (19.6%), and chemicals (12.4%).

CHANGES IN TRADE FLOWS

The East European export "push," particularly in the case of steel and steel products, cement and certain construction materials, textiles, and food has caused considerable political problems as large increases in East European exports in these commodities have generated adverse response from domestic Western producers of identical or similar products. The problem, however, has primarily been the rapid increases in exports, rather than East European dominance in any market. In almost all cases, East European manufacturers claim very small shares (less than 5%) of EU import markets. However, the increased competition has come at a difficult time as dropping demand has pressured manufacturers throughout Europe. More importantly, increased competition from Eastern Europe in selected sectors is part of the process of integrating the economies of Eastern and Western Europe together. Somehow most Western decision makers fail to understand that any fundamental economic restructuring which will take place in the East will automatically require corresponding restructuring in the West.

The association agreements that have been signed with the East European countries have reduced standard levels of protection on East European exports. The agreements have a number of bilateral safeguards embodied within them. However, at the beginning of 1994 anti-dumping/anti-subsidy measures against Eastern Europe and the former USSR accounted for only 0.34% of total trade with these countries.

The European Council which took place in Copenhagen in June 1993 adopted important decisions to improve market access of East European products. Most custom duties on industrial products will be progressively abolished within the next couple of years, while quotas and ceilings on East European imports follow the same timetable.

Contrary to the perception of East European political circles, West European protectionism has not been the major cause of the drop in exports in 1993 nor are current levels of protection likely to forestall export increases in 1994. Czechoslovak, Hungarian and Polish exports to the EU increased rapidly in 1990-1991 despite higher barriers to East European exports than are currently in place. With the passage of the GATT agreement and continued implementation of the association agreements, overall levels of protection should decline in 1994 and beyond.

Written by: PlanEcon

Investment strategies of EC companies in non European countries

INTRODUCTION

The completion of the Single European Market and the reduction of trade barriers between the main trading regions have considerably influenced corporate investment strategies of both EC and non-EC firms within the Community territory. Such strategic movements within Europe are, however, only one element of European and non-European companies' global strategies. During the 1980s, European companies have invested heavily in non-European countries, either to strengthen their presence in other world regions, to gain access to new markets or to take advantage of lower production costs in these regions.

This article analyses the recent trends in EC foreign direct investment (FDI), and provides an overview of the geographical concentration of the EC's FDI. Particular attention is focused on outward investment towards the developing world (Asia excluding the Middle East, Latin America excluding the Caribbean, and Africa) This article also examines the main factors underlying FDI strategies in a number of industrial sectors in the EC, and discusses the extent to which these factors will impact over the short and medium term.

RECENT TRENDS IN EC FOREIGN DIRECT INVESTMENT

Global patterns of foreign direct investment

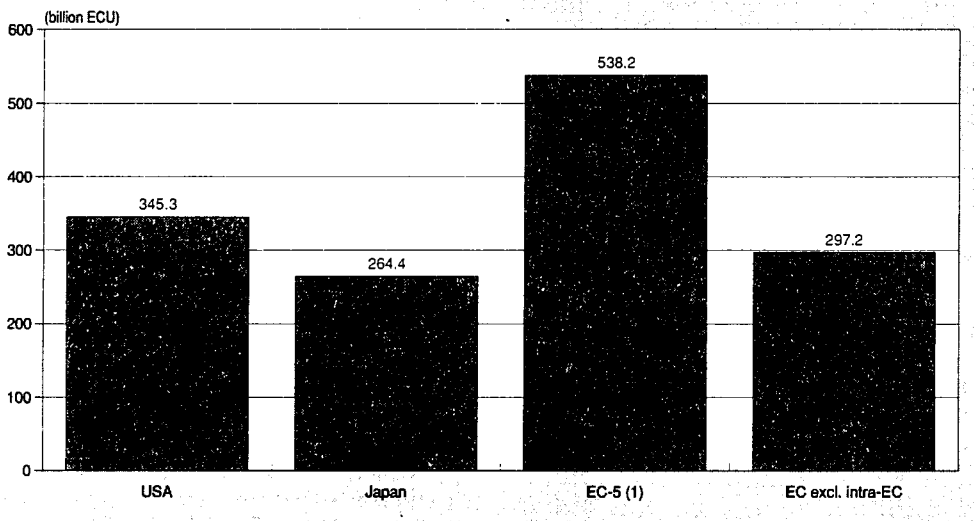
The US, Japan and the EC are responsible for the bulk of world FDI. If intra-EC investment is included, the EC is the largest single investor, with a stock of FDI valued at 538 billion ECU at the end of 1991, compared with 345 billion ECU for the US and 264 billion ECU for Japan. Excluding intra-EC investment, the EC slips back into second place behind the US, at 297 billion ECU, as shown in Figure 1.

FDI outflows from the EC grew significantly during the 1980s, from an annual flow of 14 billion ECU in 1982 to 84 billion ECU in 1989, including intra-EC flows. Between 1985 and 1989, outflows increased dramatically, but were overwhelmingly directed internally. Intra-EC FDI peaked in 1990 and has since fallen back, while EC FDI in the developing world is still on an upward trend.

Even so, in 1991, 57% of FDI flows from the Big Four EC investors (France, Germany, the Netherlands, and the United Kingdom) were directed internally, and only 10% went outside the major industrialised nations of the OECD. Just 6% went to the developing regions that are the focus of this study. This represented a flow of 3.6 billion ECU, equivalent to 0.5% of total fixed investment within the Big Four (708 billion ECU). The most dramatic recent shift in EC FDI flows is to eastern Europe rather than Asia, Latin America or Africa. In 1992, flows to eastern Europe from France, Germany and the Netherlands alone were 1.3 billion ECU.

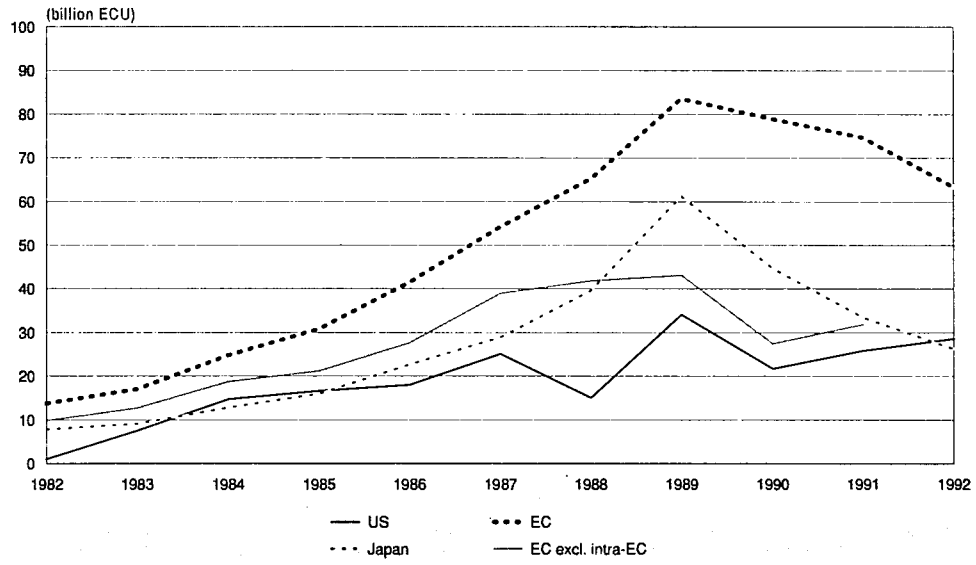
The ownership of EC FDI is very unevenly distributed across countries. The UK is by far the most significant EC investor in the developing world, followed by Germany, the Netherlands, France and Italy. In manufacturing alone though, the UK and Germany are very similar, since Germany's FDI is more heavily tilted towards this sector.

Figure 1: Total direct investment abroad, end-1991



(1) France, Germany, the Netherlands, Italy and the United Kingdom
Source: OECD and National Statistical Offices

Figure 2: Total FDI outflows for the major investors



Source: OECD and National Statistical Offices

Foreign direct investment flows to the developing world

EC FDI to less developed countries (LDCs) represents a small, albeit growing, share of total business investment in the EC. In 1991, the main four EC foreign direct investors (France, Germany, the Netherlands, and the United Kingdom) invested 5.8 billion ECU outside the OECD (10% of their total foreign direct investment outflow) and 3.6 billion ECU in Asia excluding the Middle East, Latin America excluding the Caribbean, and Africa (6% of their total outflows). These represented 0.8% and 0.5% respectively of total domestic fixed investment in these four EC nations.

Flows of FDI from the Triad (i.e. the EC, Japan and the US) to the developing world rose dramatically during the 1980s (though not more rapidly than flows of FDI within the Triad). Outflows of investment from the EC to non-OECD nations rose from 2.8 billion ECU in 1982 to 13.0 billion ECU in 1991. The 1991 figure is inflated, though, by a 4.5 billion ECU outflow from Italy which is unidentified but which looks suspiciously like a purely financial transaction. Excluding Italy, the EC FDI outflow to the developing world in 1991 was 8.6 billion ECU, very similar to the outflows in 1988-90, but still two to three times higher than in the early 1980s. This EC performance was far from unique, though. The level and the growth rate of investment by the US and Japan in non-OECD nations in the 1980s were very similar to those for the EC.

Let us now look at the more narrow group of developing nations upon which this study focuses. By 1991, the Triad had accumulated a stock of FDI in Asia excluding the Middle East, Latin America excluding the Caribbean, and Africa of a combined total of 154 billion ECU. This was distributed very evenly between the Triad members: Japan: 54 billion ECU; US: 52 billion ECU; EC: 49 billion ECU. The Japanese stock, though, is probably overstated since it is based on cumulated flows of approved FDI, so it both includes approved FDI that never took place and ignores disinvestments. It may not in reality exceed the EC stock.

Asia and Latin America have been much more important destinations for FDI than Africa. At the end of 1991, the Triad's stock of FDI in Asia excluding the Middle East had reached 79 billion ECU, ahead of Latin America excluding the Caribbean at 56 billion ECU. In comparison with these two blocks, Africa has been only a minor destination, with a stock of just 19 billion ECU (much of that in South Africa).

It is worth noting here just how important it is to treat the Caribbean region separately. The Triad's FDI stock in the Caribbean and Panama (73 billion ECU) is bigger than its stock in the rest of Latin America, and nearly as large as the stock in Asia excluding the Middle East, but it consists almost entirely of holdings in tax havens. Combining it with the rest of Latin America would give a totally misleading picture of the international location of production.

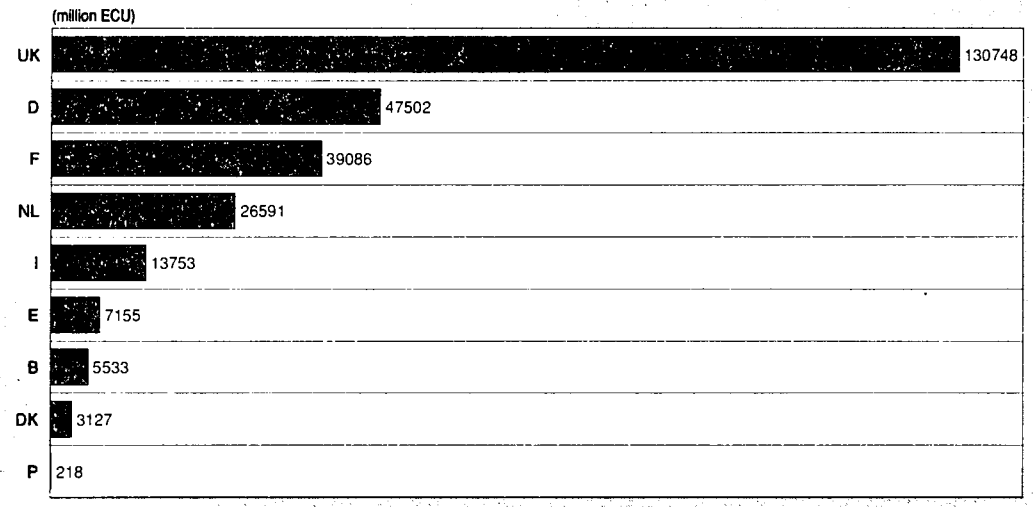
It is not surprising that geographical proximity has led Japan to be the largest investor in Asia, and the US to be the largest investor in Latin America. The EC takes third place in Asia and second place in Latin America. The EC's investment stock in both of these regions is just below 20 billion ECU. The EC leads only in Africa.

Latin America has historically been the main developing world recipient of EC FDI in manufacturing. Although Asia has been catching up, the most significant shift in EC FDI flows in recent years has been the diversion of investment flows to eastern Europe. For Germany and the Netherlands, at least, this may have come at the expense of, rather than in addition to, flows to Asia.

Asia (excluding Middle East)

Recent FDI flows to Asia have been the most substantial to any developing region and have shown the most rapid growth, with Japan the main source of the flows. EC and US FDI in developing Asia have followed a steadier but much shallower upward path. EC flows peaked in 1991, the last year for which we have complete data, at 2.0 billion ECU, just below the US level of 2.7 billion ECU. From the data available so far for 1992 it seems that EC flows to developing Asia actually fell back. Flows from France rose by 114 million ECU, but flows from Germany fell by 156 million ECU, and flows from the Netherlands fell even more steeply by around 550 million ECU. Flows from these three nations to developing Asia added up to just 546 million ECU in 1992. This can be compared with a flow of 1.3 billion ECU from the same nations to eastern Europe.

Figure 3: Cumulative FDI outflows by EC country, excluding intra-EC flows, 1982-1991



Source: OECD and National Statistical Offices

Although EC flows to the Asian region did grow in the 1980s, they should be placed in perspective. Flows grew sharply to all regions, and flows within the EC grew particularly rapidly. In 1991, Asian developing nations still accounted for less than 3% of total EC FDI. The share of EC FDI going to developing Asia actually eased back gradually over the decade of the 1980s due to the dramatic increase in intra-EC FDI.

Latin America (excluding Caribbean)

The US has been the main investor in Latin America by far. After investing only modestly there in the early part of the 1980s, (and actually disinvesting in some years) FDI outflows from the US to Latin America surged from a disinvestment of 0.9 billion ECU in 1985 to a new peak of 4.5 billion ECU in 1992. In contrast, FDI flows from the EC to Latin America have stayed roughly flat at around 1.5 billion ECU per year, while flows from Japan have fluctuated between 0.5 billion and 1 billion ECU.

An examination of flows of FDI from the EC to the two major developing regions over the last five years for which data is available (1987-1991) indicates that the total flow to Latin America and Asia was very similar, both totalling 7-8 billion ECU over the five years. The growth compared to the previous five years was much stronger for Asia. Even within the 1987-1991 period, the momentum of the flows was strongly towards Asia. The flow to Latin America was relatively static, never exceeding 1.7 billion ECU, while the flow to Asia gradually strengthened, reaching 2.0 billion ECU in 1991.

Africa

The EC is the leading investor in Africa although, even for the EC, Africa is only of minor importance as a destination for FDI relative to other developing regions. The EC and Japan continued to invest in Africa during the 1980s while the United States disinvested heavily at the end of the decade. The EC invested more in Africa during the 1980s and early 1990s than either the US or Japan, with a dramatic spike in 1989 to a level of 2.7 billion ECU.

The significance of Africa for most EC nations is very limited, though. Most of the FDI flowing from the EC to Africa in the 1980s originated in the United Kingdom.

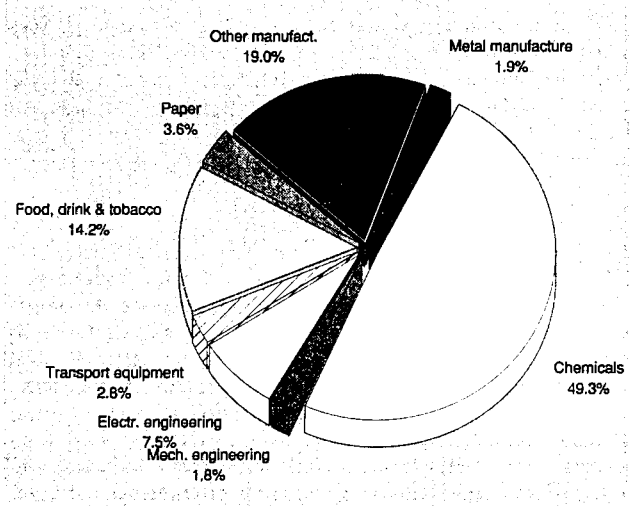
GLOBAL STRATEGIES OF EC FIRMS IN SELECTED SECTORS

The sectoral distribution of EC FDI in the developing world is heavily concentrated in manufacturing and energy (mainly oil). Within manufacturing, chemicals is by far the most important sector, accounting for nearly half of EC FDI in the developing world. The other significant sectors are electrical engineering, food, drink and tobacco, and motor vehicles, but even combined together these sectors are less important than chemicals.

The present chapter will examine FDI strategies of EC firms in selected manufacturing sectors. It is difficult to make general statements about the EC's overall FDI activity in manufacturing by country/region and by sector because there are too many gaps in the data. Some conclusions can be derived, though, based on the data discussed in the country sections above.

If we combine the data for France, Germany, the Netherlands, and the UK (EC-4) we find a manufacturing FDI stock in Asia, Latin America, and Africa of 23 billion ECU at the end of 1991. EC manufacturing FDI in developing regions has been dominated historically by Germany and the United Kingdom. These two account for about two-thirds of this stock, in roughly equal proportions. Germany's manufacturing FDI is mainly in Latin America, the UK's mainly in Asia.

Figure 4: Sectoral breakdown of UK FDI to developing world, 1991



Source: OECD and National Statistical Offices

Table 1: The importance of FDI from the Europe-4 (1), 1991

(billion ECU)

Total FDI flows	57.1
Extra-EC flows	24.6
Flows to non-OECD nations	5.8
Flows to the developing world (2)	3.6
Total domestic fixed investment in the Europe-4	707.5

(1) France, Germany, the Netherlands, United Kingdom
(2) Asia excluding Middle East, Latin America excluding Caribbean, Africa
Source: OECD and National Statistical Offices

Manufacturing investment in developing regions is mostly concentrated in the chemicals sector. 45% of the FDI stock for the EC-4 is in chemicals. The most important regional destination for chemicals investment is Asia.

Electrical engineering (15% of the stock), transportation equipment (11%), and food, drink, and tobacco (10%) are next in importance. The investment in transportation equipment is dominated by Germany's investment in road vehicles in Latin America. Investment in the other two sectors is much more evenly spread both by source and destination.

Chemicals

The chemical industry ranks among the manufacturing sectors in Europe that perform the largest amounts of FDI in LDCs. In the group of countries for which detailed statistical information is available (the UK, Germany and France), the chemicals industry had an accumulated FDI stock of 6.6 billion ECU in LDCs at the end of 1991. This represented about 40% of manufacturing FDI by the same countries. The share of the chemicals industry in manufacturing FDI in LDCs amounted to 28% in Germany, 46% in the UK and even 54% in France. The weight of the chemical sector in European FDI in the LDCs is a result of the leading position of the European chemicals industry in world markets.

FDI in LDCs by chemical companies largely reflects a desire to diversify into new geographical markets. Especially Southeast Asia and China are chosen as new expansion areas. Their enormous growth potential, due to the combination of a huge population and an economy at the start of industrial development, is in sharp contrast with the stagnating European home market. UK firms, which already have an important presence in Asia, are still expanding production capacity to follow demand growth and are looking for new geographical markets in China where they are still only marginally involved.

LDC production mainly serves local or regional demand. This is especially the case in Southeast Asia where a rapidly growing local demand easily absorbs all production. Consequently, relocated production does not replace European production, but at most limits the growth of exports from Europe. The motivation to reduce production costs by souring cheaper labour in LDCs plays only a minor role. There is evidence though that Latin American plants, mainly in Mexico, are increasingly being used as a cheaper source of supply for the North American markets.

The business segments in which European chemicals companies concentrate their FDI are specialty chemicals (agrochemicals, fertilisers, dyestuffs, paints,...), fibres and pharmaceuticals. FDI in pharmaceuticals is extensive due to the national differentiation of markets resulting from national regulations and licensing rules. It is estimated that FDI accounts for twice the value of pharmaceuticals that enter into international trade. The output being produced or the production processes often involve proprietary technology, which the investors prefer to apply in wholly or majority-owned ventures. The fastest growing products are those being supplied to the textile and automotive industries in Southeast Asia and China: fibres, additives for textile production, plastics, dyestuffs, pigments and paints.

By contrast, European chemical companies are not interested in deploying basic petrochemical activities in the LDCs, because they have few competitive advantages to exploit in that business segment. The manufaeture of basic petrochemicals has a low value added and uses fairly unsophisticated and widely known technologies. If western companies are (or were, since this is mainly a thing of the past) involved in petrochemicals in the LDCs, it is mainly through ventures that involve no or only small capital investments: joint ventures with minority share, licensing, technical assistance, plant engineering and construction.

Mining and metals processing

The metals industry is highly dependent on downstream industries for demand. Depressed levels of investments by these industries had caused a heavy drop in demand for metals and reactions to overcapacity is causing industry concentration and capacity cuts, particularly in steel. A rapid rise in imports from Eastern Europe and the CIS, whose products are artificially cheap due to energy subsidies and cheaper labour, has hastened the decline in demand for EC metal goods; this is especially true for both steel and aluminium.

Under the current circumstances recent foreign investment activity by metal producers has been slight. Those foreign investments that exist today were generally made more than one decade ago. Reasons for the investments were more for locating production closer to the natural resource that forms the raw material for the industry. Since European iron ore quality is low and expensive to mine, EC steel makers import a high volume of ore from mines that they partially or wholly own within the LDCs, as well as within the framework of management/technology exchange contracts or directly from the world market.

Crude and semi-finished products made in the foreign country of investment were also targeted for the markets in and around that nation or for supplying the world market in general. This results in EC-based metal processing firms purchasing semi-finished materials for final products. The EC thus remains a net exporter of steel products, although in the past three years there has been a negative growth rate in extra-EC exports.

As developing countries grew both in economic and technological terms, these nations began making investments of their own within the metals industries. These entailed either the formation of new firms that directly competed with EC owned local companies, or the purchase of all or a portion of the EC subsidiary. During the recent global economic downturn, companies formed by the foreign countries have had difficult times since they have now essentially taken on the majority of the business risks formally shouldered by the EC investing company who supplied the majority of the original capital. The more recent investments made by EC companies have been more in the form of joint ventures, technology licences and management assistance, with some loans and partial investments. Majority or wholly-owned subsidiaries are not as common because of the high risk of foreign demand fluctuations, exchange risks, and, occasionally, political risks.

There is unfortunately not enough statistical data available to give a price figure for FDI flows by EC metal producers in the LDCs. However the EC metal industry does not rank among the largest direct investors in foreign countries. Furthermore, FDI does not play the prominent role in direct capital formation for this particular industry. Other forms of investment, such as technical assistance contracts, licensing or other contractual forms are more common in this sector.

Mechanical engineering

The stock of FDI by the mechanical engineering industry in the LDCs amounted to 988 million ECU at the end of 1991 in the countries for which statistical information is available (Germany, the UK and France). This represents about 6% of manufacturing FDI in LDCs by these three countries.

Foreign investments by EC mechanical engineering producers have mainly been targeted at gaining access to local markets in the LDCs and their surrounding area. This is mainly the case for heavy industrial equipment and construction related products, but has also been the case of some smaller construction equipment such as industrial hand tools. The relocation of EC capital has either been in wholly owned subsidiaries or joint ventures with new or existing foreign companies. The reasons cited were closer proximity to the foreign market, avoidance of import tariffs, high transport costs, lowering the company's vulnerability to business cycles and lower labour costs. In one case, it was cited that relocated production did replace former EC production for export. In another case, a German manufacturer stated that relocated production increased activity within the EC for the provision of support to the foreign activities.

Electrical and electronic engineering

The stock of FDI in the LDCs by the electrical engineering and electronics industries amounted to 3,415 million ECU at the end of 1991 in the countries for which statistical information is available (Germany, the Netherlands, the UK and France). This represents about 15% of manufacturing FDI in LDCs by these four countries.

The electrical and electronics engineering sector has a clear strategy toward foreign expansion through direct investment in wholly owned subsidiaries or, more commonly, joint ventures. The main goal of these investments has been to penetrate markets in the region of the host country. Sometimes a local presence was required to avoid tariff barriers. Lower labour costs are a secondary benefit in most investment decisions. LDCs are considered to offer attractive investment opportunities because of their growth prospects. EC firms are targeting Southeast Asian countries for mid-term growth and East European and former Soviet Union countries for longer term growth.

In general, production of consumer electronics takes place where the products will be marketed. However, there is an increasing tendency to relocate production to low-wage regions. For example, on the ground that European labour costs are too high, a large EC consumer electronics producer is running down mass production of laser disc players and other audio equipment in the EC and transferring most production to the Far East, which has become the major destination of FDI by EC consumer electronics manufacturers. Not only do lower labour costs weigh in the choice to process FDI, however. EC firms are also increasingly locating production facilities in countries characterised by high market growth. As a matter of fact, a large amount of FDI stocks by EC firms occurred in the past years in Asian or far east countries.

It is nevertheless interesting to note that the employment and production effects in Europe of these relocation movements by EC companies outside of the EC are partly offset by recent moves in the opposite direction by Asian companies relocating production from Asia to Europe. According to Kaisui, the labour cost for assembling a TV set in Europe represents only 10% of the total cost of the set. Production costs in Asia are therefore only marginally lower, and the gap is narrowing as wages in these countries increase.

The location and size of production in the electronics industry is generally determined by increasingly fewer large companies or groupings of companies operating globally, which either own or effectively control the location of production in the component industry. Consequently, electronics manufacturing is now for the most part a global business, i.e. globally co-ordinated production of globally standard products by multinational enterprises.

Production tends to be kept close to home where the product or process is at a technological leading edge, while they are still in development, and when volumes are low. Otherwise, manufacturing location is mainly determined by the size of regional markets, the economics of production and the availability of skills. During the boom years of the 1980s, there has been a noticeable shift in the centre of gravity of electronics production, mainly to the newly industrialised countries and the developing countries of the Far East. Indeed, these areas combined low wage costs with a well educated workforce and a rapidly growing market.

The NICs in Southeast Asia (namely South Korea, Singapore, Taiwan and Hong Kong) have become favoured sites where EC companies set up semiconductor facilities, in order to benefit from low costs and highly educated workforces. In contrast, Latin American and African countries do not represent a significant destination for investment in such production activities. The analysis of the origin of extra-EC imports gives further evidence of the preference for EC companies to locate production facilities in South East Asia. In 1990, above 13% of total extra-EC imports of electronic engineering products originated in Singapore and Taiwan.

Motor vehicles and components

The motor vehicles and components industry accounts for about 10% of FDI in LDCs by the manufacturing sectors in the countries for which statistical information is available (Germany, the UK and France). At the end of 1991 the stock of FDI in LDCs by the transport equipment industry (mostly automotive) stood at 2,420 million ECU.

FDI in LDCs by EC automotive companies mainly consists of the investments of the large German firms in Latin America, notably in Brazil, Mexico and Argentina. The predominance of Latin America as destination of the investments of German firms has historical reasons. In the 60s and 70s the Latin American subsidiaries only served the protected local market. In the 80s however they were integrated in the global production strategies of their parent companies and now they export vehicles and components to the US and Europe. One can conclude that FDI by the German automotive companies in Latin America has reached its final stage. Indeed, with the exception of Volkswagen in Mexico, the Latin American subsidiaries grow in line with the groups they are part of.

In Asia, German and European automotive manufacturers are still largely absent. While the investments of German firms in Asia are growing rapidly, they still represent only a small fraction of total group assets. Japanese car manufacturers on the other hand are very active in this region, mostly through joint ventures with limited financial stakes and the government as partner. These ventures follow the same evolution as European and American subsidiaries in Latin America: from production for the local protected market to integration into the parent strategy. Within the ASEAN countries, specialisation in production between countries is possible because many protectionist import duties depend on ASEAN content and not on local content. Only Japanese producers have an ASEAN-wide integrated strategy. German presence in Asia will undoubtedly grow in the future. Since 1990 Volkswagen is investing heavily in the expansion of its joint ventures in China. Last year the Group created a new Board of Management responsible for the Asian region, reflecting its important role in corporate strategy. The main motivation for investing in Asia is the enormous growth potential of the Asian market. Volkswagen expects China, presently its tenth largest market, to move up to third place as early as 1996.

Textiles and clothing

The emergence of new important players in the textile and clothing industry has completely disrupted the world market. Countries located in South East Asia (Taiwan, Hong Kong, and South Korea) emerged as major textile producers in the fifties at a time when they were implementing an export-oriented industrialisation strategy. In the 1980's these countries' industrial strategies shifted towards higher technology and skill intensive activities. The NICs were replaced by countries like Indonesia and the Philippines and more recently by China, Morocco, Turkey and Bangladesh.

These new producers made large inroads in the world's market by selling cheap textiles and clothing products. To remain competitive, EC manufacturers reacted by either increasing their flexibility and diversifying their product ranges, and by transferring part of their activities towards low-wage countries. The Germans were first to adopt this strategy, and started sending semi-finished products to neighbouring countries presenting low wages (Turkey, Yugoslavia in particular). In a first stage, this led clothing producers located in other parts of Europe to relocate in order to maintain competitiveness. In a second phase, the phenomenon of relocation started to be implemented in upstream sectors, such as textiles, despite their higher capital intensity than clothing.

This relocation strategy, developed on a large scale, has major consequences on the EC's trade balance. Europe's textiles and clothing industry nets a trade deficit in both textiles and garments, though the latter account for the bulk of the deficit. This witnesses large flows of trade between Europe and low wage countries, where either subcontractors or European firms located there produce garments from raw materials or semi finished products exported from Europe. This activity then gives rise to further imports into the European market. EC know-how exerts an influence on EC imports which include products designed in Europe, and marketed under EC brand names. A report by Texco/KSA for CEC estimates that a third of EC clothing imports are controlled by EC manufacturers.

Whereas the textiles and clothing industry has long been involved in foreign operations in developing countries (far more pervasive in clothing than in any other segment of the industry), FDI was never significant in the first place. The bulk of investment in these countries takes the form of non equity investment such as international subcontracting, followed at a considerable distance by licensing, which is mostly found in the more fashion oriented products. Textile producers are, however, also involved in these countries via FDI, through the supply of second-hand textile machinery: often, as they have re-equipped their local plants with more advanced machinery, they tend to transfer their older equipment to developing countries through notably FDI, as part of broad strategic considerations.

There is no statistical data available which separates FDI by the textiles and clothing industry from other manufacturing FDI. However, the study of the EC's major trading partners provides additional information on the geographical distribution of textiles and clothing output. While developed countries like Switzerland, Austria or the US rank as the EC's major suppliers of textiles, the EC imports massive amounts of (mainly low-price, mass produced) clothing from the developing countries. Among them are, by decreasing order of importance: China, Hong Kong, Turkey, Yugoslavia, South Korea, Morocco, India, Tunisia, Thailand, and Indonesia. It is noticeable that the EC holds a trade deficit with all these countries (except Hong Kong) in both clothing and textiles. This indicates that the kind of activities developed with these Far east countries is quite different from the trade developed with east European or north African countries, where Outward Processing Traffic (OPT) is the most common form of production organisation.

Pulp, paper and paperboard

In the past, pulp and paper companies have processed FDI in LDCs for several reasons: to enter new markets, to reinforce the company's presence in foreign markets they entered long ago, to be closer to raw materials and to use the lower cost labour to produce pulp and lower grade products for the local and world markets. Since then, host countries have started their own companies or have taken over the foreign-owned firms to compete against the EC (and often the EFTA and North American) companies. EC firms have also made joint ventures, technology and management assistance investments outside the EC. These types of investments are, in fact, the more common ones to take place today. Foreign investment in production aimed at supplying the world market may have hurt EC pulp and paper companies because of the resulting worldwide overcapacity in pulp and paper production. Responses from the pulp and paper industry indeed indicated that recent investments in non-EC countries added to, not detracted from existing EC production. In fact, since many types of pulp are essentially commodities that are traded on a global scale, prices are easily affected by large capacity investments made anywhere in the world.

Another stated reason for foreign investment was to avoid the transportation cost of serving a distant market. To remain competitive with local production firms, EC firms had to relocate production to within a reasonable distance from the customers, particularly for finished paper products. Import tariff barriers have also played a role in encouraging the relocation of production facilities.

For the companies that are re-importing their foreign production to the EC, they do so because of the availability and cost of the raw materials to make pulp. Since it makes more economic sense to ship the semi-processed material rather than logs, EC firms with foreign pulp or paper mills can then benefit from the cheaper labour that exists near the raw material source. Pulp and paper company strategies are not necessarily geared for exploiting cheaper labour forces as the primary reason for investing overseas.

Food, drink and tobacco

The food, drink and tobacco industry in the countries for which statistical information is available (the UK, the Netherlands and France) owned a stock of FDI in LDCs of 2 375 million ECU at the end of 1991. This represents about 10% of total FDI in LDCs by the manufacturing sector.

Food, drink and tobacco companies expand in LDCs for two reasons: to diversify out of the mature European and North American markets into growth areas, and to increase the revenue from their brands by selling them in a larger area.

Expansion in the LDCs usually takes the form of FDI in wholly or majority-owned operating subsidiaries serving the local or regional market. Local production is necessary because food products are difficult and expensive to transport, certainly in LDCs where infrastructure is poor and distances large. It is therefore impossible to serve any sizeable market through exports from Europe. For the same reason, exporting of food products from LDC subsidiaries to Europe is excluded.

Food companies, especially the large ones, prefer to invest in wholly or majority-owned subsidiaries because this enables them to assure a consistent product quality around the world. This is important to safeguard the reputation of their brands. However, when smaller companies set up operations in the LDCs, they are more likely to use joint ventures with limited financial stakes. The preferred way of entering a market in the food and drink industry is by acquiring an existing firm, if suitable takeover candidates are available. The acquired firm offers the acquiring food group immediate access to local distribution channels and locally known brands. The own brands can then be added on.

Asia (China, India and Southeast Asia) is the fastest growing market for food products and cigarettes, and therefore also the most attractive to western food conglomerates. While average purchasing power is very low, this is compensated by the high growth rates of income and the enormous population size. Sales of packaged foods suddenly take off when GDP per person passes the level of 5 000-10 000 USD per year. As more countries cross this threshold food product sales grow faster than income. A small fraction of the population (but in absolute numbers very large) has an affluence comparable to west European countries. They buy the most sophisticated processed foods and are very conscious of the snob value of western brands. To take advantage of these growing market opportunities, British companies, already present in Southeast Asia and India, are now rushing into China.

CONCLUSION

Distinctive sectoral patterns have been identified for FDI strategies of EC firms. This distinction can be made between two sets of sectors based upon the reasons sustaining their investment strategies. The strengthening of the competitive position of firms following the concentration movements in EC industry over the late 1980s, has made EC firms operating in sectors such as chemicals, motor vehicles, food, drink and tobacco or electrical and electronics engineering, more competitive on world markets. This has created an incentive for them to expand abroad to have access to an enlarged market. For these industrial sectors, geographical diversification is seen as a key strategy for future success or even sometimes for survival. Local production will therefore be maintained, or even expanded, so as to achieve substantial market penetration or to avoid tariff or non-tariff barriers.

For other industrial sectors, market liberalisation in Europe has heightened the competitive environment and has sometimes created an incentive for firms to relocate part of their activities abroad to reduce production costs. As a matter of fact, EC firms operating in the textiles and clothing sector, turned to relocation because the competitive climate in the EC had become too strong for them to survive without relocating part of their activity. In the textile and clothing sector however, FDI has never and will not play the prominent role in direct capital formation. Historically, non-equity forms of investment and involvement in the less developed countries have dominated over direct investment. This is also the case in companies operating in other sectors such as mining and metals processing, mechanical engineering or pulp and paper. Prospects for FDI growth will remain relatively low in these sectors, as they will focus their development on a centralised production system in Europe (in the case of mechanical engineering) or will concentrate on their key assets such as management, product development or marketing.

Written by: DRI Europe

Eco-industries in the EC

INTRODUCTION

The 1957 Treaty of Rome did not confer the competence of environmental policies to the EC. The environmental policy is now enshrined in the Treaty on European Union that came into force on 1st November 1993. However, over the past two decades, the EC has created a number of directives (already 160 have been adopted) to protect the environment. This environmental legislation has fostered the emergence of a new market: the eco-industries. As environmental issues become a major concern worldwide as emphasised by the Rio Summit in June 1992, eco-industries can be considered as a quickly expanding industrial market in this decade.

Eco-industries are not easily defined but may be described as including firms producing goods and services capable of measuring, preventing, limiting or correcting environmental damage such as the pollution of water, air, soil, as well as waste and noise-related problems. They include clean technologies where pollution and raw material use is being minimised by initiatives focusing on quantitative terms. Eco-industry is a diversified industry spanning a variety of industrial products and services which have not yet been statistically classified and for which data are limited. For this reason, the data given in this report should be interpreted as a guide to general trends in the environment industry.

The sector overall is expected to experience strong growth over the next years and well into the future following the foreseeable development of environmental concerns. The situation of the industry is quite different from one country to the other according to the importance given to environmental problems in general and to specific concerns: air, water, waste, noise in particular.

Demand for environmental products and services has so far been mainly driven by regulations. This has had a profound effect on the structure of the industry: a number of firms have been interested in this market but have been reluctant to invest because of the linkage to political decision making. In addition, the growth of the different segments of the market has been erratic: the passing of a regulation spurs new investments and then the market quickly settles down at its replacement level. Consequently, the market has been used to relying heavily on small firms or on bigger firms whose main activities are outside the environmental market. The situation is changing rapidly, however, as polluting firms are changing their attitude towards the environment, shifting from a passive approach dictated by legislation to a more pro-active tackling of the problem, sometimes even ahead of legislation. Moreover, the concentration and the internationalisation of the industry is leading to the emergence of eco-groups in the truest sense.

If we look at the USA, which is amongst the most advanced country in terms of environmental protection, the growth potential of the eco-industry in Europe seems quite significant. The CERCLA (Comprehensive Environmental Response Compensation and Liability Act) voted in 1980 created the Superfund, a mutual fund financed by the polluting industries (mainly chemicals and oil companies) and aimed at reclaiming polluted sites. This fund disposes today of 12 billion ECU. The Environmental Protection Agency (EPA) has recently stated that there are potentially 35 000 sites to reclaim in the USA with an average cost of 31 million ECU per site. In 1990, following the application of the second Clean Air Act, 90 billion ECU have been spent to reduce and control pollution. In the meantime, the Dutch Government stated recently that there are 35 000 sites to reclaim in the EC overall.

LEGISLATIVE ENVIRONMENT IN EUROPE

Environmental action in industry has in the past largely been a result of its effort to comply with legislation. Not only has the awareness grown in industry that a more proactive stance can go a long way in preventing the realisation of new legislation, but also the legislator is acquiring new strategies to ease the implementation of environmental legislation and increase industry compliance to it. The EC's Fifth Environmental Action Programme advocates the use of a wider range of policy instruments to address in a more cost-effective way

Table 1: Chemical industry's environmental spending in 1992

Company	Environmental spending (million ECU) (1)	Turnover (million ECU)	As % of turnover
Hoechst	1 100	24 193	4.4
BASF	560	9 188	7.1
Bayer	840	20 396	4.1
ICI	495	16 370	3.0
Rhône-Poulenc	263	11 929	2.2
Elf Atochem	350	6 672	5.2
Solvay	474	5 900	7.7
Du Pont	924	29 507	3.1
Dow Chemical	462	14 615	3.1

(1) Include operating and capital costs
Source: Financial Times and company estimates

Table 2: Environment industry output by country, 1990

	(billion ECU)	(%)
BR Deutschland	17.0	36.2
France	10.0	21.3
United Kingdom	7.0	14.9
Italia	5.0	10.7
Nederland	2.7	5.8
España	1.8	3.8
Belgique/België	1.4	3.0
Danmark	1.0	2.1
Portugal	0.4	0.9
Ireland	0.3	0.6
Hellas	0.3	0.6
Total EC	46.9	100.0
EC	46.9	23.5
USA	78.0	39.0
Other	75.1	37.6
Total world	200.0	100.0

Source : OECD

the legislative challenges it faces. Policy instruments include, besides the traditional legislative approach, market-based instruments, horizontal instruments, including the provision of information and research and development, and financial support mechanisms.

The proposed Integrated Pollution Prevention and Control Directive (IPPC) embraces the three environmental compartments air, water and waste. In contrast to earlier EC environmental policy that was mostly based on instruments that separately controlled the emissions from industrial sources in each of the three media, the EC proposal on integrated pollution prevention and control introduces permitting systems based on an integrated approach to the three environmental compartments air, water and soil. This type of permitting systems already exists in the UK, France, the Netherlands, and the Flemish part of Belgium. The integrated approach must ensure that none of the three media is preferred or sacrificed. The advocated system would allow the streamlining of the permitting process, as only one authority would be involved. Although the ultimate directive could facilitate the implementation process of adequate environmental standards, the current proposal lacks well established quality objectives.

The Commission wrote notes on Best Available Technology (BAT) for a number of industries and is working on further such notes. The Commission, however, does not intend to write BAT notes for all industries prescribed in the IPPC. The delegation of this responsibility to Member States might be an opportunity missed towards harmonisation of technology definitions and of the related emission limit values.

Air

EC legislation on air has been based on two regulatory approaches, either by setting emission limits to certain components in the flue/exhaust gases to stationary or mobile sources, or by defining air quality objectives for these or other components considered necessary for environmental and health protection. The parallel application of these two legislative principles makes the EC air pollution legislation body complex. EC policy to curb air pollution can be categorised under five headings:

- Air quality objectives: Air quality limits exist for NOx, SOx/suspended particulates, and lead. The Commission is to propose a comprehensive framework directive on ambient air quality, covering the assessment, monitoring and management of air quality, as well as the introduction of new standards covering previously unregulated pollutants.
- Product quality standards: Union legislation imposes limits for certain fuel properties, including the sulphur contents of gasoline. Legislation on the lead in gasoline has allowed the introduction of catalytic converters and the significant reduction of exhaust gas emissions.
- Automotive emission standards: Severe exhaust emission standards exist for gasoline cars, light commercial vehicles and for trucks. Even tighter norms will have to be legislated in the future, fostering therefore technological progress. For passenger cars, the Council adopted in 1991 the so-called Consolidated Emission Directive which covers gaseous exhaust emissions together with particulate emissions for diesel cars and evaporative emissions for gasoline vehicles. The Commission has in the meantime issued a proposal for a further reduction of emissions for the time period 1996/97 and has been requested by the Council to prepare yet another proposal for the year 2000. Similar to cars, the already stringent emission control adopted in 1993 for trucks (CO, HC, NOx and particulates) in line with BATs, will be reduced in two further steps in 1996 and after 1999. This legislative approach is clearly "technology-enforcing".
- Air pollution from industrial plants: The key pieces of legislation in this diverse area aim primarily at the reduction of SOx, NOx, particulates and volatile organic compounds to restore air quality deficiencies and to reduce transboundary air pollution (acid rain). Directive 84/360/EEC requires Member States to authorise new plants from certain industries only when BATNEEC (Best Available Technology Not Exceeding Excessive Cost) measures are taken. This directive will in the future be replaced by the IPPC directive. The "large combustion plant directive" (Council Directive 88/609/EEC) regulates the emission of NOx and SOx and particulates from new and existing plants greater than 50MW thermal input. DGXI is presently preparing equivalent legislation for small combustion units (2MW). The protocols associated to the ECE Convention on long-range transboundary air pollution and the EMEP Protocol on monitoring and evaluating of long range transmission of pollutants, on VOC, SO2 and NOx, represent an additional driving force for the EC to legislate on air quality restoration measures. In addition to the reduction of exhaust and evaporative VOC's from vehicles, specific (draft) directives address VOC emissions of solvents from a range of industrial sectors and the losses experienced during the storage and distribution of gasoline.
- The ozone layer and the greenhouse effect: With respect to the controls on substances that deplete the stratospheric ozone layer, the European Union signed the Montreal Protocol in 1988 which targets the reduction and phasing out of CFCs. In June 1993, the Commission accelerated action on CFCs by a proposal that should cover all the major ozone depleters in one legal instrument. In addition to the phase-out of CFCs, by the end of 1994, marketing of HCFCs in the EC would be banned by the end of 2014. As regards the greenhouse effect, the adoption of the Council Decision on a monitoring mechanism of European Union CO2 and other greenhouse gas emissions will pressurise Member States to adopt specific measures to reduce greenhouse emissions, notably by taking measures to encourage energy efficiency. The monitoring mechanism will be a key information tool for the European Commission to plan for the reduction of emissions in the future. In 1990, the Council had decided to stabilise CO2 emissions in the Union at 1990 levels by the year 2000.
- Since then, a comprehensive strategy has been developed to limit CO2 emissions and to improve the energy efficiency of the European Union. Apart from the monitoring mecha-

Table 3: Pollution abatement and control expenditure, 1990

(% of GDP)

Belgique/België	N/A
Danmark	1.1
BR Deutschland	1.6
Hellas	N/A
España	0.6
France	1.0
Ireland	1.0
Italia	0.8
Nederland	1.4
Portugal	0.8
United Kingdom	1.2

Source : Ereco, for the EC (DG XI), January 1992

nism, a framework Directive on SAVE to promote energy efficiency as well as the ALTENER programme to promote renewable energies, have been adopted. Finally, the carbon/energy tax proposal is still under discussion in the Council and has been incorporated into the tax reform suggestions of chapter 9 of the White Paper on Growth, Competitiveness and Employment.

Water

A basic discussion concerns whether pollution control should be based on BAT (Best Available Technology) standards versus a system based on the respect of water quality standards. In the past a double approach has been followed, namely through quality objectives and emission standards. The present draft of the IPPC Directive finds an excellent compromise. A BAT system should prevail in the absence of environmental quality standards set by the Council, or of equivalent WHO guidelines.

A new emphasis is being given to pollution from diffuse sources. The nitrates and municipal waste water directives, the forthcoming Ecological Quality Directive, the amendment of the drinking water Directive, and a possible new Directive on ground water, are all parts of the increasing realisation that diffuse sources play an as important, if not greater, role than emissions from industrial point sources.

The single most important Directive in terms of market creation for the eco-industry no doubt is the urban waste water directive, that could have a decisive impact on the quality of EC surface waters. It will generate many opportunities for companies involved in the construction and operation of waste treatment plants. Certain industries will be compelled to review their liquid waste management procedures to comply with the requirements of the directive. The new restrictions imposed on the waste water treatment industries will generate more stringent discharge limits for industries, as waste treatment companies will be more careful of accepting waste streams which may contribute to make sludge hazardous, and hence more difficult and costly to dispose of.

The new general approach taken by the Commission towards prioritisation of substances with a view to regulating them, is to prioritise chemical substances from the standpoint of the environmental risk that they may represent. This is happening in the framework of the existing and developing chemical legislation. The novelty of this approach is the usage of exposure and effect assessment to fix priorities rather than prioritise substances simply on the sole basis of their intrinsic properties such as toxicity. Concerning water pollution, the basic reference system remains the list I of Directive 76/464/EEC on the discharge of dangerous substances. The Commission is now also looking at a another list of roughly 180 substances, which were agreed upon by the Members of the 1992 North Sea Conference. It is understood that the Commissions is now working on these two overlapping lists of substances, with the objective of coming up with a list of 20 initially and possibly 80 later. The deadline for completion of this work is the 1995 North Sea Conference.

A final issue concerns the problem of quality standards setting and the its relationship with the future shape that legislation might take. Directive 76/464/EEC left to Member States the responsibility for fixing quality standards only for the list II substances, including, among others, 20 heavy metals, while the Council retained the responsibility to fix standards for list I substances. The IPPC Directive refers in its sixth draft to one single list which includes all list I substances and the heavy metals. For these, the proposed directive implies, standards will have to be set at Union level. Apart from this apparent legalistic contradiction, the final approach is far from clear and only the developments over the coming months will clarify the contents of the proposal. As for the criteria of standard setting the main indications are towards the establishment of a scientific approach based on risk assessment. Another element of the debate stems from the difficulty of measuring individual substances and mixtures in order to control compliance. The final shape that the IPPC Directive, and the Ecological Quality Directive will take, together with the conclusions of the discussion on the amendment of the Drinking Water directive, will certainly contribute to setting the scene for future legislative development.

Waste

The Commission has had in place since the 1970s a basic waste management regulatory framework. The waste regime required the permitting of a broad range of disposal and recovery activities involving waste, toxic waste and dangerous waste. The EC waste management regulation has entered into a new phase in recent years with the replacement of the old framework legislation with new legislation that seeks (a) to provide more rigorous definitions of waste and hazardous waste; and (b) to specify the disposal and recovery activities subject to permitting.

Table 4: Main components of the eco-industries, 1990

(%)	North America	Europe	Japan	Total OECD
Equipment/Related services	74	76	79	76
Water and effluents treatment	24	34	22	29
Waste management	25	15	22	21
Air quality control	12	17	25	15
Other (land remediation, noise)	13	10	10	11
General services	26	24	21	24
Total	100	100	100	100

Source : OECD

Table 5: Number of firms and employment estimates, 1990

	Number of firms	Employment ('000)
BR Deutschland	4 000	250
France	1 500	90
United Kingdom	1 500	75
Italia	2 300	40
Europe	20 000	600

Source : OECD

Directive 91/156/EEC on waste and Directive 91/689/EEC on hazardous waste together create the new basic framework. The definitions under the directives of waste and hazardous waste will determine the scope of the EC waste management regulatory programs. As the waste management provisions will give competent authorities powers to control the import and export of waste for disposal, and arguably, for recovery, this could lead to a fragmentation of the EC waste management market.

The Commission is endeavouring to elaborate the regulatory detail regarding specific waste management activities in subsequent legislation. The most obvious examples are the Hazardous Waste Incineration Directive and the proposed Landfill Directive. The proposed IPPC Directive should however not be overlooked.

An important area of legislative activity is the Packaging and Packaging Waste directive, containing important targets for recovery and recycling of packaging waste. Comparable targets could ultimately be introduced for other priority waste streams that the Commission is currently looking into, such as electric/electronic waste, end-of-life automobiles, sewage sludge, hospital waste, used tyres, construction demolition waste, etc. This would represent an ambitious effort to recover and recycle an important part of the EC's waste mountain produced every year.

BUSINESS SECTOR RESPONSE

General response

Environmental concern is no longer the exclusive domain of traditional targets of regulations such as chemical and oil companies. Companies in all industrial and in many services sectors have to cope with diverse environmental issues: complying with ever-changing regulations, marketing environmentally-friendly products and packaging, and integrating environmental risk in their business decisions. The environment has become a key issue for a large number of companies, as demonstrated by the well publicised nominations of top executives to the title of Environment Vice-President.

In response to shifting consumer patterns, companies are required to respond both in terms of their internal procedures and processes but also in terms of the products and service offerings which are developed to meet these environmentally conscious needs. Companies who disregard this evolution are likely to find themselves isolated, if not the focus of adverse media and consumer attention. Managing one's environmental image may indeed become as sensitive an issue as managing the communication of financial performance.

The business sector has quickly understood the profit it could gain from being perceived as environmentally friendly. If demand for environmental products is mainly driven by legislation, "environmentally friendly" products are an exception to this rule: customers directly express a demand which has meant that markets have developed in the absence of regulations.

The EC national governments have tried to rationalise this "green" product offering by issuing "labels": "Blue Angel" in Germany, "White Swann" in Denmark, "Stichting Milieukeur" in the Netherlands and "NF Environment" in France. In March 1992, EC Member States agreed to launch a European Eco-Label. The first European certified eco-products have appeared on the market in the course of 1993.

Specific example of the chemical industry

Seveso in 1976, Bhopal in 1984, Basle in 1986. The chemical industry has earned a bad reputation as far as the environment is concerned. As such, it has been in the line of fire with legal authorities over the past decade. The environmental spending of some of the biggest chemical companies is shown in Table 1. The high point seems to have been reached with environmental expenses amounting to 25% of the capital expenditures of the main chemical companies. Ever increasing volumes of environment-related legislation and bureaucracy weigh heavily on costs at a time when chemical groups are under severe competitive pressures.

The problem is made more acute as environmental legislation can be different from one country to another and thus can create competitive disadvantage. The German chemical companies BASF, Bayer and Hoechst for instance, have complained that the severe domestic environmental legislation they face in Germany could hinder their competitive position worldwide and threatens to cripple German industry. This has created a new concept: environmental dumping which characterises the situation where a company manufacturing in one country could have lower production costs than its competitors producing in other countries only because of less stringent environmental legislation. In this respect, the role of the European Union in harmonising standards through the Member States is becoming increasingly important.

The response of the chemical industry to growing environmental pressure is "corporate environmentalism": self regulation is best because each company knows its own processes and the most effective way of reducing emissions. A move from a command and control phase to a voluntary phase is thought to be necessary. In this respect, the industry has launched a programme of Responsible Care. This involves measuring emissions in a credible way, improving environmental performance and then communicating that performance to the public. The programme was initially created by the Canadian chemical industry but has since been adopted worldwide.

ECONOMIC IMPORTANCE OF ECO-INDUSTRY IN THE EC

Overall market size

According to the OECD, the worldwide market for eco-industry amounted to 200 billion ECU in 1990. The largest national market was that of the USA and accounted for 39% of the total. The EC represents 24% of the world market with

Table 6: OECD trade in environmental products, 1990

	Export share (% of production exported)	Trade balance (million ECU)
USA	10	3 120
Europe	20	6 240
BR Deutschland	40	7 800
United Kingdom	17	390
France	14	390
Japan	6	2 340

Source : OECD

Table 7: Comparison of public and private environmental expenses, 1990

(%)	Public sector	Private sector
BR Deutschland	60	40
France	64	36
Nederland	43	57
Portugal	59	41
USA	41	59
Japan	87	13

Source : OECD

37 billion ECU. Table 2 shows the structure of environment output by region.

Within the EC, the market is dominated by Germany which represents 36% of the market, followed by France (21%), the United Kingdom (15%) and Italy (11%). If we look at the pollution abatement and control expenditure by country as a percentage of GDP (see Table 3), we can characterise 3 different groups: the first one comprises Germany and the Netherlands with environmental expenditure representing respectively 1.6% and 1.4% of GDP. These countries have environmental standards which are already highly developed and they aim to introduce more stringent regulations ahead of the EC; the second group comprises countries which spend between 1 and 1.2% of GDP on pollution abatement and control. These countries have less rigorous environmental policies, often accompanied by a lack of administrative and legislative structures for enforcement - Belgium, France, Ireland, Denmark and the UK; finally, the third group comprises the southern Member States which spend less than 1% of GDP on environment. They are lagging behind, in particular the new entrants to the EC : Spain, Portugal, Greece which face a major task in achieving compliance with EC environmental legislation.

Over three-quarters of industry output is made up of equipment produced for environmental purposes, primarily end-of-pipe pollution abatement equipment. The rest includes general environmental services largely based on engineering and consultancy services for solving specific environmental problems. Environmental equipment and related services can be subdivided into four main categories according to end-use:

- water and effluent treatment;
- waste management;
- air pollution control and;
- other (mainly contaminated land reclamation and noise reduction).

The structure of environment industry output differs by region as shown in Table 4 and reflects local environmental concerns as well as variations in environment legislation. Water treatment equipment for instance is highly developed within the EC, while waste management now accounts for the largest share of industry value in the USA and Japan is more concerned about air pollution.

Economics of market segments

The production of equipment for water and effluent treatment is a mature market using well established technologies. With 34% of the eco-industry output in the EC in value term in 1990, this is the largest segment of the eco-industry, principally due to the fact that EC governments have targeted most of their investments at this area. Control of water distribution and waste water treatment in the EC is still largely in the hands of public monopolies although following the French example, where already 75% of water distribution is in the hands of private operators, private companies are gaining ground. The most radical change of ownership occurred in the UK in 1989 with the privatisation of the 10 water authorities.

Waste water treatment tends to use mature, non-proprietary technology, the aim being to speed up the natural processes which reduce contaminants to an acceptable level for discharge to the environment. Equipment is generally designed to remove pollutants from an aqueous stream or body of water or to convert the pollutant to a non polluting or less polluting form prior to discharge or use. Products consist of primary treatment equipment to remove solid particles (filters, clarifiers), secondary treatment equipment to remove bacteria (biological treatment, chlorination) and tertiary treatment equipment to remove chemical or metal compounds (reverse osmosis, chemical recovery system).

Expenditure on waste water treatment is principally being driven by three factors. Higher standards on water released to the environment, stricter controls on sludge disposal, growing volume of waste to be treated. The largest sector is the secondary treatment area which is currently dominated by the biological processes.

The market is dominated by a few large players having the financial means to invest in and run big treatment plants. The European firms are at the forefront in this segment led by Alfa Laval of Sweden (turnover of 2.3 billion ECU in environment in 1990) and Bilfinger and Berger (2.3 billion ECU) and Steinmuller (2.2 billion ECU) from Germany. An increasing number of water utilities (like Générale des Eaux and Lyonnaise des Eaux in France with respectively 2 and 1.6 billion ECU in the sector) are becoming involved in the development and supply of water treatment technology. The main UK firms involved in this segment are John Brown Engineering (780 million ECU), Portals Water Treatment (700 million ECU) and Biwater (470 million ECU). The Netherlands is also active in that segment with Esmil Water Systems (78 million ECU) and Jansen Vanneboer (39 million ECU).

Waste management has been one of the key environmental issues within Europe since the mid 80's, following in particular the growing concern among public opinion about hazardous waste. The segment includes products and services to collect, transport, treat and dispose wastes from homes, municipalities, commercial establishments and manufacturing plants. It covers equipment for management of solid waste (compactor trucks, separation methods), liquid waste (tank trucks, treatment chemicals) toxic or hazardous waste (landfilling, incinerators) and waste recycling (valorisation process). It represents 15% of environment industry output in 1990.

European waste equipment companies are led by Edelhoff and Hoechst of Germany with an estimated environmental turnover of 780 million ECU in 1990. Most solutions are developed at a local level resulting in a fragmented market with companies specialising in specific materials handling or recovery markets such as chemical waste treatment (Leigh and Rechem in the UK) or hazardous or toxic wastes (France Déchets). The large French water utility Lyonnaise des Eaux is also present in this segment through its subsidiary, Sita. Large conglomerates have also targeted this segment as an area for diversification (Hoechst in Germany, BET PLC in the UK). The world market is dominated by Waste Management from the USA (turnover in that segment of 3.5 billion ECU in 1990) which has recently reinforced its position in the EC with the acquisition in November 1991 of the waste treatment division of Wimpey (UK) and of Environnement Services (F) in December 1992 and the joint venture with CFF (Compagnie Française des Ferrailles, F) in 1993.

Equipment for air quality control, which is estimated to account for 17% of environment industry output, is designed to remove

pollutants from a gaseous stream or to convert pollutants to a non polluting or less polluting form prior to discharge into the atmosphere. Pollutants include solid particulate (dust, metallic fumes), gases (carbon monoxide, nitrous oxides, sulphur dioxide) and liquid fumes (sulphuric acid, hydrocarbon solvents). Air pollution control equipment may thus address particulate (fabric filters, electrostatic precipitator, mechanical collectors), acid emissions from power stations and other large scale combustion plants (scrubbers, catalytic reduction, electron beam methods) and emission of gases and vapours (desulphurisation, oxidation, carbon absorption). Particulate emissions collectors are estimated to account for about 60% of the market.

The EC firms involved in that market are mainly subsidiaries of larger conglomerates: Handel is part of Deutsche Babcock, Lurgi of Metalgesellschaft and KWU of Siemens. Air pollution appears as the most mature segment of the environmental market as enforcement of emission standards is relatively simple and technologies most often used are well developed. Suppliers tend to provide systems rather than simple devices. Large suppliers concentrate on major areas such as Flue Gas Desulphurisation (FGD), where internationalisation and globalisation have been key. The major air pollution control companies have been highly acquisitive and have set up partnerships with local companies to gain a presence in many markets. The world market is dominated by the Japanese firms Mitsubishi and Hitachi, followed closely by Flakt of Sweden, the environmental control subsidiary of Asea Brown Boveri and one of the largest purely environmental companies in the world.

The market for product and services for remediation or reclamation of contaminated land represents, together with noise control equipment, 10% of the total market and is in an emerging phase in the EC countries at the moment. Products for excavating, transporting, incinerating and treating contaminated soil as well as covering, sealing, stabilising and enhancing land sites are in increasing demand. Equipment for noise control is designed to either eliminate the source of noise or to contain a muffle noise. These include mainly integrated encapsulations, acoustic products, soundproofing and buffers for industrial equipment. This market is also an emerging niche, driven mostly by labour safety and health regulations which are often followed by environmental regulations.

General environmental services currently represent some 24% of the eco-industry output. They regroup three main types of activities: technical engineering (site assessment, process design, control specifications, project management), environmental consulting (impact assessment, environmental audits, environmental monitoring, risk management) and management services (expert system, financial analyses, data base management). The market is dominated by large engineering firms providing technical engineering and construction services, many of which have formed special subsidiaries for the environment. These include Foster Wheeler and Davy Corporation in the UK, Philipp Holzmann and Preussag in Germany. There are additionally numerous smaller specialist environmental consultancies. A growing segment is "environmental audit" with companies like Taylor and Woodrow Plc (UK).

Number of companies/employment

The structure of the environment industry is highly contrasted, with a small number of large players accounting for more than half of the market alongside a very large number of small firms (half of them employ less than 50 employees). The number of firms involved in eco-industries in Europe is estimated at 20 000 (against 30 000 in North America and 9 000 in Japan). This industry employs directly 600 000 people in Europe. Table 5 shows an estimate of the number of firms in that sector in the main EC countries as well as an estimate of the number of people it employs. Eco-industries have hence become a significant force within the EC.

Table 8: Pollution abatement as share of total investment, 1990

(%)

Food, drink, tobacco	2.9
Textiles	1.5
Pulp and paper	5.3
Chemicals	7.0
Oil refining	4.3
Iron and steel	8.0

Source : OECD

Trade in eco industries

Trade data on Eco-industries are limited but estimates are shown in Table 6. Germany leads in trade in environmental products and appears as the world's largest exporter, currently exporting about 40% of the value of production. Exports are largely of water treatment equipment (40%) and air pollution abatement products (35%). About half of exports are to other European countries with the remainder divided evenly among North America, Eastern Europe, the Middle East and Africa. Import penetration is less than 5% of the market. Overall, Europe maintains a trade surplus in environmental products with the UK, France, and the Netherlands as net exporters in addition to Germany. An increasing share of international exchanges is through technology licensing rather than imports and exports of equipment.

Customers

The main purchasers of environmental equipment and services are municipalities, power and water utilities, the mining industry and the manufacturing sector. Expenditures for environmental equipment are almost evenly divided between the public and private sectors in the EC. The public sector spends mostly on water treatment investments (an estimated 65%) and least on air pollution control equipment (an estimated 5%). The private sector spends a larger share of its total environment outlays on air pollution control equipment (about 40%). For waste management equipment, the allocation from the public sector tends to be greater than that from the private sector. Table 7 shows a comparison of the environmental expenses of the public and private sector.

The share of investment expenditure for pollution control is estimated at between 2% and 4% of total manufacturing investments in the EC. This percentage varies significantly across the different manufacturing sectors, however, as shown in Table 8. Typically, there is a small number of manufacturing sectors, in particular chemicals and iron and steel, which account for fairly large proportions of private sector spending and have the highest share of expenditures relative to total investment (respectively 7 and 8% for chemicals and iron and steel).

FUTURE TRENDS

Future legislation

The Commission will overhaul its existing environmental legislation on water and air, adapting EC legislation to subsidiarity. The European Commission envisages to replace several directives on water, but will delay a review of existing air pollution legislation until EC-wide quality objectives have been defined.

On water the Commission intends to reorient rules and regulations towards compliance with essential quality and health parameters, leaving Member States free to add secondary parameters as they see fit. Water protection policy will essentially be based on two sets of directives:

Table 9: Forecasts of market trends for environment industry by country

(billion ECU)	1990	2000	Estimated annual growth (%)
BR Deutschland	17.0	23.0	4.0
France	10.0	15.0	5.5
United Kingdom	7.0	11.0	6.3
Italia	5.0	7.7	6.0
Nederland	2.7	3.7	4.1
España	1.8	3.0	7.4
Belgique/België	1.4	2.3	6.4
Danmark	1.0	1.2	2.2
Portugal	0.4	0.7	8.3
Ireland	0.3	0.5	6.5
Hellas	0.3	0.5	7.4
Total EC	46.9	68.6	4.9
USA	78.0	113.0	5.0
Total world	200.0	300.0	5.5

Source : OECD

- New framework directives that would replace existing water quality legislation. A drinking water quality directive would define general parameters, with some defined at the EC level and others at the national level. This directive will ultimately replace the existing drinking water directive (Council Directive 80/778/EC) and perhaps part of the directive on surface water intended for the abstraction of drinking water. The directive would cover the water for use in the home, and water used in the food industry that can affect the health properties of the final product. Another framework directive would concern the ecological quality of surface water, laying down the general objectives to be fleshed out by national or regional authorities. A directive on bathing water quality would simplify the existing one (Council Directive 76/160/EEC) and adapt it to new scientific knowledge. Other planned directives, on freshwater management and groundwater protection, would replace the existing directive on protection of groundwater from pollution by dangerous substances (Council Directive 80/68/EEC), integrating it into a general freshwater management policy.
- Directives to control water pollution at the source, which would not be changed. These include the urban waste water directive (Council Directive 91/271/EEC) and the nitrates directive (Council Directive 91/676/EEC)

On air, the Commission intends to work for an EC agreement on the definition of air quality objectives before embarking upon a review of existing air pollution legislation. At present only five air pollutants are regulated by specific directives, and there is no definition of objectives or of harmonised monitoring criteria for Union air quality standards. After defining the objectives, the Commission believes it will be possible to rationalise and simplify a body of legislation that tackles air pollution in a general way.

The withdrawal of several directives on water and air and their replacement with more general or framework directives could lead to a weakening rather than a reinforcement of standards in several Member States and in some areas. Changes intended by the Commission will indeed require the approval of the Council, and it is very well possible that the Council will try to relax standards proposed by the Commission. Whether this would effectively slow the tightening of EC environmental legislation is not altogether clear, since the Commission has recently admitted that some of the legislative pieces to be withdrawn and replaced have not been fully successful.

Growth prospects

According to the OECD, the world market for environmental products and services is forecast to grow at a real rate of 5.5% per year to the year 2000. Growth will be different from country to country. Within the Member States, Germany, Denmark and the Netherlands have developed comprehensive environmental policies over the past two decades and are therefore forecast to have lower than average growth within the environmental sector in their relatively mature markets (growth rates from 2.2% to 4.1%). The UK, France, Italy, Ireland and Belgium offer moderate growth potential as new European Union standards are introduced, thus encouraging market growth in some sectors (growth estimates range from 5.5% to 6.5%). Southern European countries such as Greece, Portugal and Spain are projected to have the highest growth rates reflecting the expected investment effort they will have to make to achieve compliance with EC environmental legislation (growth estimates range from 7.4% to 8.3%). Table 9 shows the market size and growth of the EC countries.

Within the equipment and related services market, the share of the waste management and land reclamation sectors is expected to increase, while the share of the water treatment and air pollution control equipment sectors may decrease. These trends will vary considerably by geographic region depending on local environmental problems and regulatory frameworks. Table 10 shows OECD estimated forecasts of market trends for environment industry by segment.

Technology trends

Many of the technologies used within the pollution control sector have remained basically unchanged for 30 years or more, for example those of electrostatic precipitators, sedimentation systems, chlorination treatment. With some notable exceptions, European suppliers have lagged behind in the development and assimilation of new technologies, compared to their counterparts in the USA. This has largely been due to the absence of legislation as a market driver. The situation now is changing: the environmental market is increasingly technology-driven and technology is used more and more as a competitive tool.

Research and Development in eco-industries has been particularly high, with the large multinational environment com-

Table 10: Forecasts of market trends for environment industry by segment

(billion ECU)	1990	2000	Estimated annual growth (%)
Equipment/Related services	119	172	5.0
Water and effluents treatment	47	65	4.0
Waste management	31	49	6.4
Air quality control	23	33	4.4
Other (land remediation, noise)	17	25	5.1
General services	37	62	7.4
Total	156	234	5.5

Source : OECD

panies spending 8 to 10% of their turnover on R&D. This has fostered the emergence of new technologies with significant growth prospects. In water and effluent treatment for instance, aerobic methods, ion exchange and membrane technologies are being developed. In waste management, new technologies are being developed for the physio-chemical treatment of hazardous waste, including neutralisation, detoxification and evaporation. Air quality control techniques increasing in importance include biological scrubbers and filters to treat flue gases, activated charcoal and catalysts to reduce organic emissions and combined particulate and acid gas control through electrostatic methods.

Concentration in the environmental sector in the EC

One of the most significant trends to be foreseen in the eco-industries is that of increasing concentration. A study on mergers and acquisitions in the US in the environmental industry shows that scale benefits and customer preference favour large players. Throughout the environmental industry, larger companies appear able to achieve higher returns. Table 11 shows the profitability by size of USA companies in the environment industry. Customer preference is also an important factor favouring size. In solid waste, more stringent regulations are inducing municipal firms to use fewer environmental service suppliers in order to more easily monitor compliance and trace liability.

Technology development also favours larger groups, with environmental processes becoming more complex and integrated. While new firms are constantly being created, small firms will find it increasingly difficult to fund the equipment investments necessary to remain competitive. Advantages enjoyed by large firms with significant resources are becoming more critical for achieving profitability.

As a result of such developments, spending on environmental acquisitions in the USA surged from 1.2 billion ECU in 1987 to 2.9 billion ECU in 1991, the number of mergers and acquisitions in that period increasing at an annual rate of 56% to reach 223 transactions in 1991.

Over the same period 1988-1991, the actual number of publicised mergers and acquisitions in the EC has been low. The number of deals completed grew slightly from 1988 to 1989 (from 22 to 25) but fell dramatically in 1990 (to 6). This was caused primarily by the UK recession: prior to 1991, the majority of firms acquired were British. The renewed acquisition activity in the first nine months of 1991 (23 deals) was driven by the emergence of Germany as the major market for acquisitions : German reunification was expected to lead to large growth in the German environmental market as the extent of the pollution problems in East Germany was discovered.

Mergers and acquisitions in the EC were carried out by a limited number of firms, with the 10 most active accounting for over 60% of all deals in the period. The two largest acquirers were British : Leigh Interests (including HT Hughes, acquired in 1990) and the Caird Group. The next largest were German: RWE and VEBA. In fifth and sixth place were Shanks & McEwan (UK) and Compagnie Générale des Eaux (F), the latter being the group out of the top six to be active in cross-border takeovers. Table 12 shows the environmental acquisition activity of the major EC acquirers over the period.

The development of clean technologies

Waste minimisation is the new credo in the industry. Treating waste is expensive, hence the industry is responding through the development and adoption of cleaner technologies (process modification, raw material substitution, process equipment changes) reducing the requirements for end-of-pipe pollution control equipment. In Germany, where emission standards are the most stringent in Europe, the industry is already looking to move away from traditional end-of-pipe abatement techniques to pollution prevention at source. This is due primarily to the steadily growing investment costs and energy consumption resulting from the increasing requirements made on the pollution control units concerned.

Table 11: Return on capital employed by company size in the USA, 1991

		(%)
Wastewater treatment	Small	24
	Large	30
Environmental consulting	Small	24
	Large	25
Hazardous waste (1)	Small	19
	Large	24
Instruments (2)	Small	14
	Large	22
Pollution control equipment	Small	16
	Large	21
Resource recovery	Small	10
	Large	15
Solid waste	Small	11
	Large	14

Legend : Small companies have sales 82 Million ECU
(1) Small companies have sales 123 Mio ECU
(2) Small companies have sales 41 Mio ECU
Source : LEK Public Company Database, LEK Analysis

Table 12: Environmental acquisition activity, 1988-91

Company	Country	Nr of acquisitions	Segment
Leigh Interests	UK	18	Solid waste/Res. recovery
Caird Group	UK	13	Solid waste
RWE	D	6	Solid waste
VEBA	D	5	Solid waste
Shanks & McEwan	UK	4	Solid waste
Cie Générale des Eaux	F	3	Diversified utility

Source : LEK Database

CONCLUSION

Being a relatively young industry, the EC eco-industry has developed strongly in the last two decades. Although an expected overhaul of EC legislation may lead to a somewhat lower pace with which environmental standards are harmonised, future prospects for the industry remain bright. In the more classical areas that are more mature, such as air pollution control and water treatment, further growth can be envisaged. On air, attention will focus on the reinforcement of the Large Combustion Plants Directive and the upcoming directive for small combustion plants. The recent directives on incineration of waste and of hazardous waste will also spur important investment. On water, the urban waste water treatment directive will generate an important investment programme that will last for two decades. Besides the more classical areas of air and water, waste and soil will increasingly gain attention. National initiatives on waste recycling have recently been followed by the Commission in its Directive on Packaging and Packaging Waste; the effort to recycle household waste that will follow from the application of this directive might go as far as doubling the EC waste management market over the years to come.

Written by: LEK and DRI Europe

Social and economic cohesion within Europe

Europeans living in the Member States of the European Union do not as yet enjoy equal levels of wealth or equal opportunities for improving their economic prosperity.

A levelling-out of health standards...

Over the last decade, national and Community policies can be credited for eliminating some of the worst inequalities between European nationals, those pertaining to health and life expectancies. Between 1984 and 1989, Portugal and Greece came closer (1.2% and 1.0%) to the EU's mean rate of infant mortality (0.8%). In addition, there is limited variance in the twelve countries around the average life expectancy of both men (72.8 years) and women (79.4) whereas, some thirty years ago, the less favoured (the Portuguese) could expect to live ten years less on average.

...but a persistence of economic disparities between countries...

However, the sharing of the same basic rights to life is not matched by a similar freedom of access to the riches of the modern world. The six founding members of the EC, plus the UK and Denmark, clearly constitute a centre of superior prosperity, with a GDP per head at least 50% higher than that of Spain, Ireland, Greece and Portugal. The spread is reduced by 25% when taking into account actual purchasing power standards (PPS) in each country. Nevertheless, even allowing for the difference in the cost of living, a Greek citizen is ECU 11 000 per year poorer than his fellow European from Luxembourg.

Table 1: Life expectancy at birth and at 60 years of age

Life expectancy at birth - males

	EC	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK
1950	63.9	62.0	69.8	64.6	63.4	59.8	62.9	64.5	63.7	63.4	70.6	56.4	66.2
1960	67.3	67.7	70.4	66.9	67.3	67.4	66.9	68.1	67.2	66.5	71.5	61.2	67.9
1970	68.4	67.8	70.7	67.4	70.1	69.2	68.4	68.8	69.0	67.1	70.7	64.2	68.7
1980	70.6	70.0	71.2	70.2	72.2	72.5	70.2	70.1	70.6	69.1	72.7	67.7	70.2
1991	72.8	72.8	72.5	72.1	74.6	73.3	72.9	72.2	74.0	72.0	74.0	69.8	73.2

Life expectancy at 60 years of age - males

	EC	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK
1950	15.7	15.5	17.4	16.2	16.2	14.9	15.4	15.4	16.0	15.2	17.8	15.5	14.8
1960	15.9	15.5	17.1	15.5	16.9	16.5	15.6	15.8	16.7	15.5	17.7	16.2	15.0
1970	15.9	15.2	17.1	15.3	17.5	16.8	16.2	15.6	16.7	15.2	16.8	15.5	15.2
1980	16.8	16.3	17.0	16.5	18.2	18.4	17.3	15.9	16.8	15.5	17.5	16.3	15.9
1991	18.3	18.0	17.8	17.6	19.4	19.0	19.2	16.9	18.7	18.2	18.2	17.1	17.7

Life expectancy at birth - females

	EC	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK
1950	68.3	67.3	72.6	68.5	68.5	64.3	68.5	67.1	67.2	68.2	72.9	61.6	71.2
1960	72.8	73.5	74.4	72.4	72.4	72.2	73.6	71.9	72.3	72.2	75.3	66.8	73.7
1970	74.7	74.2	75.9	73.8	73.8	74.8	75.9	73.5	74.9	73.4	76.5	70.8	75.0
1980	77.3	76.8	77.3	76.9	76.8	78.6	78.4	75.6	77.4	75.9	79.3	75.2	76.2
1991	79.4	79.5	78.0	78.7	79.8	80.3	81.1	77.7	80.4	79.1	80.1	77.3	78.6

Life expectancy at 60 years of age - females

	EC	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK
1950	17.8	17.5	18.4	17.5	17.5	17.1	18.4	16.8	17.5	16.9	18.6	18.0	17.9
1960	19.0	18.7	19.3	18.5	18.5	19.2	19.5	18.1	19.3	18.3	19.7	19.1	18.9
1970	19.8	19.2	20.6	19.1	19.1	20.0	20.8	18.7	20.2	18.8	20.5	16.9	19.8
1980	21.2	20.9	21.4	20.8	20.8	22.1	22.4	19.5	21.2	19.9	22.6	20.6	20.4
1991	22.7	22.8	21.7	21.9	22.4	23.2	24.4	20.8	23.2	22.7	23.1	21.2	21.7

Source: M. Recktenwald, EUROSTAT REGIO

Table 2: Child mortality (1) In the EC

(%)	EC	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK
1989	0.8	1.0	0.8	0.7	1.0	0.8	0.8	0.8	0.8	1.0	0.7	1.2	0.8
1984	1.0	1.1	0.8	1.0	1.4	0.9	0.8	1.0	1.1	1.2	0.8	1.7	1.0

Percentage of children under one year of age, excluding deaths at birth
Source: M. Recktenwald, EUROSTAT REGIO

...and between regions

The traditional GDP/head measurement at national level does not fully represent the wealth differentials. Significant deviations around the national averages are observed at regional level: in Germany, the Hamburg area creates 85% more value per head than neighbouring Schleswig-Holstein; in Italy, Mezzogiorno's output is half the level of Lombardia and Emilia-Romagna. Throughout the European Union, the two regional extremes (Bundesland Hamburg and Northern Greece), as measured by Eurostat in PPS-weighted Gross Domestic Product per capita, are separated by factor 3.5, i.e. a catching-up period of 30 years at a steady growth rate of 4.26%.

Impact of income disparities on individuals

Other per capita indicators give a more daily account of uneven economic conditions among Europeans:

- a Greek, Portuguese or Irish citizen owns less than 5 meters of national motorways whereas a Belgian, Danish, German, French, Dutch or Italian national can boast more than 10 meters already invested on his behalf;
- international trade amounts to more than one tonne per year/head for the second group, less than 200 kg for the first;
- 40 or more access telecommunication lines are at the disposal of 100 businessmen or private citizens in Denmark, France, UK, Germany, Benelux and Greece, 35 or less in Spain, Ireland and Portugal;
- each inhabitant of the ten richest regions of the Union (Hamburg, Ile-de-France, Bruxelles, Bremen, Hessen, Lombardia, Emilia-Romagna, Hoverstadsregion, Luxembourg, Baden-Württemberg), with an average PPS of ECU 20 512 per capita, uses 1 339 kWh/year, compared to only 796 kWh in the four countries with PPS below ECU 11 000 (Spain, Ireland, Portugal and Greece).

Geographic inequality of unemployment

The problem of unemployment in the early nineties does not affect all Europeans in equal fashion: in 1992, one out of ten (9.1%) residents under the age of 25 of the ten richest regions was out of a job, against one out of five (18.3%) in the four poorest countries. Overall, it is estimated by the Economic and Social Committee that 20% of the EU's population, (i.e. more than 60 Million people) live in areas with

Table 3: GDP per inhabitant

		1990			1985		
		ECU	PPS	PPS/PPS of the EC (%)	ECU	PPS	PPS/PPS of the EC (%)
Average	EC	14 485	14 488	100	10 401	9 952	100
The 10 richest EC regions	Bruxelles	23 997	24 013	166	16 759	16 203	163
	Hoverstadsregionen	23 627	18 293	126	17 649	13 415	135
	Baden-Württemberg	19 550	17 886	123	14 087	12 490	126
	Bremen	23 394	21 403	148	17 106	15 168	152
	Hamburg	29 052	26 580	183	21 952	19 464	196
	Hessen	21 421	19 598	135	15 135	13 420	135
	Ile-de-France	24 804	24 111	166	18 646	16 759	168
	Lombardia	19 617	19 560	135	12 741	13 223	133
	Emilia-Romagna	18 492	18 438	127	12 113	12 572	126
	Luxembourg	18 034	17 928	124	12 534	11 989	120
The poorest EC countries	GR	5 127	6 826	47	4 399	5 043	51
	E	9 939	10 924	75	5 674	6 994	70
	IRL	9 563	9 877	68	7 034	6 215	62
	P	5 012	8 137	56	2 880	5 112	51
Other EC countries	B	15 200	15 210	105	10 702	10 347	104
	DK	20 078	15 545	107	14 998	11 400	115
	D	18 530	16 953	117	13 419	11 899	120
	F	16 622	16 157	112	12 538	11 269	113
	I	14 892	14 848	102	9 797	10 168	102
	NL	14 705	14 612	101	11 492	10 409	105
	UK	13 400	14 583	101	10 643	9 935	100

Note: PPS = Purchasing power standard
Source: EUROSTAT REGIO

Table 4: Average GDP (1)

	1990			1985		
	ECU	PPS	PPS/PPS of the EC (%)	ECU	PPS	PPS/PPS of the EC (%)
10 richest regions	21 625	20 512	142	15 369	14 194	143
EC	14 486	14 488	100	10 401	9 952	100
GR, E, IRL, P	8 386	9 774	67	5 117	6 345	64

(1) Weighted average for the total population
Source: EUROSTAT REGIO

revenue per capita below 75% of the Community average and unemployment as high as 30%. A large majority of these less favoured Europeans live in the Mediterranean areas, but not all: 16 million East Germans were recently added to that group and many areas undergoing industrial conversion in northern France, northern England or the Basque Country are zones of similar imbalance. The above figures (from Eurostat Regio and International Telecom Union) concern the continental territories of the Member States. They leave aside the specific economic problems in overseas territories (France's DOM-TOM, Canarias, Azores, Madeira).

Risks of social disruption at regional level

Over the last decade, wealth disparity between countries has decreased slightly owing to a certain amount of redistribution (e.g. delocalisation) of industrial production in favour of Spain, Ireland, Portugal and Italy. However, the overall spread of wealth between *regions* has increased steadily, thus widening the gap between the poorest and richest areas. This growing discrepancy results from the economic specialisation of poor regions in labour-intensive, low technology or low value-added sectors. Introducing medium or high technology industries in these areas requires heavy conversion costs, which can only be carried out through public investment. In the meantime, the worsening situation in regions lagging behind or affected by industrial decline is reflected in above average unemployment (4 times higher in South than in North Italy) with particularly severe prospects for certain social categories (young unqualified; aged; long-term unemployed). Such a situation leads invariably to social and racial tension, criminality and the increase in drug use. Hence, the socially and politically disruptive impact on the EU cannot be underestimated.

Social and economic cohesion is a fundamental goal of the Community.

A political principle since the inception of the Community

Ever since the founding of the Common Market, the narrowing of economic gaps between Member States has been a constant principle as declared in the Rome Treaty of 1958 (in Article 2 of its Preamble). Structural Funds were established to add Community subsidies to national investment policies:

- European Regional Development Fund (ERDF)
- European Social Fund (ESF)
- European Agricultural Guidance and Guarantee Fund (EAGGF)

Overall funding of structural investment was also helped through loans granted by the:

- European Investment Bank (EIB)
- European Coal and Steel Community (ECSC)

New perspective for cohesion in the Seventies

The extension of the Community to Greece, Portugal, Spain and Ireland during the Seventies and Eighties gave new force to the issue of cohesion. The reduction in income disparities had formerly been an agreement between similar economies: overall growth fuelled by a common market was to be used to channel more prosperity to those parts of the Founding Member States that were less well developed (e.g. Mezzogiorno, Corsica). The new membership of countries that were globally behind the Community average brought about a review of the programmes and instruments of such a policy. Moreover, a new focus was imposed by the economic disaster brought to previously prosperous regions (e.g. Lorraine, Borinage, Saarland, Lancashire) by the restructuring of whole industries (steel and coal, textile, shipbuilding). Individual membership agreements as well as Community treaties reflected the growing determination of the EC political and administrative bodies to use industrial policy for the fostering of economic and social cohesion within the twelve Member States.

A turning point in 1987

The Single European Act of 1987 embodies this evolution. The concept of solidarity and its corollary of voluntary action aimed at removing economic disparities has moved from a general statement of intent (Rome Treaty) to a specific commitment in Article 130 of the new Treaty: "the Community shall develop and pursue its actions leading to the strengthening of its economic and social cohesion...reducing disparities between the various regions and less favoured regions". This article has also been inserted in the 1992 Treaty of the Economic and Monetary Union (Maastricht Treaty). There is now official recognition that the total opening of markets (Single Act) as well as the voluntary convergence of monetary and

Table 5: Electricity consumption per inhabitant, 1990

(kwh)	Transport	Household
10 richest regions (1)	212	1 339
EC	112	N/A
GR, E, IRL, P (2)	65	796

(1) Except Hoverstadsregionen
(2) Portugal: national level
Source: EUROSTAT REGIO

Table 6: Cars per inhabitant

	1990	1985
10 richest regions (1)	0.44	0.40
EC	N/A	0.32
GR, E, IRL, P (2)	0.25	0.21

(1) Except Lombardia, Emilia Romagna
(2) Portugal: national level
Source: EUROSTAT REGIO

Table 7: Road network (highways) and railways

(metres/inhabitant)	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK
Highways, 1990	0.16	0.13	0.15	0.06	0.01	0.12	0.01	0.11	0.20	0.14	0.03	0.06
Railways, 1990	0.35	0.46	0.42	0.37	0.24	0.60	0.56	0.34	0.71	0.19	0.32	0.29
Highways, 1985	0.16	0.11	0.14	0.05	0.00	0.11	0.00	0.10	0.16	0.14	0.02	0.05
Railways, 1985	0.38	0.48	0.45	0.07	0.25	0.63	0.55	0.28	0.74	0.19	0.36	0.30

Source: EUROSTAT REGIO

economic policies (Union) may impose severe constraints on less developed countries or regions in the EC, which will be confronted to free competition without the safeguard of independent budgetary and monetary policies. The Community (now Union) is committed to alleviate the cost of these constraints.

Renewed industrial policy instruments

Given the high priority accorded to economic and social cohesion in the Union, the Commission has sought to adjust its industrial policy to reflect this. An important reform of the Structural Funds was carried out in 1988 to provide the Community with an effective instrument to enact the corollary objectives of the 1993 Single Market: to coordinate macroeconomic policies, to improve the technological base of industrial sectors, to strengthen economic and social cohesion. Five policy objectives have been set out to enhance the efficiency of the various funds; the precise funding mechanism has been revised; targeted programmes (Community Initiatives) have been established across the Funds; the overall budget dedicated to the Funds has been doubled.

In 1993, while the Union Treaty was being ratified, a five-year plan was adopted for the allocation of ECU 141 billion through the Funds. A specific Cohesion Fund (cohesion financial instrument), planning to spend ECU 15 billion over seven years, was set up "to provide financial contributions to projects in the fields of the environment and trans-European transport infrastructure networks in those Member States which have a per capita GNP of less than 90% of the Community average, i.e. Greece, Spain, Ireland and Portugal".

The European Union aims at reaching a better standard of economic and social cohesion by reducing the structural deficiencies that hinder local industrial policy

Main role for local authorities

Primary responsibility for progress in backward areas rests with regional and national authorities, as underlined by the "subsidiarity" principle in the Union Treaty. EC economic and industrial policy is indeed not entirely appropriate for tackling the underlying causes of backwardness (e.g. under-education, overpopulation, poor housing conditions, political corruption and criminality). Local government is better equipped to design the general infrastructure layout, to set up efficient services (legal help, professional banking), and to implement the cultural changes that can foster regional development. EC industrial policy should therefore complement and accelerate Member States' own economic policies. However, the financial weight of Community instruments, as well as their careful application, are becoming an increasingly powerful tool in bringing about social and economic cohesion between regions.

Four general principles for EC intervention

The guidelines for EC funding of structuring investment have been clarified and reinforced since the policy reviews that followed the Single Act and Union treaties. Four general principles govern possible EC subsidies for investment projects:

- concentration on a short list of objectives and regions with a pre-allocation of global budgets by objective
- partnership with local authorities or the professional bodies they nominate
- programming of funding within specific Community Support Frameworks (Cadres Communautaires d'Appui) that set out the duties of involved partners
- "additionality" of Community subsidising to a matching investment effort by national governments

Five selected objectives

Community decisions to participate in the funding of investment projects have to fit one of the following objectives:

- Objective One: "to benefit the development and structural adjustment of regions whose development is lagging behind".

Eligible regions are defined as having a per capita GDP of less than 75% of the Community average, i.e. the whole of Greece, of Portugal, of Ireland, half of Italy, French DOM-TOM and Corsica, Northern Ireland and northern areas of the UK, about two thirds of Spain and the new Länder of Germany. Those regions represent 27% of total EU population. 96 Billion ECU (70% of total budget for the Structural Funds) will be devoted to attainment of Objective One between 1994 and 1999.

- Objective Two: "to convert regions or parts of regions seriously affected by industrial decline".

Table 8: Air trips per thousand inhabitants

	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK
Departures, 1990	374	1 367	610	N/A	1 084	709	953	405	1 270	570	545	891
Arrivals, 1990	376	N/A	613	N/A	1 085	710	934	403	1 283	570	546	893
Departures, 1985	294	N/A	439	657	1 118	508	506	287	N/A	410	351	622
Arrivals, 1985	292	N/A	441	655	1 102	507	501	287	N/A	412	351	622

Source: EUROSTAT REGIO

Table 9: Average unemployment

(% of active population)	1992		1990		1985	
10 richest regions	9.1	5.0	7.6	4.3	13.7	4.9
EC	18.1	7.6	16.1	6.6	22.8	7.8
GR, E, IRL, P	18.3	11.9	26.0	9.3	37.8	11.5

Source: EUROSTAT REGIO

Regions are made eligible for support every year according to their average rate of unemployment and the extent of restructuring forecasted in the area. ECU 15 billion ECU (i.e. 30 % of remaining Structural Funds' budget after programmes funded under objective one) is allocated to Objective Two until 1999. Specific projects to be financed are to be proposed by Member States.

- Objective Three and Four: "to combat long-term unemployment" and "to facilitate the occupational integration of young people under 25".

ECU 17 billion will to this end be budgeted by ESF.

- Objective Five: "to speed up the rate of adjustment in agriculture" and "to promote the development of rural areas".

This objective is closely associated with reform of the CAP. The EAGGF is the main provider of support to eligible regions of Objective Five.

Modus operandi of industrial policy

Within the overall framework of the above objectives, the EC has developed two main methods of programming the funding of its industrial policy:

- the Community Support Frameworks are agreements bilaterally signed with each Member State to lay out projects and areas that will benefit from an application of funds; the CSFs also state the extent and programming of the Member State's commitments according to the additionality principle.
- the Community Initiatives (9 % of total budget) are targeted programmes initiated by the EC around a specific industrial sector (coal mining, energy networks, telecommunications, services to business) or a transversal economic goal (protection of the environment, cross-border cooperation, integration of remote regions, new skills and qualifications, equal opportunities for women, access of handicapped to the labour market, diversification of regions dependent on textile or military industries); present discussions between EC, governments and trade associations examine a possible concentration of Community Initiatives on industrial conversions.

A new tool: the Cohesion Fund

Together with the Union Treaty, the Member States have created a new fund to promote social and economic cohesion (art. 130 D of Maastricht Treaty). The Cohesion Fund is aimed at financing projects in the sectors of environment protection and transport infrastructure. It stands to receive ECU 15 billion over the period 1993-1999.

Beneficiary regions are restricted to those located in countries with GDP below 90% of Community average; this means that the Fund is oriented towards programmes in four countries only: Spain (52 to 58% of total allocations), Greece (16 to 20%), Portugal (16 to 20 %) and Ireland (7 to 10 %). The purpose of the Fund is to speed up the basic equipment of the beneficiary Member States in transports, telecommunication networks, research and development, protection of the environment. Backwardness in such infrastructures is considered a sign (and a cause) of their relative poverty.

The financing principles are more flexible than those applied to the Structural Funds. Additionality, for instance, is only marginally requested since 85% of the projects and 100% of the feasibility studies can benefit from the Fund. Another feature of the Fund is that it will examine projects separately, not within bilateral agreements on joint programmes (although the projects should be part of national global planning). Key criteria that will be considered for funding are the impact of transport infrastructures on regional ease of access the rest of the Union ("désenclavement") and the catching-up of environmental protection standards applied in the most advanced Member States.

The future achievements of economic and social cohesion will depend on answers given by the Union to strategic issues facing economic policy

Towards a more active industrial policy?

Up to now, the Commission has been constantly involved in industrial policies: setting out Community rules for free markets, facilitating industrial conversions, supporting job creation and the transfer of technologies, cofinancing infrastructures. However, implementing a global industrial strategy and coordinating national policies with that strategy has not been a role assigned to the Commission. The issue is still debated within the framework of a monetary and economic union, as laid out by the Union Treaty.

Irrespective of the uncertainty of the time-frame for achieving monetary union, the indirect industrial policy implied in the present monitoring and support roles of the Community (through Directives, Funds, Initiatives, Support Frameworks) will be greatly expanded by the Single Market programme: a stronger and freer competition in the marketplace will emphasise the regional needs for adjustment and restructuring. Free competition, protected as such by the treaties, has to be made consistent with the cohesion principle. A Community industrial policy, if accepted at political level, would have to define the delicate balance between fighting state aid to individual firms - to maintain fair competition between players, and increasing state/Community aid to regions (i.e. regional players) impoverished by stronger international competition - to prevent the widening of income differentials.

Towards more coordination of social policies?

The Member States so far have failed to agree on what should be the implications of the single market and economic union aiming at cohesion for the convergence of social policies. The stakes are high for several reasons. First, differentials in social spending are important: 13% of GDP in Portugal against 32% in the Netherlands; 30% of hourly labour cost in Ireland against 47% in France. These differentials create distortions among the cost structures of free competitors; they also distort the logical link between the need for protection and actual social protection (the poorest populations have less access to collective economic protection).

Second, many economists deem that significant progress towards European cohesion cannot be achieved without some degree of convergence of national social policies. The movement of labour-intensive, low-technology industries to regions where competitive advantage is based on low wage and social costs rather than on actual productivity, leads to a situation of unstable growth:

- job creation is vulnerable to competition from countries with even cheaper labour.
- there is little impact on elements of long-term development (such as education and qualification of workers, sophistication of banking and services to business, the acquisition of diversified managerial know-how).

For these reasons, it is likely that the Council will have to address the social issues not settled in the Maastricht Treaty and give direction to the Commission in such areas as education and vocational training, immigration control, collective industrial agreements. These are all key ingredients of an overall industrial policy and essential to future social cohesion within the Union.

Towards a deeper reform of agricultural policies?

The Common Agricultural Policy (CAP) has long been a controversial factor in the social and economic cohesion of the Community. It reflected the initial fear of the founding Member States that unrestrained market forces would disrupt large segments of European farming.

The intricate policy instruments of the CAP (intervention purchasing arrangements, export refunds, monetary compensatory amounts, quotas and subsidies) as well as the growing amounts of Community spending on agriculture (EAGGF spent ECU 4.5 billion in 1975, 11.3 in 1980, 31.5 in 1991) did not achieve any meaningful progress towards improving the purchasing power of farmers, nor did it reduce the inequalities between northern and southern farming. Critics of the CAP point out that the artificial support of the market has led to over-intensive production, benefited the large units more than the medium and small size-farms, and favoured cereals and meat producers of northern states over the fruit and vegetables producers of the South (in 1989, Dutch farmers - 4.7% of population - received ECU 3 751 million from the EC, their Portuguese counterparts - 20.7% of population - only ECU 174 million).

The recent reform of the CAP aims at progressively alleviating the artificiality of the present management of markets. It probably will be accelerated by the Uruguay Round of GATT. Maintaining the living standards of northern farmers, converting non-viable units, integrating the agriculture of the new Länder into a market-oriented economy, upgrading the productivity and market access of southern farmers will therefore constitute one of the toughest challenges for the Union if it is going to apply the cohesion objective to the agricultural sector, which presently has the highest standard deviation of all economic sectors in value-added per production unit.

Written by: LEK

EEA and single market progress

INTRODUCTION

The completion of the Internal Market did not come to an end at 1 January 1993. This date marked rather the beginning of a new stage in the development of the Single Market as an ongoing dynamic process. By the deadline, embodied in the Single European Act of 1987, 95% of the basic legislative programme foreseen in the Commission's 1985 White Paper had been adopted by the Council. The objective set out in Art 8A (now 7A) of the Treaty has largely been achieved to assure the free movement of goods, services and capital. Whilst customs controls on persons have disappeared, the removal of identify controls on persons at all the Internal Borders is still outstanding. However, the entry into force of the Union Treaty has already enabled the Commission to tackle this problem with new initiatives. Additionally, the Schengen Group of countries has decided to abolish identify controls on persons in the near future after having installed the Schengen Information System (SIS).

The objective is now to ensure the efficient and proper functioning of the Internal Market. To benefit fully from the opportunities of the Single Market, national administrations, enterprises and consumers have to adapt their attitude and behaviour to the requirements of an "open" Internal Market. Thus, in 1993 the focus was shifting away from the adoption of legislation towards enforcement of the new rules and the management of the new business framework. The European Council on 10/11 December identified the full exploitation of the possibilities of the Internal Market as a major asset in the fight against unemployment. After having undertaken wide consultations over the past six months, the Commission presented a Strategic Programme "Making the Most of the Internal Market". The document maps out the priority actions which have to be taken by the Union in order to fulfil these expectations and to contribute to economic growth, competitiveness and employment.

By 1 January 1994 the European Economic Area had became reality. This development creates a free trade area covering some 375 million consumers by extending the relevant Community legislation with regard to the free movement of goods, capital, services and persons to the EFTA States except Switzerland. The EEA will cover most of the "aquis communautaire" including most Internal Market measures (e.g. public procurement and financial services) except those dealing with abolition of border controls. However, the EEA will not bind EFTA States to participate in the Common Agricultural Policy. There are special arrangements for certain sectors, such as food, fish, energy, coal and steel. A special EFTA Surveillance Authority will ensure that the EFTA Countries abide by the rules and that the same competition rules as applicable within the European Union are also applied by the EFTA Side. For some EFTA States the EEA will be a stepping stone towards full membership. Membership requests have been received from Austria, Sweden, Finland, Switzerland and Norway. Enlargement negotiations are being expedited with Austria, Sweden, Norway and Finland with the objective of completing the negotiations by 1 March 1994 so that these countries can accede on 1 January 1995.

SINGLE MARKET DECISIONS

The basic legal framework for the Single Market was agreed by 01 January 1993. Out of the 282 White Paper Measures required to eliminate remaining physical, fiscal and technical barriers, 95% measures have been adopted by the Council. Important progress concerning the outstanding measures, particularly in the field of intellectual property, has been made during 1993. Furthermore, the Council has adopted a wide range of additional measures to complement the original White Paper Programme and others are under discussion. In certain areas not covered by the White Paper Programme, particularly energy and telecommunications services, considerable work has to be undertaken. What does this impressive Internal Market statistic mean for the companies and consumers in the Internal Market area?

The entry into force of a series of measures, particularly reorganising tax, veterinary, plant health, safety and statistical controls eliminated systematic controls at the intra-EC frontiers. These measures opened up Community markets to the free circulation of goods, services and capital and reduced trade costs. It also allows firms to work towards achieving technically efficient capacity and increases competitive pressure on complacent enterprises. The traditional bureaucratic burden in terms of paperwork, imposed upon enterprises involved in Intra-EC trade, is now a thing of the past. The last symbol, the Single Administrative Document, has been axed. Cross-border deliveries are now as time and cost efficient as shipments within a member state. Additionally, the transitional VAT system provides purchasing firms with a cash flow improvement since the VAT is no longer deducted at the border and reclaimed later but is deferred until the company submits its regular VAT declaration.

The harmonisation of national technical specifications required for the operation of the Internal Market is under way and is widely seen as being one of the most significant benefits to be derived from the Internal Market Programme. The Community has applied three principles to achieve this objective: Firstly, the mutual recognition of national technical regulations is being applied where possible. As follow up to a communication on the management of the mutual recognition of national rules after 1992 (Art 100B), the Commission presented recently a proposal for a decision on the establishment of a a procedure for the exchange of information on national measures derogating from the principle of the free movement of goods. Secondly, detailed harmonising legislation was adopted where necessary. Entire sectors such as agriculture and food products, pharmaceutical products and motor vehicles are now covered by this kind of legislation. Thirdly, a "new approach" for the approximation of national legislation by establishing only essential requirements is being employed, backed up by ongoing provision of European standards (CEN, CENELEC, ETSI). In addition, the Community has established a global approach to testifying and conformity which paves the way towards recognition by national authorities and institutions for conformity assessment results. Enterprises will progressively be able to sell their products, produced according to one set of technical specifications, all over Europe. Potentially

significant cost savings result from cutting out the need for product redesign and adaptation to different national requirements.

The public procurement legislation opens up previously sheltered markets for government supplies, works and services contracts in all sectors, notably energy, telecommunications, water and transport, to European-wide competition. However, it will take some time before this legislation becomes fully effective since most of the legislation entered into force recently or has yet enter into force as far as public utilities are concerned (July 1994). In order to ensure that national administrations become familiar with the new legislation, the relevant directives provide provisions for enterprises to seek financial compensation and legal redress if they feel that a public contract has been unfairly awarded.

In the field of free provision of services, directives and regulations on transport, financial services, telecommunications, recognition of diplomas and the equivalence of professional qualifications have been adopted entering gradually into force. A breakthrough was the final decision in October paving the way for the liberalisation of road cabotage by 1997. Particularly in the financial services field the removal of controls on capital movement and the "European" passport providing financial institutions with access to partner countries has contributed to a qualitative increase in the degree of EC financial services integration. Insurance companies can provide services on a pan-European basis once the third non life insurance and life insurance directives enter into force by 1 July 1994. This will create sufficient benefits for consumers.

Since the companies have to adapt to the new conditions of the Internal Market through corporate restructuring and the restructuring of their business strategies, the proposals on company law, company taxation, and industrial and intellectual property formed an integral part of the White Paper Programme. As regards intellectual property, most of harmonisation measures (software, term of copyright protection) have been adopted. An important step was the decision of the European Council at the end of October on the location of the Community Trade Mark office in Spain (Alicante) which paved the way for the adoption of the Regulation on the Community Trade Mark. This will allow for the registration of Community trade marks, design and industrial models and thus remove the current requirement and costs for registering separately in each Member State. The political agreement on the legal protection of biotechnological inventions will foster the innovatory potential and competitiveness of Community science and industry in this field of modern technology. However, the ratification of the Community Patent Convention is still outstanding. In the field of company law and taxation important decisions are still outstanding concerning a European Company Statute, the harmonisation of laws relating to take-over bids and the elimination of double taxation (taking into account of losses suffered abroad and withholding of taxes on interest payments and royalties).

With regard to measures accompanying the abolition of Internal Market border controls, the Council has on its table proposals concerning VAT on gold transactions and transport of passengers, hall-marking of precious metals, controls on export of dual-use goods and on measures to prevent the putting into free circulation export and transit of counterfeit and pirated goods. The 7th directive on harmonisation of VAT rules concerning the second hand goods, antiques and works of art is expected to be adopted soon since major problems have been solved recently.

FUTURE PRIORITIES

The priority is now to pursue the overall approach contained in the Strategic Programme to foster the ongoing process of ensuring and reinforcing the effectiveness of the Internal Market. The Programme contains several lines of action:

The first part concerns the completion of the outstanding basic legal framework, particularly the adoption of the 17 remaining White Paper proposals, action to ensure the free movement of persons under Title VI of the Treaty on European Union and measures to introduce competition into the regulated sectors of energy, telecommunication and postal services.

The second part addresses the task of managing the Internal Market, covering several areas. First of all conformity and transparency in the transposition of Community legislation into national law as well as quality of enforcement has to be ensured to create confidence of business and consumers in a fair and convergent European-wide application of this framework, which does not distort competition between different Member States. This need can be illuminated by an analysis of transposition by Member States and sectors. Out of the 265 adopted White Paper measures 231 require currently transposition. By 20 January 1994, 83% of the total number of necessary transposition measures have been taken with Denmark in the lead (92%) followed by UK(88%), Italy and Portugal (85%). The most delays are in Spain, Greece (80%) and France(79%). Broken down by sectors, transposition has been completed or is above average in the areas of free movement of capital, in elimination of physical barriers, in financial services (excluding insurance), in the elimination of technical barriers, company taxation, VAT and excise duties. The Commission remains concerned about substantial delays in the areas of insurance (49%), company law (60%), intellectual property (60%) and public procurement (61%). To solve this problem, the Commission seeks to develop closer administrative cooperation between Member State administrations and between them and the Commission. Action is also envisaged to prevent the emergence of new barriers to trade by reinforcing and extending procedures for prior notification of new national rules concerned. Special assistance for enterprises and consumers will be provided by initiatives to improve the information on their rights under Community law, to facilitate recourse to the national courts in cases of violation of these rights and to improve judicial cooperation.

The third part deals with developing the Internal Market. A coherent communication strategy will provide individuals and enterprises with the necessary information to benefit fully from the Internal Market. Action is needed to improve the environment for enterprises by further extending Community direct and indirect taxation provisions, eliminating obstacles to cooperation and cross border activities (company law, cross border payments, European standardisation and certification, legal protection of intellectual and industrial property, transport). Special efforts will be made, in line with the multiannual programme for SME's for 1993-1996, to assist SME's in adapting to the possibilities offered by the Single Market. To gain the necessary participation of the consumer in the Internal Market measures are envisaged in the areas of legal and commercial guarantees, financial services and information for the consumer. Another important point for smoothing the Internal Market machinery is the promotion of Trans-European Networks.

The fourth part outlines the objectives of the Union's external policy in terms of management of the external frontier and completion of the common commercial policy.

CONCLUSIONS

The Internal Market is now in its second stage. The already well established legal framework provides the basis for the elimination of non tariff trade barriers. The Strategic Programme identifies new ways for managing this area without internal frontiers. As far as it can judged by now, the Single Market is operating without major difficulties, apart from transitional problems for small and medium sized enterprises. It is still to early to assess the full economic impact of the Internal Market, as firms have not yet had sufficient time to adjust to the new legislation and the process of transposition

is still going on. The Internal Market Programme is also not being constructed in an economic vacuum. The current recession and the world-wide economic situation has overshadowed the process of adaptation to the emerging single market framework. Nevertheless, there are indications to believe that restructuring and investment undertaken during the late 1980s in anticipation of the Internal Market have helped to mitigate to a certain extent some of effects of the current downturn. In this context, the successful completion of the GATT-Uruguay round has improved the economic outlook.

The Internal Market legislation has injected new dynamism into key industries and services by providing open and therefore increased cross-border competition. The key competitive yardsticks are price and quality. The transformation of this competitive environment forces enterprises to adapt to the new conditions by increasing their efficiency. The process of the completion of the Single Market has already strengthened mutually profitable economic and commercial links between the Member States. This has been reflected in a steady increase in the proportion of intra EC-Trade as a component of industrial and services output. The share of Intra-EC trade in total trade in percent has grown on the import side from 49% in 180 to 59% 1992 and on the export side from 55% to 61% during the same period. A Europeanisation of company corporate and investment strategies to allow firms to take advantage of newly accessible commercial opportunities in other Member States has been indicated by an increasing number of mergers and acquisitions as well as foreign direct investment, in anticipation of the effects of the Internal. Market.

The 1st January 1993 was a deadline for the establishment of the legal framework for the Single Market removing the physical, fiscal and technical barriers. It has been largely respected. It marked a high point in the life of the Internal Market but neither the end nor the beginning of an ongoing, dynamic and irreversible process. This legislation is coming on stream and opens up new possibilities for trade and investment. The challenge is now to realise the full potential of the Internal Market. Other Union policies also contribute to the proper functioning of the Internal Market by providing appropriate complementary measures concerning competition policy, consumer policy, special initiatives for SME's and the establishment of Trans-European Networks. The Single Market framework provides a positive environment within which to do business. But it is also up to firms and consumers to take advantage of the new possibilities and to draw attention to cases where they have experienced problems in availing of Single Market freedoms.

Written by: European Commission, DGXV

The world's largest industrial groups

This article compares the relative performance of the top 200 European companies with that of the top 200 US and Japanese firms, and describes the past trends in key financial indicators of Europe's top 200 companies by sector. The data is extracted from the Commission's database on large enterprises (DABLE), with all figures reported in current ECU. The data published only goes to 1992, as it relies on official figures from the companies' annual reports. 1993 figures were not yet available at the time of writing.

THE WORLD'S TOP 200 COMPANIES

Overall performance

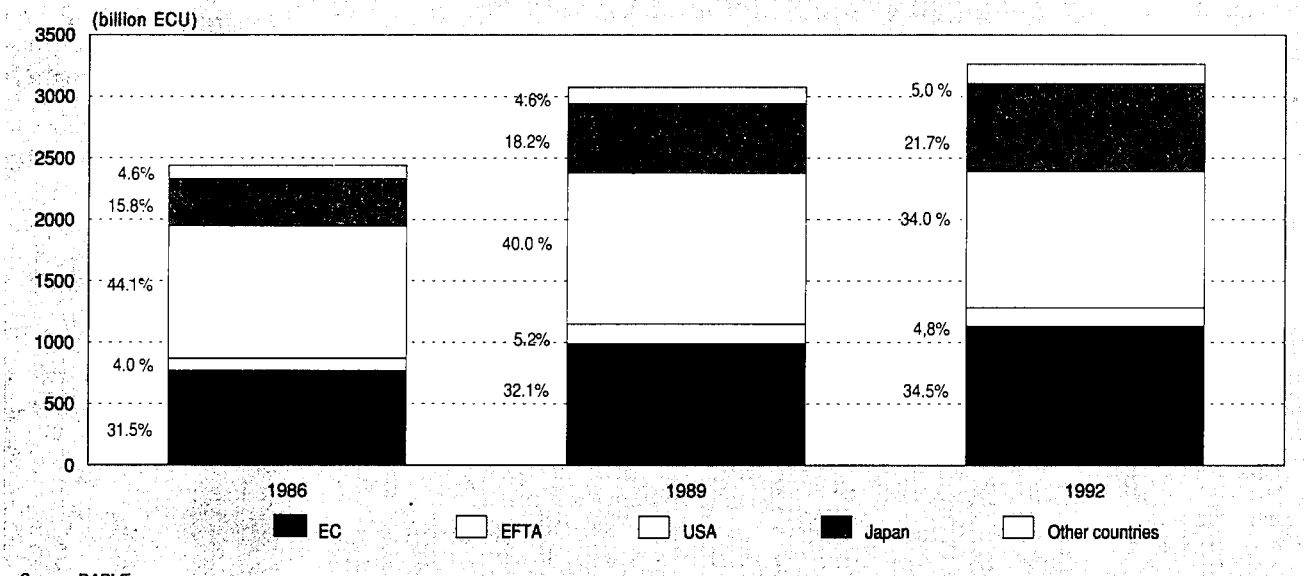
Between 1989 and 1992, the total turnover of the world's top 200 companies increased by 6%, about half the rate recorded over the previous 3 year period (Figure 1). The best performances were recorded by the top companies in Japan and in the EC, who saw their share of the turnover of the world's top 200 companies rising from 18% to 22% and from 32% to 34% respectively. In comparison, the share of turnover by the top EFTA companies and by companies from the "rest of the world" remained stable, at about 5% each. All of the improvement in the EC and Japan's positions was thus at the expense of the large US firms, who saw their share of the total turnover falling from 44% in 1986 to 40% in 1989 and to 34% in 1992.

The weak relative sales performance of the large US companies reflects more than just the downturn in the US economy in the early 1990s. On the one hand, concentration movements within the EC in the late 1980s led to a steady increase in the average size of EC firms, including of the larger ones. More EC firms thus entered the list of the world's top 200, replacing several US companies which fell back in the ranking (Table 1). After 1990, however, the number of EC firms ranking amongst the world's top 200 started to decrease, falling from 67 in 1990 to 62 in 1992. Over the same period the number of US firms continued to decline sharply (from 68 to 63) while 9 Japanese firms were making their entrance into the world's top 200 list.

To some extent, the changes in the world ranking in the early 1990s reflects exchange rate movements acting in favour of the Japanese firms, as the progressive appreciation of the Yen between 1986 and 1988, which was interrupted only for a short period in 1989 before resuming from 1990 onwards, has translated into an even stronger growth in their turnover in ECU terms than that observed in local currency.

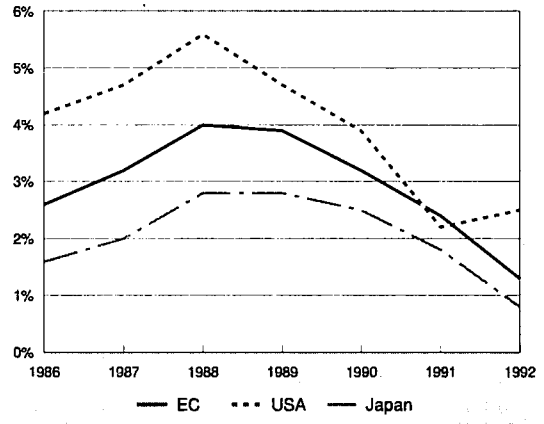
A comparison of the trend in the profit ratio of the top companies by region over the period 1986-1992 also shows an interesting pattern (Figure 2). Whereas profits were distinctly upward oriented over the period 1986-1988, thanks to policy moves aimed at restoring the profitability of firms, the trend reversed after 1988. In 1992, the profitability ratio in all three regions had fallen back below its level in the mid 1980s. This fall in average profits resulted both from the slackening

Figure 1: The 200 largest industrial groups in the world
Turnover growth at current prices



Source: DABLE

Figure 2: The 200 largest industrial groups in the world
Net profit / turnover



Source: DABLE

of economic activity in the early 1990s, which led to a decrease in sales volume, and from the increase in competition which resulted from globalisation and deregulation in many country markets. The rise in competition negatively impacted margins as companies were trying to keep prices down to retain market share. In order to limit the fall in profits, companies then started reducing employment levels and engaged in a second wave of rationalisation and restructuring moves. This, however, did not prevent the number of companies reporting a loss to increase between 1990 and 1992. In 1992, although the profit ratio was still falling in the EC and Japan, a small improvement was observed in the US (Figure 2): between 1991 and 1992, the number of US companies reporting a loss fell by 6, from 18 to 12.

What is interesting is that this fall in average profit ratios took place in all three major world regions. It can thus not be attributed to adverse movements in exchange rates in a given region, nor to the faster moves towards deregulation in the EC after 1986. In fact, the fall in average profitability was stronger in the US than in either Europe or Japan over the period.

The improvement in the profit ratio of US firms in 1992 was particularly important in the food & drink and in the aerospace industries. The automotive sector also saw an improvement in its overall financial situation, although this was not sufficient to return the sector to profit. Whereas the average profit ratio of the US automotive sector hovered between 4-5% between 1986 and 1988, it fell to zero in 1990 and to -3% in 1991 before recovering partly to -1% in 1992.

In Europe, the average profit ratio of the 200 largest firms, which had increased from 2.6% in 1986 to 4% in 1988, has since fallen back to 1.3%. The decline spared no industries, but a few were more badly hurt than others. The only sector in Europe to have reported an aggregate loss (based on the financial performance of the companies in the top 200 Europeans' list) in 1992 was the ferrous metals sector. This sector had already reported a small loss in 1991. In other sectors, the profit margins of firms in the EC also decreased but somewhat less than that of their US counterparts. Europe's largest automotive companies for instance saw their aggregate profit margin falling from a little over 5% in 1989 to just over 1% in 1992 (in the US, the top automotive producers were in deficit in both 1991 and 1992), while the European chemical firms saw their profits falling also from close to 5% in 1989 to a little over 1% in 1992.

Japanese companies, which traditionally operate with smaller margins than their European and US counterparts, also experienced a squeeze in margins between 1988 and 1992, although to a lesser extent: their average profit ratio fell from 2.8% in 1989 to 0.8% in 1992, half the 1986 level of 1.6%.

The three main causes of the deteriorating financial performance of the large US and European firms in 1991 and 1992 are weakened world demand, heightened competition leading to price wars in certain sectors, and sustained high real interest rates which weigh strongly on capital costs and negatively influence profits.

In 1991, 36 of the world's top 200 companies reported a loss (Table 2). Half of these were US firms, 10 were from the EC, 2 were from EFTA and 4 were Japanese. In 1992, although the total number of firms in the top 200 which reported a loss increased to 45, these were more evenly split across regions: there were with 16 EC groups reporting a loss in 1992, alongside 12 US groups, 11 Japanese and 5 from the EFTA region.

Within Europe, the largest groups in terms of turnover are from Germany, France and the UK, in that order. Together, the top companies of those three countries accounted for two thirds of the total turnover of Europe's top 200 firms in 1992, the same share as in 1989. This compares with a share of 71% in 1986. Two other EC countries which also host a large number of Europe's top firms are the Netherlands and Italy, followed by a non-EC country, Switzerland. The Netherlands is, in fact, home to a number of Europe's top oil and chemical companies (Royal Dutch Petroleum, Unilever, Akzo, DSM), as well as to other giant corporations such as Philips (electrical engineering), Hoogovens (metals) and Heineken (food and drink). Switzerland hosts two of the world's best known companies, Nestlé and ABB, as well as several large chemical firms such as Ciba-Geigy, Sandoz, and Roche, amongst others.

The breakdown of turnover of the world's top 200 industrial groups by sector in both 1986 and 1992 is shown in Figure 3. As expected, the sectoral shares in Figure 3 are highly related to the average degree of concentration in the industry. Thus, in 1986, oil companies accounted for 21% of the total turnover of the world's top 200 firms, followed by the motor

Table 1: The top 200 companies at world level

(number)	1986	1987	1988	1989	1990	1991	1992
EC	61	59	62	62	67	64	62
EFTA	12	15	14	14	12	13	14
USA	79	74	71	72	68	64	63
Japan	36	40	43	40	40	46	49
Other	12	12	10	12	13	13	12

Source: DABLE

Table 2: Groups showing a loss

Year	Total	EC	EFTA	USA	JPN	Others
1986	21	7	1	5	7	1
1987	9	5	1	2	1	0
1988	7	3	1	3	0	0
1989	7	2	0	5	0	0
1990	15	5	1	7	2	0
1991	36	10	2	18	4	2
1992	45	16	5	12	11	1

Source: DABLE

vehicles and parts sector, electrical engineering producers and chemical companies. The computer and office equipment sector, which represents less than 2% of total value added in the industrialised countries, has a share of the turnover of the world's top 200 firms' which is comparatively much higher (3% in 1992).

Between 1986 and 1992, however, the weakening in oil prices limited the growth in the turnover of the oil and chemical companies and made these firms lose their first place in the ranking. The motor vehicles and parts sector thus became the sector with the highest turnover within the world's top 200, despite a relatively poor financial performance over the period 1990-1992. In 1992, the motor vehicles and parts producers generated more than one fifth of the total turnover of the world's top 200 firms (Figure 3). Next came the petroleum refineries (19.5%), electrical engineering firms (15.8%), food, drink and tobacco (9.9%) and chemical companies (9%). The ferrous metals industry, which has seen many concentration moves between 1986 and 1992, had more firms in the top 200 list in 1992 than in 1986, and its total share of turnover also increased over the period, from 4.1% to 5.4%.

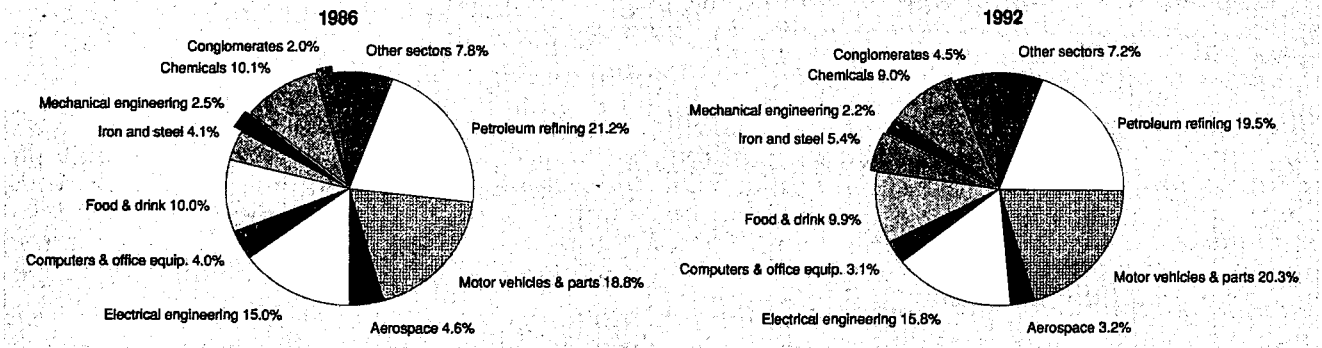
Table 3 shows the 25 largest profit earners at world level. The first is an EC firm, Royal Dutch Shell. In total, 8 EC and 2 EFTA companies rank amongst the top 25 largest profit earners, alongside 14 firms from the USA and only 1 from Japan. Most of the companies which rank in this list are from the oil, chemicals and food and drink sectors, alongside a few equipment producers such as Toyota. Toyota is, in fact, the only Japanese firm in the list.

It is interesting to compare the list of largest profit earners with that of the most profitable companies at world level (Table 3). Again, only one Japanese company ranks amongst the 25 most profitable companies at world level: Fuji Photo Film (in 23d place). Fourteen of the world's biggest profit earners are also amongst the 25 most profitable firms: these are all the pharmaceutical companies in the list of largest profit earners, along with a few diversified chemical companies such as Johnson and Johnson and Procter and Gamble, and the giant soft drinks company Coca Cola. None of the oil companies which ranked amongst the largest profit earners are amongst the "most profitable" firms, as the average profit ratio in the petroleum refinery sector is generally low. The regional distribution of the most profitable companies is similar to that of the largest earners, with 13 US companies, 9 European and 1 Japanese. The last two are Canadian and Australian.

Below, we look at the overall performance of the world's top 200 firms by main sector of activity.

The next section will then focus on the relative performance of the largest European companies, both by country of origin and by sector.

Figure 3: The 200 largest industrial groups in the world
Turnover by sector



Source: DABLE

Table 3: The largest industrial groups in the world, 1992

	The 25 largest profit earners		Net income (million ECU)
1	Royal Dutch Shell	EC	4 163
2	Philip Morris	USA	3 812
3	Exxon	USA	3 713
4	General Electric	USA	3 323
5	Merck & Co	USA	1 888
6	Unilever	EC	1 761
7	Hanson	EC	1 528
8	Procter & Gamble	USA	1 506
9	Nestlé	EFTA	1 485
10	Toyota Motor	JPN	1 460
11	Coca-Cola	USA	1 454
12	Johnson & Johnson	USA	1 254
13	Chevron	USA	1 212
14	Boeing	USA	1 199
15	Bristol Myers Squibb	USA	1 187
16	B.A.T. Industries	EC	1 181
17	Roche	EFTA	1 055
18	Mobil	USA	1 010
19	Pepsico	USA	1 005
20	Smithkline Beecham	EC	989
21	Alcatel-Alsthom	EC	965
22	Minnesota Mining & Mfg	USA	954
23	Atlantic Richfield	USA	921
24	BTR	EC	920
25	Elf Aquitaine	EC	902
	Number of representatives:	EC	8
		EFTA	2
		USA	14
		Japan	1
		Others	0

	The 25 most profitable		Net income / Turnover (%)
1	Merck & Co	USA	25.3
2	Roche	EFTA	14.8
3	Coca-Cola	USA	14.4
4	Smithkline Beecham	EC	13.9
5	Bristol Myers Squibb	USA	13.8
6	Hanson	EC	12.4
7	Johnson & Johnson	USA	11.8
8	Sandoz	EFTA	10.4
9	American Brands	USA	10.0
10	Philip Morris	USA	9.9
11	The General Electric Company	EC	9.6
12	Minnesota Mining & Mfg	USA	8.9
13	Anheuser-Busch	USA	8.7
14	Grand Metropolitan	EC	7.9
15	BTR	EC	7.7
16	General Electric	USA	7.7
17	Broken Hill Proprietary	AUS	7.5
18	B.A.T. Industries	EC	7.2
19	Raytheon	USA	7.0
20	Ciba-Geigy	EFTA	6.8
21	Atlantic Richfield	USA	6.8
22	Baxter International	USA	6.6
23	Fuji Photo Film	JPN	6.6
24	Northern Telecom	CAN	6.5
25	Procter & Gamble	USA	6.4
	Number of representatives:	EC	6
		EFTA	3
		USA	13
		Japan	1
		Others	2

	The 25 richest		Net worth (million ECU)
1	Royal Dutch Shell	EC	46 350
2	Toyota Motor	JPN	29 243
3	Exxon	USA	28 830
4	Pemex	MEX	28 193
5	IBM	USA	23 456
6	Matsushita Electric	JPN	21 668
7	General Electric	USA	19 593
8	Hitachi	JPN	18 661
9	Petroleos de Venezuela	VEN	17 430
10	British Petroleum	EC	14 332
11	Mobil	USA	13 798
12	Elf Aquitaine	EC	13 164
13	Ford Motor	USA	12 142
14	Philip Morris	USA	11 262
15	Kraft General Foods	USA	10 858
16	Amoco	USA	10 846
17	Chevron	USA	10 602
18	FIAT	EC	10 341
19	Ciba-Geigy	EFTA	10 170
20	E.I. Du Pont De Nemours	USA	9 993
21	Siemens	EC	9 699
22	Nissan Motor	JPN	9 489
23	Daimler Benz	EC	9 445
24	Petrobras	BRA	9 368
25	Sony	JPN	9 072
	Number of representatives:	EC	6
		EFTA	1
		USA	10
		Japan	5
		Others	3

	The 25 biggest employers		(employees)
1	General Motors	USA	750 000
2	Siemens	EC	413 000
3	IRI	EC	385 600
4	Daimler Benz	EC	376 467
5	Pepsico	USA	371 000
6	Hitachi	JPN	331 505
7	Ford Motor	USA	325 333
8	IBM	USA	301 542
9	Unilever	EC	287 000
10	FIAT	EC	285 482
11	Volkswagen	EC	281 649
12	Philips	EC	252 200
13	Matsushita Electric	JPN	252 075
14	General Electric	USA	231 000
15	Nestlé	EFTA	218 005
16	BBC Brown Boveri	EFTA	213 420
17	Alcatel-Alsthom	EC	203 000
18	Samsung	KOR	188 558
19	United Technologies	USA	178 000
20	Hoechst	EC	177 668
21	Toshiba	JPN	173 000
22	Robert Bosch	EC	169 804
23	Fujitsu	JPN	161 974
24	Philip Morris	USA	161 000
25	Bayer	EC	156 400
	Number of representatives:	EC	11
		EFTA	2
		USA	7
		Japan	4
		Others	1

Source: DABLE

Sector profiles

Petroleum refining

The world energy sector is dominated by large companies, many of which are either still fully state owned or largely controlled by government. Industrial restructuring, combined with a healthy demand growth leading to improved sales and profit performance during the 1980s, have led to a gradual increase in the number of energy companies in the world's top 200 and in Europe's top 200 list: the number of petroleum refining companies in the world's top 200 increased by 2 between 1986 and 1990, from 28 to 30, despite extensive restructuring in other sectors which had as an effect to increase the average size of firms in these other sectors.

Between 1990 and 1992, however, the total turnover of the world's largest petroleum refining companies decreased by 0.2%, due to a combination of falling oil prices and weak demand. This followed a period of healthy growth between 1986 and 1990, when the total turnover of the world's top refineries had increased by 21.2% in total, or 5% per year on average.

Measured in terms of turnover, the share of EC companies in the total turnover generated by the world's top petroleum refineries increased from 34% in 1986 to 36% in 1992 (Figure 4). In general, USA companies suffered the most from the hard times in recent years. Most saw their turnover decreasing in absolute figures between 1990 and 1992, some even posting a lower turnover in 1992 than in 1986. This was the case for instance of Mobil, Texaco, Atlantic Richfield, Philips Petroleum, Sun, USX Marathon Group, UNOCAL and Ashland Oil. In fact, all USA companies in the list except Exxon, Chevron and Amoco had a lower 1992 turnover than in 1986.

In the fight for leadership that Royal Dutch Shell and Exxon have been fighting over the past years, 1992 saw the victory of Exxon, whose turnover exceeded that of Royal Dutch Shell by 6.5%. (In 1990, Royal Dutch Shell's turnover exceeded that of Exxon by 0.4%). The turnover of the world's third largest petroleum refinery, British Petroleum of the UK was, at ECU 45.2 billion, 43% less than that of the first largest, Exxon. In 1992, British Petroleum indeed gained one place in the ranking at the expense of Mobil of the USA.

The new features of the 1992 ranking of the world's largest petroleum refining companies are the arrival of two Korean companies, Ssangyong and Sunkyong, respectively ranked 17th and 18th, and the entrance of Nippon mining in 26th position.

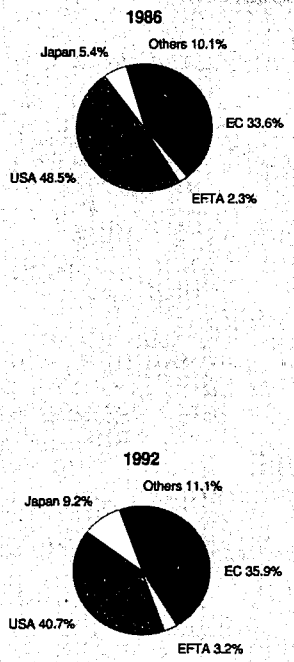
The overall improvement in the turnover and profits of the world's top US industrial firms in 1992 was not shared by the companies in the petroleum refinery sector. Indeed, in 1992, most USA oil companies continued their descent in the rankings, many of them losing four to eight places. In fact, the best performers in this sector in 1991 and 1992 were Japanese (Nippon oil gained three places compared to 1990, Idemitsu Kosan gained one from 1990, Showa Shell Sekiyu gained 4 and Mitsubishi Oil gained 2) and the already mentioned two Korean companies. Most EC firms basically moved by one rank at most in either direction in the rankings.

A direct result of the above developments is that, although the average size of the USA's top refineries has remained virtually stable between 1986 and 1992, at around ECU 23 billion, that of the average EC refinery in the world's top 30 has increased significantly, from ECU 28.14 billion in 1986 to ECU 34.93 billion in 1992 or nearly 1.5 times the size of the top USA company. The Japanese top refineries are in

Figure 4: Petroleum refining

Turnover in 1986 (million ECU)

Exxon	USA	71 052
Royal Dutch Shell	EC	65 881
Mobil	USA	45 613
British Petroleum	EC	40 493
Texaco	USA	32 139
Chevron	USA	24 756
ENI	EC	23 178
Amoco	USA	18 585
Elf Aquitaine	EC	17 601
Atlantic Richfield	USA	14 728
Total	EC	14 072
Kuwait Petroleum	KWT	13 606
Petrobras	BRA	12 961
Pemex	MEX	11 241
Nippon Oil	JPN	10 713
Phillips Petroleum	USA	9 949
SUN	USA	9 532
Petroleos de Venezuela	VEN	9 424
Idemitsu Kosan	JPN	9 280
USX-Marathon Group	USA	9 124
Showa Shell Sekiyu K.K.	JPN	8 045
Petrofina	EC	7 652
Unocal	USA	7 607
Ashland Oil	USA	7 557
Statoil	EFTA	6 778
Imperial Oil	CAN	5 086
Neste	EFTA	5 068
Total Raffinage Distribution	EC	4 586
Unocal	USA	6 866
SUN	USA	6 658



Turnover in 1992 (million ECU)

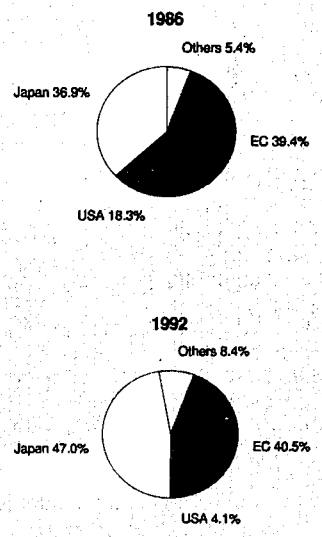
Exxon	USA	79 626
Royal Dutch Shell	EC	74 765
British Petroleum	EC	45 178
Mobil	USA	43 902
ENI	EC	31 320
Chevron	USA	29 751
Elf Aquitaine	EC	29 302
Texaco	USA	28 414
Total	EC	19 958
Amoco	USA	19 513
Nippon Oil	JPN	17 837
Petroleos de Venezuela	VEN	16 547
Pemex	MEX	16 444
Repsol	EC	14 044
Idemitsu Kosan	JPN	13 821
Atlantic Richfield	USA	13 510
Ssangyong	KOR	12 287
Sunkyong	KOR	12 281
Petrobras	BRA	11 404
Showa Shell Sekiyu K.K.	JPN	9 981
Neste	EFTA	9 926
Statoil	EFTA	9 882
Phillips Petroleum	USA	9 211
Petrofina	EC	9 039
USX-Marathon Group	USA	8 589
Nippon Mining	JPN	8 261
Ashland Oil	USA	7 415
Mitsubishi Oil	JPN	7 111

Source: DABLE

Figure 5: Iron and steel

Turnover in 1986 (million ECU)

Thyssen	EC	14 825
Nippon Steel	JPN	13 224
Usinor Sacilor	EC	10 630
LTV	USA	7 392
NKK	JPN	6 626
USX-US Steel	USA	6 245
Kobe Steel	JPN	6 002
Kawasaki Steel	JPN	5 632
Sumitomo Metal Industries	JPN	5 479
Broken Hill Proprietary	AUS	5 445
Degussa	EC	5 037
Aluminium Co of America	USA	4 745
Metallgesellschaft	EC	4 518
British Steel	EC	4 476
Mitsubishi Materials	JPN	7 182
Degussa	EC	6 286
Pohang Iron and Steel	KOR	6 120



Turnover in 1992 (million ECU)

Nippon Steel	JPN	18 505
Thyssen	EC	17 538
Usinor Sacilor	EC	12 705
Metallgesellschaft	EC	12 536
VIAG	EC	12 045
Sumitomo Metal	JPN	11 785
NKK	JPN	11 653
Fried Krupp - Hoesch Krupp	EC	11 474
Sumitomo Metal Industries	JPN	10 581
Broken Hill Proprietary	AUS	8 891
Kobe Steel	JPN	8 365
Kawasaki Steel	JPN	8 215
Sumitomo Electric	JPN	7 939
Aluminium Co of America	USA	7 326

Source: DABLE

comparison much smaller, at ECU 11.4 billion or one third the size of the EC companies.

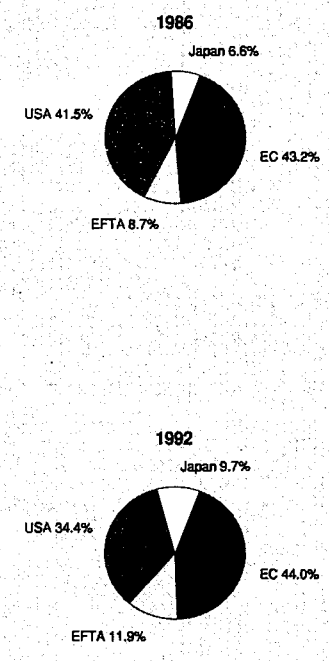
Iron and steel

The world ranking of the largest metal producers is dominated by EC and Japanese firms. In 1992, six EC companies and 8 Japanese firms featured in the world's top 17 list in this sector, the remaining three being respectively US (Aluminium company of America, in 14th place), Korean (Pohang Iron and Steel, in 17th place) and Australian (Broken Hill Proprietary, in 10th position) (Figure 5). The major restructuring moves which took place in this sector between 1986 and 1992 in Europe and in Japan are evidenced by the strong increase in the average size of firms in this sector. In the EC, the average company size of the top metal producers increased from just under ECU 8 billion in 1986 to a little over ECU 12 billion in 1992, whereas in Japan the average size of the top companies increased from ECU 8 billion to ECU 10.5 billion between 1986 and 1992. This growth was essentially achieved through acquisitions. Metallgesellschaft of Germany for instance nearly tripled in size over this 6 year period through a set of acquisitions, moving into 4th place in world rankings, whereas VIAG, also of Germany, climbed into fifth place also as a result of a series of acquisitions.

Figure 6: Chemicals

Turnover in 1986 (million ECU)

E.I. Du Pont De Nemours	USA	27 437
Bayer	EC	19 145
BASF	EC	19 014
Hoechst	EC	17 860
Procter & Gamble	USA	17 746
ICI	EC	15 106
Dow Chemical	USA	11 298
Ciba-Geigy	EFTA	9 058
Montedison	EC	8 727
Rhône-Poulenc	EC	7 747
Norsk Hydro	EFTA	7 495
DSM	EC	7 376
Johnson & Johnson	USA	7 119
Monsanto	USA	6 994
Akzo	EC	6 501
Union Carbide	USA	6 449
Mitsubishi Kasei	JPN	6 199
Baxter International	USA	5 635
Asahi Chemical Industries	JPN	5 491
Colgate-Palmolive	USA	5 068
American Home Products	USA	5 009
Bristol Myers Squibb	USA	4 916
Solvay	EC	4 893
Sandoz	EFTA	4 747
Fuji Photo Film	JPN	4 568
Pfizer	USA	4 551



Turnover in 1992 (million ECU)

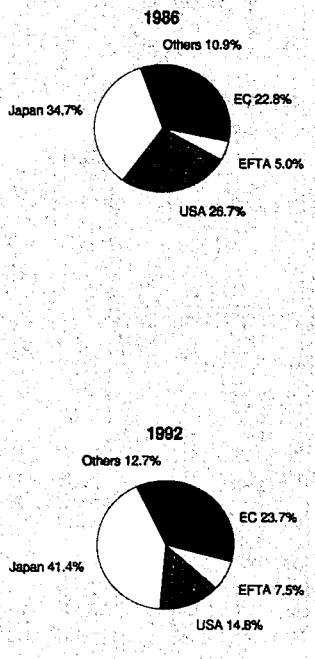
E.I. Du Pont De Nemours	USA	28 720
Procter & Gamble	USA	23 629
Hoechst	EC	22 727
BASF	EC	22 060
Bayer	EC	20 411
ICI	EC	16 388
Dow Chemical	USA	14 643
Ciba-Geigy	EFTA	12 221
Rhône-Poulenc	EC	11 938
Johnson & Johnson	USA	10 616
Bristol Myers Squibb	USA	8 611
Sandoz	EFTA	7 935
Asahi Chemical Industries	JPN	7 725
Merck & Co	USA	7 458
Akzo	EC	7 414
Mitsubishi Kasei	JPN	7 404
Norsk Hydro	EFTA	7 236
Roche	EFTA	7 129
Smithkline Beecham	EC	7 091
Enichem	EC	7 028
Henkel	EC	6 987
Fuji Photo Film	JPN	6 888
Baxter International	USA	6 539
Sumitomo Chemical	JPN	6 211
Solvay	EC	6 125

Source: DABLE

Figure 7: Electrical and electronic engineering

Turnover in 1986 (million ECU)

General Electric	USA	35 797
Hitachi	JPN	29 431
Matsushita Electric	JPN	27 587
Philips	EC	22 915
Siemens	EC	21 786
Toshiba	JPN	20 077
Samsung	KOR	16 834
NEC	JPN	14 870
Mitsubishi Electric	JPN	12 793
Alcatel-Alsthom	EC	11 894
Lucjy-Goldstar	KOR	11 649
Westinghouse Electric	USA	10 910
Daewoo	KOR	10 098
Thomson	EC	9 147
Sony	JPN	7 977
Electrolux	EFTA	7 581
General Electric Company	EC	7 575
Raytheon	USA	7 430
Sanyo Electric	JPN	7 122
Sharp	JPN	6 972
Asea	EFTA	6 376
TRW	USA	6 136
Motorola	USA	5 986
Honeywell	USA	5 468
Emerson Electric	USA	5 284
AEG	EC	5 272
Texas Instruments	USA	5 057
Martin Marietta	USA	4 832
Ericsson	EFTA	4 519



Turnover in 1992 (million ECU)

Hitachi	JPN	47 252
Matsushita Electric	JPN	44 240
General Electric	USA	43 436
Siemens	EC	38 509
Samsung	KOR	36 688
Toshiba	JPN	29 014
Philips	EC	25 752
Sony	JPN	24 324
Alcatel-Alsthom	EC	23 621
NEC	JPN	22 039
Daewoo	KOR	21 330
BBC Brown Boveri	EFTA	21 280
Mitsubishi Electric	JPN	20 442
Electrolux	EFTA	10 723
Thomson	EC	10 366
Motorola	USA	10 268
Sanyo Electric	JPN	9 314
Sharp	JPN	9 265
SPEP	EC	9 003
Rockwell Intl	USA	8 434
General Electric Company	EC	7 389
Raytheon	USA	6 992
Finmeccanica	EC	6 965
Northern Telecom	CAN	6 854
Westinghouse Electric	USA	6 520
Matsushita Electric Works	JPN	6 439
Ericsson	EFTA	6 268

Source: DABLE

Metallgesellschaft AG indeed acquired, together with Deutsche Bank AG and Dresdner Bank AG, 98.8% of the shares in Buderus AG plus 100% of the shares in both Dynamit Nobel AG and Cerasiv GmbH via MG Industriebeteiligungen. These acquisitions substantially boosted Metallgesellschaft's sales volume in the industrial sector, from DM 1.9 billion in the 1990/1991 fiscal year to DM 5.6 billion in 1991/1992.

1993 may, however, prove to be a black year for Metallgesellschaft, as the company is in the throes of serious financial difficulties. As it reported large losses for the year to September, the conglomerate unveiled a deep restructuring plan which may lead to the sale of many of its 258 subsidiaries worldwide. Such internal restructuring should lead to a lower sales performance for the German group in 1994 and after.

The other German company which posted significant turnover growth in the early 1990s was VIAG. VIAG group sales measured in DM indeed grew by 21% in 1991 and by a further 3% in 1992, through the inclusion of newly acquired companies. Among the foremost acquisitions reported during this period are the purchase of the CCE group in 1991, along with the purchase of a 33.3% interest in Kuehne & Nagel International AG and the takeover of Eisenwerk Bruehl Aluminiumtechnik GmbH and its subsidiaries in 1992.

One Korean metal producer has joined the ranking of top metal producers: Pohang Iron and Steel, which ranked 17th in 1992.

A notable feature of the sectoral growth between 1986 and 1992 is the continued decline in both the share of turnover and the number of US firms in the world ranking: whereas in 1986 the three largest USA metal producers accounted for nearly one fifth of the total turnover of the leading firms in this sector, in 1992 this share had fallen to a mere 4%, as both LTV and USX - US Steel bailed out of the ranking of the world's top 200 firms, based on turnover.

Chemicals

The chemical sector is a very heterogeneous sector, with large corporate giants dominating the basic chemicals segment and SMEs accounting for the bulk of output in many segments of the specialty chemicals sub-sector. In the pharmaceuticals industry, although no single company clearly dominates the world market, the size of the key pharmaceuticals players who fight for leadership is such that many of them are well placed in the world's top 200 list. Amongst the world top 200 firms in 1992, 25 are chemical companies, of which 10 are key players in the pharmaceuticals market.

Europe is a major player in the world chemical industry, with six of the world's top 10 chemical companies being European firms (5 from the EC and 1 from EFTA).

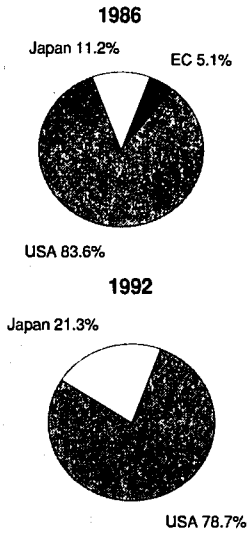
After 1986, the removal of intra-EC barriers to trade reinforced the on-going trend towards increased concentration in the industry, as basic chemical producers sought to diversify both geographically and across product lines to spread risk over a broader market base. The fall in the dollar exchange rate in the second half of the 1980s also encouraged EC firms to undertake major investments in the US. Large European chemical groups such as Hoechst, BASF or Bayer have thus become key players in the US chemical market, ranking respectively as the 5th, 6th and 11th biggest company in that market.

As a result of this move towards increased concentration and geographical diversification of EC firms, the total turnover generated by the largest EC chemical firms increased by 20.5% between 1986 and 1992, rising from ECU 106 billion to ECU 128 billion, while the number of EC firms in the world ranking of top chemical companies increased from 9 to 10. Over the

Figure 8: Computer and office equipment

Turnover in 1986 (million ECU)

IBM	USA	52 103
Fujitsu	JPN	10 862
Digital Equipment	USA	8 724
Unisys	USA	7 556
Hewlett-Packard	USA	7 443
Olivetti	EC	4 976
NCR	USA	4 963



Turnover in 1992 (million ECU)

IBM	USA	49 803
Fujitsu	JPN	21 706
Hewlett-Packard	USA	12 598
Digital Equipment	USA	11 211
Unisys	USA	6 501

Source: DABLE

same period, the number of US firms in the ranking decreased by four, such that the share of turnover generated by the largest US firms actually fell by about 7 percentage points over the 6-year period (Figure 6). Two of the USA firms which disappeared from the list were basic chemicals producers (Monsanto, and Union Carbide which was taken over by Rhône-Poulenc), and the others were specialty chemicals producers (Colgate Palmolive, American Home Products and Pfizer). Another basic chemical firm which disappeared from the list is DSM of the Netherlands.

The geographical expansion and product diversifieation strategy of the largest world chemical companies also translated in a significant increase in the average size of the top firms within each region. Whereas in 1986 the top 9 EC companies generated an average turnover of ECU 11.8 billion this figure had increased by 8.4% by 1992, to ECU 12.8 billion. In comparison, the 7 USA chemical producers which remained on the list of world top 200 firms in 1992 had an average turnover of ECU 14.3 billion, a 21% increase from 1986. In fact, between 1986 and 1992, although the overall performance of US chemical firms was dismal, the larger ones were able to maintain their position and expand their turnover through a series of acquisitions. Procter and Gamble, Johnson and Johnson and Bristol Myers Squibb - which was formed by the merger of Bristol Myers on one side and Squibb on the other side - were particularly successful over the period, gaining 3, 3 and 11 places respectively in the ranking of the top 25 world chemical producers.

The new entrants in the world ranking over the period were mainly pharmaceutical or specialty chemical companies: two from the EC (SmithKline Beecham and Henkel), Roche Holding from Switzerland, and Merck from the US. The last entrant, is Sumitomo Chemical of Japan. The dominance of pharmaceutical companies in the rankings of top world chemical producers is in line with the fact that the sector has posted much faster growth than the rest of the chemical industry over the past decade, thanks to rising demand for health care from an ageing population. This trend was exacerbated in the early 1990s when demand for basic chemicals started falling, while pharmaceuticals production was still on an upward trend.

Electrical and electronic engineering

The high degree of concentration of the electrical engineering sector is illustrated by the large number of electrical engineering companies in the world top 200. In 1986, 29 of the world's biggest companies were electrical equipment producers. Although in 1992 this number had come down to 27, the share of global turnover by the world's top 200 firms which was accounted for by these companies had increased from 15.0% to 15.8%. In fact, over most of the six year period, the sector experienced healthy growth with the total turnover by the leading firms growing from ECU 349.4 billion in 1986 to ECU 493,6 billion in 1990, a 9% average annual growth. After 1990, however, the growth in turnover slowed significantly, to less than 2% per year on average between 1990 and 1992.

The world ranking of the top electrical engineering firms is dominated by Japanese and Korean companies. In 1992, 11 of the top 27 electrical engineering companies at world level originated from one of those two countries. Together, these two countries accounted for 53% of the total turnover of the top 27 companies in this sector. Japan's share alone rose from 35% in 1986 to 41% in 1992 (Figure 7).

Rationalisation and restructuring moves amongst the top electrical engineering firms has led to significant changes in the relative position of these companies in the rankings, not only between 1986 and 1990 but also after 1990. Over the past 2 years, thus, Westinghouse Electric of the US has lost 6 places in the ranking while General Electric also of the US lost its leadership position, falling in third place behind Hitachi and Matsushita Electric of Japan. In fact, most of the Japanese companies significantly improved their position in the ranking during the past two years, with Sanyo Electric for instance rising from 22d to 17th position between 1990 and 1992 thanks to a 16% increase in turnover, and Sony rising from 12th to 8th position on the back of a 24% growth in turnover between 1990 and 1992.

Several EC firms have also improved their relative position, the most notable performance being recorded by the European leader Siemens, which ranks 4th at world level and whose turnover grew by 25% between 1990 and 1992. Alcatel Alsthom of France also posted remarkable growth in turnover, (+14%) over the same period. In both cases, growth was largely external. Divestments by Philips, on the other hand, resulted in a comparatively low overall sales growth over the period, of 7% in total over the two years. The first EFTA company, Asea Brown Boveri, saw stagnating sales (+1.2% between 1990 and 1992) which have brought the company back to 11th position in the world rankings, from 8th position in 1990.

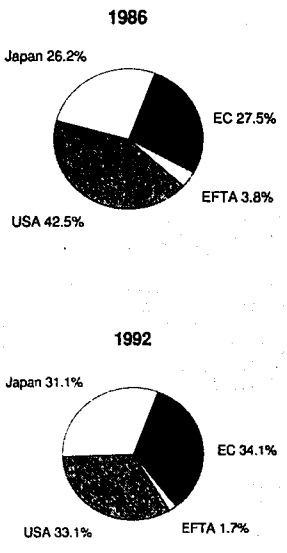
Computer and office equipment

The world computer and office equipment sector is dominated by a very small number of large companies, with IBM as the unchallenged leader in terms of sales: in 1992, IBM's turnover was close to ECU 50 billion, nearly 2.5 times the turnover of the next largest company in this sector, Fujitsu

Figure 9: Motor vehicles and components

Turnover in 1986 (million ECU)

General Motors	USA	104 525
Ford	USA	63 760
Toyota	JPN	35 927
Daimler-Benz	EC	30 773
Nissan	JPN	25 939
Volkswagen	EC	24 804
Chrysler	USA	22 962
FIAT	EC	19 949
Renault	EC	19 274
Honda	JPN	17 411
Peugeot	EC	15 428
Volvo	EFTA	12 008
Mitsubishi Motors	JPN	10 616
Mazda	JPN	10 400
Robert Bosch	EC	10 205
BMW	EC	7 310
Nippondenso	JPN	6 123
Isuzu	JPN	6 101
Suzuki	JPN	5 278
Saab-Scania	EFTA	5 030
Audi	EC	4 655
TRW	USA	6 415



Turnover in 1992 (million ECU)

General Motors	USA	100 799
Ford	USA	77 289
Toyota	JPN	62 403
Daimler-Benz	EC	48 828
Volkswagen	EC	42 315
Nissan	JPN	38 859
FIAT	EC	37 237
Chrysler	USA	27 402
Renault	EC	26 220
Honda	JPN	25 910
Peugeot	EC	22 708
Mitsubishi Motors	JPN	22 212
Robert Bosch	EC	17 042
Mazda	JPN	16 261
BMW	EC	15 479
Volvo	EFTA	11 065
Isuzu	JPN	9 528
Nippondenso	JPN	9 295
Audi	EC	8 292
Suzuki	JPN	7 895
Fuji Heavy Industries	JPN	6 570

Source: DABLE

of Japan. Between 1986 and 1990, intense competition and ownership restructuring moves in this sector led to further increases in industry concentration, such that the number of computer and office equipment producers in the world top 200 list fell from 7 in 1986 to 6 in 1990 and to 5 in 1992. Olivetti's poor sales performance since 1990 has eliminated it from the world top 200 companies' list, such that in 1992 there were no more EC (nor EFTA) companies in the world ranking of this sector. Of the five firms on the list in 1992, four were US firms, accounting for close to 80% of the combined turnover of the top 5 firms, the last one being Fujitsu of Japan, which ranks second.

The difficulties experienced by this sector over the past years as intense competition in world markets triggered price wars are illustrated by the fact that the joint turnover of these five companies only increased by 1.8% over the past two years, following a growth by 15.4% between 1986 and 1992. The only change in the relative position of companies on the list between 1990 and 1992 has been the fact that Hewlett-Packard moved from fourth to third position, thanks to a turnover growth of 17.7% over the 2-year period, the second best performance after Fujitsu (+35% turnover growth).

The crisis in the mainframe market is also evidenced by the strong fall in the global sales of Unisys (-18% between 1990 and 1992) and IBM (-8% over the same two-year period).

Motor vehicles and components

Growing concentration in the European motor vehicles and components sector over the past 6 years brought the share of world turnover which is accounted for by the largest EC firms in this sector from 27% to 34%.

Eight firms from the EC rank amongst the world's top 200 companies, alongside four firms from the US, 9 from Japan and one from EFTA. This distribution of top companies by country/region of origin in 1986 was essentially the same, with 3 US firms, 8 EC, 8 JPN and 2 EFTA companies. The sector as a whole experienced such rapid growth in the late 1980s that, despite the recent downturn in production and sales, the total turnover of the 22 largest companies in this sector was 41% higher in 1992 than 6 years earlier. The fastest growth over the 6 year period was recorded by BMW (even before its recent acquisition of Rover), which more than doubled sales to ECU 15.5 billion, closely followed (in terms of turnover growth) by Mitsubishi Motors, which posted a ECU 22.2 billion turnover in 1992 against ECU 10.6 billion in 1986. The worst performances were posted by General Motors, which remains the unchallenged leader in the sector but saw its turnover shrinking by 3.6% in total over the 6 years, and Volvo, whose turnover fell by close to 8% between 1986 and 1992. With a few exceptions and despite somewhat varying sales performances over the period, most large motor vehicles and components producers maintained their place in the rankings between 1986 and 1996.

Thanks to the concentration moves within Europe, the average size of European motor vehicle companies is now more in line with that of the other world giants: from an average size of ECU 16.5 billion in 1986, compared with ECU 63.7 billion for US firms and ECU 14.7 billion for Japanese companies firms, the top EC firms now have an average turnover of ECU 27.3 billion, which compares to ECU 52.0 billion for the US companies.

Aerospace equipment

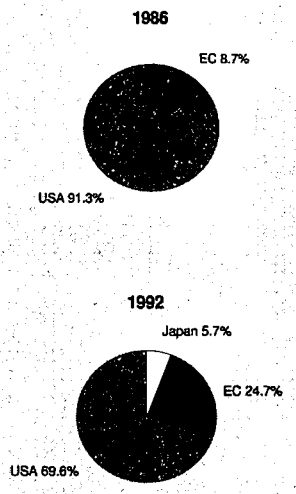
The aerospace industry has been seriously affected by the downturn in air traffic demand in the early 1990s and the deteriorating financial situation of most of the airlines. As orders for new civilian aircraft and defence budgets were cut, the aerospace equipment producers experienced falling sales and profits. Between 1986 and 1992, the total turnover of the top 11 companies increased by a mere 8.8%, less than 1.5% per year on average. Four companies on the top 11 list recorded negative growth in turnover between 1990 and 1992: British Aerospace (-8%), Allied Signal of the US (-4%) General Dynamics, also of the US (-15%) and Lockheed (-0.1%).

A new feature of the 1992 ranking is the entrance of a Japanese company in 9th position worldwide: Kawasaki Heavy Industries, with a total turnover of ECU 6.8 billion, 30% that of the industry's world leader, Boeing.

Figure 10: Aerospace equipment

Turnover in 1986 (million ECU)

Boeing	USA	16 613
United Technologies	USA	15 930
Rockwell Intl	USA	13 119
McDonnell Douglas	USA	12 985
Allied Signal	USA	11 990
Lockheed	USA	10 444
General Dynamics	USA	9 040
Northrop	USA	5 702
Textron	USA	5 107
Aérospatiale	EC	4 977
British Aerospace	EC	4 675



Turnover in 1992 (million ECU)

Boeing	USA	23 298
United Technologies	USA	16 704
British Aerospace	EC	13 556
McDonnell Douglas	USA	13 410
Allied Signal	USA	9 295
Deutsche Aerospace	EC	8 552
Lockheed	USA	7 796
Aérospatiale	EC	7 630
Kawasaki Heavy Industries	JPN	6 838
General Dynamics	USA	6 743
Textron	USA	6 441

Source: DABLE

France's Aérospatiale, which had disappeared from the world Top 200 list in 1990, has returned in the ranking in 1992 and is the world's 8th largest aerospace equipment producer.

In fact, the improved overall performance of EC aerospace equipment producers is probably the most significant feature of the 1992 figures. Whereas in 1986 the combined turnover of the top EC aerospace producers only represented 9% of the total turnover generated by the firms in the world top 200, in 1992 this share had increased to 25%, with British Aerospace moving from 11th position to third place and Deutsche Aerospace, which was not in the 1986 top 200 list, now featuring in 6th place behind Allied Signal of the US. Over the same period, Aérospatiale of France moved up from 10th to 8th position.

Food, drink and tobacco

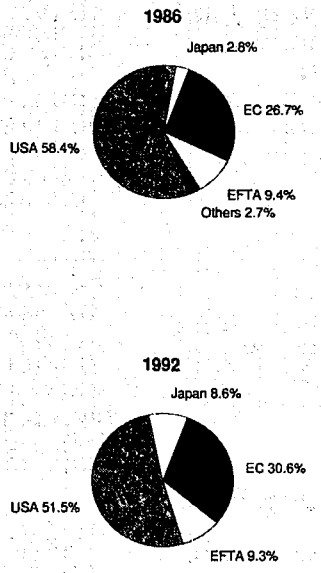
The agri-food sector is much less cyclical than most of the other sectoral markets which have been considered until now. Between 1986 and 1990, the total turnover generated by the top 25 world companies in this sector increased by 32.5%, a 7.3% average annual growth. In the two years to 1992, the turnover generated by these 25 companies increased by another 6% in total, in current ECU.

Concentration movements within the EC following the launching of the Single Market programme, combined with the fast expansion of a number of Japanese food groups, translated into a significant increase in the share of world turnover which is accounted for by EC and Japanese firms, mainly at the expense of the US. In 1992, the share of turnover accounted for by US firms in this sector had come down by 7 percentage

Figure 11: Food, drink and tobacco

Turnover in 1986 (million ECU)

Unilever	EC	23 051
Nestlé	EFTA	21 601
Philip Morris	USA	21 025
RJR Nabisco	USA	16 244
B.A.T. Industries	EC	13 422
Pepsico	USA	9 445
Sara Lee	USA	9 124
Kraft General Foods	USA	8 888
Coca-Cola	USA	8 813
Conagra	USA	8 436
Grand Metropolitan	EC	8 295
Anheuser-Busch	USA	7 805
Dalgety	EC	7 168
IBP	USA	6 935
Barlow Rand	ZAF	6 285
Taiyo Fishery	JPN	6 172
Archer-Daniels-Midland	USA	6 133
Ralston Purina	USA	5 884
Pillsbury	USA	5 743
American Brands	USA	5 349
Borden	USA	5 085
BSN	EC	4 943
General Mills	USA	4 864
CPC International	USA	4 625
Allied-Lyons	EC	4 465



Turnover in 1992 (million ECU)

Philip Morris	USA	38 667
Unilever	EC	33 692
Nestlé	EFTA	29 997
Kraft General Foods	USA	22 194
Pepsico	USA	16 958
Conagra	USA	16 921
B.A.T. Industries	EC	16 294
Ferruzzi Finanziaria	EC	12 575
RJR Nabisco	USA	12 145
Grand Metropolitan	EC	11 104
Sara Lee	USA	10 657
BSN	EC	10 350
Coca-Cola	USA	10 091
Anheuser-Busch	USA	8 794
IBP	USA	8 590
Kirin Brewery	JPN	8 333
Archer-Daniels-Midland	USA	7 429
Beghin-Say	EC	7 267
Eridania	EC	7 186
Snow Brand Milk Products	JPN	6 914
American Brands	USA	6 824
General Mills	USA	6 396
Taiyo Fishery	JPN	6 314
Toray Industries	JPN	6 085

Source: DABLE

Table 4: The world's 200 largest industrial groups, 1992

Rank	Name	Country	Turnover (million ECU)	Profit (million ECU)	Net worth (million ECU)	Employees	Return on assets (%)	Sector
1	General Motors	USA	100 799	-2 023	6 459	750 000	-1.4	Motor vehicles & parts
2	Exxon	USA	79 626	3 713	28 830	95 000	5.7	Petroleum refining
3	Ford Motor	USA	77 289	-387	12 142	325 333	-0.3	Motor vehicles & parts
4	Royal Dutch Shell	UK/NL	74 765	4 163	46 350	127 000	4.6	Petroleum refining
5	Toyota Motor	JPN	62 403	1 460	29 243	108 167	2.5	Motor vehicles & parts
6	IRI	I	52 347	-2 950		385 600		Conglomerate
7	IBM	USA	49 803	-5 299	23 456	301 542	-7.9	Computers & office equip.
8	Daimler Benz	D	48 828	703	9 445	376 467	1.6	Motor vehicles & parts
9	Hitachi	JPN	47 252	485	18 661	331 505	0.9	Electrical engineering
10	British Petroleum	UK	45 178	-622	14 332	105 750	-1.3	Petroleum refining
11	Matsushita Electronics	JPN	44 240	241	21 668	252 075	0.4	Electrical engineering
12	Mobil	USA	43 902	1 010	13 798	63 700	3.2	Petroleum refining
13	General Electric	USA	43 436	3 323	19 593	231 000	2.2	Electrical engineering
14	Volkswagen	D	42 315	-43	6 736	281 649	-0.1	Motor vehicles & parts
15	Nissan Motor	JPN	38 859	-351	9 489	143 754	-0.8	Motor vehicles & parts
16	Philip Morris	USA	38 667	3 812	11 262	161 000	9.9	Agro-alimentary
17	Siemens	D	38 509	880	9 699	413 000	2.5	Electrical engineering
18	FIAT	I	37 237	347	10 341	285 482	0.6	Motor vehicles & parts
19	Samsung	KOR	36 688	277	4 761	188 558	0.8	Electrical engineering
20	Unilever	UK/NL	33 692	1 761	6 211	287 000	9.0	Agro-alimentary
21	VEBA	D	32 545	487	7 333	129 802	1.9	Conglomerate
22	ENI	I	31 320	-513		124 000	-1.4	Petroleum refining
23	Nestlé	CH	29 997	1 485	8 158	218 005	6.1	Agro-alimentary
24	Chevron	USA	29 751	1 212	10 602	49 245	4.6	Petroleum refining
25	Elf Aquitaine	F	29 302	902	13 164	87 900	2.5	Petroleum refining
26	Toshiba	JPN	29 014	129	7 404	173 000	0.4	Electrical engineering
27	E.I. Du Pont Nemours	USA	28 720	753	9 993	124 916	2.5	Chemicals
28	Texaco	USA	28 414	781	8 413	37 582	3.9	Petroleum refining
29	Chrysler	USA	27 402	390	5 992	128 000	1.2	Motor vehicles & parts
30	Renault	F	26 220	830	4 963	146 604	4.5	Motor vehicles & parts
31	Honda Motor	JPN	25 910	240	6 585	90 900	1.3	Motor vehicles & parts
32	Philips	NL	25 752	-396	3 991	252 200	-1.8	Electrical engineering
33	Sony	JPN	24 324	227	9 072	126 000	0.8	Electrical engineering
34	Procter & Gamble	USA	23 629	1 506	7 934	106 000	7.8	Chemicals
35	Alcatel-Alsthom	F	23 621	965	7 292	203 000	2.7	Electrical engineering
36	Boeing	USA	23 298	1 199	6 616	142 000	8.6	Aerospace
37	Hoechst	D	22 727	458	6 126	177 668	2.5	Chemicals
38	Peugeot	F	22 708	493	7 829	150 800	2.6	Motor vehicles & parts
39	Mitsubishi Motors	JPN	22 212	180	2 804	45 000	1.0	Motor vehicles & parts
40	Kraft General Foods	USA	22 194	540	10 858		2.1	Agro-alimentary
41	BASF	D	22 060	306	7 465	123 254	1.6	Chemicals
42	NEC	JPN	22 039	-293	5 149	140 969	-1.2	Electrical engineering
43	Fujitsu	JPN	21 706	-204	6 996	161 974	-0.9	Computers & office equip.
44	Daewoo	KOR	21 330	284	3 795	78 727	1.0	Electrical engineering
45	BBC Brown Boveri	CH	21 280	191	1 808	213 420	0.9	Electrical engineering
46	Mitsubishi Electric	JPN	20 442	179	5 247	107 859	0.8	Electrical engineering
47	Bayer	D	20 411	747	8 820	156 400	3.9	Chemicals
48	Total	F	19 958	416	6 720	51 139	2.5	Petroleum refining
49	Amoco	USA	19 513	656	10 846	46 994	3.0	Petroleum refining
50	Nippon Steel	JPN	18 505	11	6 797	51 900	0.0	Metallurgy
51	Nippon Oil	JPN	17 837	195	3 827	11 044	1.1	Petroleum refining
52	Mitsubishi Heavy Industries	JPN	17 711	508	6 854	66 000	2.0	Mechanical engineering
53	Thyssen	D	17 538	156	2 462	147 279	1.4	Metallurgy
54	INI	E	17 301	-545	5 819	139 712	0.8	Conglomerate
55	Robert Bosch	D	17 042	234	3 654	169 804	2.2	Motor vehicles & parts
56	Pepsico	USA	16 958	1 005	4 439	371 000	6.2	Agro-alimentary
57	Conagra	USA	16 921	308	2 020	83 975	3.9	Agro-alimentary
58	United Technologies	USA	16 704	27	2 922	178 000	0.2	Aerospace
59	Petroleos de Venezuela	VEN	16 547	261	17 430	55 000		Petroleum refining
60	Pemex	MEX	16 444	827	28 193	125 000	2.1	Petroleum refining
61	ICI	UK	16 388	-774	6 357	114 000	-4.7	Chemicals
62	B.A.T. Industries	UK	16 294	1 181	6 133	92 829	2.7	Agro-alimentary
63	Mazda Motor	JPN	16 261			855 900	0.1	Motor vehicles & parts
64	Eastman Kodak	USA	15 579	767	5 563	132 600	4.3	Instrument engineering
65	BMW	D	15 479	357	3 445	73 562	2.6	Motor vehicles & parts
66	Dow Chemical	USA	14 643	213	6 780	61 353	1.1	Chemicals

Rank	Name	Country	Turnover (million ECU)	Profit (million ECU)	Net worth (million ECU)	Employees	Return on assets (%)	Sector
67	Repsol	E	14 044	545	3 882	19 632	5.3	Petroleum refining
68	Mannesmann	D	13 882	101	2 934	136 747	1.0	Mechanical engineering
69	Idemitsu Kosan	JPN	13 821	31	396	5 214	0.1	Petroleum refining
70	British Aerospace	UK	13 556	-1 207	2 482	102 500	-8.2	Aerospace
71	Atlantic Richfield	USA	13 510	921	5 862	26 800	4.9	Petroleum refining
72	McDonnell Douglas	USA	13 410	539	2 374	87 377	5.1	Aerospace
73	Xerox	USA	13 153	-198	3 581	99 300	-0.8	Instrument engineering
74	Usinor Sacilor	F	12 705	-354	3 064	89 038	-2.6	Metallurgy
75	Hewlett-Packard	USA	12 598	676	5 898	92 600	6.4	Computers & office equip.
76	Ferruzzi Finanziaria	I	12 575	-955		50 000	-4.2	Agro-alimentary
77	Metallgesellschaft	D	12 536	-20	871	62 547	-0.2	Metallurgy
78	USX Corp - Consolidated	USA	12 493	-123	3 169	45 582	-0.9	Conglomerate
79	Hanson	UK	12 346	1 528	6 299	75 000	5.3	Conglomerate
80	Ssangyong	KOR	12 287	133	2 956	24 000	1.3	Petroleum refining
81	Sunkyong	KOR	12 281	50	2 856	22 419	0.4	Petroleum refining
82	Ciba-Geigy	CH	12 221	837	10 170	90 554	5.0	Chemicals
83	Ruhrkohle	D	12 152	33	1 048	118 000		Extraction
84	RJR Nabisco	USA	12 145	599	6 630	63 000	2.4	Agro-alimentary
85	VIAG	D	12 045	143	1 643	84 543	1.4	Metallurgy
86	BTR	UK	12 013	920	2 985	135 133	7.5	Conglomerate
87	Preussag	D	12 005	230	1 604	73 680	3.3	Conglomerate
88	Rhône Poulenc Rorer	F	11 938	256	3 423	83 300	1.6	Chemicals
89	Sumitomo Metal	JPN	11 785	5	4 019	30 826		Metallurgy
90	Canon	JPN	11 678	219	4 375	67 227	1.7	Instrument engineering
91	NKK	JPN	11 653	-28	2 931	44 291	-0.1	Metallurgy
92	Fried Krupp - Hoesch Krupp	D	11 474	-122	1 177	91 411	-1.3	Metallurgy
93	Petrobras	BRA	11 404	1	9 368	51 638	0.0	Petroleum refining
94	Digital Equipment	USA	11 211	-1 859	3 968	113 800	-20.5	Computers & office equip.
95	Grand Metropolitan	UK	11 104	877	5 621	102 405	6.7	Agro-alimentary
96	Volvo	S	11 065	-443	4 042	60 115	-2.8	Motor vehicles & parts
97	Ford-Werke	D	10 901	-233	414	47 670	-5.3	Motor vehicles & parts
98	Saint-Gobain	F	10 812	347	5 247	100 373	2.5	Building materials
99	Electrolux	S	10 723	24	2 297	119 200	0.3	Electrical engineering
100	Minnesota Mining and Mfg	USA	10 716	954	5 635	87 015	10.3	Instrument engineering
101	Sara Lee	USA	10 657	612	3 269	128 000	7.6	Agro-alimentary
102	Bridgestone	JPN	10 645	173	2 805	85 835	1.5	Rubber products
103	Johnson & Johnson	USA	10 616	1 254	4 444	84 900	13.7	Pharmaceuticals
104	Sumitomo Metal Industries	JPN	10 581	4	3 722	22 089	0.0	Metallurgy
105	International Paper	USA	10 496	110	4 936	73 000	0.9	Paper & paper products
106	Thomson	F	10 366	-79	1 132	100 800	-0.6	Electrical engineering
107	BSN	F	10 350	532	4 198	58 063	5.1	Agro-alimentary
108	Motorola	USA	10 268	445	4 048	107 000	5.4	Electrical engineering
109	Tenneco	USA	10 142	-527	1 379	79 000	-4.1	Mechanical engineering
110	Coca-Cola	USA	10 091	1 454	3 571	31 000	17.0	Agro-alimentary
111	Time-Warner	USA	10 088	66	6 602	44 000	0.3	Printing & publishing
112	Showa Shell Sekiyu K.K.	JPN	9 981	115	1 028	3 828	2.1	Petroleum refining
113	Neste	SF	9 926	-411	2 363	12 950	-5.7	Petroleum refining
114	Statoil	NOR	9 882	310	2 790	14 338	3.4	Petroleum refining
115	Michelin	F	9 766	12	1 623	130 686	0.1	Rubber products
116	Pechiney	F	9 551	30	2 577	63 287	0.3	Metal products
117	Isuzu Motors	JPN	9 528	-175	403	25 615	-2.2	Motor vehicles & parts
118	General Motors CL H	USA	9 393	-38	5 483	89 300	-0.4	Instrument engineering
119	MAN	D	9 368	181	1 768	63 256	2.0	Mechanical engineering
120	Sanyo Electric	JPN	9 314	-8	4 482	56 156	-0.1	Electrical engineering
121	Allied Signal	USA	9 295	413	1 848	89 300	5.0	Aerospace
122	Nippondenso	JPN	9 295	256	4 681	56 718	2.8	Motor vehicles & parts
123	Sharp	JPN	9 265	186	4 769	41 836	1.4	Electrical engineering
124	Ford Motor of Canada	CAN	9 259	-233	434	21 800	-9.4	Motor vehicles & parts
125	Phillips Petroleum	USA	9 211	208	2 307	21 397	2.3	Petroleum refining
126	Georgia-Pacific	USA	9 144	-46	2 044	52 000	-0.5	Paper & paper products
127	Goodyear	USA	9 096	284	1 520	93 139	4.3	Rubber products
128	Petrofina	B	9 039	111	3 076	15 490	1.3	Petroleum refining
129	SPEP	F	9 003	1	877	97 451	0.0	Electrical engineering
130	Broken Hill Proprietary	AUS	8 891	666	5 218	47 000	4.6	Metallurgy
131	Anheuser-Busch	USA	8 794	767	3 827	44 871	9.4	Agro-alimentary
132	Bristol Myers Squibb	USA	8 611	1 187	5 749	52 600	14.2	Pharmaceuticals
133	IBP	USA	8 590	49	427	27 500	4.2	Agro-alimentary
134	USX-Marathon Group	USA	8 589	84	2 837	22 810	1.0	Petroleum refining

Rank	Name	Country	Turnover (million ECU)	Profit (million ECU)	Net worth (million ECU)	Employees	Return on assets (%)	Sector
135	CF Michelin	CH	8 526	-25	1 521	90 100	-0.3	Rubber products
136	Rockwell International	USA	8 434	373	2 307	78 685	5.0	Electrical engineering
137	Kobe Steel	JPN	8 365	-90	2 515	20 209	-0.6	Metallurgy
138	Kirin Brewery	JPN	8 333	229	3 375	8 086	3.1	Agro-alimentary
139	Dai Nippon Printing	JPN	8 326	312	4 723	29 111	3.4	Printing & publishing
140	Audi	D	8 292	43	771	37 738	1.5	Motor vehicles & parts
141	Nippon Mining	JPN	8 261	-181	1 009		-1.8	Petroleum refining
142	Kawasaki Steel	JPN	8 215	-188	3 503	26 215	-1.4	Metallurgy
143	Hachette	F	8 050	52	549	44 394	0.6	Printing & publishing
144	Asahi Glass	JPN	8 032	148	3 711	26 974	1.6	Building materials
145	Sumitomo Electric	JPN	7 939	203	6 167	33 500	2.3	Metallurgy
146	Sandoz	CH	7 935	823	5 330	53 360	8.3	Pharmaceuticals
147	Suzuki Motors	JPN	7 895	119	1 515	13 013	2.4	Motor vehicles & parts
148	Caterpillar	USA	7 868	-168	1 262	50 749	-1.6	Mechanical engineering
149	Lockheed	USA	7 796	269	1 675	71 700	5.2	Aerospace
150	Bertelsmann	D	7 796	201	1 020	48 781	4.9	Printing & publishing
151	Asahi Chemical Industries	JPN	7 725	114	2 776	28 334	1.4	Chemicals
152	Aérospatiale	F	7 630	-348	561	46 110	3.1	Aerospace
153	Merck & Co	USA	7 458	1 888	4 683	38 400	22.1	Pharmaceuticals
154	Archer-Daniels-Midland	USA	7 429	405		13 524	6.7	Agro-alimentary
155	Ashland Oil	USA	7 415	-53	886	33 682	-1.2	Petroleum refining
156	Akzo	NL	7 414	314	2 366	62 500	5.2	Chemicals
157	Mitsubishi Kasei	JPN	7 404	38	1 848	23 390	0.4	Chemicals
158	General Electric Company	UK	7 389	706	4 449	93 228	8.8	Electrical engineering
159	Aluminium Co Of America	USA	7 326	17	2 889	63 600	0.2	Metallurgy
160	Beghin-Say	F	7 267	187	2 306	25 036	2.9	Agro-alimentary
161	Norsk-Hydro	NOR	7 236	21	2 122	34 036	0.2	Chemicals
162	Eridania	I	7 186	192	1 161	22 334	2.5	Agro-alimentary
163	Mitsubishi Materials	JPN	7 182	2	2 009	20 400	0.0	Metallurgy
164	Roche	CH	7 129	1 055	9 003	56 335	6.9	Pharmaceuticals
165	Weyerhauser	USA	7 116	287	3 003	39 022	2.0	Paper & paper products
166	Mitsubishi Oil	JPN	7 111	79	692	3 516	1.5	Petroleum refining
167	Smithkline Beecham	UK	7 091	989	1 830	53 700	14.3	Pharmaceuticals
168	Enichem	I	7 028	-983	2 479	32 963	-8.4	Chemicals
169	Raytheon	USA	6 992	490	3 104	63 900	10.6	Electrical engineering
170	Henkel	D	6 987	170	1 596	42 244	3.4	Chemicals
171	Finmeccanica	I	6 965	67	1 486	51 503		Electrical engineering
172	Snow Brand Milk Products	JPN	6 914	51	742	7 779	1.7	Agro-alimentary
173	Toppan Printing	JPN	6 888	185	3 227	26 530	2.9	Printing & publishing
174	Fuji Photo Film	JPN	6 888	456	6 489	24 868	4.5	Chemicals
175	Unocal	USA	6 866	151	2 551	14 687	2.1	Petroleum refining
176	Northern Telecom	CAN	6 854	447	3 437	57 955	5.8	Electrical engineering
177	OIAG	A	6 848	-338	352	61 598	-4.3	Conglomerate
178	Kawasaki Heavy Industries	JPN	6 838	90	819	22 222	1.2	Aerospace
179	American Brands	USA	6 824	682	3 612	46 200	5.9	Agro-alimentary
180	Sun	USA	6 658	-245	1 611	14 219	-5.2	Petroleum refining
181	Fuji Heavy Industries	JPN	6 570	-171	891	14 813	-3.1	Motor vehicles & parts
182	Occidental Petroleum	USA	6 556	97	2 891	23 600	0.7	Extraction
183	Baxter International	USA	6 539	433	3 118	61 300	6.1	Pharmaceuticals
184	Westinghouse Electric	USA	6 520	269	2 018	109 050	3.4	Electrical engineering
185	Ishikawajima-Harima Heavy	JPN	6 507	111	1 191	27 614	1.2	Mechanical engineering
186	Unisys	USA	6 501	229	1 768	54 300	4.0	Computers & office equip.
187	Textron	USA	6 441	250	1 996	54 000	1.8	Aerospace
188	Matsushita Electric Works	JPN	6 439	111	2 751	27 889	1.7	Electrical engineering
189	TRW	USA	6 415	150	1 181	64 100	3.6	Motor vehicles & parts
190	Ricoh	JPN	6 407	31	2 245	47 976	0.4	Instrument engineering
191	General Mills	USA	6 396	398	1 174	121 290	10.9	Agro-alimentary
192	News Corporation	AUS	6 318	329	6 779	27 240	2.0	Printing & publishing
193	Taiyo Fishery	JPN	6 314	-29	130	7 823	-1.1	Agro-alimentary
194	Degussa	D	6 286	54	841	33 425	1.5	Metallurgy
195	Ericsson	S	6 268	64	2 421	66 232	0.9	Electrical engineering
196	Stora	S	6 252	-149	2 958	38 881	-1.5	Paper & paper products
197	Sumitomo Chemical	JPN	6 211	100	1 536	14 994	1.3	Chemicals
198	Solvay	B	6 125	235	2 606	45 350	3.7	Chemicals
199	Pohang Iron and Steel	KOR	6 120	183	4 813	23 628	1.6	Metallurgy
200	Toray Industries	JPN	6 085	168	2 834	31 667	2.2	Agro-alimentary

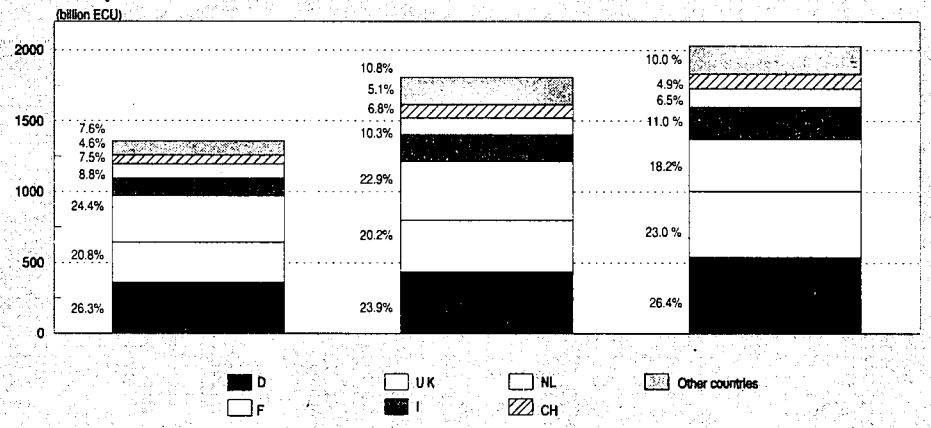
Source: DABLE

Table 5: The 200 largest companies in Europe by country

Country	Number	1986 Turnover	%	Number	1992 Turnover	%
BR Deutschland	42	356 905	26.2	41	535 915	26.4
France	44	283 292	20.8	49	459 066	22.6
United Kingdom	59	332 485	24.4	44	369 390	18.2
Italia	10	119 596	8.8	14	224 125	11.1
Nederland	9	102 237	7.5	11	135 920	6.7
Switzerland	11	62 930	4.6	10	100 330	4.9
España	4	9 795	0.7	8	63 199	3.1
Sweden	11	48 818	3.6	9	54 676	2.7
Belgique/België	5	21 208	1.6	6	34 741	1.7
Finland	2	7 480	0.6	3	17 194	0.8
Norway	2	14 273	1.1	2	17 118	0.8
Austria	2	11 581	0.6			
Luxembourg				1	4 537	0.2
Danmark				1	1 786	0.1
Total	200	1 360 895	100.0	200	2 027 792	100.0

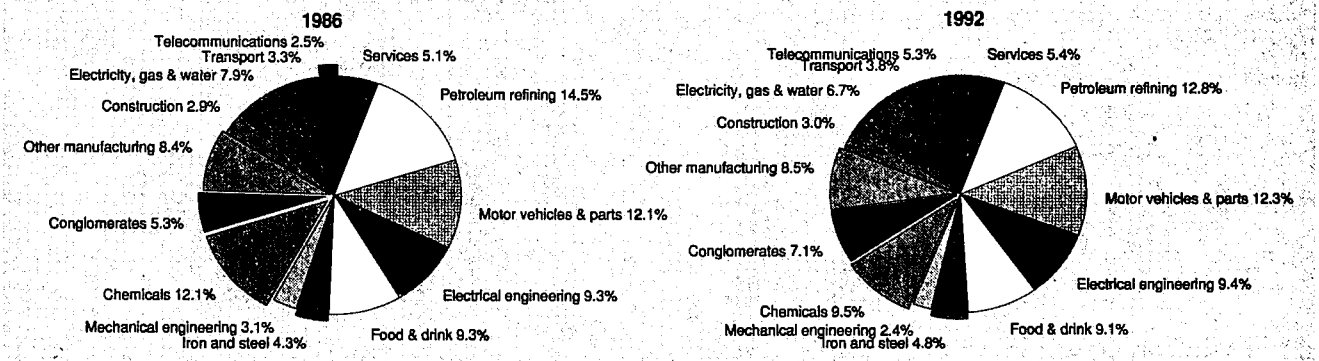
Source: DABLE

Figure 12: The 200 largest European companies
Turnover growth at current prices



Source: DABLE

Figure 13: The 200 largest European companies
Turnover by sector



Source: DABLE

Table 6: The largest groups in Europe (EC and EFTA), 1992

	The largest profit earners		Net income (million ECU)
1	Royal Dutch Shell	UK/NL	4 163
2	Unilever	UK/NL	1 761
3	British Telecom	UK	1 606
4	Hanson	UK	1 528
5	Nestlé	CH	1 485
6	Glaxo	UK	1 463
7	B.A.T. Industries	UK	1 181
8	Roche	CH	1 055
9	Smithkline Beecham	UK	989
10	Alcatel-Alsthom	F	965
11	BTR	UK	920
12	Elf Aquitaine	F	902
13	Siemens	D	880
14	Grand Metropolitan	UK	877
15	Ciba-Geigy	CH	837
16	Renault	F	830
17	Sandoz	CH	823
18	Endesa	E	806
19	Bayer	D	747
20	Royal PTT Nederland	NL	732
21	Guinness	UK	713
22	General Electric Company	UK	706
23	Daimler Benz	D	703
24	Cable and Wireless	UK	677
25	British Gas	UK	643

	The 25 most profitable		Net income / Turnover (%)
1	Glaxo	UK	25.2
2	Guinness	UK	16.5
3	Endesa	E	15.2
4	Roche	CH	14.8
5	Smithkline Beecham	UK	13.9
6	LVMH	F	13.9
7	Cable and Wireless	UK	13.4
8	Electrabel	B	12.7
9	Hanson	UK	12.4
10	Rothmans International	UK	11.2
11	Royal PTT Nederland	NL	10.7
12	Sandoz	CH	10.4
13	National Power	UK	9.7
14	General Electric Company	UK	9.6
15	British Telecom	UK	9.2
16	Powergen	UK	8.9
17	Procordia	S	8.6
18	Grand Metropolitan	UK	7.9
19	RTZ	UK	7.7
20	BTR	UK	7.7
21	Polygram	NL	7.7
22	Iberduero	E	7.5
23	L'Air Liquide	F	7.4
24	B.A.T. Industries	UK	7.2
25	Ciba-Geigy	CH	6.8

	The 25 richest		Net worth (million ECU)
1	Royal Dutch Shell	UK/NL	46 350
2	British Gas	UK	27 916
3	France Telecom	F	17 610
4	British Telecom	UK	17 359
5	British Petroleum	UK	14 332
6	Deutsche Bundesbahn	D	13 197
7	Elf Aquitaine	F	13 164
8	Telefonica de España	E	10 832
9	FIAT	I	10 341
10	ENEL	I	10 235
11	Ciba-Geigy	CH	10 170
12	Siemens	D	9 699
13	Daimler Benz	D	9 445
14	SNCF	F	9 108
15	Roche	CH	9 003
16	SIP	I	8 942
17	Bayer	D	8 820
18	ENI	I	8 480
19	Nestlé	CH	8 158
20	STET	I	8 041
21	Peugeot	F	7 829
22	BASF	D	7 465
23	VEBA	D	7 333
24	Alcatel-Alsthom	F	7 292
25	Iberduero	E	7 036

	The 25 biggest employers		(employees)
1	Siemens	D	413 000
2	IRI	I	385 600
3	Deutsche Postdienst	D	378 000
4	Daimler Benz	D	376 467
5	La Poste	F	300 000
6	Unilever	UK/NL	287 000
7	FIAT	I	285 482
8	Volkswagen	D	281 649
9	Philips	NL	252 200
10	Deutsche Bundesbahn	D	236 593
11	Deutsche Telekom	D	231 000
12	Nestlé	CH	218 005
13	BBC Brown Boveri	CH	213 420
14	Alcatel-Alsthom	F	203 000
15	Compagnie Générale des Eaux	F	198 813
16	SNCF	F	198 078
17	The Post Office	UK	190 000
18	Hoechst	D	177 668
19	British Telecom	UK	170 700
20	Robert Bosch	D	169 804
21	Bayer	D	156 400
22	France Telecom	F	155 285
23	Peugeot	F	150 800
24	Thyssen	D	147 279
25	Renault	F	146 604

Source: DABLE

points, from 58% in 1986 to 51% in 1992, whereas the share of turnover of Japanese firms had increased from 3% to 9% thanks to the entrance of three additional Japanese agri-food producers in the world top 200.

Over the period 1986-92, the average size of the top EC firms in this sector also increased significantly, from ECU 10.2 billion to ECU 14.1 billion, a figure even slightly higher than the top US firms in 1992, at ECU 13.8 billion.

Between 1990 and 1992, there was no major change in the relative positioning of the large food producers in the world ranking, with the exception of RJR Nabisco and BSN, both of which recorded strong growth in turnover (+11.6% and +35.6% respectively), thus gaining 2 (respectively 4 for BSN) places in the world ranking. BSN is, in fact, the company which recorded the fastest growth in turnover in the early 1990s, followed by Coca Cola (+25.7%), Ferruzzi Finanziaria (+14.3%) and Nestlé (+14.2%). Much of this growth was through acquisitions. In 1992, however, although the number of M&As in the European agri-food sector continued to increase, the size of deals was somewhat smaller. Both the number and size of deals came down further in 1993. Between 1990 and 1992, only one company experienced negative sales growth: Grand Metropolitan of the UK.

Table 7: Petroleum refining
Turnover

(million ECU)	1986		1992
Royal Dutch Shell	65 881	Royal Dutch Shell	74 765
British Petroleum	40 493	British Petroleum	45 178
ENI	23 178	ENI	31 320
Elf Aquitaine	17 601	Elf Aquitaine	29 302
Total	14 072	Total	19 958
Petrofina	7 652	Repsol	14 044
Statoil	6 778	Neste	9 926
Neste	5 068	Statoil	9 882
Compañia Española de Petroleos	2 571	Petrofina	9 039
Ultramar	2 185	Veba Oel	6 996

Source: DABLE

EUROPE'S TOP 200 FIRMS

Overall performance

In 1992, the total turnover of Europe's 200 largest companies amounted to ECU 2028 billion, i.e. about 42% of EC's GDP. Table 5 shows the distribution of Europe's 200 largest companies by country, in 1986 and in 1992 respectively. Important rationalisation and concentration movements in France, combined with the recession in the UK which eroded the net results of British firms, have resulted in the reversal of France and UK's positions in the ranking between 1986 and 1992, based on turnover.

The most notable trend in Table 5, however, is the Europeanisation of markets after 1986, as concentration and rationalisation moves amongst companies which were previously constrained to relatively small, national, markets resulted both in a considerable increase in the average size of Europe's giants, and in an increase in the share of companies from the "smaller" EC countries in Europe's top 200. In 1986, thus, 72.5% of the companies in Europe's top 200 list were from one of the three largest EC economies (Germany, France and the UK). In 1992, this share had fallen to 67%, with countries such as Spain, Italy, the Netherlands or Belgium increasing the number of firms that are placed in Europe's top 200 list.

Compared to the rest of the world, the breakdown of Europe's largest companies by sector is much more varied - implying that many sectors which are highly concentrated in the rest of the world have not yet reached the "critical size" in the EC (Figure 13). Petroleum refining companies for instance, which account for nearly one fifth of the total turnover of the world's top 200 firms, account for less than 13% of the global turnover of Europe's top 200 companies. And indeed, excessive fragmentation is one of the factors frequently quoted as negatively influencing the relative competitiveness of Europe's petroleum refineries compared to their competitors in the US of Asia.

In the motor vehicles sector also, the relative fragmentation of the industry in Europe (mainly of the automotive components part of the industry) is reflected by the fact that the "large" motor vehicle companies only account for about 12% of the total turnover of Europe's top 200 firms, whereas the equivalent share at world level is more than 20%.

Comparing the sectoral distribution of companies in the top 200 list in Europe between 1986 and 1992 shows no major difference (Figure 13). The telecommunications sector and the industrial conglomerates were able to post a better overall performance over the period than the average for European industry, whereas in three sectors (chemicals, petroleum refining and mechanical engineering) the sales performance of the larger firms was less than average, so that their share of the total turnover generated by the top 200 European firms decreased significantly.

Table 6 present Europe's 25 largest profit earners, the most profitable and the richest firms, along with Europe's 25 biggest employers. As in the rest of the world, the list of most profitable companies is dominated by companies from the pharmaceutical industry, alongside a few electrical equipment companies. Amongst the biggest EC employers we find a very diverse mix of companies, many of which are fully or partially government owned, and some of which may not keep their place in this ranking in future years as they are on the list of companies to be restructured or privatised.

Below, we look at the relative performance of EC firms in each of these sectors over time.

Sectoral performance

Petroleum refining

The total turnover of Europe's 10 largest petroleum refining companies represents 19.5% of the total turnover of Europe's 200 largest firms, but the employment share is much lower, reflecting the fact that petroleum refining is not a labour intensive activity.

1993 was not a very good year for petroleum refineries, which saw profits tumble as a result of weak demand and oil prices. Even those companies that were able to maintain their turnover in 1992-93 saw profits squeezed by the dollar effect. Elf Aquitaine for instance saw its net profit falling by 40% in 1992 compared to 1991.

Of Europe's 10 largest petroleum refining companies, eight are in the world's top 200 ranking. The last two, Compañia Española de Petroleos and Ultramar PLC, are from Spain and the UK respectively. All 10 companies were already in the 1990 top ranking, in the same place except for Petrofina who lost two places in the ranking, falling from Europe's 7th biggest oil refinery to 9th place.

The total turnover of Europe's 10 largest refineries fell by 1.5% between 1990 and 1992, following a total increase of 37% between 1986 and 1990, or 8.2% per year on average. The companies which reportedly suffered most in terms of turnover over the past two years were Veba Oel (whose turnover fell by 17% between 1990 and 1992), Petrofina (-11.6% in turnover over the same period) and Royal Dutch Shell (-10% in turnover). In contrast, Repsol, Elf Aquitaine and Total registered healthy rises in overall turnover between 1990 and 1992, their increase in turnover ranging from 7.7% for Total to 15.7% for Elf Aquitaine and 28.6% for Repsol.

Table 8: Iron and steel
Turnover

(million ECU)	1986		1992
Thyssen	14 825	Thyssen	17 538
Usinor Sacilor	10 630	Usinor Sacilor	12 705
Degussa	5 037	Metallgesellschaft	12 536
Metallgesellschaft	4 518	VIAG	12 045
British Steel	4 476	Fried Krupp - Hoesch Krupp	11 474
Cockerill Sambre	3 740	Degussa	6 286
Alusuisse - Lonza	3 207	British Steel	5 665
Krupp Stahl	2 764	Arbed	4 537
VIAG	2 691	Cockerill Sambre	4 036
Hoogovens	2 537	Alusuisse - Lonza	3 603

Source: DABLE

Iron and steel

The total turnover of the top 10 European metal producers increased by 66% between 1986 and 1992, an 8.8% growth in annual terms. Much of this reflected growth through acquisitions, however, as overall market demand growth was subdued, especially in the early 1990s. Of the top 10 European metal producers, five are German, the remaining five being respectively French, British, Luxemburguese, Belgian and Swiss.

The combined turnover of these top 10 companies grew from ECU 81.6 billion in 1990 to ECU 90.4 billion in 1992, a 10.8% growth in nominal terms. Although there has been no major change in the ranking of the top European companies in this sector over the past two years, the relative performance of individual producers has been quite varied, with Krupp Stahl growing by a factor of 3 through the acquisition of Hoesch, whereas VIAG and Metallgesellschaft were respectively growing by 28% and by 30%, both through a series of acquisitions. Apart from these three companies, and with the exception of Alusuisse-Lonza which recorded stable turnover at about ECU 3.6 billion, all the other top European metal producers experienced a decrease in turnover over the past two years, the worst performance being recorded by British Steel whose turnover measured in ECU fell by 20% between 1990 and 1992.

Chemicals

Amongst the top 15 European chemical companies, four are German, three are Swiss and three are British. Italy, France, Norway, the Netherlands and Belgium only have one representative on the list, and Spain has as of yet none.

The total turnover generated by these top 15 companies in 1992 amounted to ECU 168.5 billion, about 20% more than that generated by the top European chemical companies in 1986. Although there have been much changes in the ranking of the top European chemical producers, all but 2 of the top 15 in 1986 were still among the top 15 in 1992. The two that had disappeared are Montedison - whose basic chemicals division has in fact been merged with ENI's chemical division to form Enimont - and DSM of the Netherlands. The two new - one of them a false - entrants are Enichem and SmithKline Beecham.

Rhône-Poulenc, Sandoz and Henkel are the three companies which posted the best performance in terms of turnover between 1986 and 1992, growing by more than 50% in total over the 6-year period, sometimes through acquisition. The companies which showed the worst performance were Norsk Hydro, whose turnover measured in ECU actually shrank in ECU by 3.5% between 1986 and 1992, along with Bayer and ICI. The latter two companies reported an average annual growth in turnover of only 1% per year or so over the six-year period.

Mechanical engineering

The European mechanical engineering sector is much less concentrated than its Japanese and US counterparts, such that the largest EC producers in this sector rank fairly low in the world Top 200 ranking.

Table 9: Chemicals
Turnover

(million ECU)	1986		1992
Bayer	19 145	Hoechst	22 727
BASF	19 014	BASF	22 060
Hoechst	17 860	Bayer	20 411
ICI	15 106	ICI	16 388
Ciba-Geigy	9 058	Ciba-Geigy	12 221
Montedison	8 727	Rhône-Poulenc	11 938
Rhône-Poulenc	7 747	Sandoz	7 935
Norsk Hydro	7 495	Akzo	7 414
DSM	7 376	Norsk Hydro	7 236
Akzo	6 501	Roche	7 129
Solvay	4 893	Smithkline Beecham	7 091
Glaxo	4 842	Enichem	7 028
Sandoz	4 747	Henkel	6 987
Roche	4 441	Solvay	6 125
Henkel	4 095	Glaxo	5 801

Source: DABLE

Table 10: Mechanical engineering
Turnover

(million ECU)	1986		1992
Mannesmann	8 097	Mannesmann	13 882
Krupp	7 446	Fried Krupp - Hoesch Krupp	11 474
MAN	6 703	MAN	9 368
Alsthom	3 487	Thyssen Industrie	4 271
Hoesch	3 463	AG Für Industrie and Verkehrswesen	3 873
SKF	2 851	Sulzer	3 743
Sulzer	2 582	Linde	3 733
Thyssen Industrie	2 215	SKF	3 553

Source: DABLE

Between 1986 and 1992, the sector had mixed fortunes, as a period of fast growth between 1986 and 1990 was followed by falling investment and fixed capital demand. Whereas total sales by Europe's top 10 mechanical engineering firms increased by close to 47% between 1986 and 1990, or 10% annually, the total turnover generated by these top 10 firms then contracted by 0.4% between 1990 and 1992. The best sales performance was posted by Linde (whose turnover grew by 26.5% over the two years to 1992) and Mannesmann (+19.3% in turnover), whereas SKF experienced a decrease in turnover by 3.5% and MAN only grew by 1.5%.

Thanks to its takeover of Hoesch, Fried-Krupp Hoesch climbed to second place in the top 10 European ranking, despite a 16.4% decrease in the combined turnover of the two companies. The main change in the rankings between 1990 and 1992 were the improved position of AGIV, which now ranks as Europe's 5th largest mechanical engineering producer, and the continued decline of SKF which now only ranks as the 8th largest European producer, behind Sulzer of Switzerland.

Electrical and electronic engineering

The rapid growth of the electrical engineering sector over the eighties has masked highly diverse performances by market segment, which had major implications on the relative ranking of firms in this sector. In Europe, thus, there have been notable changes in the rankings of the top 10 firms due to contrasted performances of companies involved in the production of electrical equipment for consumers (a segment which has been faced to growing competition on world markets and where EC firms have been losing market share) and electrical equipment for industry (which includes telecommunications equipment, an area where EC firms are world leaders).

Siemens, which had already overtaken Philips as the European leader in this sector in 1990, has since largely confirmed its position thanks to a 25% growth in turnover between 1990 and 1992, compared an average turnover growth of the European top 10 of only 9.4%. The second and third largest European firms in this sector are respectively Philips of the Netherlands and Alcatel Alsthom of France. The EFTA countries are very present at world level in this sector, with three companies in the top 10: Asea Brown Boveri (CH/S) in 4th position, Electrolux (S) in 5th position and Ericsson (S) in 10th place.

Compared to 1990, three companies saw negative growth in turnover: Thomson (-4.7%) from France and Electrolux of Sweden (-2.0%), and General Electric of the UK (-13.2%). The best performance was that by Siemens (+25%) and Alcatel Alsthom (13.6%), both of which partly grew through acquisitions.

Motor vehicles and components

The combined turnover of the largest 10 European motor vehicles and components producers amounted to ECU 246.3 billion in 1992, a 57% increase from 1986. Most of this growth was achieved during the first part of the period, however, as falling new car registrations in the early 1990s has resulted in cutbacks in sales and turnover. Nevertheless, although overall market demand growth was slowing down significantly in the early 1990s, the total turnover generated by the 10 largest European companies in this sector continued to increase, from ECU 214.9 billion in 1990 to ECU 246.3 billion in 1992, a 7% average annual rate of growth. Much of this was external growth.

The largest European automotive producer is Daimler-Benz, with a total turnover in 1992 of ECU 48.8 billion, 15% more than the next in line, Volkswagen. Daimler-Benz is, in fact, the third largest European industrial company and ranks 11th world-wide. Fiat, which had risen to second place in the European ranking in 1990, has since fallen back into third position behind Volkswagen. Volvo, which reported an 8% fall in turnover in the 6 years to 1992, was the worst performer of the top 10 in terms of turnover growth, although a cooperative agreement with Renault has made the Volvo/Renault group

Table 11: Electrical and electronic engineering
Turnover

(million ECU)	1986		1992
Philips	22 915	Siemens	38 509
Siemens	21 786	Philips	25 752
Alcatel-Alsthom	11 894	Alcatel-Alsthom	23 621
Thomson	9 147	BBC Brown Boveri	21 280
BBC Brown Boveri	7 849	Electrolux	10 723
Electrolux	7 581	Thomson	10 366
General Electric Company	7 575	SPEP	9 003
Asea	6 376	General Electric Company	7 389
AEG	5 272	Finmeccanica	6 965
Ericsson	4 519	Ericsson	6 268

Source: DABLE

Table 12: Motor vehicles and components
Turnover

(million ECU)	1986		1992
Daimler-Benz	30 773	Daimler-Benz	48 828
Volkswagen	24 804	Volkswagen	42 315
FIAT	19 949	FIAT	37 237
Renault	19 274	Renault	26 220
Peugeot	15 428	Peugeot	22 708
Volvo	12 008	Robert Bosch	17 043
Robert Bosch	10 205	BMW	15 479
Ford-Werke	7 838	Opel	14 456
BMW	7 310	Volvo	11 065
Opel	9 623	Ford-Werke	10 901

Source: DABLE

the world's largest truck producer. The involvement of several of the large automotive producers in other markets, such as aerospace (for Daimler-Benz and Fiat) can in fact make comparisons of relative performances based solely on turnover somewhat misleading. Nevertheless, Volvo's sales performance was in sharp contrast with the overall growth of 50% and above posted by all the other top 10 European vehicle manufacturers over the same period.

Compared to 1990, the best performance in terms of turnover was that of Volkswagen (+27.9%), which absorbed Audi, followed by Daimler-Benz (+17.5%) and BMW (+17.1%).

Two groups saw negative growth in turnover over the past two years: Fiat (-1.4%) and Peugeot (-1.6%). Saab Scania, which sold a big part of its car division to General Motors a couple of years ago, has since disappeared from the top 10 list. Opel has made a notable entrance in 8th position in the top European list, just behind BMW.

Food, drink and tobacco

The total turnover of the top 10 European agri-food producers increased by 51.6% in total between 1986 and 1992, a 7.2% average annual increase.

Although most of the sector's production is accounted for by small and medium-sized firms, there are a number of major European giants operating in this sector which have recorded healthy growth in turnover and posted high profitability over the past years. As these major groups adjusted their strategies in the late 1980s to prepare for the single market, there have been significant changes in the list of companies which feature in the top 10 ranking as well as in the country of origin of the leading European producers. Whereas in 1986 seven of Europe's top 10 agri-food companies were from the UK, in 1992 this number had fallen to five, alongside two Italian companies, two French and one Swiss firm. Ferruzzi Finanziaria, Beghin Say and Eridania Zuccherifici were not in the 1986 list of top 10 agri-food businesses, and neither was Hillsdown Holdings, while companies like Dalgety, Guinness, Associated British Foods and Jacobs Suchard either disappeared from the list or were acquired by one of the other top players.

Unilever of the UK/Netherlands remains the unchallenged leader in this sector, closely followed by Nestlé of Switzerland. The next in line, BAT, has a turnover which is less than half that of the European leader in this sector.

Services

The above sections mainly looked at the relative performance of Europe's top manufacturing companies over the period 1986-92. Below, we briefly review the trends in turnover in Europe's key services companies, in those sectors which are most concentrated: the distribution of energy, telecommunications services, transport services and distribution.

The sector accounting for the largest share of turnover is the utilities sector, with 15 companies accounting for a turnover which is, at ECU 142.1 billion, equivalent to 90% of the turnover generated by the top 10 European electrical engineering companies. The next largest services sector in terms of turnover, and also the fastest growing sector, is the telecommunications services sector. Because of the major changes in the organisation of this sector in Europe in the late 1980s and early 1990s, however, the sector's growth must be appreciated by adding the "postal services" sector to the telecommunications services sector. The average annual growth of the combined "communications services" sector between 1986 and 19892 was nevertheless impressive, at +87%.

Table 13: Food, drink and tobacco
Turnover

(million ECU)	1986		1992
Unilever	23 051	Unilever	33 692
Nestlé	21 601	Nestlé	29 997
B.A.T. Industries	13 422	B.A.T. Industries	16 294
Grand Metropolitan	8 295	Ferruzzi Finanziaria	12 575
Dalgety	7 168	Grand Metropolitan	11 104
BSN	4 943	BSN	10 350
Allied-Lyons	4 465	Beghin-Say	7 267
Guinness	3 563	Eridania	7 186
Associated British Foods	3 179	Allied-Lyons	6 049
Jacobs Suchard	2 972	Hillsdown Holdings	5 942

Source: DABLE

Table 14: Energy Turnover

(million ECU)	1986		1992
Electricité de France	19 686	Electricité de France	25 930
RWE	19 215	RWE	21 454
Electricity Council	16 053	ENEL	17 954
British Gas	10 986	British Gas	13 932
Nederlandse Gasunie	9 792	Nederlandse Gasunie	7 393
ENEL	9 106	Gaz de France	7 155
Gaz de France	7 325	Ruhrgas	7 140
Ruhrgas	6 110	Tractebel	6 078
CEA Industries	4 553	Iberduero	5 921
Intercom	2 968	National Power	5 725

Source: DABLE

Table 15: Telecommunications Turnover

(million ECU)	1986		1992
PTT France	23 495	Deutsche Telekom	26 727
Deutsche Bundespost	23 325	France Telecom	17 917
British Telecom	13 605	British Telecom	17 434
STET	9 801	STET	17 115
SIP	7 083	SIP	13 282
Post Office	5 190	Telefonica de España	9 164
Royal PTT Nederland	4 132	Royal PTT Nederland	6 868
Telefonica de España	3 270	Cable & Wireless	5 037

Source: DABLE

Table 16: Transport services Turnover

(million ECU)	1986		1992
Deutsche Bundesbahn	9 972	Lufthansa	8 541
SNCF	6 963	Air France	8 325
Lufthansa	4 879	SNCF	8 089
British Airways	4 711	Deutsche Bundesbahn	7 766
Air France	4 531	P & O	7 512
British Railways	3 582	British Airways	7 328
P & O	2 909	Alitalia	4 279
Alitalia	2 547	British Railways	4 240
KLM	2 267	KLM	3 661
Swissair	2 189	Delmas	3 506

Source: DABLE

Energy

Table 14 presents the top 10 European utilities, ranked by turnover. The largest is EDF of France, with a turnover in 1992 of ECU 25.9 billion, followed by the German utility RWE AG. All the companies on the list of top European utilities are still essentially national companies, so that it is not surprising to find the French, German , Italian and UK distributors at the top of the list.

Telecommunications

The liberalisation of the European telecommunications services market and the transformation of the key national players into companies capable of competing at the EC level has changed the names and relative ranking of the top 8 companies operating in this sector in Europe, without fundamentally changing the nature of their business.

Between 1990 and 1992, the combined turnover of the 8 companies in the 1992 top European companies' list increased by 8.1%, or just over 4% per year on average. The period was characterised by the consolidation of Deutsche Telekom, and the privatisation of parts of British Telecom which would explain a fall in turnover by 6%.

The fastest growth in turnover between 1990 and 1992 was reported by Telefonica de España from Spain (+48%), followed by STET (+30%) and SIP (+23%) from Italy, and France Telecom (+13%).

Transport services

The list of top 10 transport companies in Europe is, unsurprisingly, dominated by airlines. Of Europe's top 10 companies, half were airlines, three were railways and the remaining two were shipping companies.

Table 17: Europe's 200 largest manufacturing and service groups, 1992

Rank	Name	Country	Turnover (million ECU)	Profit (million ECU)	Net worth (million ECU)	Employees	Return on assets (%)	Sector
1	Royal Dutch Shell	UK/NL	74 765	4 163	46 350	127 000	4.6	Petroleum refining
2	IRI	I	52 347	-2 950		385 600		Conglomerate
3	Daimler Benz	D	48 828	703	9 445	376 467	1.6	Motor vehicles & parts
4	British Petroleum	UK	45 178	-622	14 332	105 750	-1.3	Petroleum refining
5	Volkswagen	D	42 315	-43	6 736	281 649	-0.1	Motor vehicles & parts
6	Siemens	D	38 509	880	9 699	413 000	2.5	Electrical engineering
7	FIAT	I	37 237	347	10 341	285 482	0.6	Motor vehicles & parts
8	Unilever	UK/NL	33 692	1 761	6 211	287 000	9.0	Agro-alimentary
9	VEBA	D	32 545	487	7 333	129 802	1.9	Conglomerate
10	ENI	I	31 320	-513	8 480	124 000	-1.4	Petroleum refining
11	Nestlé	CH	29 997	1 485	8 158	218 005	6.1	Agro-alimentary
12	Elf Aquitaine	F	29 302	902	13 164	87 900	2.5	Petroleum refining
13	Deutsche Telekom	D	26 727	-627		231 000		Telcommunications
14	Renault	F	26 220	830	4 963	146 604	4.5	Motor vehicles & parts
15	Electricité de France	F	25 930	270	2 768	118 978	0.3	Energy
16	Philips	NL	25 752	-396	3 991	252 200	-1.8	Electrical engineering
17	Alcatel-Alsthom	F	23 621	965	7 292	203 000	2.7	Electrical engineering
18	Hoechst	D	22 727	458	6 126	177 668	2.5	Chemicals
19	Peugeot	F	22 708	493	7 829	150 800	2.6	Motor vehicles & parts
20	BASF	D	22 060	306	7 465	123 254	1.6	Chemicals
21	RWE	D	21 454	540	2 981	105 572	2.0	Energy
22	BBC Brown Boveri	CH	21 280	191	1 808	213 420	0.9	Electrical engineering
23	Générale des Eaux	F	20 495	425	3 659	198 813	1.6	Building/civil engineering
24	Bayer	D	20 411	747	8 820	156 400	3.9	Chemicals
25	Total	F	19 958	416	6 720	51 139	2.5	Petroleum refining
26	ENEL	I	17 954	147	10 235	107 431		Energy
27	France Telecom	F	17 917	483	17 610	155 285	1.3	Telecommunications
28	Thyssen	D	17 538	156	2 462	147 279	1.4	Metallurgy
29	British Telecom	UK	17 434	1 606	17 359	170 700	5.7	Telecommunications
30	INI	E	17 301	-545	5 819	139 712	0.7	Conglomerate
31	STET	I	17 115	608	8 041	139 757	1.4	Telecommunications
32	Robert Bosch	D	17 043	234	3 893	169 804	2.2	Motor vehicles & parts
33	ICI	UK	16 388	-774	6 357	114 000	-4.7	Chemicals
34	B.A.T. Industries	UK	16 294	1 181	6 133	92 829	2.7	Agro-alimentary
35	BMW	D	15 479	357	3 445	73 562	2.6	Motor vehicles & parts
36	Repsol	E	14 044	545	3 882	19 632	5.3	Petroleum refining
37	British Gas	UK	13 932	643	27 916	84 023	1.6	Energy
38	Mannesmann	D	13 882	101	2 934	136 747	1.0	Mechanical engineering
39	British Aerospace	UK	13 556	-1 207	2 482	102 500	-8.2	Aerospace
40	SIP	I	13 282	290	8 942	89 293	0.8	Telecommunications
41	Lyonnaise des Eaux	F	13 201	55	1 902	127 552	0.3	Conglomerate
42	Usinor Sacilor	F	12 705	-354	3 064	89 038	-2.6	Metallurgy
43	Ferruzzi Finanziaria	I	12 575	-955	520	50 000	-4.2	Agro-alimentary
44	Metallgesellschaft	D	12 536	-20	871	62 547	-0.2	Metallurgy
45	Hanson	UK	12 346	1 528	6 299	75 000	5.3	Conglomerate
46	Ciba-Geigy	CH	12 221	837	10 170	90 554	5.0	Chemicals
47	Ruhrkohle	D	12 152	33	1 048	118 000	0.2	Extraction
48	VIAG	D	12 045	143	1 643	84 543	1.4	Metallurgy
49	BTR	UK	12 013	920	2 985	135 133	7.5	Conglomerate
50	Preussag	D	12 005	230	1 604	73 680	3.3	Conglomerate
51	Rhône-Poulenc Rorer	F	11 938	256	3 423	83 300	1.6	Chemicals
52	Fried Krupp - Hoesch Krupp	D	11 474	-122	1 177	91 411	-1.3	Metallurgy
53	Grand Metropolitan	UK	11 104	877	5 621	102 405	6.7	Agro-alimentary
54	Volvo	S	11 065	-443	4 042	60 115	-2.8	Motor vehicles & parts
55	Deutsche Postdienst	D	10 947			378 000		Services
56	Ford-Werke	D	10 901	-233	414	47 670	-5.3	Motor vehicles & parts
57	La Poste	F	10 831	9	1 215	300 000		Services
58	Saint-Gobain	F	10 812	347	5 247	100 373	2.5	Building materials
59	Electrolux	S	10 723	24	2 297	119 200	0.3	Electrical engineering
60	Thomson	F	10 366	-79	1 132	100 800	-0.6	Electrical engineering
61	BSN	F	10 350	532	4 198	58 063	5.1	Agro-alimentary
62	Neste	SF	9 926	-411	2 363	12 950	-5.7	Petroleum refining
63	Statoil	N	9 882	310	2 790	14 338	3.4	Petroleum refining
64	Michelin	F	9 766	12	1 623	130 686	0.1	Rubber products
65	Pechiney	F	9 551	30	2 577	63 287	0.3	Metal products
66	MAN	D	9 368	181	1 768	63 256	2.0	Mechanical engineering

Rank	Name	Country	Turnover (million ECU)	Profit (million ECU)	Net worth (million ECU)	Employees	Return on assets (%)	Sector
67	Bouygues	F	9 232	100	1 102	68 966	1.1	Building/civil engineering
68	Telefonica de España	E	9 164	612	10 832	83 802	2.0	Telecommunications
69	Petrofina	B	9 039	111	3 076	15 490	1.3	Petroleum refining
70	SPEP	F	9 003	1	877	97 451	0.0	Electrical engineering
71	Schneider	F	8 977	45	1 540	97 206	0.5	Building/civil engineering
72	Lufthansa	D	8 541	-405	1 127	62 488	-4.8	Transport
73	Air France	F	8 325	-477	1 131	44 126	-5.5	Transport
74	Audi	D	8 292	43	771	37 738	1.5	Motor vehicles & parts
75	SNCF	F	8 089	-432	9 108	198 078	-1.5	Transport
76	Hachette	F	8 050	52	549	44 394	0.6	Printing & publishing
77	Sandoz	CH	7 935	823	5 330	53 360	8.3	Pharmaceuticals
78	Bertelsmann	D	7 796	201	1 020	48 781	4.9	Printing & publishing
79	Deutsche Bundesbahn	D	7 766	-4 283	13 197	236 593	-12.0	Transport
80	Aérospatiale	F	7 630	-348	561	46 110	-3.1	Aerospace
81	P & O	UK	7 512	261	3 306	71 133	3.1	Transport
82	Akzo	NL	7 414	314	2 366	62 500	5.2	Chemicals
83	Nederlanse Gasunie	NL	7 393	35	2 845	2 008		Energy
84	General Electric Company	UK	7 389	706	4 449	93 228	8.8	Electrical engineering
85	British Airways	UK	7 328	234	1 702	48 960	2.8	Transport
86	The Post Office	UK	7 274	255	2 931	190 000		Services
87	Beghin-Say	F	7 267	187	2 306	25 036	2.9	Agro-alimentary
88	Norsk Hydro	N	7 236	21	2 122	34 036	0.2	Chemicals
89	Eridania	I	7 186	192	1 161	22 334	2.5	Agro-alimentary
90	Gaz de France	F	7 155	232	499	26 087		Energy
91	Ruhrgas	D	7 140	394	1 563	11 274		Energy
92	Roche	CH	7 129	1 055	9 003	56 335	6.9	Pharmaceuticals
93	Smithkline Beecham	UK	7 091	989	1 830	53 700	14.3	Pharmaceuticals
94	Enichem	I	7 028	-983	2 479	32 963	-8.4	Chemicals
95	Henkel	D	6 987	170	1 596	42 244	3.4	Chemicals
96	Swiss PTT	CH	6 966	-24	-0.2			Services
97	Finmeccanica	I	6 965	67	1 486	51 503		Electrical engineering
98	Royal PTT Nederland	NL	6 868	732	5 142	101 959	6.4	Services
99	OIAG	A	6 848	-338	352	61 598	-4.3	Conglomerate
100	Fininvest	I	6 583	13		40 000		Services
101	SGE	F	6 462	59	411	66 077	1.1	Building/civil engineering
102	Degussa	D	6 286	54	841	33 425	1.5	Metallurgy
103	Ericsson	S	6 268	64	2 421	66 232	0.9	Electrical engineering
104	Stora	S	6 252	-149	2 958	38 881	-1.5	Paper & paper products
105	Solvay	B	6 125	235	2 606	45 350	3.7	Chemicals
106	Tractebel	B	6 078	224	2 323	33 985	1.7	Energy
107	Allied-Lyons	UK	6 049	346	3 268	71 713	4.2	Agro-alimentary
108	Hillsdown Holdings	UK	5 942	128	941	44 196	4.1	Agro-alimentary
109	Iberduero	E	5 921	445	7 036	16 071	1.8	Energy
110	Glaxo	UK	5 801	1 463	5 784	37 083	18.2	Pharmaceuticals
111	AEG	D	5 745	14	605	60 784	0.3	Electrical engineering
112	National Power	UK	5 725	553	3 224	7 377	9.2	Energy
113	CEA Industries	F	5 722	140	2 276	39 786	0.7	Uranium
114	British Steel	UK	5 665	-171	4 924	42 100	-2.3	Metallurgy
115	Ladbroke Group	UK	5 661	2	3 579	52 894	0.0	
116	Associated British Foods	UK	5 576	276	2 497	51 724	7.1	Agro-alimentary
117	Fougerolle	F	5 536	60	531	47 388	0.9	Building/civil engineering
118	L'Oréal	F	5 489	337	2 177	31 908	7.3	Chemicals
119	Trafalgar House	UK	5 472	-119	802	39 697	-3.1	Building/civil engineering
120	British Coal	UK	5 456	227	1 736	67 900	2.8	Extraction
121	Saatchi & Saatchi	UK	5 399	-834	-603	12 482	-64.4	Advertising
122	Procordia	S	5 315	458	2 867	36 718	8.7	Agro-alimentary
123	Endesa	E	5 310	806	4 814	16 374	6.3	Energy
124	Pirelli	I	5 198	-66	1 595	45 726	-1.1	Rubber products
125	Pechiney	F	5 161	287	2 349	35 138	4.6	Metal products
126	Saint Louis	F	5 153	113	934	28 016	2.3	Agro-alimentary
127	Alcatel Cable	F	5 133	200	1 107	28 176	4.5	Electrical engineering
128	Philipp Holzmann	D	5 116	19	494	43 680	0.5	Building/civil engineering
129	Olivetti	I	5 056	-409	1 488	40 401	-4.8	Computers & office equip.
130	Cable and Wireless	UK	5 037	677	4 186	39 837	7.9	Telecommunications
131	CSF Thomson	F	4 996	222	2 892	42 350	2.1	Electrical engineering
132	Rolls Royce	UK	4 840	-274	1 287	51 800	-6.6	Aerospace
133	Continental	D	4 801	62	726	51 064	1.8	Rubber products
134	Electrabel	B	4 748	601	5 133	17 959	5.7	Energy

Rank	Name	Country	Turnover (million ECU)	Profit (million ECU)	Net worth (million ECU)	Employees	Return on assets (%)	Sector
135	OMV	A	4 733	-42	1 237	12 660	-0.9	Petroleum refining
136	Societé Générale	B	4 715	150	3 965	29 164	1.8	Metallurgy
137	Tate & Lyle	UK	4 622	163	964	17 004	5.2	Agro-alimentary
138	BICC	UK	4 603	27	658	40 118	0.8	Building/civil engineering
139	Asea Brown Boveri	D	4 595	115	528	39 843	3.7	Electrical engineering
140	Cadbury Schweppes	UK	4 582	276	1 616	36 579	6.9	Agro-alimentary
141	ARBED	L	4 537	-101	1 512	27 440	-1.6	Metallurgy
142	Accor	F	4 466	117	1 605	144 093	1.9	Hotel trade
143	Lafarge Coppee	F	4 449	179	2 056	29 662	2.7	Building materials
144	RTZ	UK	4 413	338	4 205	68 298	4.1	Extraction
145	Machines Bull	F	4 410	-690	-400	35 175	-19.3	Computers & office equip.
146	L'Air Liquide	F	4 372	325	2 803	28 000	5.7	Chemicals
147	Guinness	UK	4 319	713	5 175	24 032	6.4	Agro-alimentary
148	Holderbank Fin. Glaris	CH	4 313	144	1 692	35 245	2.2	Building materials
149	Svenska Cellulosa	S	4 284	45	2 512	29 623	0.7	Paper & paper products
150	Alitalia	I	4 279	-11	671	28 906	-0.3	Transport
151	Thyssen Industrie	D	4 271	397		47 073		Mechanical engineering
152	RMC Group	UK	4 267	83	1 088	26 307	2.7	Building materials
153	British Railways	UK	4 240	-223	3 165	129 990	-2.5	Transport
154	Powergen	UK	4 197	375	2 307	5 715	8.9	Energy
155	Skanska	S	4 133	-419	994	28 646	-6.9	Building/civil engineering
156	Havas	F	4 118	120	1 304	12 430	3.9	Advertising
157	Repola	SF	4 118	-179	987	26 856	-2.8	Paper & paper products
158	Fasa Renault	E	4 074	78	1 085	16 090	3.9	Motor vehicles & parts
159	Cockerill Sambre	B	4 036	-34	1 657	27 522	-0.8	Metallurgy
160	Tarmac	UK	3 988	-358	1 456	28 590	-9.8	Building/civil engineering
161	Petroleos	E	3 952	86	1 338	8 792	2.6	Petroleum refining
162	DSM	NL	3 919	108	1 957	22 364	2.3	Chemicals
163	GTM-Entrepose	F	3 887	30	315	46 993	0.6	Building/civil engineering
164	AGIV	D	3 873	57	500	39 738	1.9	Mechanical engineering
165	Aegis Group	UK	3 866	-26	-209	1 851	-2.8	Services
166	BOC Group	UK	3 833	128	2 094	37 104	2.7	Chemicals
167	United Biscuits	UK	3 805	150	1 279	38 698	5.7	Agro-alimentary
168	Albatros Investissements	F	3 775	-34	311	24 128	-1.0	Conglomerate
169	Deutsche Babcock	D	3 750	31	324	38 018	1.6	Metal products
170	Gebruder Sulzer	CH	3 743	65	1 227	31 073	1.5	Mechanical engineering
171	Linde	D	3 733	112	1 404	30 424	3.6	Mechanical engineering
172	KLM	NL	3 661	-260	946	28 911	-4.3	Transport
173	CMB Packaging	F	3 628	143	1 634	30 270	3.9	Metal products
174	Alusuisse-Lonza	CH	3 603	67	883	25 249	2.0	Metallurgy
175	Rothmans International	UK	3 567	400	2 053	20 370	7.4	Agro-alimentary
176	Arjo Wiggins Appleton	UK	3 563	127	1 709	19 436	4.0	Paper & paper products
177	SKF	S	3 553	-227	1 190	45 151	-5.2	Mechanical engineering
178	Delmas	F	3 506	-78	279	21 684	-3.0	Transport
179	Klockner-Werke	D	3 484	-275	290	33 199	-8.5	Metallurgy
180	Heineken	NL	3 437	79	834	25 320	2.3	Agro-alimentary
181	Tabacalera	E	3 433	95	722	11 835	4.8	Agro-alimentary
182	Elektrizitat Westfalen	D	3 402	54	1 069	8 033	1.0	Energy
183	Hoogovens	NL	3 398	-99	805	25 303	-2.6	Metallurgy
184	Spie-Batignolles	F	3 394	-40	104	33 110	-0.7	Building/civil engineering
185	Pilkington	UK	3 387	-26	1 236	41 600	-0.6	Building materials
186	Burmah Castrol	UK	3 243	116	809	22 450	4.4	Petroleum refining
187	Lucas Industries	UK	3 184	-12	1 095	50 569	-0.4	Motor vehicles & parts
188	LVMH	F	3 164	439	3 115	15 426	5.7	Agro-alimentary
189	RWE-DEA	D	3 163	-8	454	7 280	-0.3	Petroleum refining
190	Nokia	SF	3 150	-61	826	26 770	-1.6	Electrical engineering
191	Swissair	CH	3 143	62	1 599	25 800	1.2	Transport
192	Sanofi	F	3 133	153	1 907	24 625	4.7	Pharmaceuticals
193	Standard Elecktrik Lorenz	D	3 123	69	495	22 665	3.3	Electrical engineering
194	Schering	D	3 105	130	1 405	26 034	3.7	Pharmaceuticals
195	Trelleborg	S	3 083	-165	823	20 155	-4.8	Extraction
196	Valeo	F	3 016	102	1 067	26 000	4.0	Motor vehicles & parts
197	Nedlloyd Group	NL	2 958	-23	655	23 522	-1.0	Transport
198	Publicis	F	2 922	22	207	5 500	2.0	Services
199	Polygram	NL	2 912	223	443	11 094	9.6	Electrical engineering
200	Rank Organisation	UK	2 910	188	2 079	40 689	4.4	Recreational services

Source: DABLE

Table 18: Europe's largest distribution companies

Rank	Name	Country	1992 Turnover (million ECU)	1992 Employees	1988 Turnover (million ECU)	1988 Employees
1	Tengelman	D	26 115	191 293	16 872	145 000
2	SPAR	NL	19 561	188 865	14 382	158 000
3	REWE	D	18 246	150 000	12 377	107 000
4	Carrefour	F	17 114	79 500	9 214	42 900
5	Leclerc	F	16 617	54 000	10 516	38 900
6	Intermarché	F	16 588	65 000	9 948	45 000
7	Sainsbury	UK	12 752	120 119	8 656	88 283
8	Promodes	F	12 302	49 238	6 565	32 124
9	Otto-Versand	D	10 445	43 000	6 411	28 500
10	Pinault-Printemps	F	10 261	53 914	3 733	30 248
11	Tesco	UK	10 084	86 066	7 194	75 658
12	Stinnes	D	9 903	34 697	6 303	18 825
13	Ahold	NL	9 502	109 713	6 269	80 284
14	Karstadt	D	9 165	77 560	5 965	67 174
15	Fnz Haniel	D	9 149	33 000	6 139	20 990
16	Casino Guichard Perrachon	F	8 998	50 366	5 043	39 686
17	Kaufhof	D	8 593	60 086	4 871	42 570
18	SHV	NL	8 529	50 700	5 224	27 300
19	Delhaize Frères	B	7 863	75 658	4 818	49 000
20	Marks and Spencer	UK	7 835	62 080	7 834	76 313
21	Quelle Schickedanz	D	7 550	42 900	4 838	31 500
22	Thyssen Handelsunion	D	7 134	28 701	5 315	12 481
23	Asko Deutsche Kaufhaus	D	7 081	68 654	4 242	31 254
24	Inchcape	UK	6 844	38 573	3 690	45 247
25	Argyll	UK	6 841	67 940	5 355	63 264
26	Edeka Zentrale	D	6 336	742	5 775	700
27	Asda Group	UK	6 020	69 298	4 146	50 465
28	Thorn EMI	UK	5 862	49 433	5 033	65 444
29	Système U	F	5 841	23 000	3 553	18 200
30	GIB	B	5 505	49 314	3 897	24 323
31	Kloeckner	D	5 261	10 465	5 731	9 923
32	Boots Company	UK	5 217	78 707	4 137	69 967
33	Kingfisher	UK	4 778	62 799	4 031	57 173
34	Office Commerciale Pharmaceutique	F	4 756	6 863	2 960	6 086
35	Docks de Fnce	F	4 684	24 903	3 281	21 244
36	Raab Karcher	D	4 664	25 712	3 369	10 548
37	Booker	UK	4 613	22 743	2 768	17 166
38	Galeries Lafayette	F	4 596	36 543	2 099	16 332
39	Vendex International	NL	4 576	54 000	4 362	55 000
40	Lonrho	UK	4 102	106 161	4 845	97 756
41	Great Universal Stores	UK	3 700	29 631	4 017	32 156
42	Au Bon Marché	F	3 674	17 891	133	1 195
43	Hertie	D	3 412	25 399	2 564	25 400
44	Centros Comerciales Pryca	E	3 334	13 200		
45	Comptoirs Modernes	F	3 298	15 916	2 011	14 672
46	Kwik Save Group	UK	3 270	14 843	1 376	8 423
47	Allkauf	D	3 115	12 300	2 187	8 670
48	Baywa	D	3 101	11 973	2 336	10 672
49	AVA	D	3 051	22 296	1 058	7 769
50	W.H. Smith Group	UK	2 989	30 088	2 971	34 530

Source: DABLE

Between 1986 and 1992, the total turnover generated by the top 10 European transport services providers increased by 42% in total, a 6% increase in annual terms. Most of the companies maintained their place in the ranking between 1990 and 1992, with the exception of Lufthansa which gained four places to become the European leader in the sector. Nedlloyd, the shipping company which was in 9th place in the 1990 ranking, has since disappeared from the top 10 list, whereas Delmas of France has entered in 10th position.

The on-going rationalisation and the restructuring moves which are under-way in this sector as market liberalisation proceeds will undoubtedly lead to further changes in the ranking of top firms in this sector over the coming years.

Distribution

Europe's largest distribution companies are listed in Table 18. Tengelman of Germany is by far the largest European distributor, with a total turnover in 1992 of ECU 26.1 billion. It is also the largest employer on the list, with employment of close to 200 thousand in 1992.

Although cross-European concentration movements have taken place in this sector in the late 1980s and early 1990s, the size of the top players is still mainly determined by the size of their national markets, with the exception of the second group on the list, Spar International of the Netherlands. Among the list of top 10 European distributors, three are German, five are French, one is from the UK and one Dutch.

A comparison of the turnover generated by these top firms in 1986 and 1992 respectively shows major changes both in the average size of the groups and in their relative position. Carrefour of France for instance saw its turnover nearly doubling over the period, rising from 6th to 4th position, bypassing Leclerc (also of France) which had posted a 58% cumulative growth over the same 6-year period.

The relative concentration of the distribution sector in the Netherlands is evidenced by the fact that this country has four companies in the top 50 list, three of which are in the top 20. Belgium only has two top distribution companies in this list, Delhaize Frères and GIB, ranked respectively 19th and 30th. In comparison, there is only one company from Spain on that list (Centros Comerciales Pryca, in 44th position), and there are no Italian companies.

Written by: DRI Europe based on information from DABLE
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European social economy undertakings (cooperatives, mutual benefit societies and associations)

FOREWORD

The term social economy, while still a controversial subject in some Member States, embraces throughout Europe cooperative, mutual benefit and associative undertakings as well as organised social movements of men and women who create, inspire and are members of these economic entities.

These three forms of undertaking have been grouped under a common title because they are based on specific principles and conform to specific modes of organisation which reflect legal rules different from those governing companies with share capital.

Social economy undertakings are characterised by great diversity as regards status, size, sector of activity and location. They are, however, present in all the Member States of the European Community and often play an important economic and social role nationally, regionally or locally.

A common feature of these kinds of undertaking is that they all require personal commitment by their members and thus make an essential contribution to the dynamism of a democratic society which attaches paramount importance to pluralism and to the blossoming of the spirit of initiative of its citizens.

Beyond the statutory differences between the various kinds of legal status, the specific feature of these economic entities lies in the constraining nature of both democracy ("one person, one vote") and organised solidarity - at least internally, within the group of members - resulting in particular from the indivisible nature of the reserves.

The importance of these structures is not confined purely to their economic weight but also relates to their social and cultural dimension. Thus the position assigned in each Member State to these economic structures - ratified by the rules and regulations - harks back to the history and culture of each nation.

In view of the revival of interest in the social economy during the present recession, it should not be forgotten that the period of economic expansion of the "magnificent thirty" occurred within a protective framework of regulations which made possible the institutionalisation, consolidation and expansion of cooperatives, mutual benefit societies and associations.

This is particularly true of the provident mutual benefit societies and associations in the welfare-health sector which found a reference framework when, in the post-war period, countries made social protection for everyone one of the pillars of our European societies.

It is equally true of the cooperatives in the agricultural sector (agricultural processing and distribution of the interest subsidy on loans), where the authorities made them a preferred vehicle of the modernisation of European countryside.

One could give many examples of this: Credit Unions in Ireland, Charities in the United Kingdom, the Mondragon Group in Spain, etc. These economic entities and movements thus constituted a founding and federating element in our different European societies, affecting their structures in depth.

The major changes which have taken place in our European societies over the last two decades have had a far-reaching effect on the various cooperative, mutual benefit and associative movements in the Member States.

The cooperatives

The sociological effects of the recession (fewer farmers, manual workers and traders, the tertiarisation of the economy) have had far-reaching repercussions on cooperatives. Their reaction to these changes in the European production system and to the transformations in society, as well as in patterns of consumption, has not, however, been the same everywhere.

The traditional social basis of co-operation is shrinking but some social groups belonging to the new, expanding social classes are receptive to cooperative organisation. Thus, whereas the number of farmers is falling dramatically, farmers' cooperatives are holding their own rather well, by restructuring

Table 1: Employment and turnover growth according to nature of social economy undertaking

	Full-time employment, 1988	Full-time employment, 1992	Employment growth 1992/88, (%)	Turnover 1988 (million ECU)	Turnover 1992 (million ECU)	Turnover growth 1992/88, (%)
Sample	1 354	1 572	16.0	285	594	54.0
Mutual benefit societies	1 867	2 351	26.0	2 857	4 810	68.0
Co-operatives	1 622	1 846	14.0	429	665	55.0
Associations	579	706	21.0	59	88	50.0

Source: DGXXIII

Table 2: Employment and turnover growth according to size

	Full-time employment, 1988	Full-time employment, 1992	Employment growth 1992/88, (%)	Turnover 1988 (million ECU)	Turnover 1992 (million ECU)	Turnover growth 1992/88, (%)
20 largest	7 056	8 387	19.0	1 614	2 662	61.0
50 largest	3 525	4 108	16.5	847	1 314	55.0
50 smallest	259	294	13.4	85	126	49.0
20 smallest	85	88	3.0	26	34	32.0

Source: DGXXIII

and merging, despite some spectacular bankruptcies (Feder-Consorzi in Italy, ULN in France, SüdMilch in the Federal Republic of Germany).

Workers' cooperatives are losing ground in their traditional sectors (clothing, building, printing) but are growing in the intellectual services sector (design and consultancy firms, data processing and software, audio-visual activities and cultural activities, welfare-health services).

Faced with the crisis of the "classical undertaking", the fast-growing social frameworks and categories seem to be tending to rediscover this form of undertaking, which is fairly well matched to a service economy.

Consumer cooperatives have been drastically cut down in size in some countries (Federal Republic of Germany, France) because they did not know how, or were unable to adopt the organisational and management methods of the big distribution chains.

On the other hand, in some countries (Italy, the United Kingdom, Spain) these groups have succeeded in consolidating their position in the commercial and distribution sector by adapting themselves to the new consumer behaviour. Paradoxically, whereas traders and craftsmen are two occupational categories which have been strongly affected by the changes which are taking place, cooperative groupings of craftsmen and traders have been formed to carry out certain functions such as supply and marketing and various collective service functions in order to defend their earnings and market shares more effectively.

Lastly, maritime co-operation, which used to play a role similar to that of agricultural co-operation for the prosperity of non-industrial fishermen, is now feeling the full force of the structural fisheries crisis.

Mutual benefit societies

Whether centred more on health (so-called provident mutual societies) or on insurance (insurance mutual benefit societies and cooperatives), mutual benefit societies are undoubtedly parts of the traditional "institutionalised" sector of the social economy. But this does not prevent them from being affected by the recession, like the other categories, while at the same time, some of them at least are providing support for innovation projects which are worthy of interest from the point of view, for instance, of their impact on employment.

Mutual benefit societies are having to contend with the major challenge of the relationships between their activities and public action. But this is a constant historical feature of this sector, which, except during periods of authoritarian regimes, has displayed its capacity for independence, anticipation and formulation of social needs, and also for exerting flexible pressure and adapting itself to government action. Admittedly, the outstanding fact is the Government's disinvolvement in the social field and particularly in that of social protection.

As harmonisation of the legal systems of social protection is henceforth ruled out, while the convergence of policies and - why not? - practices is encouraged, undertakings of the mutual benefit type should be well placed to meet the challenge of the establishment of this coordination in practice at, or indeed beyond, Community level. The essentially bilateral trans-border experiments now in progress ought to be further pursued in such a way as to involve mutual benefit undertakings in large-scale practical Europeanisation, which is so necessary for their durability and the preservation of their jobs.

The sector's reaction to the decline of the 'welfare state is not the same from country to country' its role and its place in relation to profit-making initiatives are, however, an essential subject of political debate everywhere. It is generally recognised that this sector has three main assets in this connection:

- its partnership characteristics (economic democracy, employment of practices based on solidarity, physical proximity...), coupled with a natural propensity towards organisation in networks;
- its particular ability to exercise concerted and lasting control over costs, thanks to the greater responsibility entrusted to everyone involved, especially members and consumers;
- lastly - a point which is noteworthy but not unanimously recognised - its role as a recession-damper, at least through an approach to welfare which does not regard it as a burden but, on the contrary, sees it as a wealth-generating and demand-stimulating investment.

Table 3: Employment and turnover growth in the 20 most dynamic social economy undertakings

	Full-time employment, 1988	Full-time employment, 1992	Employment growth 1992/88, (%)	Turnover 1988 (million ECU)	Turnover 1992 (million ECU)	Turnover growth 1992/88, (%)
Sample	1 354	1 572	16.0	385	594	54.0
20 most dynamic	994	1 492	50.0	232	492	111.0

Source: DGXXIII

The power of these assets differs, however, according to the sector's degree of "institutionalisation" and the status of its activity in relation to public intervention ("independent" sector, third sector, ...) and according to whether provident-society undertakings tend rather to be "providers of services" for the public sector, to "plug gaps" or to specialise in certain types of products and services in fields where the exclusive presence of private undertakings might lead to some malfunctioning of the market.

True, the impact in terms of employment differs in the same way. What matters in the end is to find out whether this sector's reactions do not involve substitution for other jobs elsewhere or reduction of the quality of content (qualifications, pay).

As is shown by the example relating to mutual benefit societies in the two classifications presented below, they can plan an active part in the effective creation of quality jobs. Effective because what they have to do, by a major effort to train and retrain workers, is both to preserve jobs which would otherwise be threatened and to help create others. This job creation, entrusted to experienced and for the most part financially sound institutions, should also ensure that these jobs are socially useful, permanent and reasonably well paid. It is thus necessary to avoid the risk of their developing into just "little jobs".

Associations

There are three different categories of associations, depending on their activity:

- Those which employ paid workers, which have grown very greatly over the past decade both in number and in budget. Part of this growth is due to a semi-privatisation by the Government of activities which were previously performed by the public authorities. Consequently, as is shown by the figures set out below under the various headings, employment is growing fast in this sector, even though it is difficult to obtain any financial information from associations. Furthermore, the growth of this sector seems to be entirely endogenous, as no mergers or acquisitions appear to be taking place within it. It should be noted, finally, that very little capital needs to be raised.
- The voluntary work which is done in most associations shows that it is possible to organise and harness people's good will in order to render genuine services to society.
- Training of unemployed persons and, more generally, all schemes for reintegration into the economy of persons who have been marginalised are, unfortunately, a fast-growing sector: out of the ten cooperatives, mutual benefit societies and associations which showed the greatest growth, three belong to this category!

This apparent stability of the association sector - if we disregard the sudden disappearance of some structures which were apparently unshakeable - is attributable to the status of these enterprises, which protects them from hostile take-over bids and damps down the recession by smoothing out its effects. A second explanation lies in the links which this "institutionalised" category of the social economy has forged with that economy's credit institutions.

THE AVAILABLE MATERIAL

Two classifications have been produced at the request of the European Community.

The purpose of the first is to bring together the 500 biggest European cooperatives, mutual benefit societies and associations (CMAs).

The aim of the second is to find 500 cooperatives, mutual benefit societies and associations which have shown dynamism and achieved growth over the last five years (1992 compared with 1988).

These two classifications will be finalised by the end of March 1994; at present we only have very partial results so that we cannot yet say for sure that the names of the cooperatives, mutual benefit societies and associations listed will appear in the final classifications.

These two classifications have been compiled:

- To gain a better knowledge of the major European cooperatives, mutual benefit societies and associations and thus acquire a panel of representative CMAs which can be used to study how their development and Europeanisation should be promoted.
- To determine which are the most dynamic cooperatives, mutual benefit societies and associations in order to study the financial requirements created by their development and the sectors and forms in which organisations of this type are to be found.

THE METHODOLOGY USED

Our first difficulty was to determine why a particular entity does or does not belong to the world of cooperatives, mutual benefit societies and associations.

With a view to avoiding inaccuracy and arbitrary judgements and ensuring that each entity can recognise itself and accept the classification made, we decided to adopt each entity's membership of a recognised federation as the single and sole criterion for belonging to the world of cooperatives, mutual benefit societies and associations.

Secondly, as this approach involves sending each entity a questionnaire specifying all the general and financial data so that they can be validated, each entity is free to participate

Table 4: Employment and turnover growth by sector

	Full-time employment, 1988	Full-time employment, 1992	Employment growth 1992/88, (%)	Turnover 1988 (million ECU)	Turnover 1992 (million ECU)	Turnover growth 1992/88, (%)
Production	222	256	15.0	66	106	63.4
Building	255	261	2.5	17	22	27.7
Purchasing	586	730	24.4	116	218	87.5
Agriculture	674	854	26.7	280	389	38.8
Social	1 176	1 216	3.4	62	91	44.0
Insurance	1 702	2 318	36.2	587	1 229	109.0
Consumption	2 580	2 496	-3.0	260	464	78.2
Banks	2 975	3 261	9.6	2 601	4 428	70.3

Source: DGXXIII

Table 5: Employment and turnover growth by country

	Full-time employment, 1988	Full-time employment, 1992	Employment growth 1992/88, (%)	Turnover 1988 (million ECU)	Turnover 1992 (million ECU)	Turnover growth 1992/88, (%)
Belgique/België	743	830	11.7	1 048	1 741	66.1
BR Deutschland	1 720	2 333	35.6	446	740	65.9
France	1 795	1 953	8.7	305	440	44.3
Italia	583	803	37.0	53	124	132.0
United Kingdom	1 251	1 603	28.4	290	510	75.5

Source: DGXXIII

or refrain from participating in the classification by returning or not returning the questionnaire sent to it.

It must be possible for the classification criteria to be applied to all cooperatives, mutual benefit societies and associations, which means that they must be simple, and homogeneous for the whole of the population studied: it is not possible, therefore, to use the sophisticated criteria which are fashionable in most of the classifications produced, because they would not apply to the whole world of cooperatives, mutual benefit societies and associations.

At the present stage the scope of the two classification bases is confined to a study of the magnitudes described below.

Firstly, the number of persons employed has been chosen as the main criterion for classifying the largest CMAs. It indicates the extent of contribution made by the entity analysed to the employed labour force and hence the size of its share in the working population. This concept does not create any particular problem, as we decided to observe the following principles:

- to take average employment in the year as the basis, in order to prevent certain activities using a substantial amount of seasonal labour from being overrepresented in the sample;
- to calculate on the basis of full-time equivalent jobs, because CMAs have many part-time jobs;
- to record only paid jobs, as the calculation base must exclude charitable services which do not really participate in the economy and which it would be difficult to monitor (because there is no reference wage) in terms of time actually spent.

Secondly, the change in turnover or its equivalent (comparison between 1992 and 1988) has been chosen as the main criterion for classifying the most dynamic undertakings because it gives a correct idea of how much the activity has grown in relation to other firms. In the individual cases turnover has been deemed to be equivalent to the following value:

- for cooperatives, to total proceeds (amounts invoiced + change in work in hand + other proceeds);
- for banks working in and belonging to the world of CMAs, to financial proceeds and other proceeds (and not to outstanding balance sheet items, which do not correspond to this concept);
- for insurance undertakings, to premiums received;
- for mutual benefit societies, to premiums distributed;
- for associations and the like, to the budgets for the year;
- in order to have CMAs which are large enough to justify being considered at European level, a minimum clause has been imposed, requiring that the CMA must have employed at least 50 full-time-equivalent persons during the last year (1992).

Owing to its different forms and to the difficulty of calculating it in the twelve countries of the Community, it was unfortunately not possible to use value added, which is usually the reference value because it represents the entity's contribution to the creation of the nation's wealth (the sum of values added constitutes the country's gross domestic product) and because it is entirely due to the factors of production (labour and capital).

As cooperatives, mutual benefit societies are to a great extent integrated and associated with each other, it had to be asked openly what level of consolidation should be adopted in recording the entities' financial data; an excessively high level of consolidation would have entailed the following major disadvantages:

- carried to the extreme, it would give 11 entities per country, corresponding to the following sectors of the social economy: cooperative banks, production cooperatives, consumers' cooperatives, agricultural cooperatives, social pharmacies, social tourism organisations, social housing and accommodation organisations, purchasing groups, craft cooperatives, recognised mutual benefit organisations, cooperative insurance companies, associations;
- it would give the advantage to large countries (at the expense of small ones) by allowing consolidations between regions and thus systematically increasing the entities' market share at national level;
- it would make it difficult to obtain and check the financial data for the consolidated entity, in terms of the three values adopted for reference purposes (turnover, value added and employment).

In view of the foregoing we thought it best to limit the concept of entity to the existence of a legal structure requiring accounts to be kept (consolidated, if appropriate).

The basic financial year is a 12-month year; if the reference period is more or less than 12 months, the figures given by the entity will be reduced, by rule of three, to a 12-month equivalent.

In the questionnaire, the respondents were asked to provide the monetary information in national currencies; this was then systematically converted into ECU.

STAGES OF THE STUDY

The first stage was to obtain the particulars of the cooperatives, mutual benefit societies and associations potentially eligible for inclusion in the two classifications. For this purpose:

- Nearly 500 federations in the 12 countries were personally contacted and asked to give the particulars of the member undertakings which, in their opinion, were eligible for inclusion in the classifications;
- Use was made of around ten existing financial databanks to select the undertakings which meet the conditions for participation in the classifications;
- A search was made for other sources of various origins.

Table 6: Large CMAs in the EC

Name	Country	Employment in 1992
Rabobank	NL	36 258
R+V Versicherung	D	11 635
Croix Rouge	F	10 160
United Northwest	UK	8 881
SODIAAL	F	8 639
Mutuelle Générale de l'Education Nationale	F	8 125
Standard Life Insurance Company	UK	7 795
Co-op Schleswig Holstein	D	7 048

Source: DGXXIII

In the second stage a questionnaire, accompanied by the rules for classification, was sent to these 3 000 CMAs for completion. It comprised the following eight sections:

- The undertaking's identity card;
- The financial data for the undertaking: the closing months and accounting periods of the financial years 1987 to 1992; total proceeds (for cooperatives and banks) or the budget for the financial year (for associations) or total premiums (for insurance companies and mutual benefit societies); the average number of paid employees in each financial year (full-time equivalent); it was decided not to ask for the number of voluntary unpaid persons because this box was rarely completed in the questionnaire sent to associations by the EC; the number of members of the undertaking;
- The financial data for the group, if any, to which the undertaking belongs: if there is such a group, changes in the proceeds received by that group; if there is such a group, changes in the number of its employees;
- The undertaking's financing capacity and requirements: the amount of its long-term debts (at over one year); its requirements as regards additional permanent capital (own funds plus long-term debts) during that period;
- The undertaking's involvement at international level: the present distribution of sales within the EEC countries and outside the EEC should make it easy to assess how open the undertaking is towards other countries; the undertaking could also state whether it has any branches and, if so, in which countries; it could also state whether it has alliances relating to these various countries (association with other undertakings, without the acquisition of any interest); lastly, it could mention any countries in which it proposes to pursue an active development policy;
- An open question concerning international development, in response to which the undertaking was free to comment on factors connected with its international development (plans, constraints, ...);
- A request to be supplied with the articles of association and documentation concerning the undertaking;
- The questionnaire ended with the date and the signature of the responsible person, indicating that he/she acknowledges the figures shown and agrees to their publication as part of the classification.

ANALYSIS OF RESULTS

This covers the first results for the first 150 questionnaires received. The elements at our disposal at the time of writing this article are therefore, once again, very partial and the analyses are still liable to be changed.

For the time being, the average CMA which has responded to our survey, employed, on average, 1 572 persons (full-time equivalent) in 1992, against 1 354 persons five years earlier, which represents a growth in employment of around 16% in five years or of 4% per year. With regard to turnover, its average invoicings total ECU 594 million in 1992 against ECU 385 million five years earlier, representing a growth of 54% in five years, corresponding to a growth in turnover of 11.3% per year.

Table 1 shows that, in our sample, mutual benefit societies are of roughly the same size as cooperatives, but slightly bigger, and, on average, three times larger than associations.

With regard to the rates of growth of both employment and turnover, it should be noted that the undertakings selected in the classifications are not very representative of all CMAs but constitute two selected samples, either because they employ over 500 persons or because they have undergone significant growth during the last five years.

On the basis of our present information, it would appear that mutual benefit societies - although large - have the largest growth in employment, followed by associations and then by cooperatives.

This finding that large cooperatives, mutual benefit societies and associations grow at least as fast as, if not faster than, their smaller counterparts is confirmed by the following table, in which we have included, from the 140 questionnaires received to date: the 20 largest CMAs, the 50 largest CMAs, the 50 smallest CMAs, the 20 smallest CMAs.

This finding is contrary to what might have been expected a priori, since, for a small undertaking with a turnover of ECU 26 million in 1988, an increase of 32% brings this figure up to ECU 34 million in 1992, thus requiring, in all, the achievement of a rise of only ECU 8 million.

The turnover of the large undertakings increases, on average, from ECU 1 614 million in 1988 to ECU 2 662 million in 1992, so that the growth is 61% over five years (or nearly 13% per year), representing a growth effort of ECU 1 048 million of additional turnover in five years.

At this stage, with such a small sample, it seems too early to draw any final conclusions, but we can offer the following hypotheses in explanation of what has been happening:

- CMAs operate in sectors where their growth is the result or product more of take-overs and mergers than of endogenous growth of the structure itself;
- CMAs work in fields where economies of scale are considerable beyond a certain size, and this would appear to be attributable to the following factors: large CMAs are capable of tapping financing sources enabling them to undertake investment in development; smaller CMAs are reduced to making sure that they can survive and find it difficult to develop and grow to a size allowing them to undertake similar investments;
- Small CMAs have become established in sectors or under conditions such that they do not seek to grow.

Consequently the two classifications of the largest and the most dynamic undertakings) are liable to include a significant number of CMAs appearing in both classifications and, as Table 3 shows, the average size of the most dynamic undertakings is relatively large.

The number of employees of these 20 most dynamic CMAs appears to have increased by over 50% (making an average growth in employment of over 10% of the workforce per year!). They alone created 9 960 jobs in five years (or 498 jobs on average per CMA in five years).

In comparison with our total sample of 140 undertakings creating 30 520 jobs, these 20 CMAs represent 14% of the sample

in terms of number of CMAs, account for less than 10% of jobs in the 1988 sample, and have created nearly a third of the jobs.

This finding is identical in terms of turnover, which grows by more than 20% per year (against only 11% for our sample as a whole). The analysis by sector of activity is summarised in Table 4.

One of the explanations for the low growth of the small entities would thus appear to lie in the sectoral logic, since small sectors (production, building, social) show low growth rates while other sectors in which the entities are larger (insurance, purchasing, agriculture) show higher growth rates.

Another factor explaining this relatively lower growth of small CMAs would appear to relate to the countries concerned, with expansion taking place only within the national frontiers, and small entities in smaller countries having more modest possibilities of growth. For the five countries dealt with up to the present, the growth rates are described in Table 5.

Although it is still too early to give any definitive findings, the CMAs which can be named as being very likely to be included in the final classification of large CMAs are listed in Table 6. The most dynamic CMAs are named in Table 7.

SUMMARY

The way in which the European production system has developed and operates has created a paradoxical situation: on the one hand, unprecedented levels of production of goods and services in terms of quantity and quality and, on the other hand, an uncontrolled increase in unemployment and social exclusion. It is not the particular vocation of the undertakings and movements of the social economy to solve these problems, which are primarily the responsibility of governments, the guarantors of social cohesion, and which therefore require the resources of the national or Community authorities to be used in implementation of economic and social policy.

However, the three families of the social economy do have a particular ability, which history has amply demonstrated both during recession and in periods of economic growth, to wage an effective battle against social exclusion and for economic integration. The revival of interest in this sector is largely attributable to the renewed initiatives and participation of civil society, of which it has acted as the driving force, in conjunction with bodies such as trade unions, the churches and local communities.

This finding emerged very clearly at the fourth Social Economy Conference and was illustrated in detail at the various symposiums around which it was organised (apart from two other political demands of the sector: the setting up of a consultative committee and the need for the early adoption of European articles of association).

The traditional undertakings of the social economy, which today account for the greater part of this sector's employment and turnover, will not remain outside the processes of economic restructuring. And the new wave of social economy undertakings cannot find the resources they need for development within the standard pattern of aid for the creation of enterprises if the difference in the size of projects is ignored. There is therefore a danger that entire sections of this sector will be wiped off the map, while the new forms cannot blossom, despite the fact that this sector displays a great ability to create permanent jobs (the study of the 500 largest undertakings and the 500 most dynamic undertakings shows an increase in employment of 16% over the last five years).

It is not necessary to start from scratch to meet the sector's needs: what is required, rather, is to step up certain existing lines of action and solutions.

In Europe a network comprising over thirty-five financial organisations, of all sizes and all kinds of legal status, has been created to participate in the funding of this new social economy: to collect joint savings in order to promote projects involving micro-undertakings, women, environmental groups, etc. which do not have access to the traditional banking system. Financiers of this sector are responsible for the establishment of SOFICATRA, the first European financing mechanism for social economy undertakings. However, with a few exceptions, these financial organisations based on solidarity do not have the status of banks and their development and impact, although significant, are only limited.

A first answer would therefore be to support this collective saving for the creation of socially useful undertakings employing young people and the unemployed by the establishment of a European network of solidarity risk capital funds.

The other main lines to be pursued in the work at national and/or European level in order to support this economy which may be referred to as "solidarity" or "social", are as follows:

- The promotion of socio-economic innovation. Failure to recognise economic experimentation is holding back people who are prepared to work for innovations. It must be possible to finance the design and contracting period which is essential for the success of projects, whether personal or collective.
- Increasing the supply of consultancy and training services for the parties responsible for projects. Within this framework, various associations which bring together staff performing consultancy services on an ethical basis could be effectively mobilised. The organisation and management

Table 7: Most dynamic CMAs in the EC

Name	Country	Employment in 1992	Annual turnover growth 1992/88 (%)
ST Mungo Housing Association	UK	210	35.0
Registered Charity	UK	640	30.0
SEI	F	260	29.0
Manutencoop	I	1 228	26.0
Système U	F	671	25.0
Fédération Nationale Leo Lagrange	F	1 275	25.0
MUTAVIE	F	30	24.0
Onderlinge Geové	NL	75	23.0
Paddington Churches Housing	UK	275	23.0
MAVPS	F	77	21.0

Source: DGXXIII

of these joint neighbourhood service undertakings, which are particularly complex structures, call for the dissemination of appropriate methodologies which take account of their original character.

- The establishment of mediation and/or regulation between administrations and actors. This is to remedy the inequality of approach to initiatives. This "facilitator" could speed up the innumerable procedural steps and give assistance in arriving at clear contractual arrangements including provision for a posteriori assessment and monitoring.
- The establishment of a genuine monitoring of participation in and access to the structural funds by the social economy entities, as this sector has been found to be the preferred interface for Community policies (training, regional and rural development, welfare, research and development). In particular, it will be necessary to induce the Member States and the regions to find practical ways and means of establishing a genuine partnership with the cooperative, mutual benefit and associative networks with a view to the drawing up and gradual implementation of operational programmes.

Adoption of these main lines of approach could be the prelude to the establishment of a genuine system for promoting and supporting this sector, which could then create and preserve permanent jobs.

Lastly, the organisation of undertakings open to users and to charitable contributors would provide new opportunities for participation in and assumption of responsibility for projects dealing with social problems close to everyday life. At a time when European political citizenship seems to have ground to a halt, working at European level for the recognition of a social citizenship is a challenging enterprise which is coupled with the creation of jobs.

Written by: European Commission, DGXXIII

Service industries in a changing EC economy

Introduction

The significance of services for the economy is generally acknowledged; in 1990 the service industry accounted for over 62% of both EC-total production (in value added) and employment. Technological development, particularly information technology, and deregulation in view of establishing the single market have already changed and will continue to change the service industries considerably. Change will not only occur in terms of implications for legislation, but also for employment, trade and government policies.

This chapter describes the major issues and problems that influence the trends in service industries. An outline will be given of the problems to measure service activity, the importance of the service industries in the EC-economies and the transborder provision of services. Then, the major developments in concentration, technology, market structures, deregulation and harmonisation will be described. Next, the implications of privatisation will be dealt with.

Regarding the achievement of integrated liberalised markets, in particular of relevance to internationally traded services such as transport and financial (banking and insurance) services, the most important problems still have to be solved. It concerns the harmonisation of these services in order to avoid differences in the competitive conditions by Member State. Cabotage in transport and the single licence principle in the financial and business services are the mechanisms which have to bring about this goal.

In the short, run the single licence principle will give rise to mixed regulatory frameworks by Member State: those prevailing for their own national financial enterprises, and those prevailing for foreign service providers. Harmonisation of systems is expected to occur through competition between systems; these mixed systems will converge to the most liberal one in the European Community. However, this is a long-lasting process. In the meantime financial and business services may be provided under a variety of (market) conditions within Member States and across the European Community. This may impair market transparency and so harmonisation will be in jeopardy. Hence, measures to increase market transparency are required.

Another area of legislation is to cope with externalities. These problems are of particular relevance in the transport sectors. They concern rules for various forms of pollution.

Further, despite considerable expansion of service employment it turned out that this occurred not always in the regions, which were most severely hit by loss of employment in manufacturing and agriculture. In addition, the more advanced and dynamic services such as financial and business services are not evenly distributed over the Community; advanced services tend to concentrate in the northern Member States, whereas basic services can be found specifically in the South of the European Community. These disparities in the growth and regional distribution of the services may not automatically be solved by the market mechanism and active (regional) employment policy may be required.

Another area of new legislation is in the field of privacy protection. This legislation should be aimed at limiting the possibilities to exploit databases containing confidential per-

Table 1: Share of services in total EC (10) economy and structure EC (10) service sector in terms of value added and employment, 1980 and 1990 (%)

	1980				1990			
	Share		Structure		Share		Structure	
	v.a.	empl.	v.a.	empl.	v.a.	empl.	v.a.	empl.
Market services	42.7	36.3	74.5	66.6	48.4	41.9	76.9	67.2
Recovery/repair and wholesale/retail	12.9	15.1	22.6	27.7	12.9	15.6	20.5	25.0
Lodging/Catering	2.1	3.4	3.7	6.3	2.6	4.2	4.1	6.8
Transport	4.2	4.2	7.3	7.8	4.0	4.2	6.4	6.7
Communication	1.9	1.6	3.3	2.9	2.0	1.7	3.2	2.7
Banking/Insurance	6.5	2.6	11.3	4.7	5.3	2.9	8.4	4.7
Other market services	15.1	9.4	26.4	17.2	21.6	13.3	34.3	21.3
Non-market services	14.6	18.3	25.5	33.4	14.5	20.5	23.1	32.8
Total services	57.3	54.6	100.0	100.0	62.9	62.4	100.0	100.0

v.a.: value added
empl.: employment
Source: Eurostat, National Accounts.

Table 2: Share of services in total economic activity by Member State, 1980 and 1990 (%)

Member State	1980		1990	
	v. a.	empl.	v. a.	empl.
Belgique/België	62.2	64.5	66.2	70.1
Danmark	65.8	63.6	68.1	67.0
BR Deutschland	55.1	51.6	59.3	57.6
Hellas	51.2	N/A	57.0	N/A
España	55.1	48.1	58.4	57.0
France	60.0	57.0	66.9	65.4
Ireland	51.3	N/A	54.3	N/A
Italy	54.8	50.5	63.4	60.7
Luxembourg	59.9	56.6	63.6	66.5
Netherlands	61.7	63.0	62.1	67.2
Portugal	52.2	38.2	57.2	46.8
United Kingdom	54.1	60.6	64.3	68.8
EC (10)	57.2	54.6	62.9	62.4
EC (12)	57.1	N/A	62.8	N/A

v.a.: value added
empl.: employment
Source: Eurostat, National Accounts.

sonal information of citizens. Additionally, further regulation would be required concerning the liability of service providers.

Privatisation may also give rise to problems. The particular concern is the market entry of services and the service level. Before privatisation pricing and policies for such services as banking, (public) transportation and telecommunication were often aimed at general accessibility irrespective of income. Moreover, the services had a wide geographical coverage. If economic (profitability) rather than social (general market entry) criteria are underlying prices and service levels, accessibility will be impaired, whereas peripheral -unprofitable- regions will not be serviced.

Services and statistics

The most that can be said on the general level is that services encompass a very heterogeneous group of economic activities often having little in common other than that their principal output and are, for the most, part intangible products. It is difficult to have a good definition and categorisation of service activities and a consistent way to measure it.

Traditionally, services, unlike physical products, were considered not to be transportable and storable. Hence, production of services was also considered to be the immediate consumption of services. They required face-to-face contact. They were labour intensive. They were generally tailor-made for the client. Further, they were unsuitable for capital intensive, continuous and standardised production.

The 'traditional' borderline between physical products and services has become less clear over time. Physical products sometimes also contain service features, such as after-sales service; services go together with all kinds of physical products, such as computer services requiring adequate hardware. In the production of services, face-to-face contacts are required less and less. Large scale capital intensive and standardised production have become possible. Service products have been standardised considerably. Further, new technologies allow a certain kind of storage for services, causing a disengagement of production and consumption.

Measuring service activities is problematic. Various causes underlie this. Firstly, it is not always easy to have a good indicator for service output. Secondly, there is not always a clear link between revenues and service output. And thirdly, there are difficulties in where to get the information. Most problems can be attributed to the invisibility of service transactions and the difficulties of measuring 'stored' or 'embodied' services.

Various indicators can be used to measure output. In manufacturing, output is simply the number of physical products delivered. In services, however, output is not physical, which makes counting the number of services difficult. For example, in insurance one could consider an insurance policy to be a unit of output, but one could also argue that the repayment of claims on those policies is also output. In banking, output may be the number of loans, but also the amount of loans issued can be an appropriate indicator. It is this heterogeneity of output definitions and the impossibility to derive adequate indicators which hampers measurement of service output most.

When output is already difficult to define, it is also difficult to establish a proper link between output and revenues or service income. In banking, the actual revenues come from interest margins between money lent and money borrowed. How does this relate to the number of loans made, or the number of savings accounts opened? In distributive trades, a similar problem exists: revenues generally come from sales margins on products sold. But margins differ from product to product and also from company to company.

Similar problems exist in measuring international trade in services. The invisibility of many services inhibits the establishment of when the service has crossed the border, as there is nothing physical crossing. Indicators for services trade can refer to the use of the infrastructure, such as the number of data transmissions or trucks crossing the border. Other indicators are the number of passengers or tons of goods crossing borders and the distance over which they are transported. Invisible international trade is measured financially in the balance of payments as are here the financial flows resulting from cross-border service provision are registered.

Due to the above difficulties in measuring service activity national statistical offices have had little opportunity to develop a consistent set of statistics for service industries. If offices have engaged in measuring this, there is little international comparability. It is in view of these problems that EUROSTAT has made some efforts to develop a harmonised system of information collection in services through initiatives taken in the Framework Programme for Priority Actions in the Field of Statistical Information 1993 to 1997, 93/464/EEC, OJEC L219, 28.08.93.

The source of information, i.e. the unit underlying the statistics, is the enterprise. In an enterprise, usually a set of actions are undertaken to come to a result: either a product or a service. This set of actions consists of both manufacturing activities and service activities. Enterprises are classified according to their main economic activity. Hence, the current classification systems are on an institutional rather than on a functional basis.

The most appropriate way of collecting data would be on a functional basis. This would imply that companies provide information specified according to all manufacturing and service activities within it. Gathering statistical information from an enterprise for all separate activities undertaken would be far too costly. Therefore, the data obtained from an enterprise can only be classified according to their main type of activity. Hence, statistical data on services only relate to companies with service provision as their main line of business. Data on service activities in manufacturing industries are not included in service data.

Efforts have been made to allow for functions within institutional classification frameworks. An example of such a functional classification system follows. It distinguishes five functions and their service branches: (1) transformational services (construction, public utilities), which are capital intensive and comparable with the manufacturing sector; (2) distributive services (transport and storage, communications, wholesale and retail trade) which are spanning time and place; (3) commercial services (financial, insurance, real estate, engineering/architecture, accounting/book-keeping and miscellaneous business services) which are provided to companies and governments; (4) personal services (domestic services and personal care, hotel/catering, repairs, leisure and recreation and miscellaneous personal services) which are oriented towards the individual consumer; and (5) collective services (health care, education and research, social welfare and government services) which are not provided at market prices as they are generally provided and subsidised by government authorities.

EUROSTAT's National Accounts also distinguish service functions in its institutional NACE-classification system. It identifies the following industries in services:

- building and civil engineering (NACE 5) (are transformational services, but are not always considered a service. Transformations can also be considered as a manufacturing activity).
- market services such as: distributive (wholesale and retail) trades, hotels, catering, repairs (NACE 6); transport and communication (NACE 7); banking and finance, insurance, business services, renting (NACE 8); and other market services (part of NACE 9); and
- non-market services (part of NACE 9).

Table 3: Labour productivity EC (10) by service sector 1980 and 1990 in terms of value added per employee (Indices: EC overall labour productivity = 100)

	1980	1990
Market services	117	115
Recovery/repair and wholesale/retail	85	83
Lodging/Catering	61	62
Transport	98	95
Communications	118	121
Banking/Insurance	253	182
Other market services	161	162
Non-market services	80	71
Total services	105	101

Source: Eurostat, National Accounts

Aggregate importance of services

Despite the registration problems some broad indications of the magnitude of service industries can be obtained. For this, generally, such data as turnover, value added and employment from the National Accounts statistics are used.

In terms of value added, the services industries constitute nearly two thirds of the EC-economy in 1990. Three quarters of this relates to market services, of which the grouping of repair, wholesale and retail trade takes the largest share. The remainder comes from non-market services.

Compared to 1980, value added in services grew at a rate of 8.7% per year, whereas total value added in the EC augmented at an annual rate of 7.8%. This has led to an increase of the share of service industries in total value added by 5.6 percentage points. Within services the share of market services has increased slightly during the 1980s to the detriment of non-market services. This increase is mostly due to the increasing share of other market services.

Similar tendencies are shown in terms of employment. In 1990 nearly two thirds of EC-employment related to services labour (about 80 million in the EC10). The composition is however different from that in value added: two thirds of service employment is employed in market services and the rest in non-market services.

In comparison with the situation in 1980, total employment in services grew by 13.5 million (1.9% per year), whereas in agriculture and manufacturing it decreased by 3 million (3.1% per year) and 4 million (1% per year) respectively. As a result, the share of services in total employment has increased by 7.8 percentage points, which is a stronger growth than in terms of value added. The structure within services employment remained virtually unchanged during the 1980s. However, within market services there seems to be a substitution of employment to the benefit of other market services.

The importance of the service sector in the national economies of the Member States varies from one country to the other. Most of the northern EC-countries have shares well above 60%, whereas most southern EC-countries have shares below this percentage. Germany and Italy are the exceptions to this rule. Germany, with its long tradition in manufacturing industries (especially in metal products, machinery and electrotechnical products), shows shares below 60% for value added and employment. Italy, as the most developed economy in southern Europe (especially in the northern part), has percentage shares above 60%. In Portugal services employment makes up less than 50% in total employment. This is due to the importance of the agricultural industries in this country.

The structure of the service industry varies. In Southern Europe the more basic services, such as hotels and catering and other activities associated with tourism have expanded most. In the North, other types of service activities, in particular, the high value business services, have become more important.

Since 1980, the service sector has gained in importance in all countries, both in terms of value added and employment. Especially, in Italy, Luxembourg and the United Kingdom, growth has been particularly strong. Shares increased by some 10 percentage points in these countries. The augmenting shares of services in both value added and employment reveal a structural transition from a manufacturing (and agricultural) orientation towards a service orientation in the EC-economies.

Measured as value added per employee, labour productivity in services in 1990 is hardly different from overall labour productivity. During the 1980s however, labour productivity in services has deteriorated versus productivity in agriculture and manufacturing. In agriculture, labour productivity increased by 7.9% on average and in manufacturing by 7.4%. For services, an increase of only 6.7% occurred, on average. This also confirms the stronger transition towards services

Table 4: EC service sector foreign direct investment

	Extra-EC				Intra-EC	
	Outward		Inward			
	1989 ECU million	Average 1984/89 (%)	1989 ECU million	Average 1984/89(%)	1989 ECU million	Average 1984/89(%)
Trade/hotels/catering	1 063	20.5	3 607	16.3	2 712	15.8
Transport/communications	2 979	7.8	767	3.0	356	1.7
Finance/banking	2 686	26.1	6 204	49.1	9 232	42.4
Insurance	1 943	15.6	3 028	8.2	1 405	7.5
Real estate	715	4.2	2 821	18.8	3 689	22.3
Other services	2 535	25.8	421	14.6	3 860	10.3
Total services	11 922	100.0	16 848	100.0	21 254	100.0
Share in total FDI (%)	36.0	36.7	60.3	62.5	66.7	61.3

Source: Eurostat, European Community Direct Investment, 1984-1989, Luxembourg, 1992.

in terms of employment in the EC-economy than in terms of value added.

Within the service industry, there are considerable differences in labour productivity. For repairing, wholesaling and retailing, hotel, and transport industries and for non-market services productivity levels are below the overall average. The hotel industry and the non-market services appear to be very labour intensive. In communication and, in particular, banking, insurance and other market services, productivity is high, although the banking/insurance sector experienced a productivity decrease of 28%.

During the 1980s the productivity of non-market services developed at a slower pace than that of market services: 5.9% and 7.0%, respectively.

Transborder provision of services

Basically, there are three modes to provide services across the border. These are: international trade; foreign direct investment; and cooperation agreements.

In the first mode, international trade in services, the service is provided from a resident in one country to a resident in another country. This mode can be found particularly in tourism and consultancy.

In the case of foreign direct investment, the second mode, a company from one country establishes an entity in another country, which provides the service to residents in the other country. Especially in banking and insurance, this mode is very popular. Establishing an entity across the border can be done by either creating a new company abroad (greenfield investment) or by taking over an existing company in the foreign market (merger and acquisition). The latter has the advantage that no new capacity is created and that the existing company already has a market share and knows the ways in the market.

The third mode is cooperation agreements, which is very similar to foreign direct investment. An entity is created in the foreign market without the initiating company taking control of this entity. Such agreements can take various forms, such as licensing, minority equity participation and franchising or even the creation of a strategic alliance. Effectively, a network is established in which services are provided under the same brand name. Examples can be found in accountancy, consultancy and retailing.

With a share of about one third in both extra-EC imports and exports, services are relatively less important in foreign trade than in production; for manufacturing the opposite applies. This may be due to the way in which services are provided across the border. The ratio of foreign direct investments to imports in the European Community reveals that service industries differ significantly from manufacturing. On average, during the period 1984-1988, the ratio of foreign direct investment inflows to imports was three times larger than for manufactured products. Traditional barriers, such as the need for face-to-face contacts, cultural differences and national regulations forced service providers to engage in foreign direct investment rather than in trade. Within foreign direct investments, the most important way of going international has been mergers and acquisitions rather than greenfield investments. As investments were targeted at the local market, this type of internationalisation was called internationalisation of a 'multi-domestic' nature.

When considering the importance of services in total direct investment flows, different pictures emerge. For intra-EC investments about two thirds of the total relate to investments in service industries. The same is true for non-EC investments into the European Community. For investments by EC-companies outside the European Community however, the share in the total is only about one third.

Intra-EC foreign direct investment in services amounted to ECU 21.3 billion in 1989. With this figure these investments outnumbered both inward investments from outside the European Community (ECU 16.8 billion) and outward investments from EC-countries (ECU 11.9 billion).

Between 1984 and 1989, all three types of investment have gone through a strong growth process. Intra-EC investments have grown tremendously by ECU 18.4 billion. Inward non-EC foreign direct investments have increased at a similar pace by ECU 13.2 billion. For outward non-EC investments, the increase amounted to ECU 6.3 billion.

In intra-EC investment and in inward extra-EC investment the banking sector plays a major role with some 40% of the total. This sector has also contributed most to the increase in foreign direct investments. Non-EC banking groups have increased their investments into the European Community by nearly ECU 7 billion between 1984 and 1989. This implies that these banking groups consider the EC-market important enough to establish subsidiaries. EC-banking corporations have also increased their investments abroad, particularly within the European Community. Intra-EC investments in banking have grown by ECU 9.6 billion between 1984 and 1989. Apparently, they are building large EC-conglomerates in order to meet the challenges of increased competition in the single market and to become a global player in the world market.

The remaining sectors reveal considerable annual fluctuations. This is particularly true for the grouping of trade, hotels and catering, and the total of other services, with shares of 9% and 21%, respectively, in 1989. The large 1989 foreign direct

investment shown in transport and communication is remarkable in view of the investments in the preceding period 1984-1988: in 1989 the share was some 25%, whereas the average for 1984-1989 was only 3%.

Total M&A-operations increased significantly between 1987 and 1989. The total number of deals increased from 2190 to 5455; this number declined to 4553 by 1992. M&A-operations in services followed a similar pattern. However, the services share in total M&A-operations decreased from 46.0% in 1987 to 36.4% in 1992.

Mergers and acquisitions in service industries from 1987-1992 were mostly of a domestic nature. However, the share of domestic mergers and acquisitions, in the total declined from 87% to 74%, indicating the increasing importance of cross-border mergers and acquisitions. In international mergers and acquisitions those within the European Community are most significant. Remarkably, however, after 1990 intra-EC mergers and acquisitions became relatively less important, whereas the significance of extra-EC operations increased. In 1992, both types of mergers and acquisitions were about equally important.

Most of the intra-EC mergers and acquisitions can be found in Northern Europe. Germany, France and the United Kingdom together account for some 60% of the total number of deals and for two thirds of their value. Further, the relatively high shares in the number and value of operations in the Netherlands is remarkable. The central position of Germany and France within the European Community, and the open nature of the United Kingdom and Dutch economies together with the presence of multinational companies in these countries have most likely determined this situation. Within the southern economies Spain stands out as a favoured target. Spain's relatively larger size and higher degree of development together with its proximity to the more prosperous centres of the EC could explain this. Spain is also a more favoured target than Italy, which would suggest that ownership structures in Spain are more favourable to M&A-operations than in Italy. Characteristic for the Italian economy are few massive companies (partially state-owned enterprise groups in both services and manufacturing) together with an overwhelming number of small family-owned firms.

For outward M&A-activities, the intra-EC purchases, particularly from the United Kingdom, are highly relevant. Nearly 50% of intra-EC mergers and acquisitions, both in number of operations and in value, originate from this country. France follows at a distance with 20%. Germany is relatively much less important as a buyer in the European Community. Most Spanish service firms seem to have little resources to invest elsewhere. This is also true for Greece and Portugal.

In the European banking and insurance industry, domestic and international M&A-activity has been particularly strong. In 1988 and 1989 alone, there were around 3 000 mergers, acquisitions and strategic alliances in this sector. These were mostly aimed at strengthening their market positions to respond better to the challenges of internationalisation in the sector.

Various factors underlie the strong M&A-activity in the European financial sector. Economies of scale and scope are important, but do not seem to be major factors. More importantly though, is the integration of the banking and the insurance business enabled by new regulations on financial and insurance control.

Concentration and cooperation

Competitive forces may cause national, intra-EC or even global consolidation pressures. Competitive pressure as a stimulus to consolidation is closely related to the need to cooperate in order to increase productivity through economies of scale and scope. Examples of global co-operation are to be found particularly in international air transport and shipping. Co-operation to counter competitive pressures are further to be found in banking and insurance.

EC-airlines operate on global, increasingly deregulated markets. Their strategic response has been cooperation, mainly between established European carriers and major non-European carriers. At the same time, cooperation is sought with regional airlines. Cooperation may involve partial financial participation or may be limited to commercial agreements.

A remarkable example of cooperation in the financial service industries, enabled by new regulation, is the emergence of 'bancassurance' companies, or mergers of banks and insurance companies. Although these mergers permitted economies of scale and scope, they were primarily induced to cope with competition and stagnating markets. Bancassurance enables banks to increase the potential of fee-based income (particularly from life insurance) as a relatively risk-free way of increasing revenues and profits. Conversely, the insurers have been attracted towards bancassurance primarily to solve their problems of inefficient distribution along with their need to enlarge their customer base. Moreover, insurers have used bancassurance as an entry strategy into growing markets like

Table 5: Intra-EC mergers and acquisitions
Average shares (%) 1986-1992

Member State	Number of deal		Value of deals	
	inward	outward	inward	outward
Belgique/België	7.2	2.6	3.9	70.1
Danmark	2.9	31.1	3.8	
Ireland	1.4	3.7	1.1	0.9
France	13.4	19.7	9.5	2.6
BR Deutschland	25.6	8.5	11.5	18.6
Hellas	0.4	0.1	0	10.2
Italia	5.5	3.3	4.2	2.2
Luxembourg	11	0.2	1	
Nederlands	10.9	8.2	9.3	8.2
Portugal	1.4	0.1	0.9	0.2
España	91.6	11.6	3.2	
United Kingdom	21.4	8.1	46.6	48.9
EC (10)	100.0	100.0	100.0	100.0
EC (12)	(number) 2 770	(number) 2 892	(ECU bn) 65.3	(ECU bn) 84.8

Source: Commission EC, European Economy, Supplement A, No. 5, May 1993.

the Spanish and the East European markets with the intention of gaining significant long-term growth at a relatively low price.

Concentration can further be the result of the changing position of services within value chains. Information technology induces service firms to aim at more strategic positions within chains of business activities; a great deal of competition is currently going on between firms trying to reach and preserve logistical control positions. By controlling the distribution channels and the necessary extended and complex information systems, companies have the possibility to dominate the way transactions are taking place, for instance with regard to timing, quality control and profit margins. Particularly, companies in wholesale and retail outlets, transportation and banking and insurance engage increasingly in inter-firm networks.

The crucial role of chains is very clearly revealed by the grocery retailing sector in the Netherlands and the United Kingdom. In these Member States, the grocery retailing sector is heavily concentrated; supermarket chains hold such strong market positions that they have taken over various functions of the manufacturing industry, including product development and marketing. Additionally, supermarket chains also increasingly form alliances on a European scale in order to be able to concentrate their power vis-à-vis the large food manufacturing companies.

Hence, service producers (and distributors) are trying to cooperate, although competition is intensifying. As concentration is aimed at market control, diminishing competition, restricting market entry and price agreements, strong competition policy by European authorities is required to prevent incumbents to deter entry. The concentrations of ownership in the service industry may be detrimental to free competition.

Notwithstanding that EC-competition policy is strongly geared towards ensuring the forces of the market economy and to prevent dominant market positions, cooperation and concentration are allowed if they do not harm competition. This calls for a strong competition policy by European authorities. EC-competition policy will become increasingly involved with the service industries. The dilemma between competition and concentration has to be solved by defining the relevant market in each particular case in accordance with Article 2.1 (a) of the EC-Merger regulation.

Technological development

The emergence of information and communication technology can be considered as the most significant technological development with respect to the service industry. A lot of service activities deal with the processing of information, both in terms of transformation (arrange information in appropriate ways) and communication (forward information to appropriate destinations). Information and communication technology by way of automation and computerisation enables the digitised processing of information. Hence, improvements in information and communication technology have a considerable impact on service activities, as substantial progression in economies of scale and scope can be accomplished.

New technologies have led to strong increases in office automation and transportability of information. It changed the nature and form of existing services in such a way that services are delivered more efficiently and more easily. However, service industries are not similarly affected. Industries where information and communication functions are more important and where automation and standardisation of methods and procedures to process and deliver services are most promising to achieve, economies of scale will be more affected. For example, in distribution, transport and communication as well as in banking, insurance and producer services, information technology allows firms to develop standard infrastructures to facilitate document handling, administrative processing, billing, etc. Ad hoc procedures are replaced by pre-specified methods.

New technologies have also led to new types of services. This is especially obvious in telecommunications. Apart from traditional telecom-services (e.g. telephone) new telecom-services have emerged due to the technical developments in telecom-infrastructures. New service types relate to the so-called 'value-added network services' like videotext, databank services and the like.

Introducing new technologies has had a major impact on employment. Office automation caused considerable productivity improvements, which meant that the same service could be provided with less personnel. However, the remaining personnel had to cope with the more complex aspects of the service and the maintenance and repair of the technologically advanced equipment. This implied an increased demand for better skilled personnel. Furthermore, the demand for existing services has increased in line with the growth in overall economic activity. Also, the creation of new service activities gave way to new employment opportunities. The negative employment effect in terms of redundant low-skilled labour from productivity increases could therefore be (partly) compensated by positive employment effects in terms of more need for higher-skilled labour from increased demand for existing and new services.

The improvement in service provision enabled by new information and communication technology also has relevance for manufacturing activities. As was indicated previously, services activities are also necessary for manufacturing a product. Hence, improvements in services can enhance the strategic position of manufacturing industries. For example, the development of new logistic concepts in transportation and distribution services has created the possibility for just-in-time manufacturing, which has become a major asset for the competitive position of leading manufacturing industries in the EC.

As a result of technological development, new areas of concern have emerged, such as privacy protection and liability with regard to services. The EC will take increasingly responsibility for the enforcement of rules and regulations with respect to these problems. In 1991, therefore, a directive was introduced, stipulating that liability cannot contractually be excluded or limited by the service provider in any way. As to privacy protection, new policies are aiming at limiting the possibility to exploit databases containing information on the features and behaviour of individuals, such as those held by banks, insurance companies and credit card organisations.

Market structures

Until the mid-1980s, lack of mobility of services across markets and of firms within markets had resulted in a fragmented EC service industry. Markets were generally protected against competition. This was not only due to government regulations, but also to natural entry barriers. Entry barriers can best be assessed by looking at determinants of market structures.

Firstly, if the service requires a high capital intensity for its provision, new service providers may not be able to get the necessary funds to become a competitor. This may result in a high degree of concentration and considerably high sunk costs.

Secondly, for some services (telecommunications) the creation of new capacity (e.g. a new network) next to existing capacity one would be economically inefficient. Therefore, governments have created national monopolies not allowing competition in the market.

Thirdly, governments may decide to arrange a monopoly in order to make sure a service is provided. Without such a monopoly competition would cause the service to disappear. This is the case for a lot of non-market services.

Table 6: Market structure in services

Sector	Determinant of Market Structure						
	Degree of product differentiation	Degree of concentration	Sunk costs	Regulatory measures	Degree of competition Actual	Potential	Type of market structure
Banking	High	Medium	Medium	High	Low	Medium	Oligopolistic competition
Insurance	High	Medium	Medium	High	Low	Medium	Oligopolistic competition
Road transport	Low	Low	Low	Medium	High	High	Pure competition
Airlines	High	High	Medium	High	Low	Medium	Oligopolistic competition
Telecomm.	Low	High	High	High	Low	Medium	Regulated monopoly
Distribution	High	Low	Low	Medium	Medium	High	Monopolistic competition
Hotels	High	Low	Low	Low	High	High	Monopolistic competition
Business services	High	Low	Medium	Low	Medium	Medium	Monopolistic competition

Source: Commission of the EC, European Economy, Supplement A, No. 5, May 1993.

Fourthly, the industry itself may want to keep certain standards of service quality. Then, a branch organisation may be established controlling the service quality of new entrants. Further, service companies may invest heavily in creating brand names with a stature of good quality and reliability.

Governments in all Member States play an important role in regulating service markets. Regulations can be subdivided into structural and behavioural regulations. Structural regulations particularly influence entry of new suppliers on service markets; behavioural regulations are aimed at controlling the conduct of existing firms.

Basically, only in road transportation (and in construction) are the markets are purely competitive. For telecommunication, the market can best be described as a regulated monopoly. In all other markets for services, the structure of the market can best be qualified as oligopolistic or monopolistic competition.

Deregulation

EC-policies force national governments to aim at more liberal regulatory frameworks with regard to service markets. Economic incentives rather than direct government intervention should induce economic behaviour in compliance with market forces. The resulting changing role of government regarding the outcome of economic processes, is underlying deregulation policies.

Market incentives are considered to be the basis for economic behaviour. All obstacles impairing the proper functioning of markets, therefore, should be removed, both from the private sector and from governments. If regulations are not meant to counter market failure and are not detrimental to the common interest or the achievement of government goals, they should be abolished. Not all regulations will have to disappear. On the contrary, where necessary, governments will have to take responsibility and introduce new regulations.

In view of the EC Treaty, it is envisaged to allow the free provision of services within the Community. Restrictions on the free provision which currently exist, will be abolished in the coming years. Deregulation in transportation and in banking and insurance considerable has already been achieved. In other service industries, however, regulations restricting the service market to national economies, still prevail.

For most service industries government intervention is likely to remain. Nevertheless, such intervention would require a careful analysis to determine the appropriate level of authority (Community, national, regional or local). It is likely that in several instances, national regulations should be replaced by EC-wide interventions. In addition, whatever the appropriate level of intervention, more room should be made for market-based regulations.

The Articles 52 to 58 allow companies in one Member State to supply services in another Member State by establishing branches or subsidiaries. These establishment directives have enabled companies to intensify their foreign direct investment under the prevailing regulatory system of the host country, which, therefore, needed not to be adjusted. Companies wishing to set up branch offices in other EC-countries would have to adhere to the same regulatory framework and market practices as local companies. This has been most applicable in the banking and insurance industries.

The introduction of Directives referring to the Articles 59 to 66 of the EC-Treaty, dealing with the intra-EC cross-border provision of services, required much more time than expected. National frameworks had to be adjusted. For example, in insurance, governments in a number of Member States had to find new mechanisms to collect taxes on premiums.

The deregulation is of particular relevance to the transport sector. The Commission is aiming at an integrated EC-transport market, implying a completely deregulated market for all modes of transport. Although much progress has been made in the deregulation of the international transport markets, their pace of liberalisation is very different.

One crucial issue is still to be solved in all transport sectors i.e. cabotage: the freedom of a non-resident haulier of one Member State to provide transport services within any other Member State. Cabotage is the natural outcome of Articles 59 to 62 of the Treaty, stipulating the free provision of services and elimination of competition distortions.

Although cabotage is a prerequisite to achieve competitive and integrated transport markets, it is not yet fully allowed for any mode of transport. Transitional systems and periods have been established. For example, cabotage in road freight transport, where it is most advanced, is still subject to significant restrictions. Firstly, it is based on a licensing system; as of July 1990, the number of licenses has increased by 10% per year. Secondly, cabotage may not cause serious disturbances on a national road haulage market. For example, non-resident hauliers are not allowed to reach a 30% share in the road haulage market concerned.

In air transport, the liberalisation process started in 1987. During the period 1987-1992, three sets of proposals were accepted each representing a stage in the liberalisation process. Currently, the package for the third stage is operational. It is the most far-reaching programme so far, but still it will not bring about a completely deregulated EC-air transport market, as full cabotage will only be introduced in 1997. In

the meantime, 'consecutive' cabotage will prevail: in other words, cabotage under conditions.

Further, it is intended to complete the liberalisation process in the shipping industry by 1999. This is particularly relevant to the short-sea shipping among Member States. Long-haul shipping is to a much larger extent subject to competition on the world market.

The current absence of full cabotage, the different transitional measures and the different pace of deregulation of the various transport modes are detrimental to a rapid creation of an integrated transport market across the European Community. This implies that for the time being the providers of transport services are still coping with rules distorting full competition.

Deregulation and the subsequent increased competition may tend to put too much emphasis on efficiency and profitability. As a result, other aspects related to service production such as health and safety conditions as well as externalities like environmental pollution may not get the proper attention.

This is of particular relevance in the transport sectors and in public utilities. For example, health and safety conditions in road transport may be put in jeopardy by neglected maintenance, overloaded vehicles and excessive working hours for drivers. Also, little attention for environmental pollution due to competition pressures can be added to this list.

Harmonisation of systems

Harmonisation of markets within the European Community is also a pre-condition to the creation of integrated EC-markets. Harmonisation of systems means on the one hand that the service sectors across the European Community are operating under the same conditions; lack of harmonisation gives rise to different competitive positions by Member State. This is especially important to internationally tradable services such as transport, banking, insurance and business services. The international intra-EC deregulation framework is most advanced for these sectors, but domestically a variety of regulatory systems prevails.

The most recent directives aim at providing one single legal framework for business conducted on an establishment and on a cross-border basis. The most significant feature of these directives is the acceptance of the principle of a single licence valid throughout the European Community. A company with a head office in one Member State would, for its international operations within the European Community, only have to comply with the supervision within its own State for both establishment and services.

The focus in the directives has moved from the regulatory framework of the host (importing) country to that of the home (exporting) country. Governments' acceptance of the principle of mutual recognition of existing regulatory systems is underlying these directives. Although they encourage greater liberalisation within Member States, national regulatory systems will still be allowed to exist.

As the degree of regulation varies sharply across the Community, regulation can remain an important source of competitive distortion. However, subsidiaries abroad that are controlled by the home country start to compete with local companies controlled by domestic regulation. This incurs a competition in regulation, which will trigger a process of automatic convergence in regulatory systems over time.

This policy to harmonise regulatory systems differs from the previous more static view that harmonisation of national regulation should be a precondition of fair competition and hence, cross-border business should not be allowed until harmonisation is achieved. It is the implicit dynamic character within the single licence principle to resolve this dilemma. Under the current approach, it is envisaged that if national governments have onerous regulations, this will penalise the companies licensed within their own countries, and over time there will be pressure from the local industry to moderate those areas of regulation impairing their competitiveness.

Consequently, the regulatory systems would converge to the most liberal one. However, the single licence principle will give rise to a variety of products for which, depending on their country of origin, different conditions may prevail. This will impair market transparency, which may eventually not bring about the required harmonisation through competition between systems, and competitive distortions will subsist.

For transport, apart from cabotage, the intra-EC road freight industry is largely liberalised. As of January 1st, 1993, quantitative criteria to market access (bilateral Community licenses and quota) have been abolished. With the exception of cabotage licences, they have been replaced by quality criteria such as entrepreneurial competence and a solid (financial) reputation. Despite the advanced international deregulation, most of the domestic markets are still subject to a variety of rigid regulatory systems. In addition to the absence of full cabotage these - often very different - systems have given rise to highly fragmented national markets, impairing the creation of a common EC-transport market.

Other important harmonisation issues relate to the need for uniform technical standards and equal quality standards. Uniform technical standards are of particular relevance for the creation of an integrated EC-telecommunication market. In banking, due to different payment clearing systems, it is still difficult and expensive to transfer money across borders. Further, uniform quality standards for services throughout the European Community are required. Already a stimulus can be observed for the certification of quality standards in service firms and professions.

Privatisation

Governments are increasingly trying to end their ownership of manufacturing and service companies thus, privatisation throughout the EC (and other West European countries) is developing fast. Both practical and ideological factors underlie the rush to privatise. Practical considerations refer particularly to the need for additional government revenues to counter the rise in public debt and budget deficits. More of an ideological nature is the cultural change in corporate management at the wake of increased competition from private companies. Governments now generally consider the involvement in companies as a less important and even an inappropriate task. Additionally, private sector solutions are increasingly sought to cope with government financial problems; there is a growing need - also reflected in deregulation - to let market forces allocate resources in such a way that services are provided to the consumer most optimally. Finally, the introduction of the EC-competition policy has also encouraged privatisation. State subsidies have become prohibited or are much less amply allowed. In order to get access to private investment capital companies are urged to privatise.

Over the next five years there are 70 potential candidates to be privatised in the EC, of which 43 or 62% are service firms. The amount involved with the privatisation of the EC-service industry is at least ECU 85 billion. Most of the service companies to be privatised fall into four sectors: telecommunication, utilities, energy and banking. For example, state banks had to provide unprofitable banking services and uneconomic financing for state industries. Privatisation will enable these banks to be more selective rather than acting as a government banking agency.

France, where the government has declared privatisation as a top priority, the prospects for privatisation are currently the best. As a result, with 11 privatisation candidates in the service industry, France is going to be at the centre of the next wave of privatisation. Italy follows suit with 10 candidates; the amounts involved are ECU 36 billion and ECU 12

Table 7: Number of potential privatisation projects as of mid-1993

Services	Total	Total Services	of which: Utilities	Transport	Telecom	Banking/ Insurance
Belgique/België	1	1	N/A	N/A	1	N/A
Denmark	1	1	N/A	N/A	1	N/A
B.R. Deutschland	3	2	N/A	1	1	N/A
Hellas	2	2	1	N/A	1	N/A
España	6	3	1	N/A	1	1
France	21	11	1	2	1	7
Italia	19	10	1	N/A	1	8
Ireland	2	2	N/A	1	1	N/A
Luxembourg	N/A	N/A	N/A	N/A	N/A	N/A
Nederland	3	2	N/A	N/A	1	1
Portugal	7	5	N/A	1	2	2
United Kingdom	5	4	3	N/A	1	N/A
EC-12	70	43	7	5	12	19
Value (1)	118 (54)	85 (33)	15 (6)	4 (4)	48 (9)	18 (14)

(1) Total value of projects in billion ECU; ( ) Number of projects for which the value is known.
Source: NEI and Cambridge Econometrics, based on Financial Times of 24 June 1993.

billion, respectively. In both countries, State holdings are predominantly in financial services (banking and insurance); together France and Italy account for 15 of the 19 financial companies to be privatised in the European Community.

In the remaining Member States, the telecommunication sector is the main privatisation candidate, particularly as far as value is concerned. In this respect, it is worth to note that the German telecommunication sector alone is valued higher than all the Italian privatisation candidates together: ECU 19 billion versus ECU 12 billion.

For a successful privatisation policy a number of requirements must be met. Firstly, interest rates must be low enough to encourage economic development and the subsequent investments in equities. Secondly, the company must be fully or at least nearly restructured to improve its profitability. Thirdly, prices should be set correctly in order to maximise receipts and encourage investment. Finally, regulations and legislation, including those affecting ownership must be clear.

Privatisation will put a strain on the finances of domestic investors in Europe. Domestic institutions and individuals in continental Europe hold only up to 20% of their assets in equities. They must be persuaded to switch money from fixed-income securities into variable-income equities. Lower interest rates could play an important role here.

Privatisation will have an important impact on the size of government debt and the performance of the economy. The impact will not always be positive. In particular, unemployment will rise since many redundant employees will be sacked. Further, receipts from selling government shares are important in the reform and fiscal programmes, but they will be relatively small in relation to the size of the overall government debts. Finally, the sale of profitable state companies is detrimental to the government budget, as the stream of contributions from profits (if any) by state-owned companies to state revenues disappears.

The experience from the 1980s UK privatisation programme clearly reveals the various consequences. The number of private shareholders increased five-fold as compared to the pre-privatisation period. The return on these stocks were well above the market average. Government received about 50 billion pounds in revenue. Productivity rose in the privatised companies, but employment decreased.

Privatisation along with deregulation may reduce the access to services and the service levels. This can, in particular, relate to services which were provided by state-owned or state-controlled companies and agencies prior to privatisation. The regulatory framework, as imposed by national governments, was mostly based on the need to set standards for safety, to secure the adequacy of service provision and the accessibility of the services to all citizens.

For example, pricing policies and levels of service provision, like in banking, public transportation and telecommunication, were often aimed at ensuring that everyone could have access to, and benefit from, the service irrespective of their income or the remoteness of their residence. If this social goal of general accessibility is replaced by the economic goal of profitability, possible price increases may reduce or prohibit service demand. Unprofitable service activities will be abandoned completely. As a result, deregulation and privatisation may impair the service level and quality in peripheral regions, particularly when local infrastructure is needed, for example for telecommunication and public transport services.

Government measures would secure general access to the services concerned. The Community policy regarding telecommunications has taken these regional effects into consideration, resulting in measures to stimulate investments in peripheral infrastructure and value added services. This may also be necessary in other sectors in the future: for example, when railway companies are privatised.

Additionally, the service markets that are directly linked to specific population groups should be considered. Examples are to be found in the media and entertainment sectors (movies, television, newspapers, magazines, books, etc.). Measures may have to be taken to cope with the threatened future of small, local newspapers, TV-stations and publishers representing a specific population group.

The above shows that the involvement of other dimensions, like culture and region, will lead to a more complex decision-making process. The free market focus will have to be balanced against other considerations, because of its undesired side effects.

Written by: Netherlands Economic Institute

Employment and structural change in the EC

INTRODUCTION

This article summarises the key findings of a study on "Employment and Structural Adjustment in EC Industry and Services", undertaken by DRI at the end of 1993, in association with Bernard Bruhnes Consultants, BIS, Databank, Eurostaf, IDC, KSA and WS Atkins. The study reviewed the main factors underlying structural change in 17 industrial and services sectors in the EC (see list in annex), and discussed the extent to which these factors will influence employment in Europe over the short and medium term. Among the key structural factors that were considered in the analysis are:

- competitive challenge (at the national, European and international level);
- the completion of the Single European market;
- re-location factors;
- the role of SMEs and their relationship with large companies;
- technological and organisational change;
- environmental requirements and concerns;
- the potential for innovation, including R&D activities;
- existing levels of skills and qualifications of the labour force in relation to the projected needs;
- socio-economic factors;
- the general character of relations between social partners;
- the geographical concentration of sectors in regions.

The outlook for employment in any given sector in Europe depends upon:

- future trends in demand, both in qualitative and in quantitative terms;
- changes in supply and in the competitive environment;
- the strategic response of firms to the above changes.

Future trends in demand can reflect normal cyclical developments in the economy, but can also be influenced by changes in the regulatory environment, such as a tightening of environmental protection regulations, or market liberalisation. The companies themselves can to some extent force change in consumer choices, for instance through product innovation.

Changes in supply conditions and in the competitive environment also find their origin in a number of different situations.

- In some cases, the heightening of competition can result from a sudden and largely unexpected fall in world market demand, which causes a temporary situation of excess-supply in the market.

Table 1: Relative importance of various factors in influencing demand for the sector

	Business cycle	Regulatory environment		Technological progress
		Single market	Environmental regulations	
Petrochemicals	***		*	
Machine tools	***	*	*	**
Telecom. equipment		***		*
Electronic components	*			**
Consumer electronics	***	*		**
Vehicle assembly	***	*	**	*
Automotive components	**	**	*	*
Shipbuilding	**		*	
Aerospace equipment	***	*	*	*
Textiles	*		**	
Clothing	*			
Air transport	**	***	*	*
Telecom. services	*	***	*	**
Software & computer serv.	*			***
Credit institutions	**	***		*
Insurance	**	***		*
Films & video	**			*

***=dominant
**=very important
*=important
Source: DRI Europe

- The increase in competition can also result from other factors, such as an unfavourable trend in production costs in Europe compared to competing countries, or a certain weakness shown by EC firms in innovating or developing new products.
- Changes in the degree of competition on the market can also result from changes in the regulatory environment (market liberalisation as part of the European integration process, for instance) or in trade agreements, and from the supply strategies of non-EC countries. In particular, the transformation of the economies of Eastern and Central Europe into market economies has greatly contributed - and will continue to contribute - to the changing competitive environment for EC steel producers, vehicle assemblers and ship yards, amongst others.
- A final factor which has recently played an important role - and which will continue to influence the competitive environment of firms - is the greater emphasis given to "non-price" competitiveness factors such as after sales services, product customisation, timeliness of delivery and, of course, overall product quality. Shifts away from purely price-driven competitiveness factors to more qualitative competitiveness factors can change the balance of power among the different actors on the market and thereby drive change in the industry. This then spills over to employment.

Companies respond to these challenges in different ways. The strategies that they choose to adopt are, however, instrumental in influencing future trends in employment. Possible strategic responses to the above challenges include:

- re-locating production facilities within the EC or in non-EC countries;
- increasing product automation;
- changing the organisation of production and management within the firm, adjusting to new concepts such as JIT, TQM, QC etc.;
- emphasising new aspects of product development to take into account environmental concerns or other customer needs;
- changing the nature of relationships with the suppliers or with the customers;
- re-organising supplier and distribution networks;
- increasing the rate of innovation or R&D;
- changing the level and/or nature of employment and training.

Depending on the nature of the challenge and on the degree of success firms have in adapting, the impact on employment varies.

Below, we first review the main factors influencing demand over the short and medium term. The following section analyses the factors influencing supply and the competitive environment. We then review the different ways firms in each sector are addressing these challenges, and discuss the implications for employment over the short and medium term.

FACTORS INFLUENCING THE OUTLOOK FOR DEMAND

The factors that influence the changes in demand by sector can be grouped in three main categories:

- overall economic developments, both within the EC and at world level (i.e. the influence of the business cycle);
- changes in the regulatory environment;
- changes in the nature of demand.

Within each of these categories, there are a number of distinct factors influencing future demand patterns, whose influence is briefly reviewed below.

Influence of the business cycle

Table 1 presents the factors that dominate trends in demand in 17 sectors of EC industry and services.

Economic growth in the early 1990s has slowed down considerably from the rates achieved in the second half of the 1980s. In some sectors, the slowdown in demand growth is the principal factor which is driving the change in employment in the EC. This is the case, for instance, in the petrochemicals, machine tools and pulp and paper sectors. In the petrochemical sector, the strong rates of growth achieved during the second half of the 1980s combined with improved profitability led to decisions to expand capacity. However, when these new capacities came on stream, world economic growth had slowed considerably. This created a situation of overcapacity and led to downward pressure on prices. Low industry profitability and the poor demand outlook within Europe will result in major job reductions in this sector over the coming years.

Another sector for which the present difficulties largely originate from an unexpected fall in demand is aerospace, as falling demand for commercial aircraft has combined with shrinking military orders to create the worst crisis in the history of the sector.

Elsewhere, the slower growth in demand is rather playing the role of an accelerator of change, as it combines with other supply constraints, such as enhanced competition on world markets, to reduce the sector's medium and long term growth potential. This is the case in the consumer electronics sector, where the penetration rate of many types of appliances in EC households has reached very high levels, as well as in shipbuilding, air transport and textiles and clothing. Although the textiles and the clothing sectors are accustomed to experiencing only slow growth in demand, the heightening of competition at world level still makes them extremely vulnerable to an even small deceleration in demand from their traditional markets.

There are, nevertheless, a number of sectors which will continue to benefit from fast growing demand in the medium and long term. These are mainly services sectors, among which software and computer services, and telecommunications services. Another sector benefiting from fast demand growth in the outlook is the telecommunications equipment sector.

Changes in the regulatory environment

Alongside those sectors whose outlook will be dominated by the trend in the business cycle, there are a number of sectors for which the future trends in demand will essentially result from changes in the regulatory environment. There are essentially two categories of regulatory changes that are likely to influence future trends in employment. These are environmental protection regulations and the demand effects of the completion of the Single European Market.

Demand effects of the completion of the single market

The Cecchini report outlined the potential benefits of the Single European Market. These were to be achieved through a combination of a demand and a supply effect in the EC economy. This section only looks at the impact on EC employment of the demand effects of the Single Market. The supply effects are discussed in the section "Changes in supply and in the competitive environment".

In raising expectations and giving access to both consumers and producers to a unified market of 340 million inhabitants, the creation of a Single European Market and the unification of Germany had important consequences on demand trends within the EC.

The demand effects of the Single Market which currently dominate are for the most part second round effects of over-investment in the late 1980s on equipment demand, and of the ongoing deregulation of several services sectors. In air transport, for instance, the progressive liberalisation of European skies will continue to influence both the level of demand for air travel and demand for new aircraft.

In many manufacturing sectors, however, a lasting and not entirely positive effect of European integration on demand trends has been to increase the cyclicality of markets, as the European economies move more closely together. Downturns in one market are thus not offset any more by relative strength in other EC countries.

However, as stated in the White Paper "Growth, competitiveness, employment", it is impossible today to measure the full effects of the single market, as the latter is not yet complete. There are indications that the internal market is acting as a catalyst for a change in the competitive environment: these include, among others, the removal of border formalities, the removal of controls on capital movements, the increase in intra-EC trade and in the flow of FDI into the Community.

Environmental regulations

The impact of a tightening of environmental regulations depends on the sector and on the type of product considered, and on the policy measure envisaged. For some sectors, in particular for capital goods producing sectors, a tightening of environmental regulations taking the form of tighter standards or reduced emission limits can translate into increased demand, by forcing an accelerated replacement of the existing equipment or encouraging the use of new products to substitute the less environmentally friendly ones. In the shipping sector, for instance, the envisaged tightening of environmental regulations aimed at reducing pollution at seas would have a beneficial impact on EC ship yards by raising demand for new ships built according to the recent US and IMO legislation. In the aerospace industry, an increased demand for Chapter 3 compliant aircraft would have resulted from the implementation of the Directive concerning noise, had this proposal for Directive been adopted in its original form.

New environmental regulations can, however, also translate into reduced market opportunities for existing producers. Established automotive component suppliers for instance have had to re-equip their facilities and retrain their workforce to meet the changing market requirements: the introduction of emissions legislation in the EC in 1989 indeed made it essential for the component manufacturers to incorporate closed loop catalysts and electronic fuel injection systems; carburettor producers had to adapt and accelerate the development and production of such fuel injection systems, in order not to be forced out of the market.

Amongst the 17 sectors analysed, however, it appeared that past changes in environmental protection regulations either had no significant effect on demand, or only had an indirect effect due to increased production costs resulting in losses in competitiveness for EC producers. A further tightening of environment protection regulations could, however, change this situation.

Changes in the nature of demand

A fundamental change underway on the demand side, that will have major implications for employment in Europe, is the higher rate of innovation and the resultant shortened product life cycle.

Shortened product life cycles is a typical feature of most high-tech sectors, and has been particularly important in explaining the performance of EC companies in sectors such as telecommunications equipment, consumer electronics or electronic components. On the employment front, the challenges that result from the increased rate of innovation and shortened product life cycles result in increased emphasis being given to highly skilled, flexible workers in research and development and in production, and to individuals with strong marketing and distribution expertise on the sales front.

Technological progress can also lead to a more rapid turnaround of products, as the new technologies are being deployed, in some cases by prompting an early replacement of the existing equipment. Increasing technological sophistication, however, demands high levels of customer support, both at the point of sale and after the sale. The roll-out of new technologies and their adoption by the markets thus have a major side-effect which is extremely important from an employment standpoint: they increase the importance of the service dimension of products. This, again, calls for changes in the types of skills that are required in the EC. In particular, this calls for distribution and marketing expertise within the firms, along with increased emphasis on customer support.

CHANGES IN SUPPLY AND IN THE COMPETITIVE ENVIRONMENT

Changes in the competitive environment can result from:

- temporary situations of excess supply in the market;
- unfavourable trends in production costs in the EC compared to its main competitors;
- increased importance of non-price competitiveness factors;
- changes in the regulatory environment, and privatisation;
- changes in supply strategies of other world countries.

Temporary situations of excess supply in the market have been discussed earlier. Here, we focus on the other major forces which have influenced and will continue to influence the competitive environment of EC industry and services companies, and which effect employment.

Price-competitiveness factors

The unfavourable trend in production costs compared to the EC's main competitors is often considered to be the main cause for the deteriorating external competitiveness of EC industry. Such deterioration in the EC's relative price competitiveness is said to result from:

- too high labour costs in Europe;
- excessive industry fragmentation;
- too high capital costs;
- unfavourable trends in exchange rates, environmental costs, input material costs,
- lack of appropriate basic infrastructure (transport, communications), etc.

As indicated in the White Paper on Growth, Competitiveness and Employment, however, the key elements in competitiveness that are now of greatest importance are no longer confined to the relative level of direct costs of the various factors of production. They include education and training, the efficiency of industrial organisation, the capacity to make continuous improvements in production processes, the intensity of R&D and its industrial exploitation, the fluidity of the conditions under which markets operate, the availability of competitive service infrastructures, product quality and the way in which corporate strategies take account of the consequences of changes in society, such as improved environmental quality.

The relative importance of the "traditional" cost elements in explaining the present situation and the outlook for employment in Europe is nevertheless briefly discussed below.

Labour costs

In most sectors, labour costs in the Community are significantly higher than in its main competitors. Despite this, in

the sectors considered in this analysis, labour costs were not perceived as the key factor explaining the lack of competitiveness of EC producers in domestic and world markets. More important were the organisational structure of firms, their relationships with suppliers and customers, and the duplication of R&D efforts which can result from a lack of co-operation between firms. The only sectors amongst those considered in which labour costs did play an influential role were the labour intensive textiles, clothing and consumer electronics sectors. In these sectors, the high level of labour costs in Europe was in fact reported to be the main reason for the re-location of EC production outside the Community.

There is, however, some concern that labour market regulations in the EC are more rigid than in its main competing countries, thereby reducing the industry's flexibility to adjust to changing market conditions. Increasing labour flexibility should not necessarily be achieved by making it easier for firms to adjust employment levels, but could be achieved by allowing more flexible reviews of holiday pay, health insurance, bonuses and other variable costs, for instance.

Furthermore, statutory charges on labour (i.e. the sum of taxes and obligatory social security contributions) in the EC are much higher in the EC than in the USA or Japan, thereby hampering the competitiveness of European enterprises. This explains the general trend among Member States to stabilise or reduce statutory charges as a proportion of GDP.

Another source of concern is the fact that, in eight out of the twelve countries of the European Union, social security contributions are relatively more onerous on low incomes (White Paper on "Growth, Competitiveness and Employment", COM(93) 700 final). Studies have been carried out in countries with very high levels of social security contributions, which show that a reduction of 30-40% in social security contributions for low-paid workers would increase employment by 2%. The Commission has therefore made the suggestion that the Member States find ways to reduce the relative cost of unskilled and semi-skilled labour, in order to facilitate job creation.

Industry fragmentation

Despite the surge in concentration which was observed in the late 1980s/early 1990s following the launching of the Single European Market programme, there are still sectors for which the excessive fragmentation of the industry is an important element of the unfavourable cost structure in Europe compared to non-EC countries. In the petrochemical sector, for instance, the relatively high fragmentation of the industry imposes a fixed cost penalty to EC manufacturers, which negatively weighs on their relative competitiveness vis-à-vis emerging producers in the Middle East and the Asia/Pacific region. Other sectors in need of further concentration include telecommunications equipment and aerospace.

In contrast, in sectors such as machine tools, automotive components and textiles and clothing sectors, which are also dominated by small and medium sized companies, economies of scale are only relevant in selected market niches, which are generally characterised by relative concentration. In machine tools, for instance, economies of scale in production are only relevant in the mass-products market segment, which represents no more than 30% of the total market for machine tools.

In sectors where economies of scale are limited and firms operate more efficiently as small units, consortia can represent a possible answer to the issue of fragmentation. Indeed, inter-firm co-operation is still important in these sectors in order to ensure both the efficient allocation of the R&D spending and to maintain the balance of power between these SME-dominated sectors and their global, often highly concentrated, industrial clients.

The cost of credit

The high cost of credit in the EC at present is a third factor negatively influencing competitiveness, as it slows the rate of corporate fixed investment and thus the penetration of new technologies. Small and medium sized firms are particularly vulnerable, as they suffer from a difficult access to credit. It is, however, the small-sized firms which would benefit most from the introduction of new technology, as they suffer both from the increased competition and from the increased concentration of their customers as the larger firms are putting downward pressure on their suppliers' margins, thus reducing their profitability. As a result, SMEs often lack the funds for investment or do not have the financial base to appear creditworthy.

Environmental standards

Regulatory changes in environmental and safety standards, customer demands for "clean" products, "clean" production processes and production using "clean" inputs can result in increases in production costs and losses in competitive position, or to re-location moves. Both of these have obvious (negative) implications for employment. Among the 17 sectors analysed, however, the only ones in which this factor seemed to have been important enough to significantly impact employment are automotive assembly, electronic components production (mainly the printing of circuit boards) and shipbuilding.

In shipbuilding, health and safety issues are gaining importance and legislative measures to improve the environment in ship yards are raising costs substantially, affecting the EC industry's competitiveness with respect to non-EC ship yards. The EC industry's answer to these cost pressures has been to specialise in niche markets where they can exploit the Western industry's technology leadership.

Exchange rates

Past unfavourable movements in exchange rates have aggravated, rather than being a cause of the difficulties experienced by sectors such as aerospace equipment, consumer electronics or electronic components manufacturing. The problem has been particularly acute for the European aerospace industry, due to the high share of total production costs that are in local currencies, when the final products are mostly priced in US dollars. Given the very long lead time between the development of a new product and actual sales, usual hedging techniques are of limited help.

Other factors

Other factors hampering the expansion of EC industries and services sectors in domestic and world markets reflect the lack of appropriate infrastructure for production, transport or distribution in certain countries/regions, or the unavailability of key natural resources for production at reasonable prices. In the petrochemicals sector, for instance, naphtha is still used as the principal feedstock and the lack of appropriate infrastructure in certain regions imposes a fixed cost to EC producers.

Changes in the regulatory environment

The completion of the Single European Market had major supply-side effects on industry in Europe, through the moves towards a common trade policy, the rulings on state aids, the liberalisation of public procurement markets and other similar measures. In influencing production and the competitive environment, these changes have lasting effects on the levels and nature of employment.

The harmonisation of standards

The harmonisation of standards had a double effect on EC industry, whose net impact on employment was not always positive. On the one hand, the standardisation of components used by industry broadened the market base, enabling a more

rapid write-off of R&D costs. For the end-user sectors, the standardisation of components significantly reduced the production costs as manufacturers were able to use standardised components from a limited number of supply sources. Inevitably, however, such standardisation also led to strong increases in the level of competition on the components market, putting downward pressure on prices. As access to technology for the end user (on the applications side) become even cheaper, this changed the nature of competition further downstream as companies started to fight for market share by developing customised applications to better meet the needs of their customers. The net result was a shift in development costs from up-to down-stream.

Ownership restructuring

The harmonisation of standards and liberalisation of markets had other effects on the industry structure in Europe, also with major impacts on employment. In facilitating intra-EC trade it set the stage for movements towards concentration in the industry and services sectors. These movements often translated into job reductions. Although the Europeanisation of the EC industry and services sectors through M&A is now largely completed in downstream sectors such as automotive and consumer electronics, further concentration movements are expected (and, in some cases, needed) in sectors such as machine tools, telecommunications equipment, and aerospace. This in itself will lead to further job losses in those sectors in the short and medium term.

In favouring concentration movements in the wholesale and retail sectors, and more generally in nearly all downstream sectors, the completion of the Single Market also had important indirect effects on employment in EC manufacturing, in particular in SMEs. Indeed, the growing concentration of these purchasing sectors has changed the balance of power between the large retailers and their suppliers, with the latter being forced to squeeze prices and margins. The implications on profits were disastrous and forced many SMEs out of the market. This process is still on-going in many of the equipment manufacturing sectors.

Market deregulation

In many services sectors, it is through market deregulation that the Single European Market process will have the most effect on employment. Amongst the markets that have been or are in the process of being deregulated are air transport, telecommunications services, banking and insurance. In each of these sectors, market deregulation translates into an increased competitive climate, often through the entrance of new, more commercially oriented producers in the market. In challenging the existing suppliers which were accustomed to operating in an essentially closed market and which often benefited from a quasi-monopoly situation, these new entrants usually force radical change onto the industry. This typically results in increased emphasis on productivity enhancements through the integration of new technologies and production automation, and downward pressure on prices and margins creating a need for organisational changes, rationalisation of production and restructuring.

Another market which is in the process of being deregulated is the public procurement market. The liberalisation of public procurement is having an important impact on all those sectors for which the government sector represented a major client. One of these is the telecommunications equipment sector. Market liberalisation has forced prices down in this sector and is increasing the costs associated with creating products of superior quality (quality being an important factor of competitiveness in this sector), in addition to creating needs for a more commercially oriented work-force (i.e. with marketing skills). Many of the vendors were indeed used to selling to government specifications processes which involved little competition and required no showrooms.

Free movement of persons

The completion of the Single European market has, finally, also had a more direct effect on the labour market by removing many of the barriers to the free movement of persons. As the EC manufacturers' selection policies are also becoming less nationalistic and more international, and as pressures to reduce costs and improve productivity have reached unprecedented levels, manufacturers increasingly look beyond their local region or country for suppliers and employees who are more competitive and have the requested skills. Aerospace equipment manufacturers for instance are amongst the first to stress the importance of geographical mobility of labour to maintain a leadership position in world markets.

Privatisation

The privatisation moves that are in the pipeline will have a major influence on future trends in employment, both in the sectors in which there are companies to be privatised (in petrochemicals, air transport, telecommunications services, or banking, among other) and in upstream sectors. Indeed, the privatisation of companies in sectors such as airlines, telecommunications services or banking will change the nature of relationships between these firms and their upstream suppliers (the aerospace equipment producers or the telecommunications equipment manufacturers, for instance).

Whether in the air transport, petrochemicals or telecommunications services sectors, public-owned companies indeed tend to be much slower in adjusting employment levels to changing economic conditions than their privately-owned counterparts. In the air transport sector, in particular, the privatisation process can have a bigger aggregate impact on employment than deregulation, which is implemented only gradually and is carefully monitored in order to avoid the adverse effects on the industry which were experienced in the US.

This is less true in the telecommunications services sector and in banking, where the opening of the market to private operators and the liberalisation of public procurement can contribute to the development of new products and services. This could result in such a faster overall growth in demand in these markets that it would partly offset the negative effects of privatisation on the employment front.

Changes in supply conditions in the rest of the world

Eastern Europe and the CIS

The development of both demand and supply in Eastern Europe and the CIS is still a major factor of uncertainty for EC producers. On the one hand, the East European countries have the potential to become major competitors in sectors such as petrochemicals, automotive assembly, automotive parts and components, and some segments of consumer electronics.

On the other hand, however, these regions also represent important export market opportunities for western producers in certain market segments, which could lead to job creation within the EC. Examples of such market segments include electronic components, a product whose manufacturing requires a degree of technical skills and expertise not presently available in Eastern Europe, as well as software and computer services. It is, however, important for the EC producers to take appropriate measures to ensure that it is they and not non-EC based producers who take advantage of the new market.

Far East Asia & the Pacific Rim

Being a fast growing demand region, Far East Asia and the Pacific Rim represent a major opportunity for EC producers which they do not appear to be exploiting. Contrary to Japan or the US which have undertaken major investments in the region and from which they export at competitive prices, West

Europeans have remained very timid in their outward investment strategies. This limits their potential for participating to the fast growing markets in this region but leaves intact the competitive challenge. Competition from firms located in the Far East and Asia is thus expected to intensify in the following sectors:

- petrochemicals (if demand in the region falls short of expectations);
- consumer electronics;
- vehicle assembly;
- electronic components.

Textiles and clothing are two other sectors in which emerging producers in the rest of Asia, as well as in low labour-cost countries such as China, Pakistan, India, are expected to continue making strong inroads into the EC market.

US & Japan

Last but not least, the US and Japan are of course the EC's traditional world competitors in many key, fast-growing demand sectors. Generally speaking, the competition from the US is largely felt in sectors where research and/or development costs are important and can only be written-off rapidly through access to a large, unified, market. In the film and video sector, for instance, language and cultural differences between the Member States prevent the European producers from having a rapid rate of return on their investment. In aerospace, electronic components and software and computer services, the problems for EC companies are less insurmountable as they could be offset by an increased collaboration of firms across countries.

Within manufacturing, the sectors in which the US will continue to represent a major challenge for the EC over the short and medium, and in some cases also over the longer term, are mainly the aerospace, telecommunications equipment and electronic components sectors, but also software and computer services, telecommunications services and films and videos. US competition is much less of a threat in the financial services sectors, in textiles and clothing, or in shipbuilding.

Japan, on the other hand, ranks amongst the EC's main competitors in a number of high-technology sectors such as machine tools, electronic components and consumer electronics. These are sectors in which product innovation is important and where the control of the new technologies and processes is key to market leadership. The Japanese competitive challenge is also important in other capital intensive sectors, where they have been able to retain a leadership position thanks to shift to new forms of production organisation and distribution. These are automotive assembly, parts and components, and shipbuilding.

In the services sectors, Japanese and US competition is generally more moderate than in manufacturing. Still, in the insurance sector, the financial strength of the Japanese companies is such that it is generally believed that they could easily control significant shares of the EC market if the barriers to entry in the EC market were reduced a little further.

Both US and Japanese companies are also highly competitive in software and computer services. In fact, in this sector, the highly focused US companies are market leaders worldwide. They are often able to move faster and more adeptly than their Japanese and European rivals. However, they lack the in-depth knowledge and understanding of the local markets within Europe. Such in-depth knowledge is, however, key to success in a market which is putting increased emphasis on customised applications and on close relationships between the software developers and the end-users. US companies are likely to respond to these challenges through external growth operations.

THE STRATEGIC RESPONSE OF FIRMS

Re-location strategies

As reported in the article on "Past and Future Trends in EC Foreign Direct Investment in the Less Developed Countries" which is presented elsewhere in this Panorama, the re-location of EC production in low-wage countries is much less pronounced than is usually believed, and remains the fact of a limited number of sectors. In fact, as globalisation proceeds and the fastest growth markets are displaced to the Far East, China and the Pacific Rim, some sectors naturally tend to re-locate the centre of their production activities into the newer markets. The global tendency to manufacture PCs outside Europe and the US for instance is thus not strictly the result of a production cost disadvantage, but reflects a shift in market demand growth in these regions. The same applies to petrochemicals. This, however, also tends to displace the production of up-stream sectors which are heavily dependent on these end-markets, such as semi-conductors.

It is nevertheless important to note that foreign investments only lead to reductions in employment in Europe if the production in the non-EC region is then re-exported to substitute past production within the EC. To date, there is little evidence of this happening on a large scale.

The sectoral concentration of re-location movements, however, causes concern. Such moves are indeed mainly observed in the textiles, clothing, consumer electronics and electronic components sectors, and are becoming visible in the motor vehicle sector. In the few sectors where such movements are being observed, they reflect one of the following:

- the desire to take advantage of lower production costs in the region to remain competitive at world level; this is the main reason for the re-location of the textiles, clothing and several consumer electronics firms, for instance;
- a tightening of environmental regulations in Europe which raise production costs to a level that is deemed intolerable for survival within Europe; segments of the EC manufacturing industry which have re-located their production facilities to non-EC regions for environmental reasons include the printing of circuit boards.

Production automation

The introduction of new technology in response to increased competitive pressures has been an essential factor influencing the development and structure of employment in Europe. Apart from generally resulting in absolute reductions in the numbers employed, increased automation also results in important shifts in the nature of employment. New automated equipment has typically been introduced in those areas which represent the hardest and most repetitive working conditions, and has also replaced certain craft skills. By executing the more repetitive tasks, the use of automated equipment has changed the nature of work carried by men and women. This, in turn, has resulted in important changes in the types of skills required from the employees, as will be discussed in more detail in the section "Labour Market".

Changes in the organisation of production and management

Growing competitive pressures have increased emphasis on productivity gains and production efficiency within the firm. In particular, the shortening of product development cycles and the more widespread adoption of "lean" production philosophy are generally perceived as an appropriate way to reduce costs, increase productivity and improve production efficiency. This generally implies the re-organisation of product development and management functions to maximise personnel utilisation and synergies across departments, and the introduction of new techniques such as simultaneous engineering. Such consolidation and centralisation of personnel

typically results in job losses at all levels and requirements for new skills, both in terms of organisation so that information is fed across all departments from design and development to purchasing and production and in terms of the new equipment which has come into use.

The adoption of management systems which involve Total Quality Circles (TQC), Total Quality Management (TQM), Statistical Process Control (SPC) and Quality Function Deployment (QFD) thus places new demands on production line employees. These are now expected to take greater responsibility for the quality of their work, and for stopping production if pre-programmed tolerances are exceeded. Increased responsibility is also placed on the employee by the suppression of inventory which is associated with JIT manufacturing, since any fault in the system has to be corrected quickly and with minimum disruption.

Sectors which have experienced radical changes in their approach towards organising design, development and production as well as in their relationships with suppliers and customers are the vehicle assembly, automotive parts and components, aerospace and shipbuilding sectors. In all these sectors, the re-organisational changes have had far-reaching effects on the nature of employment and has created a need for continued education and training, as well as re-orientation of displaced workers.

Increasing the rate of innovation or R&D

The previous sections have emphasised the increasing importance of new technologies in today's markets. Companies have come to realise that those producers that are first into the field with new technologies are in a position to control the market for the systems or products using those technologies. This has contributed to accelerating the turnaround of new products and increasing the importance of R&D as a factor of competitiveness. The implementation of - or increased importance given to - the new technologies should therefore cease to be viewed as a negative factor influencing employment in the long term, but rather as a prerequisite to future growth in employment in Europe.

Frequently, however, spending on R&D in the EC is still low compared to competitor countries, and so is the rate of innovation. In sectors dominated by SMEs, the fact that efforts are scattered across a large market base also involves duplication of efforts. Increased co-operation of European firms is essential to the survival of several high-tech sectors of EC manufacturing. This is true at all levels: co-operation between SMEs is essential to avoid duplication of efforts in R&D and better anticipate market needs, whereas co-operation between multi-national firms on the technology front is important to share knowledge in design or manufacturing, and develop industry standards at world level.

In the electronics sector, for instance, the dominance of Japanese producers in component technologies for the consumer sector is presently unchallenged. The Japanese producers control more than 70% of semiconductor production, 95% of imaging devices, 95% of miniature LCD displays, 70% of laser diodes and 70% of video heads. This dominance explains the dis-integration of the EC's consumer electronics producers more than any labour cost disadvantage. Inter-national co-operation of European and US firms in this sector, appears to be the only way to break the Japanese dominance. In other areas, increased co-operation between firms from all Members of the Triad would have a beneficial effect on employment, as the development of new markets relies on the maintenance of a continued rapid pace of technological development.

Emphasis on new aspects of product development

As a result of the growing concern for the environment, firms have started to develop environmentally friendly products and have tried to make this a new factor in consumer choice. They have made efforts at designing equipment or products that are recyclable and non-toxic, and have widely advertised their shifts to clean production processes and to non-polluting input materials. These moves, however, generally only have a limited direct effect on employment.

Another important change encouraged by companies in Europe has been the increased emphasis on timeliness of deliveries and close contact with the customers. Domestic (EC) players indeed have a strategic advantage in servicing customers, and are attempting to exploit this in most areas of EC manufacturing and services by putting great emphasis on:

- customised products and applications for products (or services);
- end-user support;
- after-sales service;
- timeliness of delivery.

Convincing customers that this is what they need would indeed give a leading edge to EC producers in sectors such as machinery and equipment production, but also in services sectors such as software and computer services and telecommunications services.

Changing relationships with suppliers and customers

The relationships between EC companies and their suppliers and customers are changing rapidly, for a number of reasons. End markets have become more concentrated, changing the balance of power between firms up and down stream; competition has increased due to market de-regulation and privatisation; and, markets have become more open.

In such rapidly changing markets, a producer's ability to respond to changing regulatory and market trends is key to its success as well as to its ability to create employment. SMEs, however, generally lack the resources to anticipate such trends and implement appropriate strategies for change. They can therefore be regarded as most vulnerable to change of this nature.

The concentration movement among EC industries, which was accentuated with the creation of the Single European market, has indeed fundamentally changed the structure of many "downstream" sectors such as the automotive industry, the retail sector or clothing. As companies in these sectors restructure in order to adjust to a larger (more homogeneous) market and to increased competition, they are also putting greater pressure on their customers to squeeze margins, reduce delivery time, take responsibility for product and component development and customise products. Their suppliers, many of which are SMEs, are finding it increasingly difficult to survive without undertaking a major structural re-organisation of production. In a few cases, this has the effect of causing the dis-integration of the upstream sectors into a set of increasingly independent sectoral specialities. This has for instance happened to the software and computer services sector, and is bound to happen in the aerospace industry, in shipbuilding and in the automotive components sector.

Another factor driving changes in relationships between suppliers and customers is market de-regulation and the changes in ownership structure within EC industry. Indeed, in this increasingly global world, and also due to de-regulation, captive markets are dis-integrating. The long-term relationships which existed for instance between the telecommunications equipment manufacturers and the services operators, and more generally between up and downstream producers in many equipment manufacturing sectors, have had to be replaced by new forms of relationships, often creating a need for different types of skills on the vendor side.

Finally, competitive pressures to reduce lead times and costs are leading to major changes in the structural organisation of sectors such as automotive, aerospace and shipbuilding, as well as telecommunications equipment and software and computer services. As vehicle assemblers delegate an increasing volume of component development and production to their traditional suppliers, for instance, radical changes in the interaction between these manufacturers and the component suppliers occur:

- suppliers are being structured in different levels or tiers, graded by the nature of their connection to the final user, their level of product technology and their overall role in controlling and co-ordinating the production and supply functions;
- there are stronger and more co-operative vertical relationships between customers throughout the supply chain;
- there are also stronger horizontal relationships between suppliers, through strategic alliances, joint ventures, technology partnerships and supply agreements;
- first tier suppliers concentrate on core activities, whereas non-core products are being externally sourced.

Such developments lead to smaller suppliers becoming increasingly divorced from the ultimate source of the changes, and it becomes increasingly difficult for them to understand the ultimate requirements of their final users of their products - the assembly plants or the customers.

The effect on employment is the transfer of certain component functions from the equipment manufacturer to their traditional suppliers. Not all jobs are transferred, however, and some disappear as this increased reliance on supplier technology is usually accompanied by strong downward pressure on component prices, forcing component manufacturers to further enhance productivity in order to remain profitable.

There is also an implied need for suppliers and manufacturers to cooperate on training in new technologies or R&D, in view of the design delegation trend.

SMEs, which are particularly vulnerable to such changes, could be helped to reposition their organisation through support in the following areas:

- increasing the awareness of the nature and extent of the forthcoming changes, and assessing the implications on their own company;
- implementing plans to reposition their company; this would involve the provision of appropriate resources in such areas as business planning, management and marketing techniques;
- identifying international opportunities for licensing, strategic alliances or joint ventures;
- having access to technical advice and support, in particular to continually enhance existing skills and develop new skills in product design and development;
- providing access to financial and technological expertise to support investments in new equipment and manufacturing systems, and to support start-ups.

Re-organising supplier and distribution networks

In markets previously dominated by public procurement contracts, the liberalisation of markets creates a need for the suppliers to build distribution networks where these were previously virtually non-existent. This is the case for instance with telecommunications equipment manufacturing and with the development of commercial applications for what were primarily defence markets in the past. The same is true in those sectors which were previously highly vertically integrated (automotive, consumer electronics, electronic components) and where the dis-integration of formerly captive markets creates a need for new services (marketing & distribution) functions, as well as in the sectors presently in the midst of organisational change, such as the EC software and computer services sector.

THE LABOUR MARKET

Changes in employment levels

A main result which emerges from the sectoral analyses is the significant change in employment levels which is expected to take place over the coming years. In nearly all the sectors considered, the overall trend in employment is downward oriented.

Among the few factors that will have a positive effect on employment in the medium and long term are:

- fast demand growth for many services sectors that are also high technology users, such as telecommunications services, and software and computer services;
- continued rapid growth of demand and activity in the labour-intensive banking and insurance sectors.

In most cases, however, the net effect of structural change on employment levels will be negative. The reasons are:

- increased emphasis on labour productivity to protect margins;
- increased cyclicality of markets;
- insufficient funds for SME's capital investments;
- privatisation;
- on-going concentration movements;
- increased automation;
- advances in production processes and management.

Changes in the nature of employment

Existing levels of skills and qualifications in relation to projected needs

The above-mentioned structural factors, and the strategic responses of firms to these factors, will imply major changes in the structure of employment in the EC, as well as in the required skill mix.

In manufacturing, for instance, the changes in production organisational structures and in managerial styles, aimed at reducing development cycles and increasing both productivity and production efficiency, lead to a new human resource configuration:

- increased emphasis is given by management to employee motivation;
- employees are organised into teams, which share a variety of jobs that are fully cross-functional;
- these teams are expected to take responsibility for the quality and efficiency of their work, and to be able to offer suggestions for improvement;
- traditional skilled jobs are being replaced by new skills and multi-skilling;
- employee flexibility has become of uttermost importance;
- and so has commitment to employer;
- dynamic and continuous improvements are expected.

The implication of these changes is a somewhat flattened hierarchy, with major changes in job nature and responsibility structure for middle management.

Another implication of the changes in the nature of demand and increased emphasis on the service dimension of products is that new demands are placed on the industry and services

sectors. Most companies are unable to respond to these challenges with the existing in-house skill mix. Such demands can indeed only be addressed with a more flexible and multi-skilled work force. With an unemployment rate in the two-digit range in the EC, one can not speak of a labour supply shortage, however. The problem thus arises from insufficient labour mobility and inadequate qualification and appropriate skills of the labour force in unemployment in relation to the projected needs. Such inadequacies can be addressed by an anticipatory approach, with appropriate training, and policy moves facilitating a greater mobility of the work force.

There are, nevertheless, certain sectors which do suffer from a labour-supply shortage. These are sectors which suffer from a bad image due to the past recession and to imminent (or past) layoffs, which is discouraging potential entrants into these sector's labour pool. This effect is sometimes compounded by unattractive working conditions (shift work and noisy production, for instance), by the low technological image of the industry or environmental criticism. Such sectors then fail to attract young, ambitious and highly qualified people. Up-grading the image of these sectors would make it easier for the companies within these sectors to hire personnel with the required skills and ability. Among the sectors concerned by the above are textiles, shipbuilding, and software & computer services.

Impact on the geographic distribution of employment in the EC

The structural changes underway in many manufacturing sectors in Europe will lead to important changes in regional employment distribution. In those EC regions which are characterised by a heavy concentration of production in a limited number of sectors, the structural challenges to which the firms in these sectors will be confronted over the coming years should be a major source of concern. Indeed, in these regions, additional restructuring will need to take place in order to generate employment outside the critical sectors. Many of the small and medium-sized textile companies for instance are established in structurally poor regions and are at the same time important employers. Another sector in which regional employment is at risk in certain countries is the automotive sector (particularly in Germany and Italy).

With the heightening of competition throughout the EC, company/plant location decisions based on comparative regional analysis are also increasingly common. This is particularly apparent in the telecommunications equipment and consumer electronics sectors, and, increasingly, in software and computer services. As competitive pressures increase, a trend becoming visible throughout industry in Europe is to undertake effective and careful evaluations of the savings that would be realised if production were relocated elsewhere in the EC.

Trends in production and employment by region will thus have to be monitored very closely in the coming years, as actions may be needed to accompany the structural changes underway and to minimise the problems that heavy concentrations of unemployment can mean for a region.

Training needs

The need for more or better training is apparent throughout the EC industry and services sectors. Such need for a well-trained work force is also stressed in the White Paper on Growth, Competitiveness and Employment published by the Commission in December, 1993.

Training is needed both to enhance the technical skills of the workforce in some sectors of EC manufacturing and services, in order to teach existing employees to use the new technologies, and to increase the marketing and distribution skills of vendors. Indeed, in those sectors whose end-markets were largely secured through some types of regulatory arrangement (as in banking) or because of the existence of privileged links with the customers (national champion policies in telecommunications and defence), there is presently a lack of commercially oriented staff. Increased distribution and marketing expertise has now become a major requirement for both manufacturers and services providers in these sectors.

Production line employees also have to be trained (or re-trained) at a number of levels in order to fulfil the increased requirements placed on them. This includes preparing workers to take more responsibility on the shop floor, to adapt to the new environment, to become multi-skilled and more flexible. On the production side, emphasis should also be put on training middle management in order to enhance communications skills and team motivation, and to improve team performance and effectiveness further. Finally, training is also needed in new technologies and R&D related fields.

In most small and medium-sized firms, it is mainly the upper management which requires better training, as it is mainly the internal organisation of the firms which needs to be changed to further enhance productivity and reduce costs. Also, barriers to co-operation within and among sectors dominated by SMEs often lie in the culture of management. There is no question that a better educated management would be more open to innovation and would feel less threatened by co-operation.

In those sectors such as the equipment manufacturing sectors where new management concepts are being introduced or extended, important criteria for the selection and employment of people have become the acceptance of the need to be flexible; aptitude for versatility; aptitude for learning; good level of basic education; attention to quality. This is generating a demand for a lower age profile of the work force. In those sectors where the median age of the work force is in the mid-40s and higher (in shipbuilding, for instance), the development of training programmes specifically designed at addressing this problem and enhancing the work force's aptitude for learning is particularly important.

Finally, with the likely increase in job mobility in the EC manufacturing and services sectors, there will be increased needs for re-training and re-orientation of displaced workers. Most of the employees with a job position in 10-15 years time will have gone through a second or third level training.

Job sharing, part-time work, etc.

The recent recession has highlighted the need for retrenchment in most sectors of EC industry and services. Part-time work is one response, but is commonly used only in situations perceived to be temporary, due to the high costs involved.

The extension of part time work is, however, not always possible, as it does not necessarily fit well with the production line work. In the consumer electronics and aerospace equipment sectors, for instance, job functions are by nature constrained by continuity requirements and are difficult to divide. In addition, workers in these sectors are not very keen to work on a part time basis.

In the telecommunications services sector, in contrast, interesting shifts in working patterns are emerging from the heightened competitive climate. The majority of operators now provide 24 hour customer service, which has resulted in the introduction of shift-based working schedules. In the financial sectors also, increased competition in the market has lead to increased flexibility of working hours, with late opening hours, etc.

Some telecommunications operators have been exploring the use of "teleworkers", a technique which keeps operators in their homes connected to virtual offices by computers and telephone lines. Although the participants to the first of such experiments have reported positive results, a broader application of this technique in EC firms is limited to the services functions, for obvious reasons; also, the implications for labour costs are still uncertain.

Early retirement programmes

Early retirement programmes have been largely used by EC industry and by several services sectors to gain increased labour flexibility in periods of cyclical downturns. Examples of sectors which have made an extensive use of such schemes include aerospace and shipbuilding, as well as banking and insurance. Such schemes have served part of their purpose, which was to reduce labour costs at times of falling demand and production activity, but not sufficiently as the perceived bulk of over-employment is generally concentrated in the 40-50 age range and corresponds to the massive employment increases in the 1960s and early 1970s. Where retirements schemes have proved most effective is in the services sectors where they were aimed at middle and upper management levels, where the smallest level of staff reduction could be made for the largest financial benefit.

Increasing job mobility

As stated in the White Paper on Growth, Competitiveness and Employment, labour flexibility has to be analysed under its two main aspects: external flexibility, i.e. on the external labour market, and internal flexibility, i.e. within the company. Improving external flexibility means to make it easier for unemployed people to meet the requirements of the labour market, while a better internal flexibility can be obtained through an optimisation of a company's management of human resources.

Increasing external job mobility in the EC is viewed as important in those industries for which the maintenance of a leadership position in world markets is contingent upon international co-operation, or where skill shortages are likely to develop over the medium term. International co-operation is extremely important in aerospace and in vehicle assembly, for instance. The increased geographic mobility of workers across the EC is seen as one of the ways to make it possible for the industry to benefit from all the synergies that can be achieved through multinational partnerships.

Among the practical measure that would contribute to increase the geographic mobility of the European work force are the development of a common system of references for competencies, a harmonisation of social systems and regulations related to health care, pension schemes and the like, and a greater harmonisation of direct taxation systems.

Written by: DRI Europe

Economic aspects of quality

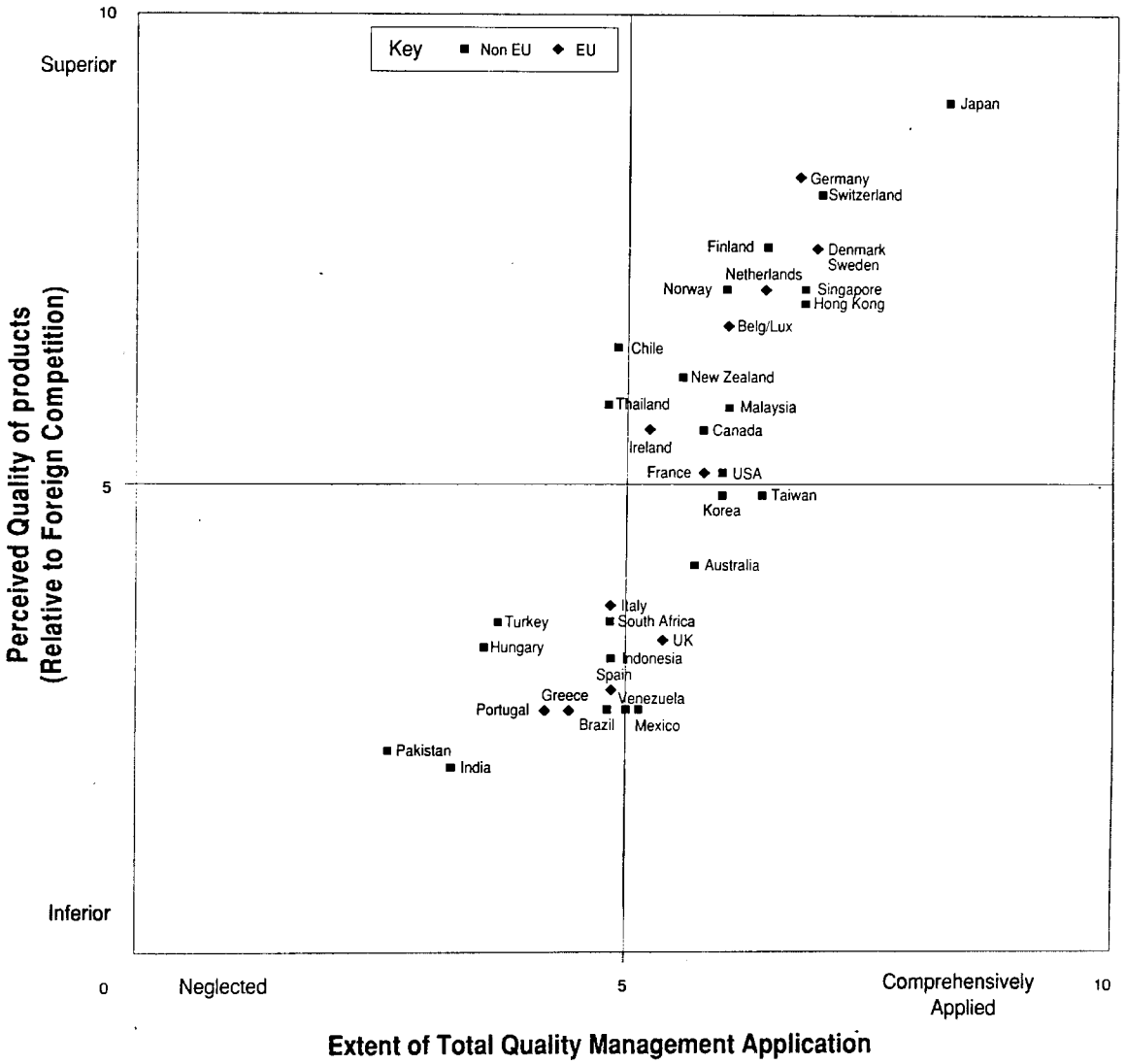
INTRODUCTION AND SUMMARY

There is mounting evidence that Quality Management improves the financial performance of European business. The following quote is typical of the commitment and enthusiasm of leading European practitioners: "We have overwhelming evidence to support that this (Total Quality Management) is an investment which is repaid many times over." - Milliken (1993 European Quality Award winner).

The term Quality Management groups a set of socio-technical theories and practices related to quality into a management discipline. Quality in this context measures the extent to which organisational outputs (products or services) satisfy "customers". The purchaser of any product is a "customer" in the publicly accepted sense, but Quality Management extends this to the notion of shareholders (e.g. via dividends), employees (e.g. via satisfying work) and society as a whole (e.g. via pollution).

Such enthusiasm from leading European organisations appears to justify formal public encouragement for the widespread adoption of Quality Management in Europe to the benefit of

Figure1: Correlation of total quality management Application & product competitiviness



Note: Readers are advised to refer to the World Competitiveness Report 1993 for the precise definition of Total Quality Management employed and the scope of the products surveyed for each company
Source: the World Competitiveness Report 1993.

Table 1: Breakdown of existing studies included in this short study

Theme of study	Number identified
European surveys	30
American surveys	13
Asian surveys	4
Accounting practice	7
Conceptual frameworks	11
Social impact	8
Doctoral and Master theses	6
Company case studies	10
Total	89

Source: Coopers & Lybrand, EFQM

companies and public bodies. Yet such encouragement needs to be underpinned by more than anecdotal evidence. The costs and benefits of Quality Management are debated widely (especially ISO9000 quality standards), with detractors often balancing the enthusiasts.

There is a clear need to quantify the costs and benefits to companies of Quality Management. It is also important to assess the macro-economic and associated social effects in Europe. Addressing these issues is essential to securing government promotion and adoption of Total Quality Management.

Against this background, Directorate General III of the European Commission has supported the European Foundation for Quality Management (EFQM) in performing a short study into the economic aspects of Quality Management.

The short study

The EFQM has worked with Coopers & Lybrand on a short study which aimed to identify significant studies completed in the last ten years (with specific focus on the past five years) that have attempted to assess the costs and benefits of Quality Management from the perspectives of:

- individual European organisations in a global context;
- the wider social costs of Quality Management.

The findings in this article are based on:

- database searches, contact with quality promotion organisations and current researchers;
- responses to a questionnaire sent to EFQM members and followed up with key personnel in selected companies.

In the article, the authors put Quality Management into context and identify some of the developing themes and issues in Europe; highlight the initial findings on the evidence of economic costs and benefits; and draw together conclusions on what further work is needed.

Table 2: Membership of the European Organisation for Quality (EOQ) (1)

Country	Organisation	Membership Individuals	Membership corporate	Total	Year of joining EOQ
Begique/België	Belgian Centre for Quality Management (CBQ-BCK)	-	1 400	1 400	1974
Danmark	Danish Society for Quality (DFK)	925	725	1 650	1961
BR Deutschland	German Society for Quality (DGQ)	3 600	1 400	5 000	1956
Hellas	Hellenic Organisation for Standardisation (ELOT)	45	145	190	1979
España	Spanish Association for Quality (AECC)	3 000	170	3 170	1961
France	French Quality Movement (MFQ)	2 063	1 018	3 081	1966
Ireland	Irish Quality Association (IQA)	2 000	800	2 800	1956
Italia	Italian Association for Quality (AICQ)	1 418	530	1 948	1956
Nederland	Dutch Foundation for Quality (KDI)	-	300	300	1956
Portugal	Portuguese Association for Quality (APQ)	1 272	809	2 081	1971
United Kingdom	The Institute for Quality Assurance (IQA)	11 478	1 292	12 770	1956
Austria	Austrian Association for Quality (OVQ)	40	260	300	1979
Finland	The Finnish Society for Quality (SLY)	1 700	200	1 900	1967
Iceland	Icelandic Association for Quality (GSFI)	120	180	300	1989
Norway	Norwegian Society for Quality (NSK)	1 250	720	1 970	1962
Sweden	Swedish Association for Quality (SEAQ)	-	2 200	2 200	1980
Switzerland	Swiss Association for Promotion of Quality (SAG)	10	1 300	1 310	1967
Bulgaria	Committee for Standardisation and Metrology				
Czech Republic	Czech Society for Quality (CSJ)				
Hungary	Hungarian National Committee for EOQ				
Poland	Central office for Products Quality (CBJW)				
Russia	Committee of the Russian Federation of Standardisation, Metrology and Certification				
Slovak Republic	Slovak Society for Quality (SSA)				
Slovenia	Slovenian Quality Association				
Turkey	Turkish Standards Institute (TSE)				
Ukraine	State Research Institute for Metrology of Measuring and Control Systems (SRI)				

(1) Membership details for Eastern European countries were unavailable at the time of publication
Source: Coopers & Lybrand, EFQM

We would like to acknowledge the support we received from Directorate General III and the EFQM companies which responded to the questionnaire and in particular to ICL, Bull, Groupe Caisse Des Depots and AT&T.

Why is Total Quality Management relevant to Europe?

European global competitiveness in key sectors is being widely debated. Further there appears to be mounting evidence of the correlation between the adoption of Total Quality Management and improved competitiveness (see Figure 1).

The findings from the short study and leading European practitioners suggest Total Quality Management is one of the most effective ways to improve competitive position of European business during the 1990s.

The findings so far

The findings need to be taken in the broader context of European Quality Management which is summarised in Section II. The important messages are:

- Europe has a well established and strengthening infrastructure for the on-going development of Quality Management;
- Total Quality Management adoption in Europe continues to lag behind the US and Japan. Similarly the quantification of costs and benefits appears less developed in Europe;
- doubts are being raised over the true economic benefits of the widespread use of the ISO9000 series of standards.

There are very few up to date, wide-ranging studies on the economic aspects of Quality Management across the European Union. Despite this, the authors have identified 89 relevant, publicly accessible studies dealing with the economic aspects of quality in Europe, the US and Asia. These are summarised in Table 1. The key points from these studies are analysed in Section III. A number of consistent and positive messages emerge:

- There is evidence that Total Quality Management improves competitive position. One US study in the mid 1980s showed that businesses with products or services rated as "superior" quality may achieve a significant increase in market share over those with "inferior" quality;
- A small number of studies shows that Total Quality Management improves financial results. A major study from 1980 to 1990 showed that the stock prices of a portfolio of Total Quality companies significantly outperformed the index;
- Continuous improvement in cost-competitiveness is a natural part of Total Quality Management for the leading practitioners.

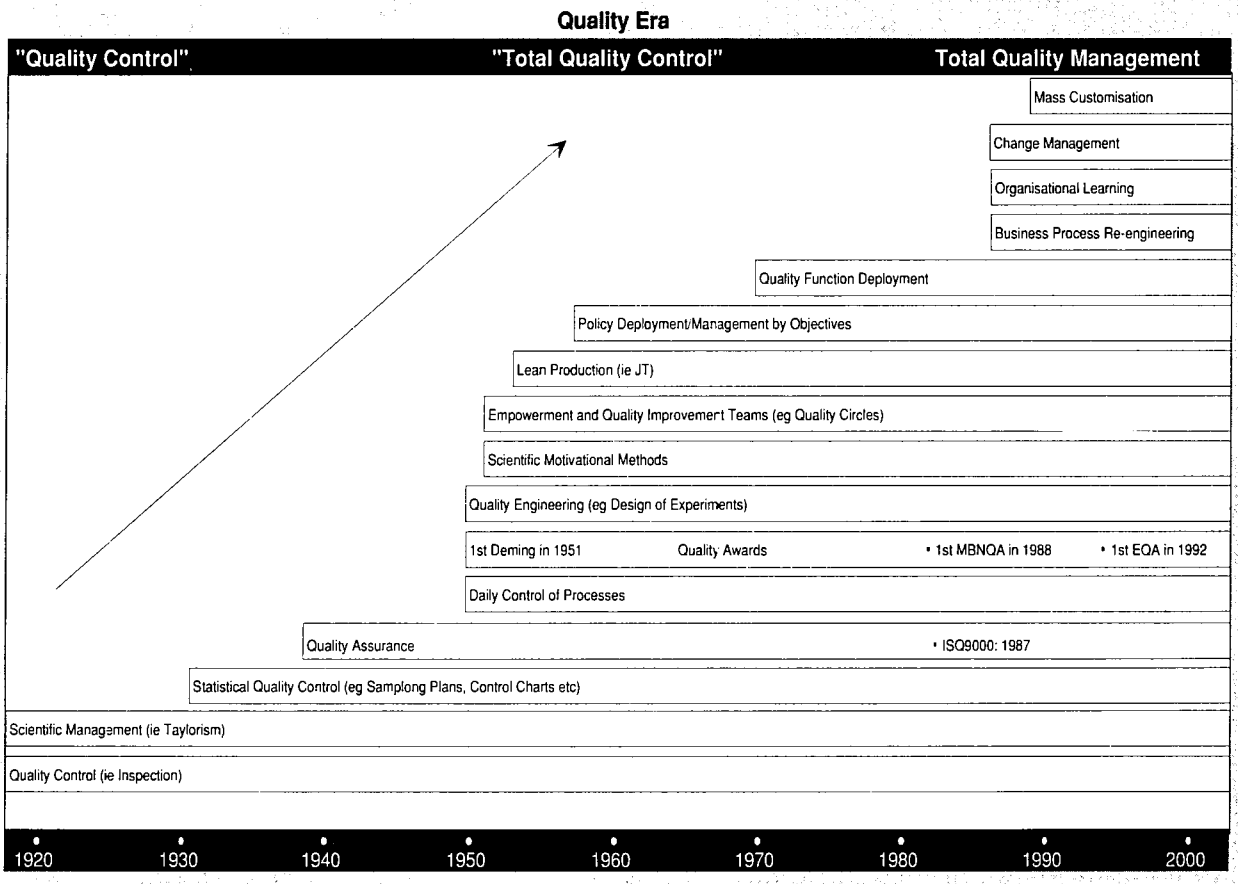
However:

- There is no generally accepted framework to measure and communicate the bottom-line impact of Total Quality Management;
- A key issue is to demonstrate the causal impact Quality Management has on economic performance as opposed to correlating it with improved business results;
- The full social impact of Quality Management has not been quantified.

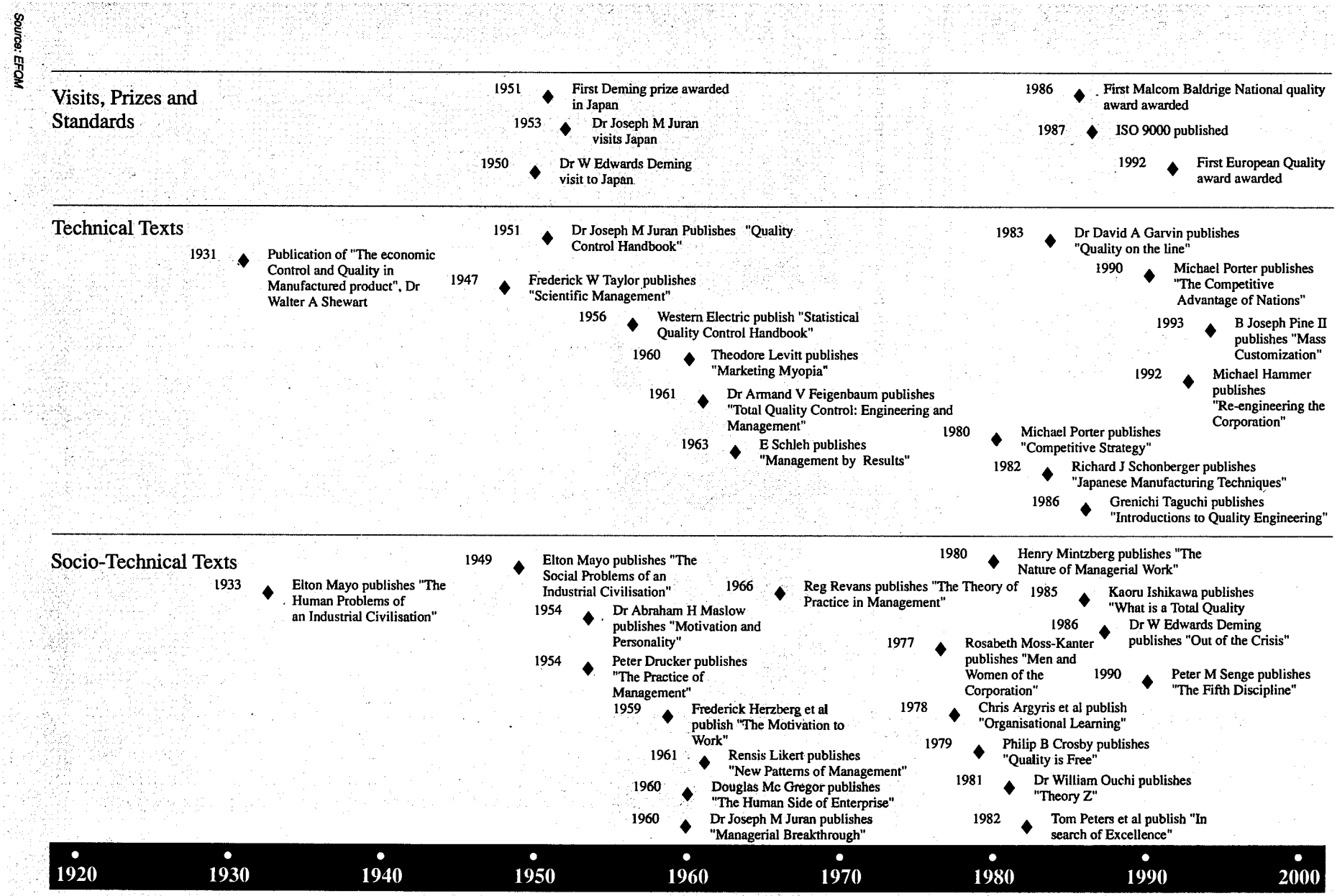
Section IV highlights the further work needed. This includes the need to:

- develop a robust framework to support the collection of economic and competitive position data in relation to Quality Management practices;

Figure 2: The History of TQM Practice



Source: EFQM



Source: EFQM

Figure 3: Milestones in the history of quality management

Table 3: Recent European quality award and prize winners

Year	Award	Prizes	Finalists
1992	Rank-Xerox	BOC Special Gases Milliken UBISA	Avis Europe ICL
1993	Milliken Cablettra	ICL	Varian Team

Source: Coopers & Lybrand, EFQM

- collect more up to date pan-European data on the costs and benefits of Quality Management in the private and public sectors;
- identify the most appropriate methods for using this data to promote Quality Management in Europe.

What are the expected benefits to European organisations and economies?

Existing work provides persuasive evidence that Quality Management could improve substantially the global competitiveness of European business.

The application of Quality Management practices is likely to benefit European business by sustaining competitiveness through:

- improved customer satisfaction;
- integrating the concept of continuous improvement into company activities;
- fully harnessing learning and innovation capacity to make step changes in performance;
- continually upgrading the satisfaction and skills of all employees;
- and improved financial performance

As financial institutions and government gain confidence in Total Quality Management, it is believed this will engender a longer term view of business and associated interventions and investment.

If this is true for the private sector, then the public sector could also benefit. The application of Total Quality Management within government and the public service sector could lead to improved efficiency and effectiveness in setting and implementing policy.

The potential impact of the benefits is far-reaching, but to what extent are they attainable? The initial findings are encouraging and the enthusiasm and commitment of the leading practitioners is beyond question. However, the study reveals uncertainties and gaps in the economic data. There are also gaps in the understanding of the indirect impacts of Total Quality Management in Europe.

The next two sections put Total Quality Management into historical context and discuss the detailed findings of the short study.

TOTAL QUALITY MANAGEMENT IN PERSPECTIVE

History

There is no single definition of Total Quality Management which is the name commonly given to the most advanced forms of Quality Management. Figure 2 shows the origins of Total Quality Management practice from 1920 to the present day. Figure 3 shows the body of theoretical work (mostly American) upon which this practice has been based. The approaches depicted have not entirely supplanted each other over the years. Rather, theoreticians and practitioners have built on the more effective elements of each and amalgamated them into the evolving best practice models for Total Quality Management (such as the European Quality Award Assessment Model, shown in Figure 4).

Until the 1950s the focus remained on technical issues such as improving inspection (Quality Control) using statistical techniques. This was associated with the introduction of planned, preventative measures (Quality Assurance). Although there were benefits from these approaches, the role of the worker was largely ignored, quality remained the domain of the "Quality Department" and improved quality was associated with increased cost. The spectacular success of certain Japanese companies in key economic sectors damaged the credibility of traditional Quality Control and Assurance. Much of this success centred on the idea that improved quality leads to reduced costs, a message promulgated by the late Dr W Edwards Deming, a leading American industrial academic.

The Japanese achieved their success with a combination of US economic and technical aid. In particular Company Wide Quality Control (CWQC) programmes were developed drawing on leading-edge Western thinking. Such programmes included the rigorous, on-going application of statistical techniques to critical processes (not just outputs) and the development of employee empowerment strategies. Indeed, the development of empowerment strategies (e.g. using Quality Circles) signalled a fundamental change from the era of Quality Control to Quality Management, and a shift in the role of managers that the US and Europe have been slow to emulate.

In the 1960s and 1970s a small number of large Japanese manufacturers fully exploited their lead by working with US and Japanese academics (amongst others) to develop innovative approaches to production. These innovations dramatically reduced lead times, inventory and cost whilst reducing defect levels (e.g. Lean Production), non-bureaucratic, empowering management systems for implementing policy (e.g. Policy Deployment) and a range of techniques for quality improvement. Concepts like 'zero defects' and 'right first time' became a reality. Few US and European companies followed suit.

It is important to keep this in perspective. Published information suggests that the Japanese experience continues to be dominated by large manufacturing companies (particularly in the automotive and electronics sectors with their supporting infrastructure). Indeed, there are reports of significant problems with white collar productivity in Japan. By contrast the European experience has been that Total Quality Management can be applied equally successfully to service industries (examples include British Airways, SAS, Avis Europe).

Considering the degree of maturity of Total Quality Management in Japan and the rate of implementation in the US over the past decade, there remains considerable scope for further adoption of Total Quality Management in European private and public organisations.

Recent approaches to implementation in the US and Europe (such as Business Process Re-engineering and Mass Customisation) are showing great promise by producing radical im-

provements in performance without the development lead-time required by the Japanese.

Current trends

Quality Management continues to grow as a discipline and there is a number of trends which are likely to raise specific issues for the European Union:

- increasing focus on individual customers by Total Quality organisations is helping to create fragmented, heterogeneous markets through the introduction of customised products and services. For example, one leading European washing powder producer now offers over 30 different products based on their analysis of specific customer requirements. Five years ago this figure was less than five.
- the role of management changes as Total Quality Management is adopted: requiring coaching, team skills and associated competencies rather than traditional management skills associated with command and control. There is a significant training and education implication;
- re-engineering organisations to focus on the core is leading to new ways of organising to provide products and services which in turn will dramatically change employment patterns. In particular this is likely to accelerate the rate of growth of small and medium-sized organisations as the corporates shrink and reorganise themselves into smaller business units. This has implications for the interaction of government and the private sector;
- increasing competitive pressures on service providers (across Europe and globally) is accelerating the adoption of Total Quality Management;
- accelerating application of Total Quality Management in government itself may improve efficiency and effectiveness, while increasing focus on excellent service delivery within the EU.

Additionally, there is a number of issues in Europe which presents both opportunities and threats to improving competitiveness. These include:

- increased competition as a result of the recent GATT round;
- the evolution of a single market in the EU;
- rapidly changing European social conditions and demographics;
- the recession and current high levels of unemployment in the EU; and
- regional differences in European business performance.

Infrastructure to assist the growth of Quality Management

Quality practices are well developed and supported by the European Organisation for Quality (EOQ). Formed in 1957, the EOQ originally acted as a focus for discussion and experience-sharing regarding Quality Assurance. The development of the EOQ has reflected the evolution of quality management and it now addresses broader aspects of quality management.

The EOQ currently represents the national quality organisations of 25 European countries and involves over 50 000 people via individual or corporate memberships (see Table 2). Importantly, the EOQ actively supports the establishment of professional Quality qualifications across Europe. Full member organisations are active in the areas of publications, research, education and training, testing and certification, conferences, national prizes and awards. In addition they liaise with other organisations in the Quality Assurance field (for example, standardisation organisations, societies, testing and certification bodies).

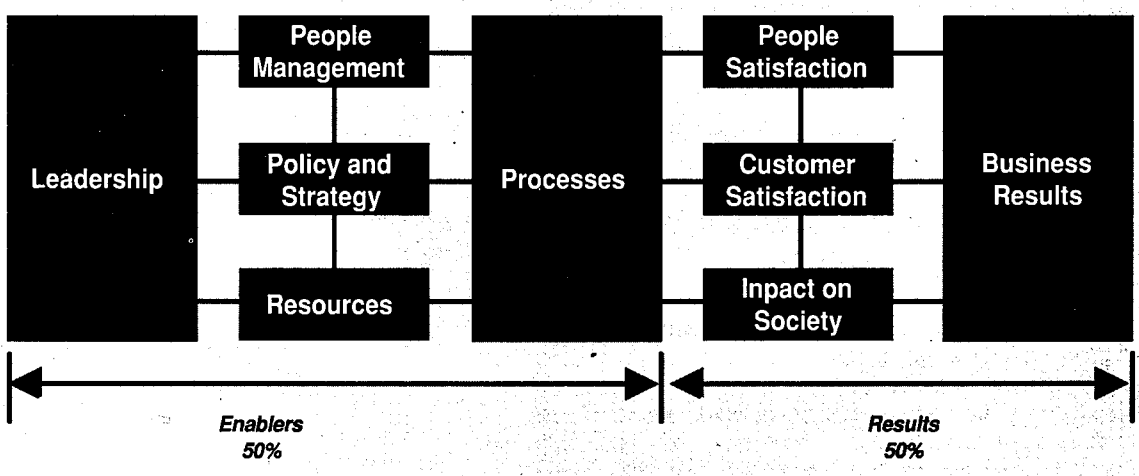
The multicultural nature of European business demands flexibility that is less apparent in the US and Japan. The existence of well-organised national quality organisations has meant that support and promotion for a variety of model approaches has been available to European businesses (e.g. publications, working groups, national quality awards and prizes). At the same time membership of the EOQ has tended to promote a degree of commonality as practice is disseminated.

In 1988, the European Foundation for Quality Management was established in recognition of the strategic importance of Total Quality Management to the competitive position of European businesses. Fourteen leading European total quality companies are founder members. The EFQM has developed a best practice Total Quality Management Assessment Model (Figure 4) which is used as the basis of The European Quality Award. The model is gaining wide acceptance as a framework for self-assessment and the implementation of Total Quality Management. The model is being adopted by some national quality organisations as the basis for all new national awards and revisions to existing ones.

A key feature of the EFQM's approach is its non-prescriptive nature. Also The European Quality Award differentiates itself from the US Malcolm Baldrige National Quality Award by overtly including the assessment of Business Results as a criterion.

The first European Quality Award was awarded in 1992 (see Table 3) In contrast the first Japanese Deming Prize was

Figure 4: The European Quality Award Assesment



Source: PIMS (1986)

Table 4: Distribution of EFQM membership

Begique/België	17
Danmark	10
BR Deutschland	14
Hellas	8
España	22
France	34
Ireland	4
Italia	31
Nederland	33
Portugal	4
United Kingdom	70
Austria	1
Finland	2
Malta	1
Norway	9
Sweden	10
Switzerland	19

Source: Coopers & Lybrand, EFQM

awarded in 1951 and the first US Malcolm Baldrige National Quality Awards in 1988.

The extent of EFQM membership indicates the status of Total Quality Management in Europe. By July 1993 there were more than 280 members (see Table 4). These figures suggest that active promotion of Total Quality Management is mostly confined to larger European corporates. This is likely to influence the standards and management of smaller companies. There is relatively little representation for small to medium businesses in Europe and manufacturers still predominate. Service organisations do not appear to be adopting Total Quality Management at the expected rate despite accounting for more than 60% of Europe's GDP. The reasons for this are not entirely clear.

In comparison there are an estimated 30 000 ISO9000/EN29000 certified organisations in Europe, with potentially 50 000 by 1995. Although growing, a small proportion of European business has announced interest in Quality Management in these two most common forms. The majority uses ISO9000/EN29000 as a vehicle which, at best, accounts for about, only a third of the features of the best practice EFQM assessment model.

Companies that have embraced Quality Management as an integral part of their management processes are likely to meet ISO9000 requirements. However it is possible to adopt a quality standard without being a follower of Total Quality Management principles.

The ISO9000 series of Quality Assurance standards have been widely adopted (by manufacturers, service providers and government). Many organisations appear to misunderstand the relationship between Quality Assurance and Total Quality Management.

What issues affect Quality Management development in Europe?

Total Quality Management remains top of many European management agendas. However, the impression gained is that CEO's are not effective at translating their proclaimed commitment into actions (even amongst EOQ and EFQM membership).

Despite the enormous strides in harmonisation of standards across Europe, some standards are still barriers to trade. This creates an unnecessary overhead for European industry in the international arena.

Other issues affecting Quality Management development include:

- many small and medium sized organisations have been ineffective at pursuing Total Quality Management because the initial training and education commitments are inconsistent with their short-term financial needs;
- training and education to support Quality Management remains a significant issue in Europe. Government incentives for training to support Total Quality Management implementation are highly variable across Europe. Small and medium sized organisations are particularly vulnerable. A recent EC working paper on 'Total Quality Management Education and Training in Europe' concluded that higher educational institutions "must urgently adapt their current curriculum" to meet training needs;
- government promotion of the proven benefits of Total Quality Management is less apparent than in the US, where the National Institute for Science and Technology actively communicates the value of adopting Total Quality Management;
- government incentives for implementing Total Quality Management (e.g. grants or economic aid) are highly variable across Europe;
- the benefits to individual companies and to European economies of research work currently underway in European management schools, universities and other seats of learning has not been quantified;
- little has been publicised of the benefits of the application of Total Quality Management within government in Europe.

WHAT ARE THE FINDINGS SO FAR?

The studies show a widespread, growing belief in the benefits of Total Quality Management. The evidence ranges from detailed and rigorous to circumstantial. In the observations presented in this section we have drawn conclusions from fact-based studies. It is worth noting that in many cases faith in a successful outcome has been a more effective driver for change than an understanding of the causal link to bottom-line improvement.

Total Quality Management improves competitive position

Michael Porter clearly demonstrates that the ability of organisations to compete more effectively in local and global markets has a significant, beneficial macro-economic impact. Understanding and measuring this ability, and the resultant competitive position, is complex and uncertain.

For example, in Table 5 competitive position is broken down into components that are commonly accepted as having a significant influence on profitability. Each component has associated measures which combine the quantitative (e.g. return on sales) and qualitative (e.g. relative quality index) aspects of competitive position. It is important to note that US experience shows that properly constituted relative quality indices have been one of the most consistently reliable measures in assessing competitive position over the 1980s and early 1990s.

Comparable data are not available for the performance of European organisations but several studies have been performed in the US. Figure 5 shows results from a recent Profit Impact of Market Strategy (PIMS) survey of more than 1 000 US companies. This relates return on investment (ROI), market share and relative quality index for a wide range of products, services and market sectors. Although a causal link was not established, the inference is that organisations which pursue quality strategically (as indicated by a high relative quality index) will secure market share and improved financial performance. A US Government Audit office report supports this

and observes that these findings apply to almost all service providers, producers and market situations.

Bottom-line impact of Total Quality Management

There is no single universally recognised approach to collecting the financial data needed to demonstrate the effectiveness of Total Quality Management. Where quality costs have been collected and analysed there are major doubts over the accounting involved and the extent of comparability between organisations. This is particularly apparent when pan-European studies are involved.

Quality Management specialists tend to use collection and analysis methods that do not always have accountants' endorsement (e.g. 'Cost of Quality' measurement). Would this situation persist if quality costs were a substantive item in management accounts (a common response to the questionnaire issued to European total quality companies as part of this short study)?

There remains an overwhelming reliance on traditional quality measures to measure effectiveness (such as productivity, defect levels, lead times etc.). The prime motivation appears to be ease of data collection. Current financial systems do not generally support the collection of quality costs or, more generally, activity costs. One study notes that the Japanese have made excellent use of Information Technology to aid in the collection of financial data to support their quality improvement efforts. Conversely, in US and European examples parallel cost collection systems have been established to provide the information. However, the general trend towards the provision of management information from activity-based costing systems could reduce the need for parallel data collection.

The replies to the EFQM's questionnaire serve to highlight the cost collection and analysis dilemma. Of the 57 EFQM members that contributed, 26 declared they had conducted studies into quality costs (either the costs of investment in quality, cost benefits from that investment or the cost of non-quality). These ranged between:

- pilot studies of the cost of non-quality using a national standard-based approach;
- full systems or the detection and tracking of non-quality costs; and
- formative attempts to introduce cost of non-quality into the normal profit-centre cost management structure.

Total Quality Management improves financial results

There is a body of fact which indicates that Total Quality Management is strongly associated with improved financial results. If profitability and competitive position of European companies are enhanced by widespread adoption of Total Quality Management, there will be a beneficial macro effect on European economies.

In the US, a study of Total Quality Management initiatives during the period 1980 to 1990 showed that the stock prices of a portfolio of Total Quality companies significantly outperformed the index (see Figure 6). The companies achieved a compound annual growth rate of 16% per annum compared with 10% for the Standard & Poor's 500 by the end of the decade.

The responses to the questionnaire (sent to EFQM members in November 1993) show that the costs of non-quality are significant and the impact of Total Quality Management on these costs is equally significant.

Typically the data are presented as the 'Cost of Quality' (i.e. costs associated with non-quality in terms of the prevention, appraisal and failure activities. Quality improvement is then represented as a reduction in 'Cost of Quality.' Note that there is no single agreed definition of the 'Cost of Quality'. The ECQ has a definition but companies often use their own.

The scale of quality costs is rarely reported as less than 25% of operating costs. For example, a UK utility responded that its annual 'Cost of Quality' is 53% of employment costs or £6.3 million per annum. Similarly, a textile manufacturer has estimated its 'Cost of Quality' to be 52% of employment costs or £3.6m per annum.

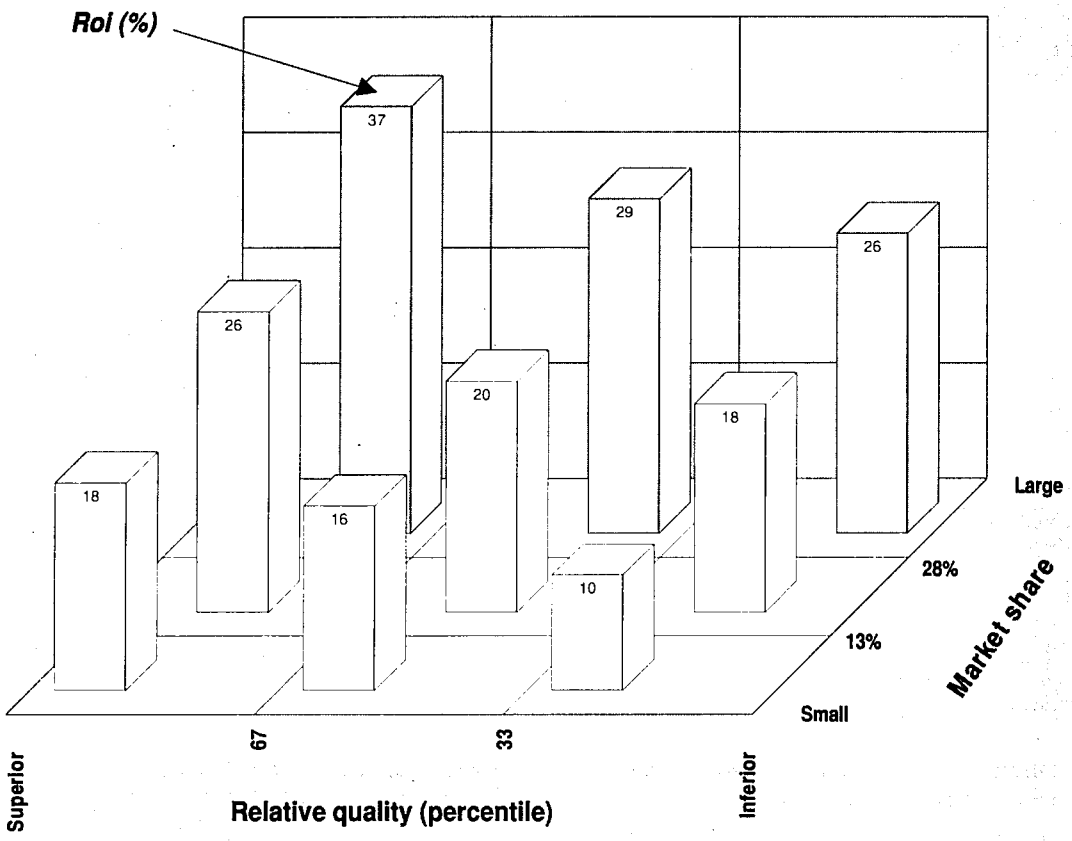
Hence, small improvements in 'Cost of Quality' will impact annually on the bottom-line and translate into added-value for the customer and profitability.

Table 5: Components of competitive position

Component	Common measures
Competitive standing	Market share (%)
Product/service quality policies	Relative quality index (1) compared to principal competitors in the same served market)
Pricing policies	Relative price index (using an average of principal competitors as the baseline)
Market intelligence investment	Marketing expense (% of sales)
R&D investment	R&D expense (% of sales)
	Relative value of sales from new products/ services (compared to principal competitors)
	Time to market
Focus on creation of long-term value	Cashflow
	Return on sales (ROS, %)
	Return on capital investment (ROI, %)
	Return on assets (ROA, %)
	Value added (% of sales)
	Value added per employee
	Profit growth rate (%)
	Shareholder returns (%)
	Capital investment rate (%)

(1) An index calculated from weighted performance against all of the key non-price product and service elements that influence a purchasing decision
Source: Coopers & Lybrand, EFQM

Figure 5: The interrelationship between quality and financial performance



Source: EFQM

Specific examples from our survey of the impact of quality management on EFQM members include:

- Honeywell S A Europe has achieved between 8 and 35% reduction per annum in Cost of Quality across its business;
- Automobile Citroën has reduced its quality costs by 50% in 10 years. This was achieved whilst improving productivity (cars per employee per year), by 88% in the same period, reducing customer claims by 50% and reducing inventory levels by two-thirds.

A multi-sector survey of British business in 1989 showed that 75% of businesses increase their profitability within three years of introducing Total Quality Management. Fifty-three percent have achieved "good" results within a year of starting. The subjective nature of replies means that the extent of improvement is difficult to assess, but the overall conclusions remain.

A key methodological issue is to demonstrate the causal impact of Total Quality Management on economic performance, as opposed to correlating the adoption of Total Quality Management with improved business results.

There have been pioneering studies on this difficult area by Bradford Management Centre and by Smith. The Bradford research, covering 29 European Total Quality companies asserts that 72% of companies show above average financial performance.

A 1993 study by Smith seeks to establish causal links between improvements in Total Quality enablers and subsequent financial performance by eight European Total Quality companies. One untested hypothesis in this study is that minor improvements in key decisions (which impact elements of the enablers) could result in significant improvement in profits. However the financial performance criteria in these studies were very broad.

Measurable targets are key to Total Quality Management success

Cost reduction allows a company to improve competitiveness by lowering prices or by creating more value for customers through a more effective customer-focused use of resources.

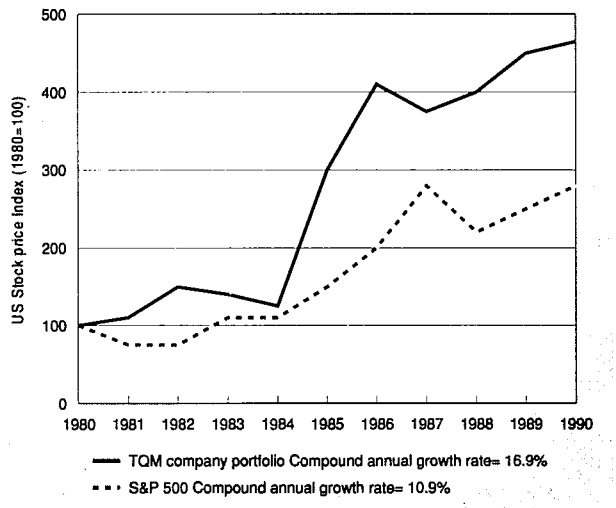
Cost reduction is an integral part of Total Quality Management. Japanese experience suggests that stretching financial targets are more likely to lead to success. This aspect of Total Quality Management is more likely to gain shareholder and senior management backing for quality improvement activities.

Cost reduction strategies are still viewed as important for maintaining competitiveness, particularly since overheads remain a significant proportion of most European organisations' operating costs.

Other critical success factors for Quality Management include:

- active customer focus along the value chain. Several surveys show Total Quality Management initiatives which are completely inward facing fail to achieve the performance improvements already discussed (from anecdotal evidence this may be particularly true of ISO9000/EN29000 initiatives).
- quick results which can only be achieved if the right approach is chosen (particularly those which initially re-engineer core processes). However, the major benefits occur over periods which are much longer than US and some European management teams are comfortable with. One affect of Quality Management is to extend management's planning horizon. Such an approach is entirely consistent with the long-term creation of value desired by many investors.

Figure 6: TQM companies outperform industry's leaders



Source: EFQM

A mix of financial and non-financial performance measures is key to Quality Management

Performance measures extend to a greater range of subjects than just financial performance as illustrated by ICL's Manufacturing Division's response to the EFQM's questionnaire. ICL has developed performance measures to cover: competitiveness; customer satisfaction; productivity; employee satisfaction.

Examples of ICL's performance measures include:

- Competitiveness: contract wins to bids, market share, customer retention;
- Customer satisfaction: customer driven indicators such as: technology performance, support performance, delivery performance;
- Productivity: value added per employee, return on capital employed;
- Employee satisfaction: annual employee opinion surveys

The business began adopting Total Quality Management techniques in 1984/5 and has achieved some remarkable results:

- Cost of non conformance reduced by a factor of 8;
- Process yields up 30/35%;
- Product costs: 10% reduction still being achieved annually;
- Time to market reduced from 2 years to below 3 months;
- Delivered quality improved by a factor of 10;
- Employee turnover reduced from 5% pa to 1% pa.

To drive through financial performance improvement, adoptees of Total Quality Management need to manage the business through a variety of non-financial performance measures.

The full social impact of Quality Management has not been quantified

There is evidence to suggest that aspects of Total Quality Management in Europe and the US have led to job losses in the short term. A possible explanation is that organisations are concentrating on core functionality and re-engineering processes to radically improve performance. This clearly implies less resources required to achieve the same or higher outputs, but this may often be balanced by an increase in contracted out services. However, a focus on cost reduction may lead to export of jobs from the EU to lower wage economies such as Eastern Europe and China. This implies that government policy will have an important role to play as European competitiveness improves

A high proportion of overhead costs is tied up in administration. Administrative functions across Europe employ a significant proportion of women. Hence, overhead reduction strategies may lead to unexpected changes in employment patterns for female workers.

There is also increased awareness of the need for European management thinking to incorporate a fuller understanding of the wider social implications, benefits and pitfalls of operating in such a culturally diverse and rich environment. The inclusion of an 'Impact on Society' criterion in the EFQM Model is a practical example of how total quality principles are increasingly being applied to the social dimension. A characteristic of Total Quality companies is that they view performance comprehensively and not from the narrow view of a single group of stakeholders.

Typically companies do this by demonstrating to the public how they are implementing environmental policies, acting as 'good neighbours', actively investing management time in the local community and by handling job losses to minimise damage to the community (e.g. outplacement counselling, relocations etc.).

Some academics consider Total Quality Management as a market de-stabiliser. They believe it creates market turbulence by shortening lead times to market, increasing diversity of organisational form and outputs to meet individual customer needs more closely. However, we believe that the benefits outweigh the disadvantages.

CONCLUSIONS AND FURTHER WORK NEEDED

The evidence examined in this short study shows that applying Quality Management principles effectively yields superior business performance. However, the short study has also confirmed that significant work is still needed to demonstrate the extent and range of benefits of Quality Management in Europe. Further study is required to:

- develop a framework to support the collection of economic and competitive position data across Europe in relation to Quality Management practices. This should aim to: test whether causal links between Quality Management practices (enablers) and business results can be demonstrated; understand clearly how individual European organisations should set performance measures, collect and analyse performance data to reveal the effectiveness of Quality Management implementation; develop a framework to assess the macro-economic effects of Quality Management on the EU economies;
- collect more data on Quality Management in the private and public sectors, for national and pan-European organisations. This will provide an up-to-date and ongoing assessment of the costs and benefits (including the impact on competitive position) of Quality Management. In particular, this should include assessment of: the extent of Quality Management adoption; the criteria for successful implementation; a comparison of implementation methods; the micro and macro-economic effects of widespread Quality Management adoption; the impact of Quality Management on small and medium-sized organisations; the impact of Quality Management in different sectors and regions; the impact on service and manufacturing industries; costs/benefits of ISO9000 (EN29000); the impact of Quality Management within government agencies;

- identify the most appropriate methods for using these data to promote Quality Management within Europe. This should aim to: quantify the costs and benefits of existing national and pan-European government promotion of Quality Management; assess what types of future national and European government interventions, if any, would be most effective to support Quality Management development in Europe;
- quantify the socio-economic impact of Quality Management application across the EU. This would: assess the social impact of Quality Management (e.g. in terms of changes in employment); explore the implications of demographic changes (especially the increase of women in the workforce) for Quality Management;

In conclusion, this short study confirms that widespread adoption of Quality Management is likely to advance the competitive position of European business. However it also shows the need for further, more detailed study.

We have identified key gaps in the information which should be closed to make this possible. It is now necessary and timely for the EU to take a more active role in developing a richer understanding of the economic aspects of quality to enhance European business performance.

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SMEs and internationalisation

INTRODUCTION

The importance for the European economy of small and medium-sized enterprises (SMEs) is now universally recognised, as is proved by the direction in which economic policy has been moving recently: the White Book of the Commission of the European Communities on growth, competitiveness and employment suggests a number of measures to promote the development of SMEs and the way in which they function.

At the same time, internationalisation is gaining more and more ground. States are more economically and politically interdependent than ever, particularly in the Community.

As there is relatively little documentation on the subject, we thought it might be worthwhile to look at the role of European SMEs in internationalisation.

A survey of European SMEs is followed by a look at the internationalisation of enterprises now taking place and finally by a description of how European SMEs are responding to internationalisation with special mention of a new Community instrument for transnational cooperation adapted to the needs of SMEs: the European Economic Interest Grouping (EEIG).

We have drawn from four main sources:

- the publication "Enterprises in Europe - Second Report, produced jointly by Eurostat and Directorate-General XXIII of the Commission of the European Communities (Enterprise Policy, Distributive Trades, Tourism and Cooperatives) which contains statistics of workforces, employment and production for enterprises in the Community and certain EFTA countries, broken down by size of enterprise (in terms of jobs).
- the first report of the European Observatory for SMEs, produced at the request of Directorate-General XXIII by the European Research Network for SMEs, which analyses the present position and prospects of Community SMEs under various headings such as spirit of enterprise, dynamism, markets and sales, jobs, capital and funding, followed by strategic recommendations;
- the research on "Les PME et l'internationalisation - La PME belge à l'aube du grand marché de 1993" (The SMEs and internationalisation - Belgian SMEs on the threshold of the single market 1993", undertaken by the Centre d'étude PME of K.U. Brussels and covering over 1000 SMEs in the secondary and tertiary sectors;
- the document "GEIE - L'émergence d'une nouvelle coopération européenne - Bilan de trois années d'expérience (EEIG - The emergence of a new form of European cooperation - Assessment of three years of experience" produced by Directorate-General XXIII on the basis of a survey of 194 EEIG.

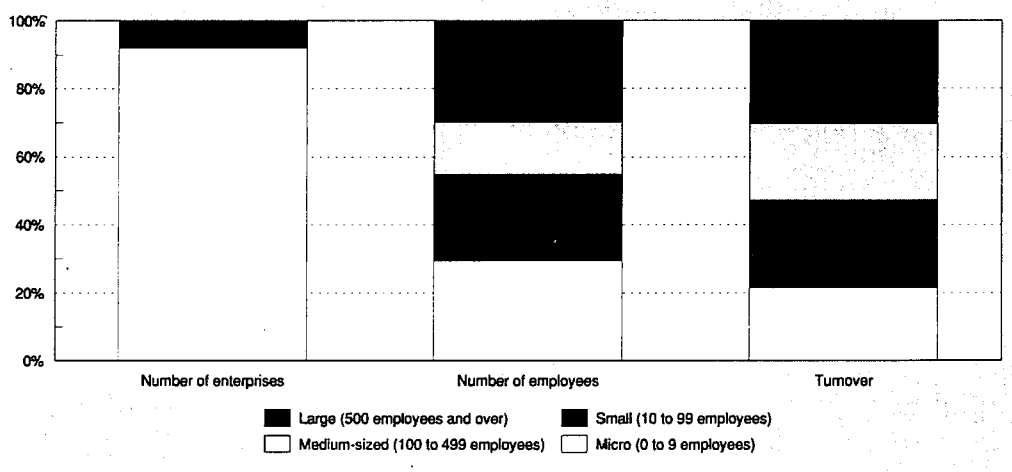
EUROPEAN SMEs

SMEs in the broad sense (0 to 499 employees) account for 99.9% of the European Community's 11.6 million enterprises (1988), not counting enterprises in the agriculture, hunting, forestry and fishing and other services sectors (NACE 0 and 9). They employ 70.2% of the 80.7 million persons employed by all enterprises and generate 69.7% of total turnover amounting to ECU 10.7 billion.

SMEs in the broad sense can be divided into three categories:

- micro-businesses (0 to 9 employees);
- small enterprises (10 to 99 employees);
- medium-sized enterprises (100 to 499 employees).

Figure 1: Breakdown of EC enterprises according to number of enterprises, employees and turnover, 1988



Source: Eurostat

Table 1: Extent of forms of internationalisation of SMEs in Belgium, 1991

Form of internationalisation	% of enterprises involved
Exports	89
Subsidiaries	29
Production units	17
Licensing of foreign firms	13

Source: Centre d'étude PME of K.U.B.

The second and third categories constitute SMEs in the strict sense (10 to 499 employees).

As figure 1 shows, micro-businesses are the most numerous, accounting for 92% as against 7.4% for small enterprises and 0.5% for medium-sized enterprises. They also have the biggest proportion of employees (29.4%; small 25.3%; medium-sized 15.5%). By contrast, their share in turnover is the lowest, standing at 21.4% as compared with 25.7% and 22.6% respectively for small and medium-sized enterprises.

As compared with large enterprises (500 and over employees), micro-businesses are still the most numerous (large enterprises: 0.1%) but their percentage figures for jobs and production are lower (large: 29.8% and 30.3%).

The percentages for SMEs in the strict sense are 7.9% for the number of enterprises, 40.8% for numbers employed and 48.3% for turnover. Community enterprises have an average of 7 employees.

As regards the weight of SMEs in the broad sense, the picture is much the same as for the Community and all the Member States. Apart from Denmark, the same is true for the average size of enterprises, 80% of which have less than 10 employees.

The position does, however, vary from country to country in the case of micro-businesses and SMEs in the strict sense, with the southern countries having proportionally more micro-businesses than the northern, except for Belgium. In Italy, this category is of exceptional relative importance in terms of jobs and production (almost 25% of the active population and over 20% of GDP, as against less than 20% and 15% respectively in most of the other countries). One-man businesses (0 employees) are most numerous in France and Spain (over 50% of all enterprises) and fewest in Germany and Luxembourg.

In Spain, Germany, Luxembourg and Denmark, SMEs in the strict sense lead with 47 to 56% of employees and from almost 30% to over 40% (Luxembourg) of the active population. The figures are lowest for Italy and France (less than 40% for employees and less than 25% for the active population).

The sectors with most SMEs in the broad sense are building and civil engineering (NACE 5) and services (NACE 6 to 9) at both Community and national level.

Micro-businesses are particularly numerous in the "distributive trades, hotels, catering and repairs" sector (NACE 6) which accounts for over 40% of all enterprises in that category, as can be seen from figure 2. They are also numerous in the "transport, credit institutions and business services" sectors (NACE 7 and 8) and in building.

The "energy, metal manufacture, intermediate goods and equipment" sector (NACE 1 to 3) is characterised by large enterprises but also has medium-sized enterprises, more particularly in the manufacture of intermediate goods and equipment.

Other manufacturing industries, i.e. consumer goods industries (NACE 4), tend to be medium-sized or small.

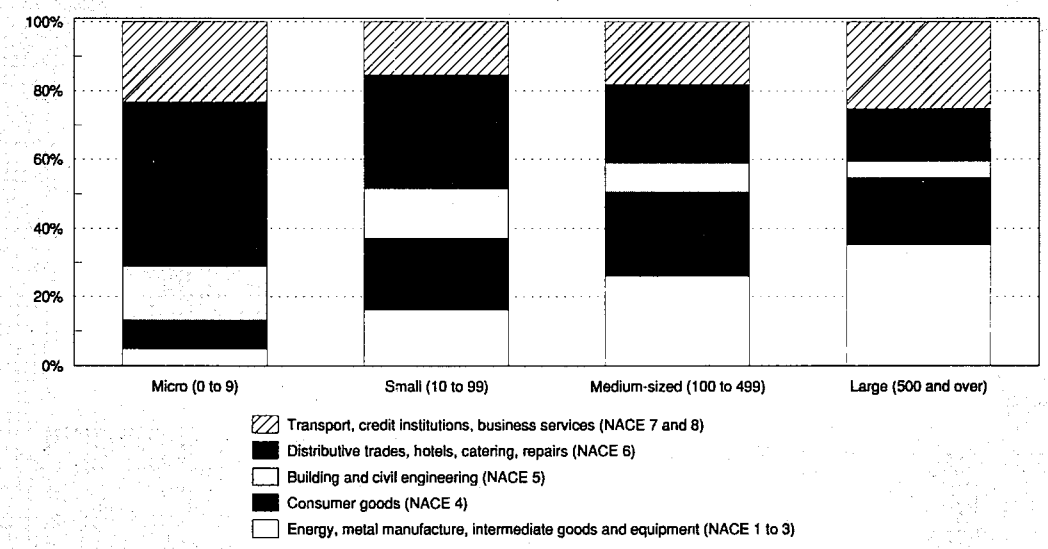
The not-insignificant presence of large enterprises in the "transport, credit institutions, business services" sectors (NACE 7 and 8) is explained mainly by the importance of the credit institutions, which may be very large.

For some analyses a distinction may usefully be made between "small" and "large" sectors. A sector is described as "small" or "large" according to whether it is dominated by SMEs and large enterprises respectively in terms of jobs or number of enterprises. For example, the "consumer goods" (NACE 4) and "distributive trades, hotels, catering and repairs" (NACE 6) sectors are made up exclusively of small subsectors while the "transport, credit institutions and business services" sectors (NACE 7 and 8) have a majority of large subsectors.

THE INTERNATIONALISATION OF ENTERPRISES

Internationalisation, also referred to as "globalisation" has been going on for a long time, as differing resources have very quickly led States to establish trading relations. It has,

Figure 2: Breakdown of EC enterprises according to sector, 1988



Source: Eurostat

Table 2: Share of exports in sales by sector of activity and size of enterprise (in terms of number of employees), 1988 (1)

(%)	Micro (0 to 9)	Small (10 to 99)	Medium-sized (100 to 499)	Large (500 and over)	Total
Energy, extraction (NACE 1 and 2)	14	13	14	16	16
Industry (NACE 3 and 4)	11	18	24	38	28
Building and civil engineering (NACE 5)	1	1	2	2	1
Distributive trades (NACE 6)	5	9	7	6	7
Other services (NACE 7 and 8)	3	8	12	12	9
Total	5	10	13	23	14

(1) Estimated
Source: EIM

however, picked up speed over recent decades, in terms of both quality and quantity, and is bound to increase in Europe with the completion of the single market. Indeed, as Figure 3 shows, world trade in goods has grown more than world production since the sixties. This acceleration is due mainly to technical advances in the fields of transport and telecommunications, which have changed very significantly the link between the place of production and the places of supply and sale, with a consequent spectacular growth of the service sectors.

For enterprises, "internationalisation" means "extension to international level of their activities at national, regional or local level".

Currently, there are four forms of internationalisation of enterprises, often constituting successive stages: exports, cooperation with foreign enterprises, licensing of foreign firms and direct investment abroad.

Exports

With world flows amounting to ECU 2665 billion in 1990 and ECU 2742 billion in 1991, accounting for over 30% of world GDP for goods, the oldest form of internationalisation through exports is still the most important. More than two-thirds of trade is accounted for by the industrialised countries and, in particular, the Community with almost 41% in 1991. In 1990, world trade in goods accounted for 81% of world exports, chiefly of manufactured products (57%).

In the Community, exports of goods represented 22% of GDP in 1991 and amounted to ECU 1136 billion in 1992. Of this figure, only 38% related to trade with third countries, led by the United States and Japan. The most dynamic Member States measured by the ratio value of goods exported to population are Belgium, the Netherlands, Denmark and Ireland.

Cooperation with foreign enterprises

Cooperation with foreign enterprises can take various forms with differing degrees of formality, ranging from a verbal agreement to the creation of an EEIG or a joint undertaking; it can cover various areas such as "research and development" (R&D), marketing or production. This method enables the parties involved both to widen their field of action, by reaching new markets, distribution networks, customers, products, technologies, capital ... and to improve their performance particularly as regards management and productivity.

Such cooperation leapt ahead during the eighties. For example, between June 1985 and May 1992, the number of joint enterprises created annually in Community industry and services (by the 1000 biggest industrial enterprises in the Community, the 500 biggest world industrial enterprises and the biggest enterprises in the distribution, banking and insurance sectors ranked by turnover) rose from 27 to 54 for creations involving different Member States and from 28 to 46 for those involving Member States and third countries, with the United States and Japan as leading partners. These operations involve chiefly the industrial sector, and chemicals in particular, while banking dominates in the services sector.

Licensing of foreign firms

Licensing of foreign firms has also grown considerably over the last ten years. As it is directed to a product, brand or technology, licensing is more successful with Swedish, American or New Zealand enterprises than with their European counterparts whose Governments' balance of payments is even in deficit.

The situation differs widely between the Member States of the Community; while Belgium has been losing ground for twenty or so years, the Netherlands have seen their influence rise by 70% between 1984 and 1990. This influence is chiefly with European countries to the extent of 60% in the Community and EFTA. Furthermore, by contrast with the other Member States, Germany exports many more licences than it imports, even though its balance of payments is in deficit.

Direct investment abroad

Direct investment abroad can be defined as the use of capital by enterprises to finance the purchase, creation or development of subsidiaries abroad or to acquire holdings in foreign companies giving them powers of decision in those companies. The reason may be a desire to escape from protectionist measures, to take advantage of attractive local conditions (fiscal, legal, financial) or to move closer to customers.

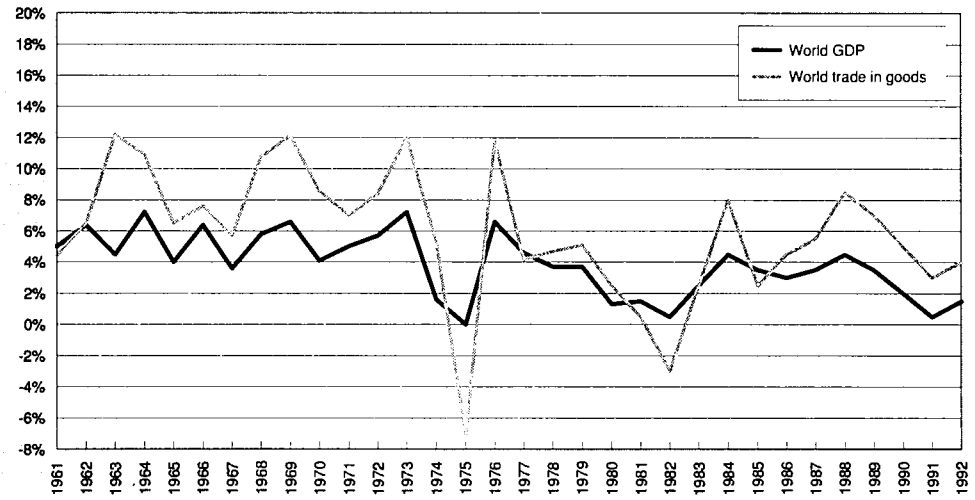
Over the last ten years this type of internationalisation has gone ahead without a break at an average annual rate of 29%,

Table 3: Destination of SME exports from Belgium, 1991

Destination	% of enterprises exporting to that destination
Neighbouring countries (1)	61
Southern Europe (2)	14
North America (3)	9
Far East (4)	6
Northern Europe (5)	6
Eastern Europe (6)	2
Former USSR	0.2

(1) D, F, L, NL, UK
(2) GR, E, I, P, Turkey, former Yugoslavia
(3) USA, Canada
(4) Japan, Indonesia, India, China, Taiwan
(5) DK, Norway, Sweden, Iceland, Finland
(6) Bulgaria, Poland, Rumania, former Czechoslovakia, Hungary
Source: Centre d'étude PME of K.U.B.

Figure 3: Growth of world GDP and trade



Source: Eurostat, GATT

thus greatly exceeding the rates for production and trade, to attain world flows of ECU 147 billion in 1990. As in the case of exports, most of the operations take place in the industrialised countries (82% in 1990). The Community, the United States and Japan together accounted for 77% of flows from 1985 to 1989 and held 81% of total world direct investments abroad in 1988.

In 1989, Community investments amounted to ECU 33 billion in third countries and ECU 32 billion in Member States (by countries of destination). The main receiving third countries were the United States (72%), the EFTA countries (7%) and Japan (2%). The United Kingdom is a very substantial investor accounting for almost half of Community investments in third countries and over a quarter of Community investments in Member States. France is also a major intra-Community investor with 26% of the total. In the Community, as in Japan and the United States, a major proportion of direct investments abroad go to the service sectors, and to the financial sector in particular. Acquisitions of subsidiaries accounted for around 85% of United States investment abroad and 60% of such Community investments over the last ten years.

INTERNATIONALISATION OF SMEs

This section examines in turn the way in which SMEs have dealt with the four forms of internationalisation, the EEIG, the indirect effects which internationalisation may have on SMEs and the organisations and bodies available to them in this field.

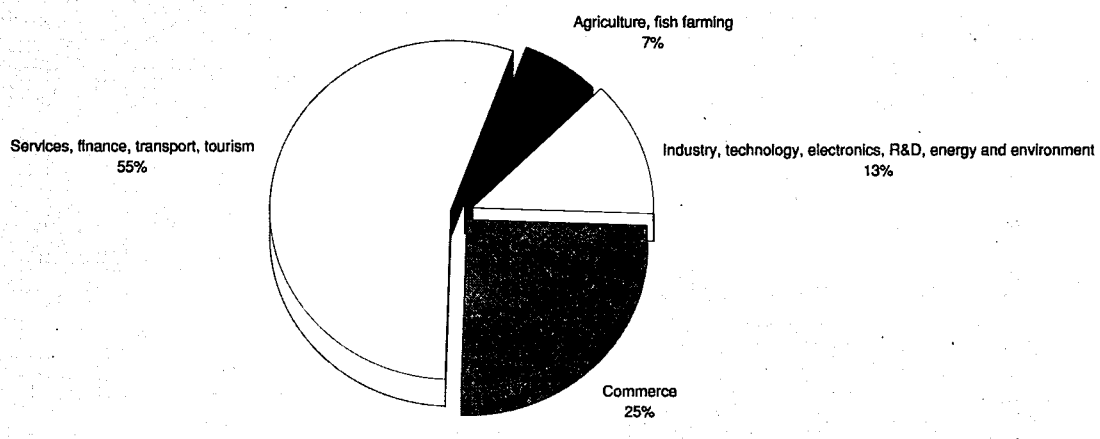
Response of SMEs to the four forms of internationalisation

Although to a lesser extent than large enterprises, European SMEs are also involved in the process of internationalisation, chiefly through exports as shown by table 1 for the 52% of Belgian SMEs which operate internationally.

Table 2 shows that for all sectors of the economy in 1988, shares in foreign sales were estimated at 5% for micro-businesses, 10% for small enterprises and 13% for medium-sized enterprises as against 22% for large enterprises. The lead adopted by the latter did not extend to all sectors, however; in the commerce sector, small and medium-sized enterprises led with 9% and 7% respectively, compared with 6% for large enterprises.

The SMEs' share in international trade seems to be growing faster than that of the large enterprises. In the Netherlands

Figure 4: Breakdown of EEIG members in the EC according to sector, 1991



Source: European Commission

Table 4: Difficulties encountered by Belgian entrepreneurs in dealing with internationalisation, 1991

Difficulty	Percentage of entrepreneurs affected
Financial or payment difficulties	31
Finding someone to hand over to	30
Foreign legislation and regulations	29
Time spent travelling	28
Length of negotiations	27
Attitude to business, different mentality	26
Customs formalities	26
Accuracy of information on markets	25
Setting of export prices	20
Language problems	11

Source: Centre d'étude PME of K.U.B.

industrial sector, for example, the growth rate for SMEs was more sustained than that of large enterprises between 1980 and 1991 when the figure was ECU 26 billion for the former and ECU 36 billion for the latter.

Three small sectors (NACE 31 "Manufacture of metal articles (except for mechanical, electrical and instrument engineering and vehicles"), NACE 45 "Footwear and clothing industry", NACE 46 "Timber and wooden furniture industries") and three large sectors (NACE 25/26 "Chemical industry"/"Manufacture of man-made fibres", NACE 33 "Manufacture of office machinery and data processing machinery", NACE 35/36 "Manufacture of motor vehicles and of motor vehicle parts and accessories"/"Manufacture of other transport equipment") were compared in order to determine the respective performances of SMEs and large enterprises with regard to international trade. It was found that there was no great difference. At European level in 1990, each of the two groups sent about 60% of their exports to Community countries. From 1988 to 1991, however, the growth of exports to these countries was much greater than that of exports to non-Community countries, for the small sectors as compared with the large sectors. This leads us to consider the "Europeanisation" of SMEs.

A further point is that SMEs export more than large enterprises to neighbouring countries. More than 70% of Irish exports go to a Community country, with the United Kingdom taking 27%. For micro and small enterprises the United Kingdom figures are 45% and 36% respectively. Belgian SMEs export mainly (61%) to neighbouring countries and in descending order of sales to France, the Netherlands, Germany, Luxembourg and the United Kingdom as shown in table 3. Reasons given by SME heads include a wish to gain experience before trying to win distant, less well known markets, ease of trading in countries which often have a familiar language and similar mentality to their own, unwillingness to risk change and fear of running up against obstructive regulations in countries which are not members of the Community.

The superiority of large enterprises over SMEs, as confirmed by the foregoing comparison (the share of exports in gross output in 1990 was slightly lower for the small sectors than the large sectors) is attributable to the sectors to which the SMEs belong (as can be seen from Table 2 the sectors where they are numerous are less export-oriented) but also to their inherent characteristics. These include mainly inadequate financial resources, lack of time and an internal structure which does not allow the enterprise to trade internationally. In addition, some SMEs do not export because their heads overestimate the problems involved or because the home market is sufficient for them. Table 4 illustrates the difficulties created for Belgian entrepreneurs by internationalisation.

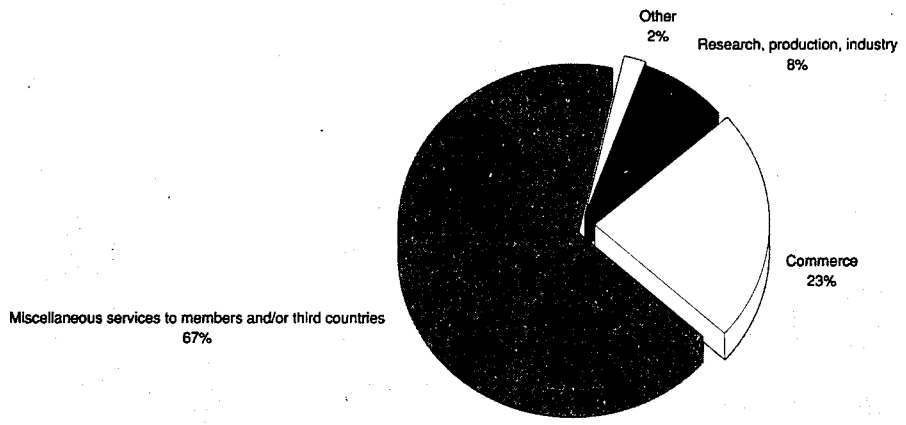
The second stage of internationalisation - cooperation with foreign enterprises - is of special interest for SMEs whose size often restricts their possibilities. Nevertheless, a European survey of transnational cooperation covering 5000 firms showed that large enterprises seem to be more active in this area than SMEs. The explanation again lies in the inherent characteristics of SMEs already mentioned and also in their wish to remain independent or their being satisfied with their present situation.

Those who decide to risk cooperation look by preference for a partner with a profile similar to their own particularly as regards sector, customers and size. In 1988, however, 45% of agreements in the biotechnology sector where cooperation is chiefly in R&D, linked SMEs with large enterprises. In most cases, collaboration is limited to two partners.

The preferred countries are in Northern Europe with Germany as favourite, followed by France, Belgium and the United Kingdom. The countries to the south suffer particularly from their remoteness, the weakness of their economies and lack of information about their markets.

Cooperation agreements mainly relate to sales but in some sectors they are concerned primarily with production and R&D. In Belgium they relate to production for 24% of SMEs, to commercial representation for 16%, to marketing for 15%, to distribution for 13%, to personnel for 12%, to R&D for 9% and to the provision of services for 7%. Cooperation is usually more formal and longer term in the case of production than in the case of sales and services.

Figure 5: Breakdown of EEIG in the EC according to main activity, 1991



Source: European Commission

Very little information is available about the licensing of foreign firms by SMEs. It may be noted, however, that as table 1 shows, Belgian owners have little enthusiasm for this arrangement. The reason given is that the laws on industrial and intellectual property, which still have gaps at both national and European level, do not afford adequate protection. This attitude is confirmed by a survey showing that only 6% of 240 industrial SMEs had granted licences abroad.

The information concerning the licensing of foreign firms must be interpreted with caution because many operations of this kind involve enterprises linked through subsidiaries.

Direct investment abroad is the prerogative of large enterprises. In the Netherlands, ten big multinationals share 40% of this activity. Smaller enterprises are not, however, standing still and are moving more and more in this direction, even faster than the large enterprises; still in the Netherlands, over the periods 1984-1987 and 1988-1990 direct investment abroad by smaller enterprises rose by 163% as compared with 110% for large enterprises.

63% of investment by small Netherlands enterprises went to Community countries from 1984 to 1987 and 67% from 1988 to 1990, as compared with 42% and 48% respectively for all enterprises. In Italy, many (50%) SMEs with subsidiaries abroad invested in the developing countries in the same way as firms with over 2000 employees. Enterprises with 500 to 2000 employees tend more towards the developed countries.

Owners of Belgian SMEs may prefer the setting up of a subsidiary abroad to the other forms of internationalisation for certain types of activity and more particularly for service activities, for which proximity to customers is important. It is indeed essential when the country of destination is a long way from Belgium. Some of them, however, consider the establishment of a production unit abroad to be very risky because of the sums involved and the unreliability of market studies; they intend to give first consideration to collaboration with an importer.

An article reporting interviews with them indicates that heads of French parent SMEs with a subsidiary abroad experience difficulties with managing from a distance. They quote obstacles resulting from differences of language, currency, tax and welfare legislation and culture. They stress problems arising from the need to have adequate local management and an effective system for monitoring management, as parent SMEs cannot guide their subsidiaries effectively for lack of time and resources. It is often very difficult to find men and women who can be relied on and are competent, perfectly acquainted with the country and capable of adapting to the methods and culture of a French group. Most enterprises take on nationals in preference to expatriates who are generally not as close to the culture and market of the country; they do so by referring to local recruitment agencies. Personal contacts with the local management are of special importance; they supplement the information provided by the management system and give a better picture of the subsidiary's position.

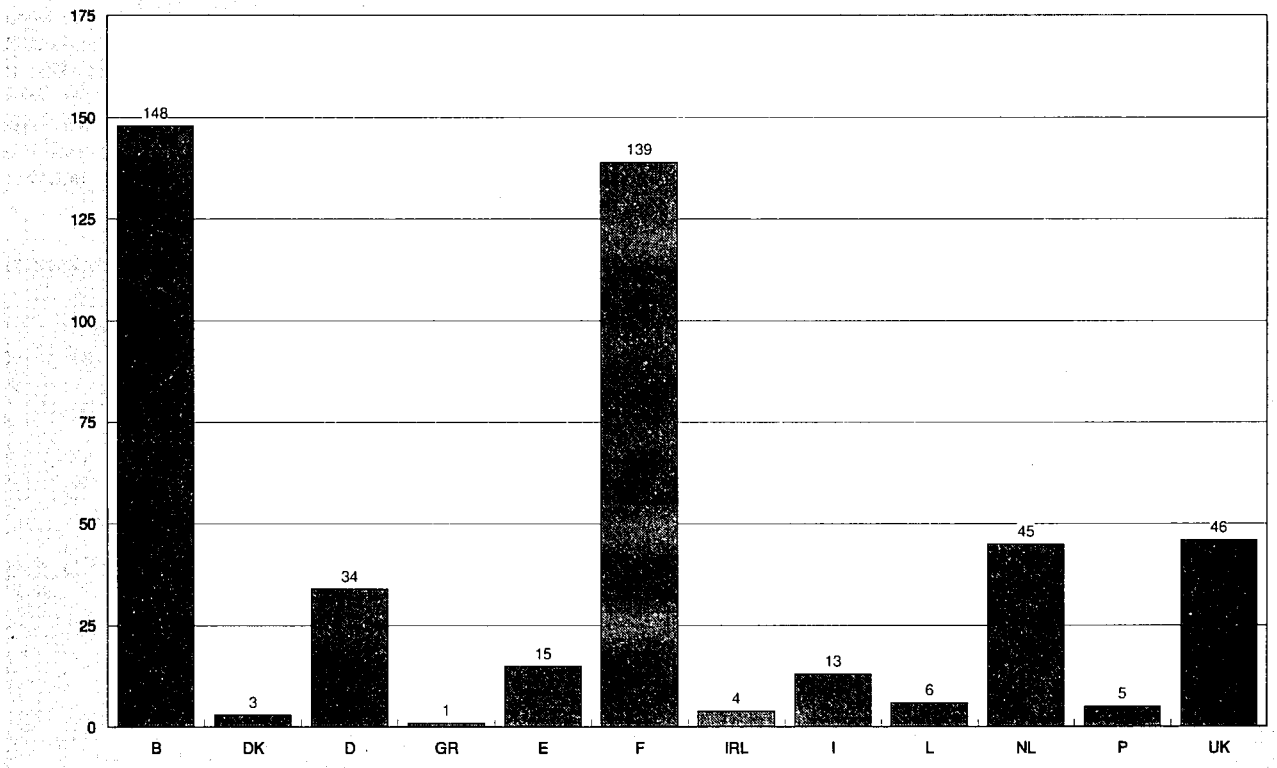
The EEIG

Formed in 1985, by regulation 2137/85, the EEIG is so far the only instrument operating under Community law which provides a legal framework geared to transnational cooperation between enterprises in different Member States.

The EEIG formula meets the special needs and circumstances of SMEs by:

- preserving the economic independence of the partners. Outside the actual arrangements for cooperation, each retains control of its economic activity and development strategy;
- ensuring great flexibility in the organisation and internal working of the EEIG. The contract of association allows the members considerable freedom to fix its internal regulations. A contribution to seed capital is optional. Members can contribute in cash, kind or know-how or by other forms of funding as they choose. Matters not covered by the EEC Regulation or by the contract are governed by the law of the Member State where the EEIG has its headquarters;

Figure 6: Breakdown of EEIGs by Member State, September 1993



Source: European Commission

- allowing a wide measure of freedom for the proposed activity. Cooperation can be developed in all sectors of the economy;
- providing a structure open to many other partners: SMEs' craft workers, tradesmen, public or private enterprises, research bodies and possibly government agencies. Cooperation can therefore be horizontal (associating partners from the same sector of activity to exchange know-how, for example) or vertical (pooling of complementary resources);
- offsetting the possible handicap of small size of the partners in the case of SMEs by cooperation on a group basis.

The findings of a survey of 194 EEIGs conducted in June 1991 by the Commission of the European Communities show that this formula meets SMEs' expectations. Several interesting results came to light:

- the members of EEIGs are predominantly SMEs (mostly medium-sized) but the public sector and large enterprises participate in many groupings;
- the service sectors, and in particular commerce, predominate, followed by the industrial sector (see figure 4);
- the members of each grouping have similar profiles: in most EEIGs they engage in the same type of professional activity;
- in over half of the cases, members of the grouping were collaborating before the EEIG was formed. Their collaboration had usually been informal in the form of an exchange of services or follow-up in professional relations and the partners had decided to make it official;
- the grouping is used predominantly to provide various services for its own members and/or non-members. Commerce stands second among the activities entrusted to EEIGs followed by research and production (see figure 5).

Notifications of formation show that by early September 1993, there were 459 EEIGs distributed among Member States as shown in figure 6. As they are a new instrument, this number indicates that enterprises are definitely interested in the EEIG thus confirming its ability to meet the cooperation needs of SMEs.

The indirect effects of internationalisation on SMEs

Internationalisation concerns not only enterprises which are actively involved but others, including sub-contractors. For all enterprises continuing to operate in the home market, the entry of foreign enterprises increases the range of goods and services on offer, with a consequent increase in competition and lowering of prices, often combined with better quality. This is to the good on the supply side but sales are likely to be adversely affected. In addition, SMEs are a favourite target for enterprises wishing to acquire a subsidiary abroad. Belgian, German and Italian entrepreneurs expect a fresh burst of takeovers with the completion of the Single Market. Some are even looking actively for possible buyers both within and outside the Community where European enterprises are highly prized.

Sub-contractors who make products for inclusion in goods or services sold abroad by their clients are forced to adapt to current standards in the countries of destination. In addition, when a direct investment abroad is accompanied by the shutdown of a domestic enterprise, that is in case of "relocation", sub-contractors have to face stronger competition from their "abandoned" colleagues who survive the departure of their customer. Lastly, the increased competition met by customers is also detrimental to sub-contractors; clients are forced to rationalise their production, become very demanding towards their suppliers and often try to cut down their numbers. Suppliers then have to improve performance, particularly as regards prices, quality and delivery times and sometimes even have to change their strategy, for example by ceasing to be direct sub-contractors and becoming indirect sub-contractors (making only part of the product originally supplied). The secondary effects on sub-contractors affect SMEs in particular, as the majority of sub-contractors are SMEs.

Organisations and bodies available to assist SMEs with internationalisation

The SMEs are not left on their own to face internationalisation. At both Community and national level their are public and private sources of assistance. At Community level, enterprises can apply, in accordance with their requirements, to various services managed by the Commission of the European Communities:

- the Euro Info Centres or EICs, operating within 211 host organisations and well-established at local level in the 12 Member States; they are supplemented by Correspondence Centres located in the countries of Central and Eastern Europe, EFTA members and the countries round the Mediterranean and are linked electronically with each other and with the Commission; they provide SMEs with assistance, information and advice relating to matters within the Community's competence.
- the Business Cooperation Network, or BC-NET, is a computerised network covering a number of third countries in addition to the Community; it brings together 600 company consultants, whose function is to identify quickly and confidentially, SMEs suitable for cooperation on the basis of proposals submitted by enterprises;
- the Bureau de rapprochement des entreprises (BRE), is a service which collects offers of cooperation from SMEs, passes them on to correspondents in 50 countries who publish them, and briefs potential partners.

In addition to these services, there are other Community instruments designed to support the international activity of SMEs. They include:

- Europartenariat which is a programme to promote contacts between enterprises in regions which are underdeveloped or in industrial decline and other regions;
- Euromanagement, which is a programme in three parts; the first is the training of SME executives and heads for the Single Market, the second is concerned with standardisation, certification, quality and safety at workplaces and the third is concerned with "technological research and development" (TRD);
- the special programmes of the 3rd and 4th outline TRD programmes, such as BRITE/EURAM or ESPRIT, which offer opportunities to SMEs wishing to collaborate at European level with large enterprises and research institutes;
- the VALUE and SPRINT programmes, concerned respectively with encouraging innovation and technology transfers and making profitable use of the results of Community research, by helping SMEs with funds to acquire new technologies developed in the Community.

57% of Belgian SMEs wishing to extend their activities to other countries apply to information and consultancy agencies located in Belgium. 34% turn to organisations located abroad. Professional and interprofessional organisations are among those most frequently consulted and their assistance is greatly appreciated. The EICs play an important part in establishing relations with Central and Eastern Europe. Through them and with the support of the Belgian government, contacts have been established with firms in Poland, former Czechoslovakia, Hungary, Rumania, Bulgaria and the former USSR.

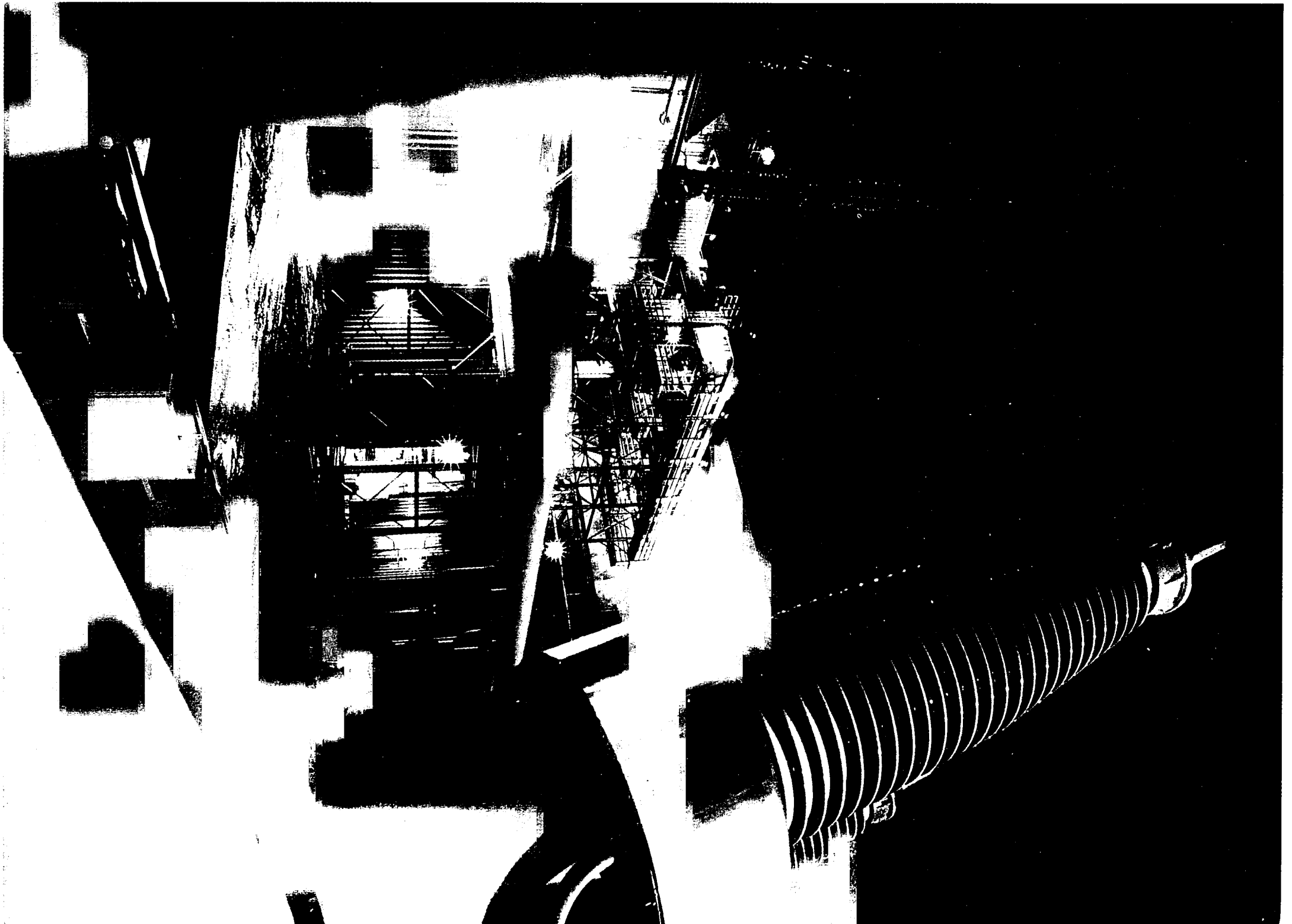
The survey of cooperation mentioned earlier showed that in most Member States very few enterprises make use of public or private initiatives to promote internationalisation and, except in Denmark, are even aware of their existence. The Community instruments, including Europartenariat, BRITE/EURAM, ESPRIT and SPRINT are the most appreciated, and attract the majority of enterprises which generally take the view that such types of action should be extended at both Community and national level.

CONCLUSION

The presence of SMEs on the international economic scene is a reality which is daily gaining ground faster than the reality of the large enterprises. This is happening mainly through exports, most often to neighbouring countries. But SMEs are also active in other areas including direct investment abroad, principally to Community countries. The extension of SMEs' activities to other countries is held back rather by their intrinsic characteristics than by external obstacles. Some of these difficulties can however be overcome through a legally established instrument for cooperation such as the EEIG, thanks to the new opportunities it provides for users. Internationalisation is also affecting SMEs which still operate on the home market particularly in the case of sub-contractors of international companies. Lastly, for sources of assistance, enterprises refer mainly to professional organisations but favour the development of national and Community public initiatives.

Written by: European Commission, DGXXIII

Reviews and Forecasts: Industrial Sectors

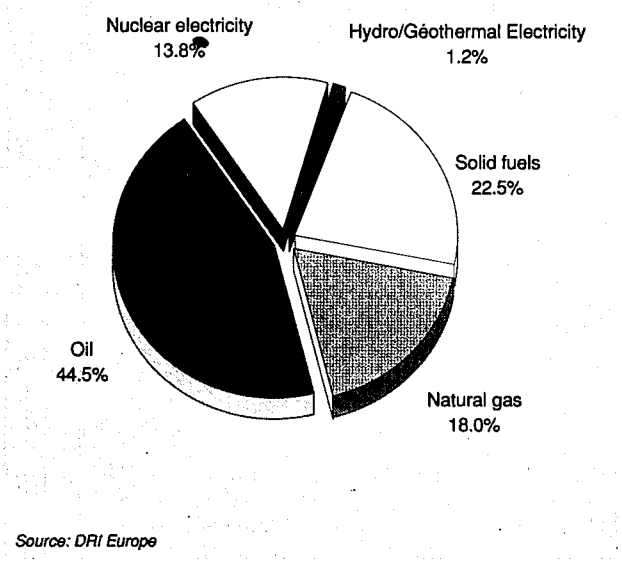


Overview

NACE 11, 12, 13, 14, 15, 16

In 1992, primary energy consumption in the EC was about 1.2 billion tonnes of oil equivalent (toe), which corresponds to 15% of total world energy consumption. On the supply side, the EC contributed about 8% of total world primary energy production. EC primary energy production is dominated by the United Kingdom which accounts for 32% of the total. The EC is a net importer of energy; in 1992 net imports amounted to 612 million toe.
The primary energy mix is still dominated by oil, which accounts for almost 45% of primary energy demand. Natural gas consumption is increasing fast. By the year 2000, gas is expected to account for about 23% of EC primary energy requirements, overtaking coal to become the second largest energy source in the demand mix.

Figure 1: Energy
Fuel shares of primary energy demand, 1992



Source: DRI Europe

INDUSTRY PROFILE

Description of the sector

The energy industry is composed of the following activities: extraction and briqueting of solid fuels (NACE 11); coke ovens (NACE 12); extraction of crude oil and natural gas (NACE 13); refining and distribution of oil products (NACE 14); the nuclear industry (NACE 15); and the production and distribution of electricity, gas, steam and hot water (NACE 16).

In addition, a description of the renewable energy industry is given in this chapter (not defined by NACE). Renewable energy still has a relatively minor role in energy supply, but should grow in importance as their environmental benefits are promoted at EC and national levels.

Throughout the discussions of the various energy industry sectors contained in this and following chapters, we have followed normal industry practice in ensuring comparability between different energy sources by the use of common units of measure, the toe.

It is also important at this stage to define the difference between primary energy consumption and final energy consumption, both of which are referred to in the following chapters. Primary energy consumption refers to the sum of all energies either used by consumers or used as an input to the production of other energy forms. For example, the production of electricity requires the input of such fuels as coal, natural gas and heavy fuel oil. Final energy consumption refers to the sum of all energy used by consumers, and thus excludes transformation and distribution losses.

Energy intensity is defined as the amount of primary energy consumed per unit of gross domestic product (GDP). Energy intensities vary from country to country and over time depending on the economic background, national energy policies and sectoral and industrial structures.

Recent trends

Between 1985 and 1992, primary energy consumption increased by 16.4%: an average annual increase of 2.4%. Over the same period, primary energy production increased by only 5.1%. These two factors resulted in an increase in EC net imports of energy of 34% between 1985 and 1992.

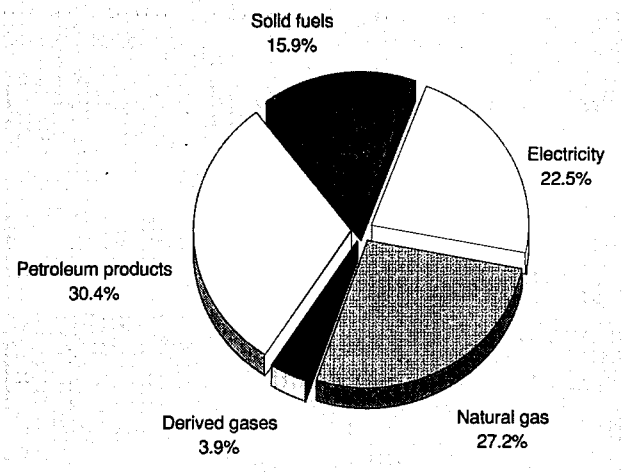
During the period 1973 to 1985, energy intensity decreased by more than 20%. The EC objective was to reduce energy intensity by a further 20% by 1995. In 1992, the energy intensity of the EC was 9% below the 1985 level, less than half way towards the target.

Overall, energy intensity in the EC showed a had a negative development from 1985 to through 1990. Intensities began increasing again in 1991 for most Member States. The largest increase indicated by the 1991 data occured in Germany; however, since it contains data for the former East Germany for the first time, it is not comparible to previous years.

International comparison

The EC is a relatively large consumer of energy. Primary energy consumption in the EC in 1992 was just under 1.2 billion toe (see Table 7): almost 15% of total world primary energy consumption. The USA, the largest energy consumer in the world, accounted for over 24% of total world primary energy consumption. The only region other than the USA that consumed more energy than the EC was the former Soviet Union with nearly 17% of total world consumption.

Figure 2: Energy
Fuels shares of final industrial energy demand, 1992



Source: DRI Europe

Table 1: Energy
Main indicators (1)

(million toe)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Final energy consumption	642	656	676	689	703	707	713	721	791	N/A
Gross inland consumption	965	991	1 029	1 044	1 063	1 077	1 099	1 115	1 212	1 198
Net imports	435	458	457	480	490	511	552	573	617	N/A
Primary production	538	534	589	601	601	591	576	573	628	619
Employment (thousands)	2 015	1 967	1 915	1 870	1 797	N/A	N/A	N/A	N/A	N/A

(1) Employment figures are for energy and water; 1991 and 1992 figures include former East Germany
Source: Eurostat

Table 2: Energy
Primary production by fuel type (1)

(thousand toe)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Hard coal	148 584	107 639	133 627	139 496	133 938	129 460	125 839	118 828	116 044	109910
Lignite (2)	36 089	37 618	35 634	33 854	32 404	32 397	34 303	33 854	70 835	62 455
Crude and semi-refined oil	130 607	141 680	144 765	145 697	144 082	136 319	113 260	113 899	112 234	115145
Petroleum produts	4 737	5 546	5 860	6 239	5 725	4 591	4 213	2 059	1 980	4 264
Natural gas	119 940	119 952	127 117	124 565	129 101	120 203	125 296	129 791	144 333	144536
Other fuels	1 833	1 562	1 664	1 660	2 169	2 622	2 456	2 662	5 698	5 027
Nuclear/geothermal heat	80 934	104 443	125 711	132 888	138 583	148 768	158 883	159 170	162 785	163578
Electrical energy	14 772	15 042	14 581	14 246	15 189	16 532	11 336	12 484	13 781	14 004

(1) 1991 and 1992 figures include former East Germany
(2) Peat for Ireland
Source: Eurostat

Table 3: Energy
Evolution of the energy intensity (1)

(1985=100)	1985	1986	1987	1988	1989	1990	1991
EC	100	99	98	96	94	93	100
Belgique/België	100	102	101	98	95	93	96
Danmark	100	97	99	93	87	85	92
BR Deutschland	100	97	96	94	90	89	107
Hellas	100	97	103	106	113	112	111
España	100	98	96	99	98	97	100
France	100	100	100	96	97	95	98
Ireland	100	103	103	100	94	91	92
Italia	100	99	107	99	100	99	99
Luxembourg	100	95	90	89	91	92	95
Nederland	100	102	104	100	97	94	96
Portugal	100	104	103	108	119	117	118
United Kingdom	100	98	94	90	89	89	93

(1) Energy intensity is equal to gross inland energy consumption divided by GDP
Source: Eurostat and Yearly statistics (Energy indicators)

Table 4: Energy
External trade

(mio toe)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Imports	819	724	766	765	777	806	843	892	906
Exports	227	267	287	274	266	254	270	275	282
Net exports	-592	-457	-479	-491	-511	-551	-573	-617	-624

Source: DRI Europe

Table 5: Energy
Final energy consumption by sector

(million toe)	1983	(%)	1986	(%)	1988	(%)	1989	(%)	1990	(%)	1991	(%)
Industry	205.1	32.0	208.6	30.3	218.9	30.9	222.4	31.3	220.4	30.6	230.6	29.1
Transport	173.1	27.0	191.5	27.8	211.5	29.9	221.1	31.1	229.8	31.9	241.6	30.5
Commerce, admin., residential	263.0	41.0	288.0	41.9	276.9	39.1	267.1	37.6	271.1	37.6	319.6	40.4
Total	641.2	100.0	688.1	100.0	707.3	100.0	710.6	100.0	721.3	100.0	791.8	100.0

Source: Eurostat

In demographic terms, the EC consumes roughly 3.5 toe per capita. This corresponds to that of Japan, where energy consumption was a little over 5% of world consumption. The USA has the highest ratio at 7.9 toe per capita per year, the former USSR consumed around 4.7 toe per capita per year.

The proportion of total primary energy requirements accounted for by oil in the EC was 43.9% in 1992. In Japan, 56.2% of primary energy consumption was derived from oil. The proportion of oil consumed in the USA was slightly less than the EC at 39.5%.

Natural gas, currently undergoing rapid expansion in the EC, still occupies a relatively low proportion of EC primary energy consumption in an international perspective. In the EC, natural gas accounted for 19.3%, compared to 24.9% in the USA. The USSR, home to the largest proven gas reserves in the world, consumed a massive 42.2% of total primary energy consumption as natural gas. In Japan, natural gas took a 10.3% share in primary energy consumption.

In the EC, 1992 coal consumption had a 21.5% share of primary energy consumption. The former USSR consumed a similar percentage. The USA, however, had a coal share in primary energy consumption of 24.2%, reflecting the greater emphasis of coal in the power generating sector. Japan was less coal intensive, with coal accounting for 17.2% of total energy consumption. China, on the other hand, as one of the world's major producers, is extremely dependent on coal which contributes a huge 76.7% to primary energy consumption, though inefficiency in combustion processes is a major factor contributing to this high percentage.

Hydroelectric power in the EC took a relatively low share in the fuel mix. At 3.4% of total primary energy consumption, hydroelectric power had a lower share than the USA (3.6%), the former Soviet Union (4.2%) and Japan (4.8%). There is limited scope for expansion of hydroelectric power in Europe as the most attractive sites have already been developed and environmental concerns are likely to inhibit further large-scale projects.

The EC contributed 7.8% to total world primary energy production. The country contributing the largest share of production was the former USSR with 22.2%. The USA followed close behind with 19.4%. EC primary energy production was dominated by the United Kingdom which accounted for around 32% of the total.

In global terms, the EC is not a significant energy producer and has been in decline since 1987. It is, however, a significant consumer. This resulted in the EC being 48% dependent on imports for its energy supplies. Oil production, 80% of which came from the United Kingdom, was modest in an international context. EC oil production was 27% of that of the USA and only 4% of total world oil production.

The EC was a rather more significant producer of natural gas with over 7% of total world natural gas production (74% of which came from the Netherlands and the United Kingdom). The former Soviet Union was the world's largest producer of natural gas; Soviet natural gas production in 1989 came to over 5 times that of the EC.

Coal production in the EC (45% of which came from former West Germany and the United Kingdom in 1989) was around 170 million toe in 1992, less than a third of the output of the world's largest coal producer, the USA (closely followed by China).

Primary electricity production in the EC accounted for 17% of the world total. The USA accounted for over 20% of world primary electricity production. This was 4.9% of total US energy production. Japan on the other hand, with very small indigenous reserves of fossil fuels, had 73.5% of its total energy production as primary electricity.

Table 6: Energy
Evolution of final industrial energy consumption by fuel type

(thousand toe)	1983	1984	1985	1986	1987	1988	1989	1990	1991
Hard coal and patent fuel	13 961	14 852	18 727	16 668	18 703	18 480	18 137	18 897	18 398
Coke	24 238	26 443	27 125	24 166	22 194	22 792	22 751	21 690	20 545
Lignite and derived products (1)	2 028	2 156	2 236	1 903	1 898	1 936	2 303	2 199	5 204
Residual fuel oil	38 747	34 500	29 031	29 095	25 833	25 949	24 257	22 986	24 038
Other petroleum products	20 764	21 174	21 350	22 916	24 753	23 750	22 644	21 375	21 430
Natural gas	46 450	50 129	51 090	50 340	56 602	57 662	61 296	63 210	68 323
Derived gases	10 689	11 364	11 974	10 809	11 099	10 664	11 112	9 342	9 054
Derived heat	2 005	2 075	2 288	2 286	2 792	2 336	2 641	2 648	2 380
Electrical energy	46 248	48 375	49 542	50 452	52 924	55 417	57 313	58 085	61 208

(1) Peat for Ireland
Source: Eurostat

Table 7: Energy
Gross Inland consumption by type of primary energy (1)

(thousand toe)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Hard coal (2)	192 388	180 636	200 662	195 754	198 086	192 997	195 560	199 062	204 240	194066
Lignite (2) (3)	37 989	39 050	38 345	35 773	33 179	33 717	35 445	34 742	71 742	63 700
Crude oil (2)	466 956	472 006	462 591	474 024	476 686	488 072	491 758	497 626	525 160	525591
Natural gas (2)	167 537	176 674	184 742	186 934	198 053	192 580	201 453	207 589	231 504	231444
Other fuels	1 834	1 660	1 765	1 668	2 168	2 981	2 456	3 025	3 348	3 240
Nuclear/geothermal heat	80 703	10 422	125 346	134 036	138 123	148 768	158 883	159 170	162 785	163578
Electrical energy	16 744	16 573	15 754	15 385	16 538	18 297	13 035	13 902	14 419	14 989

(1) 1991 and 1992 figures include former East Germany
(2) including the balance of foreign trade and stock changes of derived products
(3) Peat for Ireland
Source: Eurostat

Foreign trade

The European Community showed a deficit in the energy trade balance. Net imports were estimated at 617 million toe in 1991, or 51% of gross internal primary energy consumption.

EC energy imports have increased since 1988, this was due to a slight increase in energy prices and a renewed start up of economic activity. The Gulf War increased crude oil imports for EC refineries that were working close to capacity. This in turn led to an increase in exports of refined oil products which explained the upturn in exports which took place in 1990.

In 1991, around 38% of extra-EC crude oil imports came from the Near or Middle East. Overall, since the end of 1987, extra-EC crude oil imports from OPEC countries have been increasing by 3% per year. The percentage of extra-EC imports coming from the former USSR and eastern Europe fell by 4.2% between 1989 and 1991.

MARKET FORCES

Demand

Energy demand by sector

Conservation and structural changes in the 1970s had a great impact on the industrial sector, particularly in energy intensive industries. Industrial energy consumption (including non-energy use) declined 21% between 1973 and 1985. By 1986 in the residential and commercial sector, energy consumption had increased almost 10% on 1973 levels despite improvements in the efficiency in end use equipment and in the use of insulation. Since then energy consumption has declined in the residential and commercial sector and in 1989 consumption was down to almost 1983 levels. In 1990, consumption increased slightly, though it remained at roughly the same share of final energy consumption. Energy use in the transport sector increased 24% between 1980 and 1988, an average annual increase of 2.7% despite improvements in vehicle fuel efficiency. Since then, energy consumption in the transport sector has increased at a rate 1.5% per year above this, reflecting large increases in the vehicle population.

As a result of these trends, the share of industry in EC final energy consumption declined from 32% in 1980 to 20% in 1988. Since then the share has remained fairly stable, and in 1992 was at 19%. The transport sector share in final energy consumption has overtaken industry, accounting for about 28% in 1991. The residential and commercial sector remains the largest energy user, accounting for 36% in 1991.

Energy demand by fuel type

Oil is still the dominant energy source in the EC, mainly because of continued strong growth in the transport sector where substitute fuels have yet to make a major impact. The share of oil in gross inland energy consumption has declined only slightly since 1985, standing at about 44% in 1992. The main shift away from oil took place in the early 1980s fol-

Table 8: Energy
The 15 largest European companies, 1992

(million ECU)	Country	Turnover	Net profit	Employees
Royal Dutch Shell	NL/UK	74 765	4 163	127 000
British Petroleum	UK	45 178	-622	105 750
Veba	D	32 545	487	129 802
ENI	I	31 096	-591	124 032
Electricité de France	F	30 424	269	119 300
Elf Aquitaine	F	29 302	902	87 900
RWE	D	21 454	540	105 572
Total	F	19 958	416	51 139
Repsol	E	14 044	545	19 632
British Gas	UK	13 932	643	84 023
Lyonnaise des Eaux-Dumez	F	13 201	55	127 552
Ruhrkohle	D	12 104	25	118 337
Statoil	N	9 893	308	14 338
Neste	SF	9 848	-408	13 685
Petrofina	B	9 039	111	15 490

Source: DABLE

Table 9: Energy
Expected annual gross inland consumption growth rates (1)

(%)	1990-1995	1995-2000	2000-2005
Solid fuels	-1.1	0.2	0.0
Oil (2)	1.4	1.0	0.2
Natural gas	3.8	3.9	2.5
Nuclear fuels	1.0	0.7	0.2
Hydropower	5.4	0.6	0.3
Heat (3)	9.8	9.8	2.1
Renewables (4)	1.8	16.1	14.2
Total	1.3	1.5	0.8

(1) Including former East Germany
(2) Crude oil and finished oil products
(3) Geothermal energy
(4) Mainly biomass
Source: DG XVII; 2000-2005 data are DRI Europe estimates

lowing the oil price shocks of the mid and late 1970s. The share of oil in primary energy consumption declined almost 9% between 1980 and 1985. The share of oil in the industrial energy demand mix has been declining more rapidly than that of the residential and commercial sector. In 1992, oil shares in final energy consumption for these sectors were 30% and 32%, respectively, while the transport sector was still nearly completely dependent on oil.

The contribution of natural gas to gross inland consumption has been steadily increasing. Over the last decade it increased its share of primary energy demand by 2%, rising to over 19% by 1992. The share of electricity has increased greatly over the decade from just over 6% in 1980 to almost 15% in 1992. The growing role of electricity in meeting end-use energy requirements was largely met by an increasing penetration of nuclear power in the early 1980s, which tailed off in the latter half of the decade as nuclear construction programmes were halted following increasing public concern over the perceived risk of accidents and nuclear waste disposal problems. Nuclear energy and hydropower accounted for around 44% of electricity generation in 1992.

In the EC industrial sector, fuel consumption in the 1980s saw a marked increase in the share of natural gas accompanied by the decline in the use of refined oil products. Residual fuel oil consumption has declined by almost a third over the last decade. In 1980, the share of petroleum products and natural gas in industrial final energy consumption were 37% and 21%, respectively. By 1985, the shares had evened up to roughly 24% each. In 1991, natural gas had gained the larger share with 30% of industrial final energy consumption, leaving oil products with just over 19%. Consumption of solid fuels has increased only slightly over the decade with a share of 19% in 1991. Electricity consumption has seen a high rate of growth: an average annual rate of increase over the decade of 1.8% (0.5% per year below the average annual growth of GDP).

Energy demand by region

There were regional differences in the consumption of fuel types. The region that was over 50% dependant on oil in 1992 was the southern EC region including the Members States of Greece, Spain, Italy and Portugal. The area least dependent on oil was the north-western region including the United Kingdom, the Netherlands, France, Germany and Belgium. These regional disparities in oil dependence are due to a number of factors such as: reliance on oil fired electricity generation, the size and age of the vehicle population, the penetration of oil used for space heating and process requirements and their associated efficiencies. Industry has tended to switch away from heavy fuel oil for its heating requirements over the past decade, so that this factor is becoming less significant.

Regional differences in the consumption of solid fuels can almost exclusively be explained by the share of solid fuels in the power generation sector. As a result of this, Denmark, Greece, Ireland, Germany (including the new Bundesländer) and the United Kingdom all have a significantly higher share of solid fuels in the fuel mix than the EC average. France, noticeably, has a very low coal dependence due to the small share of coal fired electricity generation in its nuclear dominated power sector. Italy, though it has no nuclear generation, relies more on natural gas and oil for power generation than solid fuels.

Supply and competition

EC primary energy production increased at a lower rate than consumption, resulting in greater net imports. Production increased by just over 5% between 1985 and 1992 to reach a total of 619 million toe.

The EC coal industry, facing foreign competition with far lower costs, tough environmental legislation increasing its own costs and moves by EC and national governments to reduce subsidies, has been in steady decline in recent years. Between 1985 and 1992, hard coal production declined by 17.7%. Solid fuel production as a whole increased slightly, due to the inclusion of the new Bundesländer in the statistics, pushing up lignite production which had declined by over 4% to 1990, but which in 1992 was 75% above its 1985 level across the whole of the EC.

Oil production, principally from the United Kingdom North Sea oil fields, declined by 20.5% between 1985 and 1992. This meant that the share of oil in total primary energy production declined from 26% in 1985 to 18.6% in 1992. Natural gas production, principally from the United Kingdom and the Netherlands, increased by 13.7% over the same period. This has resulted in a slight increase (to over 23% in 1992) in natural gas' share in primary energy production.

Primary electricity production, mainly due to nuclear power stations coming on-line towards the beginning of the period, increased its share in primary production from 24% in 1985 to almost 29% in 1992.

INDUSTRY STRUCTURE

Companies

The EC energy industry is still dominated by a small number of very large companies that are both state and privately owned. Some Member States have made significant moves towards

privatisation, deregulation and liberalisation of their energy markets allowing new opportunities for investment by non-traditional companies. For example, the independent power generation sector is a major growth area in which oil, gas and industrial companies are planning an important presence.

REGIONAL DISTRIBUTION

In the EC as a whole, energy intensity has declined by almost 9% over the 1985-1992 period. Examination of the regional contributions to this reduction in energy intensity reveals marked differences between Member States. Leading the way in energy intensity reductions were former West Germany, Denmark and the United Kingdom. In the Mediterranean countries, where there are less opportunities for efficiency gains in space heating (such as through improved insulation), energy efficiency gains have been less marked and intensities have, in some cases (Greece and Portugal), increased. What is apparent in all countries where improvements in energy intensity have been made is the recent slowdown in the rate of energy intensity decline that resulted from the easiest improvements being completed and lower energy prices that reduced the incentive to invest in more energy efficient technology.

ENVIRONMENT

The issue of global warming has been in the forefront in the public debate and in the environmental activities of the EC. As a first step in the preparation for the Rio de Janeiro conference on global warming the joint Energy and Environment Council decided in October 1990 to stabilise the Community's CO_2 emissions in the year 2000 at the 1990 level. No specific measures for achieving this target were adopted by the Council.

Following this, the Commission outlined in October 1991 an EC strategy to limit CO_2 emissions and to improve energy efficiency. The Commission believes that a CO_2 policy is needed and that such a policy would work out more efficiently if adopted on the EC level than adopted on the national level. A coordinated carbon tax policy will be critical avoid distortions in the internal market for energy as well as for trade within the EC. The Commission outlined three sets of measures to control CO_2 emissions: specific measures, including R&D programmes, sector measures and other types of regulatory and voluntary measures; fiscal measures; and complementary national programmes.

The fiscal measure suggested by the Commission is a tax on energy use corresponding to USD 10 per barrel. The carbon tax element of the total tax should not exceed 50%. The Commission was invited by the Council to present a formal tax proposal. In this proposal (submitted to the Council in May 1992), the Commission foresees that the new energy and carbon taxes will be national taxes levied on top of already existing energy taxes. The new tax policy should only be implemented if other members of the OECD adopt similar taxes or other measures having similar effects, following the principle of "conditionality". The proposal from the Commission foresees that energy intensive industries may obtain tax refunds if they are confronted with serious difficulties because of competition from non-OECD countries not having imposed carbon taxes or equivalent measures. These measures have still not been adopted by mid-1992, nor have any of the EC's major trading partners adopted reciprocal measures. It is, therefore, unlikely that such taxation will be adopted on an EC level before the mid-1990s, although some individual states, such as Denmark and the Netherlands have already imposed taxation based on the carbon content of energy sources.

REGULATIONS

In order to promote an integrated internal energy market, the Commission is pursuing two lines of action. On the one hand, the Commission is enforcing the existing EC legislation and treaty obligations, the free trade provisions of the EEC treaty in particular as well as competition and state aid provisions.

On the other hand, a strategy involving regulatory changes and new EC legislation started being seriously envisaged in the June 1987 Council. At that time, energy ministers asked the Commission to identify the remaining obstacles to the functioning of the internal market for energy and to make proposals for their progressive elimination before the end of 1992. The subsequent Commission report (COM(88)238) was followed by a first set of proposals which have been adopted by the Council and constitute what is referred to as Phase 1 of the creation of an internal market for energy. The measures concern only gas and electricity and are the June 1990 directive on price transparency for gas and electricity, the October 1990 directive on transit of electricity, and the May 1991 directive on natural gas transit.

The directive on price transparency provides for collection of information on electricity and natural gas prices for final consumers across the Member States. It is, first of all, a statistical instrument which allows comparisons of price levels. The two transit directives give access to the electricity and natural gas transmission grids for transport across a Member State on certain conditions.

Early in 1992, the Commission made another series of proposals for Phase 2 of the energy internal market. These proposals have not yet been adopted by the Council. They include three sets of measures: the liberalisation of electricity generation and the freedom to construct transmission lines for both gas and electricity; the unbundling of production, transmission and distribution activities for vertically integrated gas and electricity companies (unbundling is an accounting concept and does not require changes in the ownership structure); and the introduction of limited third party access to the gas and electricity networks. Eligible customers will be industrial companies whose annual electricity or natural gas consumption exceeds a specified threshold (100 gigawatt hours for electricity and 25 million m^3 for gas). Distribution companies with a market share above a threshold (3% in the case of electricity and 1% in the case of gas) will also have third party access to transmission grids.

The introduction of these Phase 2 proposals has been considerably delayed from the original timetable because of the debate arising from the potentially radical consequences for the structure of Europe's energy supply industries.

The historical improvement of energy efficiency in industry is characterised by several phases that are listed below.

First, there have been changes in the structure, technology and management of energy saving measures. Implementation took place with the advent of higher energy costs in the 1970s. These measures did not require large capital investments and can be termed a stage of rationalisation.

Second, investments were instigated by improvements in energy performance through design changes. These were made by the energy intensive industries, mainly because market prospects in the 1980s, which were mediocre at the turn of the decade, did not encourage them to make investments in capacity increases. Industry consolidated and centred on inward investment with a view towards reducing costs.

Third, investments were made in wide ranging projects that took into account energy efficiency, capacity increases, product quality improvements and the reduction of other operating costs.

Since the first of the oil crises in 1973, energy efficiency has been one of the principal elements of the EC's energy policy. The EC's commitment to energy efficiency has been evident in the many measures adopted by energy ministers since 1974 aimed at improving the rational use of energy. Most notable examples are the Joule Thermie and SAVE (Specific Actions on Vigorous Energy Efficiency) programmes. The effects of these policies, indicated by a tailing off of the decline in energy intensity, have been waning partly as a result of lower crude oil prices. The SAVE programme was designed to give new impetus to progress in energy efficiency.

SAVE consists of three elements. First, legal and administrative measures are aimed at creating a more positive environment for energy saving. The legal aspects take the form of a single directive encompassing those measures without bearing on the internal energy market. A large measure of freedom is left for Member States to implement the directive with developments being monitored by the EC, as under the principles of subsidiarity. Second, a support programme is available to assist in expanding or creating an energy saving infrastructure so as to best utilise Member States' reserves of technical expertise.

Third, a network designed to disseminate information and coordinate activities on a community level concerning energy efficiency activities is also available.

The Thermie programme, designed to promote new and innovative energy technology, was approved by the Council of Ministers in 1990 and will run for 5 years with an estimated total budget of 700 million ECU. Thermie operates in four areas: the rational use of energy in industry, buildings, transport and the energy industry; renewable energy sources (solar, biomass, waste and wind); solid fuels (combustion and waste); and hydrocarbons (safety and environmental protection, exploration and production).

OUTLOOK

In the EC as a whole, gross inland consumption should grow at a rate increasingly below that of GDP as a result of energy efficiency improvements. Total gross inland primary energy consumption is expected to increase by 19% between 1990 and 2005 on this basis. Energy intensity will decrease by just over 20% on 1985 levels by 2005 on these predictions, though increased efforts in conservation on a Member State level and the success of the SAVE programme may speed up this decline.

The future primary energy mix will be characterised by the continued dominance of oil, with its share remaining at over 40% in 2005. This will predominantly be a result of increasing fuel demand from the transport sector. Moderate oil prices in the short term will reduce the incentive for fuel switching away from oil. Demand for oil will be particularly strong in the lower income Member States as stronger economic growth feeds through into energy demand.

Natural gas consumption will increase at the fastest rate of all fuels, at over 1.5% above the annual rate of growth of GDP in the short term to 1% above in the start of the next century. This will result in natural gas occupying the second largest share in the fuel mix, replacing coal in the second half of the 1990s. In 2005, natural gas will have a share of over 22%, 6% more than in 1990. This rapid increase reflects the growing attractiveness of this fuel in terms of environmental and economic considerations. Nuclear power units will be coming on-line in France and the United Kingdom, leading to an expected increase in nuclear electricity production, although all other EC States have frozen their nuclear programme. Renewable energies are expected to triple their share though their contribution in absolute terms will remain modest.

In light of increasing demand and the inevitable natural decline in the resource base, prospects for EC energy production are less favourable. Production costs are relatively expensive compared to other regions of the world, especially for hard coal. As a result, hard coal production levels will decline appreciably to a level which will be primarily determined by the availability of state aid and other policy measures. Oil and gas production from many existing fields may be depleted in 10 to 15 years time, but production from new fields should make some contribution to offset these losses. Consumption will still outpace production, however, and imports will increase as a result. Import dependency in 2005 is likely to increase by around 15% compared to 1990 levels.

In the industrial sector, final energy consumption is forecast to increase at an average annual growth rate of 0.8%. This is 0.4% per year below the annual growth rate of total final energy consumption in the EC. As a result of this, by 2005, the industrial share of total final energy consumption is expected to reduce by 2%.

In the long term, growth in industrial energy demand is forecast to be virtually stagnant. This will result from structural changes within the sector (the industrial base is shifting away from the energy intensive industries towards less intensive industries such as electronics), as well as from further efficiency gains. Energy efficiency measures will occur through both price stimulated behavioural changes and through policy measures taken at a national and EC level.

Written by: DRI Europe

Solid fuels
NACE 11

Solid fuels accounted for 21.5% of gross EC inland energy consumption and 28.2% of EC primary energy production in 1992. Back in 1980, the share held by solid fuels of primary energy production was about 40%. The decline since then has been wholly attributable to hard coal, while the contribution of lignite has been stable until 1991, when the addition of former Eastern Germany caused lignite output to increase by more than 90%. In terms of contribution to total EC thermal electricity, lignite produced in 1991 about 35% of that produced by hard coal.

INDUSTRY PROFILE

Description of the sector

NACE 11 covers not only hard coal (NACE 111) but also brown coal or lignite (NACE 112). Solid fuels or "coals" are usually classified according to their rank in terms of their degree of maturity. This ranges from peat, the lowest rank, to lignite, bituminous coal and finally hard coal, the highest rank. Although reference will be made to the total contribution of solid fuels to the EC energy balance, the emphasis in the following pages will be on hard coal.

Recent trends

In 1992, indigenous production of hard coal satisfied 57.8% of EC hard coal consumption, well down from 80.5% a decade earlier. Total EC output amounted to 183.4 million tonnes in 1992, 28.6% lower than the 256.8 million tonnes produced in 1982. The three largest coal-producing countries, the United Kingdom, Germany and Spain, together accounted for 94.6% of total output. From 1983 to 1992, hard coal production in the EC declined by 25.1%; over the same period, total imports increased by some 70%. Costs of domestic production have diverged from the international price of coal which has fallen in real terms in recent years. The strategy of coal producing Member States has been to reduce capacity.

International comparison

EC hard coal output has fallen faster than EC hard coal consumption, creating an ever growing need for extra-EC imports. The EC ranks with Japan as one of the two foremost importers of hard coal. The drastic reduction in European production since the 1960s was due to competition from imported coal and, to a lesser extent, to competitive pressure from cheap hydrocarbons since 1986. Indeed, because of unfavourable geological conditions, which among other effects means that European coal is mostly produced from deep underground mines rather then open-cast mines, European coal is expensive to produce and, over the years, its competitive position has grown ever weaker. Less than 10% of European coal is extracted from surface mines, compared to 50% in Australia, 60% in the USA and 85% in Canada. German production costs are particularly high with hard coal deposits at an average depth of 900m.

High production costs affect the competitive position of European coal against imports from abroad. This was exacerbated by the depreciation of the USD compared to EC currencies in the late 1980s which rendered imported coal even cheaper in EC currencies.

The financial losses due to growing competition from imported coal and other sources of energy have forced the European coal industry to rationalise, closing the most uneconomic mines, reducing the work force and increasing productivity. The number of underground mines in the EC fell from 504 in 1982 to 226 in 1992.

Foreign trade

Indigenous coal production accounted for 58% of gross coal consumption in 1992, with the remainder being covered by imports and stocks. Complete freedom in the movement of coal between Member States is ensured by the European Coal and Steel Community (ECSC) Treaty. However, between 1980 and 1992, intra-EC trade fell from 17.2 to 4.4 million tonnes, mainly due to the deterioration in the price competitiveness of EC coal versus coal originating from third countries. Extra-EC trade has increased from 79.5 million tonnes in 1980 to 136.6 million tonnes in 1992.

The USA supplies the greatest volume of foreign imports to the EC, providing 46.9 million tonnes, 34.4% of total extra-EC imports in 1992. Imports from South Africa and Australia accounted for 20.8% and 15.6% respectively. The remaining 29.3% was made up by largely of imports from Colombia, Poland, the former USSR, Canada and China.

MARKET FORCES

Demand

By far the greatest consumer of solid fuels is thermal power generation which, in 1992, accounted for 66% (hard coal) and for 77% (lignite) of consumption, respectively. The volume of lignite used for power generation in the EC increased by 45% between 1990 and 1991 due to the inclusion of the new German Länder. The second largest market for solid fuels is for the production of coke (90% of which is used by the steel industry) in coking plants. The third largest market is the industrial sector.

New and more efficient methods of coal combustion, notably fluidised bed combustion and integrated combined cycle generation (ICCG), are finding a market in the power generation sector. During the period 1985-1992, hard coal consumption by power stations increased in the EC by about 11%, whereas coking plants reduced their hard coal consumption by about 23% during the same period. In addition to declining steel production, development of electric arc furnace (EAF) based steelworks and technological improvements contributed to the reduction in coke consumption and, therefore, in coal consumption in coke manufacturing. EAF based steelworks took a significant share of the European market of low-grade long products, recycling significant quantities of scrap. Estimates by the ECSC suggest that a third of the European gross steel production will come from EAF based steelworks in 1992. This production method does not require coke. Technological improvements aimed at reducing production costs resulted in particular in a reduction in specific coke consumption per tonne of pig iron production in blast furnaces. The major technical change has been the wider use of pulverised coal injection (PCI) in blast furnaces, thereby reducing specific coke consumption: as a result of the PCI technology, there has been a partial substitution of coke by coal in the production of steel. The full potential for use of PCI in Europe has not yet been realised and there is, therefore, scope for further reduction in coke consumption.

The use of hard coal in the industrial sector (which excludes power stations and coking plants) has increased steadily from 16.9 million tonnes in 1980 to 24.7 million tonnes in 1992. The industrial sector includes many small and medium-sized consumers from various industries with varying energy requirements such as cement, chemicals, food, and engineering (for example motive power, high-temperature heat and low-temperature heat). Following the second oil crisis, which demonstrated the need of the EC to reduce its dependence on imported oil and gas as well as to diversify energy sources, there was an upturn in industrial coal consumption. To some

Table 1: Solid fuels
Main indicators - Hard coal

(million tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991 (1)	1992 (1)
Gross inland consumption	316.1	285.6	322.1	319.7	323.9	311.7	315.4	320.1	328.8	314.4
Net exports	-64.3	-85.8	-96.5	-92.5	-91.3	-93.4	-101.1	-114.7	-131.5	-134.7
Production	244.9	172.9	217.4	227.9	221.7	214.6	208.7	197.2	193.4	183.4
Employment (thousands)	537.9	504.3	464.4	420.8	378.4	367.0	297.1	270.1	245.8	215.4
of which underground	356.4	331.4	311.4	285.0	255.3	230.0	209.1	171.8	156.5	135.5

(1) Including former East Germany
Source: Eurostat; 1992 data from CEPCEO

Table 2: Solid fuels
Main indicators - Lignite

(million tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)	1992(1)
Gross inland consumption	191.9	196.0	194.4	186.6	179.6	183.1	190.9	187.9	359.4	322.0
Net exports	-3.0	-3.3	-2.7	-2.9	-2.5	-2.1	-2.3	-2.2	-3.3	-3.7
Production	188.5	196.6	186.9	183.1	179.8	179.8	188.7	185.7	353.4	316.3

(1) Including former East Germany
1992 data are DRI Europe estimates
Source: Eurostat; CEPCEO

Table 3: Solid fuels
Share of solid fuels in gross inland energy consumption

(%)	1980	1985	1986	1987	1988	1989	1990	1991	1992
EC (1)	23.1	23.2	22.2	21.8	21.1	21.0	21.0	22.8	21.5
Belgique/België	24.0	22.7	19.7	19.0	19.0	20.6	21.6	20.1	18.3
Danmark	30.6	39.6	38.5	39.2	38.5	33.2	35.7	42.9	38.5
BR Deutschland (1)	29.7	31.0	29.5	28.1	27.6	28.1	27.6	34.2	31.4
Hellas	20.9	34.8	36.8	37.4	38.2	37.5	38.0	36.0	37.4
España	21.5	28.0	25.8	24.0	19.7	22.5	22.2	22.6	23.1
France	16.9	12.6	10.3	9.4	9.1	9.6	9.4	9.4	9.1
Ireland	20.7	29.5	30.8	38.1	39.1	38.1	35.1	35.6	33.7
Italia	8.6	11.4	10.6	10.5	9.7	9.2	9.7	8.8	7.8
Luxembourg	50.7	45.5	42.1	34.5	34.8	34.0	31.8	29.7	27.0
Nederland	6.3	10.8	10.2	10.5	12.7	12.5	13.7	12.1	11.5
Portugal	4.6	6.4	10.0	14.4	15.5	16.3	17.1	16.8	18.2
United Kingdom	35.0	30.8	31.8	33.0	31.7	30.7	30.3	29.5	28.5

(1) Including former East Germany from 1991 onwards
Source: Eurostat; 1992 data from CEPCEO

Table 4: Solid fuels
Hard coal - Production, trade and consumption by sector

(million tonnes)	1980	1988	1989	1990	1991	1992
Production	260.3	214.7	208.7	197.2	193.7	183.4
Imports	97.7	104.6	111.5	126.0	140.7	140.8
Exports	16.9	11.2	10.4	11.3	9.2	5.7
Gross domestic consumption	330.9	311.7	315.4	320.1	328.8	314.4
Transformation, of which	293.3	270.5	273.5	280.6	286.1	273.7
Electric power stations	194.2	196.1	200.4	210.2	218.4	208.7
Coking plants	93.8	71.7	71.1	68.4	65.5	62.6
Final consumption, of which	36.0	41.7	40.9	39.4	41.1	37.6
Industrial	16.9	27.5	28.5	28.5	27.7	24.7
Domestic, Administration, Services, etc.	18.9	14.0	12.4	10.8	13.4	12.9

(1) Including former East Germany
Source: Eurostat; CEPCEO

Table 5: Solid fuels
Hard coal - Production by country

(million tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC (1)	244.9	172.9	217.4	227.9	221.7	214.6	208.7	197.2	193.4	183.4
Belgique/België	6.1	6.3	6.2	5.6	4.3	2.5	1.9	1.0	0.6	0.2
BR Deutschland (1)	89.6	84.9	88.8	87.1	82.4	79.3	77.5	76.6	72.7	72.2
España	15.4	15.3	16.1	15.9	19.3	19.0	19.2	19.4	18.3	18.5
France	17.0	16.6	15.1	14.4	13.7	12.1	11.5	10.5	10.1	9.5
United Kingdom	116.4	49.5	90.8	104.6	101.6	101.4	98.3	89.3	91.3	82.8

(1) Including former East Germany from 1991 onwards
Source: Eurostat, 1992 data from CEPCEO

extent, this upturn was prompted by government incentives that were offered to companies to encourage them to switch from oil and gas to coal and also by programmes offered by European coal producers to encourage conversion to coal.

Nonetheless, growth in coal use by the industrial sector was relatively slow and limited to a few countries. An exception was the cement industry, where coal maintains a clear-cut price advantage over other energy sources even without government incentives. Given that coal installations carry a higher capital cost than oil or gas installations, industry will switch from oil and gas to coal only if it expects that the differential of the fuel prices will become sufficiently large. This criterion is reflected in the observation that since the oil price collapse of 1986, conversion from oil and gas to coal has virtually disappeared.

The remaining sector in which significant quantities of hard coal are consumed is the domestic and commercial sector which includes households, services and administrative bodies. Solid fuel consumed in this sector is used almost exclusively for space heating, and its consumption is decreasing. Throughout the EC, environmental concern is expected to leave solid fuels losing ground to natural gas.

As for lignite, because of its low calorific value, transport over long distances is uneconomic. Thus, most lignite is mined and consumed on-site or nearby in power stations or briqueting plants. In 1992, 77% of total lignite was burnt in power stations, while the remainder was used to manufacture briquettes and for the preparation of pulverised lignite for use in the industrial market.

Supply and competition

Coal is the most abundant fossil fuel in the world and within the EC. European proven hard coal reserves are estimated to have stood at 29 billion tonnes at the end of 1992. At current rates of production, this means that hard coal reserves would last about 160 years. France, Germany and the United Kingdom are estimated to account for 93% of Europe's hard coal reserves, some 82% of which lies in Germany.

European reserves of sub-bituminous coal and lignite are believed to have stood at about 68 billion tonnes. Some 83% of these reserves were in Germany. Europe has 13% of world reserves of sub-bituminous coal and lignite. Most lignite mined in the EC is extracted by surface or "open cast" methods, which allow higher productivity than underground mining and yield a fuel that is competitive with other fuels used for electricity generation.

Although the EC is reasonably well-endowed with coal, the majority of remaining reserves are deep deposits that require working at very great depths, sometimes in excess of 1 000 metres with heavy-duty, sophisticated equipment, both for technical and safety reasons. This has led to high production costs and has undermined the financial situation of the coal production industry.

Production process

During the 1980s, mine closures and general restructuring saw the number of workers employed in the extraction of hard coal reduced by more than half. British Coal accounted for most of the decrease. However, the same trend exists in the other producing countries: Belgium coal mining ceased at the end of 1992.

Generally, the marginally least productive mine is the mine that is closed. This has lead to a significant increase in productivity in the EC coal mining industry. During the 1985-1992 period, productivity increased substantially, posting a 58% increase in output per man-hour underground in the EC. Capital expenditure over the past decade has concentrated on developing and implementing the use of new coal mining technology, increasing the share of production held by surface mines, the exploitation of additional reserves, and the closing of uneconomic pits.

Research and development

Investment in the EC coal industry has fallen from 1.0 billion ECU in 1990 to an estimated 0.7 billion ECU in 1993. This has been mainly due to the reduction in the overall size of the industry. As a result the level of investment per unit of production has fallen 32% between 1990 and 1993. Investment

Table 6: Solid fuels
Hard coal - Output per man/hour underground

(kg per man/hour)	1988	1989	1990	1991	1992
EC (1)	578	603	628	665	703
Belgique/België	320	328	361	383	268
BR Deutschland (1)	630	645	673	681	698
España	333	329	341	315	328
France	534	589	634	727	743
United Kingdom	633	680	704	801	919

(1) Including former East Germany for 1991 and 1992
Source: Eurostat

Table 7: Solid fuels
Investment in the coal industry
Coal extraction and preparation

(million ECU)	1990	1991 (1)	1992(2)	1993(2)
EC	1030.6	892.4	824.5	651.2
Belgique/België	2.0	0.0	0.0	0.0
BR Deutschland	274.7	232.3	322.5	163.7
España	201.6	214.3	195.0	167.0
France	45.1	42.2	24.3	26.0
Italia	54.8	59.0	44.7	75.6
Portugal	0.8	0.5	0.5	0.0
United Kingdom	451.6	344.1	237.5	218.9

(1) Provisional
(2) Forecasts
Source: Commission Services (DG XVII)

has been high in areas of health and safety concerns. Two key areas of technical research have been in mining technology and product upgrading.

Research in mining technology is concerned with improvement of roadway support techniques (particularly in light of ever greater working depths), monitoring of ventilation, automatic steering of mining machines, and more efficient and safer transport systems for both personnel and materials. Research is also being made into remote control, data processing and modern communication systems, to examine whether and how they can contribute to increased safety, improved working conditions and more efficient mining operations.

Research into product upgrading concerns efficiency and environmental considerations of coal preparation, handling and coking. Both fundamental and applied research is being carried out by mining institutes, universities and laboratories, often on an international level, with ECSC financial support amounting to some 60% of total costs.

After the first oil crisis, in 1974, interest grew in the conversion of hard coal and lignite into other materials as a way of reducing dependence on imported hydrocarbons. As a result, several pilot and demonstration programmes were launched by the EC into:

- gasification and liquefaction of solid fuels (including underground gasification);
- substitution of hydrocarbons by solid fuels with fluidised bed combustion, coal-liquid mixtures and combined cycles as key areas of research;
- utilisation of solid fuels within the framework of the EC JOULE 2 R&D programme into non-nuclear energy and rational use of energy which took over from Joule in 1992;
- energy production from fossil fuels based on advanced technologies, notably combined cycles, within the recent "Framework programme" (1990-94); and
- new and improved clean combustion methods for solid fuels such as fluidised bed combustion, underground coal gasification and use and treatment or enhancement of wastes arising as a result of the use of solid fuels, all within the new demonstration "Thermie" Programme (European Technologies for Energy Management) which was proposed by the Commission to run from 1990-94 and has since been adopted.

INDUSTRY STRUCTURE

Companies

In Belgium, the two remaining mines operated by Kempense Steenkolenmijnen, (a public company in which the state has a majority holding) were closed down in 1992. The central fuel buying agency for the Belgian electric utilities is the Pool des Calories.

Most coal imported by Denmark is consumed by the two Danish power companies, Elsam and Elkraft, which buy coal directly on international markets.

The bulk of French coal production is the responsibility of the nationalised company, Charbonnages de France (CdF). A few small mines are operated by Electricité de France or are privately held. The Technical Association for Coal Imports (ATIC) holds a monopoly over coal imports.

Ruhrkohle, the major shareholder in which is VEBA, is the largest of Germany's coal producers controlling the coal activities of the companies EBV, Sophia Jacoba and Auguste Victoria. Of the others, Reinbraun is owned by the German utility RWE, and Saarbegwerke, is owned 74% by the Federal state and 26% by the German Land of Saarland. The other (small) companies are completely privately owned.

The major producer of lignite in Greece is the publicly-owned Public Power Corporation (PPC). Additionally, there are some small privately-owned mines in northern Greece. Greek lignite is burned almost exclusively in PPC's power plants.

In Ireland, coal mined by the privately-held company Arigna Coelieris is burned in a 15 megawatt (MW) power station that is owned by the Electricity Supply Board.

Italy's modest lignite output is found in Tuscany and Umbria. There is also sub-bituminous coal production in Sardinia. Coal imports are the responsibility of ENEL, ENI and Finsider, the steel company.

Coal is produced in Portugal at only one mine. Most of this coal is burned in a power plant belonging to the state-owned power company, EDP. The mine is set to close in 1994.

Coal in Spain is produced by a plethora of companies, more than 200 in total. The leading company, Hunosa, is publicly owned while most of the rest are held privately. Sales of coal to power stations are made under the auspices of a contract between Carbunion, the association of coal producing companies, and UNESA, the association of electricity utilities.

Finally, in the United Kingdom, British Coal has been undergoing a rationalisation process as part of the British government's preparations to privatise the coal industry. Most underground mines are owned and operated by British Coal. Open-cast mining is undertaken by private operators, mostly under contract to British Coal.

Strategies

The strategies of companies in the EC solid fuels sector are largely shaped by the foreseen decline in EC output, caused

by the EC drive for increased competitiveness within the context of the EC state aid policy. Producing companies will have to diversify and rationalise if they wish to continue to exist in the long term.

British Coal, which the British government is committed to privatising, continues to close pits and reduce staff. In Germany, agreement has been reached between the government and the coal industry to cut subsidised sales of hard coal by 50 million tonnes by 2005, with the possibility of moving this target forward to 2000. In the new Länder, a group of east and west German lignite producers are modernising, rationalising and helping to privatise the lignite sector. Charbonnages de France, which faces similar cuts, is liable by law for the livelihood of its mining employees, and thus is investing in developing alternative employment for them. The Spanish coal industry has accepted to implement a restructuring plan which will result in the closure of the uneconomic underground pits and, hence, a further reduction of the underground workforce. Belgium ceased coal production in 1992 with the closure of their last two mines.

In order to cope with the employment effects of the restructuring process and in order to reinforce the reconversion process in the mining regions affected by pit closures, the European Commission established the Community initiative, RECHAR, which is additional to the other Community financial instruments.

REGIONAL DISTRIBUTION

Hard coal is currently mined in significant quantities in four EC members: the United Kingdom (82.8 million tonnes,) Germany (72.2 million tonnes), Spain (18.6 million tonnes), and France (9.5 million tonnes). Small quantities are also produced in Portugal, though this is due to finish in 1994.

Lignite is mined in the following six EC countries: Germany (242 million tonnes), Greece (52 million tonnes), Spain (15 million tonnes), Ireland (6 million tonnes) and Italy (1.1 million tonnes). The three biggest producers accounted for over 97% of total output in 1992. Lignite production had been stable over the decade before 1991 when lignite production in the new Länder was included. The 318 million tonnes mined in 1992 is expected to fall as lignite production falls in the new Länder.

ENVIRONMENT

As with any fossil-fuel, the production, transformation and use of solid fuels have an impact on the environment. Hard coal and lignite are used mainly for power and heat generation, processes which attract environmental protection measures. In particular, major efforts have been undertaken since the mid-1970s to reduce particulate, SO_2, and NO_X emissions from coal and lignite-burning power plants, albeit at the expense of conversion efficiency and the relative cost of coal-generated electricity. As a result of the installation of flue gas desulphurisation and NO_X removal units, drastic reductions in the emissions of pollutants have already been achieved. Further improvements are expected over the balance of this decade with the development of a large number of pilot plants that employ advanced methods of clean coal utilisation such as fluidised bed combustion.

Compared to other fossil fuels, solid fuels emit the highest amount of CO_2 per unit of energy. In order to ensure that the greenhouse gas emissions from coal use are minimised, it is important that, wherever possible, the efficiency of coal utilisation continues to improve. So far this century, the efficiency of coal-fired power generation has doubled due to technological improvements. Further efficiency gains are expected as combined cycle systems are developed and widely deployed. CO_2 emissions from such plants are as much as 20% lower than from conventional plants. Furthermore, the emplacement of combined heat and power plants offers potential CO_2 emissions reductions of more than over 50%.

REGULATIONS

The Treaty establishing the ECSC stipulates under Article 4(c) that national financial support to the coal industry is prohibited. Decision 2064/86 is the latest in a long series of decisions by which state aid is allowed under strict conditions, to be granted to the coal industry. This decision expires on 31 December 1993.

The form of a new state aid decision from 1984 has been the subject of an in-depth debate. The European Commission has proposed a scheme that would authorise aid until the end of the ECSC treaty in 2002. This will be done on the condition that production costs decrease and better transparency is introduced through the entering of aid into public budgets and their introduction in company accounts as a revenue distinct from their turnover. The draft proposal of the Commission is currently being studied by the Council with the objective of giving its unanimous consent.

The Treaty also stipulates under Article 55 that the High Authority shall promote technical and economic research relating to the production and increased use of coal and to occupational safety in the coal industry. From 1959 onwards, the ECSC High Authority, and subsequently the European Commission, granted financial aid to that end.

The Treaty establishing the ECSC will expire in June 2002. The European institutions have started discussions on the future of the provisions of this Treaty, and their phasing-in to the EC Treaty.

OUTLOOK

Solid fuels face a declining share in both the domestic and industrial sectors. However, as oil and gas prices are expected to rise more quickly than coal prices, the competitive position of coal should improve. Other cleaner fuels are favoured for space heating, while the use of coal in industry is linked closely to the fortunes of the iron and steel industry. Coal does, however, have a future in power generation where its share of the fuel mix should rise into the next century, although lignite consumption in power generation is forecast to drop mainly in Eastern Germany for environmental reasons.

Competition from extra-EC coal exporting countries and the general effort to lessen national subsidies means that, by the year 2000, 69% of consumption is forecast to be serviced by imports compared with about 45% in 1992. Meanwhile, hard coal production should fall by around 38% by the year 2000. Although indigenous energy production can play an important role in terms of security of supply, the stability of the world market for coal with abundant supplies from a wide variety of geographical sources leads to the conclusion that, even in the long term, the risk of persistent interruption of coal supplies is minimal, although it cannot be ruled out completely.

Table 8: Solid fuels Forecasts

(million tonnes)	1992	1995	2000
Hard coal			
Production	184	136	115
Consumption	314	322	368
Lignite			
Production	316	195	180
Consumption	322	195	180

Source: DRI Europe and CEPCEO

Consequently, major developments are expected in the British, Spanish and German coal markets. In the United Kingdom, a trimmed down British Coal has won a 5 year contract for 160 million tonnes of coal with the electricity generators, without which its privatisation would not be possible. The government intends to subsidise additional deep mined coal for power generation, though this is to be phased out. In Germany, the coal subsidy looks like it will be levied as a general tax, rather than a levy on electricity as is presently the case. Meanwhile, in Spain, a major restructuring of the industry is in progress, along with some improvement of import facilities.

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Exploration and production of crude oil and natural gas

NACE 13

Total production of hydrocarbons in the EC stood at 262.5 million tonnes of oil equivalent in 1992, a 7.1% increase over 1991. The United Kingdom and the Netherlands are the two leading hydrocarbon producers within the EC, accounting for 53% and 25% of output, respectively, in 1992.

INDUSTRY PROFILE

Description of the sector

NACE 13 comprises three main activities:

- the exploration of both crude oil and natural gas,
- the production of liquid hydrocarbons (i.e. crude oil), condensates and other liquids resulting from gas processing operations, and
- the production of natural gas.

Recent trends

Over the past few years, crude oil production in the EC had been declining, but the 1992 output posted an annual rise of 2.2% to stand at 113.7.0 million tonnes. This increase was due largely to a 2.7% increase in United Kingdom production to 90.2 million tonnes. The rise broke a downwards trend in output that had occurred over the past few years. The United Kingdom dominates EC output, accounting in 1992 for nearly 80% of total EC oil production. Elsewhere in the EC, output rose in Denmark and Italy, remained constant in Spain and fell in France and the other producing Member States. Total world production of crude oil was 3.1 billion tonnes, in 1991, virtually unchanged from 1990. Iraqi crude remained off world markets and output from the former Soviet Union fell. However, increased output from other producers, both OPEC and non-OPEC made up the shortfall. Provisional data for 1992 point to a 0.9% increase to 3.4 billion tonnes. On current trends, 1993 world output will be about the same as in 1992.

Total proven world oil reserves reversed a three year declining trend during 1992. At the start of 1993 they stood at 134.7 billion tonnes compared with 133.9 billion tonnes a year earlier. The EC's share of total proven world reserves at the start of 1993, was 872.3 million tonnes or 0.6% of the world total, up from 847.1 million tonnes at the start of 1992. At current rates of production and assuming that no further reserves are found, EC indigenous supplies would be exhausted within eight years.

Natural gas output in the EC rose 0.6% to 144.5 million toe (tonnes of oil equivalent) from 1991 to 1992. Meanwhile, total proven world gas reserves climbed 11.6% to 138.5 trillion m^3 (131.6 billion toe) at the start of 1993. At the start of 1992, EC gas reserves accounted for just 2.7% of the world total.

The EC produces about 22% of the oil and about 60% of the natural gas that it consumes. These figures compare to OECD averages of 43% and 87%, respectively. Thus, the EC is relatively dependent upon imports to meet consumption, particularly in the case of crude oil.

Having peaked in the mid-1980s, oil production in the EC has been declining steadily. In contrast, EC natural gas production has been rising steadily since 1988.

The 1986 price collapse led to cutbacks which saw employment in the sector contract by 30% to 35%. In 1989, overall employment within the sector was estimated at 95 000 people. Employment did rise during 1990 and the beginning of 1991, but has since fallen back under the weight of economic slowdowns.

Foreign trade

Extra-EC imports of crude oil stood at 499.4 million tonnes in 1992, 4.4% higher than in 1991. Imports from the Middle East have steadily recovered since falling sharply during the Gulf crisis and Gulf war. During 1991, imports from Kuwait began to recover, but the yearly total was just 8.0% of 1990's level. During 1992, Kuwaiti exports to the EC recovered to nearly 60% of their pre-invasion level.

Natural gas imports to the EC totalled 4.157 million TJ (terajoule) (89.3 million toe) in 1992, virtually unchanged from 1991. The greatest proportion of imports, 44%, were from the former Soviet Union, followed by Algeria and Norway with 31% and 24%, respectively. Despite the continued upheaval in the former Soviet Union, exports to the EC from the region fell back 3.5% from 1991 to 1992. Germany accounted for the greatest proportion of gas imports into the EC in 1992, taking 29.0%, Italy and France were placed second and third, accounting for 26.6% and 25.2%, respectively.

Intra-EC trade in the form of gas imports from the Netherlands showed a strong increase of 25% from 1991 to 1992 to 1.5 million TJ. The majority of this increase was accounted for by increased imports into Germany. Indeed, about 60% of Dutch exports were to Germany. Germany also accounted for all of the 30.0 thousand TJ worth of Danish intra-EC exports.

MARKET FORCES

Demand

Crude oil and natural gas are key energy sources, used to generate power and/or heat. They are used widely in everyday life throughout the power generating, industrial, commercial, domestic and transport sectors. Demand for crude oil and natural gas is characterised by low price and income elasticities because of the lack of competitive alternatives. This characteristic is particularly significant in the transport sector. In recent years, natural gas has tended to replace crude oil and petroleum products largely because of its relatively favourable impact on the environment.

Supply and competition

Nearly 80% of EC production of crude oil originates from fields on the British continental shelf. The high expense of exploiting offshore fields is the main reason why the production cost of EC oil is higher than areas with onshore resources. In 1990, the average cost of producing a barrel of oil from the United Kingdom North Sea was 18/barrel. This figure, which was little changed from 1989, includes the costs of exploration, development, and operation over expected field lifetimes, and assumes a 10% real rate of return before taxes and royalties. The cost of oil fields under development at the end of 1990 was about 12.50/barrel, down from 16/barrel a year before.

In 1990, the total number of wells drilled in the EC rose by more than 21% to 715. This figure represented just 1.2% of the world total of 58 900 wells drilled, although of the world outside the USA, the EC total represents 4.3%. In 1991, 236 exploration wells were drilled in the EC North Sea, 153 of which were exploration wells and the remainder appraisal wells.

Production process

Exploration and production of oil and gas requires a highly skilled and experienced work force. That exploration in the

Table 1: Crude oil
EC production by country, 1992 (1)

	Million tonnes	% of total	1991/92 (%)
EC	113.7	100.0	2.2
Belgique/België, Luxembourg	0.0	0.0	0.0
Danmark	7.8	6.9	11.4
BR Deutschland (2)	3.2	2.8	-5.9
Hellas	0.7	0.6	-12.5
España	1.4	1.2	0.0
France	3.2	2.8	-6.2
Ireland	0.0	0.0	0.0
Italia	4.6	4.0	7.0
Nederland	3.3	2.9	-10.8
Portugal	0.0	0.0	0.0
United Kingdom	90.2	79.3	2.7

(1) Includes NGL
(2) Includes former East Germany
Source: Eurostat; DG XVII

Table 2: Crude oil
World production, 1991

	Million tonnes	% of total	1990/91 (%)
North America	515.3	16.4	0.9
Latin America	387.2	12.3	3.6
EC	114.6	3.6	1.8
Rest of Western Europe	93.7	3.0	4.9
USSR + Eastern Europe	527.6	16.7	-9.8
Asia	297.9	9.5	2.7
Africa	336.6	10.7	7.4
Middle East	813.8	25.8	-3.5
Australia + New Zealand	27.3	0.9	-10.5
World	3 150.4	100.0	0.0

Source: Eurostat

Table 3: Natural gas
EC production by country, 1992

(million toe)	1992	% of total	1991/92
EC	144.5	100.0	0.6
Danmark	3.3	2.3	3.1
BR Deutschland (1)	13.7	9.5	1.5
Hellas	0.1	0.1	0.0
España	1.1	0.8	-8.3
France	2.7	1.9	0.0
Ireland	1.9	1.3	-5.3
Italia	14.8	10.2	5.0
Nederland	61.6	42.6	-0.2
United Kingdom	45.2	31.3	-0.9

(1) Includes former East Germany
Source: Eurostat; DG XVII

Table 4: Crude oil (1)
EC imports by country, 1992

(million tonnes)	Total imports
EC	499.4
Belgique/België	32.5
Danmark	5.6
BR Deutschland (2)	98.3
Hellas	16.3
España	55.0
France	75.1
Ireland	2.0
Italia	88.6
Luxembourg	0.0
Nederland	56.2
Portugal	11.8
United Kingdom	58.0

(1) Including feedstocks
(2) Including former East Germany
Source: Eurostat

EC takes place offshore only heightens these requirements. By the same token, the EC is in a position to export highly trained and skilled labour in this sector.

R&D activity in the industry has traditionally been high. The nature of R&D programmes reflect the significant proportion of offshore operations undertaken in the upstream oil and gas sector. The high price of crude oil maintained during the first half of the 1980s encouraged research into enhanced recovery methods. To reduce costs, improvements were made in the tools and operating efficiencies of exploration and production. Most of these programmes produced excellent results and generated significant growth in terms of services and equipment installation within the EC. However, the 1986 fall in crude prices put a damper on much of this research as players in the industry re-evaluated their priorities. Even so, the depth of water and the sometimes harsh operational environment in the North Sea has forced EC companies involved in oil exploration and production in these areas to acquire a wealth of experience in offshore operations. Much of this expertise is unparalleled elsewhere in the world.

Since the late 1980s, the increased emphasis on the development of smaller and deeper fields has led to further technological developments, many of which streamline or increase the efficiency of production. Some of the important technological advances made in the North Sea include: improved and streamlined platform designs; development of sophisticated floating production systems; improved platform safety systems such as interlocking fireproofing panels, multimedia on-platform safety monitoring systems and offshore escape systems; more efficient subsea completion systems such as those with highly flexible and highly durable flowline swivel joints; the development of dynamically positioned drilling vessels capable of operating at depths of 2 000 m; the completion of the first commercial horizontal drilling operation; the development of deep-diving techniques and submarine vessels for underwater activities; improved measurement of static and dynamic statistics; the development of sophisticated pigs such as high friction reversible safety pigs; improved pigging techniques; and better geophysical data acquisition systems such as real-time processing of short offset 3D data.

INDUSTRY STRUCTURE

Companies

During the 1980s, the participation of governments in the upstream oil and gas sector steadily decreased. This trend has continued into the 1990s. In May 1992, the French government announced its intention to reduce its stake in Total to 15% by the end of the year. In June 1992, the state sold 12.4% of Total's share which left it with a direct holding of 12.6%. The government also sold its 6.7% share of the company's capital in the form of petroleum certificates. The state has retained an indirect 2.3% share via two public insurance companies, GAN and AGF. Last year, the French government sold shares representing 2.3% of the company's capital which left it with at 51.5% holding. This year, the new centre-right government has included Elf in the list of companies slated for a round of privatisation set for the last quarter of 1993.

Over the past decade, the oil industry in Spain has been completely restructured. In June 1992, the Spanish government announced that it would give up its majority stake in Repsol through two share sales. The first took place in the Autumn 1992 and was worth some Pta 80 billion. The second phase of the sell-off took place earlier this year (1993) and reduced the governments stake to about 41%. In the long run the government has indicated that it intends to reduce its stake to 33%.

In Italy, AGIP and SNAM are to be partially floated and the remainder of ENI reorganised and privatised later. Some 15-20% of AGIP stock is likely to be floated in the near future, political problems permitting, which should net the Italian exchequer some L 2 trillion.

Competition to obtain exploration licences grew during the 1980s, with increasingly smaller areas being allocated to a

Table 5: Natural gas
EC imports, 1992

thousand TJ (GCV)	USSR (2)	Norway	Algeria	Libya	Total
Belgique/België	-	71.4	183.4	-	254.8
BR Deutschland (1)	837.0	376.0	-	-	1 213.
España	-	-	161.0	64.2	225.2
France	441.2	227.1	379.6	-	1 047.9
Italia	535.8	-	568.0	-	1103.8
Nederland	-	98.4	-	-	98.4
United Kingdom	-	213.6	-	-	213.6
EC	1 814.0	986.5	1 292.0	64.2	4 156.7
(%)	43.6	23.7	31.1	1.5	100.0

(1) Including former East Germany
(2) Former Soviet Union Countries
Source: Eurostat

Table 6: Natural gas
Intra-EC trade, 1992

thousand TJ (GCV) Importing country	From NL	DK
Belgique/België	170.2	-
BR Deutschland (1)	874.0	30.0
France	187.5	-
Italia	215.4	-
Luxembourg	21.7	-
EC	1 468.8	30.0

(1) Including former East Germany
GCV: gross calorific value
Source: Eurostat

REGULATIONS

The march to the realisation of the Single European Market brought to light several significant obstacles to the free movement of goods and services in the EC. Most of the barriers to trade that were addressed by the Commission were regulations that favoured state-owned companies (i.e. compulsory government participation, reserved areas, local landing obligation) and requirements to procure goods and services locally. In May, 1992, the Commission published full details of a proposal for a Council Directive on the conditions for granting and using exploration and production licenses. This is intended to ensure that exclusive rights to prospect for, explore for and extract oil and gas are granted only on the basis of non-discriminatory procedures that are available to all competing parties that are interested .

Table 7: Crude oil and natural gas
Number of wells drilled

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
EC	620	730	830	780	880	1 000	850	720	790	590	715
(%)	0.7	0.7	0.8	0.9	0.8	1.0	1.4	1.3	1.5	1.3	1.2
USA	64 800	80 600	79 500	67 100	83 600	69 700	39 400	34 500	33 700	31 252	42 090
(%)	76.0	81.7	79.6	76.6	78.0	72.2	65.6	60.4	63.8	66.8	71.5
World (1)	85 300	98 700	99 900	87 600	107 200	96 600	60 100	57 100	52 800	46 800	58 900

(1) USSR and Eastern Europe countries not included
Source: BEICIP, CPDP

growing number of companies, many of which included small independent operators. Nonetheless, the major companies did not relinquish their dominant position in exploration and production. Though this was not entirely due to their own efforts but was also, in part, due to the damage wrought on many small players by the 1986 price collapse. That lead to a concentration of exploration and operating licences, particularly in the North Sea. The majors in the EC include Shell, Exxon and BP, all three of which are very active in the United Kingdom North Sea (with Shell and Esso splitting many joint ventures 50/50), NAM in the Netherlands, BEB in the Federal Republic of Germany, as well as national oil companies such as ELF, DSM, AGIP and Repsol, which are involved in operations both domestically and elsewhere in the EC.

REGIONAL DISTRIBUTION

The production of crude oil and natural gas in the EC is extremely polarised. The United Kingdom dominates EC crude oil output, accounting for nearly 80% of total EC oil production in 1992. As for natural gas, the Netherlands accounted for 43% of EC production, while the United Kingdom accounted for a further 31%.

ENVIRONMENT

Stringent regulations are applied to all offshore operations in the EC. These include regulations concerning oil spills and discharges of cuttings and oil mud. Work is also being undertaken to define rules and standards for the abandonment of disused offshore installations and structures. Safety regulations are also very strict, having been tightened in the wake of several accidents that occurred in the North Sea at the end of the 1980s.

OUTLOOK

EC crude oil production is expected to reflect developments in the United Kingdom sector of the North Sea. Output is expected to peak towards the middle of the 1990s at some 129 million toe as enhanced recovery techniques are applied and small fields are brought on line in the North Sea. Later in the decade and into the next century, crude oil production in the EC is forecast to decline steadily with falling United Kingdom production. By the end of the century, total EC crude oil output should slip to 102 million toe. Moving through the early years of the next century, EC output is expected to drop off even more steeply, falling to just 70 million toe in 2005. Although modestly higher prices should lead to an upturn in exploration activity over the next few years, new finds are considered most unlikely to arrest the long term declining trend in United Kingdom oil output.

The outlook for natural gas is rosier. By the year 2000, Dutch output is expected to have risen 13% from 1992 to 70 million toe, while United Kingdom output is forecast to climb by 8% to 49 million toe. During the decade after 2000, Dutch output is expected to rise a further 5%, but United Kingdom output should decline by 25%.

Declining indigenous crude oil production is expected to lead to an increased reliance in the EC on natural gas and imports of foreign crude oil. A further complication is the expected drift in EC demand towards lighter, low sulphur products. In addition to prompting more refinery upgrading capacity, this should also lead to a shift towards importing ever lighter and sweeter crudes.

Written by: DRI Europe

Nuclear fuels
NACE 15

The EC's annual nuclear fuel requirement in 1992 was about 15 300 tonnes of natural uranium (tU), a figure which is expected to edge slightly higher by 1995 but decline over the balance of the decade. An increase in the electro-nuclear capacity is expected up to 1995 after which it should remain fairly flat. The widening margin between nuclear capacity and nuclear fuel requirements reflects the employment of better fuel management, the use of plutonium recycling and the recycling of reprocessed uranium.
The EC itself has an annual uranium production of about 3 490 tU, with uranium produced by five Member States: France, Spain, Portugal, Germany and Belgium. France is by far the leading EC producer, with annual production representing 86% of the total EC output. The EC's requirement for conversion is about the same as its need for natural uranium, with current requirement levels representing 73% of the EC's capacity. The EC energy objectives for 1995 take into account the importance of the nuclear industry to the EC's energy supplies and emphasises the need to ensure that all aspects of planning, construction and the operation of nuclear installations meet optimum safety standards.

INDUSTRY PROFILE

Description of the sector

NACE 15 covers all activities relating to the different stages of the nuclear fuel cycle, i.e., from ore extraction (NACE 151) to fuel element production and processing (NACE 152) according to the following sequence:

- Extraction of uranium and thorium ores,
- Chemical concentration of uranium and thorium ores,
- Refining of uranium and thorium,
- Enrichment of uranium in isotope 235,
- Separation of plutonium and uranium through spent fuel reprocessing and
- Preparation of nuclear fuels and fabrication of fuel elements.

Recent trends

Production of uranium in the EC is concentrated in France with 86% of total EC uranium production. France's conversion capacity is now the largest of the OECD countries since capacity in the USA was cut by 42%.

Uranium producers have been hit hard by the present upheaval in the nuclear industry. In real terms, uranium prices for short term contracts have fallen from a peak of 52 ECU/kg in 1975 (when oil prices skyrocketed) to 25 ECU/kg in 1990. During the 1980s, real prices fell steadily due to overoptimistic forecasts of demand for electricity from nuclear sources which resulted in a build-up of uranium stocks. The industry continues to find itself in a situation of over-capacity. Recently, the prospect of military stocks becoming available on the market has dashed any hopes of a recovery in prices.

International comparison

The EC accounted for 18% of OECD production of natural uranium in 1992 with 3 490 tU. Canada is the largest producer with 9 200 tU in 1992. The EC meets 23% of its annual uranium requirements, 4% less than the USA. Canada, the world's largest uranium exporter produces 4.8 times its annual requirement.

Table 1: Nuclear fuels
Natural uranium production In 1992 (tU/year)

	1992 Uranium production	1995 Theoretical capacity
EC	3 490	3 905
Belgique/België	45	45
BR Deutschland	232	0
España	185	810
France	3 000	3 000
Portugal	28	50
Canada	9 200	8 750
USA	4 745	7 386

Source: NEA

The EC has the world's largest uranium conversion capacity at 20 800 tU/yr. Two-thirds of this is accounted for by France and the rest by the United Kingdom. The USA, which until last year had the largest conversion capacity, now has a conversion capacity of 12 700, 42% less than 1991.

The EC had a total enrichment capacity in 1992 of 13 550 tonnes of separative work units (tSWU/yr, which is a measure of a plant's enrichment capacity), 80% of which was by the diffusion process (in France) and the remainder by gas centrifuge (UK, NL and D). The USA with the largest enrichment capacity at 19 300 tSWU/yr in 1992, produces enriched uranium solely by the diffusion process. The EC, therefore, has a slight technological edge over the USA in the enrichment process when it comes to higher electricity prices.

The annual nuclear fuel requirements of the EC are the highest in the OECD with 2 795 tonnes (t) of fuel per year. The USA and Canada have the next largest requirements with 2 200 and 2 150 t, respectively.

Foreign trade

Partly to protect uranium prices, a clause in the START treaty limited the uranium conversion from nuclear warheads to 10t of enriched uranium per year until 1997 and 30t per year thereafter. The USA enrichment Corporation (USEC) is due to receive 500t of weapons grade uranium which the USA has agreed in principle to buy from Russia. The trade in enriched uranium, especially of weapons grade uranium is necessarily highly regulated. In the EC, Euratom regulates both imports and exports of nuclear material. The EC imports 77% of its needs.

Spent fuel from nuclear reactors bound for reprocessing is also traded. In the EC, spent fuel arisings totalled 2 749 t, 11% below the total EC reprocessing capacity. That only France and the United Kingdom are capable of reprocessing intra-EC trade is significant. The only other OECD country with civilian reprocessing capability is Japan. Reprocessing is also practised for industrial purposes by Russia and India. The potentially hazardous nature of spent nuclear fuel rods to the environment and security issues have limited extra-EC trade. If fuel is not reprocessed, direct disposal is the only other long term option available. Of the direct disposal methods, the underground storage option has been the most favoured of proposed alternative.

Table 2: Nuclear fuels
Conversion capacities and requirements in the EC

(thousand tonnes U/year)	1990	1991	1992	1995	2000
Capacities					
Comurhex (F)	14.0	14.0	14.0	15.5	15.6
BNFL (UK)	6.8	6.8	6.8	10.3	10.3
Total	20.8	20.8	20.8	25.8	25.9
Requirements (total EC)	14.0	15.2	15.3	15.7	15.2

Source: NEA

Table 3: Nuclear fuels
Enrichment capacities and requirements in the EC

(tonnes SWU/year)	1990	1991	1992	1995	2000
Capacities					
Eurodif (F)	10 800	10 800	10 800	10 800	10 800
Urenco (UK, NL, D)	2 600	2 550	2 750	3 200	4 500
Total	13 400	13 350	13 550	14 000	15 300
Requirements (total EC)	8 887	9 623	9 462	9 726	9 748

Source: NEA

Table 4: Nuclear fuels
Capacities and requirements for the fabrication of LWR fuel elements in the EC

(tonnes HM/year)	1990	1991	1992	1995	2000	Out of which not fuels 1995	Out of which not fuels 2000
Capacities							
FBFC (F/B)	1 550	1 550	1 550	1 550	1 550	150	250
Siemens (D)	N/A	1 000	1 000	1 000	1 000	120	120
AGIP (I)	200	200	200	200	200	-	-
ENUSA (E)	250	250	250	250	250	-	-
BNFL (UK)	200	200	200	200	200	50	100
Requirements (total EC)	2 858	2 724	2 795	2 883	2 508		

LWR: Light Water Reactor
HM: Heavy Metals
Source: NEA, FORATOM

Table 5: Nuclear fuels
Nominal reprocessing capacities of uranium oxide in the EC

(tonnes HM/year)	1990	1991	1992	1995	2000
Cogema (F)	400	600	1 000	1 600	1 600
BNFL-Thorp (UK) (1)	0	0	0	415	625
Total	400	600	1 000	2 015	2 225

(1) not yet commissioned
HM: Heavy Metals
Source: NEA

MARKET FORCES

Supply and competition

Uranium production

The EC itself has an annual uranium production of about 3 490 tU, with the remainder of its requirements being imported. By-and-large, electricity producing companies tend to diversify their sources of supply in order to guard against unexpected interruptions. They have also built-up stockpiles which can vary from two to four years' worth of consumption. According to the latest data from the International Atomic Energy Agency (IAEA), in 1990 the EC paid about 62 ECU per kgU for uranium supplied on long term contracts, down almost 5 ECU per kgU from the 1989 level. In real terms, uranium prices on long term contract have fallen roughly 50% since the start of the 1980's. Prices for short term contracts have fallen 5 fold in real terms, reflecting the oversupply that now exists.

Within the EC, uranium is produced by five Member States: France, Spain, Portugal, Germany and Belgium, with 86% of EC production coming from France. The EC accounts for 18% of OECD uranium production and around 12% of world production.

In France, there are four uranium production locations extracting uranium ore from thirty or so mines. France is by far the leading EC producer, with annual production of 3 000 tU in 1992. It is estimated that the uranium resources that have already been discovered in France, with recoverable costs of up to 72 ECU per kgU, could still maintain production at their present rate for a period of 15 to 20 years. Uranium mining is expected to be boosted in Spain, while France may cut production by around a third. The OECD's Nuclear Energy Agency project a decline in output to just under 2 000 tU/yr by the first decade of the 21st century.

In 1992, Spain's annual production was about 185 tU; a 5% decrease from the previous year. Almost all this uranium (90%) was produced in the Sealices el Chico mine works at Ciudad Rodrigo from ore extracted from the uranium deposits at Fe. The remainder was produced by the small Haba experimental mine situated at Don Benito (which has an annual output capacity of around 30 tU). The government organisation, Empresa Nacional de Uranio SA (ENUSA), owns and manages the uranium production centres. Deposits have been discovered in Spain, which, at a recovery cost of up to 72 ECU per kgU, amount to a total of 27 000 tU. There are plans to increase the production.from Spain's current facilities to about 800 tU per annum by the second half of this decade using credit made available under the EC QUERCUS project.

In 1992, uranium production in Portugal was around 20 tU: a 75% decrease from 1990 production. This uranium was mined from Urgeiria and consists of ore extracted from several deposits in the Upper Beira region. Work has started on a new production centre at Nisa in the Upper Alentejo region, which will process ore from several deposits in the region. Responsibility for uranium production in Portugal lies with the public organisation Empresa Nacional de Uranio (ENU). In Portugal, discovered uranium resources, which can be recovered at a cost of 72 ECU per kgU or less, are sufficient to maintain output at about 370 tU per annum for at least the next twenty years. As Portugal does not have a nuclear power programme of its own it exports its uranium, some of which goes to other Member States. Portugal's uranium output is projected to increase over the course of the next decade, rising to around 150 tU as the new sites start to come on line.

About 232 tU were produced in Germany in 1992 from the underground mine at Ellweiler and from Menzenschwand and Grobschlopen, which are both open cast. This represents an almost seven-fold increase in total production since 1990. Production capacity at Ellweiler is about 125 tU per annum, but limited ore supplies means that capacity is under utilised. There are no plans to increase uranium production in Germany, despite the fact that Grobschlopen deposits could supply a processing facility with 250 tU per annum of uranium ore. The discovered resources, with a recovery cost of up to 72 ECU per kgU, are about 2 500 tU, but the Nuclear Energy Agency believes that German production will be wound down over the next few years and stopped after the year 1995. In former East Germany, there is an estimated 100-500 tU reserves. Production was centred on the Erzgeberge, which straddle the border with Czechoslovakia in the south-eastern part of Germany. Production was undertaken by SDAG Wismut Uranium Combine, which was reportedly once the third largest uranium producer in the world. All output went to the former Soviet Union under an agreement dating back to the immediate post-war period, where the uranium was enriched and made into fuel. Since the beginning of 1991, SDAG has practically stopped mining, with the company's only output coming from slag.

Finally, about 45 tU per annum are produced in Belgium from imported phosphates. Belgium has no known uranium resources and is expected to maintain current rates of production over the foreseeable future.

Competition in the uranium production sector of the EC comes principally from the large surplus remaining from the late 70s, and the reprocessing of military grade uranium. In the long term, the use of plutonium, mainly from reprocessing spent fuel for use as mixed oxide (MOX) fuel, could decrease uranium demand.

Conversion of uranium

The EC's requirement for conversion is about the same as its need for natural uranium, which is about 15 300 tU/yr. This figure is anticipated to increase by around 500 tU by 1995 only to fall back to 1991 levels by the end of the decade. The EC requirement for the conversion of uranium represents 74% of the capacity. Outside the EC, the USA, Canada, Japan, Russia and China have uranium conversion capacity. Canada's own requirements account for only 21% of its capacity, while the USA requires more than it can produce. Together, Canada and the USA have a capacity utilisation rate of 88%.

Despite strong competition, BNFL (UK) and Comurhex (F) have been able to obtain a significant proportion of non-EC European countries' markets and have thus been able to ensure adequate utilisation of their facilities. The EC's conversion capacity is expected to increase to around 25 900 tU/yr by the second half of the 1990s, mostly due to expansion in the United Kingdom, but also in France.

The average conversion cost is about 6.5 ECU per kgU and the turnover in the EC market is about 90 million ECU. The EC attaches more and more importance to the idea of converting reprocessed uranium. In France, Comurhex and Cogema have linked together to form the Urep marketing company with the aim of offering a range of services in this field. In the United Kingdom, BNFL continues to convert reprocessed uranium, recovered from MOX fuel, at its existing installations and hopes to begin conversion at the new THORP plant in 1994.

Uranium enrichment

Uranium enrichment is an important stage, both because it requires advanced technology with a high level of specialised knowledge and because this operation accounts for about 27% of the total cost of the fuel cycle. Production in the EC is in the hands of two multinational groups, Eurodif (F) and Urenco (UK, NL, D).

France joined forces with Belgium, Italy, Spain and Iran in forming Eurodif (F) and also in deciding to construct a large enrichment plant at Tricastin (F) using a gaseous diffusion

process. The decision to go for a large, high capacity plant was taken in order to obtain the maximum benefit from economies of scale, which are considerable in the case of the gaseous diffusion technique. This choice was also influenced by the optimistic climate towards nuclear energy which reigned after the first oil crisis in 1973.

Eurodif's Tricastin plant, which began service in 1979, is one of the biggest in the world, with an annual capacity of 10 800 tSWU. A pressurised water reactor (PWR) with a capacity of 1 gigawatt (GW), has an annual requirement of about 25 tonnes of enriched uranium (i.e. uranium containing approximately 3% U_{235}), which in turn requires about 150 tonnes of natural uranium. Products from the Tricastin plant presently satisfy about 20-25% (including ex-COMECON) of the world's requirements. After the plant reached full production capacity in 1982, it had to trim its rate of output to accommodate a reduction in demand.

Urenco Ltd (UK) was formed on the basis of an equal equity split between Uranit GmbH (D), British Nuclear Fuels Plc (UK) and Ultracentrifuge Nederland (NL). The company was established to develop and apply, on an industrial scale, the technique of enrichment by means of ultra-centrifugation. Urenco Ltd is the central holding company and the parent of the enrichment companies Urenco (Capenhurst) Ltd in the UK, Urenco Nederland BV in the Netherlands and Urenco Deutschland GmbH in Germany. Urenco Ltd has responsibility for marketing, controlling production and planning and arranging and coordinating financing for the Group.

The present output of the Urenco group of plants is around 2 750 tSWU/yr, although a number of projects are currently being undertaken to increase this output to 4 500 tSWU by the end of the decade. The centrifugation technique does not require the construction of large plants; consequently, output can be increased by adding modules when necessary. The new units can be built relatively quickly, enabling investment to be planned in relation to contracts obtained, ensuring a high level of plant utilisation.

Production of the fuel elements

Within the EC, fuel production tends to occur on a national basis. Only the Netherlands has to import all its final fuel as it has no production facilities of its own. Of the other countries, Germany is the only one where production capacity is less than its fuel requirements. For the EC as a whole, fuel requirements in 1992 represented 70% of the EC's production capacity, with the United Kingdom having the largest amount of over-capacity.

The largest producers of fuel rods for light water reactors (LWR) within the EC are Siemens (D), which is capable of producing 1 000 tU of fuel per year; Agip (I), with 200 tU; ENUSA (E), with 250 tU; BNFL (UK) owns a factory producing fuel for LWR, which has an output of 200 tU; finally FBFC factories (F/B) had an overall output of 1 550 tU in 1991. In addition, BNFL (UK) also has 1 630 tU of capacity to produce fuel rods for gas-cooled reactors (GCR). The average cost of producing LWR fuel elements is about 230 ECU per kg, giving an implied turnover of the EC LWR fuel market of about 643 million ECU in 1992.

Because of the development of plutonium reprocessing and recycling, the production of plutonium fuel elements is becoming increasingly important. Special plants in Belgium (Belgonucléar), France (Cogema) deploy a total annual output of about 50 t of MOX. The United Kingdom (BNFL) expects to start production of MOX around 1995, with production rising to 50 t of MOX by 2000. Combining these with increases in France (MELOX: 120t/yr) and possibly Belgium and Germany, would give a total EC MOX production capacity of 300 t of MOX.

Storage and reprocessing of discharged fuels

The majority of EC countries (France, the United Kingdom, Germany, Belgium, Italy and the Netherlands) have adopted fuel reprocessing after an interim period of storing the spent fuel on the power station site, either in special dry storage facilities or in under-water storage tanks. Spain and a number of countries outside the EC have opted for a longer period of fuel storage (from 20 to 50 years), while it awaits either reprocessing or disposal in deep-lying geological formations. Only France and the United Kingdom have any reprocessing facilities at the moment, a situation that seems unlikely to change in the medium-term.

Fuel reprocessing and waste management represent a considerable proportion of the fuel cost, almost 20% if account is taken of the fact that enrichment of the recovered fuel is not necessary, and 30% if this is not taken into account. However, reprocessing is favoured by source countries because of potentials to gain more energy from the spent fuel.

Originally, reprocessing was applied strictly to metallic fuels from gas cooled reactors that were powered by natural uranium. This reactor type was initially adopted by France and the United Kingdom, but no stations of this type are being built at present. Uranium oxide fuel, reprocessed from LWR and advanced gas-cooled reactors (AGR), amounts to around 7 000 t, of which 5 500 t have been processed at the UP2-400 and UP3 plants at La Hague in France, the only commercial plants at present in service. This plant's annual output was 400 t/yr in 1989, but a decision to enlarge the site, with the construction of UP3, has added a further 800 t/yr. In 1995, UP2 plant's output will be increased to 800 t/yr.

In the United Kingdom, BNFL is building THORP at Sellafield which will be capable of reprocessing up to 1200 t of irradiated fuel over the first 10 years of operation and is due to come on line in 1993. Its output is aimed at covering national requirements as well serving other EC and non-EC countries, the latter including Japan, Switzerland and Sweden.

Meanwhile, Germany abandoned its plans to build a nuclear reprocessing plant at Wackersdorf and instead, decided to step up its co-operation with France in the joint processing of spent uranium fuel. At the same time, Germany signed a reprocessing agreement with BNFL to have fuel reprocessed at Sellafield and closed its only reprocessing plant (WAK) in 1990.

Production process

To a far greater extent than other energy sources, nuclear energy has to be backed up by a complex combination of industrial activities. These include mining natural uranium, the preparation of nuclear fuel and the construction of sophisticated power stations. These characteristics are reflected in the structure of electricity costs. Only 17% of total costs is expended on fuel, 7% on natural uranium and 10% on the various processing stages of the nuclear cycle. However, 70% of total electricity costs arises from amortisation of the investment in the power stations, with the remainder (13%) accounted for by the stations operating costs.

The conversion process produces a uranium compound (uranium-hexafluoride) which lends itself to subsequent processing (enrichment and fabrication) and which possesses the required chemical purity. Conversion represents a small (about 3%) part of the total cost of the fuel. At present, two companies carry out conversion operations in the EC, BNFL in the United Kingdom and Comurhex in France. Outside the EC, Canada and the United States also have conversion facilities.

Enrichment is the process in the fuel cycle where the fissile isotope content of the uranium is increased. This stage is necessary in the case of fuel destined for light water reactors (either pressurised or boiling) and for advanced gas cooled reactors. Three processes used for uranium enrichment exist.

Two are currently commercially used. The oldest technology is based on a process known as gas diffusion and is the sole process used in France. In the United Kingdom, Germany and the Netherlands, the gas centrifuge technology is used. Since this technology uses far less power it is the cheapest based on marginal costs. A new process now exists known as atomic vapour laser isotope separation (AVLIS) which could cut costs even further, although this is not yet available commercially. This technology is being considered in the USA, where the old diffusion methods are currently used. This could potentially reduce costs by one third.

Fabrication of the fuel elements comprises the operations during which uranium fluoride, enriched or otherwise, is used to produce the final fuel elements to be introduced into the reactors. This stage represents about 11% of the total fuel cost.

Reprocessing is a complex operation performed on spent fuel discharged from nuclear power stations. This fuel is a mixture of reusable products (unspent uranium and plutonium created during the fuel irradiation in the power station's reactor) and fission products which are highly radioactive and are akin to the ashes from using fissile material. The reprocessing operation enables the various products to be separated. In the medium term, by recycling material recovered from thermal nuclear power stations in the reprocessing process, the amount of natural uranium needed by a nuclear power station is reduced. In the long term, there is the possibility that fast breeder reactors will almost totally eliminate the need for additional natural uranium within the confines of the existing industry structure.

ENVIRONMENT

Environmental considerations of the nuclear fuel cycle stem from the discharges of radioactive liquid and gaseous effluent from nuclear installations. In the attempt to limit these discharges to a small portion of the authorised limit, waste material has been concentrated into solid and solidified forms.

There are three main categories of waste: low level, intermediate and highly active wastes.

Low-level waste forms the vast bulk of waste material, amounting to about 100 000 cubic metres. The material is either held in surface or near surface installations where the composition of the waste is controlled over a maximum period of 300 years. Alternatively, the waste is stored in underground installations where the need for verification and measurement of the waste is considered to be limited. Prior to 1982, some of the low-level waste was dumped in special containers at sea. However, following the adoption of the Convention on the Prevention of Marine Pollution from the Dumping of Waste and Other Matters, the practice was curtailed.

Intermediate waste can be divided into: a) material that has been contaminated by radionuclides which have a long half-life but produce little heat because of their moderate concentration of radioactive elements, and b) material containing and emitters only, but containing intermediate levels of radioactivity that produce a significant amount of heat.

Highly active waste is either irradiated fuel discharged from the nuclear reactor when it has been decided to dump it, or is highly active vitrified waste produced after the reprocessing of the fuel.

Waste from the latter two categories has a very high radioactive toxicity which can persist over thousands of years. Given the length of time that containment of such material will require, disposal systems have to be passive, with the long-term safety not dependent on human control or surveillance. Currently, investigations are being concentrated on the burial of the waste in deep stable geological formations, which offer adequate isolation capabilities. On-land sites are the only ones currently under investigation, although research is also being carried out into the possibility of burial in sub-seabed formations or other geologically stable formations.

REGULATIONS

Another area of concern within the nuclear fuels cycle is to ensure that material is not being diverted for the development of nuclear weapons. Within Europe, the Euratom nuclear safeguards system was established in 1957, with its general objectives defined as ensuring that "nuclear material have not been diverted to purposes other than those for which they were intended".

The Euratom safeguards system is founded in European law, with strong sanctions for infringements. It applies to all civil nuclear materials from the moment they are mined on EC territory or are imported into the EC. Aside from ensuring that the material is not being diverted from peaceful uses, Euratom also checks to see that declarations of specific use are correct and that the suppliers obligations are being respected.

Because the nuclear installations are designed with security and health concerns in mind, the nuclear material is becoming increasingly inaccessible. As a result, Euratom is having to develop advanced measuring instruments and sophisticated computer surveillance systems that record and react to events that may be of interest to the inspectors.

OUTLOOK

By 1995, the EC's annual nuclear fuel requirement is expected to edge slightly higher from its current level of 15 300 tU before falling back over the balance of the decade. Uranium production is forecast to fall to around 1 905 tU by the turn of the century, a decline of 45% from the 1992 level. While Spanish and, to a lesser degree, Portuguese output is anticipated to increase, a drop in French production of 67% is expected to be responsible for the overall decline.

At the same time, the EC's conversion requirement is anticipated to increase by around 0.3% per annum over the rest of the 1990's and enrichment requirements should increase from 9 500 tSWU in 1991 to 9 700 tSWU in 1995 and, by the next century, to over 10 000 tSWU. The EC's total fuel requirements are expected to peak in the mid-1990s and then to fall around 2 500 t by the year 2000. This should coincide with greater decline in fuel production capacities so that overall utilisation rates should increase. In practice, technical progress on better utilisation of uranium in the reactors does not reduce the need for enrichment services as much as it reduces the need for natural uranium. In addition, recycling reprocessed uranium has no appreciable reduction on enrichment requirements. Current expansion plans for reprocessing facilities are set to raise capacity to over 2 225 t in the EC by the turn of the century.

An increase in total output of MOX fuel will gradually increase during the 1990s. MOX production is expected to reach 255 t from capacity increases in Belgium, France and the United Kingdom in order to satisfy the requirements of the plutonium thermal recycling programmes. Total fuel requirements are forecast to peak in the mid-1990s, falling to around 2 500 t by the 2000. At the same time, production capacities are projected to increase to over 5 000 t and, as a result, the utilisation rates should remain at around 50% to the year 2000.

Current expansion plans for reprocessing facilities are set to raise capacity to over 3 000 t/yr by the turn of the century. This should leave about 60% of capacity to deal with the current year's spent fuel and 40% to get through the backlog of material that has been in storage. Taking account of quantities to be reprocessed from countries outside the EC, it is

estimated that interim storage requirements could be about 20 000 tU from 1995 to 2000. The necessary storage capacity to cover these requirements is already in place.

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Refining and distribution of oil products
NACE 14

The trend towards lighter products has left the EC refining sector scrambling to install additional upgrading capacity. Meanwhile, the rationalisation of the EC's primary distillation capacity appears to be drawing to a close. After having fallen over the first half of the 1980s, EC oil demand is rising once again despite the economic slowdown. The displacement of oil has occurred in the industrial, domestic and power generating sectors, whereas road transport remains completely dependent on oil. Unleaded gasoline, which is available in all EC countries, continues to gain market share. Its share of the total EC gasoline market has increased from 10% in 1987 to nearly 47% in 1992.

The number of automotive fuel retail outlets has declined rapidly. In 1990, there were 127 000 outlets in the EC, one quarter less than in 1980. Although competition is stiff, the integrated oil companies, especially the majors, are regaining ground in retailing because excess refining capacity has disappeared in some countries. Access to supplies is essential for maintaining and expanding a market position in retailing. Liberalisation of the refining and retailing sectors continues. In Spain and Portugal liberalisation is well underway. Greece, however, remains a laggard.

INDUSTRY PROFILE

Description of the sector

NACE 14 includes the activities of petroleum refining and the processing of petroleum derivatives, with the exception of petrochemicals. The main products of this activity are refinery gas, liquefied petroleum gas (LPG), naphtha, motor gasoline, light distillates, aviation fuels, kerosene, diesel and residual fuel oils.

Recent trends

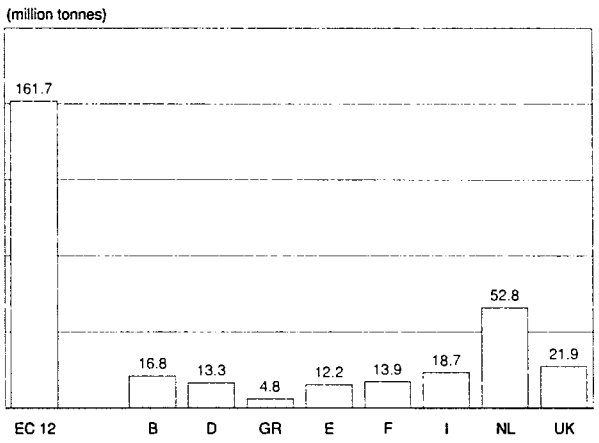
In 1992, about 23% of crude oil supplies to the EC came from within the EC itself and of that, over 90% was from the North Sea. The remaining requirements were imported from third countries. The volume of these imports has been increasing steadily over the past few years. From 1991 to 1992, such imports rose 4.8%. Total EC imports of crude oil and feedstock (including intra-EC transfers), rose by 21 million tonnes (t) to 499 million t in 1992 from 1991. This reflected higher levels of refinery throughput in 1992.

In 1992, imports of refined products into EC countries fell by 3.9%, or 6.9 million t to 172.2 million t. Extra-EC imports accounted for 52% of total imports into the EC. In 1992, extra-EC imports of petroleum products equalled about one sixth of total inland deliveries of petroleum products in the EC. The volume of these imports fell back sharply (by 8.5%) from the 1991 level, to 82 million t in 1992. Over the past few years, output of refined products from EC refineries has steadily risen, from 437 million t in 1987 to 498 million t in 1991 and 514 million t in 1992.

Refining

The reduction of the total primary distillation capacity in the EC over the past decade reached 573 million t/year in 1989. After another slight decrease in 1990, 1991 capacity rose 39 million t/year to 607 million t/year. The lion's share of this increase is attributable to the inclusion of Eastern German refinery's in figures for the EC from 1991. a significant contribution to increased capacity in western Germany was the reopening of Beta Group's 7.8 million t/year Wilhelmshaven refinery in autumn 1991. In contrast, the move away from heavy end products towards lighter products is forcing refiners to continually invest in upgrade capacity. At the end of 1992, upgrade capacity for the whole of the EC stood at about 31.4%.

Figure 1: Refining and distribution of oil products
Principal exporters of refined oil products, 1992



Source: Eurostat

Fuel retailing

During the 1980s, the number of petrol retail outlets decreased by 26% over the period 1980-1990. Rationalisation of the retail network did not occur uniformly across the EC; the most drastic reductions in number of outlets took place in the Netherlands (-36%), France (-35%) and Germany (-29%), whereas the networks grew in Greece (+16%) and Spain (+17%). The rationalisation process, which is continuing thus far this decade, has increased the competitiveness of those outlets that remain, in part because of increased throughputs. There is still considerable variation in average monthly throughputs from country to country; the highest are to be found in Spain where there is a small number of outlets per car. In contrast, average throughputs are approximately a fifth of Spanish levels in Italy, Ireland and Greece, where the rationalisation process has been slow. The number of outlets in Greece and Spain has been rising as a growing proportion of the population has had access to cars and as the average car size increased. However, unlike Spanish throughput per outlet, Greek throughput per station is the lowest in the EC after Ireland, suggesting much room for rationalisation.

Table 1: Refining and distribution of oil products
Main indicators, 1992

(million tonnes)	1992	1991/92 (%)
Production of crude oil	114	0.9
Imports of crude oil and feedstocks	499	4.4
Net production of refineries	514	3.2
Total imports of refined products (1)	172	-3.9
Total exports of refined products (1)	162	5.2
Foreign trade balance of refined products	10	-60.0
Inland deliveries	494	1.6
Bunkers	34	0.0

(1) Includes intra-EC trade
Source: Eurostat

Table 2: Refining and distribution of oil products
Capacities of primary distillation

(million tonnes/year)	1980	1988	1989	1990	1991
EC	891	591	573	569	607
Belgique/België	54	32	32	32	35
Danmark	11	9	9	9	9
BR Deutschland	150	83	79	79	111
Hellas	20	18	18	18	18
España	70	62	62	62	62
France	168	99	88	88	90
Ireland	3	3	3	3	3
Italia	177	117	117	113	113
Nederland	90	66	60	60	61
Portugal	18	14	14	14	14
United Kingdom	130	88	91	91	91

Source: Eurostat

Table 3: Refining and distribution of oil products
Trends in the number of petrol retail outlets

	1981	1982	1983	1984	1985	1986	1987	1990	1991
EC	166 760	161 170	153 945	150 543	144 115	142 763	138 275	126 618	N/A
Belgique/België	8 258	7 575	7 068	6 742	6 207	5 633	5 448	6 273	6 010
Danmark	4 208	3 985	3 631	3 733	3 622	3 515	3 364	3 031	N/A
BR Deutschland	24 864	23 219	21 049	19 288	18 448	20 320	19 501	17 807	17 422 (1)
Hellas	5 500	5 500	5 500	5 500	5 800	5 800	6 000	6 386	N/A
España	4 602	4 608	4 621	4 622	4 616	4 799	4 855	4 998	4 958
France	39 500	38 600	37 100	36 000	34 600	33 200	31 100	25 700	23 700
Ireland	3 874	3 828	3 702	3 544	3 428	3 375	3 300	3 100	N/A
Italia	38 255	37 672	36 716	38 500	35 800	35 300	34 700	31 000	30 400
Luxembourg	473	461	469	447	448	442	420	385	N/A
Nederland	10 366	9 554	8 982	8 492	8 106	7 858	7 560	6 602	6 024
Portugal	2 100	2 060	2 010	1 970	1 900	1 880	1 830	1 871	N/A
United Kingdom	24 760	24 108	23 097	21 705	21 140	20 641	20 197	19 465	19 247

(1) Including former East Germany
Source: National Statistics, CPDP

Table 4: Refining and distribution of oil products
Imports of petroleum products in 1992

(million tonnes)	Total imports	1991/92 (%)	of which extra-EC	1991/92 (%)	of which intra-EC	1991/92 (%)	Total inland shipments
EC	172.6	-3.9	82.0	-8.5	90.2	0.2	492.0
Belgique/België	12.8	7.6	3.0	20.0	9.7	3.2	19.4
Danmark	4.2	-2.3	3.1	-8.8	1.1	37.5	8.1
BR Deutschland	45.9	-4.4	13.9	-2.1	32.0	-5.3	127.5
Hellas	5.4	-3.6	5.0	-3.8	0.4	0.0	12.2
España	6.3	3.3	4.9	-2.0	1.4	16.7	41.8
France	23.8	-7.8	10.6	-15.2	12.7	-3.8	84.2
Ireland	3.5	0.0	0.0	0.0	3.5	2.9	4.7
Italia	23.2	5.5	15.8	1.9	7.4	15.6	86.1
Luxembourg	1.9	5.6	-	-	1.9	5.6	-
Nederland	31.3	-13.1	20.1	-21.2	11.2	6.7	21.3
Portugal	5.0	16.3	0.4	-42.9	4.5	28.6	12.4
United Kingdom	9.3	-5.1	5.0	2.0	4.4	-8.3	74.3

Source : Eurostat

Among EC Member States, Italy has the greatest number of service stations, 30 400 or about a quarter of the EC total, despite the fact that Italy accounts for only 17.5% of the EC automotive fuel consumption. Germany has only about 14% of EC retail outlets, and yet consumes 26% of transport fuels in the EC. Spain consumes 8% of EC transport fuels, but has only 4% of the retail outlets.

Foreign trade

The Organisation of Petroleum Exporting Countries (OPEC) provided about 34% of extra-EC petroleum product imports in 1992, with the former Soviet Union and Algeria accounting for a further 16% and 15%, respectively. Extra-EC exports of refined products from the EC rose by 5.1% to 161.7 million t from 1991 to 1992. The Netherlands accounts for about one third of these exports with the United Kingdom adding a further 13.5%.

Having risen strongly for a few years, imports of oil products from the USA have stabilised. Such imports stood at 6.9 million t in 1989, 10.8 million t in 1991 and about 10.5 million t in 1992. The USA share of total imports into the EC stood at 6.1% in 1992 compared to 4.1% in 1989. Much of the increase in imports from the USA since 1989 is accounted for by growth of imports of gasoil, particularly in 1991.

Among EC Member States, the trade balance varies widely in terms of volume. In 1992, four countries were net exporters, the Netherlands, the United Kingdom, Belgium and Spain. The Netherlands had the greatest surplus, at about 21.5 million t.

MARKET FORCES

Demand

The product consumption figures in Table 5 represent only inland deliveries, which excludes bunkers' and refineries' own consumption. Between 1973 and 1985, EC oil demand fell by 21%. Since 1985, demand has risen. From 1991 to 1992 the increase was 1.5% to 492 million t. Since the oil crisis in the early 1970s, oil has lost market share to solid fuels, natural gas and nuclear power. From 1973 to 1989, the share of oil in total primary energy demand declined 60% to about 443 million t. Recently, oil's share has crept back up, boosted by low prices and concern about the environmental impact of solid fuels. In 1992, oil's share in total primary energy demand is was about 44%. This rising trend is unlikely to continue.

The long term displacement of oil has occurred in the industrial, domestic and power generating sectors. However, the road transport sector remains completely dependent on oil due to the absence, as yet, of any viable alternative energy source: as a result, some 50% of oil is now consumed in the transport sector, compared to 30% in 1973. These long term trends in energy and oil use have had a dramatic effect on the structure of oil demand, which has increasingly favoured lighter products. The share of heavy fuel oil in inland oil demand has declined from 31% in the mid 1970s, to 29% in 1980 and 15% in 1991 (although, there is a wide varitation by country), while that of light products (LPG, naphtha and gasoline) has increased from 25% in the mid 1970s to 26% in 1980 and about 37% in 1991.

Consumption of middle distillates declined in the second half of the 1970s, but then remained virtually stable throughout the 1980s. The share of middle distillates in inland oil demand has recently been rising. In 1992, it averaged 43% compared to 40% in 1989 and 36% in the mid-1970s. The increase in the share of middle distillates is due to rising demand for middle distillate transport fuels, jet fuel and automotive diesel. Consumption of heating oil has been declining rapidly. From 1991 to 1992, consumption of diesel and jet kerosene rose by 4.6% and 8.1%, respectively, while consumption of other gasoils fell 4.3%.

Supply and competition

During 1992, there was relatively little movement in oil prices compared to 1991. However, 1991 had been an exceptional year with prices moving in wild swings in reflection of the markets' reactions to developments in the Gulf war. Early in 1992, prices showed moderate mixed movement as markets reacted to several matters. During this time, Iraq and the United Nations (UN) Security Council were discussing the "food for oil" deal. Markets talked prices up and down as they reacted to these discussions and also as they mulled February's OPEC meeting. After prices reached a March low, they rallied in June. Markets had found an excuse to send prices higher in the discussion of UN sanctions against Libya. Although an oil embargo was most unlikely given the large volumes of Libyan oil imported by several EC Member States, the discussions marked a turning point in prices. At the same time, fundamentals began to lend modest support. In May, although fundamentals were no longer particularly favourable, the roll-over of OPEC's output ceiling was viewed as bullish for prices as were comments from Saudi Arabia that it would like to see higher prices.

Spot crude oil prices fell back initially during the second half of 1992 but soon drew strength from USA gasoline demand. Towards the middle of the second half they showed some strength, boosted by demand in the Far East. Later in the second half, prices fell back with weak fundamentals and the possibility of a return of Iraqi output to world markets.

During the first quarter of 1992, product prices tracked a downward trend that was reinforced by mild winter weather. High sulphur heavy fuel oil prices bucked the trend to show a net rise. This performance was based on heightened utility demand caused indirectly by drought in France and Spain that hit nuclear and hydroelectric output as well as strong demand around the Mediterranean basin and in the Iberian peninsula. Prices turned around in August after a bearish reaction to weak disappointing summer demand gave way to seasonal buying of middle distillates and, demand for heavy fuel oil emerged in the Far East and North Africa.

The overall effect on refining margins was that they remained fairly flat, changing during the year by USD 2/barrel at most. During the first half of the year there was a general declining trend in margins, broken in May by light crudes such as Brent and Bonny Light. This was due to a strengthening of gasoline prices relative to crude oil prices ahead of the summer driving season. Moving into the summer, the margins of light crudes began a short-lived rise, but those of heavy crudes remained flat. From September into October, margins rose, boosted by higher product prices and the middle and heavy-end of the barrel. Towards the end of the year lower product prices undermined margins.

Consumer prices vary widely across Member States. The major determinant in the differences is the level of taxes applied to oil products. At the Ecofin Council meeting of 19 October 1992, the directive concerning the harmonisation of excise taxes was adopted. The following minima were agreed and applied from 1 January 1993: leaded gasoline 337 ECU/thousand litres; unleaded gasoline 287 ECU/thousand litres; automotive diesel 245 ECU/thousand litres; heavy fuel oil 13 ECU/thousand kilos; and heating oil, 18 ECU/thousand litres. The Member States that, as of the first of January 1991, did not apply an excise tax on heating oil, are authorised to continue to apply a rate of zero on the condition that they pay a control tax of 5 ECU per thousand litres (l) as of 1 January 1993. The minimum rate for LPG and methane used as transport fuel is fixed at 100 ECU per tonne and that on transport kerosene is fixed at 245 ECU per 1 000 litres.

Denmark has a lower rate than the advised minimum on premium leaded gasoline, however, leaded gasoline sold there is a mixture of 33% leaded and 67% unleaded. Luxembourg's excise tax rate falls below the advised minima for automotive

diesel and heating oil. Belgian taxes on heavy fuel oil now exceed the minima as Belgium has abolished the zero rate of tax it formerly applied; however, it's excise tax on heating oil is still below the minima.

For the period from 1 January 1993 to 31 December 1994, Luxembourg can apply a minimum rate of excise of 292 ECU per 1 000 litres for super leaded gasoline, 242 ECU per 1 000 litres for unleaded gasoline and 195 ECU per 1 000 litres for automotive diesel fuel. Greece will benefit from the same treatment for automotive diesel fuel. To a large extent, that these rates fall below the minima is just a reflection of the fall from grace of the currencies of these states within the European Exchange Rate Mechanism (ERM). Because only minima have been set, the final agreement will have only a small effect on consumer prices of oil products in Member States, and therefore on the level and structure of oil consumption.

Differences in excise tax placed on transportation fuels by the each Member States reflects the countries' policies regarding pollution reduction from the use of leaded fuels, by applying less tax on unleaded gasoline, and on gasoline in general, by applying less tax on automotive diesel.

A transitional agreement has been formulated to harmonise levels of value added tax (VAT). Following the adoption of the proposal for directive on the harmonisation of VAT rates at the Ecofin Council meeting of 19 October 1992, petroleum products were submitted to the normal rate, that is, a minimum tax of 15%. Nevertheless, Member States which applied a lower rate on petroleum products as of 1st January 1991 are authorised to apply a minimum rate of 12% from 1st January 1993 to 31st December 1996. The United Kingdom which applies a zero rate on gasoil for heating can maintain this rate until 31st December 1996. However, for domestic economic reasons, the United Kingdom government has announced its intention to introduce VAT on domestic fuel at 8% from April 1994. VAT at 17.5% will be charged beginning 1995 and thereafter.

Production process

Within the EC, each Member State has widely differing production structures. Germany, France and the United Kingdom are characterised by their low proportion of heavy fuel oil and by a relatively high proportion of gasoline output. At the other extreme, Greece, Portugal and Ireland have a refining sector that is characterised by a high proportion of heavy fuel oil production and relatively low light-end output. Over the past few years the move towards increased upgrading capacity and product quality improvement has continued to shift the structure of refinery production away from heavy oil products in favour of the light products.

Any assessment of the utilisation rates of primary distillation capacity poses a statistical problem due to the increase in the share of feedstocks in refinery throughputs. Some of these semi-finished products are re-distilled while others go directly into secondary plants. The problem is that the amounts in either category are not recorded in several EC countries. Because of this, the Commission presented a range consisting of a "maximum" (the relation of total input for transformation in the refineries to distillation capacity) and a "minimum" (calculated solely on processed crude oil) in its communication (Com (88) 491) to the Council on the oil market and the refining industry in the EC.

The variations between these two points differs from country to country and from year to year, because refiners switch from crude oil to semi-finished products depending on their relative prices. These variations are related to the prevailing economic, seasonal and climatic conditions in each country, as well as to turnarounds and the opportunities for exports of key products such as gasoline to the United States. In 1991, EC refineries went into turnarounds in the second quarter, with the utilisation rate dropping to a low of 77% in April and May, before again moving to a summer peak of 89% in August. Many refiners went into turnarounds early in 1992, but others waited until the more traditional second quarter. Consequently the utilisation rate remained flatter than in 1991, touching lows of 83% in February and April. The utilisation rate peaked at 89% in August before falling to an autumn low of 85% in November.

INDUSTRY STRUCTURE

Companies

Refining

Two major problems have afflicted the EC refining industry over the past 10 years. The industry suffered from a chronic surplus of primary distillation capacity due to the decline in overall oil demand in the first half of the 1980s. In addition, the shift toward demand for lighter oil products has forced the industry to invest heavily in conversion capacity to boost production of lighter products and improve product quality.

These problems have been solved by concentrating the industry's activities in a smaller number of refineries that have a more complex structure and are capable of responding to the changing product demand. Consequently, from 1988 to 1992, refineries in most Member States operated without making losses for the first time in many years, however, this was no longer true in the beginning of 1993 in most Member States. Moreover, finished product imports have declined. Currently, planned upgrading capacity in European refineries will help to meet the rise in demand for light products (particularly unleaded gasoline).

In autumn 1991, the 7.8 million tonne/year Mobil refinery at Wilhelmshaven (D) was brought back into operation. The refinery was acquired by Beta Refining & Marketing, a company jointly owned by the trading company Bulk Oil and the French trading firm, Dreyfus. However, in 1992, no new refineries were brought on line.

During the second half of 1993, Elf and Thyssen announced that they will invest in a new refinery as a joint project in Leuna, in eastern Germany. This new refinery, that will replace the existing one in Luena and another in Zeitz, will have a planned capacity of 10 million t/yr and is due to come on line during the first quarter of 1996. Objectives are to produce some 5 million t/yr of middle distillates and jet fuel, 3 million t/yr of gasoline and naphtha and about 300 000 t/yr of LPG.

State monopolies continue to play a significant role in a number of EC countries. However, liberalisation is steadily proceeding. In Greece a three phase plan is being implemented to liberalise markets. This plan removes all remaining controls on prices and margins and allows for the importation of oil products. More recently, the Greek government has indicated that it is keen to move ahead with privatising the refining sector. Both the Asropyrgos and EKO groups of companies are being prepared for privatisation before the end of 1993. The liberalisation of the Greek oil market has stimulated plans for a new refinery. However, new capacity is not expected to come on line before the mid-1990s. In all probability some rationalisation and adaptation will occur in the meantime, since Greece's refining sector is currently ill adapted for a move toward lighter products and a rapid shift into production of large quantities of unleaded gasoline.

In Portugal, the oil product markets were liberalised at the start of 1991, including the system of market quotas. This has put Portugal's three refineries under pressure to modernise and expand their upgrade capacity to enable them to compete with imports. Thus, the three Portuguese refineries, all owned by Petrogal, are to be functionally re-organised. The oldest refinery at Cabo Ruivo no longer distils crude, but is being converted to a distribution centre and batch blending plant.

Table 5: Refining and distribution of oil products
Inland deliveries of petroleum products in the EC, 1992

(million tonnes)	All products	1991/92	Motor fuel	1991/92 (%)	Gas/ diesel oil	1991/92 (%)	Residual fuel oil	1991/92 (%)
EC	492.0	1.5	120.3	9.4	184.1	0.1	72.8	1.7
Belgique/België	19.4	4.3	2.9	7.4	9.2	2.2	2.5	4.2
Danmark	8.1	-2.4	1.8	5.9	4.2	-4.5	0.9	-10.0
BR Deutschland	127.5	0.8	31.7	0.3	60.7	1.0	8.4	-3.4
Hellas	12.2	0.8	2.6	4.0	4.8	0.0	2.6	-10.3
España	41.8	3.2	8.9	7.2	13.3	-5.7	7.2	24.1
France	84.2	-0.4	17.6	-1.7	38.0	3.3	7.0	-16.7
Ireland	4.7	6.8	9.7	977.8	1.9	5.6	1.2	9.1
Italia	86.1	2.5	16.0	8.1	24.5	-4.7	26.9	8.0
Nederland	21.3	3.4	3.5	0.0	6.0	1.7	0.2	-33.3
Portugal	12.4	9.7	1.7	13.3	2.6	0.0	4.7	17.5
United Kingdom	74.3	0.3	23.9	-0.4	18.9	1.1	11.2	-7.4

Source: Eurostat

Work underway includes enlarging and improving liquid fuels and LPG storage facilities and modernising tanker-truck filling facilities. Work on the next oldest refinery at Matosinhos (north of Porto) was completed in 1991 and introduced increased flexibility at the plant and the ability to run imported feedstocks or refine its own crude. The newest refinery at Sines was initially considered a "white elephant", due to its large (10 million t per annum) primary distillation capacity. Efforts to export some of its output have proved successful, enabling the refinery to run at 70% of capacity. Installations of a catalytic cracker, a vacuum distillation unit, an alkylation unit, a visbreaker and an methyl tertiary butyl ether (MTBE) plant are scheduled to be operational by the end of 1993.

Fuel retailing

The major companies continue to have a dominant position, even during years of recession, as they have continued to invest large amounts to protect their market share. They now account for nearly 30% of the EC retail outlets. Shell (NL/UK) has the dominant market share, closely followed by BP (UK). Some of the traditionally national oil companies have now spread their presence throughout Europe: Total is present in eight countries for a market share of 4.4% (1992). A relative newcomer to the European downstream business is Kuwait Oil, which introduced the Q8 brand in 1986 and now owns 4.5% (1992) of the EC retail outlets. Kuwait Oil is now the largest retailer in Denmark and is a major presence in Italy, the United Kingdom, Belgium and the Netherlands. Although competition is stiff, the integrated oil companies, especially the major ones, are regaining ground in retailing because excess refining capacities have disappeared in some countries. Access to supplies is essential for maintaining and expanding a market position in retailing.

Overall, in the countries where regulations permit, supermarkets have an important market share, but nowhere is it as large as in France where a third of automotive fuel is sold by supermarkets (the market share is nearly 40% for gasoline alone). In the United Kingdom, their market share is nearing 15% and is expected to increase to 20% by 1995. The other two countries where hypermarkets have a substantial market share are Belgium and Germany, where it is 10%, though this share is not expected to increase much more in the near future. During 1990, some supermarkets have sold their service stations to oil companies: this is the case of Casino (F) which sold to Shell and AGIP (I).

In parallel with these developments, there has been a trend toward concentration. During 1990, Elf (F) was the most aggressive acquirer, with acquisitions in Spain and the United Kingdom. Shell, AGIP and Norsk Hydro (N) also made acquisitions in the EC retail business.

Liberalisation is also affecting the structure of the petroleum product retailing sector. In Spain, the refinery and product distribution sectors have been liberalised. The structure of its industry has changed in that Repsol (part state owned), Cepsa (part owned by Elf) and Petromed (owned by BP) have inherited the Campsa retail outlets and jointly own Corporacion Logistica de Hidrocarburos (CLH), which inherited the Campsa distribution network. The share of ex-Campsa retail outlets is roughly 60% Repsol, 25% Cepsa and 10% Petromed (some are still unaccounted for). In addition to this is a number of other oil companies have entered the Spanish retail market, most notably Shell and Petrogal. There are now about 750 retail outlets owned by "new" entrants.

Shell recently purchased a 5% share in CLH. This share was purchased from Repsol, reducing their stake in CLH from 66% to 61%.

However the liberalisation of the Spanish oil market has not led to a dramatic increase in imports of oil products. The reasons for this are excess domestic refining capacity, poor access to the CLH distribution system, and the small market share of non-domestic refiners in retail markets. The issue of access to the CLH distribution system, including its pipeline network, has yet to be resolved and is likely to be contentious. This pipeline network gives CLH shareholders a distinct advantage over their future competitors.

In 1992, the first stage of the privatisation process of Petrogal was completed with the sale of 25% of the company's shares to a consortium led by Total of France. The buyers will purchase a further 26% of the company's stock within three years, giving them a majority stake in the company. Petrocontrol was formed as a joint holding company to manage the consortium's stake in Petrogal. The Portuguese investors have a 52% stake in the new company and Total has a 48% stake. Of the remaining 49% of Petrogal's shares, some 20% is expected to go to the employees and small investors, 19% will be sold to "strategic investors" (namely the Calouste Gulbenkian Foundation and Sonangol - the Angolan state oil company). The remaining 10% will be held by the state as a "golden share".

In May 1992, the French government announced its plan to reduce its stake in Total to 15% by the end of the year. In June 1992, the state sold 12.4% of Total's shares which left it with a direct holding of 12.6%. The government also sold its 6.7% share of the company's capital in the form of petroleum certificates. The state has retained an indirect 2.3% share via two public insurance companies, GAN and AGF. Last year, the French government sold shares representing 2.3% of the company's capital which left it with a 51.5% holding. This year, the new centre-right government has included Elf in

Table 6: Refining and distribution of oil products
Excise taxes on petroleum products, end September 1992 (1)

(ECU/1000litres)	B	DK	D	GR	E	FR	IR	NL	I	P	UK	I
Premium leaded	452	325 (2)	471	458	400	536	386	521	532	524	384	358
Unleaded	378	297	420	400	364	481	352	458	482	455	324	305
Automotive diesel	281	256	282	261	269	263	300	270	375	342	316	229
Heating diesel	5	232	41	150	79	71	50	63	375	-	19	5
Heavy fuel oil (ECU/tonne)	19	261(3)	15	46	13	23	13	30	50	60	13	14

(1) Premium leaded gasoline in Danmark is a mixture of 37% leaded and 67% unleaded gasoline
(2) Excise tax of 250 ECU from 1 October 1992
(3) After 1/1/1993 excise tax can be recuperated by industrial consumers up to a total of 1820 DKR or 240 ECU.
(4) Exchange rates at 4 January 1993: 1ECU = 40.1543FR, 7.57884 DKR, 1.95268 DM, 260.095 DR, 138.885 PTA, 6.67240FF, 0.742826IRL, 1804.52LIT, 2.19538HFL, 175.652ESC, 0.795735UKL
Source : DGXVII

the list of companies slated for a round of privatisation that is scheduled for the last quarter of 1993.

AGIP and SNAM (I) are to be partially floated and the remainder of ENI (I) reorganised and privatised later. Some 15-20% of AGIP stock is likely to be floated in the near future, political problems not withstanding, which should net the Italian exchequer some L 2 000 billion.

In Greece, state-owned DEP which among other functions distributes petroleum products, is effectively a monopoly, though its public monopoly status has been removed. Since the "competition" to which the oil market has been opened remains very restrained, DEP continues to control the domestic market

ENVIRONMENT

Environmental considerations have moved to the top of the EC's political agenda, particularly in relation to global climatic change. The EC has committed itself to stabilising CO_2 emissions at the 1990 level by the year 2000 and signed the Climatic Convention at the Rio de Janeiro conference. The energy sector has a key role to play in achieving this target, through improvements in energy efficiency and the promotion of fuels containing less carbon. The mechanisms to implement these changes are primarily aimed at influencing market forces, either directly through fiscal measures or via assistance to R & D projects and the promotion of technological innovation in the energy sector.

During 1992, the EC Commission proposed new taxes which involved an element explicitly linked to the carbon content of fuels. Under these proposals, the tax will be phased in during the 1990s at an initial level of USD 3 per barrel of oil and will reach a level equivalent to USD 10 per barrel in 2000 (50% linked to the carbon content of the fuel, 50% to the energy content). The proviso is that the EC's major trading partners do the same.

Environmental issues are likely to continue to put pressure on refiners to remove sulphur from products and, more generally, to affect the specifications for fuel quality.

An EC directive adopted in 1985 required that unleaded gasoline be marketed in all Member States from 1 October 1989. This date coincided with the date when all large cars produced (2 litres) were to be equipped with catalytic converters. Unleaded gasoline is now widely available in all European countries. Moreover, all cars produced after 1 October 1990, whether they are equipped with catalytic converters or not, must be able to run on unleaded gasoline (Eurograde 95 research octane number [RON]). Although there have been some derogation for old-type engines, 90% of cars produced can run on Eurograde.

An amendment to the directive permits Member States to ban leaded regular grades, which Germany and Luxembourg have done; Belgium is in the process of implementing a ban. The directive encourages Member States to introduce tax incentives in favour of unleaded gasoline in order to accelerate its penetration, which all countries have done. In addition, in order to allow a larger proportion of the existing car population to run on unleaded gasoline, most oil companies have introduced an unleaded fuel with a higher octane level, Super-premium unleaded (98 RON). Super-premium is marketed in most countries, with the exception of Greece, Portugal, Spain and Italy.

The introduction of tax incentives and high octane grades of unleaded gasoline have led to a rapid penetration of unleaded in the gasoline market. Its share increased from less than 10% in 1987 to an estimated 47% in 1992. Concurrently, sales of leaded regular have nearly disappeared in several countries even where they are not banned (United Kingdom, Denmark, Netherlands). Nevertheless, the rate of penetration of unleaded varies widely between member states, because of different tax incentives, government policies and the structure of the car population. The penetration is as high as 84% in Germany but still negligible in Portugal and Greece. In Spain, the share of unleaded is picking up, from less than 1% in 1990 to 6% in 1992.

From the beginning of 1993, all new gasoline-powered cars registered in the EC have to be fitted with three-way catalytic converters to meet exhaust emissions standards. This presages the universal use of unleaded gasoline. However, the speed with which unleaded gasoline gains 100% market share depends on the rate at which owners of pre-1993 cars opt for unleaded fuel and the rate at which old cars, able to use only leaded fuel, are scrapped. The effect will be relatively small in Germany, Denmark and the Netherlands, where the purchase of catalyst-equipped cars has been favoured for some time by tax incentives. However, in other countries, the new emission rules will give a significant push to sales of unleaded gasoline.

REGULATIONS

EC legislation relating to fuel quality addresses the content of lead, benzene and oxygenates of gasoline and the sulphur content of diesel and other gasoils (national standards specify other fuel properties). The European Standard Organisation (CEN) adopted European specifications for unleaded gasoline (EN228), for automotive diesel (EN590) and LPG (EN 589).

The maximum authorised lead level in leaded gasoline is 0.4g/litre, but EC countries are encouraged to use a maximum limit of 0.15 g/litre. All EC countries, except Portugal, have now adopted this lower limit. The maximum benzene content of gasoline is set at 5% for both leaded and unleaded grades.

Table 7: Refining and distribution of oil products
Net production of EC refineries

(million tonnes)	1987	1988	1989	1990	1991	1992	1993(%)
LPG	14.1	14.7	14.6	14.7	14.7	15.2	3.0
Naphtha	14.7	16.2	17.1	15.5	17.7	17.6	3.4
Petrol	103.4	109.1	110.8	113.9	117.0	121.8	23.7
Kerosene	30.0	32.9	34.5	36.2	33.7	34.6	6.7
Derv	150.6	160.3	159.9	164.0	180.3	185.7	36.1
Residual fuel oil	95.1	92.0	91.2	95.0	99.6	101.5	19.7
Other products	29.1	32.3	31.8	32.5	35.1	37.6	7.3
Total	437.0	457.5	459.9	471.8	498.1	514.0	100.0

Source: Eurostat

CEN EN228 specifies the octane quality of Eurograde unleaded (95 RON/85 MON [motor octane number]), the benzene content (5% vol. max.) and the lead content (0.013g/litre). The sulphur content is currently set at 0.1% weight maximum, but will be reduced to 0.05% by 1995. Volatility and density specifications have also been agreed upon.

A directive requires that Member States permit fuel blends containing oxygenates and specifies the maximum content. If this maximum is exceeded, then the pumps must be clearly labelled. Most countries restrict limits below the maximum, with only four countries (Belgium, Denmark, Ireland and Luxembourg) permitting levels equal to, or exceeding, this level.

A 1987 directive specifies a maximum level of sulphur in gasoil of 0.3% weight, except for gasoil used in shipping or further processing; the directive allows Member States to reduce the sulphur content to 0.2% if necessary for environment or health reasons. Five EC countries have already reduced the sulphur content to 0.2%. A directive, adopted in March 1993, calls for a reduction in the sulphur content of all gasoils to 0.2% by 1 October 1994. A further reduction is to be implemented by 1 October 1996 for the sulphur content of automotive diesel (to 0.05% by weight), as this is required to meet the exhaust emissions limits for diesel engines. The Council asked the Commission to propose a further reduction of the sulphur content of gasoil for industry, space heating and shipping, and sulphur limits for aircraft kerosene. This directive also requires that the distributed automotive diesel of 0.05% sulphur be gradually available by 1 October 1995.

Control of reserve stocks

The reserve stocks consist of quantities of oil products which can be called upon at any time by a country to bridge a temporary shortage situation or difficulties in the sourcing of hydrocarbons that occur as a result of an oil supply emergency following rules established by the EC as well as the IEA. Directive 68/414 required the creation and maintenance of reserve stocks at the EC level initially representing 65 days' consumption this was then increased on 1 January 1975 to 90 days' consumption for three categories of product: petrol, jet propulsion fuel and diesel and heating and heavy fuel oils. Since the directive merely imposed the obligation to achieve an end result, the EC Member States have established over the years systems quite different from one another and which can be divided into two categories depending on the existence or non-existence of a centralised stockpiling authority.

EC countries with a central reserves administration

Four countries have a central reserves administration: Denmark, Germany, France and the Netherlands.

Denmark has had legislation governing reserve stocks for over 30 years; the reserves are administered by the Foreningen Danske Olieberedskabslager (FDO), a non-profit making foundation established in 1959 with voluntary membership. The FDO is financed by contributions from its members. The 1959 legislation related chiefly to fuels and was amended when Denmark joined the EC by the law of the 24 May 1972 which widened the stockpiling commitment to the three product categories specified in the EC directive. Currently, Denmark has a 120 day reserve of stocks.

In Germany, the lion's share of the stockpiling requirement of 80 days' consumption is administered by the Erdölbevorratungsverband (EBV), a national body with public corporation status financed by means of a special tax. At least 90% of the reserves stocked by the EBV are its own property. The refineries themselves ensure a mandatory 15 days supply. In addition, the federal government has amassed stocks of crude oil equivalent to a 30 day supply.

France long ago established legislation requiring the stockpiling of oil reserves (the commitments to create and maintain safety reserves can be traced back to the law of the 10 January 1925). More recently (1988) France established a central reserve administration, the Société Anonyme de Gestion des Stocks de Sécurité (SAGESS). This is a private limited company with a special fiscal and legal status. Its shareholders must be all those companies (refiners and independents) who hold a special licence to import and market oil products; its operating costs are defrayed by the contributions paid by the shareholders. SAGESS is responsible for half the total legal stockpiling requirements, i.e. 45 days, twelve of which it actually owns and the balance being covered by allocations; the remaining 45 days are the responsibility of special licensees. As of 1 January 1993, a new law was passed regarding stockpiling requirements.

In the Netherlands the collective administration of stocks is entrusted since 1986 to the Central Organ Vorraadsvorming Ardolie-produkten (COVA), a public body which maintains 70 days of reserves of the light and medium distillation fractions. COVA is financed out of a levy on oil products additional to excise tax. The refineries are required to maintain a 50 day stockpile and sixteen and two-thirds days are maintained by the independents. The stockpiling of heavy fuel oils has been administered since 1 January 1987 by the Union of electricity generators (SEP).

EC countries with no central reserves administration

In Belgium, compulsory stockpiling represents one quarter of domestic supplies made during the previous calendar year; the responsibility is assumed by refineries and importers who are both required to maintain 90 days.

In Greece, the distributors are principally required to maintain 90 day reserve stocks, however this obligation may be assumed by the local refineries which supply the distributors. Distributors only commit themselves to the products which they actually import.

Table 8: Refining and distribution of oil products
Structure of production by product, 1991
(outputs as a % of refinery inputs)

(%)	LPG Ref.gas	Motor spirit	Naphtha	Kerosene	Fuel oil & gas diesel	Residual fuel oil	Others	Total
EC	2.8	22.2	3.4	6.4	34.2	18.9	12.1	100
Belgique/België	1.6	19.5	3.6	5.4	36.3	22.4	11.2	100
Danmark	1.8	18.9	1.9	2.6	45.5	24.4	4.9	100
BR Deutschland	2.7	25.8	4.4	2.5	44.7	11.2	8.7	100
Hellas	3.5	21.5	1.6	10.2	22.4	35.4	5.4	100
España	3.4	16.4	3.7	7.0	28.5	25.0	16.0	100
France	3.0	20.6	3.2	6.0	37.8	14.1	15.3	100
Ireland	1.6	18.4	2.5	0.0	39.0	34.7	3.8	100
Italia	2.4	20.3	1.1	4.9	33.8	25.3	12.2	100
Nederland	4.6	17.2	6.5	8.7	29.7	19.9	13.4	100
Portugal	3.3	17.0	6.7	7.7	22.5	34.3	8.5	100
United Kingdom	2.0	30.5	2.5	10.4	28.5	14.1	12.0	100

Source: Eurostat

In Spain, the requirement to hold 90 days of oil reserves is spread evenly between the refineries and distribution companies.

In Ireland, stockpiling is ensured by importers by means of coverage contracts signed with the state refinery company located at Whitegate.

In Italy, the compulsory 90 day reserves are administered by various bodies: the refiners, importers, ENEL, the national electricity generating company, as well as the government itself whose strategic stocks are handled by ENI.

The Portuguese oil reserves are administered by import licence holders (refineries, importer-distributors) and represent 120 days of consumption although part of these may be provided by the state corporation Petrogal.

The target of 90 days of indigenous production of oil reserves of every country was cut by 15%. Today, this target is only fully utilised by the United Kingdom and Denmark Two groups of operators are required to maintain reserves: first the refineries (76.5 days); and then the importers, distributors and consumers importing more than 50 000 t per annum for their own account are required to maintain a 66 day reserve.

OUTLOOK

Net back margins are expected to increase. However, as this upward pressure will result from rising operating costs, refiner's net margins are not expected to benefit greatly from the increase in this ratio. Factors pushing up operating costs are principally environmentally related. Increasingly severe constraints will be placed on refiners to abate plant emissions into water (discharges of oil and other products), into the air (principally emissions of SO_2, NO_x and hydrocarbons) and on to the land (liquid and solid by-products of refining). Product quality norms (notably for transport fuels) will become more severe, increasing the complexity of the refining process. The latter factor will be accentuated by the deterioration in the average quality of crudes available to the Western European market.

The structure of oil product demand is expected to shift in favour of middle distillates. The previous move to lighter products appears to be complete while the trend away from heavy-end products is set to continue. By 1995, the share of unleaded gasoline in the EC is expected to exceed 75%. Although there will continue to be wide variations from country to country in the market share, the difference between countries is expected to be far less than that of 1990. Overall, the share

Table 9: Refining and distribution of oil products
Share of unleaded petrol in total motor fuel sales (1)

(%)	1987	1988	1989	1990	1991	1992	1992 unleaded sales (1000 t)
Belgique/België	0.2	0.5	15.3	24.5	37.4	46.1	1 340
Danmark	29.7	33.0	40.1	56.6	63.4	69.6	1 244
BR Deutschland (2)	25.7	44.5	57.5	67.8	76.9	84.0	26 634
Hellas	e	e	e	1.8	7.3	16.4	424
España	e	0.1	0.3	0.9	3.1	6.2	549
France	0.1	0.2	2.4	14.5	25.0	33.9	5 974
Ireland	e	e	6.4	18.8	23.9	30.2	293
Italia	0.2	0.7	2.1	5.1	6.7	13.1	2 098
Luxembourg	1.8	10.2	20.2	29.9	44.7	57.9	302
Nederland	20.4	26.0	32.3	42.2	52.7	69.5	2 536
Portugal	e	e	e	e	8.2	13.1	221
United Kingdom	0.1	1.1	19.4	34.0	40.8	46.8	11 181

(1) e = infinitesimal amount
(2) includes former East Germany in 1991 and 1992
Source: Eurostat

of oil in EC primary energy demand is forecast to decline further over the next decade, giving way to natural gas.

The refinery sector is expected to see a very modest expansion of primary distillation capacity. However, upgrade capacity within the EC is expected to increase at a faster rate, reflecting the move towards higher quality products and the shift in oil product demand away from the heavy-end. The retailing market is expected to move into a more sophisticated and increased product specification era, with the emphasis on product quality and performance, as well as on brand differentiation. The trend towards diversification, automation and increased size of sites is also expected to continue.

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Electricity generation and distribution

NACE 161

Electricity consumption in the EC grew by 30% in the 1980-1990 period, while the electricity intensity of GDP has been generally stable from the second half of the 1980s.
Nuclear contribution to the electricity sector has risen considerably over the past two decades, but generating capacity is expected to peak in the latter part of the 1990s. The share of nuclear power may then start to decline unless new orders are placed for additional capacity. Electricity production from renewable sources remains very isolated, limited by high investment costs and increasing concerns over siting. Constraints on these primary energy sources will mean that an increasing share of electricity demand is likely to be met by increases in conventional thermal capacity, and in particular gas-fired capacity.
The industry is also going through a period of change with respect to its structure and regulation. At the European level the Commission of the European Communities is continuing discussions on its plans to develop the electricity sector within the framework of the Internal Energy Market, with the proposal for a further two stages to be added to the directives on transit and price transparency. The new proposals include the introduction of third party access on a limited scale. These developments are being complemented at the national level where there is a trend towards greater involvement of independent power producers.
In addition to developments in structure and technology, the industry also has to face the challenge from the environment. The electricity industry should play a significant role in achieving CO_2 emission targets.

INDUSTRY PROFILE

Description of the sector

NACE 161 includes generation of electric power destined for public use from thermal energy (161.1), hydro-electric energy (161.2) and nuclear energy (161.3), transmission and distribution of electricity (161.4), and the generation of electricity by non-public suppliers for their own use (161.5 to 161.7).

The supply of electricity involves numerous activities, including: fuel purchasing and electricity generation; expansion, maintenance and operation of transmission and distribution networks; trading bulk electricity; operation of customer billing and accounting systems.

Recent trends

Three countries account for two thirds of the total EC electricity production: Germany (27%), France (24%) and the United Kingdom (16%). Indeed the top six countries account for over 90% (Italy (12%), Spain (8%) and Netherlands (4%). Over the course of the 1980s, France has dramatically increased its share of total EC electricity production, up from just over 18% in 1980. This increase reflects the French policy aimed at reducing its dependence on imported oil and promoting increased electricity use in conjunction with the development of nuclear power plants. The other countries where there has been a noticeable increase in electricity production over the course of the 1980s have been Greece and Portugal with growth of 4.3% and 5.7%, respectively, (the EC average was 2.5%). The only country to show a fall in production was Denmark, which reflects the increase in imports from Norway and Sweden.

Electricity consumption increased by 30% from 1980 to 1990, an average yearly growth rate of 2.5%, which represents a slow down compared with the corresponding rate of 3.7% from 1970 to 1980. However, the rate of growth of consumption has varied considerably largely due to the strong link between electricity demand and economic performance. Growth was therefore low during the first half of the 1980s, and then much stronger in the second half. The strong growth seen in the later 1980s continued into the 1990s, however the sharp recession of 1993 is expected to make a significant impact on demand.

The electricity intensity of GDP, having increased between 1970 and 1985, has been relatively stable in more recent years, although across countries the trend has varied widely.

Several factors explain why electricity intensity in the EC stopped increasing after 1986:

- the oil price collapse (in real terms the price of oil is now below the 1973 level) and the general decline in fossil fuel prices, while electricity prices remained much more stable, which resulted in electricity becoming less competitive;
- the saturation effects in some applications and some countries. This is most evident in the northern EC Member States, while there is scope left for increased penetration of electrical appliances in the Mediterranean area;
- the development of more efficient appliances and processes in general.

Most of these factors will continue to have an impact on electricity consumption in the future, though the catch-up effect of increased electrical appliance utilisation in southern Europe, coupled with some fuel switching to electricity in the industrial sector, should ensure that electricity intensity remains stable over the next few years. However, saturation effects will progressively become more widespread, with the result that the electricity intensity of GDP may start to decline over the second half of the 1990s.

Electricity has increased its penetration of total energy consumption, rising from 14.7% in 1980 to 17.9% in 1991. The share of electricity in final energy consumption varies substantially across countries, reflecting the structure of industry, the level of automation in industry, the use of electricity for space heating and the level of appliance ownership in the domestic sector.

Within the EC, France, Portugal, Spain, and Denmark have the highest level of electricity penetration, while Luxembourg, the Netherlands and Ireland have the lowest. In France, electricity consumption in the residential sector has grown with the increased use of space heating, while in Luxembourg, the low share of electricity reflects the dominance of coal use in the important iron and steel sector.

Foreign trade

The flow of electricity between Member States has noticeably increased over the past fifteen years. In 1992, the trade in electricity between the Member States increased to 231.4 TWh, compared to 200.5 TWh in 1989 and 58 TWh in 1973. The amount of electricity traded has risen faster than consumption, such that in 1990 it accounted for 12% of gross inland consumption, up 2% from 1987.

Trade with countries outside the EC is still very limited due to the lack of interconnections between countries. Currently only Austria, Switzerland and Norway exchange significant amounts with the EC. However this is expected to change in the near future as new connections to Central Europe are added and those to Scandinavia strengthened.

France is the major net exporter of electricity within the EC; Spain and Germany also recorded small net exports in 1992.

Table 1: Electricity generation and distribution
Net electricity production by country

(billion kWh)	1980	1990	1991	1992
Belgique/België	51	67	68	68
Danmark	26	24	34	28
BR Deutschland (1)	347	417	501	498
Hellas	21	32	33	34
España	104	143	148	151
France	247	400	427	442
Ireland	10	14	14	15
Italia	177	206	211	214
Luxembourg	1	1	1	1
Nederland	62	69	72	74
Portugal	15	26	28	28
United Kingdom	266	298	300	298
EC	1 327	1 697	1 836	1 852

(1) Includes former East Germany in 1991 and 1992
kWh: Kilowatt Hour
Source: Eurostat

Table 2: Electricity generation and distribution
Main indicators (1)

(billion kWh)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	1 460	1 518	1 585	1 626	1 677	1 727	1 774	1 814	1 967	1 976
Net production (2)	1 230	1 420	1 486	1 524	1 568	1 611	1 656	1 698	1 841	1 852
Electricity consumption as % of final energy consumption	16	17	17	17	17	18	18	18	18	N/A

(1) Electricity delivered to market (excluding electricity consumed and losses within power stations);"
1991 and 1992 figures include former East Germany
(2) EC10 for 1983
kWh: Kilowatt Hour
Source: Eurostat

Table 3: Electricity generation and distribution
Electricity intensity of GDP (1)

(kWh/1000 ECU)	1985	1986	1987	1988	1989	1990
EC	392	392	397	393	394	N/A
Belgique/België	459	462	474	473	472	471
Danmark	331	336	350	356	360	361
BR Deutschland	425	420	425	416	411	N/A
Hellas	546	545	568	586	594	N/A
España	471	466	459	456	467	459
France	366	373	382	375	380	381
Ireland	395	414	412	401	399	399
Italia	309	311	318	321	325	329
Luxembourg	830	800	790	766	738	722
Nederland	369	367	381	389	386	389
Portugal	643	659	655	674	679	697
United Kingdom	402	400	395	387	386	390

(1) At 1985 constant prices for GDP; consumption is defined here as final consumption of electricity
kWh: Kilowatt Hour
Source: Eurostat

Table 4: Electricity generation and distribution
Share of electricity in total final energy consumption, by sector and by country

(%)	1980 Total	Industry	Hh (1)	Transport	1991 Total	Industry	Hh (1)	Transport
EC	14.7	20.0	18.1	1.5	17.9	26.6	23.9	1.5
Belgique/België	11.7	15.9	12.1	1.4	16.2	23.1	18.9	1.4
Danmark	12.9	16.0	16.6	0.4	19.3	29.4	27.9	0.4
BR Deutschland	15.2	20.7	17.3	2.3	17.3	26.3	20.0	2.2
Hellas	16.2	22.8	30.0	0.1	18.3	29.3	34.6	0.2
España	17.8	24.8	28.6	1.1	19.5	29.2	38.0	1.3
France	14.2	18.8	17.9	1.9	20.9	28.9	30.8	1.9
Ireland	12.9	17.0	19.5	0.0	14.8	19.2	21.3	0.0
Italia	14.2	21.2	15.6	1.6	17.1	27.2	21.5	1.6
Luxembourg	9.1	9.3	15.5	0.8	10.2	13.3	19.8	0.4
Nederland	11.3	17.5	11.4	1.0	14.5	23.3	16.0	1.1
Portugal	17.3	22.6	34.9	0.8	21.5	29.4	45.0	0.7
United Kingdom	15.8	19.8	22.0	0.8	17.2	25.5	24.4	1.0

(1)Hh: Households, etc.: consumption by households, agriculture, fisheries, administration, services and others
Source: Eurostat

Net exports from France amounted to about 12.7% of the country's production, a situation that resulted from the development of nuclear power capacity in France at a rate faster than domestic demand growth. The major export markets for France are the United Kingdom, Italy, Germany and Switzerland.

MARKET FORCES

Supply and competition

The mix of generation in each country varies considerably, and reflects access to the various primary energy sources. However, it is possible to determine some key trends that will shape the future supply picture for the Community as a whole.

Hydro-electric power, having maintained a relatively stable share of the total energy input over the 1970s and first half of the 1980s, has seen its share edge lower as growth has returned in electricity consumption. Should electricity production increase further over the next decade, it is expected that hydro-electric's share of the total will fall further. The scope for additional hydro-electric development is limited for a variety of political, economic, and environmental reasons, with the result that the remaining exploitable hydro resources will see limited development throughout most of the EC. Significant developments are only expected to occur in the Mediterranean area.

Electricity production from renewable sources remains limited, despite efforts at the EC and national government level to promote and subsidise their development. Excluding hydro-electricity, only geothermal and wind power have made real inroads into the public supply sector, although across the EC there are wide variations in the use of renewable sources. Of these two energy forms, Denmark has the highest share of wind power, 1% of total generation, while Italy has the highest EC level of geothermal power, 1.5% of total generation. The principal limitations to the development of renewable sources are high investment costs, and concern over siting in a number of countries. However, more recently, considerable interest has been shown in the use of biomass and waste as a source of fuel for electric power plants. It is anticipated that these sources will become more important and widespread in the future.

With the exception of France, no new orders for construction of nuclear power plants (which have not subsequently been cancelled or indefinitely postponed) have been placed in Europe since the early 1980s. The completion of capacity currently under construction, and firmly committed capacity, will lead to a peak in nuclear generation capacity and production in Western Europe in the late 1990s. Unless further nuclear plant is ordered within the 1990s the share of nuclear power will begin to decline in the early 21st century, due to increasing demand and plant retirement. New construction in France and the United Kingdom after the year 2000 will not be sufficient to offset the steady decline in generation capacity (though life-extension programmes are expected to draw out operating spans to as much as 40 years for most reactors).

The slowly declining shares of nuclear and hydro/geothermal power over the next decade will be offset by expansion of the share of conventional thermal power. Consequently, the major capacity development questions facing the Western European electricity supply industry surround the refurbishing, replacement, and expansion of conventional thermal power generation capacity.

Table 5: Electricity generation and distribution
Breakdown of electricity consumption by sector

(%)	1980	1986	1987	1988	1989	1990	1991
Industry	48.4	44.2	44.0	44.8	44.8	44.3	43.3
Transport	2.5	2.5	2.4	2.4	2.3	2.5	2.6
Households	28.6	30.1	30.3	28.9	28.4	28.7	29.3
Other	20.5	23.2	23.3	23.9	24.5	24.5	24.8

Source: Eurostat

Table 6: Electricity generation and distribution
Breakdown of final electricity consumption by country and by sector, 1991

(%)	EC	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK
Industry	43.3	51.3	29.7	47.1	40.6	50.3	36.4	37.1	50.7	61.8	44.0	50.3	35.4
Households, etc. (1)	53.4	46.6	69.6	49.5	59.0	46.8	60.7	62.8	46.3	36.9	54.2	48.4	62.7
Other	3.3	2.1	0.7	3.4	0.4	2.9	2.9	0.1	3.0	1.3	1.8	1.3	1.9

(1) Households, etc. includes households, administration, agriculture, fisheries and others
Source: Eurostat

In 1992, conventional thermal generation accounted for 56% of supply, down slightly from the previous year. Indeed, the share has declined substantially over the past two decades, down from 83% in 1973, largely due to the increase in nuclear power generation. The share of nuclear power share has risen from 5.4% in 1973 to 34.4% for the EC as a whole in 1991. However, fossil fuel use in conventional thermal power plants continues to dominate the energy input mix within the power generating sector.

Environmental arguments against the continued development of solid fuel-fired generation capacity have, to some extent, been accommodated by the implementation of the Large Combustion Plant Directive (LCPD). In addition, since the removal of the directive restricting gas use in power generation many utilities plan to build efficient and clean gas-fired combined cycle gas turbine (CCGT) plants. However, despite the cost of emission abatement equipment, coal will remain an important source of fuel reflecting the importance the power generating utilities place on flexibility, and the expectation that coal will retain a relatively low and stable price profile. In the longer term, the prospects for coal will be improved with the development of high efficiency Integrated Gasification Combined Cycle (IGCC) generation.

The use of natural gas in combined cycle generation offers higher thermal efficiency than "conventional" generation. There are four main reasons why a shift towards natural gas can be expected in the power generation fuel mix:

- Environmental advantages: growing concern about the environmental impact of energy consumption helps to sustain interest in natural gas, which is less polluting than most of the other fossil fuels.
- Price: although fuel costs are higher than those of coal, the total cost, including capital and operating costs, per MWh of output are less.
- Co-generation: growth in the use of combined heat and power is creating many new market openings for natural gas consumption in industry. The countries showing the largest growth potential for gas-fired co-generation are Denmark, Italy and the United Kingdom.
- Changes in industry structure: the European electricity generation industry is undergoing some degree of change. There is a trend, most noticeable in the United Kingdom, to encourage the generation of electricity from many different sources and new entrants are being allowed into the public supply industry. It can be seen that commercial developers tend to choose CCGT plants due to their lower specific capital costs, and lower level of environmental risk due to the higher efficiency and low levels of polluting emissions.

Production process

In general, the use of a power station will be determined by its marginal cost, and plant will be scheduled in order to minimise costs. However, the nature of electricity requires that any increase in demand must be met with an instantaneous increase in production from within the confines of the transmission system. This imposes technical requirements for the operational management of the system and the scheduling of power stations. Other factors, such as power losses, will also provide a second order input into the economic scheduling of power plant. One way to reduce the call on expensive plant, and to increase system security, is to increase the size of the system. Electrical interconnections across national frontiers have developed over many years as a logical extension of local, regional and national interconnections, and have been driven by the economic and technical advantages that a more profitable use of generating facilities provides.

In the EC, this trend has resulted in one of the most closely integrated high-voltage international networks in the world, although Ireland and Greece are still not directly interconnected with any other Member State. In the case of Greece, who has been disconnected by the UCPTE grid because of the war in the former Yugoslavia, the EC has recently approved funding of the interconnection to Italy as a means of providing Greece with greater security of supply. Plans are also being considered to link Ireland with the UK mainland, but as yet no funding has been agreed.

International exchanges are managed, without executive powers, by two co-operative organisations of the electricity authorities. These are UCPTE (Austria, Belgium, France, Germany, Italy, Luxembourg, Netherlands, Switzerland, Greece, Portugal, Spain and former Yugoslavia), and NORDEL (Denmark, Norway, Sweden, Finland and Iceland). UCPTE announced in March 1990 the development of a computerised exchange system, called the Electricity Stock Exchange. This system enables the daily management of exchanges instead of the previous weekly sessions. However the final implementation

Table 7: Electricity generation and distribution
EC electricity trade, 1992

(TWh)	Total	B	DK	D	GR	E	F	I	L	NL	P	UK
Total exports	110.0	5.7	2.9	33.6	0.4	3.7	60.6	1.0	0.5	0.2	1.2	0.0
Total imports	121.4	5.9	8.6	28.3	1.0	3.0	4.5	36.2	4.5	8.9	2.5	16.7
Net exports	-11.4	-0.2	-5.7	5.3	-0.6	0.7	56.1	-35.2	-4.0	-8.7	-1.3	-16.7

Source: Eurostat

Table 8: Electricity generation and distribution
Maximum nuclear output capacity and share
in electricity production

(GWe)	1991 Capacity	1991 Share (%)	1992 Capacity	1992 Share (%)	1995 Capacity	1995 Share (%)
EC	107.2	33.2	106.8	34.6	108.9	34.8
Belgique/België	5.5	59.3	5.5	59.9	5.5	53.5
BR Deutschland	22.5	27.7	22.5	30.1	22.6	35.0
España	7.1	36.0	7.1	36.5	7.1	30.0
France	56.8	72.7	57.7	72.9	59.9	77.5
Italia (1)	1.3	0.0	0.0	0.0	0.0	0.0
Nederland	0.5	4.9	0.5	4.9	0.5	4.2
United Kingdom	13.5	20.6	13.5	23.2	13.3	19.6

(1) Nuclear power plants were shut down in 1989/90
GWe: Gigawatts of electricity
Source: DG XVII

of the system is awaiting clearance from the EC competition authorities.

The electric utilities enter into a range of commercial arrangements for the exchange of electrical energy; these fall into three main categories: hour-by-hour exchanges on a cost basis, including back-up in the event of grid difficulties; contracts (usually short-term) for net transfers; permanent arrangements for the transfer of energy from joint-owned production plants in a neighbouring country. Furthermore, it should be noted that all the elements of the international interconnection system are owned by the companies and transfer arrangements are made on a co-operative and not a mandatory basis.

INDUSTRY STRUCTURE

Companies

The structure of the electricity supply industries in the EC countries varies considerably, and reflects a number of factors including the historical development of the industry, and government policy in such areas as security of supply and competition. Some countries of the EC have industries dominated by a single, often state-owned, vertically integrated utility, others have far more decentralised industries with a separation between generation and distribution, and others have a mixture of small municipal distribution companies and much larger vertically integrated companies. France and Italy have highly vertically and horizontally integrated utilities, while at the other extreme UK and Netherlands have decentralised structures.

However there is a movement throughout Europe towards a greater involvement of independent power producers. It is anticipated that this will continue irrespective of the outcome of the debate over the future structure and regulatory systems that is currently taking place. The reason for this are two-fold; firstly, in countries that are dominated by state control, the need to curb public sector borrowing may cause the government to consider privatisation, which may involve the introduction of competition into the generation business; secondly, technological development is providing end-users with greater flexibility in the way that they can meet their energy needs (through both demand-side and small scale supply-side measures).

In Belgium, the three private generators (Ebes, Intercom, Unerg) were grouped together in July 1990 to create a new entity, Electrabel. This grouping is the result of a sectoral rationalisation process under way since the 1950s and will enable them to better confront foreign competition. The municipalities are responsible for the distribution of electricity destined for lighting and domestic use, as well as to industrial users who consume less than 1 000 kW.

In Denmark, the electricity generation is in the hands of twelve companies, most of which are directly or indirectly owned by municipalities. The public electricity generation companies are grouped into two associations, Elsam and Elkraft, which are responsible for co-ordination and planning of generation and transmission capacities, as well as the daily operational co-ordination of fuel purchases for power stations. Electricity distribution is provided by 111 companies, five of which are generating companies, 54 are municipal companies and 52 are co-operatives or foundations.

In France, the monopoly for electricity generation, transport and distribution was given to Electricité de France (EdF) in 1946. EdF operates 88% of installed capacity and 96% of electricity distribution. The remainder being accounted for by auto-producers and some municipal distributors.

In Germany, the electricity supply industry is highly decentralised, with some 960 individual public electricity companies. However, the sector is tightly controlled by several federal and regional organisations which are responsible for co-ordination and regulation. Nine large public companies (two of which are nationalised) own and operate the majority of generation capacity, including all the nuclear power stations and almost the entire national high-voltage grid.

The former East Germany will soon be connected with the UCPTE network. Prior to unification, East Germany was connected to the IPS grid, which primarily received power from the Soviet Union for base load supply rather than peak exchange as in the case of the UCPTE grid.

In Greece, the Public Power Corporation holds the monopoly for generation, transmission and distribution.

The Irish electricity industry has been substantially reorganised in order to give it greater flexibility and cost transparency, and to accommodate potential developments in regulation at the European level. The Electricity Supply Board (ESB) now has a horizontal structure, with the main activities of generation, transmission and supply, separated into different divisions. The new structure specifically allows for the development of independent power generation. The company is still state owned.

In Italy, the electricity industry largely consists of a single state owned company responsible for electricity generation, imports, exports, transmission and distribution throughout the country. The only exceptions to this are: municipal companies in existence before 1962; generating organisations which con-

Table 9: Electricity generation and distribution
Structure of electricity production (1)

(%)	1988	1989	1990	1991	1992
Hydro	12.6	8.7	9.2	9.4	9.6
Nuclear	40.0	35.7	34.8	33.3	34.4
Thermal, of which	53.4	55.6	55.9	57.2	55.9
Oil	9.4	10.7	10.4	10.2	N/A
Natural gas	6.5	7.3	7.2	6.8	N/A
Solid fuel	35.5	35.7	36.2	38.3	N/A
Other	2.0	1.9	2.1	1.9	N/A
Total (billion kWh)	1 611.0	1 656.0	1 698.0	1 848.0	1 851.8

(1) 1991 and 1992 figures include former East Germany
kWh: Kilowatt Hours
Source: Eurostat

sume more than 70% of their own production; production by combined heat and power plants of less than 15 MW; generation from renewable resources. In July 1992, ENEL was incorporated as a joint company following a decision by the Italian government to privatise its industrial and commercial activities. The timing of the privatisation of ENEL S.p.A. will depend on the its ability to reduce its debt to a level more acceptable to the private sector. It is unlikely that this will happen before 1994.

In the Netherlands, electricity generation transmission and distribution is in the hands of municipal and provincial companies. After the sector re-organisation in 1987, there are now seven provincial companies and one municipal company responsible for electricity generation and transmission. They are grouped within the electricity generators co-operative (SEP), which is responsible for capacity planning and inter-provincial and international electricity exchange co-ordination. Sixty seven municipal companies distribute electricity and are grouped within VEEN.

In Portugal, Electricidade de Portugal (EdP) has the quasi-monopoly for generation and transmission. Independent generation and transmission is permissible in those areas not covered by the EdP distribution grid. A recent electricity law in Portugal provides for a new structure (removing generation monopoly) for EdP.

In Spain, the electricity industry has seen a number of mergers and asset swaps as companies respond to the new electricity legislation passed in April 1993 and prepare themselves for a more open European market. This new legislation allows for independent electricity traders and requires the separation of generation and distribution business accounts. The industry currently consists of a number of companies, some privately owned and some public, 17 of which are grouped under Unidad Electrica (UNESA), which is responsible for co-ordinating generation and transmission planning. The electricity grid was nationalised in 1984 and is operated by Red Electrica de Espana S.A..

The United Kingdom undertook a privatisation programme in 1990 and 1991, with the sale of the twelve Area Boards, the CEGB and the Northern Irish and Scottish generating and distribution companies. In England and Wales the 12 distribution boards where sold as separate companies and became the Public Electricity Suppliers (PES) with the responsibility of ensuring security of supply. The CEGB was broken into four parts; three generating companies, National Power, PowerGen and Nuclear Electric; and the National Grid Company (NGC), which is now jointly owned by the 12 PESs, and is responsible for scheduling plant. In Scotland the two vertically integrated utilities were sold largely intact, except for the removal of the nuclear generating business into Scottish Nuclear. In Northern Ireland the privatisation involved restructuring the industry into two distinct companies, one generating company, and one transmission and distribution company. In addition to the privatisation a new trading system has been implemented in England and Wales to orchestrate the trade of electricity between the various companies. This organisation is known as The Pool, and membership of which is enforced by the licensing system. The privatisation legislation also involved a support scheme for promoting non-fossil electricity generation.

ENVIRONMENT

The EC directive (no. 88/609) on emissions control from large combustion plants (those with a rated thermal input equal to or greater than 50 MW) was adopted by the European Council in November 1988, after four years of lively debate. The directive comprises two parts and is based on the use of best available technology at a reasonable cost. Applying this technical constraint helps to ensure the evolution of new and better technologies aimed at pollution abatement.

The first part of the directive applies to new combustion plants, built after 1st January 1990 and whose rated thermal input is greater than 100 MW (coal) or 50 MW (oil and natural gas). Under the directive, all new large combustion plants are subject to a licensing procedure to ensure that the plant meets specified emission standards for SO_2, NOx and particulates. The second part applies to existing stationary combustion sources (those for which authorisation was given prior to 1st July 1987), and specifies target values for reduction of emissions based on the 1980 level. Reductions in emissions are targeted at different levels by country: compared to 1980, overall EC SO_2 emissions must be reduced by 60% by the year 2003, and NOx emissions by 30% by 1998, the former in three stages, the latter in two phases. Plants authorised prior to 1987 and built before 1990 must either conform to the new plant standards or be taken into account in the global ceiling value.

Although new plant emissions standards have been uniformly established, global targets still vary from country to country. In addition, exceptions have been included at the request of specific countries, as well as a number of caveats that allow for the relaxation of targets and or target dates, e.g. "If a substantial and unexpected change in energy demand or in the availability of certain generating installations creates serious technical difficulties for the implementation by a Member State of its programme [of SO_2 and NO_x abatement]."

The emission limits for large combustion plants favour the penetration of natural gas in the power generating sector. The limits imposed on NO_x emissions in new plants can be met without the need for expensive NO_x emission abatement equip-

Table 10: Electricity generation and distribution
Power generating capacity by country, 1991
(output capacity)

(MW)	Nuclear	Thermal	Hydro	Total
EC	103 557	269 790	81 830	455 177
Belgique/België	5 485	7 207	1 401	14 093
Danmark	0	9 194	10	9 204
BR Deutschland	22 527	87 040	8 550	118 117
Hellas	0	6 361	2 512	8 873
España	6 987	20 295	16 340	43 622
France	56 700	22 585	24 742	104 027
Ireland	0	3 295	516	3 811
Italia	0	38 226	19 078	57 304
Luxembourg	0	106	1 132	1 238
Nederland	505	16 919	37	17 461
Portugal	0	4 077	3 333	7 410
United Kingdom	11 353	54 485	4 179	70 017

MW: Megawatt
Source: Eurostat

ment, though the SO_2 emission limits are relatively restrictive as regards the use of coal.

More recently the EC has proposed a carbon/energy tax as a way to give an incentive to consumers to achieve the $C0_2$ and limit other environmental degradation caused by energy consumption. The proposals have yet to gain support from all members of the Community due to concerns that it may affect industrial competitiveness. The carbon/energy tax was proposed as part of a package of measures which included initiatives on energy conservation (SAVE) and the development of renewables (Altener).

REGULATIONS

The development of electricity trade within the EC has received considerable attention from the European Commission, with the Council adopting a number of directives which constitute a first step towards the completion of the internal market in electricity.

The transit directive (no. 90/313/30), approved by the Council on 30th October 1990, provides that "each high voltage transmission utility shall facilitate power exchanges between other utilities through its grid, provided that transmission reliability is not affected." Meanwhile, the price transparency directive (no. 90/185/16), approved by the Council in June 1990, provides that "electricity and gas utilities shall supply to the Statistical Office the rates they charge to all categories of customers on the understanding that published aggregate figures will respect confidentiality."

The Commission has also presented plans for the further development of an internal energy market within the EC, involving two stages in addition to the two directives cited above. The second stage is based on three elements:

The creation of a transparent and non-discriminatory system for granting licences for the production of electricity and the building of electricity lines. The aim of this proposal is to "open up investment in production and transport to independent operators, and in particular to large industrial users."

- The creation of transparency of operations by the separation of the management and accounting of production, transmission and distribution operations in vertically integrated undertakings (commonly called "unbundling").
- The introduction, on a limited basis, of third party access (TPA). The transmission and distribution companies will be obliged to "offer access to their network to certain eligible entities at reasonable rates, within the limits of available transmission and distribution capacity." Those eligible will include large industrial users and distribution companies.

The Commission also wishes to see subsidiarity play a substantial role during the second phase. This involves Member States retaining their regulatory powers for all end-users not eligible for TPA, as well as determining the extent and nature of distribution companies' rights and their public service obligations. Member States will also be free to establish the criteria used for granting licences to build power stations and transmission and distribution lines. The Commission initially wanted to see the second stage enter into force on 1 January 1993. However this did not happen, discussions are still continuing and no firm timetable has yet been announced. The third stage will be defined in detail in the light of the experience acquired during the second stage and is planned to come into force on 1st January 1996.

To achieve a more open market in the field of electricity, the Commission has identified a number of potential obstacles which must be eliminated. The opening up of tenders for the supply of equipment ordered by the public electricity companies, and establishing the 20% guideline for support of indigenous energy supplies, mark important milestones in removing the barriers to a free market for electricity.

OUTLOOK

The principal concerns in the outlook for power generation surround the evolution of the fuel mix for conventional thermal power generation. Development of hydro power, renewable sources, and nuclear power is expected to be limited over the next decade. As a result, increases in demand will have to be met by increases in conventional thermal capacity or explicit demand-side programmes operated by public utilities.

Within this context, there is considerable scope for natural gas use for power generation in Europe. It is, however, only in few EC countries where the use of gas in power generation will increase substantially. Italy, Belgium, Denmark and the United Kingdom are all in the process of changing the fuel mix in favour of gas. Such a move is also planned in Greece and Portugal, but in these countries the future of gas depends upon the spread and extent of supply and distribution infrastructure installation. Natural gas fired power generation could almost double its share of the power generation fuel mix in the EC by the year 2010, from its 1990 level, almost tripling the volume of gas consumed in this use.

By the year 2000, the demand for natural gas fired power generation will increase to the detriment of oil-fired power. Nevertheless, solid fuels will continue to play an important role in the conventional thermal power generation fuel mix.

However in the longer term, after the year 2000, it is unlikely that emissions of CO_2 can be stabilised without recourse to greater use of non-fossil generating capacity. This may lead to new orders for nuclear power stations early in the next century.

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Transmission and distribution of natural gas

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In 1992, EC natural gas production remained relatively constant compared with the previous year and accounted for 62.5% of gross consumption. The Netherlands and the United Kingdom accounted for 73.9% of the EC total natural gas production. The former Soviet Union was the major external supplier of natural gas to the EC, followed by Algeria and Norway.
Growing concern about the environmental impact of energy consumption has helped to sustain interest in natural gas. It contains virtually no sulphur and by-and-large emits less NO_x per unit of energy than other fossil fuels, it also produces less CO_2 per unit of energy burnt than any other fossil fuel. As a result, natural gas is expected to become increasingly important within the energy mix.

INDUSTRY PROFILE

Description of the sector

Natural gas is used in a variety of ways to meet a number of energy needs across all economic sectors. It is burned as a fuel for space heating and hot water production; used in power stations to generate electricity; provides a feedstock in the chemical industry; and is used in industry for steam raising, firing furnaces, and in drying processes. The natural gas industry embraces a range of activities, of which the three principal ones are exploration/production, transmission and distribution. Some companies carry out all three activities. The industry applies the term transmission to: the purchase of gas from producers or from other transmission companies; the transportation and storage of natural gas; and the sale of gas to other transmission companies, to industrial consumers and power stations and to local distribution companies.

The distribution activity is concerned with the supply of natural gas via a local network to final consumers.

Recent trends

In 1992, EC natural gas production remained relatively constant compared to the previous year, at 6 722.5 terajoules (TJ). A small decrease in Netherlands was offset a small rise in the United Kingdom (the two main producers in the EC). The decline in the proportion of gross consumption supplied from sources within the EC appears to have stabilised at around 62.5%.

In 1992, two countries accounted for 73.9% of the EC total natural gas production, 42.6% for the Netherlands and 31.3% for the United Kingdom. Of the other EC countries, Italy, Germany, Denmark, France and Ireland accounted for a further 25.2%. Greece and Spain each produce less than 1% of the EC total production; Portugal and Luxembourg have no natural gas production.

Gross consumption in 1992 also remained flat for the EC as a whole. However, some countries continued to see large rises in demand, while the more mature markets saw falls. The largest consumers were Germany and the United Kingdom, accounting for 25% and 21% of total EC consumption, respectively. These are followed by Italy (19%), the Netherlands (14%)and France (12%).

The average rate of increase in consumption was 3.2% per annum over the last five years. The most remarkable change in short term trends was in the power generation sector which is now growing at a rate of 5% per annum, and can be expected to increase further.

Foreign trade

Imports from outside of the EC rose slightly by 0.6% in 1992 to 4 175.0 TJ, representing nearly 38.4% of gross EC consumption. The three main sources were the former Soviet Union (43%), Norway (24%) and Algeria (31%). Imports of natural gas into the EC in 1992 were divided between Germany (29%), Italy (26%), France (25%), Belgium (6%), Spain (5%) and the United Kingdom (5%).

Imports from the former Soviet Union decreased 3.7% compared with 1991 and were divided between Germany (46%), Italy (30%), and France (24%). It is possible that exports from this region could rise substantially over the next decade. However, the reliability of the infrastructure and the political and economic conditions seem certain to ensure that the full export potential of the region will not be achieved in the short term.

Norwegian natural gas deliveries into the EC were split between Germany (38%), France (23%), the United Kingdom (21%), the Netherlands (10%) and Belgium(7%). They are set to grow significantly when the development of the Troll-Sleipner project and the corresponding infrastructure are completed in the mid-1990s. A Norway-Western Europe pipeline project, Zeepipe, will have Phase 1 completed in October 1993 and permit the transport of Norwegian gas from Sleipner to Zeebrugge, Belgium. The Norwegian authorities have also agreed on the construction of a new pipeline linking the Norwegian North Sea to Emden in Germany, which is due to come on line in October 1995 and will supply Germany, Austria and the Netherlands (Europipe project). By the year 2000, Norwegian natural gas exports are likely to be approximately 50 million tonnes of oil equivalent (toe), most of it heading into the current EC countries.

Algerian natural gas imports into the EC in 1990 were divided between Italy (44%), France (29%), Belgium (14%) and Spain (12%). Algerian gas is either transported by pipeline via Tunisia and into the Italian grid or is exported as liquefied natural gas (LNG) via Arzew and Skikda to terminals in Belgium, France and Spain. Within a few years Greece will also receive Algerian natural gas in this manner. An extension of the Trans-Med pipeline, expected to be commissioned in 1995, will carry Algerian gas directly to Italy through a 2000 km long pipe. A second Algerian supplied pipeline, the Maghreb-Europe project, is expected to come on line in 1995 and will carry natural gas to Morocco and on to Spain.

MARKET FORCES

Demand

The combined effects of liberalising electricity markets and tougher environmental constraints are expected to expand the market for gas by making co-generation or combined heat and power (CHP) a more attractive option. This market accounts for about 10% of Western European power generation. Countries showing the largest growth potential for gas-fired co-generation are Denmark, Italy and the United Kingdom.

In Denmark, the government has made a commitment to expand gas-fired CHP applications. In Italy, the lack of power generation capacity and the constraining site approval regulations for public power plants have made new industrial co-generation more attractive as it is the easiest capacity to expand.

The recent privatisation of the electricity industry in the United Kingdom has led to higher costs for transmission and distribution of electricity making local generation more attractive. In addition, the public suppliers now face higher costs of

Table 1: Transmission and distribution of natural gas
Main indicators

thousand TJ (GCV) (1)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Gross EC consumption	7 792.0	8 217.0	8 592.3	8 689.3	9 221.9	8 890.2	9 369.5	9 654.9	10 767.1	10 764.6
Primary EC production	5 579.5	5 580.2	5 913.5	5 798.3	6 001.6	5 509.1	5 825.8	6 035.9	6 712.9	6 722.5
Extra-EC imports	2 436.0	2 777.9	2 858.8	3 094.0	3 427.2	3 487.9	3 731.2	3 819.7	4 149.8	4 175.9

(1) GCV = gross calorific value
Source: Eurostat

Table 2: Transmission and distribution of natural gas
Trends in consumption and usage of natural gas

thousand TJ (GCV) (1)	1983	1984	1985	1986	1987	1988	1989	1990	1991
Gross EC consumption	7 792.0	8 217.0	8 592.3	8 689.3	9 221.9	8 956.8	9 369.5	9 371.2	9 371.2
% of total energy consumption	17.4	17.8	17.9	17.9	18.7	17.9	18.3	18.6	19.1
Final non-energy consumption	569.0	646.2	626.6	529.7	527.2	531.2	534.9	528.4	487.2
Transformed in power stations	1 046.7	1 152.4	1 055.0	1 020.0	1 108.0	1 098.7	1 244.3	1 288.7	1 303.4
Final energy consumption	5 807.5	6 135.4	6 536.7	6 698.6	7 193.5	7 016.7	7 248.0	7 496.0	8 569.6
of which									
-industrial	2 260.9	2 331.9	2 376.7	2 341.7	2 632.5	2 681.8	2 850.8	2 939.9	3 177.7
-domestic and commercial	3 634.5	3 791.5	4 148.8	4 355.5	4 549.7	4 324.5	4 387.4	4 546.4	5 382.1

(1) GCV: gross calorific value
Source: Eurostat

Table 3: Transmission and distribution of natural gas
EC trade by origin

thousand TJ (GCV) (1)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Primary production	5 579.5	5 580.2	5 913.5	5 798.3	6 001.7	5 590.6	5 825.4	6 035.9	6 712.8	6 722.5
Intra-EC trade	1 306.2	1 207.	1 297.4	1 115.7	1 123.5	964.2	1 131.0	1 199.3	1 361.0	1 498.8
Imports extra-EC	2 436.0	2 777.9	2 858.8	3 094.	3 427.2	3 487.9	3 738.6	3819.7	4 149.6	4 175.9
Norway	1 005.1	1 090.6	1 030.4	1 039.2	1 133.2	1 126.6	1 057.9	1 030.7	996.1	986.4
ex-USSR	823.8	949.4	979.6	1 215.	1 294.7	1 351.7	1 475.2	1 683.9	1 886.0	1 815.6
Algeria	530.0	684.6	797.9	797.9	961.5	970.2	1 040.5	1 077.5	1 216.8	1 292.0
Other	77.1	53.5	50.1	41.9	37.8	39.4	164.9	57'8	50.7	81.9
Imports extra-EC as a % of gross EC consumption	31.3	33.8	33.3	35.6	37.2	39.2	39.9	39.6	38.5	38.8

(1) GCV: gross calorific value; TJ = 10KJ"
Source: Eurostat

Table 4: Transmission and distribution of natural gas
Share of natural gas in gross EC energy consumption

(%)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC (1)	17.4	17.8	17.9	17.9	18.6	17.9	18.3	18.8	19.1	19.3
Belgique/België	17.6	17.6	16.8	14.6	16.1	15.6	17.1	17.3	17.5	17.6
Danmark	0.1	0.6	3.0	5.5	6.9	7.8	8.9	9.8	10.9	10.5
BR Deutschland	15.9	15.8	15.5	15.5	17.1	16.5	17.6	17.7	16.9	17.4
Hellas	0.4	0.5	0.4	0.6	0.6	0.7	0.6	0.7	0.6	0.6
España	3.2	3.0	3.3	3.6	3.6	4.2	5.3	6.2	6.2	6.6
France	12.7	12.6	12.5	12.3	12.5	11.8	11.7	11.9	12.7	13.3
Ireland	22.3	22.7	22.2	15.1	14.4	17.2	19.6	19.8	18.6	18.5
Italia	17.9	20.5	20.6	21.5	22.8	23.5	24.7	25.8	27.0	26.9
Luxembourg	9.1	9.2	9.7	9.8	11.4	11.3	12.0	12.1	11.9	12.4
Nederland	50.6	51.2	52.8	51.2	51.5	47.3	47.9	46.7	49.7	48.4
United Kingdom	21.9	22.6	23.1	23.2	23.3	22.1	21.6	22.4	23.5	23.0

(1) Excluding Portugal - not relevant
Source: Eurostat

capital, similar to any other private sector company planning to build generation plants. This has also changed the balance of economics in favour of self-generation. Other factors, such as reform of the local tax and regulatory requirements on public electricity suppliers to purchase at least cost, have further levelled the playing field between bulk and local generation.

Gas consumption has stagnated in recent years and it is expected that there will be a decrease in consumption during the 1993/1994 time period.

Supply and competition

In many countries, the price of gas to final consumers is linked to that of competing oil products or other energy sources. Price increases will depend on the economic sector concerned but generally reflect the increase in costs suffered by the distributor, a cost of living index for the domestic sector and any changes in the cost of competing fuels. In some specific cases, e.g., electricity generation, the price may be escalated to the value of the product produced.

Contracts between gas transmission companies and producers have a variety of indices, ranging from the cost of living index or industrial production, to the price of oil (heavy fuel oil and gasoil) or coal. It is usual for a contract to contain some combination of these factors.

Third party access could result in both natural gas falling prices (as increased competition leads to a reduced ability to extract monopoly rent), and real incentives for gas companies to cut costs. However, the increased risks associated with the loss of monopoly power will lead to higher costs of capital, and a requirement for the gas companies to earn higher returns to cover the increased risk. The resulting effect on prices depends upon the relative effects of encouraging new entrants into the national markets and what impact that will have on actual levels of competition against the risk adversity of gas companies. The effects may not be uniform across all countries and will depend on specific structural and regulatory factors.

New pipeline projects linking North Sea fields with Western Europe and new storage capacities will undoubtedly enhance the quantity and security of the EC natural gas supply.

Production process

The physical infrastructure of the gas industry consists of pipelines and of other equipment needed to regulate the passage of gas through the pipelines (notably compressors) as well as for storage and gas treatment. Investment in 1988 was ECU 4.77 billion, an increase of 6% from 1987, and involved an increase in both transmission (+9.67%) and distribution (+5.6%). From 1982 to 1988, transmission investment declined by about 22%, but investment in distribution activities increased by 56% and resulted in an overall increase of 24%. This pattern reflects the maturity of the transmission grid in the majority of Member States, and the continuing expansion of the distribution lines to supply new end-users.

There are plans for a sub-sea pipeline, which will link the republic of Ireland to the United Kingdom. Portugal has no natural gas supply, but planning continues for a proposed LNG terminal to be built south of Lisbon. From there, pipelines will be run north to Lisbon and other principal cities. The gas infrastructure needs of Eastern Europe are expected to result in more integration with the West.

The Czech and Slovak sections of the Transgas east-west pipeline will be renovated to boost capacity by 5 x 10^9 m^3/yr from 75 x 10^9 m^3/yr to 80 x 10^9 m^3/yr. New pipe is being laid in Russia to connect it with Germany Frankfurt/Oder), via Belarus, avoiding the Ukrainian network. This project includes plans to provide a connection to the Baltic States.

Two other projects in the advanced design stage concern Iranian gas and Turkmen and Kazakh gas. The Iranian project is examining the possibility of building a pipeline via Turkey and Greece to Italy or Yugoslavia, or via Turkey to Central Europe (Bulgaria). Turkmenistan is examining the possibility of building a pipeline to Europe via the other Central Asian republics and Turkey. The route seen as the most advantageous includes a passage through Azerbaijan and Armenia, joining Turkey via Nakhichevan.

INDUSTRY STRUCTURE

Companies

The organisation and structure of the gas industry varies from country to country. In some Member States one company covers the whole gas chain, while in others there may be a number of companies involved in the production, transmission and distribution of natural gas. Additionally, some companies are state owned, while ownership is mainly in the private sector for others.

France and Ireland have vertically integrated gas industries, a structure that Greece is also planning to develop. The French (GdF), Irish (BGÉ) and Greek (DEPA) companies are 100% owned by the state.

In Belgium, Luxembourg, Denmark, Italy, the Netherlands and Spain, a two-tiered structure has developed. There is a national transmission company and local governments tend to own the companies that distribute gas. In Italy and Spain, the transmission company is state owned, with their respective transmission companies, SNAM and ENAGAS, are subsidiaries of government controlled companies. Other companies, such as DISTRIGAZ of Belgium, SOTEG of Luxembourg and Gasunie of the Netherlands are 50% state owned and 50% privately owned.

Two companies, GdF and SNAM, have exclusive national concessions for the purchase and/or transport and storage of gas. In Italy, this is limited geographically with SNAM having the exclusive rights in major parts of the country.

There are exceptions to this model within the two-tier structure, the most notable of which is in Germany where there are six companies importing gas, 18 transmitting it over long distances and over 500 regional transmission companies operating local concessions.

In the United Kingdom, British Gas, formerly a vertically integrated state-owned monopoly, was privatised in 1986. This had little immediate effect on the market, but during the early 1990s a process designed to change the structure of the industry was introduced. The franchise limit above which consumers can purchase freely was lowered and British Gas was forced to give up some of its gas purchasers to encourage competitors in the market. There are now several companies competing in the non-franchise market, many of which are joint ventures between, or subsidiaries, of oil companies and the United Kingdom electricity companies. At the same time, British Gas is to create a separate subsidiary to run its pipeline and storage systems. This subsidiary will also serve its competitors on an equal basis. Overall, it can be seen that a number of different structures exist for the supply of natural gas, each with its own implications for consumers and producers.

ENVIRONMENT

Natural gas contains virtually no sulphur and it emits less NO_x per unit of energy than other fossil fuels. It can also make a contribution towards reducing the risk of adverse effects of global warming, as natural gas combustion produces less CO_2 per unit of energy burnt than for the other fossil fuels.

Growing concern about the environmental impact of energy consumption has helped to sustain interest in natural gas. In late 1988, the EC directive concerning emissions from large

Table 5: Transmission and distribution of natural gas
Trends in natural gas consumption by country

thousand TJ (GCV) (1)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC (2)	7 792.0	8 217.0	8 592.1	8 689.3	9 211.4	8 956.6	9 371.2	9 654.8	10 767.1	10 764.6
Belgique/België, Luxembourg	343.3	354.8	355.0	317.7	356.1	352.1	391.8	400.0	427.1	442.7
Danmark	0.6	4.6	26.3	47.8	60.8	64.8	69.3	83.0	94.6	89.0
BR Deutschland	1 843.0	1 896.1	1 918.2	1 908.5	2 115.7	2 069.6	2 175.6	2 245.5	2 685.3	2 696.6
Hellas	3.2	3.5	3.3	4.5	5.2	6.2	6.3	6.4	6.4	5.8
España	99.5	94.8	109.4	118.8	121.9	155.7	206.5	231.2	260.5	276.9
France	1 042.6	1 090.2	1 129.1	1 131.8	1 168.3	1 104.7	1 137.6	1 157.5	1 304.7	1 369.0
Ireland	82.6	87.8	90.5	63.2	62.8	75.7	87.0	87.1	89.2	88.3
Italia	1 048.6	1 234.0	1 265.2	1 343.3	1 491.5	1 561.5	1 716.6	1 815.0	1 928.9	1 916.7
Nederland	1 356.7	1 433.7	1 503.7	1 512.9	1 563.6	1 416.7	1 451.9	1 433.3	1 602.7	1 563.5
United Kingdom	1 971.9	2 017.5	2 191.4	2 240.8	2 265.5	2 149.8	2 128.6	2 195.8	2 367.7	2 316.1

(1) GCV: gross calorific value
(2) Excluding Portugal
Source: Eurostat

combustion installations was adopted which imposes environmental abatement measures on new power plants. Increasingly stringent emission limits for SO_2 and NO_x favour the use of natural gas since in most cases, it does not require the heavy investments in emission abatement equipment that are associated with use of solid fuels and "normal" (i.e. high sulphur) heavy fuel oil.

The years 1989 and 1990 were noted by increasing worldwide concerns about the environment in general, and the greenhouse effect in particular. As a consequence, several countries (i.e. the Netherlands, Denmark, Italy and Belgium) have adjusted their generation capacity plans in order to incorporate an increased share of combined-cycle, gas-fired base and mid load power.

Methane, which contributes to the greenhouse effect if it is leaked or vented, contributed around 15% to the "radiative forcing" added to the atmosphere in the 1980s, based on the estimate that one molecule of methane has about 3.7 times the global "climate forcing" effect of one molecule of CO_2. However, emissions of methane from the natural gas chain currently contribute not more than 1 to 2% of the overall effect.

REGULATIONS

With the creation of the single market scheduled for the end of 1992, the EC has turned its attention to the ways in which a single energy market can be created. There are a number of elements in the Commission's approach to the gas sector that can be seen as an evolution towards third party access (TPA) legislation. First, in some countries the electricity or gas carrier is defined by statute. The Commission took action to remove the discriminatory aspects of these statutory monopolies in 1991 under article 37 of the Treaty of Rome, which requires that state monopolies should create no commercial discrimination. Second, the Commission is taking further action in the form of draft directives concerning two aspects. Two directives are aimed at providing TPA in gas and electricity markets, which find their legal basis in Article 90 of the Treaty of Rome. Two other directives seek to create a level playing field for both the gas and electricity industries, based upon Article 100A of the Treaty of Rome.

The directives based upon Article 100A have severe ramifications for some Member States. They seek to remove the influence of national governments in setting and approving tariffs other than for certain social welfare and rural supply protection cases. The directives also seek to separate the transmission and distribution functions of utilities and require them to produce transparent accounts.

Broad draft proposals were put forward by the Commission under Article 90 concerning opening the internal EC energy markets to more competition. These proposals for directives gave rise to a great debate within the EC institutions, across the industry and among the public. Agreement has been reached as to the objectives of the liberalisation of the market, but consensus is far from being reached as to how to achieve these objectives.

In essence, the original proposals made by the Commission were for the natural gas (and electricity) sectors to: abolish monopolies and exclusive rights for the building of high pressure gas transport lines and high voltage electricity distribution lines; create separate accounts and management responsibilities for the different types of activities in vertically integrated companies (production, transport and distribution); and authorise step by step third party access (TPA) to networks for large consumers or large distribution companies. Other specifics were also part of the debate, however, the TPA aspects of the proposals were the most difficult element. The industry is strongly opposed to TPA, claiming it will undermine the long-term security of gas supply and the higher costs of capital will act as a disincentive to exploration and production, which, in turn, would lead to increased costs of supply. The Commission remains convinced that access to the gas distribution system of some king or other is an essential element for a truly open gas (and electricity) market.

The Commission had pursued the concept of regulated access to the network. In a recent statement, the Commission expressed that it could be possible to progress towards an open market by means of case-by-case negotiations conducted at the commercial level. They felt that arbitration by Member States, who would be given supervisory powers to ensure that access could only be refused for legitimate reasons and that negotiations would be timely, would be essential and could be done by a regulator, by the application of national competition law, by an arbitrating authority or by any other appropriate procedure. The European Commission stated that it would wish to leave as much room as possible for subsidiarity (meaning that, where possible and more efficient, implementation of a policy is left to the Member States themselves).

OUTLOOK

The share of natural gas in Western Europe's energy mix is expected to increase steadily throughout the next two decades. Natural gas for industrial and residential use will make sig-

nificant inroads in some undeveloped markets such as Portugal, Spain, Greece and Ireland. The principal area of demand growth is expected to be in power generation.

There are various other factors which are anticipated to continue to influence the use of natural gas, including: environmental concerns and their consequences for the pattern of fossil fuel use; security of supply; developments in other fuel markets, notably the trends in oil availability and prices, as well as the role of nuclear electricity generation within the EC; the exploitation of new sources (e.g., Nigeria, Northern Norway, etc.); the competitive position of natural gas in the different end-markets; and the impact on the gas sector of the Commission's moves towards an integrated energy market and their long-term effects on the supply and demand patterns of natural gas (given the anticipated growth in European demand underpinned by the need for cleaner forms of energy.)

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Renewable energy

In 1991, renewable energy contributed around 4% to gross inland energy consumption in the EC. Of this percentage, the majority of the share come from large scale hydro-electricity production (31%) and from the combustion of biomass in one form or another (60%). The remaining 9% was a variety of renewable technologies in varying stages of development, bordering on commercial viability. Through national and EC funded research, development and demonstration (R,D&D) and other programmes and actions, this share is expected to increase to 8% of total primary energy demand by the year 2005.

Funding for renewable energy, though low compared to other energy research programmes, has increased substantially in past years. All the signs suggest that this trend will accelerate, driven predominantly by environmental considerations. At the EC level, the major programmes promoting renewable energy are Altener, Joule, Thermie (and Valoren).

INDUSTRY PROFILE

Description of the sector

Energy from renewable sources, that is those that are not depleted due to their exploitation, may be in the form of electricity or in gaseous, liquid or solid forms. Some renewable energy sources are predominantly limited to one form of energy production. e.g. hydro-electric power generation to produce electricity. Others are more flexible; biomass may be converted to liquid fuels, burnt as a low calorific solid fuel or gasified and be used for electricity generation.

The major renewable energy technologies are listed below by the form of energy they most commonly produce.

Electricity

Tidal power extracts energy from the tides using the same principles as hydropower facilities but captures the tidal ebbs and flows rather than the flow of a river to generate electricity.

Small hydro-electricity generation uses the same principles as large scale hydro-electricity, but it generally uses different types and sizes of turbines.

Wind power generation uses the wind turbine to generate electricity by the same principles as the old fashioned windmill but using a higher level of technology.

Photovoltaic systems, use semiconductor materials to convert solar radiation into DC (direct current) electricity without moving parts or thermal energy sources.

Heat and/or Electricity

Geothermal energy use takes heat from the earth directly for heating purposes, or uses it for electricity generation. The temperature determines the application.

Biomass is considered all matter that can be derived directly or indirectly from plant photosynthesis. "Indirectly" refers to the products available via animal husbandry and the food industry. Feedstocks for the technologies include wood resources, agricultural wastes, residues and surpluses and energy crops.

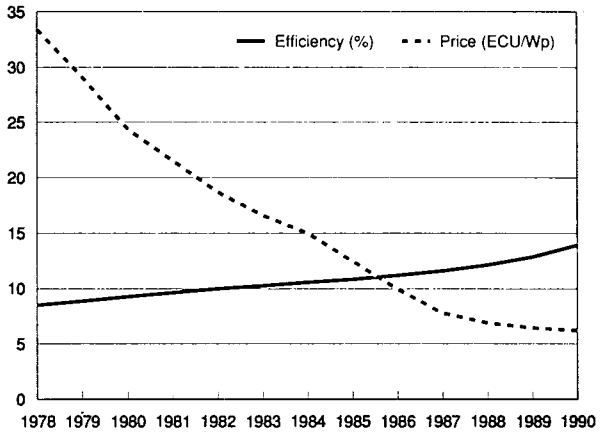
Heat

Active solar generation produces heat by capturing solar radiation. It usually consist of one or more collectors, an energy transport system to move the heat to the point of use, an electronic control system and an energy storage system.

The 'Renewable Energy Industry' is very broad in definition and is not classified as a single industry under NACE. Given the current relevance of the industry in the context of its environmental benefits, compared to other methods of energy production, the different forms of renewable energy are discussed under one heading. In addition, associated industries exist which fall into two types.

- Industries that provide feedstock: e.g., the Agricultural products industries (NACE 011, 014, 020) who provide feedstocks such as straw, slurry and wood residues for biomass derived renewable energies; the pulp and paper and wood processing industries (NACE 471/2, 461/2) who produce waste products and residues which can be used as feedstocks; and the waste and recycling industries (NACE 62, part of 921) who provide low cost feedstock.
- Manufacturing industries that provide components for use by renewable energy technologies: e.g., the mechanical engineering industry (NACE 32) that is involved in the manufacture of renewable energy equipment, the most important being turbines (water turbines for hydroelectric plants, aeroturbines for wind farms and steam turbines for geothermal power stations); agricultural equipment used for biomass collection and processing; and the electrical engineering industry (NACE 34) who, in addition to manufacturing electrical components for control equipment, manufactures semiconductor material for photovoltaic cells.

Figure 1: PV module cost and performance



Wp: peak watts
Source: IT Power, UK

Recent trends

Mature renewable energy technologies such as biomass combustion and hydroelectric power have been a significant part of EC energy supply for some time. Over the last two decades, the energy supplied by these sources has seen significant growth. Since around the 1970's, energy supplied from other renewable sources has grown very quickly, though it is still a very small fraction of total energy supply.

The situation by Member State for the supply of electricity and heat from each of the renewable energy technologies is shown in Tables 1 and 2. Around 10% of electricity demand is met by renewable energy sources. Hydro-electric power generation accounts for 86% of the renewable electricity supply. Biomass and hydro, together, make up nearly 98%. Biomass sources provide almost all of the renewable heat supply and 3% of total EC heat demand

Greece has the largest installed capacity of solar collectors. In France and Portugal, where the climate is particularly fa-

Table 1: Renewable energy
Electricity production from renewable energy sources, 1990

(terawatt hours)	Solar	Wind	Biomass	Hydro	Tidal	Geo-thermal	Total	% Total demand
EC	0.00	0.66	21.68	164.94	0.50	3.21	191.00	10.10
Belgique/België	0.00	0.01	0.94	0.31	0.00	0.00	1.26	1.90
Danmark	0.00	0.51	1.67	0.02	0.00	0.00	2.20	6.70
BR Deutschland	0.00	0.02	3.12	18.73	0.00	0.00	21.87	4.10
Hellas	0.00	0.00	0.38	2.52	0.00	0.01	2.91	8.20
España	0.00	0.01	7.04	31.40	0.00	0.00	38.45	25.60
France	0.00	0.00	3.02	62.26	0.50	0.00	65.78	17.70
Ireland	0.00	0.00	0.19	0.74	0.00	0.00	0.93	6.60
Italia	0.00	0.00	1.76	36.20	0.00	3.20	41.16	16.60
Luxembourg	0.00	0.00	0.06	0.08	0.00	0.00	0.14	3.00
Nederland	0.00	0.08	1.59	0.06	0.00	0.00	1.73	2.60
Portugal	0.00	0.00	0.95	9.01	0.00	0.00	9.96	15.00
United Kingdom	0.00	0.01	0.99	3.62	0.00	0.00	4.62	1.40

Source: ESD, DECON, ITC, ERL

vourable, active solar technology also makes a contribution. The Danish have by far the largest amount of wind power installed: it accounts for roughly 77% of electricity generated from wind power in the EC. Italy, France and Spain generate the majority of small hydro generated electricity in the EC. Italy has the largest geothermal energy industry, a large proportion of which (520 megawatts, MW) is used for electricity generation. France, Germany and Italy have the largest biomass consumption due to a large amount of direct wood combustion. Denmark, however, uses a high proportion of agricultural waste, mainly crop residues like straw, in biomass consumption. Spain generates the most electricity from biomass in the EC.

MARKET FORCES

Geothermal energy

From a world perspective, the production of electricity from geothermal sources has accelerated over the past decade. Between 1980 and 1990, production increased by 50% from 3 900 MWh (megawatt/hour) to 5 850 MWh. In the EC, the greatest amount of geothermal electricity generating capacity by far lies in Italy (545 MW in 1991) where over 50 geothermal units are in operation. Other countries include France (4.2 MW in Guadeloupe), Portugal (3 MW in the Azores) and Greece (2 MW on Milos). Germany has a 10 MW plant at Neubrandenburg. The capacity of this plant is to be doubled in the near future and a second 50 MW plant is being considered at Schwerin. Further developments are centred in Italy where the largest geothermal power plant in the world, a 60 MW plant, opened in Tuscany in 1991. Plans for three more plants of this size are being considered in line with governments policy to increase the share of geothermal derived electricity to 3% of total national energy production.

In addition to geothermal energy for electricity production, hot ground water may be used for space heating on a smaller scale. Worldwide, the consumption of geothermal energy for heating was around 2 million toe (tonnes of oil equivalent), the majority being used in Japan, China, Iceland and Hungary. In the EC, it is estimated that in terms of primary energy, it represented 370 000 toe in 1990. The regional distribution is the same as that for geothermal electricity production, yet it differs in that it is used extensively in urban areas. In 1990, the equivalent energy saving from using this source of energy was 170 000 toe in France and 200 000 toe in Italy. Other countries with geothermal potential for heating include Spain, Portugal, Greece and Germany. In former East Germany, much use was made of geothermal energy for district heating, a 12

Table 2: Renewable energy
Heat production from renewable energy sources

(thousand tonnes of oil equivalent)	Biomass	Solar	Geo-thermal	Total	% Total demand
EC	20 561	158	171	20 884	3.3
Belgique/België	267	0	2	269	1.0
Danmark	557	1	1	559	5.5
BR Deutschland	3 480	12	7	3 498	1.8
Hellas	534	69	4	607	5.4
España	1 613	9	3	1 624	3.8
France	9 422	30	71	9 520	9.6
Ireland	70	0	0	69	1.2
Italia	2 913	16	83	3 012	3.4
Luxembourg	11	0	0	11	0.4
Nederland	299	0	0	299	1.2
Portugal	1 065	21	0	1 085	4.2
United Kingdom	330	0	0	331	0.3

Source: ESD, DECON, ITC, ERL

Table 3: Renewable energy
Exploitable small hydro-potential

(gigawatt hours/year)

Belgique/België	N/A
Danmark	N/A
BR Deutschland	2 000
Hellas	2 000
España	66 000
France	75 000
Ireland	190
Italia	65 000
Luxembourg	5
Nederland	130
Portugal	6 500
United Kingdom	400

Source: Water Power and Dam Construction (May 1991)

MW plant will come on-line in 1994 in Mecklenburg-Vorpommern. In the west, a 20 MW project in Bavaria will be Germany's largest geothermal plant, and is due for completion in 1994.

Tidal power

The largest tidal power station in the world is at La Rance, in France. Conceived as a prototype for other, possibly larger, tidal plants along the Brittany coast, it has been operating since 1968, with an installed capacity of 240 MW_e (megawatt of electricity). Predominantly due to concern over the environmental impact of tidal barrages, no further sites have been developed despite their considerable potential. The best sites are to be found along the west coast of Portugal, France, Ireland and the United Kingdom. In the United Kingdom, where the tidal potential is approximately 54 TWh/year (terawatt/hours per year) - over half of the total European tidal resource - the government has been heavily investing on tidal energy research and feasibility studies since 1979. A barrage across the Severn Estuary could generate around 17 TWh_e (terawatt/hours of electricity), equivalent to about 2.5 large (1 000 MW) power stations. Another project is on the Mersey which could generate 0.5 TWh_e.

Small hydro-electricity generation

In the EC, the total installed hydroelectric capacity is about 80 GW (gigawatt). Small hydroelectric plants (less than 10 MW) contributed 5 GW to this or just over 6%. There is a marked trend towards small scale applications of hydropower which have a smaller impact on the environment than their larger counterparts. The reason for this shift is mainly due to the limited availability of new large scale sites. The percentage of sites economically exploitable and already in use is 95% for large hydro but only 20% for small hydro-electricity. France, Italy and Spain have by far the largest small hydro potential. The total EC exploitable potential for small hydro-electricity is around 4-5 GW.

Biomass

The theoretical potential for biomass in the EC is very large at around 100-120 million toe. Within the EC, wood, straw and municipal solid waste are the most commonly used biomass fuels. The primary energy derived from these sources amounted to almost 22 million toe in 1989.

The great proportion of this total is given by wood. The EC currently consumes around 20 million toe of wood energy. France is by far the largest consumer of wood taking 45% of the EC total due to the large proportion of wood burning stoves used in rural areas.

The biggest consumer of straw for energy is Denmark, where there are over 12 000 straw-burning stoves on farms and over 30 district heating schemes using straw. Its importance is obvious when one considers that it provides 1.5% of Denmark's primary energy needs. Biomass provides 5.8% of Denmark's total primary energy requirements and the government intends to increase this to 9% by the year 2000.

The most widely used method of recovering energy from municipal solid waste (MSW) is by incineration; the other rapidly expanding major source is landfill gas. In the EC, around 550 schemes were operating in 1988, including 174 with heat recovery of which more than 80% are in France, Germany and Denmark. Disposal of MSW in landfill is widely practised in many Member States. The United Kingdom is notable in that 90% of MSW is disposed of in landfills. Typical schemes generate between 1 to 5 MW and may be used to generate electricity or used directly as fuel in industry.

Biogas consists mostly of methane, produced from the anaerobic digestion of organic residues. Agricultural waste, sewage and a variety of liquid industrial effluents can be treated anaerobically. The technology is widespread at sewage works and it is expected to be used increasingly in treating food industry waste and slurry from intensive livestock farming. Member States currently using biogas to any extent are Italy, United Kingdom, Denmark and the Netherlands, due to their livestock farming industries. The world's first biogas plant was finished in July 1991 in Denmark and is planned to generate 3 million m3 per year of methane.

The development of energy crops is closely tied to the Common Agricultural Policy (CAP). Set-aside land, which farmers must put to a use other than food production, will total around 15% of EC agricultural land. Energy crops are an attractive option to farmers. Wood could be sustainably harvested or coppiced (where the outer branches of a tree are stripped away without causing it any terminal damage). If 15 million hectares of farmland is in surplus by the end of the century, and if it was all turned over to fuel wood crops then it is estimated that 120-150 million tonnes of wood with an energy content of 55 to 65 million toe might be produced per year

Biofuels may also be produced from energy crops. The Netherlands is investigating using feedstocks such as elephant grass, poplar wood or straw for gasification to a fuel for use in electricity generation plants. The Italian chemical manufacturer, Novamont, is operating refineries in Italy and France with a total capacity of 160 000 tonnes/year to produce biodiesel from feedstocks of rapeseed and soya. A second Italian

Table 4: Renewable energy
Economic Indicators for the Danish wind power industry

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Annual Growth (%)	149	121	270	167	158	-28	-56	-42	158	23
Turnover (M ECU)	14	19	51	121	302	195	84	47	102	121

Source: European Wind Energy Association (EWEA)

Table 5: Renewable energy
National market share of solar collector sales (1990)

	Home Market Sales	National Market Share
	(sq. m)	(%)
EC	248 150	100.0
Belgique/België	0	0.0
Danmark	11 660	4.7
BR Deutschland	40 000	16.3
Hellas	130 000	52.9
España	6 000	2.4
France	16 700	6.8
Ireland	0	0.0
Italia	6 000	2.4
Luxembourg	0	0.0
Nederland	8 790	3.6
Portugal	13 000	5.3
United Kingdom	16 000	6.5

Source: TECSOL

refinery, run by Distilleria F. Palma with a capacity of 70 000 tonnes/year, has also started up in Naples.

Wind power

Denmark is the largest generator of electricity from wind energy in the EC. The industry has expanded considerably so that in 1991, the total installed capacity in the EC was 509 MW of which Denmark accounted for 70%, the Netherlands and Germany both for 11%. The USA has an installed capacity of 1 500 MW, consisting of around 15 000 turbines. Denmark has one of the smallest wind power potentials, and yet has by far the largest installed capacity. Sizeable subsidies were given by the Danish government during the late 1970s and early 1980s which boosted the industry and enabled it to enter the large Californian, USA export market ahead of competitors. The United Kingdom, in contrast, has the largest potential but relatively few turbines installed.

In Spain, a 30 MW plant has been commissioned, built largely by Endesa, the state electricity company, and Ecotecnica, a Spanish turbine manufacturer. In Greece, a series of wind projects have been approved for use on the Aegean islands. Technical difficulties have meant that off shore farms are less commercially developed. In Denmark, however, the electric utility Elkraft brought on-line the world's first off-shore wind farm consisting of eleven 450 kW (kilowatt) turbines. A second 5 MW farm is planned by the other electric utility, Elsam consisting of ten 500 kW turbines.

Active solar collectors

By far the largest user of active solar collectors is Greece. In 1989, the total installed solar collector surface area was around 1.3 million m2 that contributed around 67 thousand toe to primary energy production. In Greece, hot water from active solar collectors contributes 4.5% to the total hot water needs. In the other Member States, this fraction is considerably less due to less favourable climatic conditions and a smaller area of collectors installed.

Today, solar collector sales in Greece represent over half the total sales in the EC. Solar collector production in Greece, however is solely for the home market, which is very large. At EC level, imports from outside Europe are decreasing: they amount to about 2 500 solar water heaters and about 1 000 additional collectors each year.

Photovoltaic systems

The decrease in cost accompanied by the increase in efficiency of photovoltaic (PV) cells has enabled a rapid growth in the world photovoltaic market. Since 1978, when a mere 1 MW was installed world-wide, it has increased to reach around 56 MW in 1991, primarily for remote sites. However, it is now becoming feasible to use PV for power generation in a centralised manner. In 1992, in Switzerland, a 500 kW PV power station came on-line. In Greece, a 600 kW plant has been completed. In Spain, Germany's RWE and Union Electric Fenosa are to build a 1 MW PV power station, to be completed in 1993. In Italy, a PV power station over three times this size is under construction. Currently, the demand in Europe exceeds the production capacity. In 1991, the two largest PV manufacturers in Europe were BP Solar (E) and TST with a market share of around 15% apiece. Other large PV manufacturers are Helios (GR), Italsolar (I) and Photowatt. Together this group of companies accounts for about two-thirds of the PV market.

Table 6: Renewable energy
Forecast of energy production from renewable energy sources in the EC (1990-2010)

	1990 Electricity (TWh)	1990 Heat (ktoe)	1995 Electricity (TWh)	1995 Heat (ktoe)	2000 Electricity (TWh)	2000 Heat (ktoe)	2005 Electricity (TWh)	2005 Heat (ktoe)	2010 Electricity (TWh)	2010 Heat (ktoe)
Tidal	0.50	0.0	0.50	0.0	0.50	0.0	0.50	0.0	0.50	0.0
Hydro(1)	184.90	0.0	172.23	0.0	181.54	0.0	186.00	0.0	186.72	0.0
Wind	0.66	0.0	7.47	0.0	19.17	0.0	28.38	0.0	34.84	0.0
PV	0.01	0.0	0.03	0.0	0.08	0.0	0.27	0.0	0.77	0.0
Geothermal	3.21	171.4	6.17	817.9	9.12	1 635.7	10.57	2 093.9	11.82	2 349.1
Biomass	21.68	20 556.0	40.69	24 874.3	83.02	31 404.3	107.92	35 658.7	126.70	37 502.1
Active Solar	0.00	166.0	0.00	712.9	0.00	1 675.7	0.00	2 006.4	0.00	2 118.5
Passive solar	0.00	0.0	0.00	175.9	0.00	689.3	0.00	1 357.8	0.00	2 063.0
Total	191.00	20 891.0	236.31	26 703.6	300.63	37 087.6	346.68	45 314.6	378.16	51 969.1
Energy Demand	1 893	637 027	2 102	670 727	2 329	712 141	2 648	741 620	2 778	776 815
% Contribution	10.1%	3.3%	11.2%	4.0%	12.9%	6.2%	13.8%	6.1%	13.6%	6.7%
Renewable primaryenergy (2)		46 406		66 556		96 093		117 696		134 165
Total primary energy (ktoe)		1 099 194		1 182 917		1 279 658		1 382 476		1 453 928
% Renewable energy contribution		4.3%		5.6%		7.5%		8.6%		9.2%

TWh: terawatt hours
ktoe: thousand tonnes oil equivalent
(1) Includes large hydoelectric power stations
(2) Eurostat
Source: DG XVII;

Production process

Geothermal energy

Electricity generation is the most attractive use for geothermal energy due to the low distribution costs. At temperatures below 150° C the most common application is for direct heat. This has advantages in terms of its simplicity, efficiency and adaptability and is relatively cheap. The hot water cannot economically be transported a distance greater than about 1 km so the site location is limited by the cnd use location. Other methods such as magma, geopressured and hot dry rock technologies have been investigated though none are near to commercial viability.

Tidal power

The simplest systems generate power by capturing water at high tide and running the head of water through turbines. More complicated systems impede the flow of water in both directions. The turbine best suited for the low head characteristics is the bulb-type turbine and units are manufactured with runner diameters of 7.5 metres and capacities of 60 MWe.

Small hydro-electricity generation

Countries and institutions define what is small differently. An upper limit for small hydro is 10 MW, while capacities may be as low as a few hundred kW. The technology differs compared to large scale hydro-electricity generation in that turbines are specifically designed for low head conditions and the control equipment differs in its complexity.

Biomass

The resource base is huge and is said to be in the order of 100-120 million toe. On a global scale, the majority of the population relies on biomass as its primary source of fuel. In the industrialised world, where energy production is more centralised, biomass energy conversion is perhaps the most technically, economically and socially complex renewable energy option. Old, well developed technologies co-exist with completely new, advanced techniques for converting biomass to useful energy.

Liquid fuels may be produced by various methods, three are mentioned here. First, biodiesel consisting of complex natural esters from the esterification of oils extracted from plants such as rapeseed, linseed and the sunflower. Second, the hydrolysis and subsequent fermentation of plants with a high energy value can produce methanol or ethanol which can be used as fuels in vehicles with engine modifications. Lastly, liquefaction is a variant of the pyrolysis technique where a diesel or gasoline fuel may be produced by one of two methods. An indirect method gasifies the biomass and is followed by the catalytic conversion of the product to a liquid fuel. Direct liquefaction skips the gasification step using lower temperatures to produce partially deoxygenated, complex oils which are then upgraded.

Electricity generation and heating requirements can be met by direct combustion or gasification of wood, straw or other dry biomass. Household waste may be incinerated or the landfill gas used to provide heat and/or electricity. Agricultural waste such as slurries from animal husbandry may be used in the anaerobic digestion process to produce biogas: a high grade gas consisting mostly of methane. In addition, any organic material may be gasified (or liquefied) by thermal decomposition, in the absence of oxygen, by pyrolysis.

Wind power

Wind power in Europe, in its present form, can be said to have begun in the mid 1970s in the wake of the oil crisis. Over this time there has been considerable improvement in the design of turbines so that the efficiency, measured in energy generated per swept area per year, doubled between the beginning and the end of the 1980s. Modern wind turbines operate on either a horizontal or a vertical axis, though horizontal axis machines are the most common units manufactured. The average size of wind turbines installed in the EC has increased steadily and the trend is still continuing. There is no consensus as to the optimum size for machines, though R,D&D work is currently centring on 300 kW machines with rotor diameters of 25 metres. Along with improved technology comes increased reliability and lower costs. A study of the top performing wind farms in California showed an increase in the availability of electricity generated from 60% to around 95% over the 1980's. Based on Danish experience, turbines in the range 100-300 kW have an average total cost per swept area of 280 ECU/m2. The costs vary from country to country and from site to site, depending on the terrain and other factors.

In addition to onshore wind sites, a great potential exists for turbines situated off-shore. There are particular problems associated with this, however, such as difficulties of operation in a saline environment, achieving designs rigorous enough to stand up to storms and the difficulties of access for maintenance. Off-shore sited turbines tend to be larger than their land based counterparts and environmental constraints hindering turbines on land are more relaxed for off-shore sites.

Active solar collectors

In addition to temperature ranges that satisfy building energy needs, active solar technology can supply heat for industrial processes at moderate temperatures. The essential component is the collector and designs include flat plate collectors (glazed or unglazed), evacuated tube collectors and air collectors.

Unglazed solar water heaters are used in outdoor applications, predominantly for heating swimming pools. Glazed solar water heaters form the bulk of the market, representing approximately 90% of total installed collector surface area. Evacuated tube collectors form a small but growing part of the market, particularly in northern Europe. In value terms, they account for approximately 10% of total EC sales. Air collectors are generally built into the building structure to produce warm air directly or in connection with a heat pump for space heating. The most important and widely used application is for drying hay, particularly used in Sweden, where an estimated 200 000 m2 have been installed.

Photovoltaic systems

The basic element is the PV or solar cell. This is comprised of semiconductor materials which have both negative and positive charge carriers. When photons fall on the cell, electrons in the semiconductor are freed, and an electric current is generated. Cells are built into modules of around 1 m2 in size and may generate in the region of 100 W_p (peak watts). Efficiency has been increased by around 50% over the past decade.

Three methods of production exist. First, single crystal silicon is a well established technology, with cells that tend to be stable and relatively efficient. The cost of manufacturing, though decreasing, is still relatively high. Second, polycrystalline silicon ingots with grain sizes of several millimetres can be produced by a casting process less expensive than single crystalline process. Larger areas are needed for the same power and module efficiency is slightly lower. Polycrystalline silicon ribbons may be manufactured using edge defined film-fed growth and dendritic web processes. The manufacturing process is complex though it has high potential for high speed production. Third, thin film technology is an area of intense research effort. Films are deposited directly onto substrates by technologies such as glow discharge, chemical vapour and electro-chemical deposition. Semiconductor materials being investigated include amorphous silicon, copper indium diselenide, gallium arsenide and cadmium telluride.

INDUSTRY STRUCTURE

The renewable energy industry is a heterogeneous mixture of small and large companies. Small companies, which are financially viable through support from EC and national programmes, generally concentrate in niche markets where their core expertise lies. Large multinational companies have historically tended to view renewable energy investments as part of a long term strategy of diversification. Research into renewable energy technologies is conducted predominantly in universities and government research institutes. However the research budget for renewable energy in large companies has been on the increase. Government incentives have made renewable energy technologies more attractive and companies involved in the market have stepped up investment in order to retain a competitive edge in the field.

REGIONAL DISTRIBUTION

The factors currently governing the regional distribution of renewable energy technologies are, in order of decreasing importance, the relative size of national financial incentives promoting renewable energy, the technical and commercial maturity of the technology and the size of the resource base. For more mature technologies, such as biomass combustion and hydro-electricity generation, the size of the resource is the most important. A good example is the wind energy industry in Denmark. The wind resource in the region around Denmark is relatively small, however a government commitment to wind energy has produced the largest wind energy industry in Europe. In the United Kingdom, which has the biggest wind energy resource in Europe, the wind energy industry is less well established.

In the long term, as renewable energy technologies mature, the size of the resource base should become the main factor controlling the size of the industry. PV, active solar energy and biomass all rely on sunlight, hence the southern regions have the most potential. The mountainous regions of the Community have the largest potential for small hydro power. The largest tidal potential exists along the western coasts of the United Kingdom and France. Wind energy has the largest potential in the north west region of Europe. Geothermal power will remain confined to Italy.

ENVIRONMENT

In the mid 1970s, interest in renewable energy was born as a result of high crude oil prices. Current interest is centred more on the environmental benefits that renewables offer, particularly with respect to their contribution to reducing carbon dioxide emissions.

With the exception of biomass, renewable energies are almost free of pollution. This clearly differentiates them from conventional methods of energy production where increasing concerns over pollution from the energy sector is forcing very large investments in emission control equipment. This is not to say that renewable energy has a negligible environmental impact. Ironically, the growth of the renewable energy industry is driven on the one hand by world scale environmental factors such as the threat of global warming, while on the other hand, being constrained by environmental factors on a local or regional level such as the visual impact of wind turbines and the environmental impacts of tidal and hydro-electric schemes.

There are two main environmental factors promoting the industry. The first is that a renewable energy technologies produce zero or negative net CO_2 emissions. Biomass releases carbon dioxide when burnt to produce energy. However, during biomass growth, carbon dioxide is sequestered from the atmosphere. If biomass use is accompanied by afforestation then the net carbon dioxide emissions for biomass could theoretically be zero or even negative in the long run. The second factor is that, with the exception of biomass, energy produced from renewable sources does not produce sulphur dioxide, sulphur trioxide or nitrous oxide, the principal components of acid rain.

The environmental impacts of renewable energy technologies, though less than that of conventional energy sources, are significant since they determine the feasibility of implementation. For example, tidal power systems have a very large impact on the environment. Environmental impacts arise mainly from: changes in water levels, flow patterns and velocities; sediment movement; and the physical presence of the barrage. The most serious effects are felt in navigation and for port facilities, water quality will be affected and the impact on wildlife, particularly birds and fish, is particularly acute.

The environmental impact of wind power is essentially on the human rather than the natural environment. There is significant visual intrusion, especially since the best sites are often the most beautiful and with the least signs of human interference. Noise levels are another factor. Telecommunications may be affected, though this is a localised problem. The impact of large scale implementation of wind turbines on bird life and bird migration is relatively unresearched.

Active solar collectors and photovoltaics have a visual impact since their use is predominantly in a widely dispersed fashion and because they must, for maximum efficiency, be placed in prominent positions.

EC AND MEMBER STATE SUPPORT

At the EC level, several initiatives are underway to promote renewable energy. Over the last decade, many Member States have successfully encouraged the development of domestic renewable energy industries through policies discussed below.

In Denmark, subsidies for installing wind turbines were phased out in 1989 and replaced by tax credits. Shareholders obtain income from the electricity sold tax-free below a set limit. State aid also encourages the use of straw as fuel, biogas plants and certain solar projects.

In France, special grants have been used to cover the exploration risks of geothermal development. In the area of biofuels the French government gives grants derived from a tax on petroleum products and a newly created biofuels agency coordinates R,D&D. Biofuels are exempt from excise taxes.

In Germany, a law (Einspeiseverguetungsgesetz, 1991) has helped wind and photovoltaic energy by forcing the electricity utilities to pay for electricity generated by these methods at a premium rate of 90% of the price paid by end consumers. Subsidies encouraging the installation of wind power are also available. For electricity produced by small hydro-electric generation, biogas and agricultural and forest waste, the rate they are paid is fixed between 65-75% of the electricity sale price.

In Greece, the government has made particular commitments to the promotion of wind and geothermal installations. Financial incentives take the form of subsidies in the region of 40-55% of the total investment. Tax breaks and low interest loans are also available.

In Spain, the national energy plan gives a clear objective for the contribution of renewable energy in the year 2000 and provides for government support.

In Portugal, the EC Valoren project and a national programme to promote renewable energy (SIURE) have benefited around 100 projects such as small hydro-electric generation, active solar collectors, photovoltaics, geothermal energy, wind power, the use of wood residues and the production of biogas. The relaxation of the authorisation procedure for the production of electricity from small installations has particularly benefited small hydro, biomass and biogas. In addition to EC funding,

10 million ECU have been invested in projects in the areas of active solar collectors, photovoltaics, biomass and biogas

In Italy, funding is available covering 30% of the capital costs for renewable energy projects. For demonstration projects, 50% funding is available and 80% subsidies are available for the installation of photovoltaic equipment in buildings. Efforts to remove barriers to the incorporation of electricity from small generators has resulted in very favourable tariffs for wind, photovoltaics, geothermal and biomass energy in particular. Biofuels are exempt from excise taxes.

In the Netherlands, wind power installation is subsidised on the basis of the swept area and in the area of R,D&D, funding for 50% of the costs are made available. General subsidies go to solar, biomass and geothermal projects of up to 40% of costs.

In the United Kingdom's privatised electricity sector, regional electricity companies (REC's) are obliged to purchase a portion of their electricity from non-fossil sources under the Non-fossil Fuel Obligation (NFFO). This obligation also forces the REC's to purchase the electricity at premium prices organised in bands. Different renewable technologies are associated to different price bands according to their commercial status. Other than energy from waste, wind and small hydro-electric generation projects are currently being supported under the scheme.

The European Commission has several programmes running which support renewable energy.

The Altener programme was launched by the Commission (13 September 1993) to promote greater penetration of renewable energy. It will run until 1997 on a current budget of 40 million ECU. The plan contains the political EC objectives which are to increase the penetration of renewable energy's contribution to total primary demand from the current 4% to 8% by 2005, to triple the production of electricity from renewable energy sources (excluding larger hydro-electricity power stations) and to secure for bio-fuels a market share of 5% of total fuel consumption by motor vehicles..

The Joule programme is continuing to run under the Community's Framework Programme on research and technological development. The renewable energy technologies covered are wind energy, photovoltaics, biomass and geothermal energy.

Thermie is the Community's technological programme designed to promote, among other objectives, the greater use of renewable energy sources. Renewable energy takes its share of the funds along with R,D&D into the rational use of energy, hydrocarbons and solid fuels. The programme is designed to run from 1990-1994 with an estimated 700 million ECU of funds.

Valoren was a Community regional funding programme relating to the development of certain, less favoured regions of the EC by the encouragement of their indigenous energy potential.

OUTLOOK

Strong growth in the renewable energy industry is predicted into the next century. Some technologies will see faster growth than others and this will depend more on the type and effectiveness of policies promoting market penetration than technological development, though this will also take place. Photovoltaics are less commercially viable than the other renewable energies discussed and a decrease in the module cost per kW is a prerequisite before photovoltaic technology can compete seriously in the electricity supply industry.

Strongest growth could occur in the area of biomass and other renewable energy technologies, notably wind and geothermal energy. The share of large hydro-electric generation, though remaining large, will see relatively slow growth due to the lack of suitable sites remaining.

For electricity generation, biomass, predominantly wood, agricultural residues like straw, and waste will be increasingly used. Direct combustion will be the main method, though gasification should see larger growth. Electricity generation from wind energy is expected to grow rapidly though it is dependent on political factors to enable its widespread development. In the generation of electricity from geothermal sources, only Italy and Greece have high temperature geothermal resources. Italy is likely to see the largest growth in this area in the short term. Small hydro-electricity generation will experience higher growth than its larger counterpart. Photovoltaics, though a small component, will see growth in applications for remote locations. In the long term, PV will see higher growth through grid connection from either centralised or decentralised generation sites.

For heating applications, biomass will again play the major part, gasification technology showing the largest growth. The future for biofuels, formed from energy crops such as rapeseed or sunflowers, depends very much on future agricultural policy in the EC. Energy crops could supply farmers with a valuable source of revenue from set-a-side land. Tax breaks, as seen in Italy and France and continued Member States support will ensure that the use of biofuels increases.

Geothermal energy for heating will experience growth in all Member States where resources are available. The future prospects for the active solar collectors market depends to a large extent on the effectiveness of national and EC energy plans. Denmark and the Netherlands will see large growth due to government commitments to reducing carbon dioxide emissions; similar conditions should favour the industry in Germany. Italy has recently included the development of active solar energy into its national energy plan, ambitious targets have been made and these should promote strong growth. Spain has considerable potential, a government commitment combined with public education campaigns could result in active solar being widely implemented. In Greece, the market, though large, is not near to saturation and is likely to continue increasing steadily.

Written by: DRI Europe

Overview

Mining and quarrying operations in the EC vary widely in size and operation. The EC is a major world producer in construction raw materials and physical industrial chemicals. Currently the industry suffers from high stockpiles and low demand in the case of metals and oversupply and low minerals prices in the case of industrial minerals.

INDUSTRY PROFILE

Description of the sector

The non-energy mining and quarrying sector is broadly divided into two main sections, metals and industrial minerals. The metals section is subdivided into iron ore (chapter 2) and non-ferrous metal ores (chapter 2), which form the raw material for iron and steel making (chapter 3) and non-ferrous metals manufacture (chapter 4) respectively. Industrial minerals are categorised by their applications into construction raw materials and stone (chapter 2), chemical industrial minerals (chapter 2), and physical industrial minerals (chapter 2). Over 30 minerals are extracted and beneficiated and the EC is major world producer in some products, notably construction raw materials and some of the physical industrial minerals. Individual commodities for which significant mines and quarries are operated in the EC include: copper, zinc, limestone, dolomite, other stone, sand and gravel, silica sand, kaolin, and bentonite.

The value of production in the sector totals approximately 15 billion ECU, a relatively low figure in comparison with other industries but significant in terms of providing vital raw materials for added value industries such as metal products and construction. Construction raw materials account for nearly 75% of production value.

All EC countries bar one, have significant mining activity, with Germany the biggest producer, responsible for over 25% of all supply. Germany, France and the UK combined produce over 60% of EC mined minerals; Italy and Spain also have outputs of over 10% of the EC total. Portugal, Spain, Ireland, and Greece produce over 90% of non-ferrous metal ores, and only France and Spain extract iron ore.

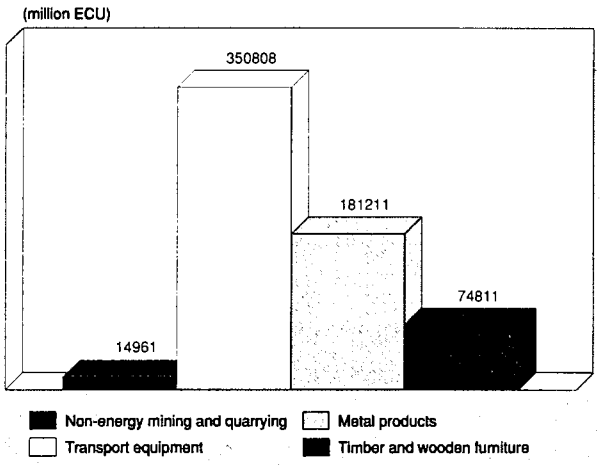
Recent trends

In all categories, production levels which remained on average fairly constant during the second half of the 1980s, have declined since 1989 by over 30% as a result of the worldwide recession. This change is most noticeable in the area of non-ferrous metals where the value of production in constant prices has halved, although 1989 was a particularly good year for that sector. In general terms the reductions have been due to falling commodity prices, which for many minerals, are at an all time low in real terms. Production of physical industrial minerals in 1992 remained close to 1991 levels in constant value terms but reductions were experienced in all other sectors commensurate with declining consumption.

International comparison

The EC remains a negligible producer of iron ore in a world context. In comparison the USA is nearly self-sufficient, although EC consumption is twice as high. Japanese consumption lies between the two with zero production. The EC produces around 20% of its non-ferrous ore needs, compared to over 75% in the USA and just over 10% in Japan. The USA produces 2.5 times more non-ferrous metals than the EC produces.

Figure 1: Non-energy mining and quarrying Production in comparison with other industries, 1992



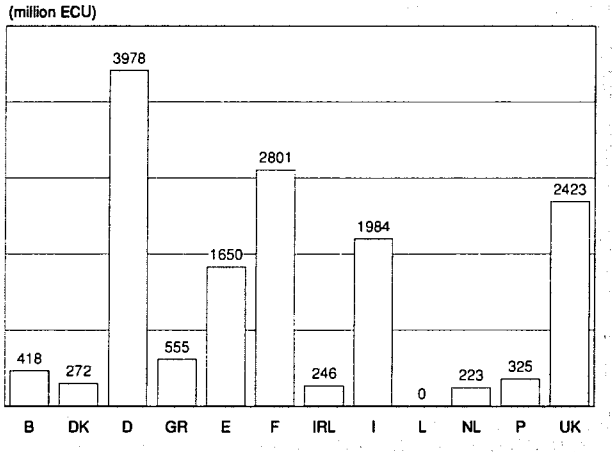
Source: B.M.Coope & Partners, DEBA

In industrial minerals, the EC is the world leading producer of construction raw materials with output 50% higher than the USA and 300% higher than Japan. The EC remains almost 50% ahead of the USA in the extraction of physical industrial minerals although for the for chemical industrial minerals the USA produces at a level three times greater than EC levels. Japan has experienced only a small reduction of both the latter categories. Overall, EC and USA consumption levels are very similar. The USA is net self-sufficient in minerals, and EC production is 75% of US levels and nearly 4 times higher than production in Japan.

Foreign trade

Trade in metal ores has been heavily affected by high international stocks and reduced demand. The EC's dependency on metal ore imports is very high and major sources of imports are the traditional mining countries, most notably in South and North America and Australia. Exports are insignificant. The net trade deficit for all industrial minerals is only 5%,

Figure 2: Non-energy mining and quarrying Production by Member State, 1992



Source: B.M.Coope & Partners

Table 1: Non-energy mining and quarrying
Breakdown by sector, 1992

(million ECU)	Apparent consumption	Production	Extra-EC exports
Iron ore	2 831	106	4
Non-ferrous metal ores	2 824	554	297
Construction raw materials	10 963	10 682	363
Chemical and fertilizer raw materials	1 812	1 608	561
Physical minerals	2 337	2 011	328

Source: B M Coope & Partners, Eurostat

Table 2: Non-energy mining and quarrying
Main Indicators in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993(1)
Apparent consumption	21 436	23 976	25 832	22 511	21 851	24 502	27 210	24 023	22 275	20 768	23 000
Production	14 997	16 182	17 401	16 032	16 213	17 756	19 326	17 219	15 802	14 961	15 000
Extra-EC exports	819	987	942	743	754	1 174	1 552	1 422	1 521	1 553	1 690
Trade balance	-6 439	-7 794	-8 431	-6 479	-5 638	-6 746	-7 884	-6 804	-6 473	-5 807	-8 000
Employment (thousands)	203.3	212.5	206.9	201.8	203.8	201.0	201.5	211.2	213.1	203.3	194.0

(1) Eurostat estimates.
Source: B M Coope & Partners, Eurostat

Table 3: Non-energy mining and quarrying
Average real annual growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption	0.9	-7.1	-2.7
Production	-0.1	-8.1	-3.8
Extra-EC exports	3.3	5.5	4.3
Extra-EC imports	3.2	-3.8	0.0

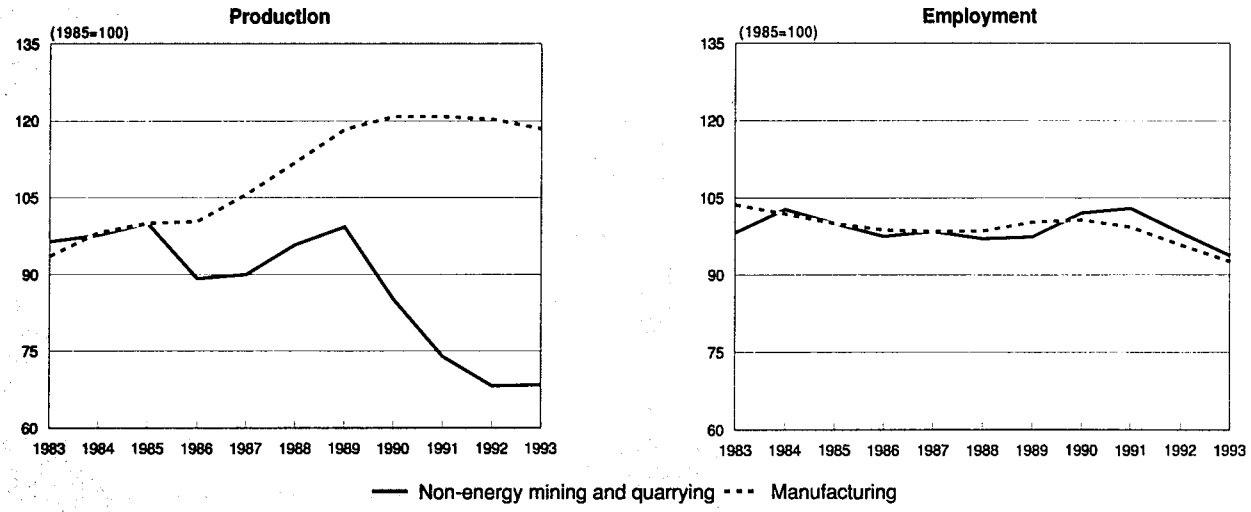
Source: B M Coope & Partners, Eurostat

Table 4: Non-energy mining and quarrying
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	819	987	942	743	754	1 174	1 552	1 422	1 521	1 553
Extra-EC imports	7 258	8 781	9 373	7 222	6 392	7 920	9 436	8 226	7 994	7 361
Trade balance	-6 439	-7 794	-8 431	-6 479	-5 638	-6 746	-7 884	-6 804	-6 473	-5 807
Ratio exports/imports	0.11	0.11	0.10	0.10	0.12	0.15	0.16	0.17	0.19	0.21
Terms of trade index	95.0	96.4	100.0	118.1	132.8	136.4	120.1	119.2	123.1	128.7
Intra-EC trade	1 560	1 858	2 337	2 458	2 210	2 754	4 034	4 013	3 992	3 885
Share of total imports (%)	17.7	17.5	20.0	25.4	25.7	25.8	29.9	32.8	33.3	34.5

Source: B M Coope & Partners, Eurostat

Figure 3: Non-energy mining and quarrying
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: B.M.Coope & Partners, DEBA

representing less than 15% of the overall total. The relatively low unit value of industrial minerals places economic restraints on transport distances and thus EFTA countries are featured more extensively as trading partners.

MARKET FORCES

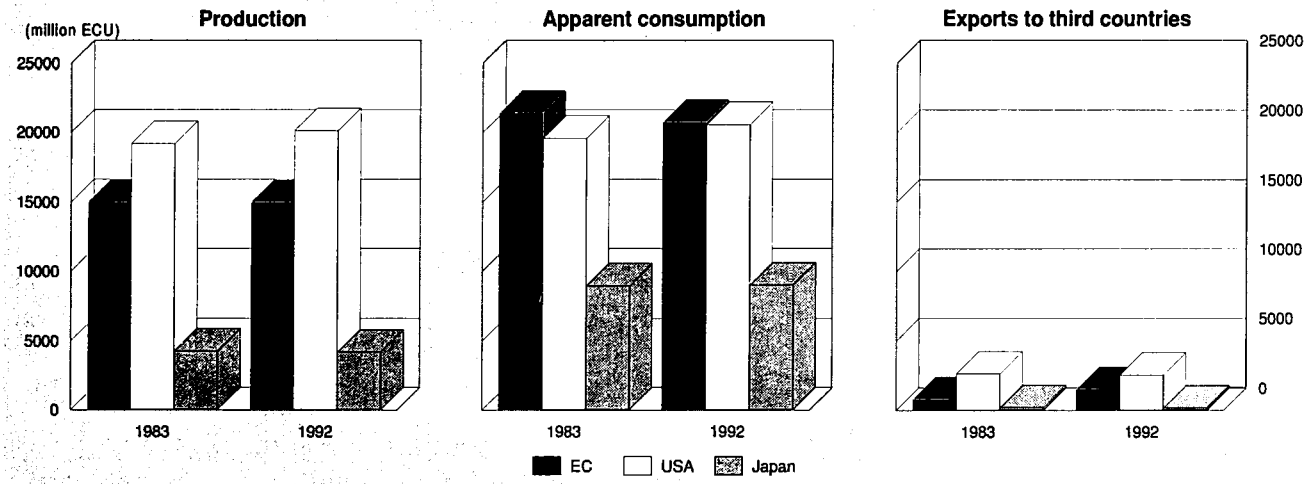
Demand

Demand for metalliferous ores and concentrates by the consuming sectors, iron and steel making and metal products is dictated by the end use industries, in particular transportation, machinery, and construction, all of which have been adversely affected by the recession. Individual metals are particularly affected by the electrical (copper), construction (steel, zinc, and aluminium), transport (steel, lead, and aluminium), and container (aluminium) sectors. Sign of improvement in these industries has been noted as 1993 progresses.

The poor performance of the construction industry has obviously been reflected in lower demand for construction raw materials. Some minerals in this category are also consumed in the chemicals, metallurgical, glass, and ceramics industries which have been less affected by the recession than the construction industry. The bulk inorganic chemical and fertiliser industries, both of which were oversupplied in 1992, are end-use markets for the bulk of chemical industrial minerals. The physical industrial minerals are used across a whole spectrum of industries ranging from ceramics, refractories, glass, and abrasives to paper, plastics, and paint.

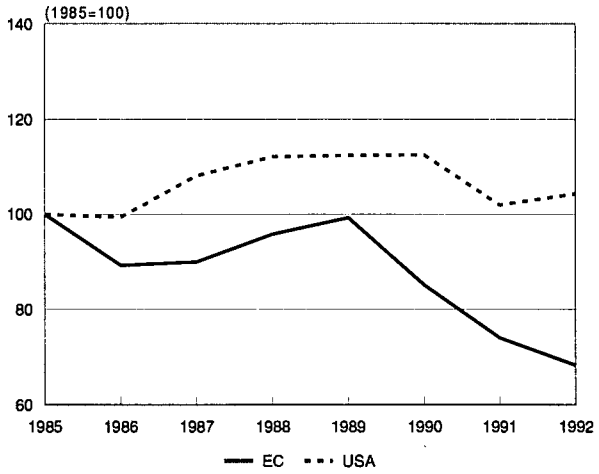
Application diversity of metals and, in particular industrial minerals, continues to provide a hedge against the problems of falling demand in any one sector. Nevertheless, overall demand for virtually all metal ores and industrial minerals was weak in 1992 and the presence of large stockpiles may retard recovery.

Figure 4: Non-energy mining and quarrying
International comparison of main indicators in current prices



Source: B.M.Coope & Partners, Eurostat

Figure 5: Non-energy mining and quarrying
International comparison of production in constant prices



Source: B.M.Coope & Partners, Eurostat

Supply and competition

The low production of metalliferous ores is a reflection of the small number of economically treatable orebodies which exist within the EC. This is not the case in many areas of the world where large, high grade deposits exist, often in combination with advantageous labour, energy, and environmental compliance costs. At present the sector is experiencing, high stocks, currently 35 million tonnes in the case of iron ore, over capacity and low demand, so that operating metal mines in the EC is not easy. Where high quality deposits are located, however, such as the Neves Corvo copper mine in Portugal, EC miners have shown that they can compete profitably with overseas operations.

As previously indicated, transport costs militate against imports of at least the low value bulk industrial minerals and encourage local development where possible. The EC is fortunate to have good grade deposits of a range of industrial minerals which are efficiently exploited. The effects of international oversupply are restricted, although the same logic reduces the scope for exports. General exceptions to the above are special circumstances such as where super quarries operate in conjunction with low cost bulk carriers, or where high value materials are required or preferred.

The major world oversupply of chemical industrial minerals, particularly potash, phosphates, and sulphur, have placed pressure on all but the largest and lowest cost producers, although sulphur production in the EC is virtually all involuntary. With lower by-product revenues, greater pressure is placed on the main product

Production process

It is estimated that there are around fifteen thousand mines and quarries of varying sizes operating in the EC, ranging from one million plus tonne per annum super quarries to small concerns employing a small staff. Wherever possible operations are by open pit or quarry which require more material to be removed, but at the same time greatly reduces the cost of extraction and handling. The larger EC operations employ state-of-the-art excavation and transportation equipment comparable to the best foreign mines. Improvements to the efficiency of equipment and processes are largely due to upgrades in materials of construction, computerised control, and scale rather than technical innovation.

Underground mines are confined to a small number of non-ferrous and higher value industrial minerals (such as potash and fluorspar) where the value of the product justifies the increased costs.

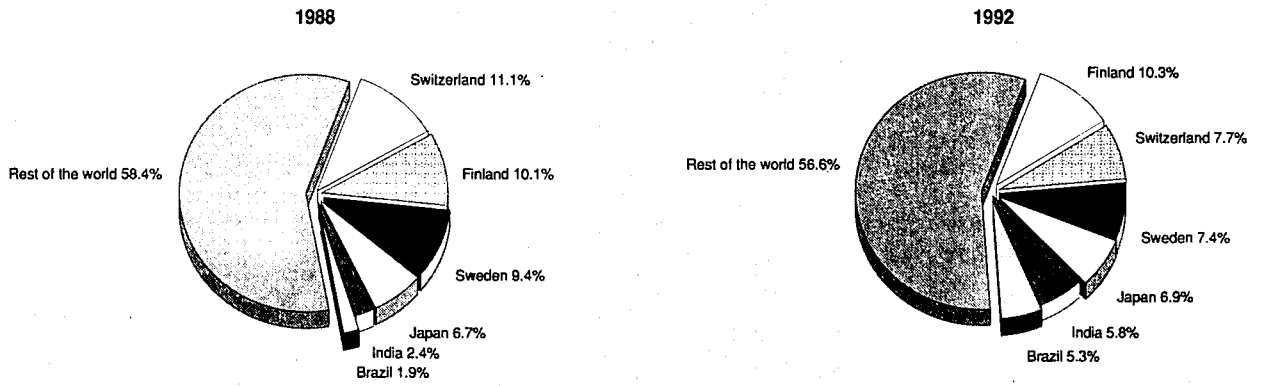
INDUSTRY STRUCTURE

Companies

Approximately 50 metal mining operations exist in the EC employing around 15 000 people. The largest operating company is Somincor, which mines and concentrates copper in Portugal. This mine is the world's tenth largest copper operation. Seven other EC companies employ over 200 staff each. EC companies such as RTZ (UK), Metallgesellschaft (D), and Union Minière (B) are strongly represented among the world's leading non-ferrous metals ores mining companies.

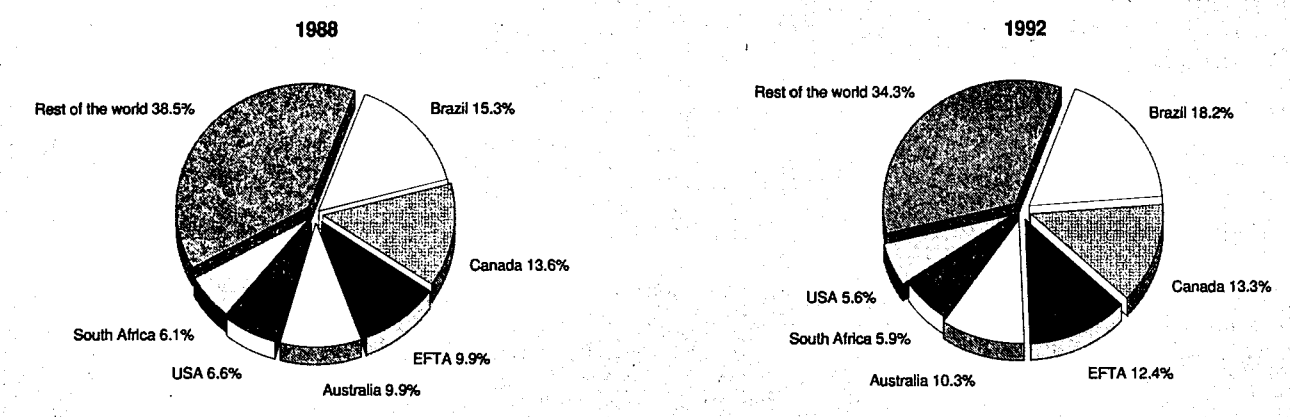
The number of companies, operations, and staff employed in industrial minerals mining and quarrying is difficult to assess, initially because of the lack of official data in virtually all countries. Reliable data is available for some single product companies but for other, larger organisations there is an insufficient breakdown of detail to isolate the industrial minerals data. Nevertheless, it is estimated that there are around 15 000

Figure 6: Non-energy mining and quarrying
Destination of EC exports



Source: Eurostat

Figure 7: Non-energy mining and quarrying
Origin of EC Imports



Source: Eurostat

mines and quarries of varying sizes in the EC involving over 1 000 companies and 200 000 employees.

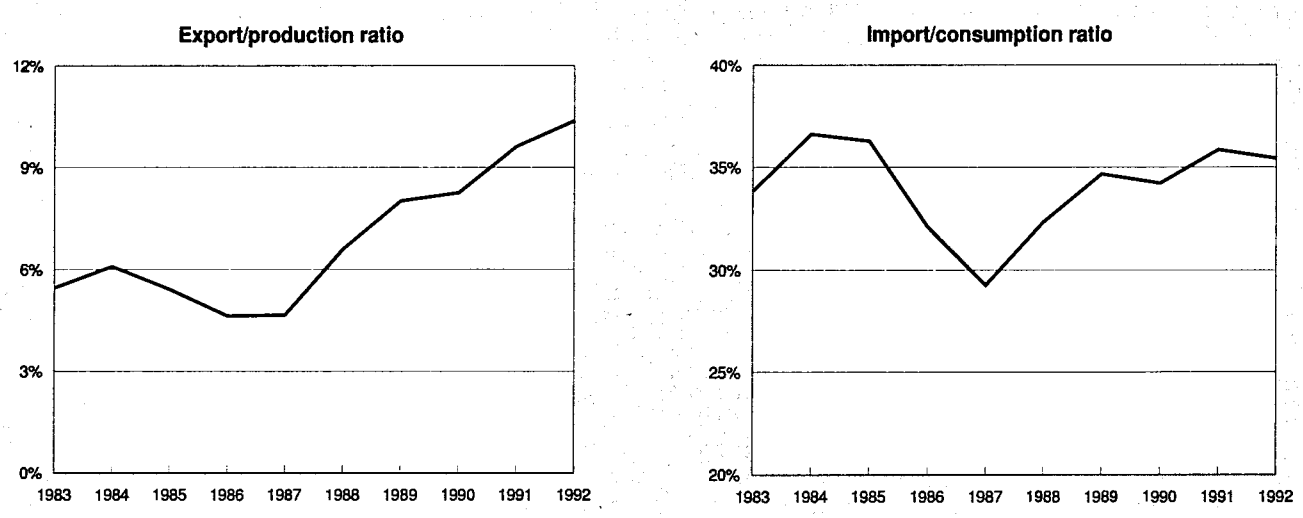
The largest industrial minerals producing companies in the EC, in many cases among the largest in the world, include, construction groups such as: Tarmac, RMC, Redland, and Blue Circle (UK), Lafarge Coppee and Ciments Français (F), Italcementi (I), CRH (IRL), CBR Cimenteries (B), and Heidelberger Zement and Dyckerhoff (D). These companies are all major producers of crushed stone for aggregate and/or cement manufacture and some are also involved in the production of other products such as lime, gypsum, and clays products. Other major construction raw material producers are the gypsum specialists BPB Industries (UK) and Knauf Bauprodukt (D). In non-construction sectors the major companies include: industrial limestone and dolomite: Lhoist (B) and Carmeuse (B) and Wulfrath (D); industrial sands: Sibelco (B), Hepworth (UK), and Quarzwerke (D); industrial clays: English China Clays (UK) and Sud Chemie (D); potash: Kali und Salz (D); salt: Solvay (B) and AKZO (NL); and sulphur: Elf-Aquitaine (F).

Strategies

Metals mining companies are pleased to operate in the EC if economic deposits are identified. Several companies have active exploration programmes in the EC although the extent of exploration is modest compared with higher priority geological targets in foreign countries, most notably in South America. Most mining companies' strategies are integrated with their metals production interests and an increasing feature has been the establishment of alliances between international groups to provide strength and flexibility in financial and raw material resources. One major European mining company, the Shell group company, Billiton (NL), announced its intention in 1993 to sell its international operations.

Strategic considerations in construction minerals are tied up with downstream activities. There has been a strengthening of the major EC groups by merger and acquisition and the extension of EC ownership of companies overseas, in particular in the USA and increasingly in East Europe. Strategic changes have also occurred with the rationalisation of mines in former East Germany and with companies withdrawing

Figure 8: Non-energy mining and quarrying
Trade intensities



Source: B.M.Coope & Partners, Eurostat

Table 5: Non-energy mining and quarrying
Breakdown by size of enterprise, 1990 (1)

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	14 081	88.2	38.0	34.0
20-99	1 688	10.6	31.8	34.2
100 or more	193	1.2	30.2	31.8

(1) Provisional estimates; extraction of non-metallic minerals (NACE 23) only.
Source: Eurostat

Table 6: Construction groups
The fifteen largest companies in the EC, 1991

(million ECU)	Country	Sales	Employment (thousands)
Tarmac Group	UK	4 601	31.7
Lafarge Coppee	F	4 541	34.7
RMC	UK	3 986	26.0
Ciments Français	F	2 360	N/A
Redland	UK	1 851	16.1
Blue Circle	UK	1 587	18.3
CRH	IRL	1 493	11.7
BPB Industries	UK	1 454	12.6
CBR Cimenteries	B	1 097	7.4
Italcementi	I	1 063	6.4
Heidelberger Zement	D	983	8.6
Knauf Bauprodukte	D	974	2.0
Hepworth	UK	942	10.1
Knauf Gips	D	828	2.5
Marley	UK	818	11.1

Source: B M Coope & Partners

from sectors, most notably ICI (UK) from salt, limestone, and soda ash production.

REGIONAL DISTRIBUTION

Iberia, Ireland, and Greece are the most important regions for non-ferrous metal ores mining whilst Lorraine and the Pyrenees are the dominant iron ore producing regions. Among industrial minerals the production of construction raw materials is fairly well distributed throughout the EC but the occurrence of many of the more important chemical and physical industrial minerals such as, potash, kaolin, and talc, are more localised.

ENVIRONMENT

Although maximum discharge levels for mining emissions are only fixed in two member countries, most countries now have, or are producing guidelines, or are tightening compliance standards for mines along with other industries. All mining is subject to restrictions on noise and dust emissions and to waste storage and/or dumping and mine site renovation after cessation of operations. The last mentioned is the subject of present discussion. Special problems for individual minerals include acid mine and rock drainage from base metal sulphide ores and salt generation during potash extraction. Mining and quarrying by their nature have an unavoidable environmental impact, albeit a temporary one. Responsible EC operators' standards compare well with international industry parameters and with other industries.

REGULATIONS

General regulations applying to mining activities are well established and followed. As mentioned, environmental legislation is the subject of continuous change on the basis of applying the best available technology without incurring excessive cost.

OUTLOOK

The EC will continue to be a major area of activity in the production, trade, and consumption of industrial minerals. Overall production and consumption will grow only moderately in the medium term but the longer term prospects are good, particularly for construction raw materials and physical industrial minerals. The future for some of the chemical industrial minerals appears less bright because of the uncertainties about future fertiliser usage and because of structural changes in the chloralkalis industry.

In the metals sector the EC is expected to remain a significant producer of non-ferrous metal ores and concentrates and new production can be expected in the medium term, most notably in zinc ore production. Prices and markets are predicted to improve moderately as part of the general upturn in EC economic activity. EC mining companies will also continue to be major players in non-ferrous mining developments in foreign countries. Meanwhile the EC's low level of iron ore mining may not be economically sustainable in the long term due to the low quality of indigenous deposits. EC and world consumption of iron ore is expected to grow strongly in the

Table 7: Non-energy mining and quarrying
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.2	2.2
Production	-0.1	2.2
Extra-EC exports	-0.1	1.4

Source: B M Coope & Partners

post-recession period but, a combination of large existing stocks and adequate low cost international mining capacity should prevent any potential shortages.

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The industry is represented at the EC level by: International Association of Mining Industries (EUROMINES). Address: Avenue de Broqueville 12, B-1150 Brussels; tel: (32 2) 755 6311; fax: (32 2) 779 0523.

Iron ore
NACE 211

The EC remains a minor and declining producer of iron ore, providing only a small proportion, 6% by volume and 3% by value, of the Community's requirements from operations in two countries. Almost all of the mined ore, which is of low grade, is consumed within the EC iron and steel making industry in which product demand in 1992 fell by 7%. EC output will shrink further due to changing raw material demand patterns from ore to scrap, the poor quality of the EC iron ores and competition from larger and cheaper overseas producers.

INDUSTRY PROFILE

Description of the sector

NACE 211 covers the extraction and physical processing of iron ore, the primary feedstock for iron and steel making. The iron ore may be oxide or less frequently sulphide (pyrite) and open pit methods of extraction are usually employed, however, in France, ore mining is exclusively an underground operation. Mineral processing techniques are used to concentrate the ores which may also be agglomerated and sintered. The products are used as raw material for iron and steel making (NACE 301) and in 1992 they had a total value of 106 million ECU.

Recent trends

Production tonnage within the EC declined 20% in 1992 and is currently less than 35% of 1983 levels. The rate of output reduction, which has dropped for ten successive years, increased in 1992 well above consumption trends, yet commercial factors make it likely that the decline will continue, possibly to the cessation of significant EC output by the end of the decade. Production in both France and Spain has reduced in parallel; the French product is of a particularly low grade and the outputs from both countries consist only of non-agglomerated ore. Consumption within the EC reduced by around 7% in 1992 due to recessionary trends but its predicted to stabilise and increase moderately in the short term at levels in excess of 150 million tonnes (at 60% iron content equals 90 million tonnes of iron), compared to current EC production of less than 90 million tonnes (at 30% iron content equals 2.7 million tonnes of iron). Exports of iron ore from the EC are negligible.

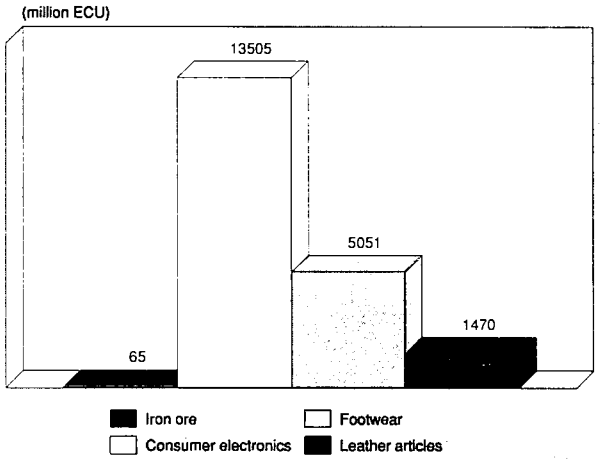
International comparison

The pattern of trade in iron ore in the EC and Japan is similar, although all production in Japan has ceased during the past 5 years and consumption was harder hit by the worldwide recession in 1992, falling down to 11%. The USA, by virtue of recovering from the recession in advance of Europe and Japan, has shown a growth in the value of both production and consumption. Current US consumption is around 50% of EC levels and its domestic production accounts for 83% of its requirements. Japanese consumption remains midway between that of the EC and the USA. In total world terms, EC production is less than 1% and consumption around 16% of overall figures.

Foreign trade

The negative trade balance continues to remain consistent at current prices with the same value for 1983 and 1992. Imports originate most significantly from South America and Brazil now provides about one-third of EC requirements. Australia and Canada are also major suppliers and together they account for a further 25% of total requirements. Exports, mainly to Eastern Europe, are insignificant. Production by low cost operations in countries such as Brazil, Australia, India, Mauritania, and South Africa is set to increase further during the 1990s.

Figure 1: Iron ore
Value added in comparison with other industries, 1992



Source: B.M.Coope & Partners, Eurostat, DEBA

MARKET FORCES

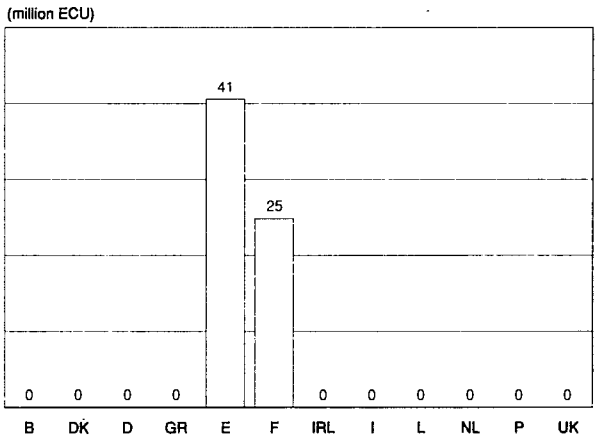
Demand

Iron ore both produced in the EC and imported from non-EC countries is consumed by EC steelmakers. The decline in demand for steel, particularly by the automobile, construction, and machine manufacturing sectors, has resulted in an overall reduction in iron ore consumption in the EC of 7%, which approximately equals the Western World average. Although certain EC countries are reporting industrial growth in 1993, no significant increase in demand is predicted for the EC as a whole. International production of iron ore is unlikely to be stimulated by moderate increase in demand due to the large surplus of iron ore stocks, reported to vary as between 17 and 35 million tonnes.

Supply and competition

Despite such favourable factors as stable labour costs, high and improving productivity levels and the sheer scale of local

Figure 2: Iron ore
Value added by Member State, 1992



Source: B.M.Coope & Partners, Eurostat, DEBA

Table 1: Iron ore
Main indicators in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)
Apparent consumption	3 075	3 573	3 998	3 068	2 568	2 999	3 142	2 945	3 202	2 831	2 890
Production	350	277	277	189	126	113	141	108	138	106	90
Extra-EC exports	0.8	1.0	0.8	1.2	1.0	5.4	2.2	4.8	3.3	4.3	3.0
Trade balance	-2 725	-3 296	-3 721	-2 879	-2 442	-2 886	-3 001	-2 837	-3 064	-2 725	-2 800
Employment (thousands)	5.15	4.45	3.80	3.52	2.85	2.48	2.11	1.91	1.75	1.19	1.00

(1) B.M.Coope & Partners' estimates.
Source: Mining Journal, B.M.Coope & Partners, DEBA

Table 2: Iron ore
Breakdown by sector, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Unagglomerated ore	2 152	106	4
Agglomerated ore	671	0	0
Pyrites	8	0	0

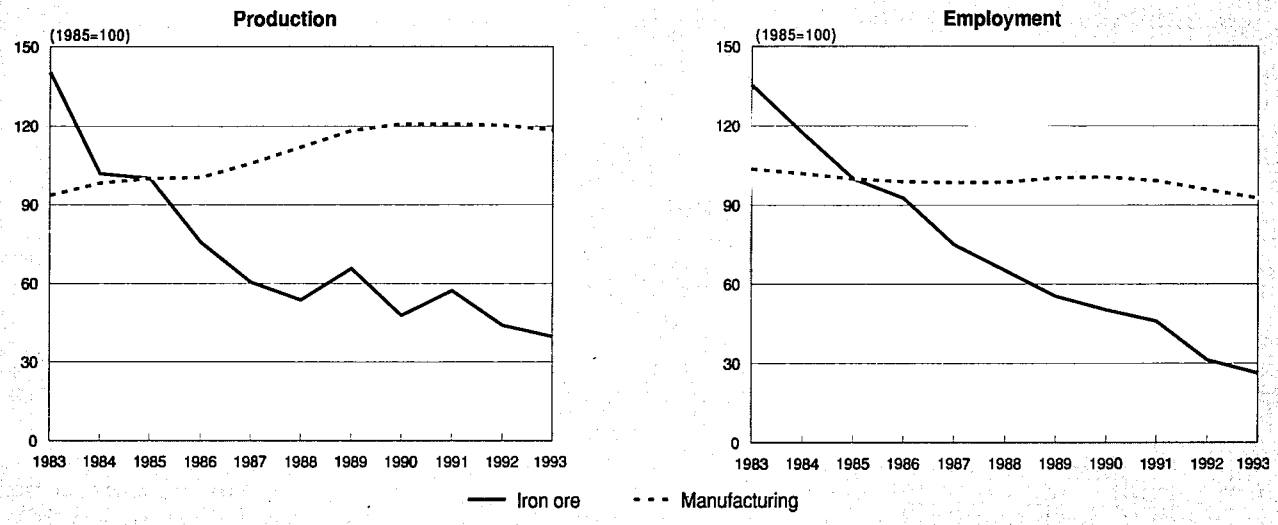
(1) Except for trade figures, estimates are used if country data is not available.
Source: B.M.Coope & Partners, Eurostat

Table 3: Iron ore
Average real annual growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption	6.9	-4.7	1.6
Production	-17.5	-4.8	-12.1
Extra-EC exports	58.4	13.7	36.7
Extra-EC imports	9.0	-4.7	2.7

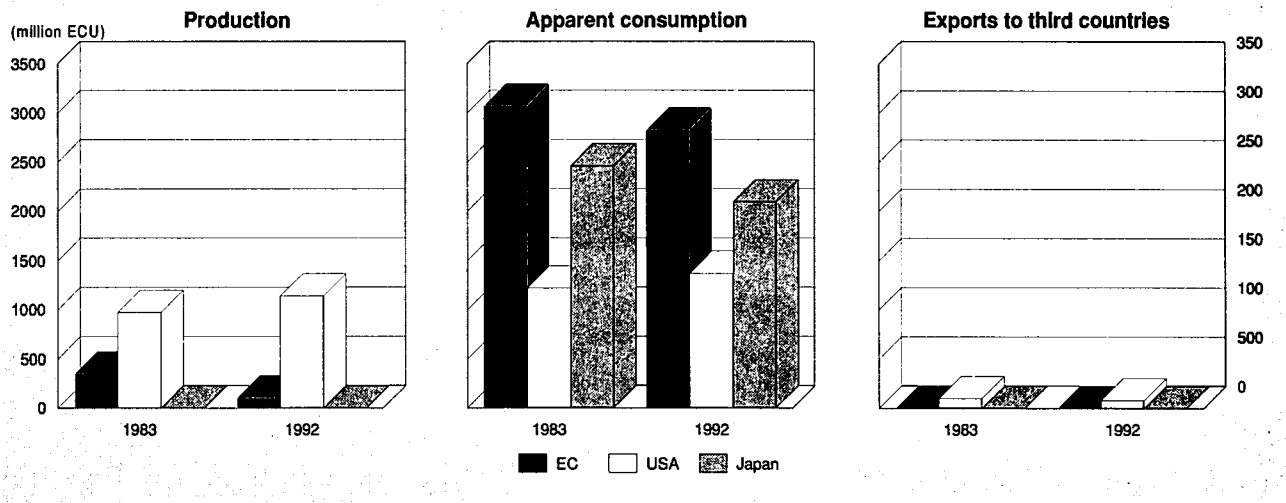
Source: Mining Journal, B.M.Coope & Partners, DEBA

Figure 3: Iron ore
Production in constant prices and employment compared to EC manufacturing



(1) B.M.Coope & Partners and Eurostat estimates.
Source: B.M.Coope & Partners, DEBA

Figure 4: Iron ore
International comparison of main indicators in current prices



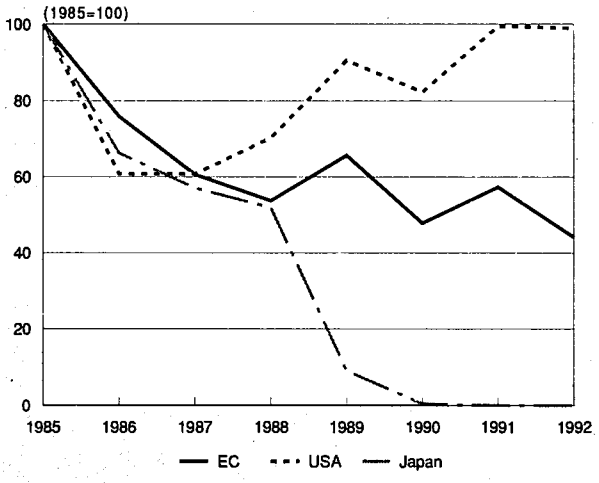
Source: Mining Journal, B.M.Coope & Partners

Table 4: Iron ore
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	0.8	1.0	0.8	1.2	1.0	5.4	2.2	4.8	3.3	4.3
Extra-EC imports	2 726	3 297	3 721	2 880	2 443	2 891	3 003	2 842	3 068	2 730
Trade balance	-2 725	-3 296	-3 721	-2 879	-2 442	-2 886	-3 001	-2 837	-3 064	-2 725
Ratio exports/imports	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terms of trade index	120.1	N/A	100.0	138.5	159.7	117.9	87.0	83.9	54.1	49.0
Intra-EC trade	68.4	91.0	435.5	540.2	330.1	153.0	764.4	816.6	854.3	796.5
Share of total imports (%)	2.4	2.7	10.5	15.8	11.9	5.0	20.3	22.3	21.8	22.6

Source: DEBA

Figure 5: Iron ore
International comparison of production in constant prices



Source: Mining Journal, B.M.Coope & Partners

demand, there appears to be little prospect for EC producers to raise production from current levels, which are already below nominal capacity levels. The EC industry, which is based on low grade ores (low iron content and impurities), high transport costs and problems with deposition of waste slags, is poorly equipped to compete with large scale, low cost foreign producers whose existing capacity appears capable of supplying any growth in world demand for the foreseeable future.

Production process

In recent years little modernisation has been introduced into EC operations compared to the large investments major overseas plants have made in modern excavating, haulage, and process plants. These operations have been able to enjoy both technical advantages and massive economies of scale. Despite strong efforts to increase productivity, profitability of EC ore mines decreased to the point that some had to be closed.

The consumption of EC iron ore could also be negatively affected by the trend towards smaller steelworks, including some of those currently accepting EC iron ore, who are converting to modern electric arc furnace technology which favours the use of steel scrap feed material rather than ore.

Table 5: Iron ore
Breakdown by size of enterprise, 1992

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	0	0	0	0
20-99	3	43	17	12
100 or more	4	57	83	88

Source: B.M.Coope & Partners

Table 6: Iron ore
The three largest companies in the EC, 1992

(million ECU)	Country	Turnover	Employment
Compania Andaluza de Minas	E	60	350
Lormines	F	23	400
Arbed	F	20	300

Source: B.M.Coope & Partners

INDUSTRY STRUCTURE

Companies

The iron ore industry in the EC consists of less than 10 operating units. The major operators are: Lormines (F), who recently stopped operations in the Lorraine district of France; ARBED (L), whose operations in Lorraine near the border with Luxembourg still continue; and Compañia Andalusa de Minas (CAM) (E) in Andalusia, Spain. The companies are small to medium sized private enterprises and are of small significance in world terms when compared with industry giants such as CVRD of Brazil, which exports over 75 million tonnes per annum and has invested over 500 million ECU in recent years on an expansion and modernisation programme. For the reasons already described it is difficult to perceive of circumstances that will halt the decline of the EC iron ore mining industry.

REGIONAL DISTRIBUTION

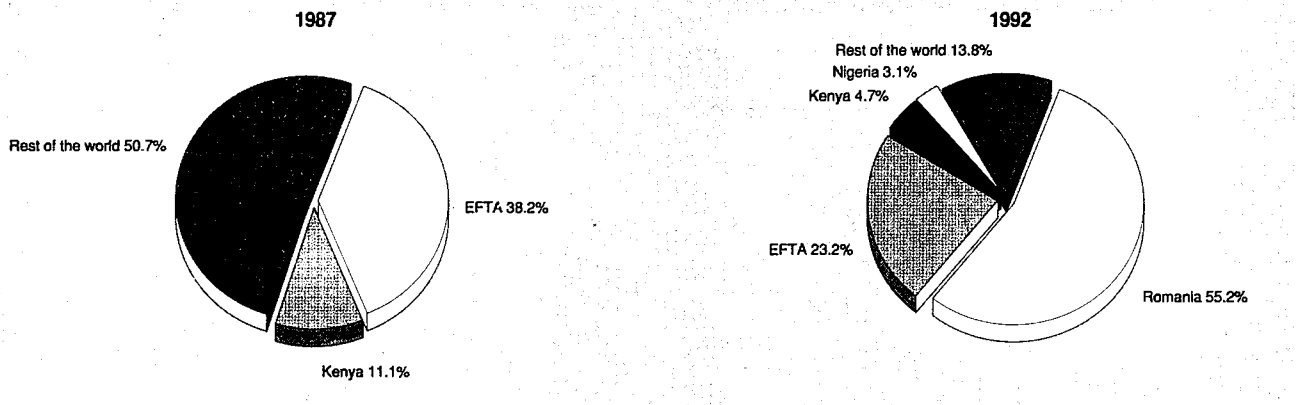
As indicated, operations are concentrated in the regions of Lorraine, France, and Andalusia, Spain, where the only deposits of ore currently deemed commercial exist. Future exploitation of the very limited reserves known to exist in other areas and countries within the EC seems highly improbable.

ENVIRONMENT

Environmental concerns in iron ore mining in the EC are low compared to non-ferrous metal ores. Virtually all ores mined are of the oxide type with the consequent absence of the problems encountered in sulphide ore operations i.e. acidic mine drainage and sulphur dioxide emissions. The major compliance requirements are associated with dust suppression and the avoidance of particulate solids entering water courses. Satisfactory operations are maintained by the use of best available techniques for processes as required by national and EC legislation.

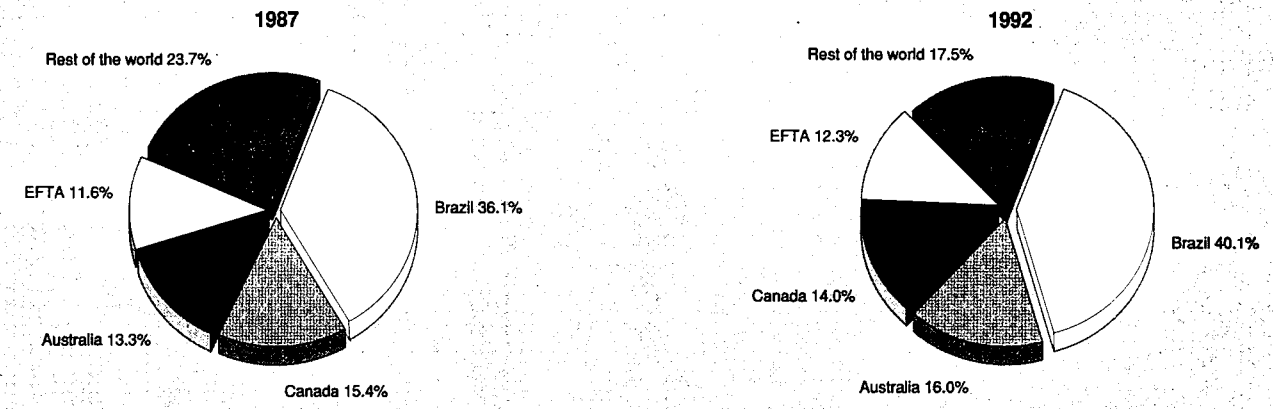
Since EC iron ore has an iron content of approximately 30%, the amount of energy consumed and the amount of CO_2 released per unit of enriched ore is much higher than for ore with higher iron content (such as imports with 60% iron content).

Figure 6: Iron ore
Destination of EC exports



Source: Eurostat

Figure 7: Iron ore
Origin of EC Imports



Source: Eurostat

REGULATIONS

The small number and scale of EC iron ore mining operations is a function of a lack of commercial grade natural resources. Whereas mining regulations in some foreign countries producing iron ore are less stringent than those in the EC, the standards are rapidly converging to EC levels. EC regulations allow responsible development of mining operations and this is reflected in the number and variety of mining operations exploiting other minerals throughout the EC.

OUTLOOK

For the reasons discussed above, the long term prospects for EC iron ore production are unfavourable. Although EC demand far exceeds EC production and will continue to do so under any foreseeable circumstances, resources in the EC are limited and inherently disadvantaged in their economic exploitation in comparison to foreign operations. At best the EC will continue to produce at levels below 10 million tonnes per annum (3 million tonnes in iron content), representing less than 6% of tonnage demand and around 3% in terms of value. At worst, significant production will cease as in Japan, leaving the EC with a complete reliance on imports from abundant and cheap foreign sources.

Table 7: Iron ore
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	5.0	3.5
Production	-10.0	-10.0
Extra-EC exports	-10.0	-10.0

Source: Metal Bulletin, B.M.Coope & Partners

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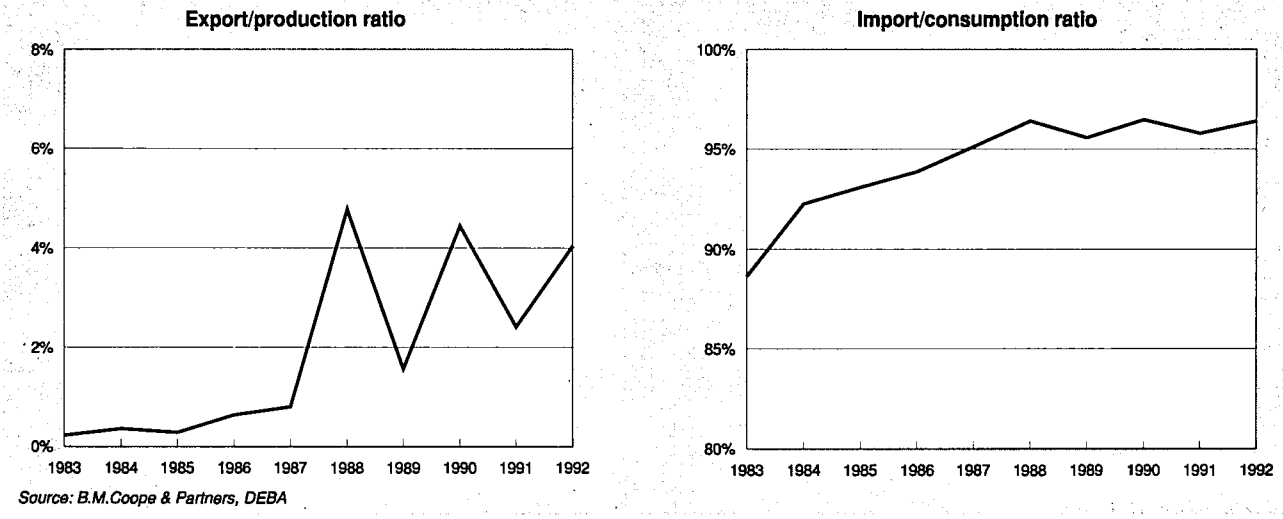
Figure 8: Iron ore
Trade Intensities



Source: B.M.Coope & Partners, DEBA

Non-ferrous metal ores
NACE 212

The EC has a small but significant non-ferrous metals mining industry which provides nearly 20% of the EC's primary raw material requirements for production of all metals. Copper and zinc concentrate production from three major operations account for approximately 80% of revenues from the industry. Non-ferrous metals mining in the EC is a mature industry subject to strong international competition. Little change to the established pattern is expected in the medium term.

INDUSTRY PROFILE

Description of the sector

NACE 212 covers the extraction and physical processing of all non-ferrous metal ores, of which seven are actively mined in the EC and a further eight major ores are sourced solely from imports. Production of two others, mercury and chromium ores, was suspended in 1992. Some gold and silver are present in EC base metal concentrates but separation occurs at the smelter stage rather than as part of the mining and processing operation. Mines in the EC produce around 7% of the world's zinc, 3% of the world's lead, and 2% of the world's copper and bauxite. There is minor production of tin, tungsten, and nickel ores and concentrates. Magnesium metal is also produced from dolomite by the silicothermic process. Products from the sector are used as raw materials for metals production (NACE 224) and in 1992 totalled over 500 million ECU in value. Portugal remains the largest EC mining country in terms of revenue by virtue of the major copper mine at Neves Corvo. Other significant producing countries are Spain and Ireland for their lead/zinc operations and Greece for its bauxite operations. The four countries account for over 90% of EC production.

Recent trends

Overall production levels declined slightly in 1992 as a result of mine closures in Spain, Germany, and Greece and the reduction of bauxite output from Greece. 1992 concentrate prices continued in a trough and were 2-3% lower than in 1991, with the single exception of zinc whose price rose by 11%. Little change in output is expected for 1993, although metals prices should experience some improvement.

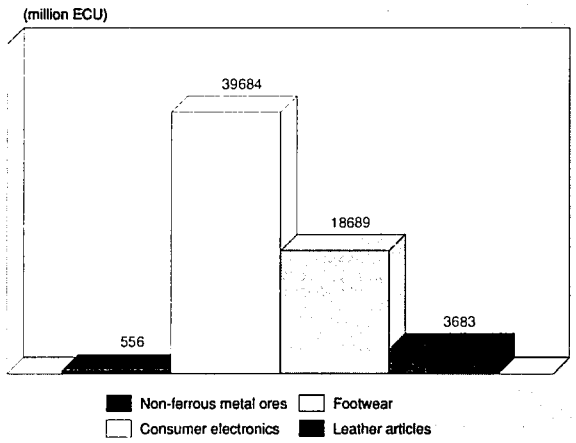
International comparison

Mining trends are more positive in the EC than they are in Japan, but EC output is less than 10% of that achieved in the USA. Mining is a function of geological potential combined with national stability and cost structure. The country particularly favoured at present for new non-ferrous ore developments is Chile. Also prominent for non-ferrous ore mining are Mexico, Ghana, and Indonesia.

Foreign trade

The EC remains heavily and increasingly dependent upon imports from the world's major mining countries; the Americas alone provide over half of the EC's total requirements. Most EC non-ferrous ores are exported out of the EC to other countries. Although EC imports from the former Soviet Union and China have been minor for concentrate ores, they have been enormous for metal, a factor together with persisting recessionary influences, has been responsible for several metal prices being at record low levels.

Figure 1: Non-ferrous metal ores
Production in comparison with other industries, 1992



Source: B.M.Coope & Partners, Mining Annual Review, DEBA

MARKET FORCES

Demand

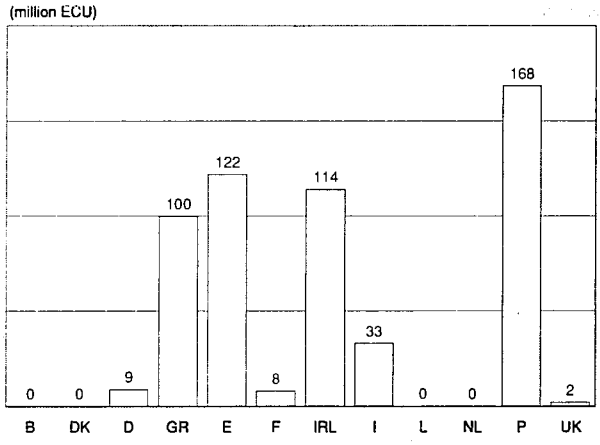
None of the concentrates produced from mining are products in their own right and all proceed as raw materials for metal production or abrasives, cement, or chemical production in the case non-metallurgical grades of Greek bauxite. The EC is a major participant in world metal production. These metals serve some of the world's largest industries, such as construction, machinery, and transportation, all of which have been affected by the current industrial recession. Substantial stocks of most major metals now exist, reflecting the poor demand in 1992/93.

Supply and competition

By virtue of the grade and reserves of ore in Portugal, Ireland, and Spain in particular, the EC is able to mine competitively at its existing operations. At least one major new zinc mine, Lisheen in Ireland, is scheduled to come on stream in the near future. These operations will continue to be the mainstay of EC domestic supply for the foreseeable future.

Further large deposits of base metals are known to occur in the EC, for instance, the Parys Mountain lead/zinc polymetallic

Figure 2: Non-ferrous metal ores
Production by Member State, 1992



Source: B.M.Coope & Partners, Mining Annual Review

Table 1: Non-ferrous metal ores
Main indicators in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)
Apparent consumption	3 118	3 897	3 930	2 877	2 621	3 269	4 448	3 662	3 078	2 824	3 380
Production	645	800	799	597	479	632	987	855	665	554	600
Extra-EC exports	202	287	245	158	153	170	427	351	297	297	300
Trade balance	-2 474	-3 097	-3 131	-2 280	-2 142	-2 637	-3 461	-2 807	-2 413	-2 270	-2 800
Employment (thousands)	18.8	18.8	17.4	15.1	15.5	14.5	14.4	14.3	14.2	14.1	14.0

(1) B.M.Coope & Partners' estimates.
Source: B.M.Coope & Partners, Mining Annual Report, DEBA

Table 2: Non-ferrous metal ores
Breakdown by sector, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Zinc	945.2	269.5	53.0
Copper	413.2	160.5	115.0
Lead	146.3	33.0	5.3
Bauxite	346.1	54.5	16.2
Nickel	24.7	24.7	0.0
Tin	N/A	7.3	18.2
Tungsten	1.9	4.6	3.4
Others	946.6	0.0	85.9

Source: B.M.Coope & Partners, Mining Annual Report, Eurostat

Table 3: Non-ferrous metal ores
Average real annual growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption	4.8	-3.7	0.9
Production	3.0	-6.4	-1.3
Extra-EC exports	0.1	20.5	8.7
Extra-EC imports	4.9	-0.9	2.2

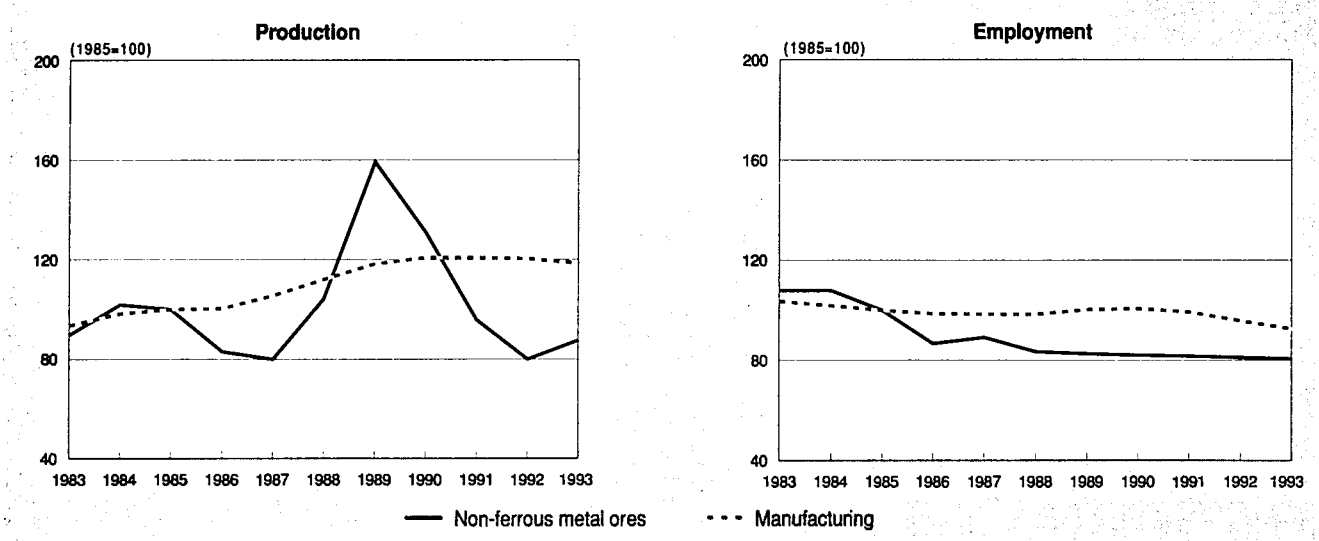
Source: B.M.Coope & Partners, DEBA

Table 4: Non-ferrous metal ores
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	201.6	286.6	245.0	157.6	153.4	169.6	427.3	351.4	296.8	297.4
Extra-EC imports	2 675	3 384	3 376	2 438	2 295	2 807	3 889	3 159	2 710	2 567
Trade balance	-2 474	-3 097	-3 131	-2 280	-2 142	-2 637	-3 461	-2 807	-2 413	-2 270
Ratio exports/imports	0.08	0.08	0.07	0.06	0.07	0.06	0.11	0.11	0.11	0.12
Terms of trade index	90.3	90.7	100.0	99.9	97.5	91.2	87.0	81.9	79.3	79.8
Intra-EC trade	340.8	468.2	505.0	317.5	285.1	346.8	772.7	651.7	509.0	452.8
Share of total imports (%)	11.3	12.2	13.0	11.5	11.0	11.0	16.6	17.1	15.8	15.0

Source: DEBA

Figure 3: Non-ferrous metal ores
Production in constant prices and employment compared to EC manufacturing



(1) B.M.Coope & Partners and Eurostat estimates.
Source: B.M.Coope & Partners, DEBA

deposits at Anglesey in the United Kingdom, but potential operational costs are likely to compare unfavourably with the high grades and low costs experienced in other regions such as South America. Similarly some large but relatively low grade deposits of tin, tungsten, and nickel ores exist in the EC but are only likely to become profitable operations should economic or technical circumstances change. Meanwhile production of gold and arsenic is likely to recommence from Salsigne in France shortly and possibly mercury from the Almaden mine in Spain. Further production of chromite from Greece is uncertain.

Production process

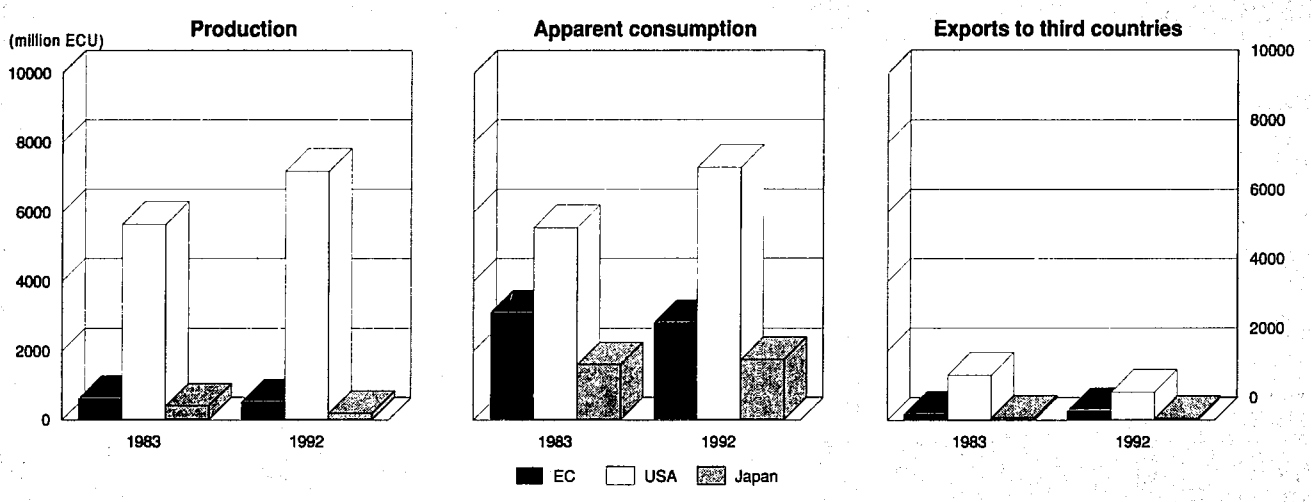
No radical changes in mining and beneficiation methods have been introduced in 1992, although the trend towards larger sized equipment and the treatment of fine material has continued, together with efforts at energy saving and improved environmental compliance.

INDUSTRY STRUCTURE

Companies

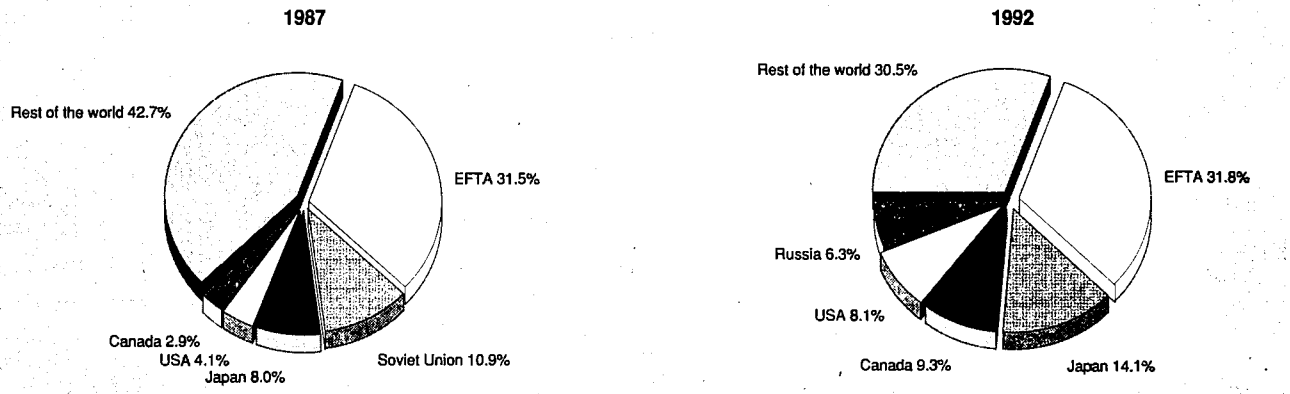
Half of the companies, 22 firms, have over 100 employees and account for 89% of the industry turnover. As indicated above, the largest mines are located in Portugal, Ireland, Spain, and Greece. These operations are owned by European private or public interests. The major companies are Somincor (P), Tara Mines (IRL), Asturiana de Zinc (E), Exminesa (E), and Bauxites Parnasse (GR). There are also a number of EC-based mining companies which operate on a significant international basis, including RTZ (UK), Union Miniere (B), Minorco (L), Metallgesellschaft (D), Pechiney (F), Nuova Samim (I), and Billiton (NL). Together these and other leading companies are responsible for over 10% of worldwide non-ferrous ore mine production.

Figure 4: Non-ferrous metal ores
International comparison of main indicators in current prices



Source: B.M.Coope & Partners, Mining Journal, DEBA

Figure 5: Non-ferrous metal ores
Destination of EC exports



Source: Eurostat

Strategies

Appropriate geological conditions can be found for mining companies and their operations in EC countries. There is also a reasonable exploration aimed mainly at Iberia, Greece, Ireland, and Scotland, although this represents a small fraction of exploration investment in other parts of the world. While EC mining interests have been most active in South America they are cautious with regard to developments in Eastern Europe. There is a significant degree of integration between non-ferrous metals mining and metal production, in fact most companies have dual interests in which metals manufacture provides the major share of EC-based activity. A feature of recent mining and metals company strategies has been establishing international alliances by share ownership to ensure financial strength and availability and flexibility of resources. The trend for oil companies to divest of other mineral interests is on the verge of completion with the announced sell of Shell's mining and metals interests, largely located in Gencor, South Africa.

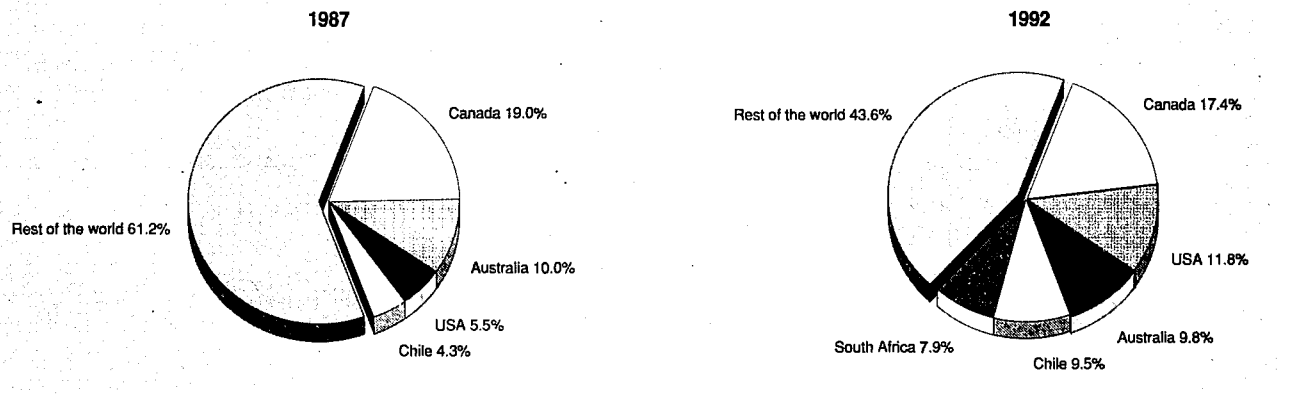
REGIONAL DISTRIBUTION

As indicated, the majority of non-ferrous mining operations are located in, Portugal with 168 million ECU worth of production, Spain with 122 million ECU, Ireland with 114 million ECU, and Greece with 100 million ECU. There is minor production in Italy, 33 million ECU worth, but other EC countries have insignificant or no operations.

ENVIRONMENT

Stricter standards of environmental compliance are being imposed throughout the EC and the world which force the mining industry to meet waste discharge limits. The most significant emission problem concerns water, and specifically water associated with sulphide operations where acidity levels may be high. There have been no reports of serious environmental non-compliance from EC mines although future compliance standards are a major issue with existing and planned operations, particularly in Ireland.

Figure 6: Non-ferrous metal ores
Origin of EC imports



Source: Eurostat

Table 5: Non-ferrous metal ores
Breakdown by size of enterprise, 1992

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	10	23	2	2
20-99	11	25	8	9
100 or more	22	52	90	89

Source: B.M.Coope & Partners

Table 6: Non-ferrous metal ores
The five largest companies in the EC, 1992

(million ECU)	Country	Turnover	Employment
Somincor	P	153	1100
Tara	I	105	750
Esturiana de Zinc	E	57	500
Exminesa	E	56	500
Bauxites Parnasse	GR	53	700

Source: B.M.Coope & Partners

Figure 7: Non-ferrous metal ores
Trade intensities

Source: B.M.Coope & Partners, DEBA

REGULATIONS

Exploration, mining, and associated environmental legislation is well understood, applied, and observed within the EC mining industry and is not an overriding factor in the development of the industry. The mining industry is not greatly affected by single market regulations.

Table 7: Non-ferrous metal ores
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	2.0	2.5
Production	0.5	0.5
Extra-EC exports	0.0	0.0

Source: Metal Bulletin, B.M.Coope & Partners

OUTLOOK

The EC is expected to continue to rely primarily on imported sources of ores and concentrates to serve its metals industries. Nevertheless a small number of competitive operations within EC borders will continue to make a significant contribution to its requirements. One or two major new mines will be opened before the end of the decade, the first of which involving lead/zinc deposits in Ireland. Exploration should at least maintain if not increase the overall level of output. Profits for mine operators will be restricted by international oversupply, weak demand, and low prices in the immediate future.

Written by: B.M. Coope & Partners
The industry is represented at the EC level by: International Association of European Mining Industries (EUROMINES). Address: Avenue Broqueville 12, B-1150 Brussels; tel: (32 2) 775 6311; fax: (32 2) 779 0523.

Stone
NACE 245

The European stone industry is the oldest and still the most important stone industry in the world. Europe produces, transforms, trades and consumes all kinds of stone materials including marble, granite, travertine and other similar stone. These products are destined for various uses although the largest consumer is the building industry; particularly the upper end of the industry, where there is competition from ceramics and glass whose investment potential from the view point of marketing as well as research and development is greater.

INDUSTRY PROFILE

Description of the sector

The ornamental stone industry is divided into two main parts:

- the excavation of raw materials;
- transformation of raw materials into the various finished products.

The processed materials are mainly calcareous (marble, travertine, etc.) or siliceous (granite, serizzo, beola, etc.). The latter are of greater resistance and are employed mainly for exteriors while the formers are mainly used for interiors.

Recent trends

In the 80s the industry experienced a real boom. From 1981 to 1991, world quarry production rates rose from around 20 to over 30 million metric tonnes and this was accompanied by an equally significant increase in the number of producer countries. At present only 9 countries exceed an annual production of one million metric tonnes and 6 of these belong to the EC. Up until 1992 the EC ornamental stone industry accounted for over 50% of world production and around the same percentage of global international trade in terms of volume. Intra and extra-EC trade involves rough blocks and a wide variety of finished articles.

Production averages around 30 million metric tonnes per annum with a recent, constant upward trend mainly due to the emergence of new producer countries on the world market. Since the early 80s at least ten new significant producers have emerged and become self-sufficient, thereby increasing the production of quarrying, sawing and processing machinery. The machinery sector has in fact experienced a period of rapid growth over recent years and is mainly based in EC Member States.

Table 1: Stone
International rough production

(thousand metric tonnes)	1981	1988	1992
Belgique/België	2 070	467	320
Danmark	N/A	N/A	N/A
BR Deutschland	N/A	137	200
Hellas	900	1 700	1 900
España	2 730	2 155	3 400
France	734	920	1 058
Ireland	N/A	N/A	N/A
Italia	6 700	7 480	7 300
Luxembourg	N/A	N/A	N/A
Nederland	N/A	N/A	N/A
Portugal	401	640	800
United Kingdom	N/A	715	1100
EC	13 535	14 214	16 078
Sweden	92	143	N/A
Finland	200	257	250
Norway	177	100	150
Austria	25	40	30
Turkey	150	485	850
Former Comecon	1 000	2 600	1 150
USA	875	1 062	1 350
Brazil	850	970	1 500
Mexico	165	263	550
South Africa	330	700	750
India	400	700	2 500
China	N/A	N/A	1 500
South Korea	N/A	687	1 250
Others	2 000	2 800	3 500
Total	33 333	39 234	47 486

Source: National Statistical Institutes

Table 2: Stone
Imports of blocks and slabs

(metric tonnes)	1988	1992
Belgique/België	72 800	109 500
Danmark	N/A	N/A
BR Deutschland	416 180	415 700
Hellas	N/A	N/A
España	142 890	248 100
France	191 040	243 120
Ireland	1 668	N/A
Italia	1 467 400	1 525 200
Luxembourg	N/A	N/A
Nederland	56 900	60 000
Portugal	12 200	40 800
United Kingdom	132 500	48 000
EC	2 493 578	2 690 420
Japan	1 100 810	1 272 000
USA	415 300	58 000
South Korea	75 350	120 000

Source: Various sources

The EC countries in the Mediterranean basin form the heart of the sector at both a European and a world level despite intense development in other areas of the world. In 1992 the greatest producer country of blocks for ornamental use was Italy which has always held the leading position in the market, followed by Spain, Greece, Portugal and France.

International comparison

With the exception of EC countries, all the other significant stone consumers are far from being self-sufficient, even within their own home markets. Since '85 Japan has been a very important importer of granite primarily destined for funeral art. It prefers to procure lower quality semi-processed or finished articles from Taiwan and South Korea, but obtain stone for more complex work which requires the expert use of sophisticated production techniques and a wide range of different products from EC countries. The same applies to the USA despite its strong domestic production. Since 1988, however, the demand for finished products (especially granite) in the USA has gradually decreased due to the slump in the high-rise non-residential buildings. The great decline in this sector, which has been compensated to some extent by the increase in housing in many areas of the USA, has influenced international trade in terms of sales and volumes. The US market, however, like the Far East market, generally remains an advantageous market thanks to the average unit value of the product it absorbs.

In South East Asia there is a tendency towards self-sufficiency which is likely to continue over the next few years. The great buying power of the Japanese market, the extensive building activities in some of the newly industrialised countries, the availability of low-cost labour, the proximity of areas with high raw material production rates such as India, South Africa and more recently, China, all create a shorter distribution chain for products which only excludes a few very privileged niches in the market. The EC occupies a strong position as far as the latter are concerned.

Foreign trade

World trade in volume mainly involved raw and semi-raw materials. Most important exporters are Italy, Spain, Greece. Outside the EC the main exporting countries include India, Brazil, South Africa, and South Korea which primarily export raw materials. South Korea is the only country to have recently (1988-89) penetrated the market as a producer, transformer and consumer.

EC exports include mainly finished products which are largely destined for the building industry. They are intended for fellow Member States and extra-EC countries, mainly North America and the Far and Middle East. Right up until '82-'83, demand from the Middle East was much stronger. Subsequently, external factors led to an abrupt decline in demand. The effects of the international crisis in the Persian Gulf were mostly responsible for the 1990-91 figures, although already in 1992 some positive signs were seen which have continued to develop in 1993. Nevertheless, the strongest market is still within the EC, Germany and Italy first, followed by Spain, France and Greece.

MARKET FORCES

Demand

The demand for stone materials is as varied as ever. It ranges from the large importers of blocks which amount to only a few dozen companies throughout the world, concentrated in Italy and Germany, to the large North American building companies and developers and the end-users for all the other segments of the market.

The greatest problems facing the sector stem from the extreme fragmentation of the consumer market together with the very limited average size of companies. Moreover, the lack of capital to invest in research, development, promotion and marketing makes it difficult to exploit this dispersed consumer market which is often regional and not even national. Demand is maintained thanks to the intrinsic characteristics of the products themselves, such as their reputation, response to technical problems, aesthetic variety and image.

Quarrying technology is relatively simple and more often than not problems arise from the lack of infrastructures rather than anything else. Countries capable of offering technologically advanced finished articles at competitive prices are however very few.

Supply and competition

The traditional usage, the extensive and intensive production, the capacity to transform raw materials and a building industry very keyed in to maintenance and restoration all favour the use of stone in all its aspects. It is often considered a material which adds value and prestige to buildings where it is used, be they residential or non-residential. The difficulties of the

Table 3: Stone
Imports of finished products

(metric tonnes)	1988	1992
Belgique/België	252 930	75 200
Danmark	N/A	N/A
BR Deutschland	352 270	567 000
Hellas	N/A	N/A
España	132 300	133 100
France	72 420	154 600
Ireland	1 880	N/A
Italia	15 410	43 350
Luxembourg	N/A	N/A
Nederland	50 270	85 000
Portugal	N/A	2 800
United Kingdom	78 000	63 000
EC	955 480	1 124 050
Japan	341 880	542 430
USA	875 440	338 350
South Korea	75 340	47 800

Source: Various sources

Table 4: Stone
Exports of blocks and slabs

(metric tonnes)	1988	1992
Belgique/België	6 340	18 500
Danmark	N/A	N/A
BR Deutschland	55 530	91 700
Hellas	23 090	58 000
España	404 990	546 600
France	20 530	43 890
Ireland	N/A	N/A
Italia	398 220	465 700
Luxembourg	N/A	N/A
Nederland	17 940	19 000
Portugal	157 000	265 000
United Kingdom	N/A	N/A
EC	1 083 640	1 508 390
Sweden	264 990	311 400
Finland	247 540	237 000
Norway	61 860	87 800
Austria	24 640	3 900
Turkey	23 390	62 000
USA	N/A	113 600
Brazil	459 830	557 500
South Africa	550 000	600 000
India	560 000	650 000
China	250 000	850 000
South Korea	324 400	227 000

Source: Various sources

sector which do not allow it to invest sufficient capital in promotional and marketing activities may affect its development over the next few years. Segments of the market which promise expansion despite the recession which is investing certain countries are still confronted with intense competition from rival industries such as glass and ceramics. Indeed, since 1991 the general increase in the competitiveness of all markets has already adversely affected the prices which have had to decrease in real value to retain a share in the major markets.

Production process

The traded materials are mainly calcareous (marble, travertine, etc.) or siliceous (granite, serizzo, beola, etc.) and are used differently according to their peculiar characteristics. Granites are generally employed for exteriors or wherever greater resistance is required to withstand wear and tear and atmospheric pollution; marbles are mainly destined for interiors or where there is greater protection from external elements. The progress in processing technology has widened the scope for the use of stone, especially in the building and furnishing sectors, and this progress has been accompanied by improvements in stone laying and maintenance techniques. Most important of all is the development of techniques for the production and application of thin light weight units which have enabled stone products to penetrate new markets and the avant-garde markets such as the removable floorings market for electronic processing centres and the light vertical claddings market. Marble and granite can now be used to clad lifts, ships, skyscraper facades in areas subject to typhoons and in other situations which were previously inconceivable for traditional methods. Alongside these avant-garde uses, there are of course the more traditional, well-established areas of usage, such as funeral art, furnishings, monuments and decorative architecture where production processes have also undergone a radical technological transformation. For some of the traditional uses, the processing of stone is part of production in other industrial sectors. This is particularly true in the case of furniture production where marble and granite cutting and polishing workshops (which produce vanity tops, kitchen table tops and bathroom furniture coverings) are an integral part of the production line of finished furniture. However, the most important market as regards the quantity of material sold and the value added absorbed remains the traditional building industry including new buildings, restoration and maintenance work.

INDUSTRY STRUCTURE

Companies

The average size of companies in the sector is generally very limited. There are now around 500 000 employees overall, including at least half employed in the quarries. Average company size is no more than 8.1 employees, although various groups of companies have joined forces to develop effective market strategies and pool resources. Great changes have taken place as regards the production methods, speed and costs in recent times due to the widespread introduction of diamonds in the quarrying and processing of marble at the beginning of the 1980s.

The greatest concentration of productive companies is in Italy, where stone materials are available in nearly all its regions. The number of quarry workers is estimated at over 70 000 and there are also a large number of workers in the industries connected to quarrying, processing and trade. The same situation can be seen in Spain, France, Portugal, Greece and Belgium.

Strategies

A major problem which affects almost all the EC countries is the ageing labour force. The turnover of the generations of workers is very slow indeed and this is a problem which may become very serious in the future for a sector which often requires long periods of professional training. The biggest question mark however, rests on economic and commercial prospects. In view of its close links with the building industry in all countries, the sector is inevitably dependent on the building industry, and especially the top end (residential, non-residential, urban landscape, restoration of old town centres, renovation in general) of the industry. The tendency towards self-sufficiency, even partial, of certain producer and consumer areas (as seen in South East Asia and Japan) could even reduce the overall market of the European stone industry and limit it more and more to the market within the EC itself. As far as stone companies are concerned, this could lead to even more problems for smaller companies forced to specialise

Table 5: Stone
Exports of finished products

(metric tonnes)	1988	1992
Belgique/België	9 350	28 800
Danmark	N/A	N/A
BR Deutschland	44 390	13 000
Hellas	89 090	183 000
España (1)	129 500	167 500
France	25 500	38 650
Ireland	N/A	N/A
Italia	1 627 610	1 832 300
Luxembourg	N/A	N/A
Nederland	15 120	N/A
Portugal	131 784	197 300
United Kingdom	1 000	9 000
EC	2 073 344	2 469 550
South Korea	269 860	152 000
Hong Kong	15 030	36 500

(1) Not including "pizarras".
Source: Various sources

Table 6: Stone
Number of enterprises and employees, 1991

	Number of enterprises	Employees
Belgique/België	374	6 500
Danmark	N/A	N/A
BR Deutschland	350	N/A
Hellas	4 000	50 000
España	3 343	30 000
France	900	10 000
Ireland	N/A	N/A
Italia	11 000	70 000
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	2 448	15 000
United Kingdom	505	5 090
EC	22 920	186 590
Sweden	21	1 000
Finland	72	1 500
Norway	40	750
Turkey	765	10 000
South Africa	30	N/A
India	300	200 000
China	3 000	50 000
South Korea	1 142	13 643

Source: Various sources

still further or opt for subcontracting, leaving the larger companies to deal with the more complicated contracts and the more distant markets. The larger companies and groups already work on this basis on the international market. They are directly present on distant markets, often with local associates, and among other things co-ordinate complex projects. In other words, they have already partly reorganised their presence on the market.

ENVIRONMENT

Important environmental issues affect the stone industry in both its productive areas, that is quarries and workshops. There are serious problems as regards the respect for and restoration of the structure of the mountains where quarrying activities are carried out. Various countries and regions do actually stipulate that exploitation plans should include programmes for the temporary management of quarry dumps and at least partial reconstruction of the natural habitat. This, however, is not always feasible and sometimes leads to the interruption of activities as it is impossible to comply with current regulations. The ecological issue goes hand in hand with the ever complex problems regarding safety in the quarries. Every year, in spite of the increased awareness of workers and employers on the subject of safety measures, accidents continue to occur and are sometimes fatal.

Respect for the environment must continue after the quarrying process and this requires compliance with current regulations regarding interior working environments (microclimates inside the workshops, noise levels, dust, mud, complete safety) and respect for workers and inhabitants in the vicinity of working environments. Thus, refluent slurry, noise, water pollution and overloaded roads are all problems which concern technical researchers, machine manufacturers and environmentalists alike. Technical researchers are trying out new solutions (for example, the reutilisation of marble rubble) while manufacturers are designing machines with lower noise levels and less dust production (sound-proof machines, purified plants at the design stage, etc.) and environmentalists are trying to impose respect for the environment and the observance of current regulations.

REGULATIONS

The stone industry in EC countries is subject to the regulations which in general apply to building material products. It now has to face restraints in two areas regarding:

- production, environmental and workers' safety regulations both inside and outside the quarry and the workshops;
- usage, special safety regulations regarding anchorage systems for vertical cladding and the development of unified EC regulations for certain production methods.

Various technical committees have been set up within the EC. Among these, there is:

- TC 125 which regulates masonry works and plans to set up a sub-commission for natural stone;
- TC 128 which deals with building coverings etc. and has a work group for slates;
- TC 178 which concerns roads and curbs and has a subcommittee for natural stone;
- TC 246 which regulates floorings in general in natural stone, interiors, stairs, terraces, balconies, etc. and exterior facings.

Throughout 1993 as in previous years, the EC has striven to make it possible for stone materials to circulate freely within the EC and withstand competition from similar rival materials.

OUTLOOK

The present economic recession felt on some of the major markets or at least on the more profitable markets for processed stone troubles producers in the sector. In some countries where there is an important stone industry overall excavation is expected to decrease between 5 and 10% by the end of 1993. Although globally the sector seems to be in constant but modest overall expansion, the future of the industry in Europe, in the medium-term, is very closely linked to the European building industry (including new buildings and restoration works, the public and private sectors). The unification of the markets will not affect companies already operating outside their own region. At worst, these companies will have to conform to the new standards and the consequent quality certification requirements. Trade relations with more distant markets will be more difficult as the latter are tending to form autonomous systems to face European competition. It has already become more complicated for individual companies, especially smaller ones, to get a share of such markets without having privileged partnerships with local companies and the necessary support in the form of assistance, services and credit facilities. On the other hand, new quarrying activities in third world countries and increased familiarity with using natural stone since the late '80s are gradually creating much better prospects for new markets.

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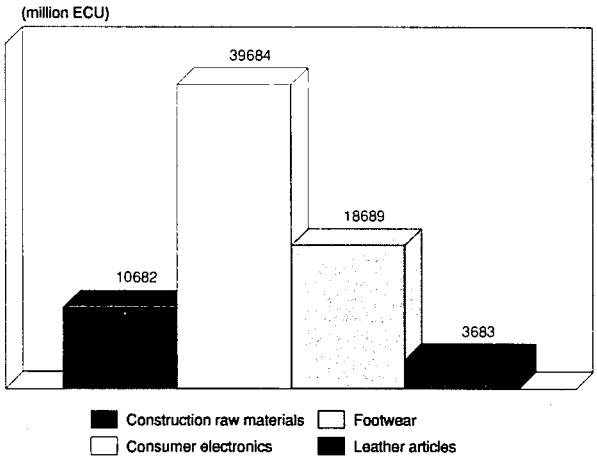
Construction raw materials

NACE 231

The EC is one of the major producing and consuming regions for construction raw materials. In the construction raw materials sector the EC is theoretically self-sufficient. Virtually all mainstream products and external trade tends to be in material chosen on aesthetic grounds. The economic performance of this industry is tied directly to the level of building and construction activity in the EC, which has been low in recent years. Some of these predominantly construction minerals notably limestone, dolomite and silica sand, are also widely used by industries such as, glass and ceramics, metallurgy, paper, paints, plastics, etc. The proportion of construction raw materials ending up in these industries and not in construction is generally less than 10%.

Figure 1: Construction raw materials Production in comparison with other industries, 1992



Source: B.M.Coope & Partners, DEBA

INDUSTRY PROFILE

Description of the sector

Most of the mainstream products fall under NACE 231 category. The following is list of some mainstream products and their end-use markets: crushed stone for construction and road aggregate; sand and gravel for construction and road aggregate; limestone and chalk for cement and lime; gypsum for plaster and cement; and dimension stone including marble and granite. Clays are not included in this category. For more information about dimension stone, please refer to the previous chapter on stone.

Construction aggregates and cement are the bulk raw materials used in the construction of roads, railways and buildings. Value added data are in line with overall economic activity. Thus, Germany displays the largest value added followed by France, the UK, Italy, and Spain.

Many larger operations are owned by large construction and civil engineering groups. However, the abundance of deposits and the localised nature of their markets, which typically fall within a 50 kilometre radius, also allow the existence of a very large number of small enterprises. Limestone and chalk are the main raw materials used in both cement and lime manufacturing and, consequently, quarries for these end-uses are invariably captively owned by the large cement or lime manufacturing groups featured in Chapter 5.

Recent trends

Production and consumption levels increased gradually throughout the 1980s but fell during 1990-93. This reflects not only the strong performance of the construction industry in the late 1980s, but also the more recent downturn in construction activity. Nevertheless, the long term trend is upward and both production and consumption are expected to show renewed growth in 1994.

International comparison

The EC is the world's leading producer of construction raw materials with a 1992 output 50% higher than the USA and 3 times the size of Japan's output. Both the USA and Japan display a similar pattern of production and consumption over the past ten years with growth in 1983-89 period followed by decreases in the 1989-1993 period.

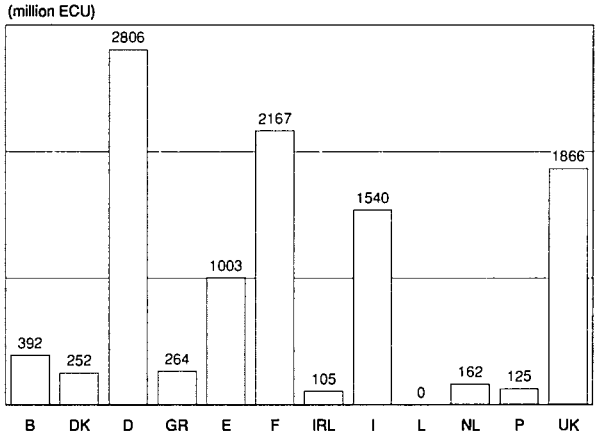
Foreign trade

Foreign trade represents only a small part of the total commercial activity in construction minerals, with imports accounting for about 6% of total consumption and exports are 3% of total production. Nevertheless, the sheer size of the sector means that significant tonnages are involved and the total value of imports has regularly exceeded 500 million ECU in the past 4 years.

Thus, the EC is active in both the importing and exporting of these materials but in recent years has become a net importer. This is primarily due to a surge in the imports of dimension stone granite from countries such as Norway, South Africa, Brazil, and India. Frequently these imports arrive in the EC for further processing increasing activity for EC's domestic stone processing industry, particularly in Italy.

Exports are dominated by shipments to EFTA countries. Construction aggregates have enjoyed large demand in Switzerland. Highlights in export trade to non-EFTA countries are the shipments of dimension stone marble and granite to Japan, the USA, and the Middle East. So far as sources of 1992 imports are concerned, the EFTA countries accounted for about two-thirds of total imports. Products most commonly imported were dimension stone granite and crushed stone aggregate from Norway, Sweden, and Finland.

Figure 2: Construction raw materials Production by Member State, 1992



Source: B.M.Coope & Partners

Table 1: Construction raw materials
Main indicators in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)
Apparent consumption	9 945	10 515	11 166	10 603	11 418	12 795	13 997	12 423	11 721	10 963	10 900
Production	9 945	10 479	11 093	10 563	11 381	12 677	13 846	12 194	11 174	10 682	10 700
Extra-EC exports	242.4	273.0	260.5	242.5	262.4	305.7	378.4	347.5	372.3	362.8	368.0
Trade balance	0.3	-36.0	-73.0	-40.4	-36.9	-118.5	-133.1	-182.9	-223.8	-281.4	-270.0
Employment (thousands)	121.8	133.1	135.4	133.4	136.6	136.4	138.8	148.1	150.2	144.2	139.0

(1) Eurostat estimates.
Source: B M Coope & Partners, Eurostat

Table 2: Construction raw materials
Average real annual growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption	-0.4	-8.0	-2.9
Production	-0.5	-8.5	-3.3
Extra-EC exports	0.7	2.7	1.5
Extra-EC imports	13.4	8.7	11.3

Source: B M Coope & Partners, Eurostat

Table 3: Construction raw materials
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	242.4	273.0	260.5	242.5	262.4	305.7	378.4	347.5	372.3	362.8
Extra-EC imports	242.1	309.0	333.5	282.8	299.3	424.2	511.5	530.3	596.1	644.3
Trade balance	0.3	-36.0	-73.0	-40.4	-36.9	-118.5	-133.1	-182.9	-223.8	-281.4
Ratio exports/imports	1.00	0.88	0.78	0.86	0.88	0.72	0.74	0.66	0.62	0.56
Intra-EC trade	441.4	474.1	484.2	603.0	630.6	774.4	867.3	948.1	1 003.1	1 037.8
Share of total imports (%)	64.6	60.5	59.2	68.1	67.8	64.6	62.9	64.1	62.7	61.7

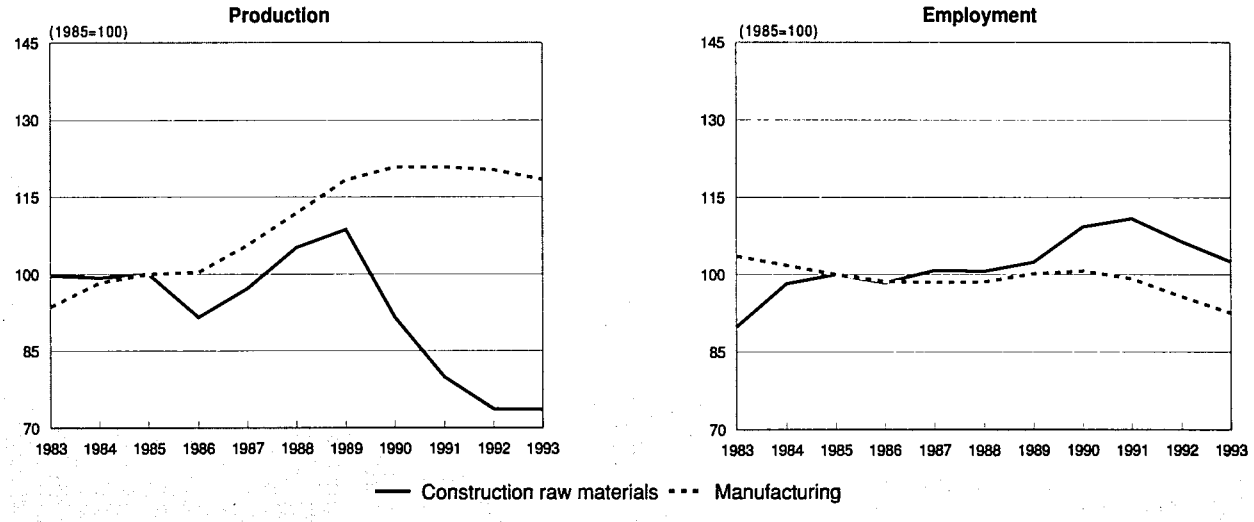
Source: Eurostat

Table 4: Construction raw materials
Breakdown by subsector, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Limestone	3 785	3 780	3
Dolomite	490	495	11
Other stone	2 167	1 883	85
Gypsum	165	180	15
Slate	112	111	7
Sand and gravel	3 850	3 736	72
Silica sand	493	497	24

(1) Trade may occur in products not produced within the EC, hence figures are not additive with respect to Table 1.
Source: B M Coope & Partners, Eurostat

Figure 3: Construction raw materials
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: B.M.Coope & Partners, DEBA

Intra-EC trade is dominated by cross border movement of aggregates and industrial limestone/dolomite products between Germany, the Netherlands, Belgium, and France and by trade in dimension stone products in which Italy, Spain, Portugal, and Greece are prominent.

MARKET FORCES

Demand

The construction industry is clearly the dominant market for this group of raw materials. As fundamental ingredients in the construction of roads and buildings, demand for the major product lines is directly dependent on overall construction activity. However, it should not be forgotten that the industrial grades of limestone, dolomite, and sand are consumed primarily in the chemical, metallurgical, glass and ceramics industries. These industries are also affected by recession although they are typically more resilient than the construction industry.

No major technological changes have taken place recently in construction materials although on aesthetic grounds the increasing use of natural stone, e.g. dimension stone granite and marble, for the exterior and interior surfaces of buildings has been a noticeable growth area for the sector.

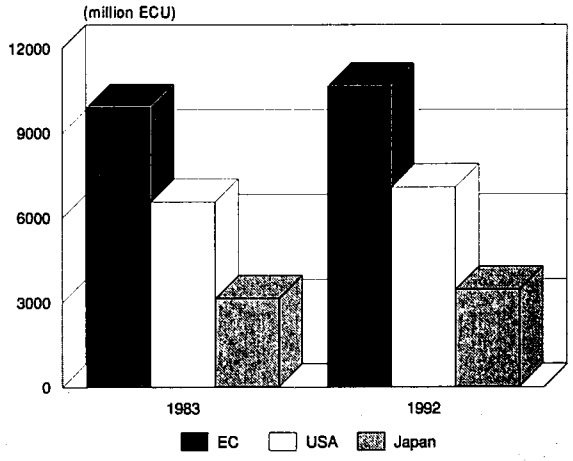
Supply and competition

The EC is a major world producer and is theoretically self-sufficient for virtually all the minerals and rocks in this group. Prices tend to be an intra-EC affair based on contracts negotiated between producer and consumer. Indeed, with the high degree of captive ownership in the construction minerals area, many prices tend to be an intra-company affair. Prices for most of the bulk construction raw materials are usually constant in real terms and thus value growth for both production and consumption reflects increases in volume. Likewise the higher levels of extra-EC exports in recent years reflect higher volume sales of products such as gypsum, dimension stone granite, and carbonate fillers.

Transporting the product between seller and buyer is a major consideration in bulk raw material markets. Producers often operate their own trucks and sell on a delivered basis, and in many cases sell semi-finished or finished products such as ready-mixed concrete, coated road stone, and plasterboard. Sales of these value added products, plus the strong element of service offered to the customer, often combine to give attractive operative margins for companies operating in this sector.

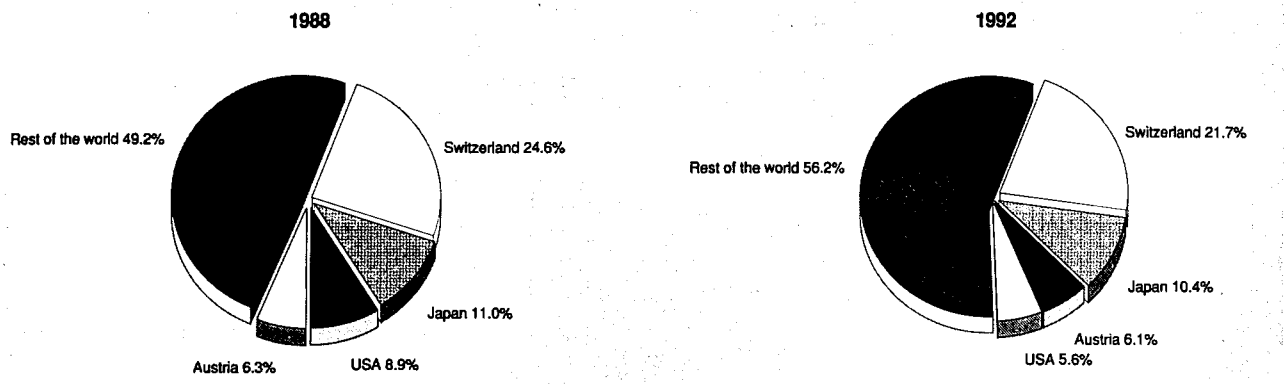
Transportation costs can rule out foreign competition in bulk construction raw materials. The exceptions to this rule cover situations where non-EC countries are neighbours as in the case of Norwegian and Swedish stone shipped to Denmark and Germany, or in the case where "super quarries" have been set up to export stone in low cost bulk carriers e.g. Glen Sanda in Scotland, Wimpey in Ireland, or also in the case where high value items are preferred on aesthetic grounds e.g. dimension stone granite from South Africa, Brazil, and India. In the latter case it should be noted that the EC stone processing industry adds significant value to the material before sale, and is actively engaged in extra-EC exports of the cut and polished versions of the products.

Figure 4: Construction raw materials
International comparison of production in current prices



Source: B.M.Coope & Partners, Eurostat

Figure 5: Construction raw materials
Destination of EC exports



Source: Eurostat

Production process

Construction raw materials extraction is often in the hands of large construction groups whose activities may range from cement and plaster products manufacture to civil engineering. The quarrying divisions of such groups tend to be large scale, highly mechanised operations with quality control well in evidence to cover what is in essence a crushing and grading exercise. Much attention has been focused on improving the efficiency of the crushing process and new or improved technologies are being used to cut costs and maximise the output of high grade products.

INDUSTRY STRUCTURE

Companies

The largest enterprises operating in the construction raw materials sector are the major cement and aggregates groups such as Lafarge Coppee and Ciments Français of France; RMC, Redland/Steetley, Tarmac, Tilcon (BTR), Blue Circle, Hanson, and Evered Bardon of the UK; Heidelberger Zement, Dyckerhoff, and Basalt AG of Germany; Holderbank of Switzerland; Italcementi of Italy; CBR of Belgium; and CRH of Ireland each of whom have thousands or tens of thousands employees.

Other major enterprises extracting limestone include the lime specialists such as Lhoist (B), Carmeuse (B), Rheinische Kalkstein-Werke (D) owned by Wulfrath (D), and Buxton Lime (UK) owned by Minorco (L) and the carbonates producing Omya group (F) fully owned by Pluess-Staufer (CH). In the gypsum and plaster sector the major enterprises are BPB Industries (UK), Lafarge Coppee (F) and Gebr. Knauf (D). Major players in the industrial sands industry are Sibelco (B), Quarzwerke (D), and Hepworth (UK).

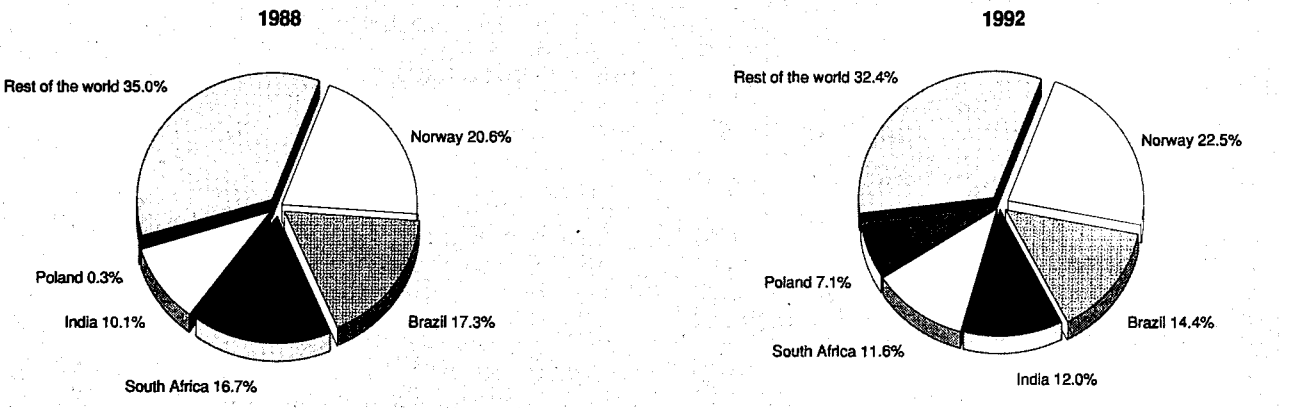
In each of their subsectors the above named enterprises represent over 60% of total EC turnover. All these companies are either European or international in character.

Strategies

In the construction raw materials sector, market strategies for the larger enterprises are tied to their downstream activities. There has been a marked consolidation of the industry within the EC as major groups continue to increase reserves of raw material and influence downstream products by acquisition.

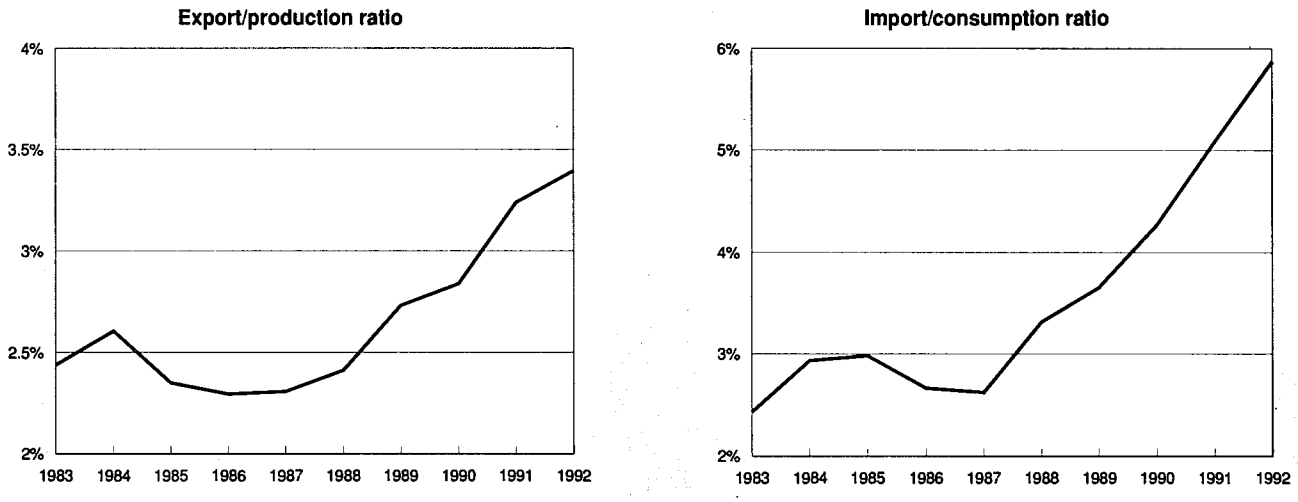
During the 1980s the EC and North America were main areas of focus for acquisitions in the cement and aggregates subsectors. Today the focus has shifted towards Eastern Europe.

Figure 6: Construction raw materials
Origin of EC imports



Source: Eurostat

Figure 7: Construction raw materials
Trade Intensities



Source: B.M.Coope & Partners, Eurostat

In the aggregates subsector, quarries or sand gravel pits are prime targets for acquisition as they are the best way to increase aggregate reserves with planning permission and to maximise involvement in major construction activity. The best approach is to acquire existing operations and invest in expanding or modernising as required.

For the cement subsector, the prime objective is to acquire a cement producing unit, while acquiring a limestone reserves is a secondary consideration. The European cement industry has suffered from overcapacity in the past and thus many mergers and acquisitions were part of the rationalisation process. Recent acquisitions by the big international groups have been aimed both inside and outside the EC. During the 1980s the European cement producers focused their merger and acquisition efforts on North America but since 1990 the closer regions of Eastern Europe have been favoured for EC investment. Nevertheless, intra-EC acquisition and merger activity continues with the drawn out take-over of Greek cement producers, Heracles and Halkis Cement, by the Italian company, Calcestruzzi, another example is Italy's other main producer, Italcementi, taking a major interest in Ciments Français.

REGIONAL DISTRIBUTION

Aggregates and cement are produced throughout the EC with all 12 countries recording production. With regard to aggregates, sand and gravel is more prevalent in low-lying regions and crushed stone more common in highland areas. Dimension stone workings tend to be highly concentrated, for instance in the Carrara marble district of Italy and the Pontevedra/Badajoz granite district of Spain. Gypsum is not as widespread as limestone but large deposits exist in Germany, France, Spain, and the UK and mining, both open cast and underground and processing, including plaster and plasterboard, tend to be carried out at single sites. Sand deposits are fairly widespread although the better quality industrial grades are obtained from

Table 5: Construction raw materials
The largest companies in the EC, 1991

(million ECU)	Country	Sales	Employment (thousands)	(million ECU)	Country	Sales	Employment (thousands)
Construction Raw Materials:				Aggregate Companies:			
Lafarge Cement Division	F	1 816	N/A	Garon	F	132	0.9
Lafarge Aggregates	F	1 408	N/A	Kalkwerk Mathis	D	100	0.5
Tarmac Quarry Products	UK	779	6.3	Basalt AG	D	72	1.5
ARC (Hanson)	UK	588	3.8	ISV Ilseder	D	70	0.3
Evered Bardon	UK	476	4.1	GSM Poissy	F	70	0.4
ECC Construction	UK	352	3.0	Gralex	B	47	0.5
Tilcon (BTR)	UK	342	3.1	Limestone Companies:			
Lafarge Gypsum	F	318	0.0	Wulfrath Group	D	408	2.9
Redland Aggregates	UK	261	2.0	Rheinische Kalk	D	180	1.7
Steetley Quarry (Redland)	UK	197	1.6	Fels-Werke	D	157	0.9
Industrial Sand Companies:				Dolomitwerke	D	101	0.6
Hepworth MinChem	UK	118	1.1	Faxe Kalkbrud	DK	80	0.4
Quarzwerke	D	60	0.3	Dol Marches les Dames (Lhoist)	B	63	0.2
United Sand (Sibelco)	B	55	0.3	CFC Meuse (Carmeuse)	B	48	0.6
Nieuwe Zandgroven van Mol	B	23	0.1	CFC Aisemont (Carmeuse)	B	31	0.2

Source: B M Coope & Partners

deposits located in Belgium and in the north of Germany and France.

ENVIRONMENT

Most of the minerals and rocks in this group are mined by open cast methods so operations consist of a quarry or sand and gravel pit with associated processing plant. Many such operations are highly visible and subject to the NIMBY (Not In My Back Yard) factor.

The modern quarrying industry has an excellent record for dealing with potential problems such as dust emissions and noise pollution during the life of an operation and for restoration of the land once the extraction process has finished. Nevertheless, the restrictions imposed on new workings in some Member States will lead to some areas of the Community importing materials at higher cost. Although the use of waste materials as aggregates is growing, it will remain small because of the stringent performance requirements which specify only high grade aggregate. Meanwhile, the coastal super quarry will play an increasingly important role in supplying deficient areas.

This sector also supplies products for use in environmental processes, most notably limestone and lime in water and air treatment and silica sands for water filtration. Paradoxically many limestone and lime-based processes to remove sulphur from gases or waste streams yield chemical gypsum as by-product. The use of this by-product gypsum will reduce demand for natural gypsum.

REGULATIONS

Producers of construction minerals are actively engaged in the broad initiative to increase harmonisation of building codes and standards in Europe through the EURONORMS programme of CEN (European Standards Organisation). The scheme involves not only the EC countries but those of EFTA and the former Comecon members of Eastern Europe.

Table 6: Construction raw materials
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.0	2.5
Production	0.0	2.5
Extra-EC exports	0.0	2.0

Source: B M Coope & Partners

OUTLOOK

The EC will continue to be a major centre for the production of construction raw materials and EC enterprises operating in this sector will continue to be major players on the world scene. Future development of EC production and consumption will be closely tied to the overall level of building activity.

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Chemical industrial minerals

NACE 232, 233, 239

The EC is a major producer of salt, and potash, coming mainly from secondary sources and is a significant producer of sulphur, fluorspar and barite. However, it appears to be almost totally deficient in phosphate rock and borate resources, the EC is a major importer of these minerals and their derivatives. The markets for several of these items are severely depressed at present, particularly those such as sulphur, phosphates, and potash which are heavily influenced by fertilizer demand.

INDUSTRY PROFILE

Description of the sector

Chemical industrial minerals are major raw materials for the chemical and fertilizer manufacturing industries covered in Chapter 6. The products are covered under the new NACE Rev 1 codes 1430 and 1440, but under current system, they are listed as NACE 232 and 233 plus some products of NACE 239. The principal bulk items are salt, potash, phosphates, and sulphur. Other significant products include fluorspar, barite, and borates.

The EC is a leading world producer of salt and potash and is a significant player in world markets for sulphur, fluorspar, and barite. However, it is has no phosphate or borate mineral production of its own. Germany, France, the UK, Italy, and Spain are the principal EC producers of chemical industrial minerals and are all active to some degree in potash, salt, sulphur, fluorspar, and barite production. The Netherlands is also notable for its major contribution to EC salt production.

Recent trends

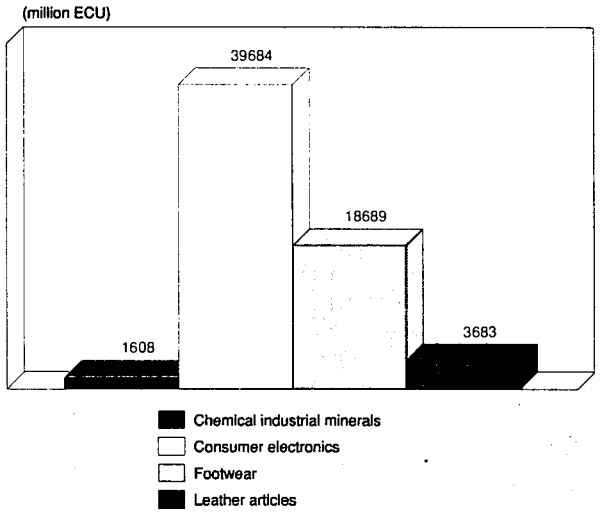
The production and consumption levels for this group of minerals have shown a major decline since 1985. In the case of production this is partly due to falling tonnage output for all the major minerals. Salt is an exception: in 1992 output was 42 million tonnes, slightly above the average for the past decade. However, the decline in production value is exaggerated by falling prices for all the minerals concerned but in particular for sulphur, whose 1992 price was less than one third of the prevailing 1985 price.

The fall in consumption has been more marked in the fertilizer sector rather than the industrial chemicals sector. The decline in fertilizer consumption in the EC has reduced the demand for all fertilizer minerals but especially for phosphate rock. It should further be noted that much of EC phosphate imports now consist of phosphoric acid rather than phosphate rock and this has been one major factor in reducing the trade deficit apparent in the figures presented in Table 2. A sharp reduction in sulphur imports has been another major factor.

International comparison

The USA is the world's leading producer of salt, sulphur, phosphate rock, and boron minerals and is an important producer of potash and barite. Thus, its production of chemical industrial minerals exceeds that of the EC by a factor of three. Declines in some commodities such as sulphur and barite have been balanced by increases in the production of potash, soda ash, bromine, etc. so that production levels have been maintained. Meanwhile, Japan's only significant contribution as a producer is sulphur and the small volume, high value product iodine. Japan is a major importer of all the other commodities, including salt.

Figure 1: Chemical industrial minerals Production in comparison with other industries, 1992



Source: B.M.Coope & Partners, DEBA

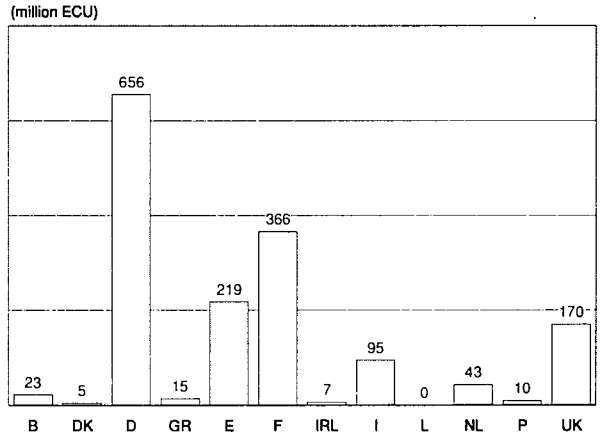
Consumption trends in Japan have been similar to the EC as reflected in overall value decline and falling tonnage in the fertilizer sector. This is seen most strongly in reduced phosphate consumption. In the USA demand for fertilizer minerals has held up better and thus overall consumption shows a somewhat smaller decline in value terms.

Foreign trade

The EC is active in both import and export trade of the chemical industrial minerals. Major export items are potash, salt, and sulphur. Major import items are phosphate rock, potash, borates, and sulphur. Although the EC continued to show a negative trade balance in 1992 the deficit is now quite small compared to those of the mid-1980s. This is due to both reduced imports, particularly of phosphate rock and sulphur, and increased exports, particularly of potash and salt.

The most important supplier countries to the EC are Morocco (phosphates), the USA (phosphates), Israel (phosphates and potash), the former Soviet Union (potash), Turkey (borates), South Africa (phosphates), and Canada (potash).

Figure 2: Chemical industrial minerals Production by Member State, 1992



Source: B.M.Coope & Partners

Table 1: Chemical industrial minerals
Breakdown by sector, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Sulphur	303	302	39
Barite	57	46	6
Fluorospar	76	64	1
Kieserite	53	78	25
Potash	623	782	347
Salt	251	336	99

(1) Trade may occur in products not produced within the EC, hence figures are not additive with respect to Table 2.
Source: B M Coope & Partners, Eurostat

Table 2: Chemical industrial minerals
Main indicators in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)
Apparent consumption	3 285	3 836	4 449	3 727	3 034	2 967	2 988	2 555	2 261	1 812	1 830
Production	2 358	2 737	3 239	2 720	2 282	2 096	2 017	1 872	1 810	1 608	1 610
Extra-EC exports	200.1	209.0	219.2	166.3	178.2	347.8	384.6	382.4	516.3	561.0	558.0
Trade balance	-926.9	-1099	-1210	-1007	-751.9	-871.1	-970.8	-682.8	-451.0	-204.4	-220.0
Employment (thousands)	32.8	30.6	25.8	25.7	24.7	23.7	22.4	22.0	21.8	20.0	18.1

(1) Eurostat estimates.
Source: B M Coope & Partners, Eurostat

Table 3: Chemical industrial minerals
Average real annual growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption	-0.9	-9.6	-4.8
Production	-0.9	-5.7	-3.1
Extra-EC exports	7.3	10.8	8.9
Extra-EC imports	3.0	-12.8	-4.4

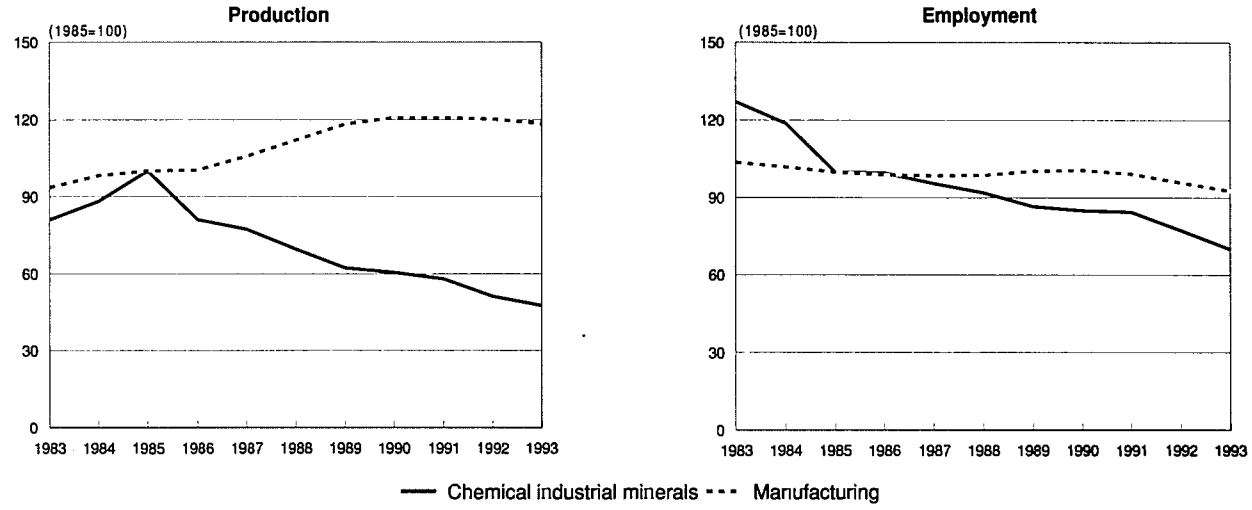
Source: B M Coope & Partners, Eurostat

Table 4: Chemical industrial minerals
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	200.1	209.0	219.2	166.3	178.2	347.8	384.6	382.4	516.3	561.0
Extra-EC imports	1 127.0	1 308.2	1 429.6	1 173.1	930.1	1 218.9	1 355.4	1 065.2	967.3	765.4
Trade balance	-926.9	-1099	-1210	-1007	-751.9	-871.1	-970.8	-682.8	-451.0	-204.4
Ratio exports/imports	0.18	0.16	0.15	0.14	0.19	0.29	0.28	0.36	0.53	0.73
Intra-EC trade	309.8	367.7	453.3	470.2	446.0	718.4	794.5	757.3	802.2	779.6
Share of total imports (%)	21.6	21.9	24.1	28.6	32.4	37.1	37.0	41.6	45.3	50.5

Source: Eurostat

Figure 3: Chemical industrial minerals
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: B.M.Coope & Partners, DEBA

MARKET FORCES

Demand

The main consuming industries for these minerals are the bulk inorganic chemical and the fertilizer industries. Salt is the main raw material of the chloralkali chemical sector whose products include chlorine, caustic soda, and soda ash. Such products and their derivatives are used not only within the inorganic chemicals sector but also in plastics (PVC), soaps and detergents, glass, paper manufacturing, and in a wide range of general industrial processing.

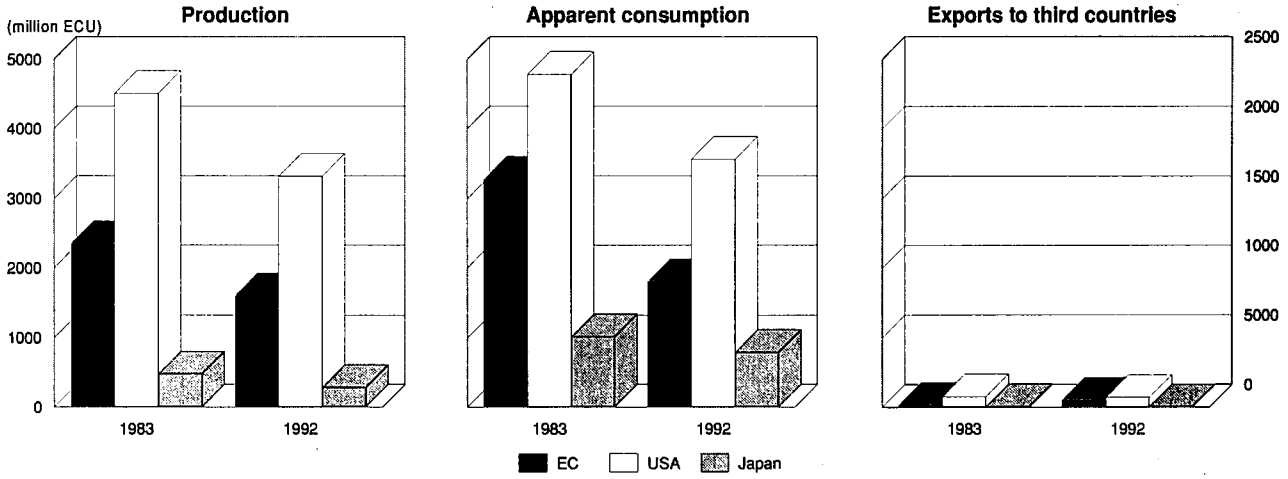
Sulphur is the source of sulphuric acid, probably the most versatile chemical used in chemical and other industrial processes. Nevertheless, it should be pointed out that about 60% of sulphuric acid is consumed by the fertilizer industry. Thus, fertilizer manufacturing, which in turn is highly dependent on demand from EC agriculture, is a major influence on the EC markets for sulphur, phosphates, and potash. It follows that these three minerals have all been adversely affected by EC agricultural reforms and environmental legislation concerning fertilizer usage.

Supply and competition

There is a major world oversupply in all the major products of this grouping although this is less true for salt than for potash, phosphate rock, and sulphur. The downward pressure on prices that this situation has created is certainly hurting some of the more vulnerable, the smaller, higher cost producers of these minerals.

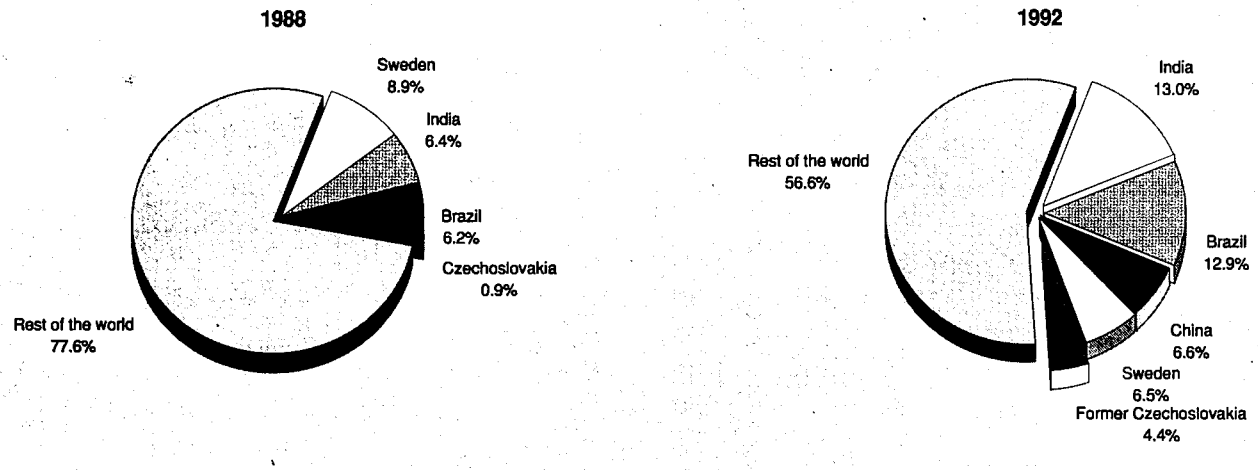
The sulphur supply situation is further complicated by the high proportion of co-product and by-product output in world production. Apart from Spanish pyrites, all EC sulphur production is from secondary sources ranging from elemental sulphur recovered from sour natural gas and oil (particularly

Figure 4: Chemical industrial minerals
International comparison of main indicators in current prices



Source: B.M.Coope & Partners, Eurostat

Figure 5: Chemical industrial minerals
Destination of EC exports



Source: Eurostat

in Germany and France) to sulphur recovered as sulphuric acid from metal smelters. Major cutbacks have been made in Spanish pyrite production, but output has been maintained at other operations in line with the output of primary products. It should be noted that the profitability of some operations has been curtailed by loss of these sulphur by-product revenues.

The EC potash industry has been facing a number of problems and challenges in recent years including the increased competition from low priced material from the former Soviet Union and the integration of the former East German potash industry into unified Germany. The EC imposed anti-dumping duties on potash from the former Soviet Union during 1992. The industry also has to compete with low cost producers in Canada, who benefits from economies of scale, and Israel, who has low cost brine operations.

As a high volume, low value commodity, salt tends to be less vulnerable to foreign competition and most bulk grades of salt, i.e., for chemicals and road de-icing, are consumed close to the point of production. Much of this production is captive or subject to long term contract agreements.

The EC's domestic fluorspar industry has been cut back drastically in recent years as result of exposure to low priced competition from foreign countries. In fact, the main source of these imports, China, has been the focus of anti-dumping action by the EC in 1993.

Production process

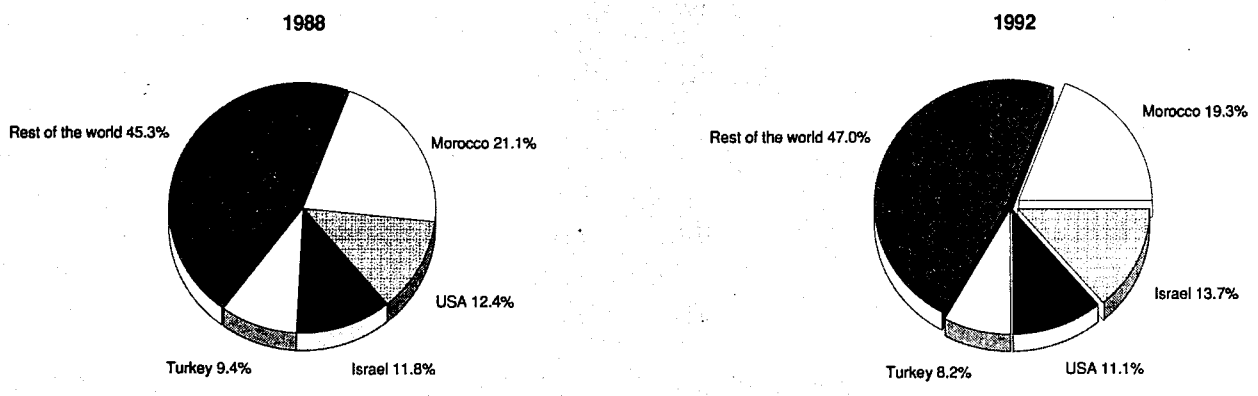
No major new technological developments have taken place in the processing of chemical industrial minerals although the trend towards larger sized equipment and the treatment of finer material has continued together with efforts at energy saving and improved environmental compliance.

INDUSTRY STRUCTURE

Companies

EC production of chemical industrial minerals is highly concentrated in the hands of few large organisations. The salt industry involves major chemical groups such as AKZO (NL), Solvay (B), BASF (D), and SKW Trostberg (D), as well as salt specialists such as, CSME-Salins du Midi (F), Salt Union (UK), British Salt (UK), and Union Salinera (E). The EC potash industry consists of six operating companies: the BASF

Figure 6: Chemical industrial minerals
Origin of EC imports



Source: Eurostat

Table 5: Chemical industrial minerals
The largest companies in the EC, 1991

(million ECU)	Country	Turnover	Employment (thousands)
Potash Companies:			
Kali und Salz (BASF) (1)	D	683	7.6
MDPA (EMC)	F	208	3.9
Italkali	I	108	N/A
Cleveland Potash	UK	83	0.9
Suria K (INI)	E	49	0.7
Potasas de Subiza (INI)	E	40	0.5
Salt Companies:			
Solvay	B	6 045	45.7
AKZO Salt	NL	N/A	6.6
CSME - Salins du Midi	F	238	2.0
BHS (SKW)	D	213	2.7
Sudwestsalze	D	100	0.3
Salt Union	UK	65	0.2
British Salt (Staveley)	UK	35	0.3
Union Salinera	E	26	0.1
Sulphur Companies:			
Elf Aquitaine	F	28 800	87.0
Elf Atochem	F	7 516	33.5
BEB	D	500	2.0
Rio Tinto Minera	E	392	1.7

(1) Companies denoted in brackets indicate majority ownership
Source: B M Coope & Partners

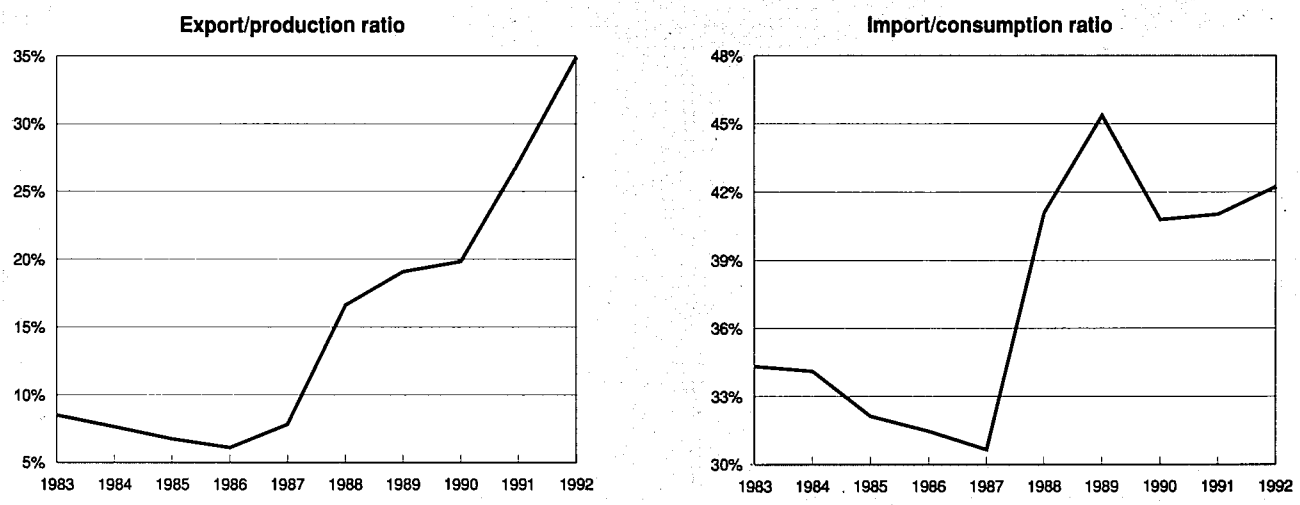
subsidiary, Kali und Salz (D); the Entreprise Minière et Chimiques subsidiary, MDPA (F); the two INI subsidiaries, Suria K and Potasas de Subiza (E); the Anglo-American subsidiary, Cleveland Potash (UK); and the IRI subsidiary, Italkali (I). Most potash producers are also significant producers of by-product salt and Kali und Salz produces another important by-product, the magnesium sulphate mineral kieserite. Meanwhile, sulphur is recovered from sour gas by the two energy companies, Elf-Aquitaine (F) and BEB (D).

Major EC fluorspar producers include Sogerem of the Pechiney group (F); Laporte (UK); Mineraria Silius (I); Minersa (E); and Sachtleben of the Metallgesellschaft group (D). The most important barite producers are M-I (UK and IRL), Barytine de Chaillac (F), and Sachtleben (D).

Strategies

A strategic decision of note made in the salt industry in recent years was the decision of the major UK chemical concern, ICI, to remove itself from both salt and soda ash production. It sold its soda ash interests to Penrice of Australia in 1991, which are now run under the name of Brunner Mond Ltd., and in the following year sold its salt operations mines to D George Harris Associates of USA, which are now run under the name Salt Union Ltd. ICI now buys salt for its chlorine

Figure 7: Chemical industrial minerals
Trade intensities



Source: B.M.Coope & Partners, Eurostat

chemical production under long term contractual arrangements.

REGIONAL DISTRIBUTION

The underground potash and salt operations are associated with the Zechstein geological formation in northern Europe. Salt operations based on the solar evaporation of sea water are located in the more arid climes of the EC Mediterranean coast countries.

ENVIRONMENT

In the recent past the principal environmental issue facing the EC potash industry has concerned the disposal of waste salt from processing operations -- particularly into water courses or rivers such as the Rhine and the Werra. Legislation has forced producers to adopt alternative means of disposal, to increase production of saleable salt, or to close down offending operations. The introduction of phosphates to water courses through their incorporation in fertilizer and detergent products also became a major issue in the 1980s and has been a contributing factor towards the reduced levels of fertilizer application in recent years.

The by-product nature of most of EC sulphur production has already been commented on and it is worth noting that sulphur recovery units are required by legislation to prevent emissions. Some sulphur control processes yield gypsum rather than sulphuric acid as by-product.

Environmental constraints have made a major impact on the EC fluorspar industry through drastic cuts in the production of chlorofluorocarbons (CFCs) in response to the requirements of the Montreal Protocol. The ozone depleting CFCs were once the major market for fluorspar. Although certain hydrofluorocarbons (HFCs) may provide ozone friendly replacements in some applications, they are unlikely to provide the same scale of sales for fluorspar producers.

Table 6: Chemical industrial minerals
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-1.0	0.0
Production	-1.0	0.0
Extra-EC exports	0.0	1.5

Source: B M Coope & Partners

OUTLOOK

The outlook for the chemical industrial minerals does not look very bright in the short term. The existing lack of demand caused by industrial recession combined with major oversupply for the major internationally trade products is expected to prolong this period of low prices and trade disputes for some time to come. Thus further mergers, rationalisation, and closures may be necessary before any major recovery occurs. Recovery is hoped for the late 1990s in response to renewed demand in the former Eastern Bloc and the agriculturally less mature areas of world.

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The industry is represented at the EC level by: International Association of European Mining Industries (EUROMINES). Address: Avenue de Broqueville 12, B-1150 Brussels; tel: (32 2) 775 6311; fax: (32 2) 779 0523.

Crystallised salt
NACE 233

EC production of crystallised salt amounted to 18.3 million tonnes in 1992. Sales declined to 16.4 million tonnes, a 16% decrease from 1991. Sales of road salt were soft across the area in 1992 due to the mild winter conditions. The chloralkali sector was under significant pressure, mainly for environmental reasons and, as a result, sales of crystallised salt continued to slow down. As both sectors represent nearly 70% of the total sales of this type of salt, the situation looks rather bleak, overcapacity being thus emphasised.

INDUSTRY PROFILE

Description of the sector

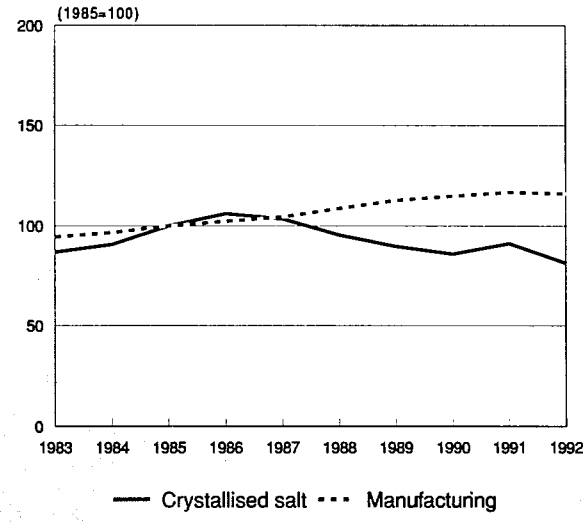
Salt production basically involves solar evaporation (sea salt), dry mining (rock salt) and solution mining (vacuum salt, salt in brine). In the monograph, salt in brine will be excluded unless otherwise specified. The differences in technology do not prevent the identification of this substance in "common salt" or "salt". Salt is mainly sodium chloride (NaCl), and is generally considered not to be a chemical substance.

Recent trends

Output of crystallised salt contracted in the past decade from a 1980-82 average of 24.5 million tonnes to a 1990-92 average of 19.3 million tonnes. Weather climate explains both market and output ups and downs for sea salt and rock salt, but a shrinking demand over years leads to the conclusion that this negative trend will continue. Salt consumption within the EC declined to 16.4 million tonnes in 1992.

The breakdown of production by the main technology line shows that in 1992 rock salt accounted for 39% of the total crystallised salt production, sea salt for 17% and vacuum salt for 44%. Successive mild winters in Western Europe have had a negative effect on the demand for road salt, which is reflected in rock salt production. Adverse weather conditions have detrimentally affected the solar salt harvest in several EC regions.

Figure 1: Crystallised salt
Production in volume compared to EC manufacturing



Source: European Committee for the Study of Salt, Eurostat

International comparison

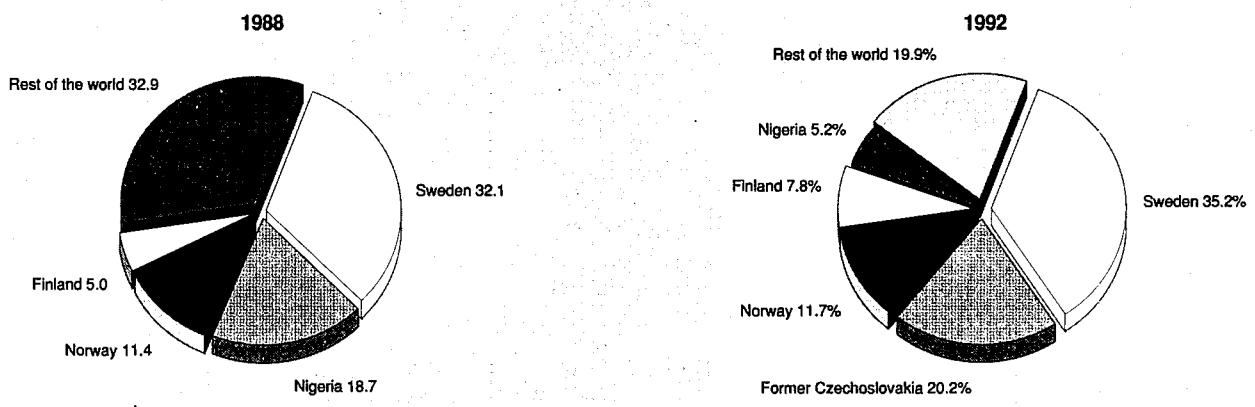
Salt consumption is higher in the USA than in the EC. In 1992, US salt sales stood at 22.2 million tonnes showing a 7% decline compared to 23.8 million tonnes in 1991. By chance, salt requirements for servicing the highways amounted to 10.5 million tonnes an increase of 7.5%. In 1992, Japanese salt sales amounted to 8.4 million tonnes. Since Japan has very few salt facilities, this country depends on imports for 84% of its requirements.

The US, Canadian and Mexican production totalled approximately 55 million tonnes (salt in brine included) in 1992 compared to 35 million tonnes (salt in brine included) for the EC. The scheduled enlargement of the EC is not of a nature to alter this ratio, Austria, for example, represents only 0.7 million tonnes, salt in brine included.

Foreign trade

In 1991, extra-EC imports amounted to 0.35 million tonnes and extra-EC exports reached 1.96 million tonnes. Intra-EC trade represented 3.44 million tonnes. Apart from specialities,

Figure 2: Crystallised salt
Destination of EC exports



Source: Eurostat

Table 1: Crystallised salt
Main indicators

(million tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	16.3	17.1	21.1	20.2	20.8	17.8	17.1	17.1	19.6	16.4
Production	21.4	22.3	24.6	23.8	23.3	22.6	22.0	19.3	20.4	18.3
Intra-EC trade	2.4	2.9	3.7	3.7	3.5	3.1	2.9	3.1	3.4	3.7
Extra-EC exports	1.99	1.44	1.51	1.96	1.70	1.40	1.30	1.50	2.00	3.20

Source: European Committee for the Study of Salt, Eurostat

Table 2: Salt
Production breakdown by sector

(thousand tonnes)	Rock salt	Solar salt	Vacuum salt	Brine
1983	8 812	2 565	8 120	12 305
1984	9 543	2 539	8 281	13 458
1985	11 194	2 456	8 780	12 976
1986	11 806	3 728	8 284	15 290
1987	11 176	3 725	8 332	16 080
1988	8 456	4 068	8 869	15 814
1989	7 707	3 714	8 721	16 256
1990	7 851	3 300	8 151	15 653
1991	8 889	3 536	7 998	15 169
1992	7 217	3 048	8 025	15 123

Source: European Committee for the Study of Salt

Table 3: Crystallised salt
Average volume growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption	2.8	-6.7	-1.5
Production	1.9	-3.8	-0.7
Extra-EC exports	-6.8	23.0	5.4
Extra-EC imports	9.5	-1.9	4.3

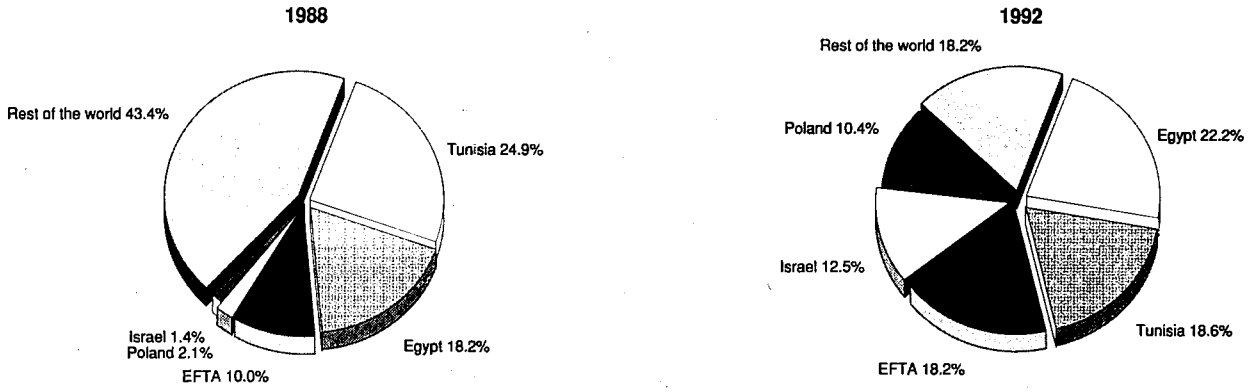
Source: European Committee for the Study of Salt, Eurostat

Table 4: Crystallised salt
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	89.4	72.6	72.1	53.9	65.8	49.6	53.3	51.0	66.2	98.8
Extra-EC imports	6.0	9.6	10.9	12.5	13.4	11.1	14.0	13.0	10.5	13.7
Trade balance	83.4	63.0	61.2	41.4	52.4	38.5	39.3	38.0	55.7	85.1
Ratio exports/imports	14.87	7.56	6.63	4.31	4.92	4.48	3.80	3.92	6.29	7.21
Terms of trade index	99.0	104.2	100.0	114.3	124.1	120.5	122.8	119.4	118.5	136.2
Intra-EC trade	88.1	109.0	141.7	139.9	131.8	124.6	120.9	132.3	149.5	160.0
Share of total imports (%)	93.6	91.9	92.9	91.8	90.8	91.8	89.6	91.0	93.4	92.1

Source: Eurostat

Figure 3: Crystallised salt
Origin of EC imports



Source: Eurostat

salt is a widespread, low value bulk commodity. Transportation costs which represent a significant proportion of the total price prevent any trade expansion as does the abundance of sources. The major market for EC salt producers is non-EC Scandinavia which has no production. Most of the salt imported by Norway, Sweden and Finland is used in the chemical industry. Virtually all of the rest of the salt trade in Western Europe is carried on between neighbouring countries. Surprisingly, the current recession is not slowing down intra-EC trade activities.

MARKET FORCES

Demand

Some 60% of world salt consumption is used as raw material for the chemical industry, followed by food grade salt with 20%, road salt with 10%, special salts for water treatment, salt used in animal feeding etc. The consumption pattern differs in Western Europe. Deliveries of crystallised salt have been broken down are in Figure 5.

Chlorine, a major market for salt, is subjected to environmental pressure. The most buoyant sector in the chlorine industry is the production of PVC, but even this use is now being questioned. The latest scientific studies show that modern PVC plants, equipped with efficient treatment installations can operate without releasing hazardous waste in the environment. The use of recycled glass which has doubled in Europe since 1985, is pushing down demand for soda ash. Salt remains the basic de-icing agent used for winter service. Research on alternative products has focused on abrasive mixes, glycol, urea, calcium magnesium acetate (CMA). Studies have also been conducted on automatic spreading, roadway heating combined with weather forecasting. Salt is still acknowledged as the least expensive and the most efficient de-icer. This was pinpointed by the OECD in a comprehensive survey (1989).

Other sectors where salt is used include diet and food processing, agriculture and water softening. Salt consumption in the EC for water softeners is estimated at 1 million tonnes. But the ion exchange process where salt is used as a regenerant for the resins is challenged by other processes like the reverse osmosis or electro-magnetic devices. Several studies performed by scientific institutes and consumer associations have made evident that the physical treatment of water remains disputable. Traditionally the dyestuffs and soap manufacturing industries use salt. Leather tanning implies special grain size of salt for the preparation of skins. High purity salt is required in the production of pharmaceuticals.

Supply and competition

The difficulty of allocating certain quantities under the right heading remains unsolved. Food grade salt covers, to a large extent in certain Member States, salt which is marketed for non-food uses. In 1992, sales of food grade salt amounted to some 2.3 million tonnes. Some attention has already been paid to the absence of the equivalence between "food grade salt" and "table salt" or between "salt consumption" and "dietary salt intake". For miscellaneous industries, which include in particular the manufacture of feeding stuffs and water softening, salt deliveries amounted to 3.1 million tonnes. In both the manufacture of feeding stuffs and water softening markets, the situation remains contrasted and varies from one Member State to another.

Road salt sales were less than 2.3 million tonnes in 1992 compared to 5.9 million tonnes in 1991. The requirements for this type of salt depend on the severity of winter. Winter maintenance with curtailed salt spreading increases the risk of accidents. The release of Marquette University's study which quantifies the lifesaving benefits of de-icing was presented to the ECSS plenary session in September 1992. In the past, the use of salt was only decided on cost criterion, now this study provides reliable data that quantify the benefits of de-icing.

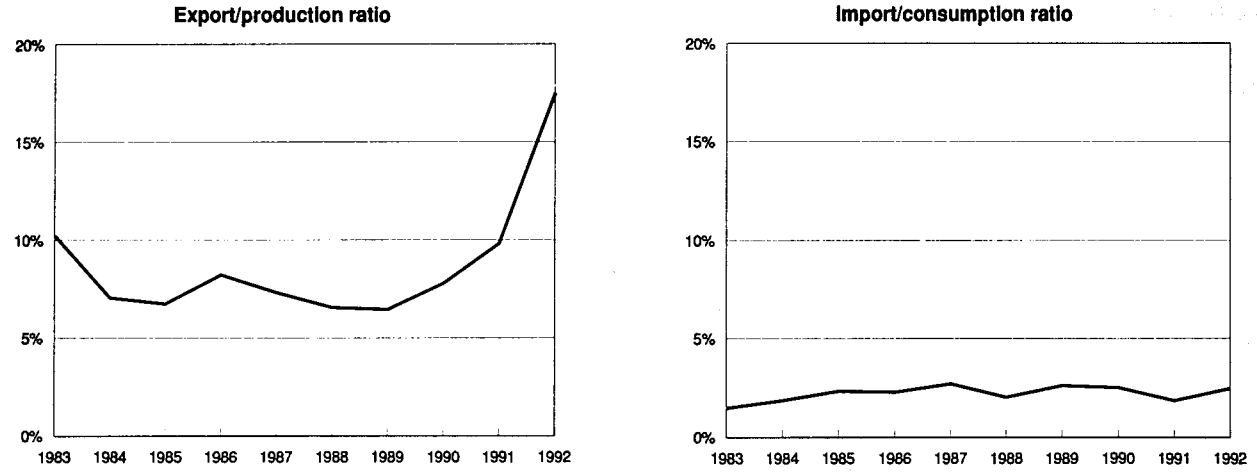
Sales of crystallised salt to the chemical industry decreased by 5% to 8.6 million tonnes. The recession and the sluggishness of demand explain the negative trend affecting chlorine production at the beginning of the 90's, most notably in the pulp & paper and aluminium industries. The following indexes illustrate this trend: 1990: 100; 1991: 95; 1992: 93. There is a strong correlation between chlorine and caustic soda. But they each have different markets.

The introduction of membrane cell technology has been a very slow process in the EC. Japan, however has now equipped more than 80% of electrolysis with membrane cells. As mentioned before, the PVC industry is committed to combating PVC's tarnished environmental image, particularly in the packaging sector.

Production process

Sodium chloride is a common substance in nature. Its main source are the oceans but it is also available in large quantities as rock salt or as subterranean brine. There are three methods of producing salt. One of these involves direct mining of rock salt. The other two are based on the evaporation of brine by heating (vacuum salt) or using sun and wind to mediate crystallisation (sea salt or solar salt). Large amounts of brine

Figure 4: Crystallised salt Trade Intensities



Source: European Committee for the Study of Salt, Eurostat

are used as raw material in the chemical industry without the formation of crystalline salt as an intermediate.

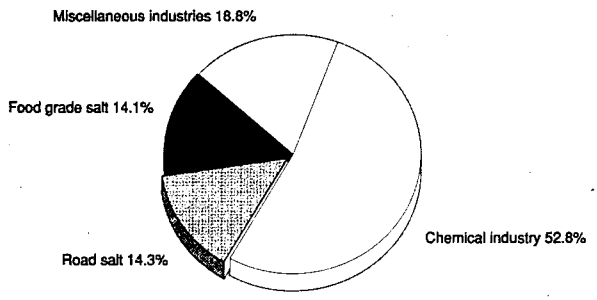
There are three methods used currently to manufacture chloral-kalis by electrolysis. The diaphragm cell process is based on salt in brine. The mercury cell and the membrane cell technologies require crystallised salt. All types of electrolysis work on the same principle: electric power passing through a saline solution between immersed electrodes. While positive ions migrate towards the cathode and lose their electric charges to form neutral molecular products, the neutralisation of negative ions occurs at the anode. The distribution of technology use in 1992 is estimated: mercury cell: 62%; diaphragm cell: 23%; membrane cell: 15%.

INDUSTRY STRUCTURE

Companies

The structure of the EC salt industry has already been described in the Panorama. Producing companies can be split into three categories: the large multinational chemical companies, the medium sized producers specialising in salt, and other companies like potash producers who are also producing salt.

Figure 5: Crystallised salt Consumption by sector, 1992



Source: European Committee for the Study of Salt

Strategies

The multinational companies like Akzo (NL) and Solvay (B) have subsidiaries in various Member States. On January 1st, 1993, Akzo Salt and Basic Chemicals became Akzo Chemicals BV. It was decided to spend 38 million Dutch florins on renovations at its Delfzijl salt facility. In 1991, the company upgraded its salt processing facility at Stade and in 1989 spent approximately 100 million Dutch florins to modernise its Hengelo facility. In Spring 1993, Dansk Salt (DK) became fully owned by Akzo. Akzo is the world's largest salt producer with an annual production capacity of over 15 million tonnes per annum (tpa), of which roughly 10 million tpa in the USA. Solvay is the largest producer of salt in Europe with a total output of about 7 million tpa of crystallised salt and a large but variable amount of salt in brine. Solvay is principally involved in the production of chemicals derived from salt, such as the manufacture of soda ash and the processing of chlorine derivatives such as PVC.

The companies Kali und Salz (D) and Mitteldeutsche Kali (D) decided in 1992 that it would be beneficial to merge their assets in a joint venture. Their objectives over the next five years include a gradual elimination of uneconomical potash and rock salt capacities to 3.1 million tpa of K2O and 2.1 million tpa of NaCl, relocating production to the most suitable sites, and reducing distribution and administration costs. The merger was brought to the attention of the EC Commission in July 1993 to be examined under the European merger control rules. The Commission is also currently examining, in parallel proceedings, the State aids relating to the merger: DM 1 billion granted by the Treuhandanstalt.

ICI (UK) recently announced the closure in 1993 of its chlorine plants at Hillhouse, Lancashire. ICI's UK chlorine capacity will total 0.8 million tpa. As ICI sources all its own brine operations in Northwich, Cheshire, the above mention closure should not affect salt business directly. ICI's soda ash plants in the UK along with a subsidiary in Kenya was sold in 1991 to Penrice Soda management in a buy-out from ICI Australia. In the UK, a significant investment is being made to improve plant reliability and efficiency. The Penrice Group, with a current capacity of 1.7 million tpa, is aiming at growing in the international soda ash market.

The privatisation process of Hellenic Saltworks (GR) continues, their production at Messolonghi represents more than 50% of the national requirements for salt in Greece which are estimated to about 200 000 tons p.a.

A consortium plans to develop a new salt works with a capacity: 1.2 million tpa in the north of the Netherlands with the financial support of the government and of a government-controlled regional agency. The Dead Sea Works Ltd (Baer Sheva) who markets 560 000 tons of salt for chemicals, water treatment, fisheries etc. has announced the construction of a new facility to be built at Sodom for export (700 000 tons).

ENVIRONMENT

The International Conference on Nutrition which took place in Rome in December 1992 emphasised measures to prevent and alleviate health problems thanks to nutritional solutions. Salt supplementation is one of the solutions. Salt iodisation, for example, was called "the most effective long-range measure for preventing and correcting iodine deficiency disorders (IDD)." The introduction of fluoridated salt in the German market during the period under review constituted a major response to the prevention of dental decay in this Member State. Salt is a very appropriate carrier for both iodine and fluoride but there are still pending problems due to the progressive reduction of dietary salt intake (discretionary salt contributes less intake than commonly believed) and the variety of legal provisions in force in the Member States. Common salt used for highway de-icing is by far the most popular product because it is quickly available, easy to handle, store and apply and inexpensive to purchase. The side effects, motor vehicle and infrastructure corrosion, degradation of the roadside vegetation, and migration through the soil into ground water, are sometimes evoked. In terms of corrosion, acid rain has greatly increased the corrosivity of the highway environment and manufacturers have already developed corrosion-resistant vehicles by improving materials and manufacturing processes. Currently most of the bridge decks are equipped with protective systems. Given the complexity of the matter and the site specific conditions prevailing in the natural environment, it is very difficult to quantify these alleged effects. The sensitivity of ground water to salt depends on many factors (soil, climate, water volume etc.). Other sources of salt or sodium including natural brines and salt deposits are generally more susceptible to alter sodium concentration in drinking water. Some controversy exists about the use of disinfectants spreading waterborne diseases. It is important to make the right distinction between risk and danger.

Campaigns against chlorine and especially PVC have developed in recent months calling for a phase out. Environmental considerations were said to have forced reductions in chloride bleaching. Many of chlorine components are essential to medical and agricultural activities and to construction, packaging and other industries. Ill-considered restrictions of their use would have serious consequences on health and quality of life.

In the case of the use of land for solar salt evaporation, a natural resource is exploited in the least harmful way for the environment. Salt works constitute a natural park. A recent book published as part of the EC project on the upgrading of the Messolonghi salt works expresses from the ecological point of view that salt production is a positive combination of economic development and ecological protection (birdlife, halophytic vegetation etc.). This is valid for many other sites as well.

REGULATIONS

The Council Regulation no. 793/93 of March 1993 on the evaluation and control of the risks of existing substances, is a matter of concern for the manufacturers because of the very nature of salt which is, essentially a foodstuff. Most of the requested data are already available. A literature search on the various aspects of its constitutive ions represents a considerable amount of work from individual companies. The monograph on "Sodium chloride (the production and properties of salt and brine)" edited by Dale W. Kaufmann should have been considered as a suitable response.

Several directives and regulations are enabling food law in Europe to be harmonised. The profession has developed a preliminary draft directive on iodised salt which corresponds to the concerns of the EC Commission and of the endocrinologists. Salt iodisation was also discussed in September 1992 within the framework of the Codex Committee on Nutrition and Foods for Special Dietary Uses. A similar document has been produced on fluoridated salt.

OUTLOOK

It is very difficult to forecast the future of the salt industry. The sales of salt are highly dependent on developments occurring in the chemical industry (technology, regulations, outlets). The second largest use of crystallised salt relates to winter service which is widely varying according to weather conditions from year to year.

Although overcapacity is emphasised by the economic recession, projects relating to new facilities have been disclosed recently. According to various sources, it can be assumed that the European salt market is sluggish; salt demand is expected to fall by a further 3 to 4 million tonnes by the end of the century.

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Physical industrial minerals

NACE 231, 239

The EC is the world's major consuming region for physical industrial minerals and currently produces around 85% of its own requirements. The products included in this sector are minerals for non-chemical industrial application. Foreign competition is stiff in some areas and there is a high volume of intra-EC trade. Overall, major EC producers of these minerals are recognised as world leaders in their fields and are actively involved in operating in other countries. This leadership has been gained through technical expertise and a close understanding of its consuming industries' requirements.

INDUSTRY PROFILE

Description of the sector

The physical industrial minerals are defined as those industrial minerals used predominantly for their physical characteristics rather than for their chemistry. They correspond with the minerals covered by the existing NACE codes 231.7 and non-chemical items in NACE 239 and are listed under the new NACE Rev 1 codes as 1422 and 1450.

Thus, these minerals are used in such fields as ceramics, refractories, and abrasives; as filler/ extender pigments for incorporation into paper, paints, and plastics; and as filters, absorbents, and insulating materials. The range of products includes clays such as kaolin, kaolinitic clays, bentonite, and sepiolite as well as a variety of minerals such as diatomite, feldspar, magnesite and magnesia, asbestos, perlite, pozzolana, pumice, and talc. The EC is a leading producer and exporter of these products.

Recent trends

EC production and consumption of the physical industrial minerals displayed excellent growth during the 1980s followed by a fall in 1990 and 1991. The declined seemed to stabilise in 1992 and the signs are that there may be a modest return to growth in 1993. Extra-EC exports have increased during the period under review although the trade balance has remained consistently negative during this time.

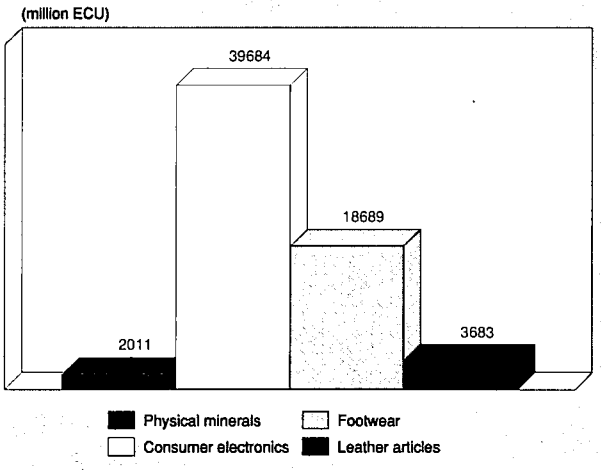
International comparison

In 1992, EC production of physical industrial minerals was 40% higher than the USA, and EC consumption was over 2.5 times USA's consumption. As these figures suggest, the USA exports more of these minerals than the EC. Japan is a minor producer of physical minerals and in 1992, its consumption less than 30% of EC consumption, is heavily based on imported raw materials. The EC displayed stronger growth in consumption than either the USA or Japan over the last ten year period. Indeed, the USA appeared to show a clear value decline between 1983 and 1992 although this has more to do with exchange rate movements than any decline in volume terms.

Foreign trade

The EC is net importer of physical industrial minerals. Nevertheless, during the 1983-92 period exports grew by nearly 90% while imports grew 35%. Major EC export items are the industrial clays, kaolin, ball clay, bentonite, etc. are responsible for over 60% of total exports in 1992. Ironically, industrial clays are a major imported item in this group, and indeed the value of imports almost exactly balances exports in most years. It should be noted, however, that for a number of other important EC export items such as magnesia and talc, imports actually exceed exports by a considerable margin.

Figure 1: Physical minerals Production In comparison with other Industries, 1992



Source: B.M.Coope & Partners, DEBA

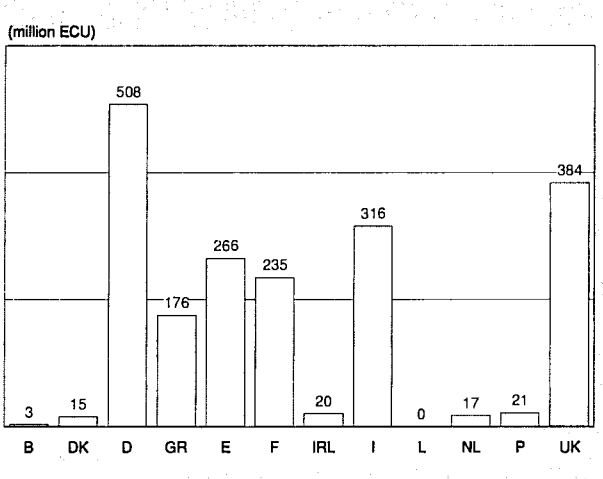
Major sources of EC imports of physical industrial minerals are the USA for kaolin, other clays, diatomite, and talc, Brazil for kaolin, China for magnesia and graphite, Canada for asbestos, Austria for magnesia and talc, Finland for talc, and Norway for feldspathic minerals. The major destinations for EC exports were the EFTA countries, an important element of which is the supply of kaolin to the paper industries of these countries.

MARKET FORCES

Demand

The physical industrial minerals are consumed by a wide range of industries. The most significant end markets for physical industrial minerals are: ceramics, refractories, glass, and abrasives; paper, paints, and polymers in terms of plastics, rubber, sealants/adhesives, etc.; and as filters, absorbents, and insulating products. Since the ceramics industry also includes

Figure 2: Physical minerals Production by Member State, 1992



Source: B.M.Coope & Partners

Table 1: Physical industrial minerals
Breakdown by sector, 1992

(million ECU)	Apparent consumption	Production	Extra-EC exports
Kaolin	388	409	160
Bentonite	319	326	23
Asbestos	73	12	5
Diatomite	112	103	8
Feldspar	183	170	2
Magnesia	289	170	37
Perlite	34	21	5
Pumice	69	68	11
Quartz(ite)	47	45	14
Talc	178	122	12
Others	646	565	50

Source: B M Coope & Partners, Eurostat

Table 2: Physical industrial minerals
Main indicators in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)
Apparent consumption	2 013	2 154	2 289	2 235	2 210	2 472	2 653	2 484	2 336	2 337	2 320
Production	1 699	1 889	1 993	1 963	1 945	2 238	2 335	2 190	2 015	2 011	2 010
Extra-EC exports	173.8	217.4	216.4	175.5	159.1	345.4	359.1	335.8	332.0	327.9	332.0
Trade balance	-314.1	-265.1	-296.1	-272.5	-264.9	-233.7	-318.4	-294.2	-321.4	-326.5	-320.0
Employment (thousands)	24.8	25.6	24.4	24.2	24.2	23.9	23.8	24.9	25.1	23.8	22.9

(1) Eurostat estimates.
Source: B M Coope & Partners, Eurostat

Table 3: Physical industrial minerals
Average real annual growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption	5.8	-1.8	2.3
Production	6.5	-2.7	2.3
Extra-EC exports	10.3	-2.9	4.2
Extra-EC imports	4.9	1.0	3.2

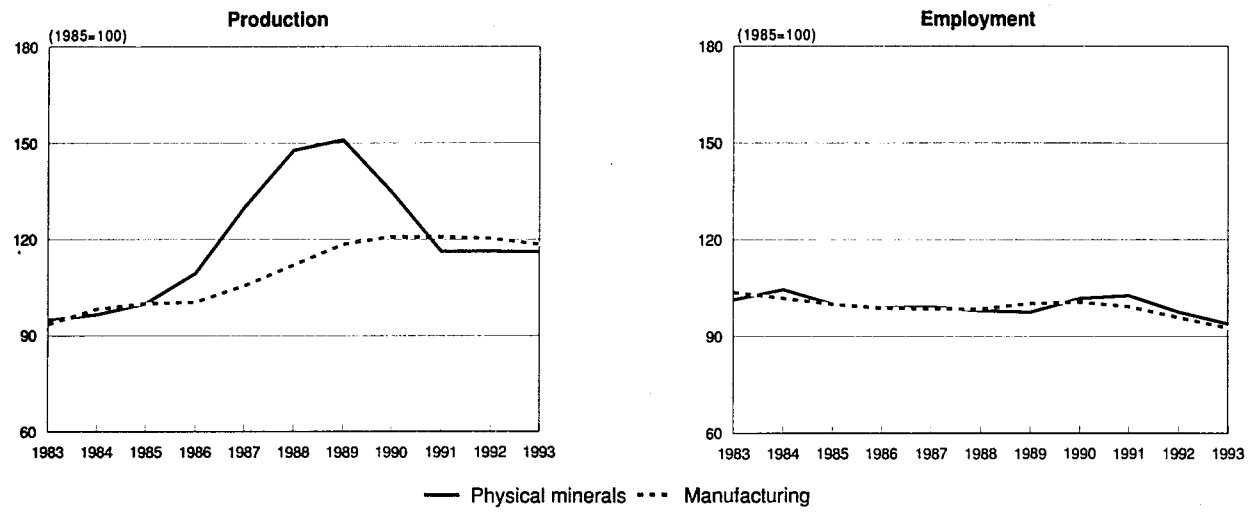
Source: B M Coope & Partners, Eurostat

Table 4: Physical industrial minerals
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	173.8	217.4	216.4	175.5	159.1	345.4	359.1	335.8	332.0	327.9
Extra-EC imports	487.9	482.5	512.5	447.9	424.0	579.1	677.6	630.0	653.4	654.3
Trade balance	-314.1	-265.1	-296.1	-272.5	-264.9	-233.7	-318.4	-294.2	-321.4	-326.5
Ratio exports/imports	0.36	0.45	0.42	0.39	0.38	0.60	0.53	0.53	0.51	0.50
Intra-EC trade	399.9	456.6	459.2	526.9	518.1	761.0	835.2	839.1	823.0	818.1
Share of total imports (%)	45.0	48.6	47.3	54.1	55.0	56.8	55.2	57.1	55.7	55.6

Source: Eurostat

Figure 3: Physical minerals
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: B.M.Coope & Partners, DEBA

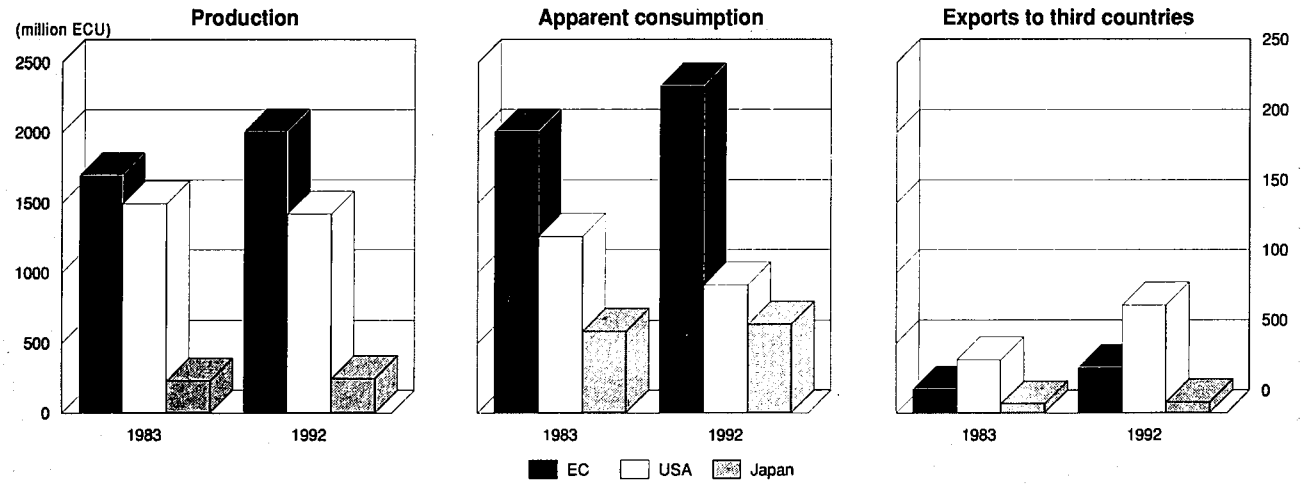
building products such as bricks, tiles and pipes based on common clays, the construction industry is also a large direct and indirect consumer of these other products. The technical requirements of manufacturing many of these products have become more stringent with time, but the raw material producers have tended to upgrade their products accordingly. Many producers of physical industrial minerals maintain close technical relationships with major consuming companies in order to meet future requirements. Thus, many products are "speciality" rather than "commodity" minerals and long term contracts between major producer and major consumer are common.

Supply and competition

The degree of intra-EC trade is due partly to the multiplicity of grades available and the suitability of certain grades for specific end-uses. EC producers usually compare well against foreign competition as result of either the quality of deposits or the processing expertise or a combination of both. The high technical input into many products is undoubtedly reflected in the USA, Canada, and the EFTA suppliers. It should also be noted that certain products such as graphite, mica, and clays are bought in raw form for further processing in the EC before reaching the eventual consumer. Nevertheless, the EC is clearly deficient in certain minerals such as asbestos, vermiculite, and graphite and must import the bulk of its requirements. Asbestos is no longer as vital as it used to be and a range of replacements has been developed, many of them based on indigenous EC raw materials, to overcome the health hazards associated with this mineral.

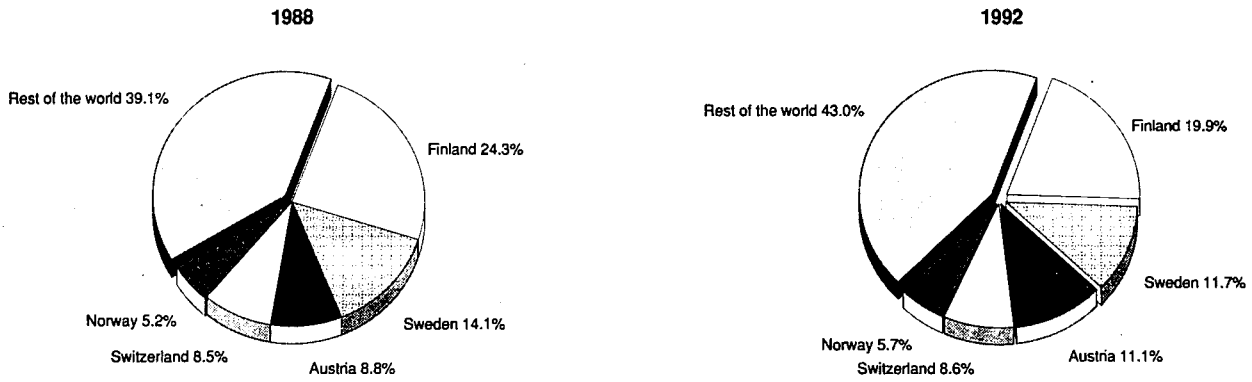
Magnesite and magnesia is one area where EC industry is suffering from foreign competition. The EC produces a wide range of grades of magnesia from natural magnesite, or from sea water, or brines for applications in refractories, construction, general chemicals, and agriculture. For most of the past

Figure 4: Physical minerals
International comparison of main indicators in current prices



Source: B.M.Coope & Partners, Eurostat

Figure 5: Physical minerals
Destination of EC exports



Source: Eurostat

decade EC magnesia producers have had to meet strong competition in the lower grade sections of the market from low priced products from China. More recently further competition has become evident in the higher grade sectors of the market from new low cost production in Australia and China, who is now able to improve the quality of certain grades. During 1992 anti-dumping action was taken against China and a duty imposed on certain products. Even so the EC magnesia industry is undergoing a process of rationalisation with producers focusing on more specialised grades and value added products.

Production process

Many of the minerals in this group are beneficiated or their properties enhanced by highly sophisticated processing techniques. Kaolin, bentonite, talc, magnesia, and diatomite are all subjected to a wide range of treatments involving such processes as high intensity magnetic separation, acid or alkali treatment, high temperature processing, laser sorting, jet milling, attrition grinding, classification at micron sizes, and surface modification. Such techniques have not only improved product quality in traditional uses but have introduced new grades to new markets and have expanded viable reserves.

INDUSTRY STRUCTURE

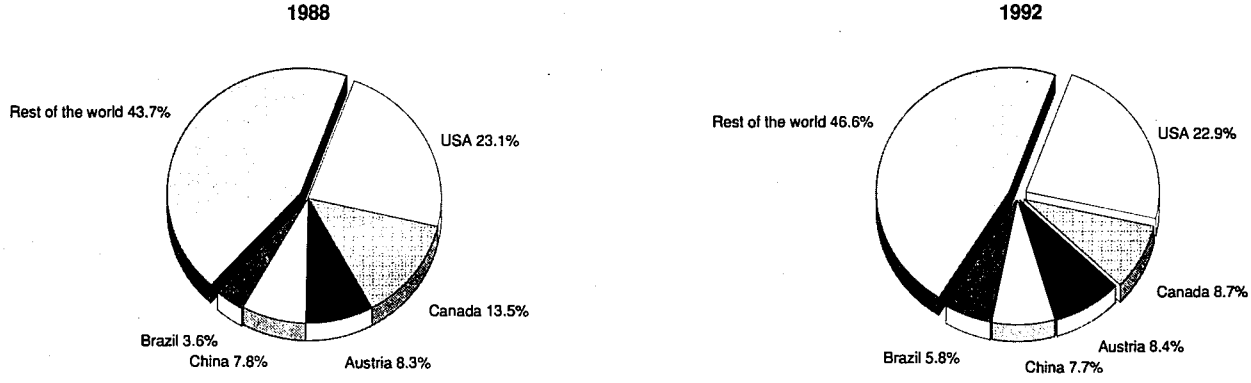
Companies

Most of the companies operating in this sector tend to be industrial minerals specialists although some companies come from other industries like: the construction, e.g. Redland/Steetley (UK) and CRH (IRL), petroleum, e.g., Elf-Aquitaine (F) and Shell (NL), and metals, e.g., RTZ (UK). In the kaolin and ceramic clays sector major enterprises include: English China Clays (UK) and Watts Blake Bearne (UK), Amberger Kaolinwerke (D), and AGS (F) and Imetal (F). Major enterprises in the bentonite and special clays sector are Sud Chemie (D), Laporte (UK) and Redland/Steetley, Tolsa (E), Eliopoulos (GR), and Laviosa (I). Leading companies in other minerals are CECA (F) for diatomite; Grecian Magnesite (GR) for magnesia from natural magnesite; Redland/Steetley, Sardamag (I), Billiton, part of Shell, and Premier Periclase (F), part of CRH (IRL) for magnesia from sea water and brines; and the RTZ subsidiary, Talc de Luzenac (F).

Strategies

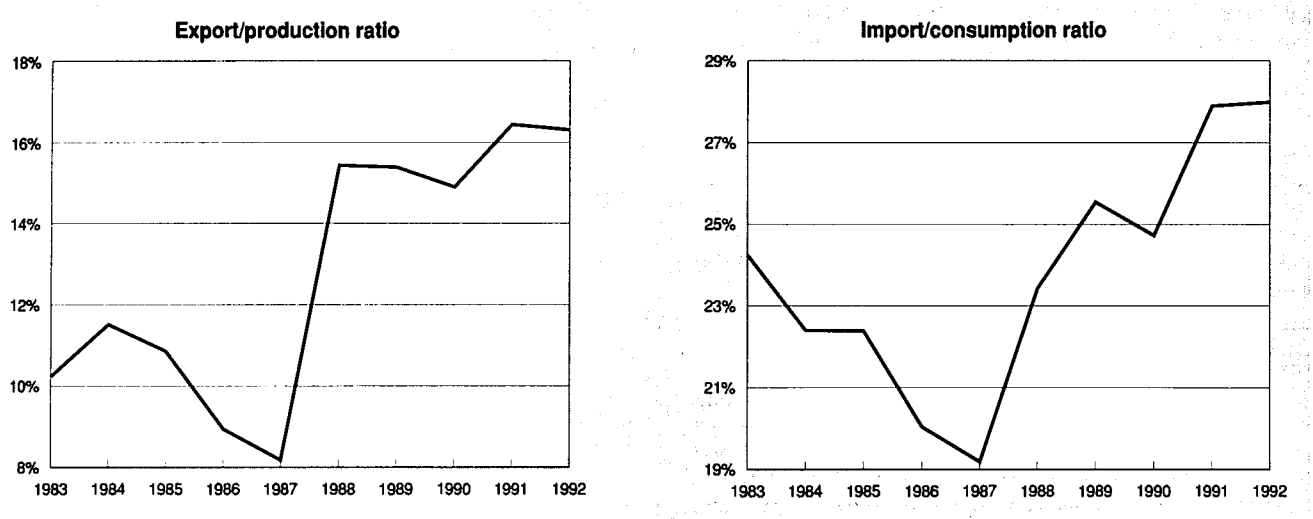
Several of the companies mentioned in the previous section operate on an international level, and are justly recognised as world leaders in their own particular fields. English China

Figure 6: Physical minerals
Origin of EC imports



Source: Eurostat

Figure 7: Physical minerals
Trade intensities



Source: B.M.Coope & Partners, Eurostat

Clays (ECC), Watts Blake Bearne (WBB), RTZ/Luzenac, Laporte, and Sud Chemie all have important operations in North America and are becoming increasingly involved in the Far East. At the same time, WBB is currently subject to a bid from Sibelco (B) who was, until recently, only a minority shareholder. Germany's main kaolin producer, Amberger Kaolinwerke (AKW), has been active on the acquisition trail first buying some of the more important kaolin operations in former East Germany (Kemmlitz and Caminau) and more recently its near neighbour in Bavaria, Eduard Kick GmbH. The world's largest kaolin producer, ECC of the UK, is currently planning to liquidate its Construction Materials Division, an important aggregate producer in the UK and the USA, while simultaneously buying into the Calgon speciality chemicals business in the USA. Recent strategic developments in the bentonite sector have included the move by Laviosa of Italy into processing in Spain through a joint venture with Promasa of Bilbao and the investment made by Navan Resources of Ireland into the Hungarian bentonite industry.

REGIONAL DISTRIBUTION

Clays of a type suitable for the production of bricks and tiles are to be found in many regions of the EC although the more specialised industrial clays are much rarer and more localised. The Cornwall and Devon region of England accounts for about two thirds of total EC kaolin output. Other significant centres include Bavaria in Germany and Brittany in France. The main ball and ceramic clay producing districts in the EC are Wester-

Table 5: Physical industrial minerals
The largest companies in the EC, 1991

(million ECU)	Country	Sales	Employment (thousands)
Clay Companies:			
English China Clays	UK	1 441	11.8
Steetley (Redland)	UK	1 013	9.2
Hepworth	UK	942	10.1
Sud Chemie	D	452	4.3
Ibstock Johnsen	UK	407	4.6
Redland Bricks & Tiles	UK	233	2.0
London Bricks	UK	134	3.1
Watts Blake Bearne	UK	87	1.1
Agrob Fliesen	D	51	0.8
Argiles et Minéraux	F	49	0.5
Tolsa	E	37	0.3
General Industrial Minerals:			
CECA	F	275	1.5
Talc de Luzenac	F	44	0.5
Grecian Magnesite	GR	23	0.7
Silver & Baryte	GR	17	0.3
Mining Houses:			
RTZ	UK	5 061	73.5
Metallgesellschaft	D	4 309	7.6

Source: B M Coope & Partners

wald in Germany, Charente in France, and Devon in the UK. The main bentonite centres are Bavaria in Germany, Milos island in Greece, Sardinia in Italy, and south-east England whilst the region around Madrid is the sepiolite capital of the world. The volcanic regions of Greece and Italy are well known for their deposits of perlite, pumice, and pozzolana.

ENVIRONMENT

The main environmental issues concerned with quarrying physical industrial minerals are shared with those in construction raw materials discussed earlier in this chapter and indeed most of the EC mining industry. The modern quarrying industry has an excellent record in overcoming potential problems of dust, noise, waste disposal, and land reclamation.

OUTLOOK

The EC will continue to be a major producing and consuming area for the physical industrial minerals and the influence of major EC producers will continue to spread well beyond Europe. Technical expertise and innovation will continue to play a major role in the development of the industry and projects in other countries. Eastern Europe and the Far East will benefit from the involvement of EC-based expertise. Within the EC itself most new developments are likely to be extensions to existing producing areas although some new projects, such as kaolin in Spain and Portugal, and talc in Scotland, may be launched in the near future.

Table 6: Physical Industrial minerals
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.0	2.5
Production	1.0	2.5
Extra-EC exports	0.0	2.0

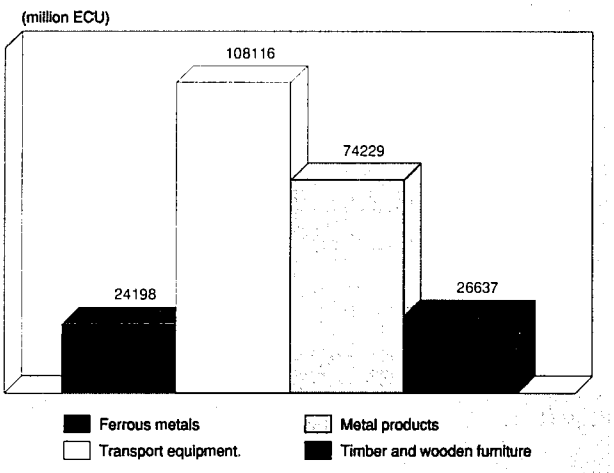
Source: B M Coope & Partners

Written by: B M Coope & Partners
The industry is represented at the EC level by : International Association of European Mining Industries (EUROMINES). Address: Avenue de Broqueville 12, B-1150 Brussels; tel: (32 2) 775 6311; fax: (32 2) 779 0523.

Overview
NACE 221, 222, 223

After an annual increase of 8% in 1988 and 1989, the EC production of ferrous metals has witnessed continuous decline. The 1989 peak was achieved after a period of crisis, dating back to the 1970s. Low growth in the main customer sectors, the emergence of new producing countries and substitute products contributed to the crisis. In the first half of the 1980s, the steel industry underwent a process of rationalisation and capacity reduction. The restructuring made productivity gains possible. However, because of the upswing in 1988 and 1989 the restructuring process was not entirely completed, and identified excess capacity, meant to disappear, remained in production. This, together with the ever increasing competition from newly industrialised and East European countries and the depressed general economic situation in 1992/1993, plunged the sector into a new crisis, urging a new restructuring programme.

Figure 1: Ferrous metals
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

This monograph covers the activities of the steel industry as defined by the European Coal and Steel Community (ECSC) Treaty and the other ferrous metal industries. According to the NACE classification, these activities are the following:

- Steel industry (NACE 221);
- Manufacture of steel tubes (NACE 222);
- Other first processing of steel (NACE 223).

This last sector can be further divided into four subsectors: cold drawing of bars (NACE 223.1); cold rolling of steel strip (NACE 223.2); cold forming of steel flat products (NACE 223.3); and cold drawing of steel wire and manufacture of wire products of steel (NACE 223.4).

The manufacture of steel accounts alone for about 70% of total ferrous metal production, while the manufacture of steel tubes accounts for 13% and the other first processing of steel for 17%.

Germany contributes more than one third to the total value added of the ferrous metals sector in the EC. Italy, France and the United Kingdom follow with 17%, 14% and 11% respectively. Hence four Member States allow for three quarters of the total value added of the EC ferrous metals sector.

The development of the ferrous metals industry has clearly deviated from the trend of total manufacturing sector in the EC. Unlike the total manufacturing industry the ferrous metals industry showed a fluctuating development pattern over the past ten years. However, since 1989 its production has continuously declined, which resulted in a 1992 production level that was similar to the 1983/84 level. Conversely the total manufacturing industry's production grew by 29% over the period under consideration, although since 1989 it has remained virtually unchanged.

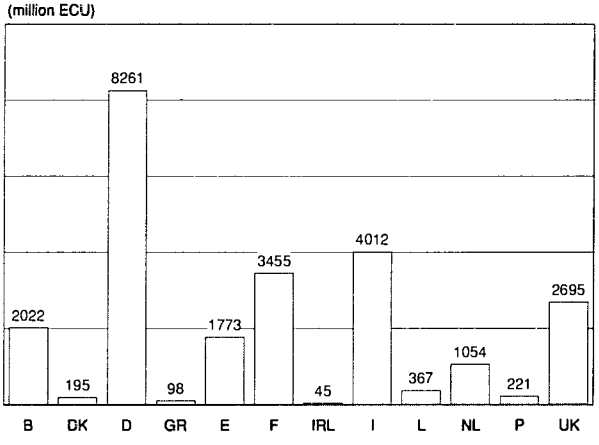
The employment level of the total manufacturing sector has been rather stable from 1983 to 1992. This with a drop of 3.5% in 1992. The employment level in the ferrous metals industry dropped at a faster rate (4.7%) in 1992. As a result of a rationalisation and restructuring process, which particularly affected the steel industry, employment level in the ferrous metals industry has constantly decreased over the reference period; in 1992 it was 39% lower than in 1983.

The significant decline in the extra-EC exports is worthy of note. This development has a negative impact on the production. At the same time the extra-EC imports grew. Consequently the trade balance has deteriorated increasingly, particularly since 1985.

Recent trends

The production and consumption of ferrous metals in the EC were highest in 1989. Since then, the demand for ferrous metals declined increasingly, resulting in a significant drop in the production level between 1989 and 1992. Production decreased faster than the consumption, which affected the trade balance adversely. The employment in the ferrous metals industry revealed a continuous decline too. However, unlike the production and consumption the employment level has not dropped since 1989, but it decreased throughout the reference period 1983-1992. In 1993 the situation is not expected to improve and the production and consumption of ferrous metals will further decline.

Figure 2: Ferrous metals
Value added by Member State, 1992



Source: DEBA

Table 1: Ferrous metals
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	62 803	71 003	74 812	70 807	66 813	80 777	94 487	90 119	82 776	78 291	74 000
Production	73 085	84 289	89 804	79 926	75 063	89 077	102 949	96 319	89 402	83 597	79 000
Extra-EC exports	14 624	18 027	20 403	14 935	13 620	14 707	16 533	14 017	13 836	12 758	12 200
Trade balance	10 283	13 286	14 991	9 118	8 250	8 301	8 462	6 200	6 626	5 306	5 000
Employment (thousands)	913.5	847.3	799.0	754.6	693.7	661.2	645.2	622.7	588.2	560.1	530.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) NEI estimates
Source: DEBA

Table 2: Ferrous metals
Breakdown by sector, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Iron and steel	56 832	59 694	7 697
Steel tubes	9 795	11 444	3 044
First processing of steel	11 664	12 459	2 017

(1) Except for trade figures, estimates are used if country data is not available.
Source: DEBA

Table 3: Ferrous metals
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	2.4	-0.5	1.1
Production	1.6	-1.2	0.4
Extra-EC exports	-1.1	-2.6	-1.8
Extra-EC imports	4.0	3.9	4.0

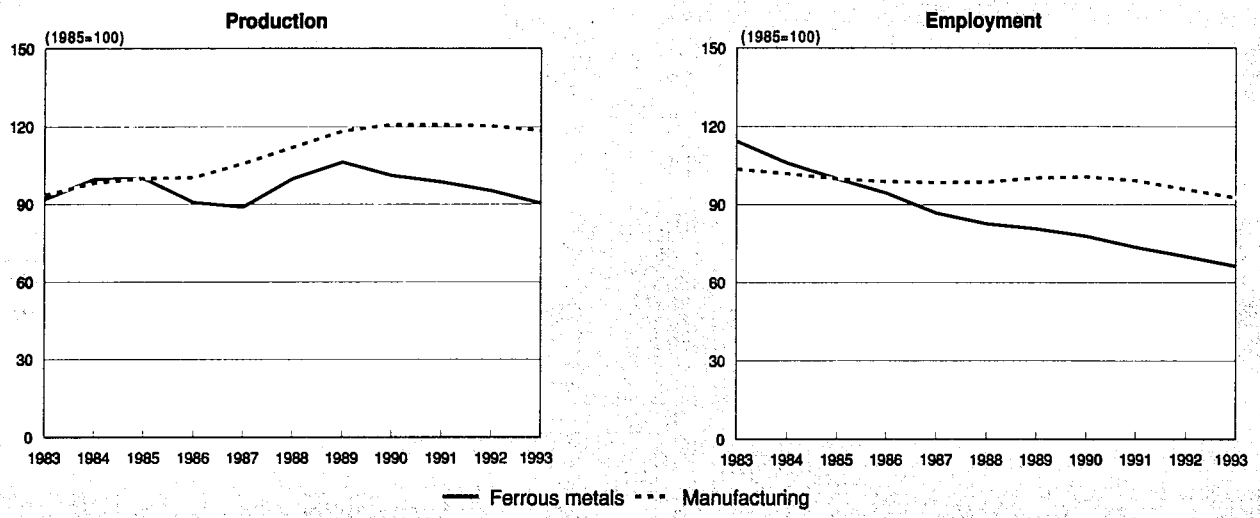
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Ferrous metals
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	14 624	18 027	20 403	14 935	13 620	14 707	16 533	14 017	13 836	12 758
Extra-EC imports	4 342	4 741	5 412	5 817	5 370	6 407	8 071	7 817	7 210	7 452
Trade balance	10 283	13 286	14 991	9 118	8 250	8 301	8 462	6 200	6 626	5 306
Ratio exports/imports	3.37	3.80	3.77	2.57	2.54	2.30	2.05	1.79	1.92	1.71
Terms of trade index	99.8	100.4	100.0	91.8	91.6	87.6	85.9	89.4	85.4	82.7
Intra-EC trade	14 547	17 004	18 969	19 215	18 531	21 749	26 488	26 174	25 384	23 796
Share of total imports (%)	77.0	78.2	77.8	76.8	77.5	77.2	76.6	77.0	77.9	76.2

Source: DEBA

Figure 3: Ferrous metals
Production in constant prices and employment compared to EC manufacturing



Are NEI estimates
Source: DEBA

International comparison

International comparison of main indicators in volume

Due to lack of data a comparison of the ferrous metals industries of the EC, the USA and Japan can only be assumed. Taking crude steel as an indicator, it can be seen that the EC is the world's largest producer of ferrous metals, followed by Japan and the USA. At the same time the EC and Japan are the principal exporters of ferrous metals, although in 1992 these exports were lower than in 1983. This applies particularly to Japan, that witnessed a considerable drop in its ferrous metals exports between 1983 and 1992. Unlike in the EC and Japan, USA the consumption of ferrous metals is higher than their production.

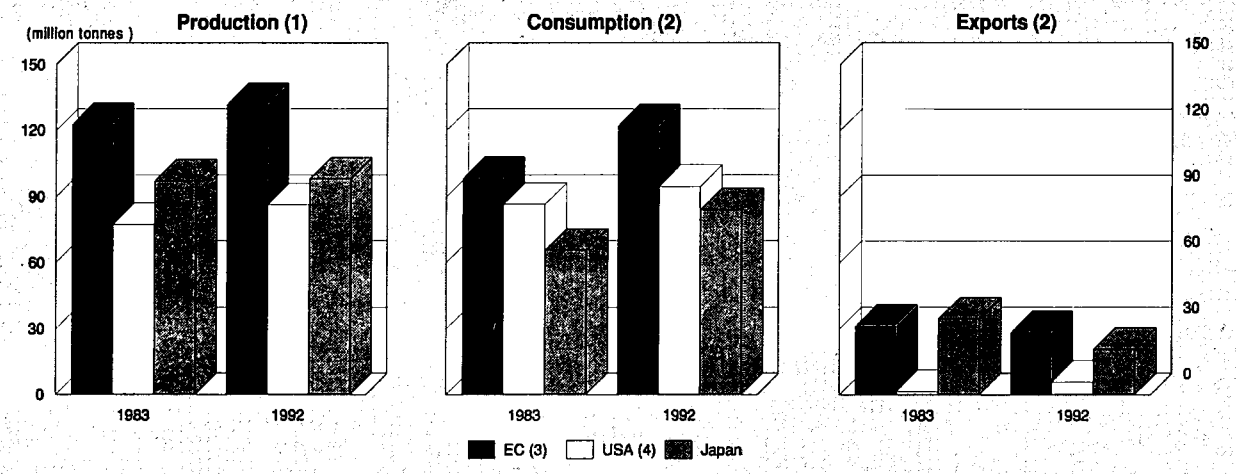
All the countries under consideration show a fluctuating development pattern of their production of ferrous metals from 1985 to 1992. After a rather stable level between 1988 and 1991 the EC and Japan show a significant decline in 1992. Conversely the USA's production of ferrous metals increased significantly in 1992, after a decrease in 1992. The 1992 production level was still lower than in 1988-1990.

Foreign trade

Ferrous metals account for about 4% of total EC exports of goods and 2% of its total imports. The extra-EC trade of the sector shows a significant export surplus. Due to increased imports and declining exports, however, the trade surplus decreased considerably over the reference period; in 1992 it was 65% lower than in the top-year 1985.

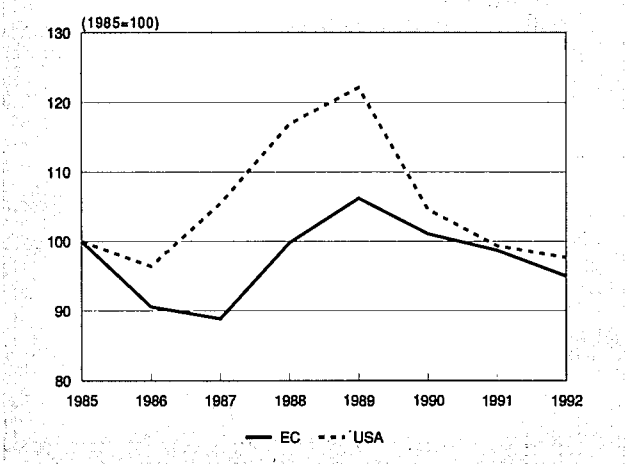
The major export market for EC ferrous metals are the EFTA countries; the USA ranks second. The share of the EFTA in the total extra-EC exports was higher in 1992 than it was in 1987; conversely, the USA was in 1992 relatively less im-

Figure 4: Ferrous metals
International comparison of main indicators in volume



(1) Crude steel
(2) ECSC and non-ECSC steel products in crude steel equivalent.
(3) 1983=EC10, 1992=EC12
(4) 1991 instead of 1992
Source: Eurostat, IISI

Figure 5: Ferrous metals
International comparison of production in constant prices



Source: DEBA

portant than in 1987. Japan is not relevant to the exports of ferrous metals from the EC.

The EFTA countries play an overwhelming part in the EC imports of ferrous metals, although their share in the total extra-EC imports was in 1992 smaller than in 1987. Japan and the USA are only of marginal importance to the imports of ferrous metals into the EC. Among the countries included in the rest of the world, in particular the East European countries have recently become more important.

The intra-EC trade in ferrous metals increased significantly from 1983 to 1992 (see Table 4), owing to the well established integrated market for these products. Remarkably, although the share of extra-EC imports in the total imports of ferrous metals remained virtually unchanged over the reference period, the penetration rate of foreign competitors increased steadily from 6.9% in 1983 to 9.5% in 1992.

MARKET FORCES

Demand

The ferrous metals industry is a major supplier of intermediate goods. The major clients are the manufacturers of metal products, electrical machinery, transport equipment and the mechanical engineering and construction sectors. As a result of the improvement in the activity level of ferrous metals-using industries the EC consumption of ferrous metals increased strongly in 1988 and 1989. In addition, strong stockpiling on the part of producers, traders and consumers had a positive impact on domestic demand. The recovery in the ferrous metals industry took place after a long period of crisis, entailing an average annual production decline of 1.8% over the period 1982-1987.

Other factors, which contributed to the downturn in the ferrous metals industry were the emergence of substitutes such as plastics and the emergence of new competitors, particularly in the newly industrialised countries with their relatively low production cost. A growing number of these countries succeeded not only in covering their own needs, but they also broke into the EC market and competed successfully on the world market. Together with the reduced demand of traditional export markets in Eastern Europe and China the extra-EC exports of metal products declined sharply and in 1992 the lowest level ever was achieved.

Supply and competition

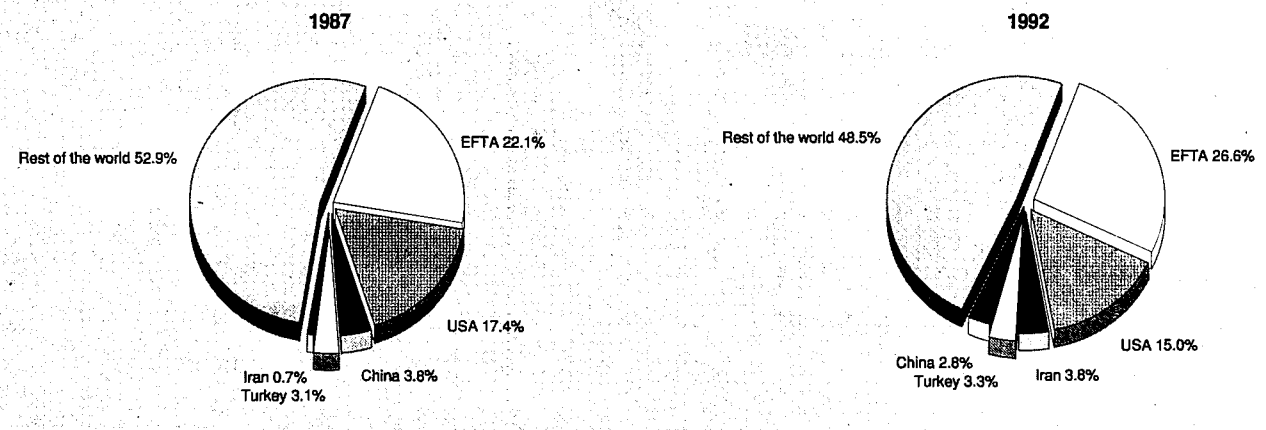
Despite a permanent process of reducing workforce and technical capacity, the EC ferrous metals industry currently suffers from a global overcapacity. Customers, therefore, have ample opportunities to obtain their supplies, enabling them to exercise strong pressure on producers. This has an adverse impact on profit margins, particularly in export markets and for products with a low share of value added.

Competition within the EC is strong, which is revealed in high intra-EC trade. Over the past decade the share of intra-EC consumption increased, in real terms, from about 25% to over 30%.

The use of up to date technology is of utmost significance to the competitiveness of the EC ferrous metals industry. However, with regard to cost, the EC suppliers are in an adverse position. Newly industrialised nations produce at lower cost and enter the EC market with lower prices. The import pressure from East European countries also increased, particularly because their lower selling prices are not truly reflecting their production cost. The share of foreign extra-EC imports in the EC consumption of ferrous products increased from around 7% in 1983 to nearly 10% in 1992.

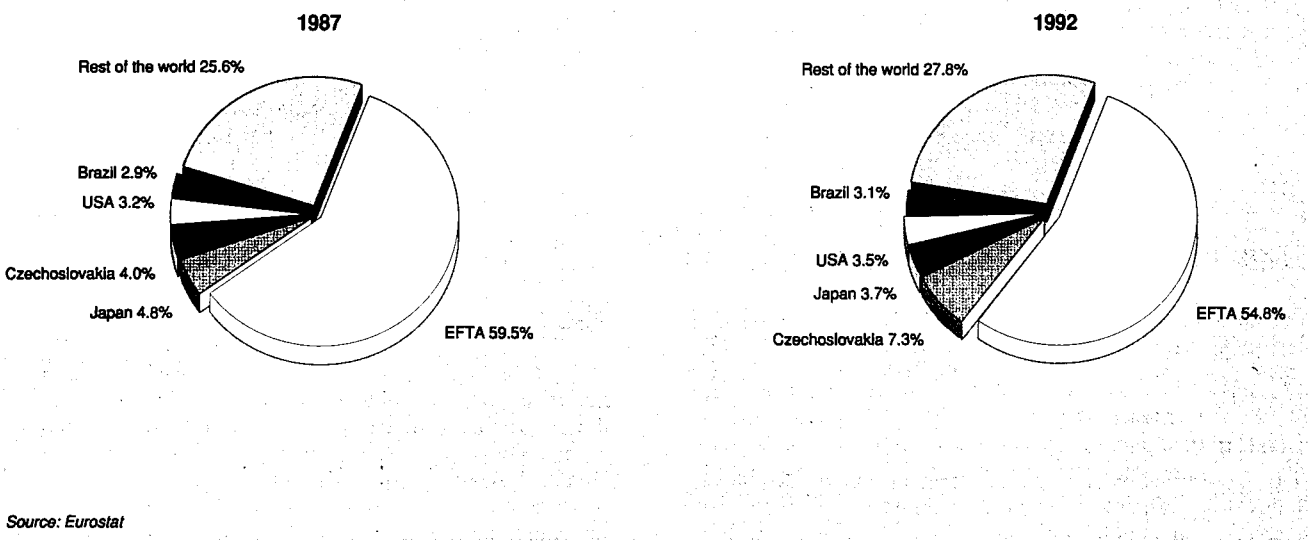
During the restructuring period 1980-1986, the steel industry experienced a considerable reduction in its production capacity

Figure 6: Ferrous metals
Destination of EC exports



Source: Eurostat

Figure 7: Ferrous metals
Origin of EC Imports



Source: Eurostat

and the labour force. Currently a further restructuring of this sector is required. The crude steel and its rolled-steel capacity must be reduced by 30 and 20 million tonnes respectively, whereas the labour force will have to decline by 70,000 workers.

To facilitate the restructuring process and to alleviate the hardship resulting from the redundancies, the Commission has already put forward a proposal for special measures for the ECSC workers. The final restructuring programme will be launched at the end of September 1993.

Production process

In terms of technology the EC ferrous metals industry is one of the most advanced in the world. Research and development constantly assure high quality steel production and rolling processes. Drastic restructuring measures, especially in the steel industry resulted in a significant reduction of the employment level of the EC ferrous metals industry. Over the period 1983-1992 the labour force dropped by 39%, a rate of 3.8% per year.

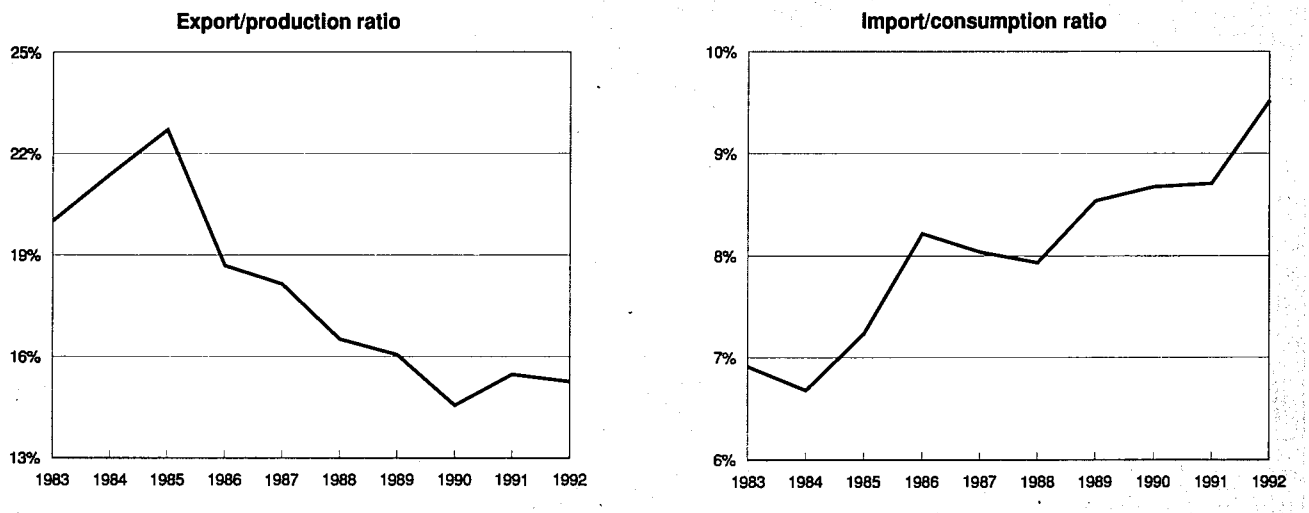
The necessary modernisation of the EC industry was undertaken fairly late; not beginning until the end of the 1970s. This explains why the return to profitability did not start until the second half of the 1980s.

INDUSTRY STRUCTURE

Companies

The degree of concentration in the EC ferrous metals industry varies from the steel and the steel tube sector on the one hand, and first processing on the other hand. Both the steel and the steel tube sector are characterised by large companies and a large degree of concentration. In contrast, the other first processing of steel sector is formed by a majority of medium size companies and is characterised by a low degree

Figure 8: Ferrous metals
Trade Intensities



Source: DEBA

Table 5: Ferrous metals
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	24.7	26.9	28.7	30.0	34.4	42.7	44.2	42.3	42.3	43.2
Productivity index	86.2	93.8	100.0	104.6	120.1	149.0	154.1	147.4	147.6	150.6
Unit labour costs index (3)	84.9	93.9	100.0	104.4	111.2	118.1	125.8	132.6	141.9	152.3
Total unit costs index (4)	73.3	90.3	100.0	93.1	94.3	112.3	132.0	131.4	132.8	134.6

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

of concentration. Moreover, steel tubes manufacturers are often linked to steel producers, while a considerable part of the other first processing of steel mills belong to independent companies.

Strategies

The modernisation and restructuring of EC ferrous metals industries, particularly in the steel industry, is reflected by mergers. acquisitions and joint-ventures. Some of these investments look to widen the company's competitiveness by branching out into new related activities whereas others simply look to increase market concentration. Unlike the major companies in the steel, and the steel tube industry, the other first processing of steel sector tend to stress rationalisation and specialisation rather than concentration in order to strengthen its competitiveness.

Further it should be mentioned that companies are diversifying and upgrading their supply. There is a tendency to reduce the supply of ordinary, mass products in favour of more sophisticated products. For example, the development of high-yield point sheet steel and coated sheets, particularly for the car industry enabled the steel industry to increase unit prices and value added. Furthermore, special alloyed and non-alloyed steels are becoming increasingly important. The great efforts the EC ferrous metals sector puts in the rationalisation and modernisation of its facilities in view of the Single market, however, are not visible in the development of the domestic investment due to lack of current data.

REGIONAL DISTRIBUTION

Only three Member States account for nearly two thirds of the EC production of ferrous metals. Germany with over one third of the EC production ranks first, followed by Italy and France. Further the five minor producing countries (Denmark, Greece, Ireland, Luxembourg and Portugal) have a joint share of about 4%. The remaining Member States Belgium, Spain, the Netherlands and the United kingdom hold medium positions.

The development of the production of ferrous metals was similar in most EC countries during the 1980s, which lead to little change of their shares in the total EC production. However, some major exceptions should be mentioned. France, whose market share declined, was overtaken by Italy for the second position while, Belgium and Luxembourg revealed significantly increasing shares. Further in 1992 most of the Member States revealed a drop in their production of ferrous metals; it was only in some minor ferrous metals manufacturing countries (Denmark, Ireland and Portugal) that production grew. The production decline was particularly substantial (over 30% in terms on value added) in the United Kingdom.

ENVIRONMENT

In the ferrous metal producing industry the cost arising from environmental protection are considerable, especially for the steel industry. The costs are largely due to: the treatment of smoke emissions from raw material production units, the re-

Table 6: Ferrous metals
The 15 largest European companies, 1992

(million ECU)	Country	Turnover	Net profit	Employees
Thyssen	D	17 538	156	147 279
Usinor Sacilor	F	12 648	-352	89 038
Ilva (1)	I	6 919	-328	43 000
British Steel	UK	5 656	-169	42 100
Hoesch (1)	D	4 926	79	44 200
Arbed	L	4 537	-101	27 440
Cockerill Sambre	B	4 036	-34	27 522
Krupp Stahl (1)	D	3 771	35	25 651
Klockner-Werke	D	3 484	-275	33 199
Hoogovens	NL	3 398	-99	25 303
Ugine	F	2 197	-53	12 243
Svenskt Stal	S	1 583	-21	10 224
TI Group	UK	1 562	77	21 500
Bekaert	B	1 280	63	11 087
Glynwed International	UK	1 232	31	11 441

(1) 1991
Source: DABLE

Table 7: Ferrous metals
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-2.5	1.0
Production	-2.5	1.0
Extra-EC exports	0.0	0.5

Source: NEI

heating of the furnaces, the treatment of waste water from the pickling installations and noise control in the production units.

Because of high costs, and the dissimilar requirements and enforcement of environmental protection in the various Member States, environmental legislation should be harmonised within the Community in order to avoid distortion of competition. Within the framework of the Environmental Protection Research Programme (established under Article 55 of the Treaty of Paris), the European steel producers together with the European Commission continue to work on such a harmonisation.

REGULATIONS

With the establishment of the ECSC in 1951, the founding countries committed themselves to subordinate their national steel policies to the decisions of the ECSC institutions. These institutions were particularly active during the steel crisis between 1980 and 1988, when quotas for the EC production and imports into the Common Market from non-ECSC were established. At the same time steel prices were fixed and investments directed.

Government subsidies are strictly forbidden by the ECSC Treaty. Nevertheless, national governments often pursue a policy subsidising their steel industry. This has been tolerated by and large by the European Commission. Moreover, in 1980 the European Commission facilitated the granting of subsidies by stipulating in the Aid Code that the prohibition of subsidising was not applicable to subsidies within the framework of a common steel policy. Subsidies, aimed at achieving the goals of the ECSC Treaty were also allowed. Consequently during the restructuring process of the EC steel industry subsidising was a widely spread activity. The Aid Code was to expire at the end of 1985. However, it has been prolonged several times, although it became increasingly hard for governments of the Member Sates to subsidise their steel industry. Since the beginning of 1986 subsidies may only be geared to the encouragement of research and development, to safeguard the environment and to meet the social costs, incurred by total plant closure.

In summary, future regulations for the steel market and the steel policy of the EC are expected to be increasingly geared to liberalisation. Supporting measures and measures to monitor competition rather than direct interventions will be increasingly pursued.

OUTLOOK

At the end of 1989 the consumption of ferrous metal products weakened; the decline in demand, which still continues on an intensified level. An adverse development in the consumer demand of the ferrous metal industry is the main reason. Additionally, the EC exports to non-EC countries has fallen substantially since 1989. These developments resulted in a reduction of the EC production of ferrous metals of 2.3% and 3.7% in 1991 and 1992 respectively.

Due to both cyclical and structural factors the situation is not expected to improve in the short-term; the economy is anticipated to remain depressed, which will adversely influence the major consumers of the ferrous metals industry. The primary transformation of steel sector witnessed a net decline in new orders. The steel tube industry, is excepting a production loss of about 10% 1992, and new orders decreased by 12% in the first quarter of 1993. In addition, the steel industry is not expected to achieve sustained recovery, until the restructuring is completed. This will be at the earliest in 1996. Under these circumstances in the short term both apparent consumption is expected to decrease by 2.5%, whereas the extra-EC exports are expected to remain stable in 1993 and 1994, due to a envisaged drop in the exports of the steel tube sector.

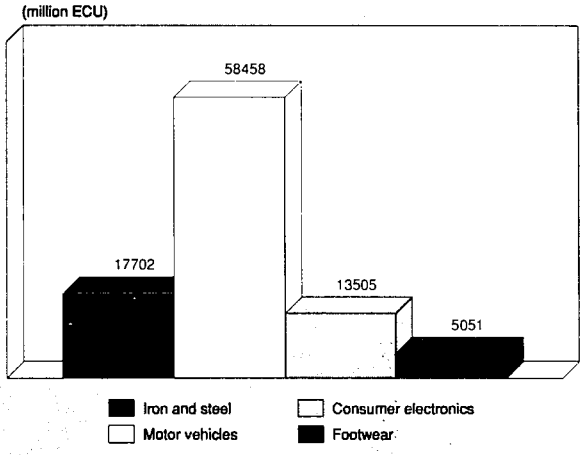
Looking further ahead to the medium term, the general economic situation is expected to improve and the demand for EC ferrous metal products will increase. However, while the restructuring of the steel industry is not completed, a low growth rate of both production and consumption are anticipated 1%. Extra-EC exports are expected to grow by 0.5%.

Written by: Netherlands Economic Institute

Iron and steel
NACE 221

Between the mid-1970s and 1987, the steel industry in the industrialised countries suffered serious set-backs due to reduced demand from steel-using industries, the emergence of steel substitutes and increased competition from newly industrialised countries. During the 1980-86 period, major restructuring measures were taken, which allowed the achievement of significant productivity gains by reducing capacity and by cutting labour force.
In 1988 and 1989 record levels of steel production and consumption were obtained. However, in the 1990s new problems arose, partly because of the depressed general economic situation, partly because the EC steel sector has to cope again with a structural overcapacity. Both production and consumption have been decreasing since 1990. These developments urged a new three year restructuring programme, whose full content will be known at the beginning of 1994. Before its completion no recovery of the EC steel industry can be expected.

Figure 1: Iron and steel
Value added in comparison with other industries



(1) Including non-ECSC steel products.
Source: DEBA

INDUSTRY PROFILE

Description of the sector

Steel and coal were the subject of to the ECSC Treaty in 1952, one of the first European industry agreements. The special provisions governing these two products remained in force after the two administrative bodies of the Community were merged.

The steel industry encompasses steel production from raw material processing to the production of finished rolled steel products and covers the following operations:

- coke manufacture (except if coke is purchased from the coal industry or from independent coking plant);
- ore preparation, especially for the production of sinter and pellets;
- manufacture of pig-iron in blast furnaces;
- manufacture of steel from pig iron in converters and from scrap in electric furnaces;
- continuous casting and/or hot rolling of semi-finished products;
- hot rolling of long products and flat products;
- cold rolling of flat products;
- metallic and organic coatings.

The finished products of the steel industry, including ordinary, special and alloy steels, can be divided into hot-rolled and cold-rolled products.

Hot-rolled

- Flat products: sheet strip obtained directly from the hot mill or by slitting of sheet in coils; heavy or medium wall plate obtained directly from the hot mill or by cutting of sheet;
- Long products: heavy sections, light sections, including concrete reinforcing bars, and wire rods.

Cold-rolled

- Thin wall sheet in coils uncoated or coated with zinc, tin, lead, aluminium, plastic, paint, etc.

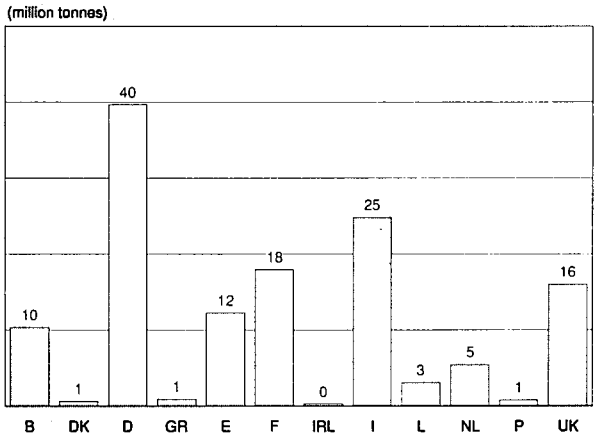
Four countries (Germany, France, Italy and the United Kingdom) allow for three quarters of the total production of steel in the EC. With about 40 million tonnes, Germany is the largest steel producing country in the EC, followed by Italy with about 25 million tonnes.

Recent trends

Over the period 1983-1988 both production and consumption of steel grew at an annual rate of 4.6% and 4.8% respectively, entailing record production and consumption levels in 1989. Following the unfavourable economic climate which started in 1990, significant reductions in demand were recorded, which adversely affected the EC steel industry. Although a slight increase in production and consumption of steel was recorded in 1989, this was solely due to the inclusion in the statistics of the new German Bundesländer. In 1992 both production and consumption declined further by around 4% and 1% respectively. A further deterioration of the EC steel market is expected for 1993.

A breakdown of the steel production by the principal product categories is shown in Table 2. The proliferation of new production techniques since the 1970s (such as continuous coating

Figure 2: Iron and steel
Crude steel production by Member State, 1992



Source: Eurostat

Table 1: Iron and steel
Main indicators in crude steel equivalent (1)

(million tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	98.5	102.5	101.9	111.7	110.0	123.5	127.0	125.9	126.6	124.9	118.0
Net exports (3)	11.8	16.8	18.8	15.5	17.4	13.9	11.2	9.5	10.9	9.4	8.8
Stock variation (4)	-0.6	1.0	0.2	-1.3	-1.2	0.2	1.7	1.8	0.3	-2.0	-1.1
Scrap consumption (5)	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.2
Crude steel production	109.5	120.1	120.6	125.6	126.0	137.4	139.6	136.9	137.6	132.1	125.0
Employment (000) (6)	479.2	450.0	425.8	456.5	424.0	408.9	394.6	379.4	388.5	355.7	325.0

(1) 1983-85 EC10; since 1991, including former East Germany."
(2) NEI estimates.
(3) ECSC steel.
(4) Merchants' and producers' stocks.
(5) In rolling mills.
(6) At the end of the year.
Source: Eurostat

Table 2: Iron and steel
Breakdown by major product line (1)

(million tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Pig iron	74.5	83.3	85.9	85.4	85.6	93.7	95.1	91.7	89.8	84.7
Crude steel	109.5	120.1	120.6	125.6	126.0	137.4	139.6	136.9	137.6	132.1
Hot-rolled products	89.8	97.9	99.6	106.6	109.0	119.7	123.4	121.1	122.6	115.1
Finished products	85.9	94.4	95.7	103.0	105.1	115.1	119.0	116.4	119.0	N/A

(1) 1983-85 EC10; 1991 including former East Germany. "
Source: Eurostat

Table 3: Iron and steel
Average real annual growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption (1)	4.8	-0.2	2.6
Crude steel production	4.6	-1.0	2.1
Extra-EC exports(1)(2)	2.0	-1.5	0.4
Extra-EC imports (1)(2)	0.4	7.0	3.3

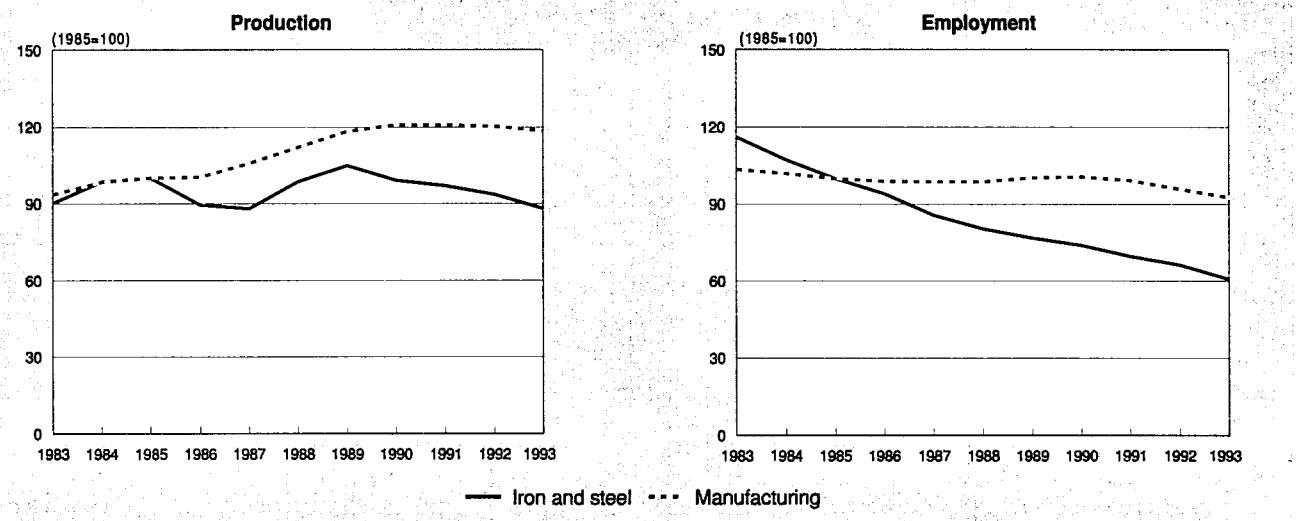
(1) Crude steel equivalent.
(2) ECSC steel products.
Source: Eurostat

Table 4: Iron and steel
External trade in volume (1)

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	18 883	22 413	25 188	23 025	23 698	21 018	19 339	19 261	19 913	20 296
Extra-EC imports	8 491	8 087	8 616	9 281	8 833	9 694	10 735	11 624	10 709	12 451
Trade balance	10 392	14 326	16 572	13 744	14 865	11 324	8 604	7 637	9 204	7 845
Ratio exports/imports	2.22	2.77	2.92	2.48	2.68	2.17	1.80	1.66	1.86	1.63
Terms of trade index	97.0	100.6	100.0	90.6	90.8	83.1	80.5	88.9	85.9	86.3
Intra-EC trade	23 085	24 713	25 088	29 350	30 647	33 920	36 853	37 905	40 100	38 539
Share of total imports (%)	73.1	75.3	74.4	76.0	77.6	77.8	77.4	76.5	78.9	75.6

(1) ECSC steel products; 1983-85 EC10; 1991 including former East Germany.
Source: Eurostat

Figure 3: Iron and steel
Production in constant prices and employment compared to EC manufacturing (1)



(1) Including non-ECSC steel products.
1993 are NEI estimates.
Source: DEBA

and electric arc furnaces has greatly improved productivity in certain production processes.

Figure 3 shows the decline of the EC steel industry compared to the manufacturing industry average.

International comparison

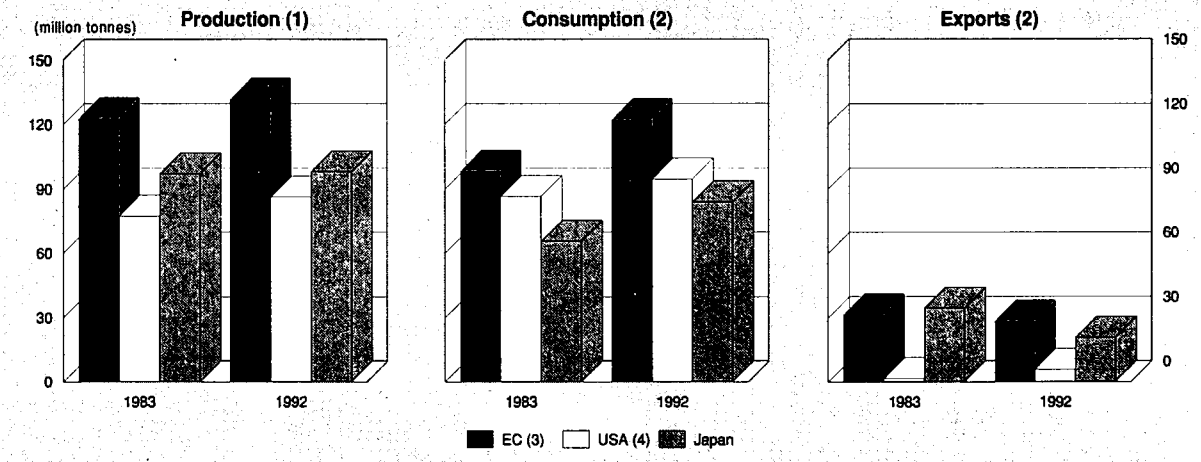
The EC is the world's largest steel producer, followed by Japan and the USA. In the EC and in Japan, steel production in 1992 appears to exceed steel consumption, respectively by 7% and 17%. The EC is also the principal exporter of steel, although in 1992 its exports were about 10% lower than in 1983. Japanese exports declined at a much faster pace (40%) than those of the EC. Unlike the EC and Japan, the USA is a net importer of steel.

All the three major producers show a fluctuating development pattern for production during the period 1985-1992. For the EC and Japan these developments resulted in a 1992 steel production which was considerably lower than in 1991. Conversely US steel production increased considerably in 1992, surpassing the 1985 level, but remaining lower than in the period 1988-1990.

Foreign trade

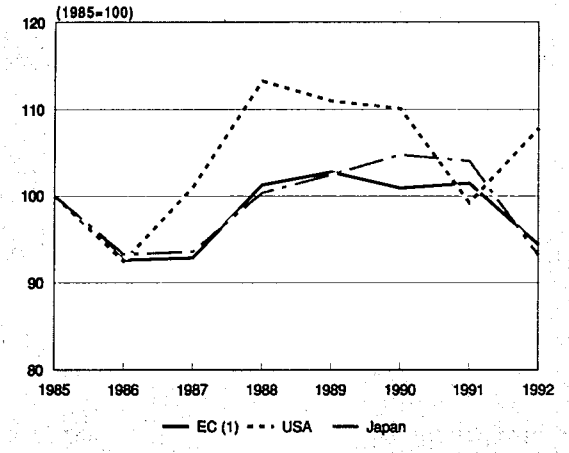
The EC has a significant trade surplus in steel. However, since 1985 declining extra-EC exports (which were in 1992 nearly 20% lower than in 1985) and increasing extra-EC imports (which were in 1992 nearly 45% higher than in 1985) are entailing a slow decrease of the trade surplus. At the same time the export/import ratio declined substantially. Re-

Figure 4: Iron and steel
International comparison of main indicators in volume



(1) Crude steel.
(2) ECSC and non-ECSC steel products in crude steel equivalent.
(3) 1983=EC10, 1992=EC12
(4) 1991 instead of 1992
Source: Eurostat, IISI

Figure 5: Iron and steel
International comparison of development of crude steel production in volume



(1) 1985=EC12
Source: Eurostat, IISI

markably, the peak production of steel did not interrupt the downward trend in extra-EC exports as it was primarily needed to meet the exceptionally high demand within the EC.

Three major export markets for EC steel can be observed: Asia (excluding Japan), the EFTA and the USA. The share of the first two markets has increased since 1987, whereas the USA was in 1992 a slightly less important destination than in 1987. Steel exports to Eastern Europe have been halved during the 1987-92 period. Conversely, Africa has become an increasingly important market for EC steel.

The EFTA countries and Eastern Europe play an overwhelming part in EC steel imports steel; their joint share in total EC steel imports totalled nearly 78% in 1992, against 76% in 1983. The increase is due to a clear substitution process which favoured cheaper steel imports from Eastern Europe to the detriment of imports originating from EFTA.

Thanks to the long time integrated EC steel market, intra-EC trade in steel increased by 67% in volume terms from 1983 to 1992.

MARKET FORCES

Demand

Primary processing industries account for over one third of the ECSC steel used in the EC. Most of steel is used for the production of steel tubes (14%), for wire and bright drawing (9%) and for cold rolling and cold forming (6%). In terms of final internal demand the principal consumers are building and civil engineering (15%), transport equipment (11%) and metal products (10%). Other important customers are mechanical engineering (7%) and structural steel work (6%).

Since the mid-1970s steel consumption in the EC (and in the industrialised countries in general) has decreased. Various factors contributed to this development such as: the recent cuts in the production of a number of steel-consuming industries; technological development, entailing a decrease in the quantity of steel needed for the production of a given product; an improvement in the quality i.e. the durability of the steel products themselves; the substitution of steel by other materials (plastics, aluminium etc.).

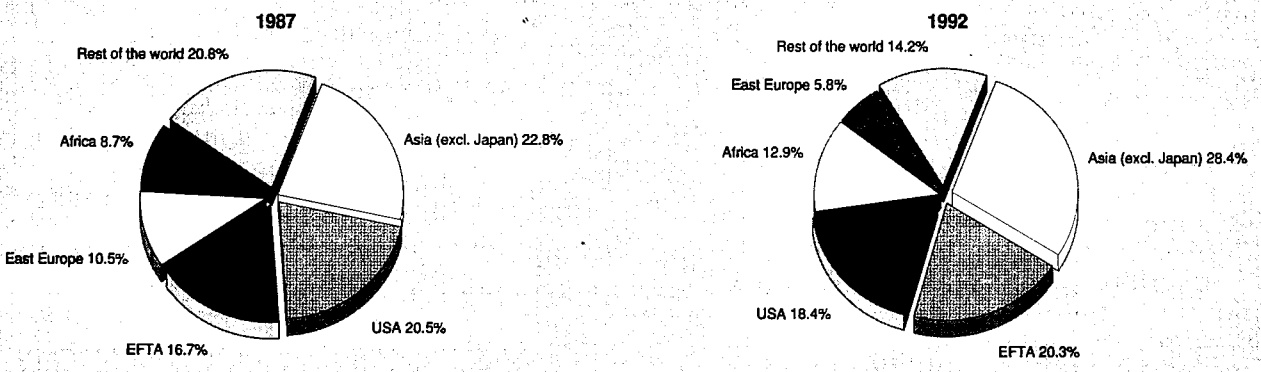
In addition to these factors, the EC steel industry has been suffering from a reduction in demand because of the emergence of new competitors, particularly in the newly industrialised countries and more recently in Eastern Europe. These countries succeeded not only in covering their own domestic demand, but they also competed successfully on the world market.

Supply and competition

The reduced demand for steel, induced by the structural and cyclical factors dealt with before, gave rise to a massive restructuring programme. Market controls regulated by article 58 of the ECSC Treaty and the State Aid Code, enabling national governments to support their steel industry, were underlying the restructuring process which took place between 1980 and 1986. The market controlling measures expired mid-1988. The restructuring process brought about a reduction in the EC's production capacity for crude steel of 40 million tonnes (19%). Moreover, by the end of 1988 the hot rolling capacity had been reduced by 34 million tonnes (18%).

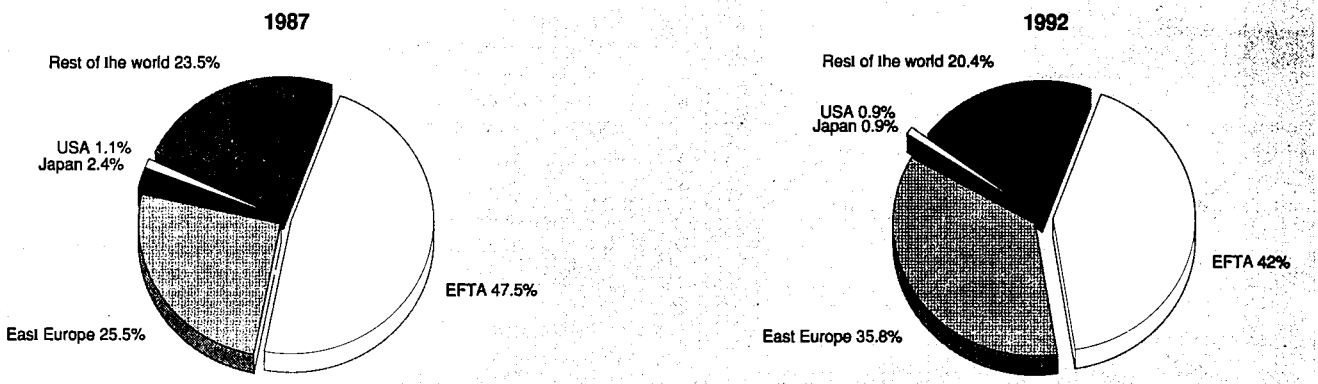
At the same time, however, the newly industrialised countries increased their production significantly. Low production costs (cheap labour and energy, indigenous raw materials) and technological development in steel production (mini-mills) enabled them to compete successfully with traditional exporters in the world market. This had an adverse impact on extra-EC

Figure 6: Iron and steel
Destination of EC exports (1)



(1) ECSC steel products.
Source: Eurostat

Figure 7: Iron and steel
Origin of EC Imports (1)



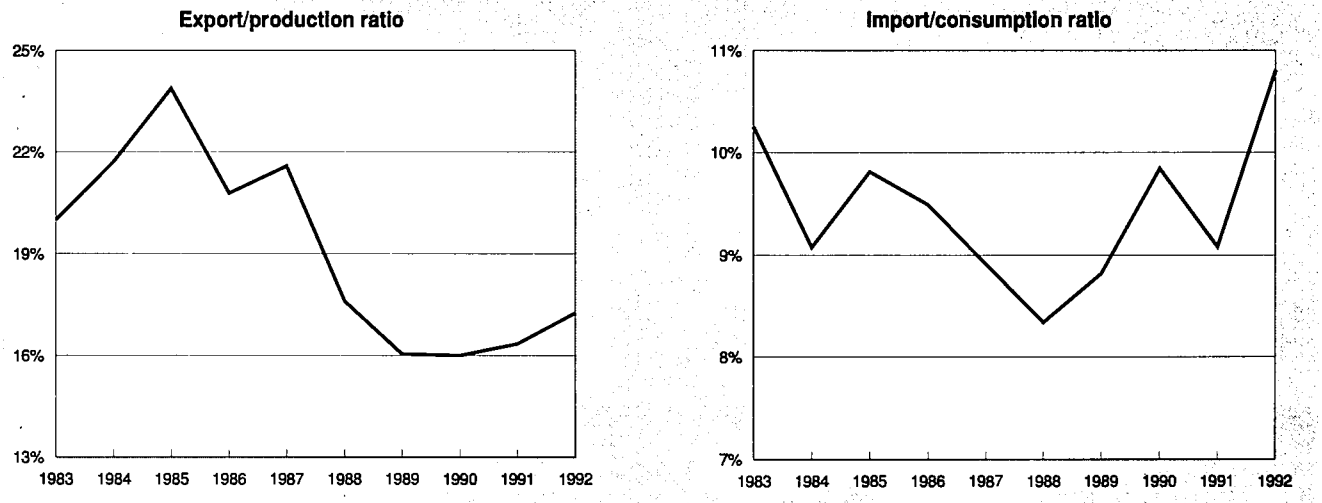
(1) ECSC steel products.
Source: Eurostat

exports. In addition, the newly industrialised countries, and the East European countries broke into the EC steel market by supplying large quantities of low-priced steel. Consequently the non-EC share in apparent consumption grew from 5% in 1975 to nearly 10% in 1992.

Detrimental to the EC steel industry's competitive position is its relatively high cost structure; moreover unit labour cost increased by more than 50% during the 1985-92 period. At the same time, labour productivity the EC steel industry increased substantially, mainly thanks to the massive labour force reduction: in terms of output per worker, the increase totalled 62% between 1983 and 1992.

Despite the considerable reduction in the production capacity and the labour force of the EC steel industry during the period 1980-1986, the restructuring was not completed. Envisaged capacity reductions were not carried out. The sudden improvement of the market in 1988 together with the subsidies enabled the less competitive manufacturers to survive. The same manufacturers are currently facing again huge financial problems, as they are confronted with high production costs and low prices. The Commission identified reductions of 30 and 20 million tonnes in crude steel and rolling capacity respectively. Unlike in the 1980s, the Commission currently wants the steel industry to solve itself problems i.e. the steel producers will have to indicate which enterprises should reduce their capacity and to which extent. The main plank of the EC restructuring is a partly self-financed scheme (Art. 53A of the ECSC Treaty) under which companies remaining in the industry would pay rivals to cut capacity or leave the business. The reduction

Figure 8: Iron and steel
Trade intensities (1)



(1) 1983-85 EC10; 1991 including East Germany. "
(2) Crude steel equivalent.
Source: Eurostat

Table 5: Iron and steel
Labour productivity and unit costs (1)(2)

(1985 = 100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (3)	24.0	26.2	28.5	30.7	35.5	45.3	48.4	45.6	45.6	47.2
Productivity index	84.1	92.1	100.0	107.7	124.6	158.9	170.0	160.0	160.1	165.6
Unit labour costs index (4)	84.0	93.3	100.0	104.1	111.2	119.5	128.5	134.8	143.5	155.0
Total unit costs index (5)	71.2	88.4	100.0	91.5	92.8	111.3	133.1	131.9	133.4	135.5

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Including non-ECSC steel products.
(3) Value added in 1992 prices per person employed.
(4) Based on labour costs in current prices per person employed.
(5) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

must be permanent; capacity may not be restored as soon as the economy recovers. The restructuring process is expected to require three years.

The Commission intends to strictly control state subsidies (Art. 4c of the ECSC Treaty); state subsidies should only be authorised by the EC Commission if they are aimed at achieving substantial reductions in inefficient production capacity.

To facilitate the restructuring process and to alleviate the hardship resulting from the redundancies, estimated at 70 000, the Commission has already put forward a proposal for special measures for the ECSC workers. Under the condition that the EC Member States will pay a similar amount, to cover costs of redundancies up to 5 000 ECU per worker will be made available. Further the Commission will pay up to 4 000 ECU per worker. Finally, the Commission has accepted in principle to pre-finance the funds required for the elimination of excess capacity. These ECSC loans will be entirely repaid by the industry.

Production process

The application of improved production techniques together with the reduction of production capacity enabled the EC steel industry to reduce its cost and to increase its efficiency. An example is the proliferation of continuous-casting plants, (in which one step in the production process is eliminated with a subsequent drop in the crude steel requirements). Nowadays in the EC around 90% of the crude steel is produced by way of the continuous casting method (in 1980 this was only 30%). In some countries all the crude steel is produced with this method.

Besides technological developments the productivity in the EC steel industry has increased through a drastic reduction in its labour force. The labour force reduction is estimated at 45% to 50% over the period 1980-1992. This reduction, together with the technological innovation of the production process, has brought about a significant increase in (labour)productivity since the beginning of the 1980s. From 1983 to 1992 productivity (in value added per person employed) increased at an average rate of nearly 8% per annum, whereas the output by 5.5% per annum.

INDUSTRY STRUCTURE

Companies

Two major categories of producers can be distinguished: the integrated companies and the mini-mills.

The integrated companies account for 70% of steel production in the EC. These companies produce pig iron in their blast furnaces and convert it in oxygen-based steel works, using scrap to maintain the temperature of the molten steel. Companies using this method are usually geared to the production of flat products, including subsequent cold rolling into thin sheet steel (which may be coated), and the production of heavy sections and wire rod. Integrated mills generally have large production capacities, ranging from 2 to 10 million tonnes of finished products. Although these large production units allow economies of scale, they allow little production flexibility.

Mini-mills are relatively small companies with annual capacities ranging from 0.15 to 1.2 million tonnes. They are involved in the production of more specialised products. The mini-mills encompass enterprises whose sole operations are electric steel works, continuous casting plants and rolling mills. Mini-mills play a significant part in the management of industrial waste; they convert scrap into quality steel products. These products include reinforcing bars, reinforcing mesh and small and medium-sized sections for the construction industry. The mini-mills also produce merchant bars and wire rods, particularly for the use in the automobile and construction industry. The mini-mills owe their success to their flexibility and capacity to adapt production to market demand. In certain Member States mini-mills account for a substantial share in total steel production. Good examples are Italy and Spain, where mini-mills account for 55% and 42% respectively of total steel production.

The iron and steel industry is a sector with a high degree of concentration. In 1992 almost half of the EC crude steel production came from only five companies. In descending order of turnover they were: Thyssen Stahl (D), Usinor-Sacilor (F), Ilva (I), British Steel (UK) and Hoesch (D).

A number of mergers and acquisitions have taken place in the course of the modernisation and restructuring of the EC steel industry. Examples are the merger between Usinor and Sacilor in France, the creation of Ilva in Italy and the rationalisation agreement between Krupp and Mannesmann in Germany. The most recent example is the takeover of Hoesch by Krupp. With the exception of Usinor-Sacilor, British Steel, Ilva and Thyssen, most of the European steel producers are only medium-sized firms in comparison to other international steel firms.

Strategies

In 1952, the ECSC Treaty created for coal and steel the necessary conditions for the Single Market, which after 1992 has extended to all other industrial sectors. The Single Market is already a reality for the EC steel industry.

In order to better face the hardships of the present situation, steel companies are starting to protect themselves against future downturns and strong competition from outside. Such measures include: paying more attention to customer service and commercial investment; diversifying into areas other than steel; take-overs and mergers; specialising in high-quality products; and more integrated production techniques.

Table 6: Crude steel
International comparison of electric are process (EAP) in crude steel production, 1992

	EC	USA	Japan
Crude steel production (million tonnes)	132.1	86.3	98.1
Oxygen (%)	66.8	62.8	68.4
EAP (%)	32.8	37.2	31.6

Source: IISI, Eurostat

REGIONAL DISTRIBUTION

There are steel plants all over in the EC, with varying levels of production capacity. Originally the steel plants were built inland, usually near the coal or iron-ore fields from which they used to draw their supplies, or near steel consumers. More recently they are built on the coast, where they have easy access to imported raw materials, without the cost of land transport. They are also better placed to capture international markets.

Whereas Germany is the greater EC producer of steel, the importance of the steel industry in the economy is the largest in Luxembourg, where the share of steel production in total industry exceeds 40%. By contrast, the contribution of steel to total manufacturing production only accounts for about 1% in Denmark, Ireland and Portugal.

With regard to mini-mills, the highest concentrations of such mills can be found in Northern Italy and Spain.

ENVIRONMENT

The steel industry is conscious of its responsibility with regard to environmental protection. Long before the protection of the environment had been placed on the political agenda, the steel industry intensively developed and generated techniques to reduce environmental pollution. These measures include the low-pollution manufacture of steel products, steel recycling and the utilisation of waste material. The restructuring of the industry in the 1980s encouraged the innovation of the production process; older installations were replaced by modern plants, fully equipped with a whole range of pollution-control equipment. The increasing use of electric arc furnaces (EAF) across Europe is a leading example of such new processes.

The steel industry's dust emissions have been lowered considerably. Emissions of carbon dioxide (CO2) have also been strongly reduced by optimisation of process technology and an overall reduction in energy inputs. For example in the mini-mills the average required input of electricity per tonne of steel declined from 510 KWh in 1980 to 380 KWh in 1990.

In recent years the EC steel sector consumed about 60 million tonnes of steel scrap, the bulk of which was collected from discarded steel-containing products. This recycling of scrap, which represents about 45% of total steel production, is one of the highest rates for any industry.

Environmental protection places considerable financial burdens on the iron and steel companies. In the light of the high costs and the fact that the requirements and enforcement of environmental protection is not equally strict in all countries, a harmonisation of environmental protection legislation in Europe is essential for avoiding distortion of competition. European steel producers continue to work with the European Commission in the framework of the Environmental Protection Research Programme established under Article 55 of the ECSC Treaty.

REGULATIONS

For more than forty years, the European steel industry has been regulated by the European Coal and Steel Community (ECSC). The ECSC was originally established in 1952 to regulate pricing, transport, tariffs, etc. for coal, iron ore and scrap iron among the Member States.

As to recent legislation particularly in the field of the environment, it is worth to note the EC Council Directive of 1st February 1993 on the movement of waste (ferrous scrap is on the Green list) within and outside the EC. This Directive follows the conclusions of the Basle Convention as well as other similar conclusions at the OECD level. The industry fears that this Directive will include scrap into the waste list rather than consider it as a raw material. The subsequent cost increase (because of penalties) may be detrimental to the further innovation of the production process and it may jeopardise further reductions of environmental pollution.

An energy tax to stabilise CO2 emissions will also penalise rather than encourage steel producers' efforts to reduce energy consumption. In fact, CO2 emissions have already been reduced by 25% since 1974. A CO2 tax would have no effect on the reduction of CO2 emissions, because the industry is already using the best available technologies.

OUTLOOK

The general economic activity in the EC has considerably declined in 1992 and many countries entered a recession phase. After a two-year decline, steel prices in the Community reached their lowest level at the first quarter of 1993. Since then prices have increased on average by about 10%, because of the following reasons: an adaptation of EC production to reduced consumption; the sharp demand increase from the Far East; and the stabilisation of the US dollar versus European currencies. However, the medium term-prospects for the EC steel sector remain dim. Sustained recovery is heavily dependent on the restructuring of the EC steel industry. In the short-term, the general economic situation in the EC is expected to deteriorate, adversely affecting the demand of the steel-using industries. Most steel-using sectors are reducing their demand in 1993; the automobile industry will account for the greater decline (about 16%), whereas metal manufacture, mechanical construction, building and civil engineering and other means of transport are expected to reduce their

Table 7: Iron and steel
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-2.5	1.0
Production	-2.1	1.1
Extra-EC exports	1.5	2.5

Source: NEI

demand by 1.5% to 3%. Only for electric construction a demand growth is foreseen in 1993 (2%). Allowing for stock variations, the joint impact of these developments will result in a decline of the EC steel consumption in 1993 of around 10%; the decline in production will be slightly less, namely about 9-10%.

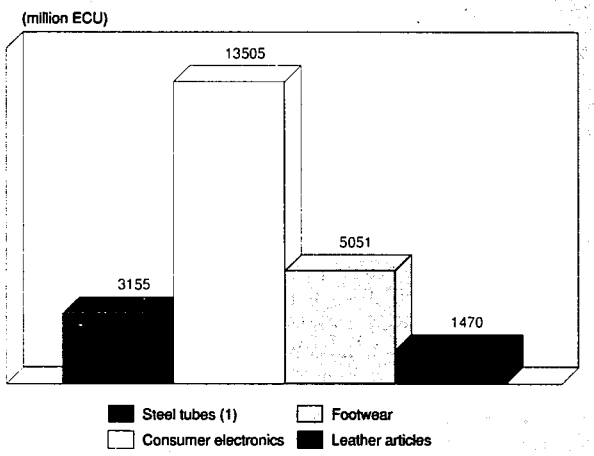
Neither in the short-term (1993-1994) nor in the medium-term (1993-1997) drastic improvements of EC steel production and consumption are envisaged; an increase in the demand will be largely met by non-EC imports.

Written by: Netherlands Economic Institute
The industry is represented at the EC level by: European Confederation of Iron and Steel Industries (EUROFER). Address: Rue du Noyer 211, B-1040 Brussels; tel: (32 2) 736 0100; fax: (32 2) 512 3001; and European Independent Steelworks Association (EISA). Address: Rue Belliard 205, Bte 18, B-1040 Brussels; tel: (32 2)230 7962; fax: (32 2) 230 0136.

Steel tubes
NACE 222

The steel tube industry has faced a severe volume and financial downturn since the mid-1980s due to worldwide over capacity. Seamless tubes and welded tubes with an outside diameter of over 406.4 millimetre in particular were deeply influenced by import quotas imposed by the USA until March 1992 and later by the harassing threat of trade cases, and by the low international value of the dollar. Furthermore, the collapse of the former Soviet Union and other East European markets and the lack of orders from China are of great concern to EC manufacturers. The EC has maintained its leading position in the world market, ahead of the USA and Japan, due to continuous productivity gains achieved over recent years through industry restructuring. Nevertheless, foreign trade has been steadily deteriorating. Despite its improved competitiveness, the EC steel tube industry is under the strongest pressure from massive volumes of low priced imports from Central and Eastern Europe which forced EC mills to significant reductions of output, capacities and workforce.

Figure 1: Steel tubes
Value added in comparison with other industries, 1992



(1) NACE 222
Source: DEBA

INDUSTRY PROFILE

Description of the sector

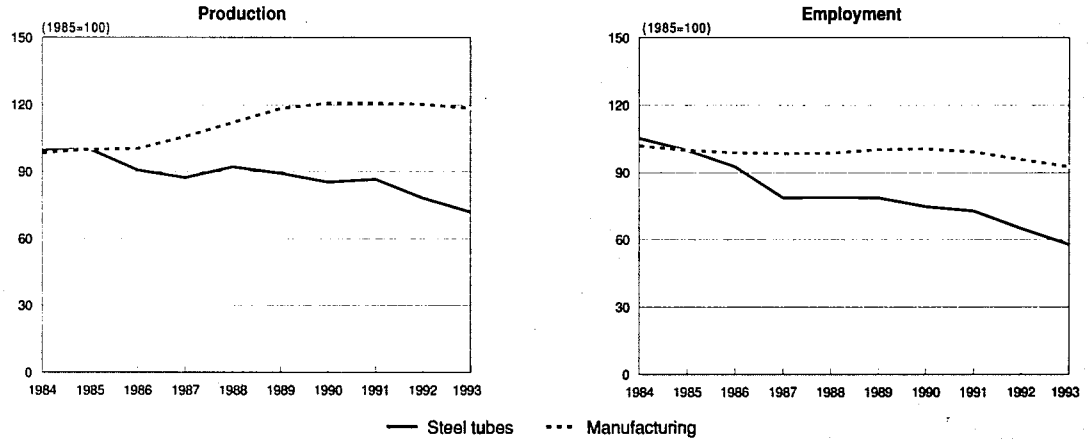
The activity of NACE 222 encompasses the manufacture of steel tubes as well as of steel tube fittings and compressed gas cylinders. This monograph however covers only the manufacture of steel tubes; the data are based on production figures compiled by surveys conducted by the organisations of the producers located in the EC Member States. Export and import figures are provided by Eurostat sources. Steel tubes cover three product categories which differ considerably in their manufacturing processes, raw materials, and investment requirements. These categories are classified as: seamless steel tubes, welded steel tubes of circular cross-section over 406.4 millimetres in outside diameter, welded steel tubes of circular cross-section up to and including (uti) 406.4 millimetres in outside diameter and welded steel tubes of non-circular cross-section of any perimeter.

The main consumers are the energy markets (e.g. oil, gas, nuclear, steam generating industries), petrochemical, automotive, mechanical engineering, mechanical services, and construction industries. The economic development in each of the product areas of the steel tube sector vary according to their different end markets. Calculated, using a crude steel equivalent, the EC steel tube production consumes 16-19% of ECSC steel output. Steel tubes are manufactured at varying levels in each EC country.

Recent trends

After a peak in 1990 and an expected steep downturn in 1993, the long term trend of consumption can be seen as developing moderately. Since 1992 production has had to be reduced dramatically in some countries as a consequence of lower export possibilities and heavy imports. In 1992 apparent consumption of steel tubes in the EC was practically the same in volume as in 1991 thanks to a recovery of demand for welded tubes over 406.4 mm. Consumption is expected to decrease 8% in 1993. Production diminished by 10% in 1992 and will continue to decrease at an estimated 8% in 1993. Exports fell 27.4% in 1992 with even less opportunities in 1993, while imports increased by 4.6% and are estimated to remain at the same level in 1993.

Figure 2: Steel tubes
Production and employment indices compared to EC manufacturing



Are CdL and DEBA estimates.
Source: CdL, DEBA

Table 1: Steel tubes
Main Indicators

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)
Apparent consumption	8 173	8 406	8 190	8 370	9 674	9 904	10 566	9 811	9 795	9 000
Production	14 377	14 462	13 132	12 624	13 329	12 908	12 326	12 524	11 311	10 400
Extra-EC exports	6 948	6 754	5 744	5 103	4 782	4 291	3 165	4 134	3 002	2 900
Trade balance	6 204	6 056	4 942	4 254	3 655	3 004	1 760	2 713	1 516	1 400
Employment (thousands) (end of year)	99.9	94.8	87.8	74.7	74.9	74.8	71.0	69.2	61.7	55.0

(1) CdL estimates.
Source: CdL, Eurostat

Table 2: Seamless tubes
Main Indicators

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	2 011	2 272	1 896	1 903	2 331	2 417	2 453	2 440	2 210
Production	4 664	4 773	3 720	3 744	4 062	3 967	3 680	3 758	3 025
Extra-EC exports	2 898	2 774	2 092	2 170	2 126	2 023	1 685	1 810	1 390
Trade balance	2 653	2 501	1 824	1 841	1 731	1 550	1 227	1 318	815

Source: CdL, Eurostat

Table 3: Welded tubes OD>406.4mm
Main Indicators

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	605	668	734	477	598	850	1 101	773	1 144
Production	3 163	3 449	3 344	2 551	2 297	2 013	1 553	2 021	1 941
Extra-EC exports	2 634	2 803	2 740	2 096	1 725	1 241	608	1 428	869
Trade balance	2 558	2 781	2 610	2 074	1 699	1 163	452	1 248	797

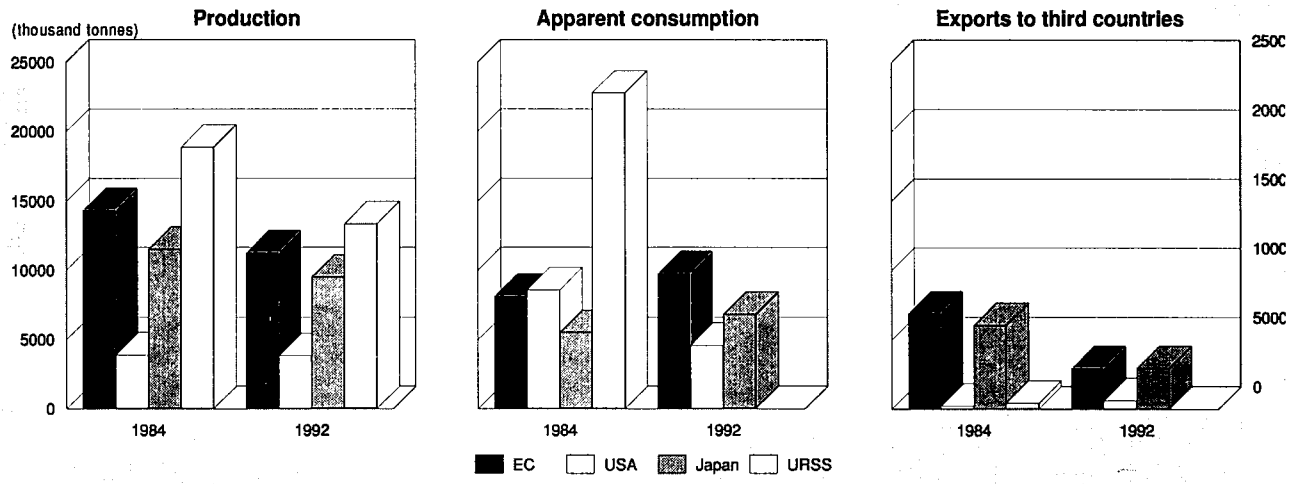
Source: CdL, Eurostat

Table 4: Welded tubes OD≤406.4mm (1)
Main Indicators

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	5 557	5 466	5 560	5 990	6 745	6 637	7 012	6 598	6 441
Production	6 550	6 240	6 068	6 329	6 970	6 928	7 093	6 745	6 345
Extra-EC exports	1 416	1 177	912	837	931	1 027	872	896	743
Trade balance	993	774	508	339	225	291	81	147	-96

(1) Includes tubes of non-circular cross section.
Source: CdL, Eurostat

Figure 3: Steel tubes
International comparison of main indicators



Source: CdL, Eurostat

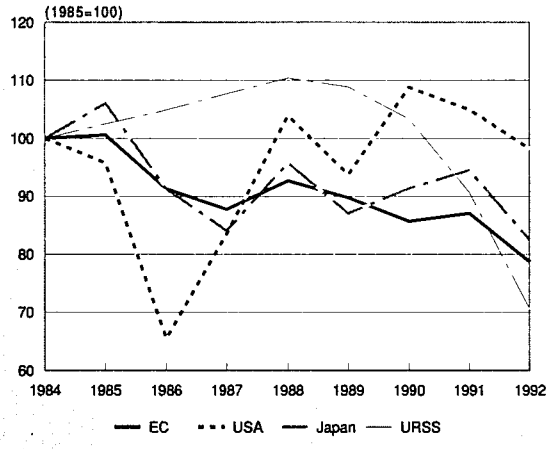
MAIN INDICATORS

Data show marked decreases in production and exports of steel tubes which have resulted in a loss of employment of 38 200 (38%) employees between 1984 and 1992. Although apparent consumption has increased steadily, or at least has remained level, over the past decade, it has mostly been to the advantage of third country competitors. The share of imports from third countries of EC consumption, measured in terms of tonnes, increased strongly from 9.3% in 1984 to 15.2% in 1992. Growth in the steel tube sector has clearly lagged behind developments in general manufacturing as a whole and since 1987 general manufacturing has been characterised by strong growth in production and consumption and a stagnation in extra-EC exports and in employment. In contrast, all indicators for the steel tube sector, with the exception of consumption, show a sharp decline.

International comparison

EC production of steel tubes in 1992 accounted for 19.2% of world production against its 1984 production rate of 20.6%.

Figure 4: Steel tubes
International comparison of production in volume



Source: CdL

In world ranking, the EC is ahead of Japan and the USA. The former Soviet Union has been at the top of the league for the past several years. Particularly in Japan, but also in the EC, steel tube production greatly exceeds consumption which reflects their role as the most important steel tube exporters.

While the EC, the USA and Japan suffered setbacks in their shares of world production since the 1980s, the newly industrialised countries (NICs) and the developing countries (DCs) were the winners. Some of these countries have continued to expand their production capacity, often supported by heavy public subsidies. This group of countries includes Turkey, Mexico, Venezuela, Brazil, Argentina, Taiwan, The Republic of Korea and Thailand.

Foreign trade

The EC's share of estimated world exports of steel tubes in volume amounts to about 43%, if intra-EC trade is included, or to roughly 25%, if intra-EC trade is excluded. Extra-EC exports of steel tubes have decreased continuously since 1984, with an unusual exception in 1991, while extra-EC imports increased steadily in volume, leading to a declining trade balance.

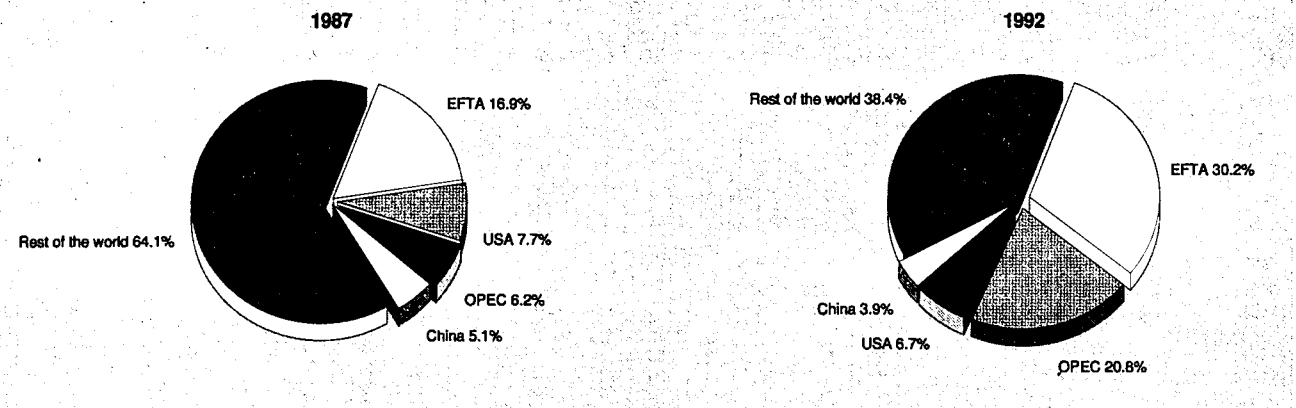
The list of countries receiving EC exports has changed considerably between 1987 and 1992. Exports to EFTA and OPEC countries more than doubled during this period. The former Soviet Union in the past was a major export market, but now the lack of hard currency has reduced its share of EC exports from 42% to almost zero. The EFTA countries are dominant suppliers to the EC steel tube market. However, over the last five years, there has been a decrease in the share of EC imports coming from EFTA countries and also Japan while Central and Eastern Europe countries have almost tripled their exports to the EC. Intra-EC trade is significant and has strengthened in the past decade in absolute value. In value it amounted to roughly 73% of total EC imports in 1992.

MARKET FORCES

Demand

The most important steel tube consuming sectors are: oil and gas exploration and extraction, transport of oil and gas by pipelines, nuclear and other steam generation industries, mechanical engineering, the automotive industry, structural steel

Figure 5: Steel tubes
Destination of EC exports



Source: Eurostat

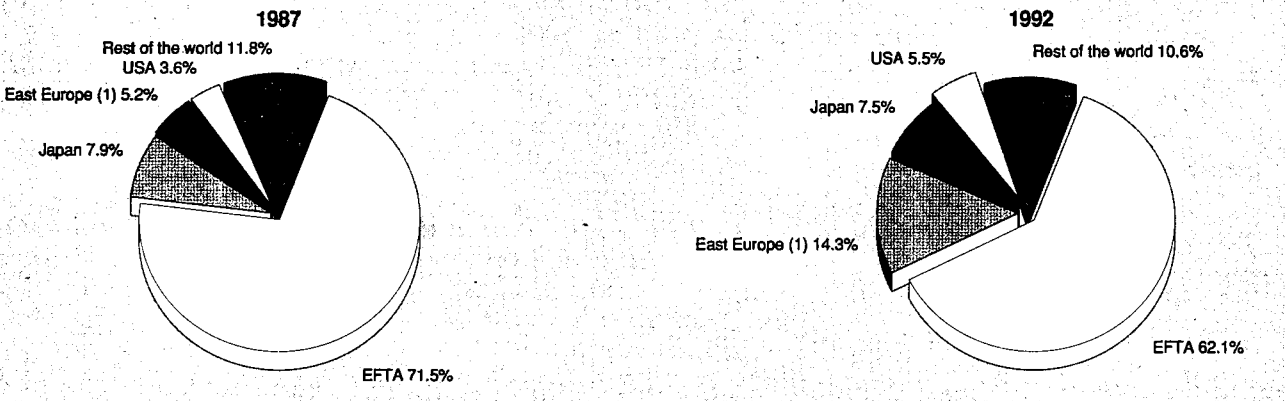
work, the building industry and other metal processing industries. Due to economic developments in these sectors, apparent consumption of steel tubes in the EC rose by 30% from 1984 to 1990 reaching a volume of 10.6 million tonnes. Since that time however, consumption shrank due to lower investment activity in almost every steel tube consuming sector. At the same time the majority of the export markets for EC mills have decreased. In 1984, 48.3% of EC steel tube production was exported to third countries. The decrease of this share to 26.5% in 1992 shows a serious fall in the sales opportunities of the industry. The main reason for the reduction in extra-EC exports is the dramatic fall in orders from the Commonwealths of Independent States and China, caused by their lack of purchasing power, not by loss of EC market share.

Supply and competition

Regardless of continuous workforce and production cutbacks, the EC steel tube industry still suffers from the worldwide over capacity. The effects on profit margins are considerable, especially in export markets and for commodity steel tubes. Given the range of purchase possibilities worldwide, and rising imports, customers are in a strong position to dictate prices to producers. Internal competition within the EC is high and continues to increase. In 1984, intra-EC trade amounted to 2.5 million tonnes or 30.3% of the consumption of steel tubes, whereas in 1992 imports were 3.8 million tonnes or 38.4% of consumption. Intra-EC imports in 1984 totalled 1 763 million ECU or 31.5% of consumption, by 1992 this figure had increased to 2 833 million ECU or 42.8% of consumption. This development is an indication of the fact that there are today very few trade barriers in the steel tube sector. Further impact of the single market, therefore, is expected to be low.

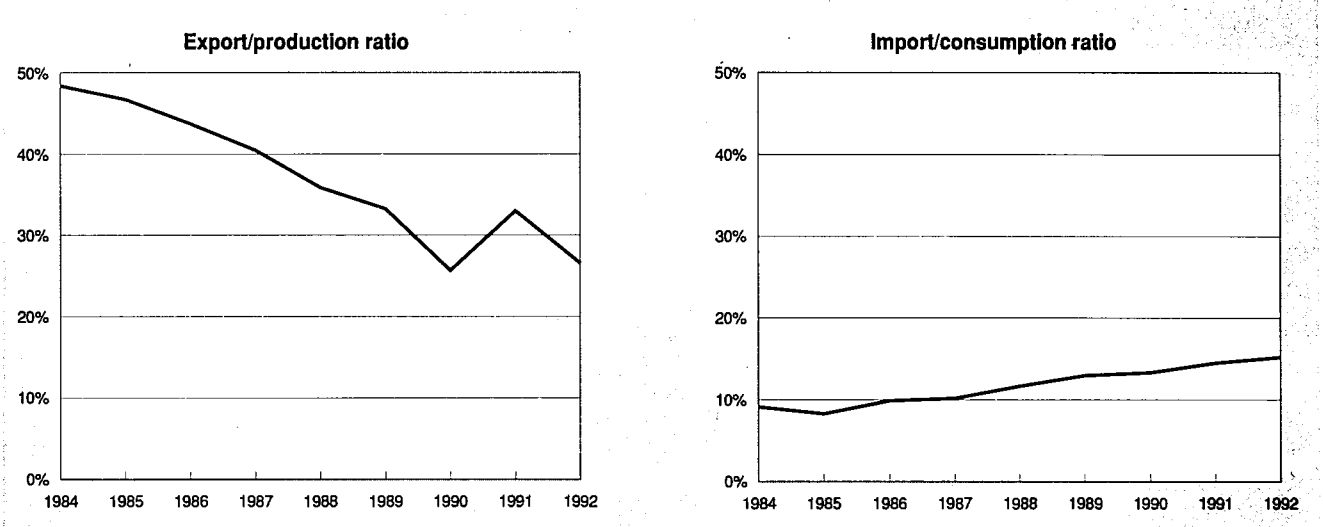
EC competitiveness with respect to third countries, however, is threatened when imported steel tubes are subsidised in their production and/or are produced under non-market economy conditions. This is the case with most of the imports that have flooded the EC from Central and East European countries, especially since the second half of 1991. Their "costs" are not real and thus are often not reflected in pricing. For example, raw materials are often purchased in exchange for other materials, while electric power, and water supply, are heavily subsidised. Given the situation, these imports oversupplied the EC market with price differences of 30% to 50% below

Figure 6: Steel tubes
Origin of EC imports



(1) Bulgaria, Czechoslovakia, Hungary, Poland, Romania.
Source: Eurostat

Figure 7: Steel tubes
Trade intensities in volume



Source: CdL, Eurostat

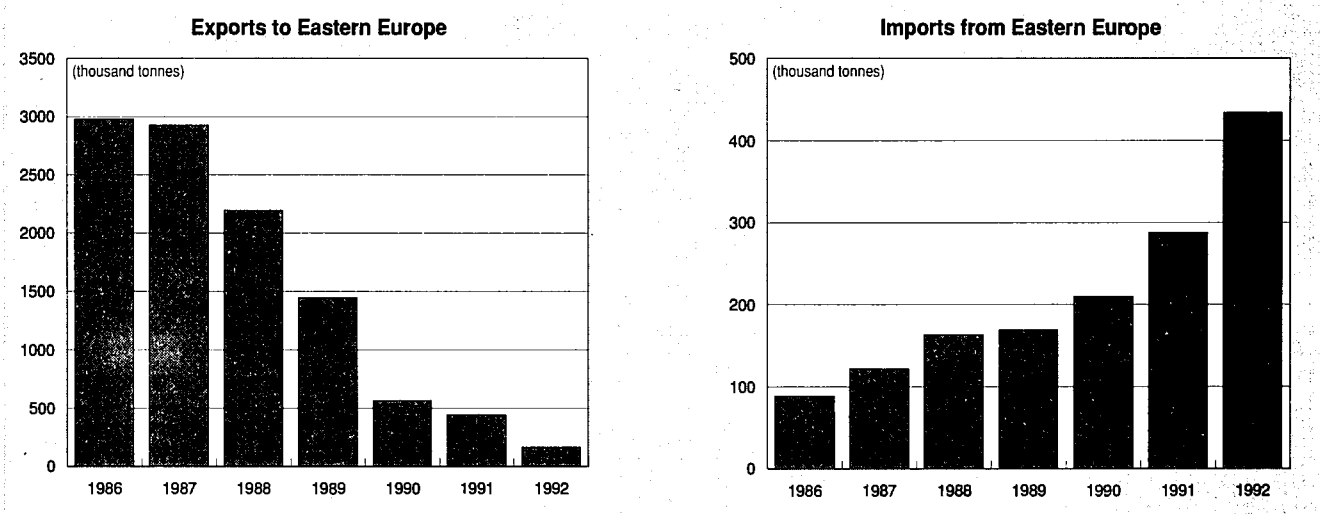
the EC price level. The consequences are plant closures. Two production lines for seamless tubes in the United Kingdom were closed in 1991 and several modern facilities with very high productivity were closed in 1992, including one well known continuous mill in Germany. In contrast, old and inefficient mills in Central and East European countries have been trying to replace the collapse of their exports to the former Soviet Union by increased exports to the EC. While exports to East European countries virtually melted away to zero, imports from this region were five times higher in 1992 than in 1986 and caused severe injury to the EC steel tube industry.

Production process

Technically speaking, the EC steel tube industry is a very strong performer. Continued investment in research and development assures high quality steel production and rolling processes. On-going rationalisation efforts both in production and labour have kept the costs at a competitive level. In the period from 1984 to 1992, the number of employees in the steel tube industry dropped by 38%. Productivity (measured in terms of tonnes per person employed) increased by 27.4% over the same time period.

It should be noted that in many sectors of seamless and welded tubes different product categories are manufactured in the same mill, i.e. tubes of commercial grade as well as tubes of highly sophisticated quality. This means that the installations need to be filled with a substantial base load of commodity products along with high added value grades to obtain a cost level which is competitive in the world market

Figure 8: Steel tubes
Trade with Eastern Europe (1)



(1) Bulgaria, former Czechoslovakia, Hungary, Poland, Romania, former Soviet Union.
Source: CdL

Table 5: Steel tubes
Breakdown by major product line, 1992

(thousand tonnes)	Apparent consumption	Production	Extra-EC exports	Trade balance
Steel tubes	9 795	11 311	3 002	1 516
Seamless tubes	2 210	3 025	1 390	815
Welded tubes OD>406.4mm	1 144	1 941	869	797
Welded tubes OD≤406.4mm (1)	6 441	6 345	743	-96

(1) Includes tubes of non-circular cross section.
Source: CdL, Eurostat

Table 6: Steel tubes
Average real annual growth rates

(%)	1984-1988	1988-1992	1984-1992
Apparent consumption	4.3	0.3	2.3
Production	-1.9	-4.0	-3.0
Extra-EC exports	-8.9	-11.0	-10.0
Extra-EC imports	11.0	7.2	9.0

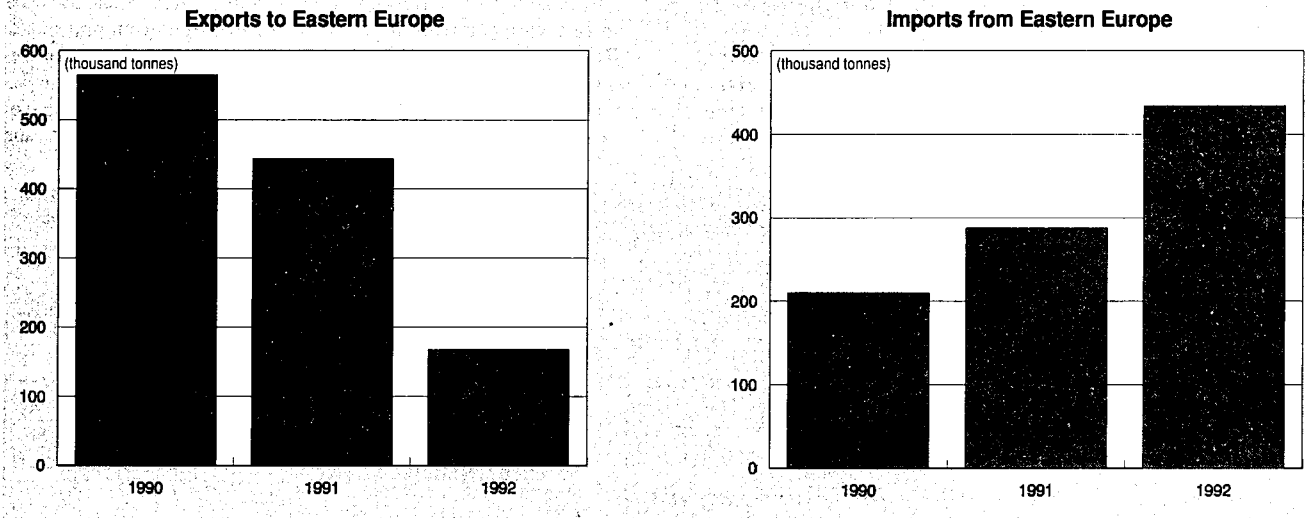
Source: CdL, Eurostat

Table 7: Steel tubes
External trade at current prices

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	4 496	4 788	3 550	2 970	3 293	3 575	2 677	3 092	2 496
Extra-EC imports	629	665	699	682	900	1 141	1 146	1 116	1 056
Trade balance	3 867	4 123	2 851	2 288	2 393	2 434	1 531	1 976	1 440
Ratio exports/imports	7.15	7.20	5.08	4.35	3.66	3.13	2.34	2.77	2.36
Intra-EC trade	1 763	1 991	1 916	1 730	2 239	2 700	2 958	3 116	2 833
Share of total imports (%)	73.7	75.0	73.3	71.7	71.3	70.3	72.1	73.6	72.8

Source: CdL, Eurostat

Figure 9: Steel tubes
Trade with Eastern Europe (1)



Source: CdL

Table 8: Steel tubes
Trade with Eastern Europe (1)

Exports to Eastern Europe	1987	1988	1989	1990	1991	1992
In volume (thousand tonnes)	2 926	2 199	1 448	565	444	168
In value (million ECU)	1 345	1 227	973	430	334	162
ECU / tonne	460	558	672	761	752	964
Imports from Eastern Europe	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**
In volume (thousand tonnes)	122	163	169	210	288	434
In value (million ECU)	40	58	66	82	112	161
ECU / tonne	328	356	391	390	389	371
Share of total extra-EC imports (%)	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**
In volume (thousand tonnes)	14.4	14.5	13.1	15.0	20.3	29.2
In value (million ECU)	5.9	6.4	5.8	7.2	10.0	15.2
ECU / tonne	N/A	N/A	N/A	N/A	N/A	N/A

(1) Bulgaria, former Czechoslovakia, Hungary, Poland, Romania, former Soviet Union.
Source: CdL, Eurostat

INDUSTRY STRUCTURE

Companies

The steel tube industry is a primary steel processing industry with a highly concentrated structure. Five countries Germany, Italy, France, the United Kingdom and Spain, account for roughly 90% of total production. In some countries, a single company can account for 50% or more of national output. In addition to the major steel tube manufacturers who are usually linked to the large steel producers, especially when manufacturing welded tubes, there are a relatively large number of medium-sized and small firms. Some manufacturers, often small in tonnage terms, operating in small, high value-added markets, specialise in the manufacture of special dimensions and grades of tubes according to a customer's particular specifications. At the end of 1991 there were 285 production units in the EC belonging to an estimated 245 enterprises, 67 of which were specialised in cold drawing of seamless or welded tubes.

Strategies

No significant investment has taken place in recent years due to the reductions in capacity imposed by difficulties in the market since 1985. Contrary to the early 1980s where some investment was directed towards expanding capacity, current investments relate to improvements in productivity and quality. In the past, companies and countries tended to either manufacture a full range of products or to specialise in niche markets. To strengthen the competitiveness of the industry, thought is now being given to cross-border cooperation and by capacity reductions.

ENVIRONMENT

Costs arising from environmental protection legislation are considerable. To a large extent, the costs of classical end-of-the-pipe measures such as the treatment of emissions from raw material production units, reheating furnaces, noise control, and the treatment of waste water can amount to as much as 50 ECU per tonne and average at least 1% of the turnover of EC firms. Waste reduction strategy is implemented more often in refurbishments or modifications of current production processes, procedures and feed stock than it is implemented in the input/output balance. Heat usage and water saving measures, treatment of process liquids, recycling of materials and maximising yields are just a few of the measures used that follow the needs of "best available technology" (BAT). Additional costs, which cannot at present be estimated, come from the installation of measures to maintain and boost confidence in an environmentally friendly industry. This prevents site closures for environmental reasons. These measures are in line with the Community Eco-Audit Regulation and of the Regulation of Free Access to Environmental Information requirements. Steel and steel tube manufacturing enjoy the advantage that during the production process no toxic gases develop and the waste material is recycled immediately and

Table 9: Steel tubes
Labour productivity and unit costs (1)

(1985=100)	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (tonnes/employee)	143.9	152.5	149.6	169.0	178.0	172.6	173.6	181.0	183.3
Productivity index	94.4	100.0	98.1	110.8	116.7	113.2	113.8	118.7	120.2
Unit labour costs index (2)	95.6	100.0	106.2	113.8	116.6	121.7	129.2	142.6	148.0
Total unit costs index (3)	93.0	100.0	96.4	100.4	123.9	141.3	145.3	150.8	148.6

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) For the whole NACE 222; based on labour costs in current prices per person employed."
(3) For the whole NACE 222; based on total costs in current prices per person employed, excluding costs of goods bought for resale."
Source: CdL, DEBA

completely. Another environmentally sound characteristic of steel is that the product itself can be entirely recycled without polluting the environment.

REGULATIONS

Trade regulations are a key source of concern for the EC steel tube producers. Trade barriers in several countries of the world hamper the penetration of EC exports. The reduction of non-tariff barriers is an important item in the framework of the Uruguay Round trade negotiations. The harmonisation of EC standards in the sector is well advanced, internal barriers have practically disappeared and do not impede the free circulation of goods among the Member States. The EC steel tube market remains open for imports from third countries under fair trade conditions. Imports continue to face strong competition from domestic suppliers and suppliers in other Member States and third countries. Unfair trade practises will be countered by Antidumping procedures.

OUTLOOK

In 1993, EC consumption of steel tubes is expected to decrease by 8% due to the slowdown of overall economic growth as well as stock reduction by distributors and users. Also production is estimated to decline by 8% after the 1992 downturn of 10%. EC countries which are affected at the same time by heavy imports and lack of export orders suffer most from the production setbacks, which rose to 14% in 1992 and are estimated at 25% in 1993. Recovery of the steel tube industry cannot be expected before mid-1994, brought about by stronger overall economic growth and stabilisation of exports.

In the medium term, the development of the EC steel tube industry will be characterised by a number of risks and opportunities. The main risks are a continued increase of imports from Central and East European countries which could lead to further plant closures in the EC. Continued weak demand in the US market and an increase in the export activities of subsidised producers in third countries will dampen export demand for EC steel tube manufacturers. CIS imports will not improve for some years. However there are promising opportunities for the future. The economic recovery in the CIS and in Central and East Europe will bring larger export markets, as well as an improvement in the world economic situation with a related increase in the demand from the energy industry. Fair trade enforcement under confirmed GATT regulations will also increase the industry's activity.

Table 10: Steel tubes
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.2	1.2
Production	1.7	1.7
Extra-EC exports	2.6	2.6

Source: CdL

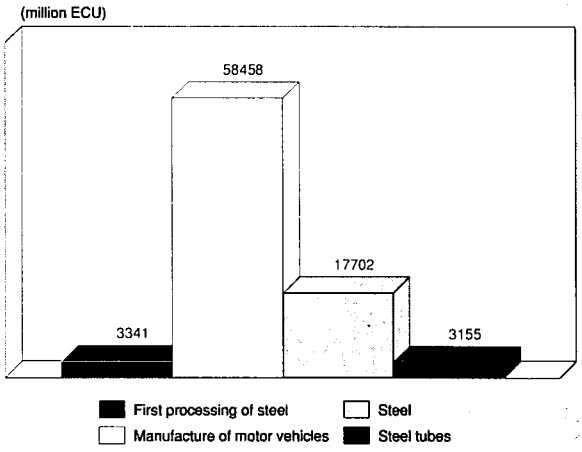
Written by: Stahlrohrverband e.V.
The industry is represented at EC level by: Liaison Committee of the European Community Steel Tube Industry (CDL). Address: 130, rue de Silly, F-92100 Boulogne-Billancourt; tel: (33 1) 49 09 35 91; fax: (33 1) 49 09 39 20.
Statistics are collected by: Stahlrohrverband e.V. Address: Tersteegenstraße 3, D-40474 Düsseldorf; tel: (49 211) 43 47 54; fax: (49 211) 43 47 57.

First processing of steel

NACE 223

After substantial growth in 1988, 1989 and 1990, production of the first processing of steel sector fell to 16.1 million tonnes in 1992 against 17.2 million tonnes in 1990. This was primarily due to the economic downturn experienced by the end-users, particularly in the building sector, the automotive sector and in mechanical engineering.
In the past, developments were marked by decidedly weak growth rates due to slack demand and an ongoing deterioration of foreign trade. Emergent industrial competition from East European countries made incisive inroads into the EC market as extra EC exports receded simultaneously. One consequence of this unfavourable trend and of intensified rationalisation measures was a drop in employment. Production in value in 1992 was by 10.5 % lower than in 1989.

Figure 1: First processing of steel
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

Sector 223 of NACE is in fact a part of first processing of steel. It includes the following four subsectors:

- NACE 223.1: Cold drawing of steel bars
- NACE 223.2: Cold rolling of steel strip
- NACE 223.3: Cold forming of steel flat products
- NACE 223.4: Cold drawing of steel wire and manufacture of wire products.

The manufacture of cold drawn wire and wire products is the largest activity of the sector with a share of 54 % of production and 45 % of extra-EC exports in 1992. The manufacture of steel tubes referenced NACE 222 is also a first processing of steel activity but is considered separately in this publication.

Manufacturing process

Transformation of hot rolled raw material by cold working is a common feature of the four subsectors which leads to more accuracy in size and mechanical properties, as well as improvement of the surface condition (except for cold forming) compared to products obtained on the hot mill. The products are or standard or manufactured according to the requirements of each individual customer which is obviously not possible for the primary steel industry.

Cold drawing

"Cold drawing" concerns the manufacture of steel bars or sections by cold drawing, grinding or peeling of hot rolled steel bars, into so-called "Bright steel bars", having the form and characteristics required by the users. The finished product has tight tolerances, accurate mechanical properties and a high quality surface. Improved quality surface conditions and closer tolerances can be achieved by additional grinding and polishing. Cold finishing during drawing operations hardens and increases the tensile strength of the steel, while at the same time reducing the ductility, which may require an annealing treatment of the product after drawing. Bright steel bars are mainly of circular, square rectangular or hexagonal section, but all kinds of sections can be produced according to demand. They are delivered in fixed length.

Cold rolling

Cold rolling of steel strip is a process in which pickled flat hot rolled steel products are rerolled between polished cylinders. The dimensions of the finished product are of less than 600 mm in width and 0.025 mm up to 12.5 mm in wall thickness.

In the wall thickness range of 0.3 mm up to 3 mm, other flat cold rolled steel products can be obtained by slitting coils of large cold rolled sheet manufactured by the primary steel industry. This operation is done either by the primary steel industry itself or by distributors of steel products.

Rerolling gives a high quality product with consistent dimensional and internal characteristics. The equipment used to roll, anneal, slit, edge and heat treat cold rolled steel strip is highly capable of producing a unique product when compared to large cold rolled sheet mills found in all integrated steel plants throughout the world.

The specialised rolling mills and processing equipment used allow to meet all the different requirements of each individual customer: mainly close tolerances, special forming capabilities and special finishes (surface edges, coating, for instance) which are not possible for the primary steel industry.

Cold forming

Cold forming concerns the manufacture of open sections of steel by progressive forming on a roll mill or folding on a press of hot rolled descaled flat products of steel or cold rolled coated flat products of steel. Cold forming is a continuous process which allows the manufacture of big quantities of simple or complex forms. Cold folding is generally used to obtain sections of simple forms in small quantities. Compared to the simple form sections produced on the hot mill, cold formed sections are more accurate in size.

Wire drawing

Wire drawing is an operation consisting to cold stretch hot rolled wire rod, through a die, with an aperture of a form corresponding to the cross-section of the finished product. The mechanical properties of the hot raw material must be appropriate in order to have sufficient ductility to pull it through the die. After this operation, the hardness and tensile strength of the wire becomes higher and may require an annealing after drawing. In some cases a patentage heat treatment is required. The finished products have tight tolerances, ac-

Table 1: First processing of steel
Main indicators

(thousand tonnes)	1988	1989	1990	1991	1992	1993(2)	Average annual growth rates (%) 1988-92
Apparent consumption (1)	12 504	12 943	13 540	13 316	12 891	11 900	0.8
Production	16 491	16 780	17 273	16 634	16 083	15 000	-0.6
Extra-EC exports	2 263	2 268	2 143	1 946	2 028	1 970	-2.7
Trade balance	1 239	1 133	968	797	748	880	-11.9
Employment (thousands)	91.3	88.8	87.1	88.3	85.9	85.0	-1.5

(1) Excluding cold rolling of steel strip.
(2) Rounded Eurostat and European Committee estimates.
Source: Eurostat, European Committee

Table 2: Cold drawing of steel bars
Main indicators

(thousand tonnes)	1988	1989	1990	1991	1992	1993(1)	Average annual growth rates (%) 1988-92
Apparent consumption	2 424	2 465	2 468	2 168	2 057	1 700	-4.0
Production	2 563	2 597	2 586	2 275	2 158	1 800	-4.2
Extra-EC exports	296	310	296	254	265	290	-2.7
Trade balance	139	132	118	107	101	100	-7.7
Employment (thousands)	9.0	8.9	8.5	8.1	7.9	7.7	-3.2

(1) Rounded Eurostat and European Committee estimates.
Source: Eurostat, European Committee

Table 3: Cold rolling of steel strip
Main indicators

(thousand tonnes)	1988	1989	1990	1991	1992	1993(1)	Average annual growth rates (%) 1988-92
Production	3 280	3 217	3 191	2 873	2 803	2 600	-3.9
Extra-EC exports	838	805	741	692	754	720	-2.2
Trade balance	532	513	426	352	359	360	-11.2
Ratio exports/production (%)	25.5	25.0	23.2	24.1	26.9	27.7	1.3
Employment (thousands)	16.2	15.9	15.8	15.5	14.8	14.5	-2.2

(1) Rounded Eurostat and European Committee estimates.
Source: Eurostat, European Committee

Table 4: Cold roll forming or folding of steel
Main indicators

(thousand tonnes)	1988	1989	1990	1991	1992	1993(1)	Average annual growth rates (%) 1988-92
Apparent consumption	2 101	2 218	2 453	2 561	2 463	2 200	4.1
Production	2 111	2 216	2 453	2 535	2 433	2 190	3.6
Extra-EC exports	101	100	108	100	107	100	1.4
Trade balance	10	-2	0	-26	-30	-10	N/A
Employment (thousands)	11.0	10.7	10.6	10.3	9.9	9.8	-2.6

(1) Rounded Eurostat and European Committee estimates.
Source: Eurostat, European Committee

Table 5: Wire drawing of steel and manufacture of wire products of steel
Main Indicators

(million ECU)	1988	1989	1990	1991	1992
Extra-EC exports	2 236.3	2 560.6	2 314.2	2 064.5	2 018.6

(thousand tonnes)	1988	1989	1990	1991	1992	growth rates (%) 1993(1)	1988-92
Apparent consumption	7 979	8 260	8 619	8 587	8 371	8 000	1.2
Production	8 537	8 750	9 043	8 951	8 689	8 430	0.4
Extra-EC exports	1 028	1 053	998	900	902	860	-3.2
Trade balance	558	490	424	364	318	430	-13.1
Employment (thousands)	55.1	53.3	52.2	54.4	53.3	53.0	-8.3

Source: Eurostat

curate mechanical properties and a smooth surface. Their cross-section may be circular, flat with rounded edges, rectangular, hexagonal, triangular, oval, semi-circular etc.

Products manufactured

Cold drawing

The subsector manufactures the following products: non alloy steel bars of free cutting steel and carbon steel bars; stainless steel bars; alloy steel bars of different grades including high speed steel and other tool steel and shapes and sections of different grades of steel. All these products meet the specifications of each individual user.

Cold rolling

The subsector manufactures the following products: steel strip of a carbon content of 0.50 % or under, including as rolled or blue strip for packaging; steel strip coated with zinc, tin, lead, copper, nickel or with paint, varnish or plastic, printed on request; cladded steel strip; quenchable or quenched steel strip; stainless steel strip; and other alloy steel strip.

Cold forming

The subsector covers two production areas: standard sections of simple form such as L,C,U, Omega and Z and products for specific uses of complex form according to the requirements of each individual customer; wide size sections for building purposes in low carbon steel coated with zinc, paint, varnish or plastic, such as sandwich panels, corrugated sheet, profiled sheet and safety barriers. These products are mainly of non alloy steel with a content of carbon up to 0.25 %. There are also manufactured sections of stainless or other alloy steel.

Wire drawing

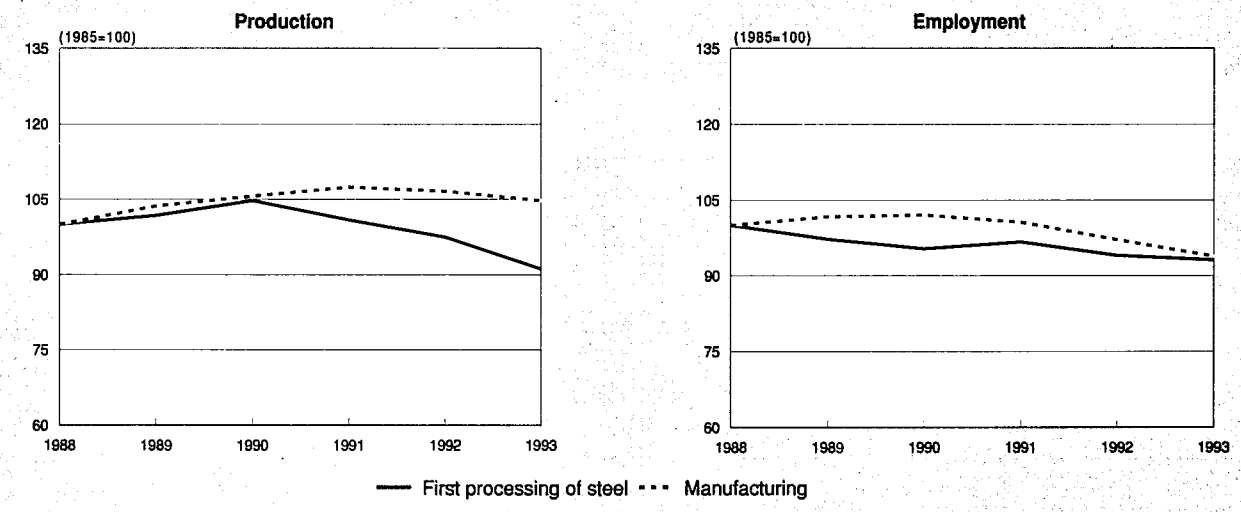
The subsector covers two fields of activity:

- Wire drawing: mild steel wire with a carbon content up to 0,25 % and hard steel with a carbon content of over 0,25 %. These products are delivered uncoated or coated with zinc, copper, tin, nickel, chrome, plastic, varnish or other materials; stainless steel wire; and other alloy steel wire.
- Wire products: strand and ropes, heavy welded mesh, plaited bands; barbed wire, wire fencing, grill, netting; welded link chains, hooks, springs, nails, etc.

Classification in the Combined Nomenclature (C.N.)

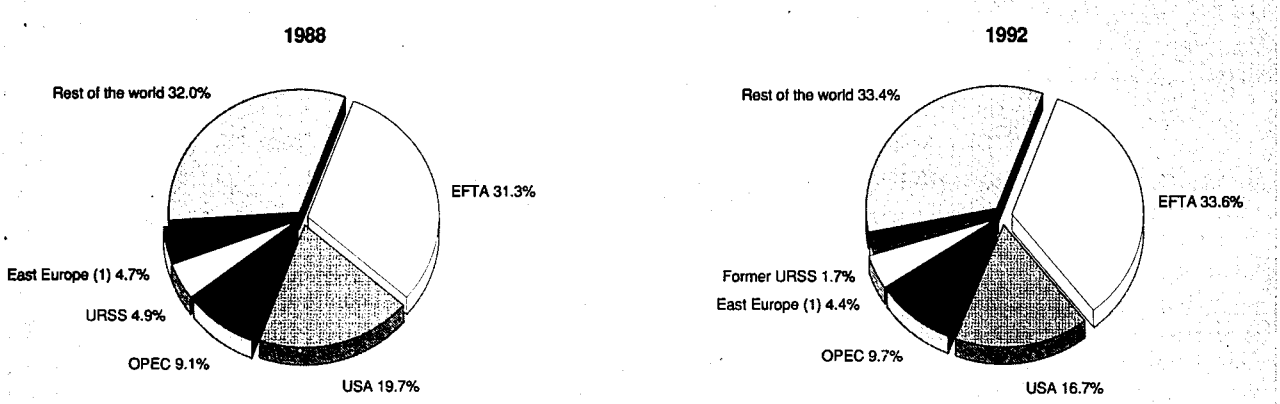
Products covered here are classified in chapters 72 and 73 of the "C.N.". Except for cold rolled strip, external trade statistics can be used for the calculation of apparent consumption. The problem for cold rolled strip is that strip produced by the cold rolling industry cannot be classified apart of the cold rolled strip obtained by slitting of cold rolled sheet manu-

Figure 2: First processing of steel
Production and employment indices in volume compared to EC manufacturing



(1) Albania, Bulgaria, Czechoslovakia, Hungary, Poland, Romania.
Source: Eurostat

Figure 3: First processing of steel
Destination of EC exports



(1) Albania, Bulgaria, Czechoslovakia, Hungary, Poland, Romania.
Source: Eurostat

factured by the primary steel industry. Consequently, apparent consumption is not available for sector 223.

Period covered

In order to have homogenous figures for external trade statistics, the table and figures begin in 1988, the year of enforcement of the C.N. based on the Harmonized System, which has replaced the previous Common Custom's Tariff and Nimexe nomenclatures. Accordingly, the period 1988 to 1992 has been selected for all other statistical information.

Recent trends

After several years of weak growth, the sector was able to record healthy growth rates in 1988, 1989 and 1990. With the slowdown of production in consuming industries that began in 1990 and intensified in 1991, consumption of drawn wire and bars and cold formed products decreased by 1.2% in 1991 and 3.2% in 1992 and is doomed to decrease again in 1993. The trade balance has dropped by 14.6% in 1990, 17.7% in 1991 and 6.2% in 1992. As a result of these trends, production in value has decreased steadily since 1989 falling down to 12.5 million ECU in 1992 (-10.5%).

Similarly to the primary steel and steel tube sectors, production in the first processing of steel industries has clearly lagged behind the continuous growth in the manufacturing industry as a whole. Productivity in tons per worker has decreased since 1990 with the slowdown of production. Productivity in value added, in 1992 prices per person employed, has decreased since 1990. Unit labour costs have increased since 1990 while total unit costs have decreased since 1990.

International comparison

International comparisons are difficult due to the lack of data on first processing of steel in the world. EC is probably the world's largest producer followed by Japan, the USA. Sweden, Finland, Switzerland and Austria, among the EFTA countries, and East European countries are also major producers.

Foreign trade

A look at table 7 shows the deterioration in value of extra-EC trade leading to a declining trade balance and a declining exports/imports ratio. The export/production ratio for the sector decreased. Conversely, the import/consumption ratio (excluding cold rolled strip) grew steadily.

Figure 2 shows some changes in the destination of extra-EC exports comparing 1988 and 1992. The share of EFTA countries has increased but the shares of the USA and of the former Soviet Union have decreased. As for extra-EC imports, the share of the EFTA countries has decreased but remains the highest, while the share of East European countries increased.

MARKET FORCES

Demand

A wide variety of sectors are users of the products of the first processing of steel industries which are described in the paragraphs below. At present, most users have to cope with recession which will worsen in 1993 and possibly also in 1994.

Cold drawing

Bright steel bars are used by industries such as manufacture of motor vehicles, machinery, electrical goods and other industries, where a high quality basic material is compulsory. There has been a severe slowdown of demand especially from the automotive industry due to recession in this sector.

Table 6: First processing of steel
Breakdown by product line, 1992

(thousand tonnes)	Apparent consumption	Production	Extra-EC exports
Bright steel bars	2 057	2 158	265
Cold roll strip	N/A	2 803	754
Cold formed sections	2 463	2 433	107
Cold drawn wire and wire products	8 371	8 689	902

Source: Eurostat, European Committee

Table 7: First processing of steel
External trade in current prices

Average annual					
Extra-EC imports	891.7	1 101.1	1 111.3	1 057.9	1 122.4
Trade balance	1 344.6	1 459.5	1 202.9	1 006.6	896.2
Ratio exports/imports	2.5	2.3	2.1	2.0	1.8
Intra-EC trade	3 630.6	4 243.4	4 140.5	3 965.3	3 917.8

(1) Rounded Eurostat and European Committee estimates.
Source: Eurostat, European Committee

Cold rolling

Cold rolled steel strip is used for the manufacturing of automotive parts, hardware, office equipment, fasteners, bearings, chains, tubes and many other products, whenever a high quality basic material is compulsory.

The most important consuming sectors are the manufacture of motor vehicles and other transport equipment including bicycles, which account for more than half of the demand. Due to recession, there is a slowdown of demand from the industrial sectors who use cold rolled steel strip.

Cold forming

Sections are used by sectors such as building, civil engineering and transport equipment, mainly for safety barriers for the highways, sheet piling and manufacture of trucks, railway rolling stock and furniture. Some of these sectors are in recession.

Wire drawing

Drawn wire and wire products are used by the construction of buildings and civil engineering sectors, the manufacture of motor vehicles, of machinery, of fasteners , screw machine products, chains and springs and furniture sectors, agriculture and telecommunications. There has been a slowdown of certain of these sectors in 1992 due to recession.

Supply and competition

The first processing sector has been cutting its work force and improving its productivity. Progress is due to wire cold drawing and cold forming industries. There has been a loss in employment of about 5 400 workers between 1988 and 1992. Capacity is estimated at around 20 million tonnes in 1992 compared to a production of 16 million tonnes. This situation of persistent overcapacity is at the present time shared by most producing countries.

Internal competition within the EC has been active. Intra EC imports which were of 4.3 million tonnes in 1988 climbed progressively up to 4.6 million tonnes 1992, corresponding to 3.6 million ECU and 3.9 million ECU respectively.

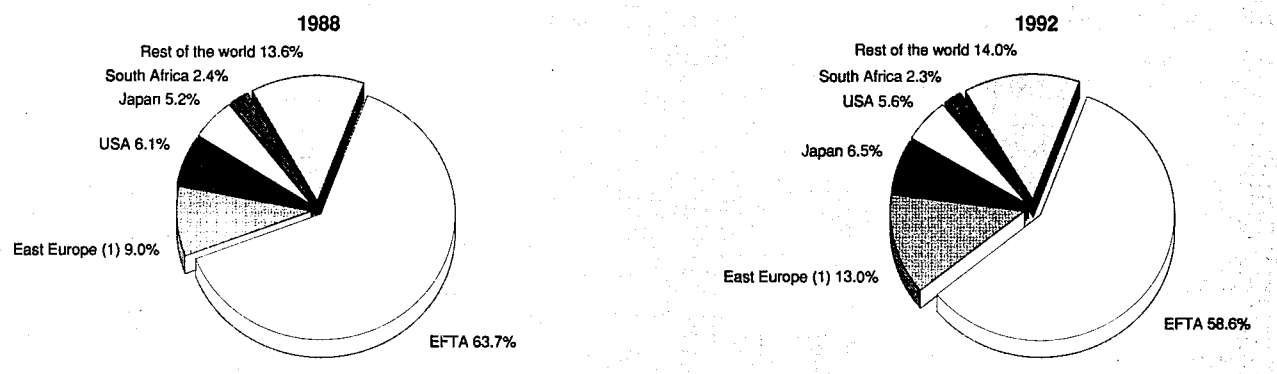
Imports from third countries have been constantly increasing since 1988 passing from 1 million tonnes up to 1.3 million tonnes in 1992 corresponding to 0.9 million ECU and 1.1 million ECU respectively. Imports from EFTA countries were in 1992 14.6% higher than in 1988, with 573 980 tonnes against 500 627 tonnes. Imports from East European countries were in 1992 108.7% higher than in 1988, with 420 079 tonnes (37.4 % of total imports) against 201 432 tonnes, at far lower prices than for other foreign competitors. Czechoslovakia is the most important competitor with 277 918 tonnes or +178% over 1988. Low price imports from this group of countries have a disastrous effect on the market. The other main competitors were South Africa with 59 488 tonnes in 1992 against 51 168 tonnes in 1988; China with 25 100 tonnes in 1992 against 16 171 tonnes in 1988, and the USA with 23 361 tonnes in 1992 against 19 089 tonnes in 1988.

Cold drawing

There has been a loss in employment of about 1 000 workers between 1988 and 1992. Production capacity, which was of 4.3 million tonnes in 1988 was around 4.1 million tonnes at the end of 1992.

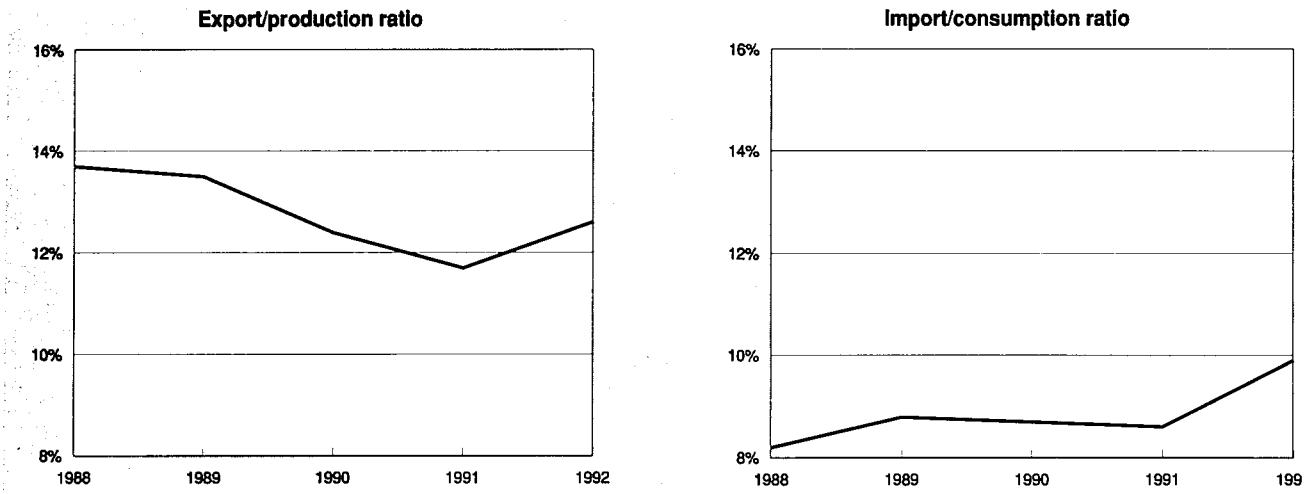
Intra-EC imports amounted to 643 160 tonnes in 1992 against 639 053 tonnes in 1988. Imports from third countries have decreased after a strong increase in 1989 and 1990, but are still higher by 4% over 1988 with 163 490 tonnes against 157 431 tonnes. Imports from Switzerland were in 1992 24%

Figure 4: First processing of steel
Origin of EC imports



1993 are Eurostat and European Committee estimates.
Source: Eurostat, European Committee

Figure 5: First processing of steel
Trade intensities in volume



(1) Excluding cold rolling of steel strip.
Source: Eurostat, European Committee

higher than in 1988 with 36 545 tonnes against 29 377 tonnes and those from Czechoslovakia 124% higher, with 40 092 tonnes in 1992 against 17 653 tonnes in 1988.

Cold rolling

There has been a loss in employment of about 1 700 workers between 1989 and 1992 and the production capacity of 4,6 million of tonnes in 1988 was reduced to 4,3 million tonnes in 1992.

Internal competition within the EC is high and has strengthened during the last five years. Intra EC-imports amounted to 1 534 032 tonnes in 1988 compared to 1 652 124 tonnes in 1992. With regard to extra-EC imports, in 1992 imports from Austria were 111 543 tonnes against 103 826 tonnes in 1988. Among East European countries, imports from Czechoslovakia reached 56 850 tonnes in 1992 against 25 278 tonnes in 1991.

Cold forming

Productivity has passed from 191.9 tonnes by employee in 1988 to 245.8 tonnes in 1992. Employment was reduced of about 1 000 workers since 1988. Capacity investments have been high in the years previous to 1988. Thus, with the slow-down of demand, the industry suffers of overcapacity as most producing countries in the world.

Internal competition within the EC has been active. Intra EC imports which were of 233 158 tonnes in 1988, were of 332 050 tonnes in 1992. Imports from EFTA countries increased by 56.7% in 1992 with 71 956 tonnes against 46 204 tonnes in 1988. Imports from East European countries increased from 10 850 tonnes in 1988 to 50 404 tonnes in 1992, at very low prices. The countries of origin are mainly Poland and Hungary.

Wire drawing

Employment in the subsector has decreased by about 2 000 workers between 1988 and 1992. Intra-EC imports amounted to 1.99 million tonnes in 1992 against 1.86 million tonnes in 1988. Extra-EC imports in volume increased by 24.3% during the 1988-92 period, mainly because of increased imports from East European countries (+170% during the same period), the EFTA countries (+13%) and South Africa (+62.8%).

Production process

Cold drawing and wire drawing

There has been steady progress in processes used to manufacture bright steel bars, mainly with the introduction of computers in the production lines, in order to meet the demand of users for even higher quality finished products. The methods used keep gauge, mechanical properties and surface condition under much stricter control. The same comments can be applied to the subsector of cold drawing of steel wire and manufacture of wire products.

Cold rolling

In the 1960s, an important technological innovation was brought on by the multicylinder rolling mills and particularly the so-called Sendzimir mill, which allowed rolling of wall thicknesses under 0.20 mm and as low as 0.025 mm. Since then numerous technological innovations have been made, e.g. the introduction of computers in the processing lines which keep gauge, mechanical properties and rolling speed under much stricter control.

Cold forming

One of the main technological innovations has been the automatic machining of forming rolls. The automatic conditioning of products before shipment is also to be mentioned.

INDUSTRY STRUCTURE

Companies

The number of mills declined from 981 in 1988 to 932 in 1992 due to the closing of redundant installations. The situation at the end of 1992 was : 302 mills in Germany, 232 in Italy, 133 in France, 123 in Spain, 90 in the United Kingdom, 29 in Belgium/Luxembourg, 13 in Holland, 7 in Denmark, 3 in Portugal, 2 in Greece. Among the biggest companies, some are integrated to the steel industry, the others are independent and mostly small-size specialised companies.

Cold drawing

The number of mills declined from 162 in 1988 to 143 in 1992. The situation at the end of 1992 was the following: 51 mills in Germany, 25 in France, 25 in Italy, 25 in Spain, 16 in the United Kingdom, 1 in Denmark.

Table 8: First processing of steel
Labour productivity and unit costs (1)

(1988=100)	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	40.4	39.9	43.6	40.2	38.9
Productivity index	100.0	98.8	107.9	99.5	96.3
Unit labor costs index (3)	100.0	113.4	125.3	126.0	132.0
Total unit costs index (4)	100.0	121.2	124.2	114.5	114.7
Productivity (tonnes)	180.6	189.0	198.3	188.4	187.2
Productivity index	100.0	104.7	109.8	104.3	103.7

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA, European Committee

Cold rolling

The number of mills declined from 164 in 1989 to 155 in 1992: the situation at the end of 1992 was of 64 mills in Germany, 32 in Italy, 18 in the UK, 15 in Belgium/Luxembourg, 13 in France, 11 in Spain, 1 in Portugal, 1 in Holland.

Cold forming

The number of mills was of 137 at the end of 1991: 30 in Spain, 26 in the United Kingdom, 25 in Germany, 25 in Italy, 20 in France, 5 in Holland, 4 in Denmark, 2 in Belgium.

Wire drawing

The number of mills declined from 520 in 1988 to 497 in 1992. The situation at the end of 1992 was: Germany 162, Italy 150, France 75, Spain 59, United Kingdom 30, the Netherlands 7, Belgium/Luxembourg 12, Greece 2, Denmark 2, Portugal 2.

Strategies

In contrast to the major firms in the primary steel industry and the steel tube industry, mergers, acquisitions, alliances and cooperation form a less suitable strategy for the medium and small size companies of the first processing of steel sector. The emphasis will continue to be placed on investments in rationalisation to achieve productivity gains. In addition, the trend towards specialisation will intensify. This applies also with regard to the completion of the Single Market. The introduction of the Single Market has had only relatively minor effects on the sector, given that trade among the various Member States is hardly hindered at the present time.

Products exchanged within the EC amounted to 4.6 million tonnes in 1992 which is considerable compared to the total deliveries on the different domestic markets which amounted to about 10 million tonnes. Due to comparable production techniques in all Member States and harmonisation of Standards published by the National Standardization Organizations, the quality of these products is consistent.

Wire drawing

A number of mergers and restructurings have taken place since 1988, especially in and among major steel producing group subsidiaries. Besides these efforts to improve productivity, a tendency to rationalise and specialise production has been spreading among the main European wire-drawing and wire products companies concerned.

REGIONAL DISTRIBUTION

The majority of the mills is concentrated in the highly industrialised regions: Ruhr district, Northern part of Italy, East and North of France, North East of Spain, West and South Midlands in the United Kingdom.

ENVIRONMENT

Costs arising from environmental protection are significant in the first processing of steel sector. They are, to a large extent, due to costs incurred by the treatment of smoke emissions from reheating furnaces, treatment of waste water from the pickling installations where they still exist and noise control in the production units.

Cold drawing

An innovation is this field has been the substitution of pickling by shotblasting in the descaling of raw material. This has eliminated problems of discharging acid pickling tank contents into local waterways. This industry is noiseless, except when charging raw materials in the drawing mill.

Cold rolling of steel strip

Pickling installations have disappeared from the factories in many cases because coils ordered from the steel industry are delivered pickled and protected. In the coating installations, it is necessary to aspirate smokes especially when strip receives a metallic coating. Today, smoke aspiration is also necessary for annealing processes. As for noise problems, cold rolling mills are not noisy except when charging the coil in the rolling mill.

Cold forming

Pickling installations have disappeared from the factories because coils ordered to the steel industry are delivered pickled and protected. Previously used acid waters were rejected from the pickling tanks in the rivers or the lakes. This industry is noiseless, except when charging the coils in the forming mill.

Wire drawing

Pickling installations have disappeared from most factories because the hot rolled wire ordered to the steel industry is delivered pickled and protected. In the coating installation, it is necessary to use fume extractors especially when applying metallic coatings. As for noise problems, cold wire drawing mills are noiseless except when charging the raw material in the drawing mill.

REGULATIONS

Trade regulations are a key concern for the EC producers of steel and articles of steel. Up to the end of March 1992, the Voluntary Restraint Agreements (VRA) provided for quotas by group of products for exports to the USA. Since then, trade barriers have hampered the penetration of EC exports into the USA. These barriers might be subject to revision in the context of the Uruguay round trade negotiations.

Different versions of a draft of "Multilateral Agreement on Steel Liberalization" have been subjected to negotiations between steel producing members of the GATT, particularly the USA, EC Member States and other partners who were under a VRA. Other meetings will be held in Geneva on the subject.

OUTLOOK

As consumption is likely to drop again due to recession, EC production is expected to decrease by around 8 % in 1993. A recovery of the first processing of steel sector can not be expected before the end of 1994 or the beginning of 1995.

In the medium term, the development of this sector will be characterised by a number of risks. The main risk is a further increase of imports from East European countries and continuing diminished opportunities to export to the USA. On the other hand, three main opportunities might be seized: first, in the medium and long term, the economic recovery in the CIS and East European countries; second, an improved access to the USA under GATT conditions; and third, a recovery in the worldwide economic situation.

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Comité international d'étude du laminage à froid du feuillard d'acier (CIELFFA). Address: Rue Paul Cézanne 1, F-75008 Paris; tel: (33 1) 49 53 72 43; fax: (33 1) 49 53 72 44;
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Overview
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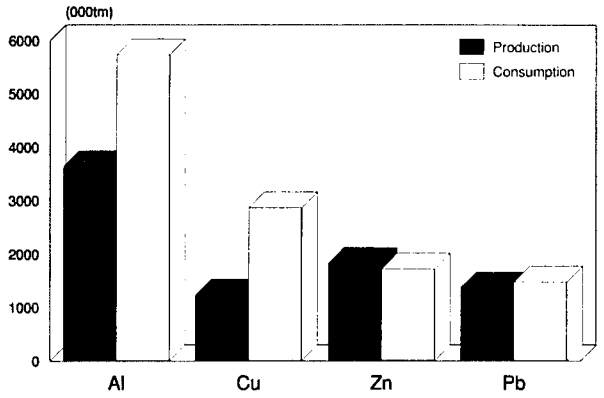
The EC non-ferrous metals industry employed just under 300 000 people at some 3 000 industrial units in 1992. Having very few mining resources at its disposal, the EC is responsible for less than 3% of the mining production of the market economy countries for aluminium, copper, zinc and lead. Nevertheless, in refined metal production, the EC is a leader among the market economy countries with refined metal output of the four major non-ferrous metals (Al, Cu, Zn and Pb) representing 21% of the market economy country total. EC consumption of these same metals is even higher, representing 30% of market economy country demand. The EC non-ferrous metals industry is a net importer of raw materials : ores, concentrates and other raw materials for refining, and unwrought metals for processing. It is also highly dependent on secondary materials (scrap and residue), which constitute the only "domestic" resource of major size in the EC. In purchasing the raw materials which are necessary for its supplies, and, to a lesser extent, in selling its products outside the EC borders, the EC non-ferrous metals industry is very much present on the international market and subject to its price fluctuations.

Figure 1: Refined metal
EC production and consumption, 1992



Source: Organisation of European Aluminium Smelters, European Aluminium Association,
World Bureau of Metal Statistics (Copper, Lead), International Lead and Zinc Study Group

INDUSTRY PROFILE

Description of the sector

The EC non-ferrous metals industry is widely diversified in terms of metals which are produced or processed. These include: the four major non-ferrous metals aluminium (Al), copper (Cu), zinc (Zn) and lead (Pb); the precious metals gold (Au) and silver (Ag); the platinum group metals platinum, palladium and rhodium; and the alloying metals and other minor non-ferrous metals such as molybdenum, vanadium, tungsten, manganese, cobalt, germanium, cadmium, etc. In view of the fact that the EC is relatively poor in mining resources, its industry is largely dependent on primary raw material imports, and also finds a significant proportion of its supplies in secondary materials (scrap and residue). It is consequently geared to primary and secondary smelter and refining metallurgy and to processing.

The most important consumer markets for the EC non-ferrous metals industry are within the EC itself, but outlets have also been found beyond EC borders. The industry is therefore involved in the international non-ferrous metals market, not only as a purchaser of raw materials, but also as a supplier of metals and processed or speciality products. In both these respects, it is extremely sensitive to the world balance of markets and to their often irregular cyclic developments. The EC non-ferrous metals industry operates in a highly competitive field and is supported by long years of technological expertise making it the world leader in various segments of its activities.

MARKET FORCES

Supply and demand

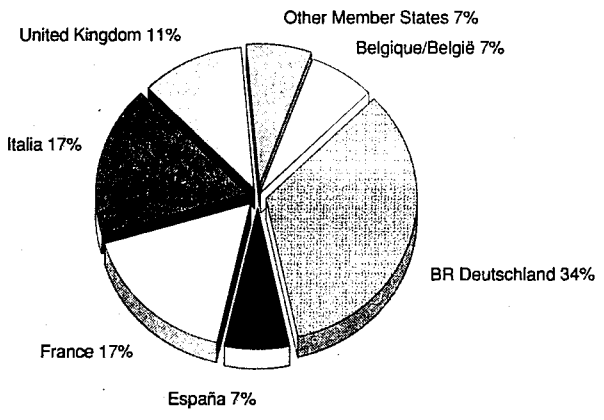
In terms of volume produced, aluminium, copper, zinc and lead are the dominant metals of the EC non-ferrous metals industry.

In the aluminium sector, EC production amounts to about 4 million tonnes of metal per year, which is equivalent to over 65% of EC demand. This represents only 16% of world production, however.

The aluminium industry is facing two serious problems: the recent massive increase in exports of metal from the CIS (Commonwealth of Independent States) and the ongoing tendency to move production units to geographic zones where energy (an important cost component) is both abundant and inexpensive.

The EC zinc industry produces about 1.7 million tonnes of metal per year, 30% of which come from the processing of ores and concentrates extracted in the EC - an unusually high ratio in EC non-ferrous metals. The EC zinc output represents 24% of world production and is approximately equivalent to EC market demand. The industry's major problem is unquestionably how to manage the long cycles which affect its market, with a certain degree of inertia in the adjustment of supply to demand.

Figure 2: Aluminium semis
Breakdown of production by Member State, 1992



Source: European Aluminium Association

Table 1: Non-ferrous metals
Imports and exports by Member State, 1992

(thousand tonnes)	Aluminium		Copper		Lead		Zinc	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Belgique/België	347	75	194	162	13	50	147	158
Danmark	28	14	0	0	5	0	16	0
BR Deutschland	1 162	325	533	60	108	49	283	118
Hellas	47	70	48	0	5	0	12	0
España	71	128	28	54	45	1	2	220
France	518	219	445	15	31	63	98	147
Ireland	8	1	0	0	N/A	0	N/A	N/A
Italia	529	26	436	3	76	0	83	34
Nederland	195	336	19	1	38	10	29	143
Potugal	60	0	22	0	27	0	12	0
United Kingdom	368	135	278	5	28	79	123	13

Source: World Bureau of Metal Statistics

Table 2: Non-ferrous metals
Production of primary and secondary products

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991
Aluminium									
EC	3 024	3 160	3 068	3 612	3 693	3 905	4 019	3 924	3 816
World	18 517	20 275	19 977	20 132	21 296	22 799	23 598	23 888	24 389
EC share (%)	16.3	15.6	15.4	17.9	17.3	17.1	17.0	16.4	15.7
Copper									
EC	965	921	973	1 136	1 097	1 188	1 236	1 235	1 219
World	9 662	9 528	9 724	9 874	10 159	10 536	10 809	10 706	10 580
EC share (%)	10.0	9.7	10.0	11.5	10.8	11.3	11.4	11.5	11.5
Lead									
EC	1 175	1 235	1 214	1 345	1 374	1 441	1 422	1 389	1 426
World	5 287	5 444	5 618	5 477	5 651	5 752	5 903	5 668	5 540
EC share (%)	22.2	22.7	21.6	24.6	24.3	25.1	24.1	24.5	25.7
Zinc									
EC	1 299	1 348	1 373	1 616	1 667	1 708	1 686	1 699	1 765
World	6 382	6 665	6 870	6 827	7 024	7 246	7 254	7 054	7 189
EC share (%)	20.4	20.2	20.0	23.7	23.7	23.6	23.2	24.1	24.6

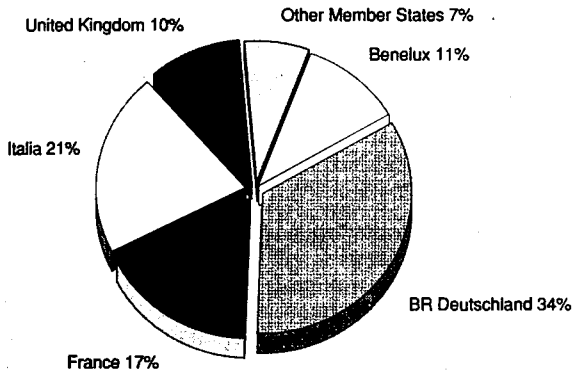
Source: Metallgesellschaft

Table 3: Non-ferrous metals
Consumption of primary and secondary products

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991
Aluminium									
EC	4 048	4 323	4 356	4 926	5 136	5 643	5 889	5 975	6 028
World	20 187	20 948	21 288	21 713	23 003	24 245	24 638	25 472	24 604
EC share (%)	20.1	20.6	20.5	22.7	22.3	23.3	23.9	23.5	24.5
Copper									
EC	2 128	2 261	2 227	2 419	2 463	2 525	2 709	2 811	2 841
World	9 325	9 876	9 860	10 106	10 405	10 537	11 018	10 825	10 755
EC share (%)	22.8	22.9	22.6	23.9	23.7	24.0	24.6	26.0	26.4
Lead									
EC	1 200	1 265	1 219	1 393	1 378	1 423	1 478	1 513	1 503
World	5 265	5 393	5 429	5 530	5 647	5 765	5 844	5 605	5 414
EC share (%)	22.8	23.5	22.5	25.2	24.4	24.7	25.3	27.0	27.8
Zinc									
EC	1 301	1 337	1 312	1 477	1 491	1 570	1 585	1 654	1 738
World	6 351	6 515	6 500	6 707	6 904	7 164	7 102	6 963	6 888
EC share (%)	20.5	20.5	20.2	22.0	21.6	21.9	22.3	23.8	25.2

Source: Metallgesellschaft

Figure 3: Copper semis
Breakdown of production by Member State, 1992

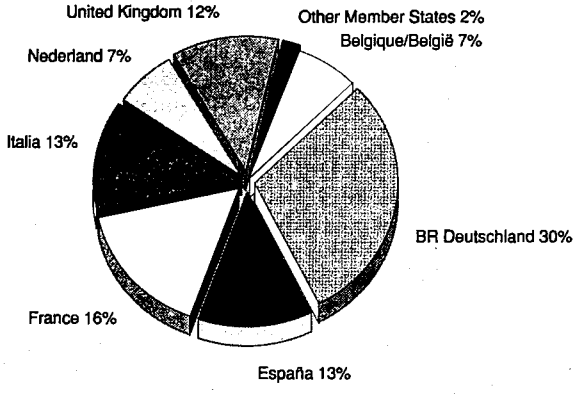


Source: World Bureau of Metal Statistics

In the copper sector, the EC produces about 1.2 million tonnes of metal each year. As the EC is the largest consumer market in the world, this production volume equals somewhat less than 45% of its requirements. To lessen its dependence on imported copper raw materials, the EC industry has considerably developed recycling technologies, and is therefore able to secure a significant amount of its supplies from scrap and residue within the EC itself.

Producing about 1.4 million tonnes of metal per year (one quarter of world production), the EC lead industry is able, for the most part, to satisfy the requirements of its market. The industry is experiencing problems due to inherent properties of the metal, the use of which, particularly in "diffuse" applications, is tending to decrease due to constraints connected with the environment. With this in view, the car battery sector is the only consumer industry capable of offsetting the losses of consumption in the other sectors, and increased recycling will further boost the share of secondary lead in the industry's supplies (more than 50%).

Figure 4: Refined metal (aluminium, copper, lead, zinc)
Breakdown of production by Member State, 1992



Source: World Bureau of Metal Statistics

INDUSTRY STRUCTURE

Companies

The EC non-ferrous metals industry comprises about 3 000 companies, most of which are active in the processing sector. The upstream sectors of primary and secondary smelting and refining metallurgy are more concentrated.

Of the four basic non-ferrous metals - aluminium, zinc, copper and lead - the activities of the primary aluminium industry are strongly integrated.

In 1992, Germany accounted for 30% of the total EC refinery output of the four major non-ferrous metals, compared with 16% accounted for by France. Italy, Spain and the United Kingdom followed closely with 12 to 13% each, while Belgium and the Netherlands trailed behind. The breakdown of semis production by country confirm the leading position of Germany with about 34% of the total EC copper and aluminium semis output, followed by France and Italy.

Strategies

Recycling is an important aspect of the EC non-ferrous metals industry. "Secondary" materials, or recyclable scrap and residue, constitute an essential input for many of its metallurgical and processing concerns. Some of the latter's supplies depend entirely on access to secondary materials, although for most of the producers, recourse to secondary materials goes together with primary raw materials supplies for both economic and technical reasons.

As a result of the scarcity of European mining reserves, the EC non-ferrous metals industry has naturally developed much expertise in the processing of secondary materials. Recycling has therefore traditionally enabled the industry to reduce its dependence on raw materials imports by making use of the "surface" resources generated by the consumption of goods (old scrap) and by the industry itself (new scrap and metallurgical residue). Considerable investments are devoted to recycling, in terms of research, equipment and human resources, to such an extent that recycling is at the root of more than 50% of total EC production of the four major non-ferrous metals (aluminium, copper, zinc and lead), and accounts for more than 35% of their consumption in the EC.

ENVIRONMENT

More than ever, environmental concerns are impelling the EC non-ferrous metals industry to keep abreast of innovation in the recycling sector. Upgrading and processing scrap and metallurgical residue contributes to environmental protection, reducing the need for disposal capacities and dependence on non-renewable natural resources, and allowing considerable energy savings in the extraction and processing of metals (from 60% for copper to 90% for aluminium).

EC environmental policy emphasises integrated pollution control. Many of the issues related to the protection of the environment are of direct relevance to the non-ferrous metals industry.

Several legislative proposals currently being drawn up by the EC in the field of industrial pollution are based on the concept of "Best Available Techniques". This approach increases the need to analyse, in an integrated way, the impact of an activity on the whole environment taking into account the whole life-cycle of a product and managing the specific risks accordingly at each individual stage. Legislation on hazardous products is developing in such a way as to take into account the conditions of exposure over and above the intrinsic properties of products, which is a positive trend when it comes to assessing the real impact of heavy metals.

Waste management also raises difficult questions of direct relevance to the non-ferrous metals industry. A clear definition

of waste, as opposed to product or by-product, and legislation on the management and the control of movements of wastes are critical for the non-ferrous metals sector; non-ferrous scrap and residue are used as feed materials by the sector and are traded extensively on the international market. A competitive recycling industry and considerable energy-saving potential could be affected by limits on this trade.

Additional measures are under discussion concerning waste incineration and landfills. This is another area which could entail a large number of adjustments for the industry. Finally, the new directive on packaging waste will also have implications for the non-ferrous metals industry.

OUTLOOK

During the 1990's, the industry will have to face two major problems. The first is the opening-up of the economies of Central and Eastern Europe. The changed macro-economic position of the CIS and former COMECON countries now almost exclusively takes the form of movements of raw materials; consequently, the full weight of these changes is being borne first and foremost by the non-ferrous metals industry. For this reason, it is the EC's non-ferrous metals sector which is exposed to the chaotic exports of these countries.

The sudden, massive development of their exports on the international market and, first and foremost, on the Community market, is throwing the cyclic adjustments between supply and demand structurally off balance and jeopardising the very survival of companies.

In the case of aluminium for instance, the export level of the CIS has dramatically increased by more than 100% in 1991 and by a further 70% in 1992.

The current imbalance of the world aluminium market is the result of this increasing export flow, which appeared just over two years ago, and continues at such a pace that world market prices have dropped to unbearable levels which threaten the viability of the whole industry.

In the case of zinc and lead, the CIS has become a net exporter, whilst it was previously an importer trading more particularly with the COMECON countries.

In the case of non-ferrous metals semis, the countries of Central and Eastern Europe are exporting rapidly increasing tonnage at lower than prevailing market prices, fostering a severe downward pressure on the industry's revenues.

In view of these developments, it is vital to make every effort to ensure that the liberalisation of trade in the international markets develops on a more harmonious basis by placing greater controls on flows, by adapting qualities to international standards, by diversifying outlets and by taking into account the free-market mechanisms in which this trade will henceforth be conducted.

The second major challenge of the non-ferrous metal industry for the 1990's is the mushrooming legislation relating directly or indirectly to environmental protection, the development and effects of which ought to be managed not only with a view to maintaining the access to a whole range of raw materials (secondary materials) but also to maintaining future development of non-ferrous metal uses.

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Aluminium
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The aluminium industry is currently having to adjust to a sudden inrush of exports from the former Soviet Union which is throwing the cyclic adjustments between supply and demand off balance and pushing market prices down. The EC is particularly hit by this phenomenon, being the closest market outlet for CIS producers. However, the industry can count on sound fundamentals to overcome the current difficulties: there is still room for structural growth of demand from the major consumer industries (transportation, packaging and construction), and the producers are continuously improving and rationalising their installations with a view towards higher productivity and environmentally-sound production conditions.

INDUSTRY PROFILE

Description of the sector

The aluminium industry is the largest of the non-ferrous metal industries, and is the youngest as well in that aluminium smelting only began about a century ago. Lightness, longevity, resistance to corrosion, electrical and thermal conductivity and reflectivity make aluminium a popular choice in many sectors of the economy. Its aesthetic qualities, alloy possibilities and easy recyclability all add to this appeal.

The aluminium industry encompasses several activity segments, from bauxite mining and alumina production to primary and secondary smelting and metal processing into semi-finished products (bars, profiles, wires, sheets, foils, tubes, pipes, etc.) or specialty products (powders, special alloys, etc.).

As far as the EC major metal producers are concerned, those activities are integrated to a large extent but a number of EC concerns are focusing their activity on one particular segment only, such as recycling and secondary smelting or semis fabrication.

Recent trends

The EC aluminium industry directly represents a workforce of about 200 000 people and its annual turnover is in the order of 20 billion ECU. Total production of refined metal amounted to 3 642 400 tonnes in 1992, a slight increase over the 1991 figure. About 45% of this output is accounted for by secondary production, i.e., the recycling of scrap which is an activity that is regularly expanding.

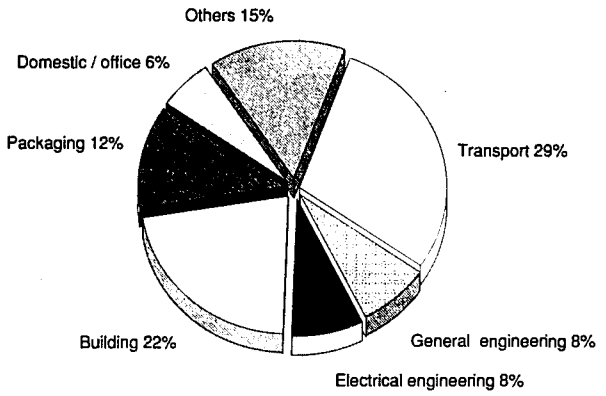
The EC consumer market for aluminium exceeds domestic supply, posting 5 740 000 tonnes in 1992. Demand develops along a rising trend of approximately 2.5% per year in the long term, with ups and downs in relation to business cycle fluctuations.

International comparison

In terms of primary metal production, the EC ranks second to the USA and its output accounted for 15% of the market economy countries' total production in 1992. Its secondary production is the highest, and hovered at more than 1 600 000 tonnes in 1992, about 60% above the US secondary output and 67% above the Japanese figure, representing 40 to 45% of the market economy countries' total.

Regarding the production of semis in 1992, the EC was responsible for approximately one-third of the market economies' output of rolled and drawn products, wires, cables and castings, with 5.5 million tonnes.

Figure 1: Aluminium
Total EC consumption by end use



Source: European Aluminium Association

Feed supply requirements of the EC primary and secondary metal producers are largely met by domestic alumina production and scrap recycling, but the total metal output falls short of the processing industry needs: it meets only 52% of EC demand, which is rising, while there has been hardly any growth of metal production capacity during the past years.

Foreign trade

As a result of the deficit in metal production capacity versus semis production capacity, the EC is a regular importer of unwrought aluminium. The EFTA countries traditionally accounted for about 45 to 50% of these EC imports with Brazil, Africa and Canada making up another 25% at least. Imports from the former Soviet Union, however, have made sharp inroads since 1991, increasing from about 60 000 tonnes per year in the late 1980s to 528 000 tonnes in 1992.

This phenomenon not only affected the import picture regarding the sourcing of the metal, but it also had a major disturbing impact on the overall market balance. The sudden and massive aluminium export flow originating from the CIS created a massive surplus which resulted in soaring inventories on the London Metal Exchange (LME) and unprecedented price collapse.

Regarding trade of semi-finished aluminium products, the EC was a net exporter after having met domestic requirements. This trade, however, is highly contingent on monetary phenomena and during the last years it was adversely affected by the development of the USD/ECU exchange rate.

MARKET FORCES

Demand

Aluminium is the material with the largest range of applications in the transportation, construction and packaging industries, the electricity sector, household appliances and the mechanical and agricultural sectors. Researchers and engineers have been constantly improving the material qualities; they have developed new alloys and production processes to open up new areas of application.

The transport sector is by far the largest client sector, accounting for approximately 29% of total EC aluminium consumption. It is the market segment with the best growth potential, as the strength and stability properties of aluminium

Table 1: Aluminium
EC main indicators: Aluminium semis (1)

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	2 990	2 887	2 960	3 190	3 359	3 730	3 865	4 180	4 205	4 315
Net exports	289	328	311	213	220	160	106	-85	-33	-30
Production	3 279	3 215	3 271	3 403	3 579	3 890	3 971	4 095	4 172	4 285

(1) 1990-92 excluding Ireland and Portugal.
Source: European Aluminium Association

alloys, combined with their lightness, make them an attractive material in all transport applications where reduced weight immediately translates into energy consumption savings. In the car industry for instance, 90% of cylinder heads and 25% of engine blocks, gear boxes and wheels are made of aluminium castings. Many other components are made of rolled and extruded aluminium products (radiators, roof racks, ABS components, licence plates, etc.). New casting and body-frame techniques should allow further development of the use of aluminium by the automobile producers, while this metal is already widely used for frame parts in air, road and rail transportation, as well as in commercial and cruise ships.

Construction is the second largest aluminium consumer sector, making up about 22% of EC demand for aluminium. Aluminium products such as profiles, claddings, window and door frames, staircases, roof panels, greenhouse frames, smoke and fire protection systems, etc., find markets not only in new buildings but also in the renovation of old ones. They are selected for a number of qualities such as resistance to corrosion, lightness, easy machinability, easy installation, low maintenance and repair costs and good formability and shaping along modern design requirements.

The third most important client sector for aluminium is packaging, which accounts for an estimated 12% share in EC aluminium demand. Packaging applications are numerous, not only in relation to foodstuffs and household products, but also for pharmaceuticals and cosmetics. Aluminium has the necessary properties to protect and preserve these goods and to ensure their safe transportation and distribution as well as their convenient use. Further progress can be expected in the use of aluminium in this sector as technical developments will further improve thin strip quality, down-gauging, lacquering and coating.

Supply and competition

The world aluminium market has deteriorated considerably since 1991, following three years of a more or less full balance between supply and demand.

The exports from former Soviet Union are playing a determining role under these circumstances. Until 1990, trade between the market economy and socialist countries resulted in net imports from the latter, which hovered around 300 000 tonnes per year. However, from 1991 onwards, the collapse of the Soviet system fundamentally changed the picture: the loss of the COMECON outlets, the sudden drop of domestic demand for military applications and a surge in the need for hard currency have propelled the former Soviet Union aluminium industry out into the international market. The export level of the CIS increased by more than 100% in 1991 and by a further 70% in 1992. The 1993 estimates show another 90% increase, up to a minimum of 1.4 million tonnes. As a result, primary aluminium inventories on the LME jumped from a mere 300 000 tonnes at the end of 1990 to five times as much at the end of 1992 (over 1 500 000 tonnes), and are heading for 2 400 000 tonnes by the end of 1993.

The EC market was the first to be hit, being situated nearest to the former Soviet Union. It is estimated that three-quarters of CIS exports have been directed to the EC; 1992 imports from the CIS were recorded at 528 000 tonnes.

The resulting price collapse on the LME seriously affected the profitability of the aluminium producers in the market economy countries and, in Europe, price levels have dropped by more than 20%. Production cutbacks have been implemented mostly in the EC where 13% of the 1991 production capacity was temporarily frozen in addition to the rationalisation cuts which had been planned several years ago.

Table 2: Aluminium
Breakdown of EC production, 1991-92

(thousand tonnes)	Bauxite 1991	Bauxite 1992	Alumina 1991	Alumina 1992	Primary aluminium 1991	Primary aluminium 1992	Aluminium semis 1991	Aluminium semis 1992	Secondary aluminium 1991	Secondary aluminium 1992
EC	2 326	2 297	5 237	N/A	2 259	2 172	4 172	4 285	1 503	1 624
Belgique/België, Luxembourg	0	0	0	N/A	0	0	332	306	0	0
Danmark	0	0	0	N/A	0	0	20(1)	20(1)	16	14
BR Deutschland	0	0	1 148	N/A	690	602	1 395	1 444	535	538
Hellas	2 134	2 200	641	N/A	152	153	130	132	0	0
Ireland	0	0	981	N/A	0	0	N/A	N/A	N/A	N/A
España	0	0	1 004	N/A	355	359	300(1)	290(1)	96	81
France	183	0	538	N/A	286	418	726	732	229	236
Italia	9	97	805	N/A	218	161	685	721	343	353
Nederland	0	0	0	N/A	264	235	158	157	114	150
Portugal	0	0	0	N/A	0	0	N/A	N/A	N/A	N/A
United Kingdom	0	0	120	N/A	294	244	426	483	170	252

(1) Estimated.
Source: European Aluminium Association

Table 3: Primary aluminium
World refined production by country, 1992

(thousand tonnes)	
EC (1)	2 172
of which	
BR Deutschland	602
Hellas	153
España	359
France	418
Italia	161
Nederland	235
United Kingdom	244
USA	4 042
Canada	1 974
Australia	1 246
Brazil	1 195
Norway	865
Venezuela	569
India	495

(1) Belgium, Denmark, Ireland, Luxembourg and Portugal do not produce primary aluminium.
Source: European Aluminium Association

INDUSTRY STRUCTURE

Companies

At the beginning of 1992, 22 primary aluminium smelters were operating in the EC, but the number of producer companies is, in fact, much smaller: the major ones being Aluminium Pechiney (F), VAW (D), Inespal (E), Alumix (I), Hoogovens (NL) and British Alcan (UK). Some of these companies operate plants in different EC countries or have subsidiaries or branches in other parts of the world.

The number of companies involved in aluminium processing is much larger, although there is a fairly good integration of the rolling activity into the smelting. The structure of the extrusion industry is, on the contrary, much more diffuse and much less integrated, with about 170 production sites scattered throughout the EC.

ENVIRONMENT

Aluminium has properties which make it increasingly competitive in an ecology-conscious world. As previously mentioned, its light weight is particularly effective in increasing energy savings in transportation applications. The high recyclability of aluminium is an additional important competitive advantage, particularly in packaging, but in other sectors as well. Currently, 45% of total EC aluminium output arises from scrap recovery. The proportion recycled varies widely among Member States, however.

Aluminium projects for packaging will be affected by the planned "EC Directive on Packaging and Packaging Waste" which is aimed at reducing the amount of waste and sets certain targets for recycling used packaging materials. In co-operation with other industries which are affected by this legislation, the aluminium industry is prepared to play a leading role in minimising the impact of packaging on the environment and is working together with the public authorities to reduce the quantity of packaging waste going to landfills. At the same time, the industry would like to emphasise packaging's contribution to product protection and the safe transportation and distribution of goods.

Aluminium, as a mineral, is available in almost unlimited quantities: 7% of the earth's crust is aluminium. In order to produce aluminium, the raw material, bauxite, has to be extracted in the same way as other ores which can have negative effects on ecological systems. Reclamation of mined land is a top priority for the industry; experiments and continuous efforts have yielded positive results in this area.

The reduction process for producing the metal consumes electricity and gives rise to emissions. The worldwide aluminium industry reduced its electricity consumption from 17 kWh (kilowatt hours) per kg produced in 1980 to less than 16 kWh at the beginning of the 1990s. Major emissions were reduced by a factor of four or more during the same period with the EC producers complying with stringent emission constraints.

OUTLOOK

Primary aluminium consumption in the EC is expected to grow at an average annual rate of 2 to 3% during the 1990s. Total aluminium demand, i.e. including secondary aluminium, should grow at a slightly higher pace as a result of the development of secondary uses, especially in the transportation and packaging sectors.

The packaging industry is expected to make considerable progress: the canning sector is far from maturity and will give rise to considerable demand.

In the transportation industry, the growth of aluminium demand is expected to arise chiefly from the private automobile sector, where aluminium can further contribute to weight reduction of cars, not only in castings, but also in wiring and body frames.

Increases in aluminium consumption in the construction industry is more a function of the recovery of that sector as such.

Production growth prospects are being considerably hindered by the recent development of CIS exports which are throwing the cyclic adjustments between supply and demand structurally off balance and jeopardising the survival of EC companies. As a result, at the end of 1993, the world market primary aluminium inventories were more than twice their normal levels and prices had dropped to such low levels as to discourage any new investment. Worldwide production cutbacks are necessary to reduce the huge excess supply hanging over the market; in this respect, any recovery in production growth is unlikely before the mid-1990s at the earliest.

Table 4: Aluminium
EC exports and imports: Aluminium semis, 1992

(thousand tonnes)	Exports	Imports
Belgique/België	290	143
Danmark	0	35(1)
BR Deutschland	526	617
Hellas	59	14
España	60(1)	58(1)
France	431	350
Ireland	N/A	N/A
Italia	182	271
Nederland	171	187
Portugal	N/A	N/A
United Kingdom	252	326

(1) Estimated.
Source: European Aluminium Association

Table 5: Aluminium
EC primary aluminium producers, 1992

Country	Company	Locations	Theoretical annual capacity (tonnes)
BR Deutschland	VAW aluminium AG	Norf, Töging, Stade	367 000
	Hoogovens Aluminium GmbH	Voerde	78 000
	Leichtmetall-Gesellschaft mbH	Essen	136 000
	Hamburger Aluminium-Werk GmbH	Hamburg	120 000
Hellas	Aluminium de Grèce	Distomon	150 000
España	INESPAL	Aviles, La Coruña	162 000
	Aluminio Español S.A.	San Ciprian	194 000
France	Aluminium Pechiney	Auzat, Nogueres, Riouperoux, St Jean de Maurienne, Lannemezan, Venthon, Dunkerque	459 000
Italia	Alumix	Fusina, Porto Vesme	166 000
Nederland	Aluminium-Delfzijl	Delfzijl	98 000
	Pechiney Nederland N.V.	Vlissingen	175 000
United Kingdom	British Alcan Aluminium plc.	Kinlochleven, Lochaber	114 000
	Anglesey Aluminium plc.	Lynemouth,Holyhead	127 000

Source: European Aluminium Association

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Copper
NACE 224

The EC possesses few copper mine resources, but its copper metallurgical activities are highly significant. Its refining and semi-manufacturing capabilities have developed in line with the requirements of its large consumption, by using imported primary raw materials and domestic as well as imported scrap. EC copper demand follows the slow growth pattern of a mature market. Recycling is brought to a high level as, in many applications, copper can be reprocessed without loss of its intrinsic properties in many of its applications.

INDUSTRY PROFILE

Description of the sector

The core of the EC copper industry is in refining and semi-manufacturing, in comparison with which the EC mining capabilities are negligible. Since the start-up of mining at Neves Corvo in 1989, Portugal has become the only EC country with a sizeable copper mine production (149 000 tonnes of copper in 1992). At present, with about 159 000 tonnes of copper extracted from domestic ores in 1992, the EC accounts for no more than 2% of total Western world (referring to market economy countries) copper mine output.

Annual refined copper production in the EC slightly exceeds 1.2 million tonnes. The largest facilities are located in Germany, Belgium and Spain. Refinery output essentially arises from electrolytic processes, in the form of cathodes, that are often melted and cast on the premises into "refinery shapes", i.e. billets, cakes and wire-rods, principally. About 60% of the feed supplies to the EC copper refineries are purchased on the international market in the form of copper blister, anodes or scrap. The remaining 40% come from the refiners' smelting operations, whose feed consists of domestic and imported copper ore concentrates as well as copper bearing residue or scrap.

Refineries' products are the major feed material for the copper semis manufacturers. The EC copper semis output exceeded 4.4 million tonnes in 1992. Germany, Italy and France accounted for about 72% of EC output in this industry segment, with the Benelux countries, the United Kingdom and Spain making up most of the balance. The range of products supplied by the semis manufacturers is very wide. They consist primarily of rods, profiles, wires, sheets, strips, tubes, etc. which the end-users integrate in the manufacture of their own products, with applications in such varied sectors as the electrical industry, the automobile industry, construction, machinery, shipbuilding, the aviation industry, the precision instrument and optics industry, the watch and clock industry, etc.

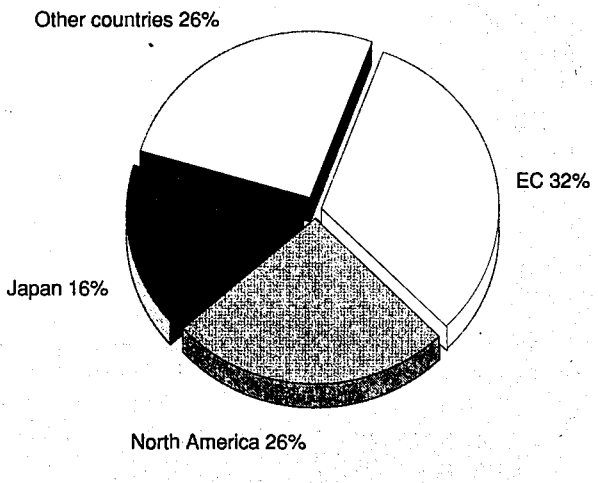
With an output which is three and half times that of EC refinery output, the EC copper semis manufacturers must turn to the international market to secure adequate volumes of feed supplies, together with the required alloying metals (zinc, tin and nickel for the most part).

The EC semis production is in excess of demand, and the EC copper semis manufacturing industry is a net exporter by about half a million tonnes per year.

International comparison

Nearly one third of the Western world's 8.9 million tonnes demand for refined copper, arises from the EC market. The EC consumed 2.9 million tonnes of copper, more than both North America's consumption of 2.4 million tonnes and Japan's consumption of 1.4 million. Germany, France, Italy, Belgium and the United Kingdom are each among the top ten consumers, together with the United States, Japan, South Korea, Taiwan and Canada.

Figure 1: Refined copper Consumption in market economy countries



Source: World Bureau of Metal Statistics, April 1993

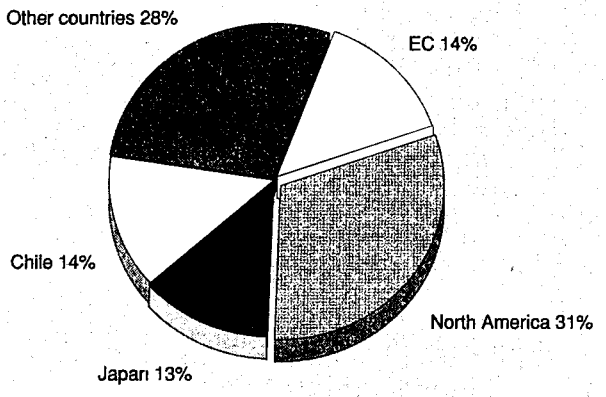
In terms of production, the EC refiners account for about 14% of the Western world output. The EC's 1.2 million tonnes produced per year is slightly ahead of Japanese production of around 1 million tonnes, but behind North American production, of 2.7 million tonnes. In the coming years, however, EC production will most probably lose its second place ranking to Chile, whose production exceeded the 1.2 million tonne mark in 1991. For copper semis production, the EC countries hold by far the most dominant position worldwide, accounting for 39% of the market economy countries' 10.8 million tonnes output in 1991, the United States and Japan each contributing 23%.

MARKET FORCES

Demand

Though lacking copper primary resources, the EC has a strong copper industry, being the largest copper consumer market

Figure 2: Refined copper Production in market economy countries



Source: World Bureau of Metal Statistics, April 1993

Table 1: Refined copper
EC main indicators

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Consumption	2 268	2 394	2 358	2 419	2 457	2 525	2 710	2 804	2 834	2 869
Production	1 209	1 165	1 216	1 229	1 192	1 226	1 236	1 236	1 219	1 232
Trade balance	-1 031	-1 248	-1 236	-1 312	-1 254	-1 257	-1 354	-1 602	-1 645	-1 702

Source: World Bureau of Metal Statistics

Table 2: Copper semis
EC main indicators (1)

(thousand tonnes)	1988	1989	1990	1991	1992
Consumption	3 236	3 441	3 522	3 612	3 714
Production	3 800	4 079	4 142	4 217	4 320
Net exports	468	496	454	411	442

(1) Excluding Denmark and Ireland.
Source: International Wrought Copper Council, London

in the Western world. Demand for copper mainly comes from the electrical and electronic industries, which absorb about 50% of total EC consumption. These industries use copper primarily as a conductor material to carry electricity, in the form of wires, profiles and rods made of unalloyed copper. The construction sector is the second largest consumer, it accounts for approximately 25% of total EC copper demand. A wide variety of semifinished products, of both unalloyed and alloyed copper, is used in plumbing, wiring, roofing, decoration, etc. The remaining 25% of demand arises mostly from industrial machinery and equipment, transportation equipment, consumer and general products.

Copper applications are well developed and the growth pattern of copper consumption closely follows the ups and downs of industrial activity at large. Copper demand on the EC market as a whole is growing slightly, as in most industrialised areas in the world. Trends differ from country to country, however. The economic revival in the former East Germany is expected to induce higher than average copper demand in the years to come.

Supply and competition

EC copper refining activity has been able to grow primarily by securing raw materials on the international market and making use of the domestic "surface mine" consisting of copper scrap and residue generated by consumers and production facilities. Access to feed supplies has become increasingly difficult over the past few years, however, as copper mining countries have developed their own refining facilities near to their mines, thereby reducing raw materials availability on the international market. Furthermore, competition by rapidly industrialising countries for copper raw materials has increased as these countries develop domestic refined output capabilities to satisfy the requirements of their consumer markets.

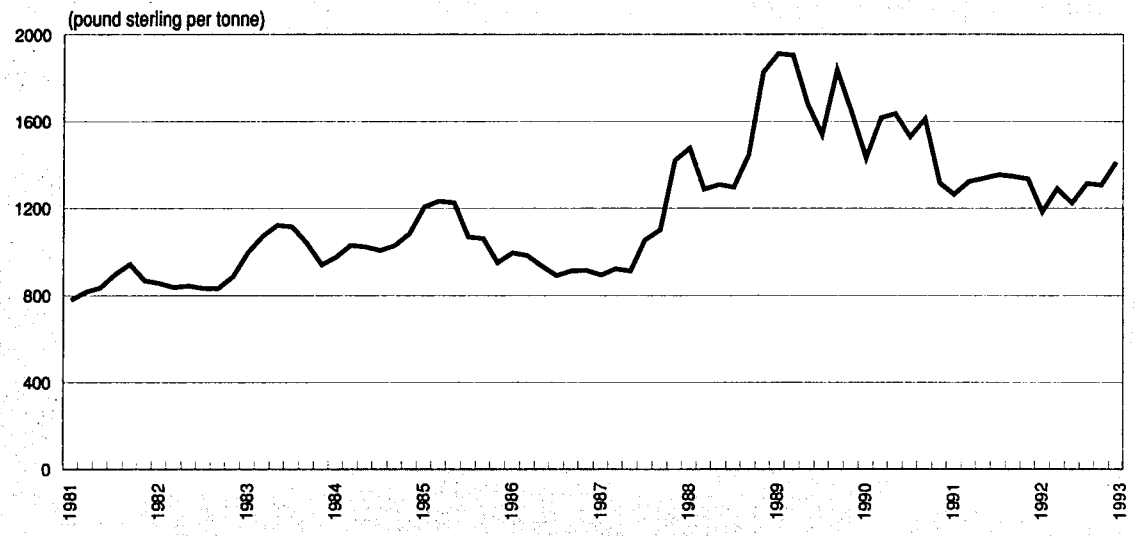
The EC copper refiners are confronted with heavy international competition for their feed purchases. This market is being negatively affected by competition from refiners in certain markets, mainly in the Far East, which benefit from protective measures. Furthermore, the movement of materials is increasingly being restricted by environmental regulations such as the Basel Convention. Any expansion of the copper refinery capacities in the EC is limited due to the difficulties of access

Table 3: Refined copper
International comparison of consumption

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	% of 1992 total 1992
Market economy countries total	6 843	7 668	7 362	7 674	8 012	8 211	8 629	8 762	8 969	8 937	100.0
EC	2 268	2 394	2 358	2 419	2 457	2 525	2 710	2 804	2 834	2 869	32.0
Belgique/België	258	299	310	303	292	318	376	390	372	325	4.0
BR Deutschland	737	792	754	771	800	798	855	897	995	1 038	12.0
España	231	114	116	130	131	135	146	146	156	155	2.0
France	390	412	398	401	399	409	459	478	481	472	5.0
Italia	325	348	362	394	420	445	458	475	471	508	6.0
Portugal	18	19	16	18	26	28	22	25	26	21	0.2
United Kingdom	358	353	347	340	328	328	325	317	269	308	3.0
USA	1 804	2 133	1 976	2 100	2 127	2 206	2 204	2 150	2 058	2 183	24.0
Canada	195	231	223	226	232	236	219	185	185	176	2.0
Japan	1 216	1 368	1 226	1 211	1 277	1 331	1 447	1 577	1 613	1 411	16.0
Taiwan	105	137	92	156	208	215	315	265	399	416	5.0
South Korea	152	188	207	262	259	266	252	324	343	352	4.0

Source: World Bureau of Metal Statistics

Figure 3: Copper
LME quotations (settlement-grade A)



Source: World Bureau of Metal Statistics, April 1993

to feed supplies and the heavy investment requirements and operational costs arising from environmental protection measures, which are far above the average world standard. Hence, no major new projects in this field are due to reach completion in the short or medium term. The structural shortage of EC refined copper output versus the manufacturing industry's needs is therefore expected to continue.

EC copper semis output, on the other hand, is large enough to adequately supply the EC consumer market towards which it is primarily geared. Excess capacity should enable consumption growth to continue, while net export flows are maintained.

Prices

The London Metal Exchange (LME) quotations for copper cathodes generally govern the pricing on copper transactions made by the industry. The evolution of the LME copper price generally reflects the market balance at world level.

INDUSTRY STRUCTURE

Companies

There are ten major refineries in the EC, and it is estimated that the copper refining industry employed around 10 000 people in 1992. Two companies have facilities of over 250 000 tonnes refined copper per year capacity, Union Minière (B) and Norddeutsche Affinerie (D). Two others, Hüttenwerke Kayser (D) and Rio Tinto Minera (E), produce more than 100 000 tonnes per year each. Production capacity at the other facilities, in Spain, Italy, the United Kingdom, France and Belgium, ranges between 35 000 and 100 000 tonnes of copper per annum.

Table 4: Refined copper
International comparison of production

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	% of total 1992
Market economy countries total	7 321	7 186	7 310	7 434	7 631	7 974	8 333	8 465	8 525	8 819	100.0
EC	1 209	1 165	1 216	1 229	1 192	1 226	1 236	1 236	1 219	1 232	14.0
country breakdown:											
Belgique/België	405	396	413	414	408	393	344	332	298	293	3.0
BR Deutschland	420	379	414	422	400	426	475	476	522	582	7.0
España	159	156	152	155	151	159	166	171	190	180	2.0
France	45	41	44	42	40	44	49	52	56	59	0.7
Italia	31	50	64	65	65	75	83	83	83	76	0.9
Portugal	5	5	5	5	5	5	0	0	0	0	0.0
United Kingdom	144	137	125	126	122	124	119	122	70	42	0.5
USA	1 584	1 490	1 435	1 480	1 542	1 853	1 954	2 017	1 995	2 154	24.0
Canada	464	504	500	493	491	529	515	516	538	539	6.0
Japan	1 092	935	936	943	980	955	990	1 008	1 076	1 161	13.0
Chile	834	880	884	942	970	1 013	1 071	1 192	1 228	1 242	14.0
Peru	195	219	227	226	225	175	224	182	244	250	3.0
Zaire	227	225	227	218	210	203	204	173	140	57	0.7
Zambia	574	522	510	487	509	448	470	479	424	459	5.0
Australia	203	197	194	185	208	223	255	274	279	327	4.0

Source: World Bureau of Metal Statistics

Table 5: Copper semis
EC main indicators by product line, 1992 (1)

(thousand tonnes)	Consumption	Production	Net exports
Unalloyed copper, total	2 450.8	2 929.6	354.3
Wire	1 677.0	2 129.5	336.5
Rods, profiles	61.8	56.2	2.7
Rolled material	276.8	310.4	18.3
Tubes	435.2	433.5	-3.2
Copper alloys, total	1 263.2	1 390.4	87.6
Wire	67.4	66.7	2.2
Rods, profiles	811.5	838.5	14.9
Rolled material	274.9	359.3	53.9
Tubes	109.4	125.9	16.6
Total	3 714.0	4 320.0	441.9

(1) Excluding Denmark and Ireland.
Source: International Wrought Copper Council, London

Table 6: Copper
EC copper refineries, 1992

Country	Company	Location	Theoretical annual capacity (tonnes)
Belgique/België	Union Minière	Olen	330 000
	Metallo-Chimique	Beerse	38 000
BR Deutschland	Norddeutsche Affinerie	Hamburg	290 000
	Hüttenwerke Kayser	Lünen	115 000
	Mansfeld Küpfer-Silber-Hütte	Hettstedt	60 000
España	ELMET	Bilbao-Berango	38 000
	Rio Tinto Minera	Huelva	150 000
FranceCie. Générale du Palais	Le Palais50 000		
Italia	Nuova Samim	Porto Marghera	60 000
United Kingdom	IMI Refiners	James Bridge	80 000

Source: International Wrought Copper Council, London

Upstream integration into smelting operations varies from one refinery to another. Some are fully or partially integrated whilst others have no smelting facility at all. One company only has a smelting capacity which significantly exceeds its refining capacity (Metallo-Chimique in Belgium). At EC level, there is a deficit in copper smelting capacity.

There is much less concentration in the copper semis manufacturing industry, where about 100 companies are involved throughout the EC, employing some 75 000 people. Altogether, these enterprises have a production capacity which is not fully used at present. Activity is developed where demand develops, causing widespread presence throughout the EC. The EC copper semis manufacturers turn to the international market not only to fulfil their feed supplies requirements but also to sell their surplus output, as their production is in excess of EC consumption.

ENVIRONMENT

Recycling constitutes an important component of the raw material supplies of the copper refining and manufacturing facilities. Copper can be recovered from many of its applications and returned to the production process without loss of quality in recycling. Having extremely limited access to domestic primary sources of copper, the EC industry has traditionally given much attention to so-called "surface mine", relying to a large extent on scrap feed to reduce the large deficit of its copper raw materials trade balance. Altogether, "secondary raw materials" account for about 40% of EC refined copper use. More than 40% of EC refined copper production arises from copper scrap recycling, and nearly 20% of copper semis output results from the direct use of scrap. In some cases, such as brass rods, for example, semis use 100% recycled copper.

The EC copper industry has developed advanced technologies and made considerable investments so as to be able to process a wide range of copper scrap, including complex, low-grade residues, and to comply at the same time with increasingly stringent environmental constraints.

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Zinc
NACE 224

The EC zinc industry holds a top ranking position at world level, not only in terms of production, but also in terms of know-how and consumer market basis. It is currently confronted with the effects of serious market imbalance created by both the lasting slump in demand and the sudden inversion of net trade with the former COMECON countries and the CIS. Prices have dropped to unbearable levels which may lead the industry to fundamental restructuring.

INDUSTRY PROFILE

Description of the sector

Zinc is the third most used non-ferrous metal, behind aluminium and copper. Primary zinc production results from the processing of zinc ores into zinc concentrates of approximately 60% zinc content which are then smelted and refined into zinc metal. Zinc production may also arise from secondary source materials such as metallurgical residue, ash from galvanising, new and old scrap. Zinc production from secondary sources accounts for 6% to 7% of refined zinc output in the market economy countries.

Zinc is supplied to the market in various qualities and shapes: metal ingots of various grades (the highest quality is SGH i.e., Special High Grade which rates 99.995% Zn and the poorest is only about 98% pure); extrusion products such as bars, rods and wires; rolling products such as sheets and strips; casting alloys; powders; and chemical compounds, such as oxides.

End-uses include a wide range of applications, the most important one in terms of volume being steel protection against rust through galvanising for the automobile, appliance and building industries. Brass and other alloys, mostly for die-casting, are respectively the second and third major consumption areas with applications also in the building, appliance and car industries.

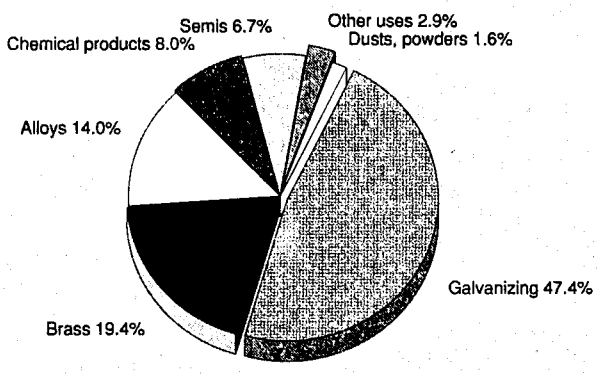
In 1992, the EC mine output dropped to 500 000 tonnes of zinc contained in concentrates as a result of the exhaustion of reserves and lower ore grades at some mining operations. Metal production reached a record level, however, at 1 827 000 tonnes zinc, while consumption of refined zinc stayed above the 1 700 000 tonnes mark which it had overstepped in 1991, accounting for 32% of the demand for zinc in the market economy countries.

International comparison

As shown in Table 1, and although it has been decreasing since the late 1980's, the EC production of zinc concentrates is still significant at international levels, ranking in 5th position behind Canada, Australia, Peru and the USA.

The EC mine output is essentially accounted for by Spain and Ireland. In the other countries, mining is gradually being phased out as mine reserves are exhausting and operations are becoming uneconomic due to the high cost for labour and environmental protection, and the relatively low grade of ores. Considering these factors, combined with the persisting low prices for metal, zinc mining in the EC is most likely bound for further decline in the coming years. While EC concentrates used to meet more than 45% of the EC refinery requirements 10 years ago, they now account for less than one third of EC requirements. The deficit is filled in by increased imports, as mine production is currently increasing in North America, Australia and some South American countries.

Figure 1: Zinc
Breakdown of consumption by end product, 1991



Source: International Lead and Zinc Study Group, January 1993 Bulletin

In terms of refined zinc production, the EC definitely stands as the world leader, way ahead of Japan and Canada which rank on the second and third position respectively. In 1992, the EC output reached a new record level with 1 827 000 tonnes metal, accounting for 34% of the market economy countries total of 5 435 000 tonnes.

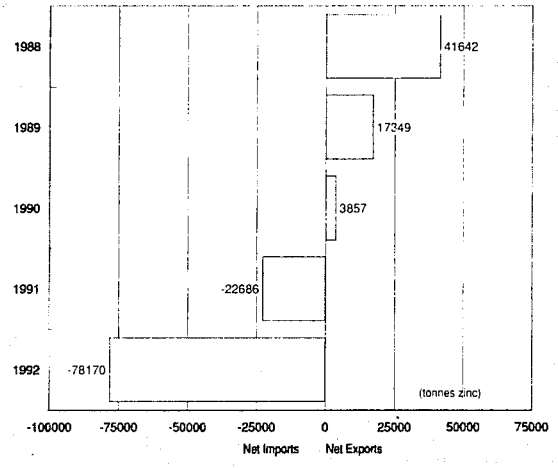
The EC is also the major consumer area for zinc among the market economy countries. The 1 718 000 tonnes zinc consumed in 1992 was 67% above the second largest consumer market, the US, and 119% above Japan.

MARKET FORCES

Trade patterns

Zinc metal is a widely traded commodity as shown in Tables 4 and 5. Trade patterns have undergone a major change, however, with the opening of the "Eastern Bloc". In the past, the countries of Eastern Europe and the former Soviet Union were net importers of about 75 000 tonnes of zinc per year from the West. With the dismantling of the COMECON and

Figure 2: Zinc
EC net trade with former USSR and COMECOM



Source: Eurostat

Table 1: Zinc
Production of zinc concentrates

(thousand tonnes of zinc content)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Danmark	79	73	70	62	66	77	71	48	0	0
BR Deutschland (1)	113	113	118	104	99	75	64	59	54	14
Hellas	21	23	21	23	21	21	25	27	30	27
España	176	229	234	227	273	278	266	257	265	206
France	34	36	41	40	31	31	27	24	27	17
Ireland	186	206	192	182	177	177	169	166	188	194
Italia	43	42	45	26	33	38	44	42	37	31
Portugal	0	0	0	0	0	0	0	0	2	11
United Kingdom	9	5	5	6	6	5	6	6	1	0
EC	661	727	726	670	706	702	672	629	604	500
Canada	1 070	1 207	1 172	1 291	1 482	1 347	1 216	1 203	1 157	1 312
USA	293	277	252	221	233	256	288	543	547	553
Peru	553	555	583	598	612	485	598	584	623	602
Australia	663	653	713	665	738	739	811	884	1 048	1 013
Western world (2)	4 843	5 095	5 148	5 066	5 316	5 052	5 094	5 382	5 586	5 619

(1) Data prior to 1991 include the former Federal Republic of Germany only.
(2) Western world refers to market economy countries.
Source: International Lead and Zinc Study Group , June 1993 Bulletin

the collapse of the State monopolies, the trade flows which traditionally existed between those countries were dismantled. Also the rouble clearing system broke up, this phenomenon being accelerated, in fact, by the rouble devaluation. Simultaneously, major production outlets in defence applications vanished, and as the conversion of the industry from defence to consumer products is a slow process, metal demand has dropped dramatically.

Owing to these developments and the urgent need of these countries for "hard currencies", domestic production has been diverted from home markets and it is estimated that about 250 000 tonnes of refined zinc were exported from Eastern Europe and the CIS during 1992. Since the traditional 75 000 tonnes per year net export flow from the West to these countries dried up in fact at the beginning of the 1990s, it can be estimated that an excess supply of approx. 325 000 tonnes has consequently developed on the "Western" market.

The EC zinc industry used to export significant tonnage of zinc to the former Soviet Union and, to a lesser extent, Czechoslovakia on a regular basis, while imports from the COMECON remained negligible.

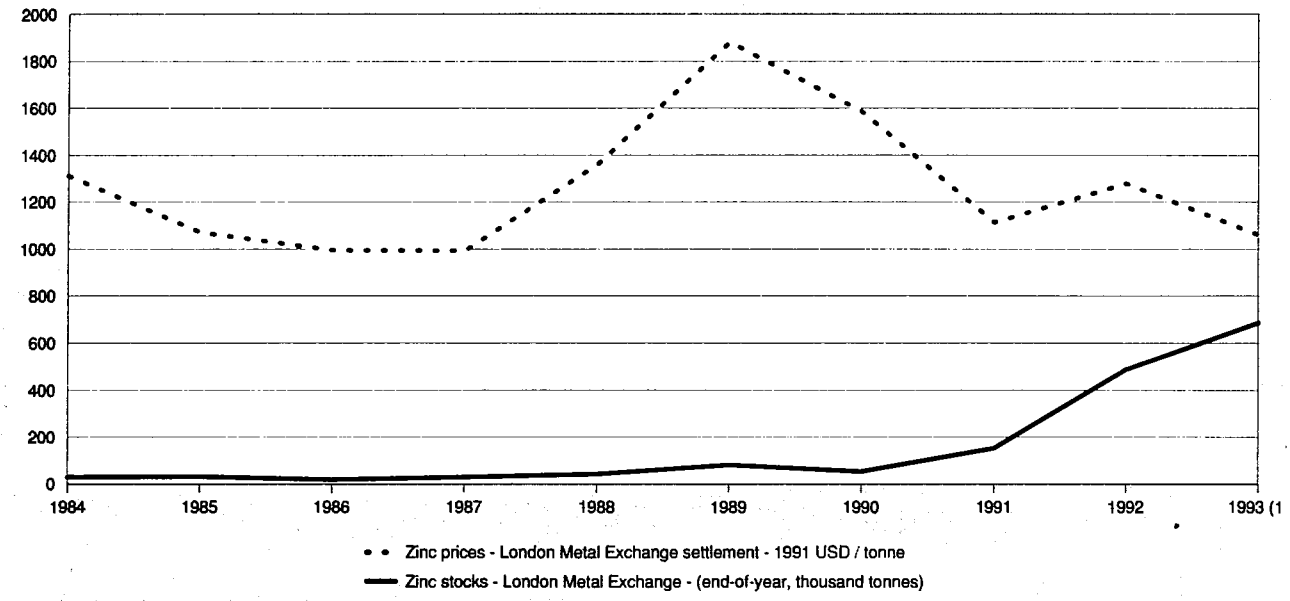
By the beginning of the 1990s however, a drastic change occurred in these trade flows: EC exports rapidly decreased from more than 46 000 tonnes in 1988 to a mere 6 000 tonnes in 1991, and imports from the CIS and the countries of Eastern and Central Europe mushroomed from about 1 000 tonnes in 1989-1990 to nearly 27 000 tonnes in 1991 and almost three times as much in 1992. Figure 2 shows this development: the net trade surplus of the late 1980's has turned into a major deficit in 1992. Within three years, not only did the EC zinc industry lose a market outlet which it had won owing to the superior quality of its product, but it also had to incur fierce inroads on its domestic market by lesser quality, low price imported zinc products.

Table 2: Zinc
Production of refined zinc (1)

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	263	271	271	269	284	298	285	290	298	217
BR Deutschland (2)	356	356	367	371	380	356	353	338	346	383
España	198	212	216	202	224	256	257	257	274	364
France	149	259	247	257	249	274	266	264	299	305
Italia	156	167	310	230	247	242	246	248	256	253
Nederland	188	210	203	198	206	210	203	207	201	205
Portugal	4	6	6	6	6	6	5	6	2	3
United Kingdom	88	86	74	86	81	77	80	93	101	97
EC	1 402	1 567	1 694	1 619	1 677	1 719	1 695	1 703	1 777	1 827
Canada	617	683	692	571	610	703	670	592	661	672
USA	305	331	334	316	344	330	358	358	377	390
Japan	701	754	740	708	666	678	665	687	731	730
Australia	303	306	293	308	312	302	294	303	326	332
Western world (3)	4 645	4 592	4 996	4 854	5 058	5 240	5 215	5 176	5 385	5 435

(1) Total production by smelters and refineries of zinc in marketable form or used directly for alloying including production on toll in the reporting country, regardless of the type of source material i.e., whether ores, concentrates, residue, slags or scrap. Remelted zinc and zinc dust are excluded.
(2) Data prior to 1991 include the former Federal Republic of Germany only.
(3) Western world refers to market economy countries.
Source: International Lead and Zinc Study Group - June 1993 Bulletin

Figure 3: Zinc
LME zinc prices and stocks



(1) January - June.
Source: International Lead and Zinc Study Group, June 1993 Bulletin

Actually, the move of the CIS and former COMECON zinc industry towards foreign markets, in particular their currency owning EC neighbours, is a major blow to the balance of the zinc market. This has a direct impact on the supply/demand balance and resulting market prices; but, more perniciously, it also pulls the market value of zinc down as CIS and former COMECON zinc is offered at excessive discounts.

Prices

Zinc is quoted on the London Metal Exchange (LME) where demand and supply regulate the price. As production remained slightly below consumption in 1990 and 1991, the price drop, linked to business cycle factors, was stopped in 1992 and prices increased during the first months of the year until the rising of stocks forced them to drop back.

The doldrums of consumption worldwide and the exports from the former COMECON countries and the CIS created a surplus which has been heavily depressing price levels since October 1992. On 1 October 1993, zinc was quoted on the LME below USD 900 per tonne, which is the lowest level since 1987 in real terms.

Table 3: Zinc
Consumption of refined zinc (1)

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	166	156	169	172	163	175	174	185	200	190
Danmark	9	10	12	15	10	12	11	13	13	16
BR Deutschland (2)	405	425	410	434	455	450	453	484	540	532
Hellas	11	12	15	15	14	14	17	20	16	16
España	107	101	103	100	109	127	116	125	129	113
France	271	282	247	260	253	290	279	284	289	258
Ireland	2	1	1	1	1	2	2	1	2	1
Italia	208	210	218	232	245	254	262	275	283	300
Nederland	54	60	51	54	50	67	75	76	82	87
Portugal	16	11	9	10	12	10	11	15	13	15
United Kingdom	177	182	189	182	188	193	194	193	184	190
EC	1 426	1 450	1 424	1 475	1 500	1 594	1 594	1 671	1 751	1 718
Canada	144	146	156	154	158	159	148	123	121	126
USA	934	980	962	998	1052	1089	1059	992	933	1 030
Japan	771	774	780	753	729	774	769	814	845	784
Australia	102	97	107	99	94	108	111	114	113	119
Western world (3)	4 556	4 704	4 737	4 885	5 044	5 267	5 199	5 219	5 403	5 336

(1) Total consumption of refined zinc including zinc used directly for the production of zinc alloys, regardless of the type of source material from which produced i.e., whether ores, concentrates, residue, slags or scrap. Remelted zinc and zinc dust are excluded.
(2) Data prior to 1991 include the former Federal Republic of Germany only.
(3) Western world refers to market economy countries.
Source: International Lead and Zinc Study Group - June 1993 Bulletin

Table 4: Zinc
Imports of refined zinc (1)

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC	491	526	504	475	491	556	573	598	642	795
of which:										
Belgique/België	51	46	47	45	38	35	30	25	39	142
Danmark	8	11	12	12	10	12	12	11	14	16
BR Deutschland (2)	144	161	152	159	156	179	186	222	270	283
Hellas	15	15	15	17	15	16	17	13	11	10
France	55	65	62	64	70	87	84	89	82	98
Italia	84	91	63	55	64	53	76	77	71	82
Nederland	14	15	14	17	19	36	36	26	25	29
Portugal	5	6	8	4	5	5	6	11	10	12
United Kingdom	115	116	131	102	114	133	126	124	120	123
USA	618	639	611	665	706	749	712	601	549	645
Japan	42	57	65	93	105	113	133	141	142	106
Taiwan	48	40	39	56	65	64	57	72	126	129

(1) World imports.
(2) Data prior to 1991 include the former Federal Republic of Germany only.
Source: International Lead and Zinc Study Group - June 1993 Bulletin

INDUSTRY STRUCTURE

Table 6 identifies the EC top zinc metal refiners with reference to their 1992 production capacity. One plant was closed during 1992, the Union Minière's facility at Overpelt in Belgium.

The major EC refiners have a diversified product list as they process part of their unwrought zinc output into value added products such as rolling products (sheets and strips of various dimensions), casting alloys or speciality products such as galvanising anodes, powders and callots for the battery industry, wires for the surface treatment of steel, dust, and oxide. In the case of Union Minière and Metallgesellschaft, value added products account for 50% or more of the output value and volume. The most diversified product list is Union Minière's.

Backward integration at the mine level is limited, and none of the EC refiners can rely significantly on its own mines' concentrate supplies, if any. A significant share of zinc mine production in the EC is not dedicated to any particular refinery. In Ireland for instance, Tara Mines has no integrated refinery and sells its concentrates on the market, and the current major mining projects or developments in Ireland and Spain are not geared to the exclusive supply of any EC zinc refinery.

During the year, Belgium reduced its production as the result of the closure of one refinery while Spain and Germany increased their output by 33% and 11%, respectively.

ENVIRONMENT

According to the European Zinc Institute (E.Z.I.) the market economy countries consume about 2 million tonnes of zinc from secondary sources either as refined metal or as remelted zinc or through direct use of scrap at the fabricating stage. Estimates based on historical consumption and product life cycles indicate that a recovery rate of 80% has been reached. The recyclability of zinc is far advanced, not only as zinc metal, but also in several different forms.

Primary and secondary facilities in the EC operate under strict emission control and limit values with respect to air and water. The technology currently implemented is state of the art in this respect, making the EC production units the most environmentally friendly in the world.

Table 5: Zinc
Exports of refined zinc (1)

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC	627	675	659	597	655	703	686	631	618	825
of which:										
Belgique/België	156	168	157	137	160	155	158	132	126	150
BR Deutschland (2)	115	98	94	78	79	99	93	72	74	117
España	96	106	127	94	106	146	148	137	146	220
France	51	93	69	66	71	66	71	74	81	147
Italia	32	42	44	46	58	50	45	51	35	34
Nederland	157	160	160	165	177	180	162	157	140	144
United Kingdom	20	8	8	11	4	7	9	8	16	13
Canada	500	530	556	427	441	528	495	450	521	510
Australia	233	221	215	217	241	207	203	244	253	259
Finland	129	123	137	128	134	128	134	135	149	139

(1) World exports
(2) Data prior to 1991 include the former Federal Republic of Germany only.
Source: International Lead and Zinc Study Group - June 1993 Bulletin

Table 6: Zinc
Top EC producers in terms of annual capacity, 1992

Country	Company	Location	Process (1)	Theoretical annual capacity (tonnes)
	capacity (tonnes)			
Belgique/België	Union Minière	Balen-Wezel (Anvers)	E	190 000
BR Deutschland	Ruhr-Zink GmbH	Datteln (Ruhr)	E	200 000
	MHD "Berzelius" GmbH	Duisburg-Wanheim	ISF-RT	100 000
	Metaleurop Weser Zink GmbH	Nordenham	E	130 000
	Harz Zink GmbH	Harlingerode (Harz)	CV	30 000
España	Asturiana de Zinc S.A.	San Juan de Nieva	E	320 000
	Española del Zinc S.A.	Cartagena	E	60 000
France	Union Minière France	Auby (Nord)	E	205 000
	Metaleurop S.A.	Noyelles Godault	ISF-RT	100 000
Italia	Nuova Samim S.p.A.	Porto Vesme (Sardegna)	ISF-RT	70 000
		Porto Vesme (Sardegna)	E	83 000
	Pertusola Sud S.p.A.	Crotone (Calabria)	E	100 000
Nederland	Budelco B.V. (Pasminco + Billiton)	Budel-Dorplein	E	210 000
United Kingdom	Pasminco Europe	Avonmouth	ISF-RT	105 000

(1) E = Electrolytic plant ISF = Imperial Smelting Furnace CV = Vertical retorts RT = Fire Refining
Source: 1991 Minemet Yearbook

OUTLOOK

The oversupply of zinc metal, due to reduced consumption and increased exports from former Eastern Bloc countries, has resulted in extremely low prices which do not cover production costs for most mines and smelters, especially in the EC.

The integration of the former USSR and COMECON countries to the international zinc market appears to be the major determining factor for the future. It might lead to some fundamental restructuring of the industry worldwide, but the EC is more specifically affected as its neighbouring position makes it the closest target for the newcomers' exports. Meanwhile, the resumption of consumption might bring some relief in absorbing the current market surplus, although zinc is a mature metal and demand growth rates are, therefore low.

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Lead
NACE 224

The EC possesses few lead mine resources, but its lead metallurgical activities are powerful and competitive. During the last 10 years, EC consumption and production have experienced only modest growth, resulting in a decrease in the EC's share in world markets. Considerable restructuring has been taking place in the lead refining industry and in its major client industry, the battery sector. The restructuring will require the building up of new relationships between suppliers and consumers. Secondary smelting is an increasingly important source of lead, particularly as environmental regulations become more stringent.

INDUSTRY PROFILE

Description of the sector

Lead is the most abundant heavy metal in the earth's crust. It is normally found in mixed ores where it is associated with zinc and small amounts of silver and copper. Lead's softness, low melting point, chemical reactivity and resistance to corrosion give it great functional value, both in its pure form and in alloys or compounds.

Mine production of lead has decreased slightly, as a result of the growing importance of recycling. Refined lead is derived from two sources: primary material in the form of lead ores and concentrates, and secondary material in the form of scrap and residue. Primary production requires the smelting of lead-bearing ores to produce refined lead bullion.

Secondary production may also require refining facilities if the secondary raw materials contain unwanted compounds. As a result of the environmental and other regulations aiming at the recycling of lead-bearing scrap, the secondary refining industry now supplies more than 50% of the lead consumed in the market economy countries. As lead acid accumulators in cars are the main source of scrap for secondary refining, this proportion will increase as the world car population increases.

Primary refining is closely linked to the economics of mining lead-zinc orebodies. The bulk of lead mine production comes predominantly from operations in which zinc, and silver to a lesser extent, are the principal profit makers; less than a third comes from the actual lead ore mining operations in which lead is the principal metal recovered.

The most important consumer of lead is the battery industry. Other uses for lead include, petrol additives (tetraethyl lead), paint, shot, glass, ceramics and plastics.

Recent trends

Consumption of lead rose significantly worldwide in the 1980's. From 1982 to 1992, consumption in the EC Members States has risen by some 13% at an average annual rate of 1%.

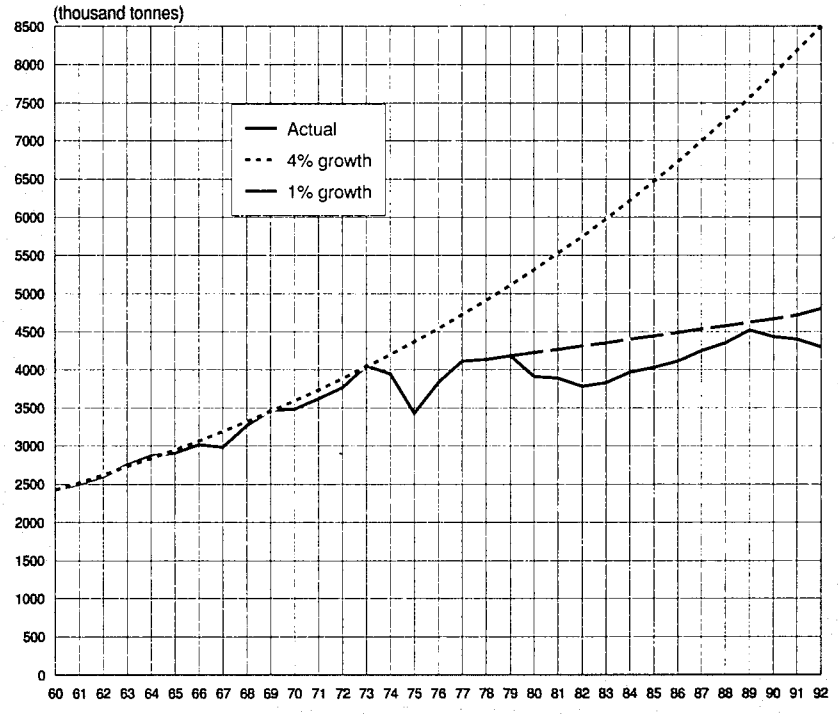
The EC is not a major mining region - only 123 300 tonnes of lead were mined in the EC in 1992. Metal production, however, is much higher and amounted to 1 372 000 tonnes in 1992, of which 50% came from secondary feed materials. The industry is responding effectively to potential ecological problems by recovering ever increasing amounts of lead, resulting in a steady decline of primary production.

MARKET FORCES

Demand

Consumption of lead generally follows the business cycles, increasing during periods of high economic activity and falling during periods of recession. So was it in the EC in 1991 and 1992 with the result that the average annual growth rate recorded over the 1980's dropped from 1.5% to 1% per year.

Figure 1: Refined lead
Market economy countries lead consumption



Source: Billiton - Enthoven Metals Ltd.

Table 1: Refined lead
EC main indicators

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	1 317	1 399	1 342	1 386	1 377	1 416	1 474	1 514	1 503	1 480
Production	1 321	1 384	1 370	1 339	1 374	1 453	1 422	1 389	1 423	1 372

Source: World Bureau of Metal Statistics

Regional trends in consumption are variable. For example, the share of the EC consumption relative to consumption in the market economy countries has fallen in recent years. The same is true for the USA. In contrast, most other areas of the world have increased their share in world consumption in recent years. Apart from the major influence of business cycles, consumption trends are largely driven by regulatory control on lead products (e.g. gasoline additives) and the cost and availability of substitutes.

Demand from the battery industry will continue to underpin consumption, largely as a result of rising demand for lead acid batteries for the automobile industry. Between 1979 and 1991 lead consumption in the battery industry increased by almost 43%, at an average annual rate of 3.25%. The vast majority of storage batteries are used in starting, lighting and ignition (SLI) applications in motor vehicles. Demand for such batteries depends on the number of vehicles built and, more importantly, on the number of batteries required to replace exhausted units. Demand has also increased for other types of batteries, such as those used in load levelling/peak sharing applications, as well as in electric-powered vehicles and standby power applications.

Environmental constraints and competition from other metals or materials have resulted in a stagnation or decline of lead demand in most of its other end-uses. Consumption rose only marginally in rolled and extruded products, shots, pigments and other compounds: these sectors contributed little to overall growth. In applications such as cable sheathing, alloys and gasoline additives, consumption has declined markedly: between 1979 and 1991 consumption in these three sectors fell by nearly 55%. By the end of 1991, they accounted for only 9% of the total, compared with 23.2% in 1979.

In the case of cable sheathing and alloys, lead has suffered both from the substitution by other materials and from the introduction of new technologies. Increasing awareness about the impact of polluting emissions on the environment is the main reason for the drop in lead consumption in gasoline additives. Over the period 1979 to 1989, consumption of lead for this end-use fell by two-thirds, and it only remains of any significance in the United Kingdom.

Supply and competition

The market for primary lead and lead products is international in scope. Large consumer markets such as the EC are significant importers of lead concentrates and bullion. North America and Australia are large exporters of the same after having met their own market's requirements. The market for secondary refined lead is more regional as secondary refining is predominantly carried out in the country where the scrap arisings occur and production is supplied directly to the neighbouring market.

With the growing importance of secondary refining from an environmental standpoint the major firms in Europe have a vested interest to be active in both primary and secondary refining. These companies are best placed to finance the investment that will be required to conform with increasing environmental legislation.

With the breaking down of the COMECON nations and the former Soviet Union in the early 1990's, increasing tonnages of refined metal of good to mediocre quality are being exported from these countries, disturbing the prevailing trade patterns on the Western European market since it is the closest outlet to the now liberalised Eastern producers. The flow of Eastern material has enhanced the downward pressure on prices which were already suffering from the slump in demand and pushed the metal stocks on the London Metal Exchange (LME) to sky-high levels. Competition from Eastern Europe is all the more damaging to the EC industry because Eastern material prices do not take into account any comparable costs with respect to environmental protection, transport, salaries, while the EC producers bear the full brunt of heavy investments in R&D and the implementation costs of anti-pollution measures and environment friendly technologies. At the resulting current price levels, the viability of the industry is at stake and even secondary refining, though directly beneficial to the environment, is seriously threatened because it is no longer economic.

Table 2: Refined lead
Consumption of refined lead in major countries by end-use

(thousand tonnes)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	growth rates(%)
Batteries	1 605	1 711	1 710	1 828	2 081	2 131	2 164	2 303	2 395	2 492	2 543	2 560	3.0
Cable sheathing	260	256	250	223	207	207	195	194	183	196	182	164	-4.2
Rolled and extruded products	302	287	258	288	302	280	289	290	320	321	310	283	-0.5
Shot/ammunition	85	90	92	92	107	102	92	88	85	96	133	123	1.2
Alloys	193	167	177	166	158	155	143	151	147	140	133	123	-5.0
Pigments and other compounds	496	474	449	448	503	524	500	528	527	557	517	539	0.3
Gasoline additives	239	209	212	176	166	136	110	108	103	98	87	74	-10.8
Other	162	160	133	132	151	157	153	165	165	151	153	157	-1.0
Total	3 342	3 354	3 281	3 353	3 675	3 692	3 646	3 827	3 925	4 051	4 058	4 023	0.7

Source: ILZSG (covers over 90% of market economy countries' consumption)

INDUSTRY STRUCTURE

Companies

Within Western Europe there are ten primary smelter/refiners, ranging in size from 75 000 tonnes per year to 200 000 tonnes per year.

The primary refineries are mostly multinational, and are spread throughout UK, Sweden, France, Germany, Belgium, Spain, Austria, Yugoslavia and Italy. All plants, with the exception of Britannia Refined Metals (UK), smelt lead or lead/zinc concentrates before refining lead bullion. Britannia Refined Metals refines only crude lead bullion imported from its parent company MIM in Australia.

The secondary industry is characterised by a large number of smaller refineries, many of which are independent. There are approximately thirty secondary smelter/refiners in Western Europe producing from 5 000 to 65 000 tonnes per year. They recycle and refine scrap generated in their local area. The number of these refineries is decreasing as the large multinational companies, and the major battery manufacturing groups as well, acquire the smaller secondary facilities or set up their own new recycling operations.

The largest primary smelters/refineries in Western Europe include Britannia Refined Metals (UK), Metaleurop (F and D), Metallgesellschaft (D), Union Minière's Business Unit Hoboken (B), Boliden Mineral (S), Enirisorse (I) and Penarroya-España (E). With the exception of Union Minière's Business Unit Hoboken, all of these primary refiners are involved in secondary recycling/ refining as well. Other companies include: STCM (F), the battery producers CEAC (F) and Varta Batterie (D), Fonderie-et-Manufacture des Métaux (B) and H J Enthoven (UK).

Strategies

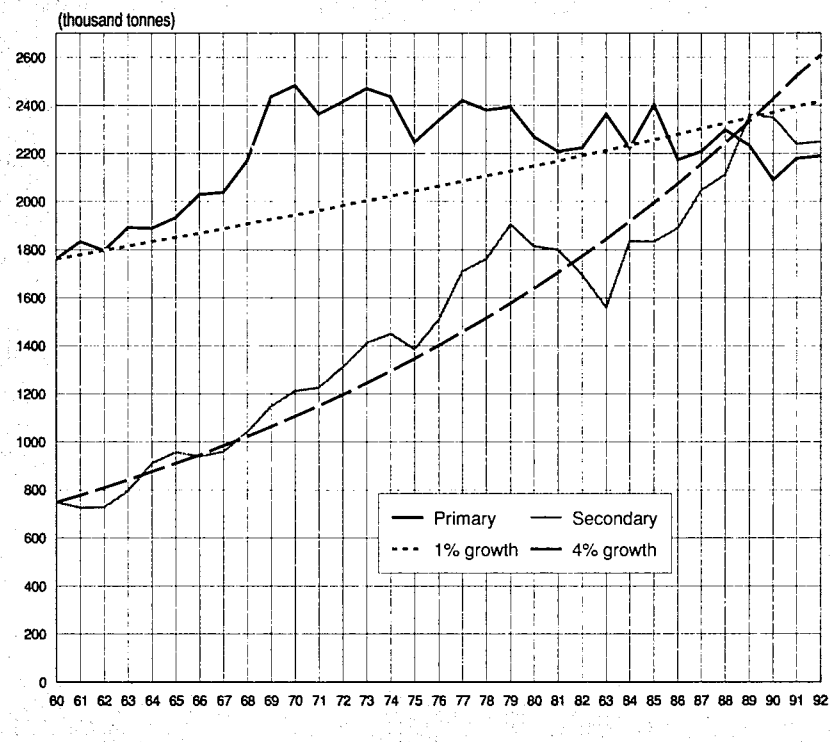
During the last three years, there has been considerable restructuring within the overall lead refining industry and its major outlet, the battery industry. The effects of such restructuring so far can mostly be noticed within the battery industry, with the emergence in Europe of five major battery groups. These groups have become very powerful in their bargaining capabilities and some are competing with the lead refiners by integrating their battery manufacturing facilities into lead recycling/refining operations: they process their own scrap collected from their own collecting networks for spent batteries, which are returned through their distributor networks.

In the future, secondary refiners will have to work more closely with the major battery companies in order to maximise the recycling rate of battery scrap and to comply with national legislation implementing the EC Battery Regulation. Government approved collection schemes will be set up hopefully in close collaboration between the refiners and the battery manufacturers. Such schemes should be harmonised throughout the EC to allow fair competition on supply of lead and lead alloys between EC Member States and other European countries with similar schemes.

Environmental legislation will also require investment to reduce lead in air emissions. In recent years several new technologies have been developed and implemented which offer more efficient, environmentally acceptable methods of smelting lead concentrates. These new technologies should rapidly gain ground because of their ability, in most cases, to handle secondary feed material as well. They integrate the smelting and refining operations, offering many advantages such as: economies of scale; synergy of the smelting and refining processes; concentration of lead production in fewer areas and the closure of environmentally unacceptable plants; and lower lead emission levels.

It seems certain that the new pyrometallurgical technologies will further increase their share of total lead smelting capacities over the next decade at the expense of the conventional blast furnace. Ultimately, looking further ahead, hydrometallurgical processes will probably make their way through, there are already signs of such development in the treatment of battery paste, in fact.

Figure 2: Refined lead
Production of primary and secondary refined lead



Source: Billiton - Enthoven Metals Ltd.

Undoubtedly, the number of operational refining sites will decrease in Europe: consolidation and rationalisation are bound to take place as companies are confronted with facts and figures relating to possible return on investments.

ENVIRONMENT

As lead is a toxic metal, it ranks high among environmental concerns. The metal has relatively little impact on ecosystems though and there has been much debate about the levels of lead which can actually cause harm: general policy is normally to restrict emissions to the lowest practicable levels given the state of technology, and recycling is normally conducted whenever appropriate and economic. Most control measures are concerned principally with human exposure (humans are most affected by lead exposure) although there are certain instances in which animals can be exposed to environmental lead.

Lead is increasingly recyclable in its major applications. Batteries, which created 49% of lead consumption in Europe in 1990, are recycled with more than 90% efficiency. Indications are that this efficiency rate should further improve in the future. Among the other uses, tetraethyl lead (petrol additives), pigments and shots have declined dramatically or disappeared completely over recent years. This has been partly as a result of environmental legislation (e.g. tetraethyl lead), partly as a result of voluntary reductions by industry (e.g. lead shots for fishing weights) and partly as a result of substitution (pigments). As far as the other uses are concerned, lead is mostly used in products from which it cannot be easily extracted such as glass, ceramics, plastics, so even in these cases there is minimal risk for ecological impact. The net result is that the uses of lead which can really affect the environment are steadily disappearing.

During the production and processing of lead there are inevitably occasions for emissions. These are kept to a minimum through the use of pollution control technologies and the strict compliance to legal limit values on the amounts which are allowed to escape. Airborne emissions are controlled through efficient filtration systems and through the implementation of design and management systems which prevent uncontrolled losses to the environment. Aqueous effluents are treated before discharge to ensure their compliance with limits imposed by water authorities. Finally, solid residues may not be disposed of indiscriminately. Depending on their lead content or their ability to dissolve into the environment, residues are designated as safe or hazardous and disposed of in authorised landfills.

REGULATIONS

Regulations affecting lead fall into three main categories: occupational exposure, emissions from plants and controls on products. Occupational exposure is addressed under EC Directive 82/605/EEC of July 28, 1992 on the protection of workers from risks related to exposure to metallic lead and its ionic compounds at work. This directive sets allowances on the level of lead in air in the workplace and on certain biological indicators which reflect the level of exposure of individual workers. The limit values are complemented by rules on the protection of the workforce providing for the use of protective clothing, respirators, washing facilities or specifying rules on eating, drinking, smoking, etc.

Emissions from lead works are normally controlled by means of national regulations relating to air or water. There are no universal European limits in these areas. However, lead in the general atmosphere is limited under Directive 82/844/EEC of December 3, 1982 which sets a limit for levels of lead in air throughout the EC. Levels of lead in water are also controlled in a number of directives relating to water depending on its type and use e.g., water intended for human consumption, water for bathing, fishing waters, etc.

Regarding products, regulations do apply to a number of non-recoverable uses of lead. The use of lead in petrol, for instance, is controlled under Council Directive 85/210/EEC of March 20, 1985. Several Member States have their own regulations which impose tighter limits or which require the availability of unleaded petrol for vehicles introduced on to the market after a certain date. Another area in which legislation is applied, is the use of lead in paints, which has been restricted under various national regulations for many years. Recently, lead carbonates and lead sulphates have been also controlled under the EC Directive, 89/667/EEC of December 21, 1989. This directive prohibits the sale of lead pigmented paints and prohibits their use in domestic buildings.

OUTLOOK

The balance of primary output versus secondary output and the cost of complying with environmental legislation will determine the strategy of the companies for the future. The price of lead will obviously be a major factor, especially as it is suffering the downward pressure caused by the exports of lead from the countries of Central and Eastern Europe and the CIS. The way in which these countries will integrate into the international market in the coming years will determine the future development of the whole industry. It is crucial to monitor such an integration with a view to ensuring that competition takes place on an equal footing and that environmental challenges be faced by the Eastern producers as well.

Secondary refined lead will grow in importance in the medium and long term, and it is expected that by the end of the century it will represent almost 60% of the supply to the market.

The battery sector will remain the major lead consumer and its share in total demand will further increase. By the end of the century, it is expected that the battery sector will absorb almost 70% of all lead consumed.

Unfavourable business cycle factors and steadily increasing LME stocks have pushed the price of lead to a seven year low. In these circumstances, secondary refiners are unable to purchase feed at levels anywhere near those needed to give realistic returns and it is no longer economic for merchants to handle scrap batteries. Governments are being made aware of the environmental implications of this development but it would seem that any action is likely to be too late.

Primary producers are suffering from depression in both the lead and zinc markets. The only way they can survive is to increase production with the aim of lowering their unit costs. This has been taking place to some extent, but is only adding to the vicious circle.

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Nickel
NACE 224

The nickel industry worldwide has developed a highly concentrated structure: about 60% of the metallurgical production of nickel in the market economy countries comes from only four companies. The EC is the third largest producing area for nickel products, with three companies operating on its territory, while two other companies have facilities in Northern Europe (in Norway and Finland). With regard to nickel mine production, only two EC companies operate mining activities, one in Greece and the other in the overseas territories of France in New Caledonia. Nickel demand is still on a rising trend, determined to a large extent by the increase of consumption in the stainless steel sector, particularly in the newly industrialised countries (NICs).

INDUSTRY PROFILE

Description of the sector

The EC nickel industry processes raw materials, either nickel ore or intermediate products, into nickel products which are then used by the nickel consuming industries. The range of products for nickel is wide: ferronickel, produced by Eramet-SLN (F) in New Caledonia and Larco (GR) in Greece for use as a charge product in the fabrication of stainless steels; metal, produced by Inco Europe (UK) and Eramet-SLN (F) in the form of cathodes for use as an alloying element in various applications (such as superalloys); salts, produced by Inco Europe in the United Kingdom and Eramet-SLN in France for use mainly in the catalyst and electroplating industries.

Recent trends

Since the mid-1970s, nickel consumption in the EC has increased at an average annual rate of 2.4%. A record level of 238 000 tonnes was reached in 1990, but consumption fell by 10% in 1991 and by a further 8% in 1992, essentially as a result of poor economic activity. The metallurgical production of the EC also grew steadily during the 1980s, reached a peak in 1988 with 89 000 tonnes but decreased slowly thereafter, down to 83 000 tonnes in 1992. The number of employees in the EC nickel industry decreased by one third between 1982 and 1992, although mine production almost doubled and metallurgical production increased by more than 30%.

International comparison

Among the top four companies producing nickel in the market economy countries, one is an EC corporation, Eramet-SLN in France, another owns a factory in the EC, Inco in the United Kingdom, and a third has production facilities in Northern Europe, Falconbridge (Canada) in Norway. Table 4 shows the estimated share of the EC in world production of refined nickel. If reference is made to the market economy countries only, the EC share has diminished significantly over the past 16 years. The Canadian share decreased even more during the same period of time.

In 1992, nickel consumption in the market economy countries reached 619 000 tonnes, with the EC representing 32% of total consumption. This share of one-third has been relatively stable since the 1970s. Asia, however, increased its share of consumption from 24% in the mid-1970s to 33% in 1992, the USA's consumption decreased from a 31% share in 1976 to 20% in 1992.

MARKET FORCES

Demand

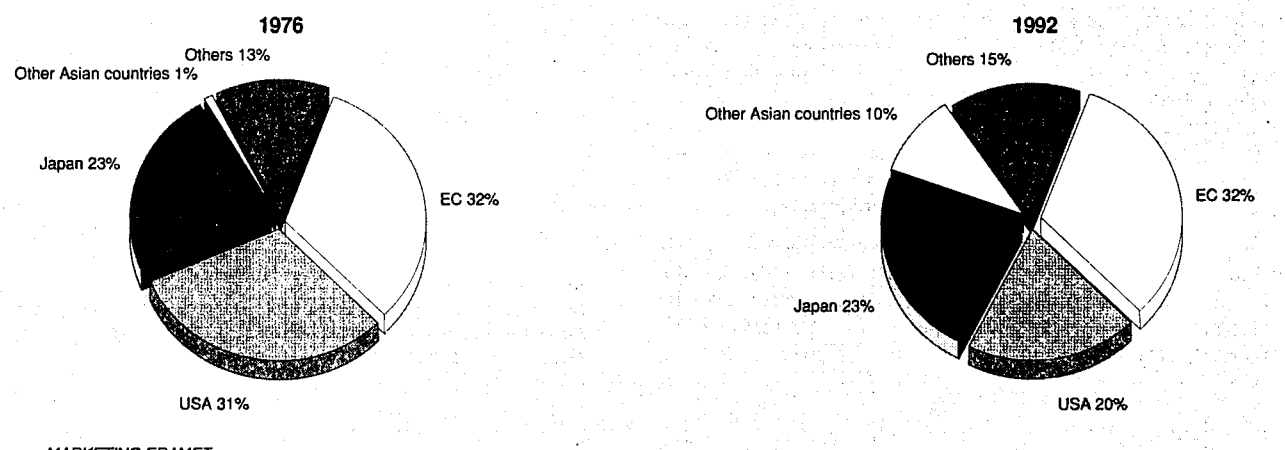
Nickel consumption in the market economy countries grew at an annual rate of 2.1% between 1976 and 1992. EC consumption increased by 2.4% per year during this period, while Japanese consumption rose by 3% per year, and consumption in the USA decreased by 1.7% per year. East Asian NIC were the fastest developing area from 1986 to 1992 with an average annual growth rate of 9.2% as new nickel consuming industries were being installed, especially in South Korea and Taiwan.

Among the various nickel uses, stainless steel plays the leading role. Nickel consumption for stainless steel represents more than 60% of total nickel demand (63% in the EC). It grew yearly at a rate of 4.3% between 1976 and 1992, while nickel consumption in the non-ferrous industry declined at a rate of 0.5%. There are two primary reasons for this rapid evolution of nickel demand in stainless steel. Firstly, the production of nickel-bearing stainless steel (austenitic) rose at a higher rate than that of nickel-free stainless steel (ferritic). Secondly, due to the improvement of the yield in stainless steel production, the rate of growth of primary nickel consumption (4.3%) was just a little higher than that of secondary nickel (4.1%).

Production of nickel-bearing stainless steel is influenced both by the overall production of capital goods and by the intensity of use of nickel-bearing (austenitic) stainless steels in the capital and consumer goods sectors.

Over the past 15 years, the use of austenitic steel has increased at a higher rate than industrial production in the OECD coun-

Figure 1: Nickel
Market economy countries nickel production by area



Source: MARKETING ERAMET

Table 1: Nickel
Mine production by nickel content

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
New Caledonia (France)	46.2	58.3	72.4	64.5	58.3	71.2	96.2	85.0	99.6	100.5
Hellas	13.6	16.6	16.7	10.8	9.7	13.8	17.0	16.5	16.8	16.2
Total EC	59.8	74.9	89.1	75.3	68.0	85.0	113.2	101.5	116.4	116.7
World	659.7	788.7	827.7	837.9	876.3	918.3	947.3	921.1	929.6	923.3
Share of the EC (%)	9.1	9.5	10.8	9.0	7.8	9.3	11.9	11.0	12.5	12.6

Source: MARKETING ERAMET

Table 2: Nickel
EC main economic indicators in volume

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	154.9	192.0	174.4	193.4	204.7	226.6	225.5	238.1	214.9	198.1
Mine production	59.8	74.9	89.1	75.3	58.0	85.0	113.2	101.5	116.4	116.7
Metallurgical production	62.9	73.1	77.7	83.5	75.9	88.8	88.5	84.3	87.7	83.4
Employment (number)	5 478	5 722	5 616	5 078	4 363	4 445	4 546	4 519	4 463	4 380

Source: MARKETING ERAMET

Table 3: Nickel
Top 4 companies by production share (1)

(%)	1986	1987	1988	1989	1990	1991	1992
Inco (all products)	32	37	35	34	31	29	32
Falconbridge	12	14	15	15	15	14	14
Le Nickel-SLN (ferronickel, matte and ore sales)	9	8	9	9	8	8	8
Western Mining (fiscal years, nickel in concentrates)	8	8	7	6	8	9	9
Total	61	67	66	64	62	60	63

(1) Former COMECON countries excluded.
Source: MARKETING ERAMET

tries. This increased use is mainly due to the technical qualities of austenitic steel, which, for many applications, has no acceptable substitute.

Recent developments in export markets show an extremely strong growth of nickel consumption in East Asia. Korea and Taiwan were the first markets to experience rapid growth, followed by China. The Eastern European countries might become the next boom area.

Supply and competition

At the end of the 1960s, scarce nickel supplies led to a boom in investments by newcomers. Production, however, did not start until the mid-1970s. Most of these projects were located in NICs where large nickel deposits were found. As a result, Canada and New Caledonia, which were responsible for around 75% of the nickel mine production in the market economy countries in the early 1970s, accounted for only about 45% in the early 1980s.

Up to 1970, about a dozen firms were engaged in nickel production, and increases in output were the result of expanding and modernising existing installations. At that time, all producers were working at near capacity level. Maximum capacity was reached at the beginning of the 1980s, but because of low demand, and subsequently very low nickel prices, producers had to significantly reduce their level of activity after 1975, bringing about a decrease in the rate of use of production capacity. Several facilities closed after 1984, as production costs were too high to enable firms to survive the depressed period of the first half of the 1980s. Real capacity also decreased due to a lack of maintenance at most of the plants still in use.

Considerable progress in productivity has been achieved since the 1980s, including a significant reduction in energy consumption. This has enabled some companies to reduce production costs so that they are in a better position to cope with the economic ups and downs which are affecting the capital and consumer goods sectors, the major driving forces of nickel demand. Many companies still suffered heavy losses, however.

Production costs decreased in constant terms, and the average break-even price for low cost producers, which was over 6.5 USD per kg at the end of the 1970s, decreased to a level

Table 4: Refined nickel
EC share of world production, 1992

(thousand tonnes)

EC	51.5
World	837.8
EC share (%)	6.1

Source: MARKETING ERAMET

between 4.5 USD and 5.5 USD per kg by the mid-1980s. The most competitive producers remained the sulphide producers in Canada and Australia which were less affected by the high price of oil at that time. After 1985, production costs increased significantly. Producers treating sulphide ore (e.g. Inco) faced increases in wages and social benefits for their workers and lower ore content in their mines due to the lack of extensive mining development work.

Producers processing oxidised ore, including the EC companies Larco and Eramet-SLN, also suffered an increase in costs, but to a lesser degree. The decrease in the price of oil and the depreciation of some currencies in Indonesia, Columbia and the Dominican Republic helped these producers to reduce the gap with the sulphide producers, and in some cases to take the lead in terms of costs. The break-even price of the low cost producers was estimated at the beginning of the 1990s at 6.5 to 7.5 USD per kg, while the average price for the whole industry was between 7.5 and 9 USD per kg.

As nominal production capacity was increasing in the market economy countries, net imports from former COMECON countries were also markedly increasing, particularly from the Federation of Russia, which rapidly increased its exports to the West and especially to the EC, eagerly striving for hard currency revenues. As a consequence, the share of net imports from COMECON countries rose from less than 11% of EC consumption during the 1981 to 1986 period to 19% during 1987 to 1992. The future trend of deliveries from the CIS will have a vital influence on the supply/demand balance over the coming years.

INDUSTRY STRUCTURE

Companies

Only three companies operate nickel production facilities in the EC. Inco Europe Ltd, a subsidiary of Inco Ltd of Canada, processes matte, an intermediate product supplied by its mother company, into pure nickel and nickel salts. Inco Europe Ltd markets its production throughout the world, although Europe is the preferred market owing to its proximity. The American market is primarily supplied by Inco Canada.

Eramet is a 70% subsidiary of ERAP, which is the holding company of the French state-owned company Elf-Aquitaine. Other shareholders are Elf-Aquitaine with 15% and Imetal with 15%. Eramet is the mother company of Le Nickel-SLN in New Caledonia which produces nickel matte and ferronickel. Its plant in Le Havre-Sandouville was built in 1978 to replace the facility founded in Le Havre in 1888. Matte shipped from New Caledonia is processed in Le Havre into pure nickel and salts. Eramet's sales program worldwide therefore includes a range of products i.e. metal, ferronickel and nickel salts.

Larco, currently a state-owned company in Greece, was founded in 1963 for the mining of nickel ores and their processing into ferronickel. Due to the very small size of the Greek market, production is almost entirely intended for export. The EC market is the prime outlet for the Greek producer.

Strategies

Nickel demand grows steadily and such a growth must be met by a corresponding sustained increase in nickel supply. To allow for such a development, investment in additional capacity at the lowest possible production costs must take place. Expansion at the existing mining and smelting facilities and improvements in the productivity are preferable to opening and building new mines and production plants.

Apart from economic considerations, long term stability of adequate supply can best be provided by giving priority to investments in integrated operations. Integrated nickel producers are not dependent on an external supply of nickel ore, and have their own refining facilities with a diversified range of products. They are therefore, less dependent on cyclical market developments and are better able to withstand periods of recession. The nickel producers must keep abreast of market developments: close cooperation between the nickel producers and consumers is necessary for both industries.

REGIONAL DISTRIBUTION

The nickel market is worldwide, and to a large extent, nickel mining areas do not correspond to nickel consuming areas. Major nickel consuming countries are net nickel importers, either in the form of nickel ore and intermediate products or in the form of finished products.

Nickel consumption in the EC represents approximately one-third of consumption in the market economy countries, but the production of the three EC nickel companies accounts for only 14% of the corresponding output.

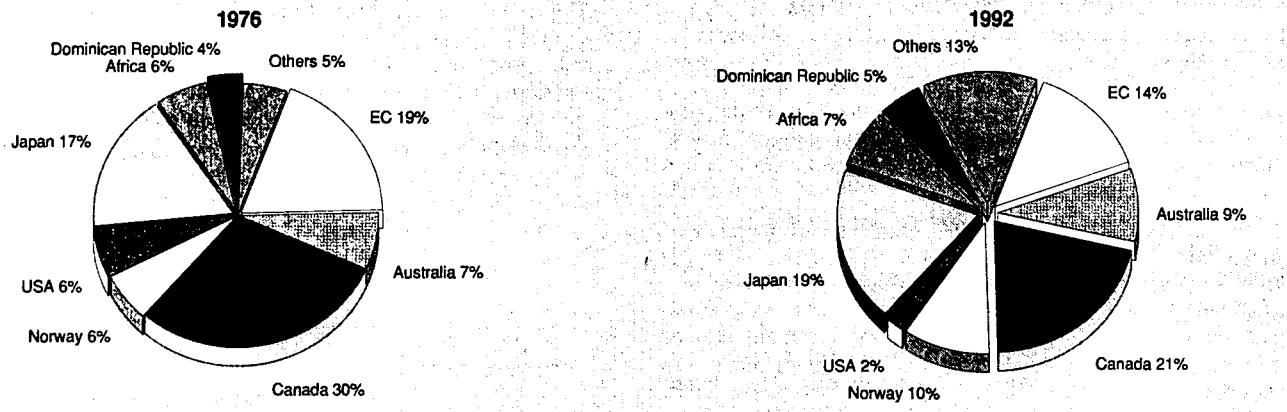
Germany is by far the largest nickel consumer market in the EC, representing 36% of total EC demand, but it has no domestic production. France is the second largest market, with a share of around 18%. Other nickel consuming Member States are the United Kingdom and Italy with respectively 14 and

Table 5: Nickel
EC producers

Country	Company	Location	Process	Products	Annual capacity (tonnes Ni)
France	Eramet	Sandouville (Le Havre)	ER	nickel metal	10 000
				salts	3 000
France	Le Nickel-SLN	Doniambo (Nouvelle Caledonie)	F	ferronickel matte	50 000
United Kingdom	Inco Europe Ltd	Clydach (Wales)	VT/CO	nickel metal salts	54 000
Hellas	Larco	Larymna	F	ferronickel	25 000

ER=Electrolytic refining
F=Smelting facilities for ore
VT/CO=Carbonyl process
Source: MARKETING ERAMET

Figure 2: Nickel
Market economy countries nickel consumption by area



Source: MARKETING ERAMET

15%, Belgium 10% and Spain 7%. The other EC countries are not substantial consumers of nickel.

Since the mid-1970s, nickel consumption in the EC has grown by 2.4% per year on average, although growth rates vary widely among the various Member States. Belgium with a 14% increase per year and Spain with a 5.8% increase per year experienced the highest expansion in consumption, while demand in France increased by only 0.8% per year and the United Kingdom's demand increased by only 0.3% per year.

ENVIRONMENT

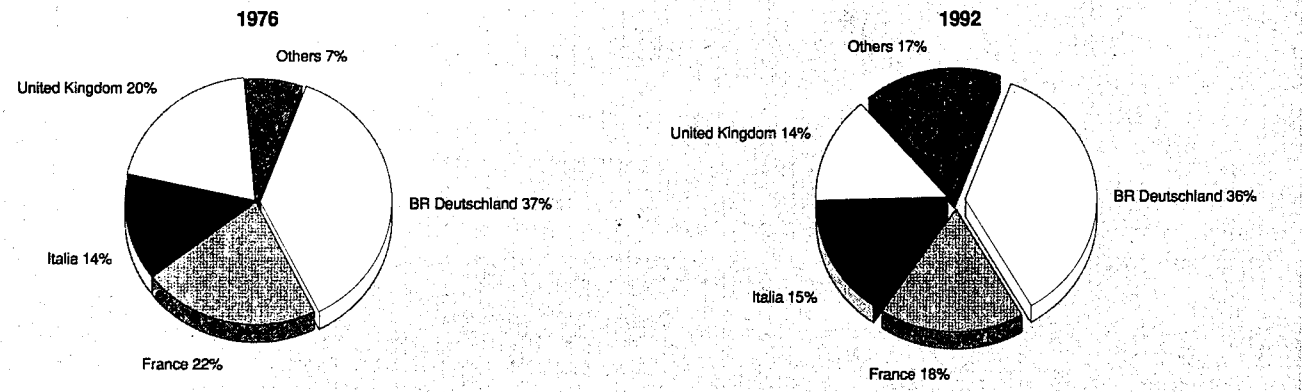
Although nickel itself does not create environmental problems, some nickel compounds have ecotoxic (dangerous to the environment) and/or toxic (dangerous to humans) properties. Most of the nickel producer and user industries have already reduced their emissions to an environmentally acceptable level. At the EC level, atmospheric emissions have been controlled and reduced by means of the installation of efficient filter systems. Liquid effluents have been under control for many years now, and their levels comply with regulatory limit values. Solid waste containing water-soluble compounds such as nickel-bearing metallic hydroxides is still a concern. In most cases, however, it is disposed in controlled landfills. Nickel-bearing recyclables (stainless steel and alloy scrap, spent catalysts, etc.) are not an area of concern with respect to their nickel content.

REGULATIONS

In spite of minimum specific risks for the general environment, nickel and some of its compounds are facing increasing regulatory pressure at the EC level. Skin-contact allergy is a clearly established risk linked to direct and prolonged exposure to nickel in some common products. The European nickel producers support the efforts of the EC Commission to establish rules for the protection of the fraction of the population at risk. Nickel is suspected of inducing respiratory cancer in workers in certain nickel refining processes. In addition, the classification of some nickel compounds as human carcinogens (Directive 67/548) will have a serious impact on industry and will require protective measures for workers exposed to these substances (Directive 90/548). This classification has been requested by the industry.

The nickel industry is also concerned about the controls which will be applied to transfrontier shipments of "wastes" in ac-

Figure 3: Nickel
EC apparent consumption



Source: MARKETING ERAMET

cordance with the Basle Convention, and therefore strongly supports the approach adopted by the OECD for "wastes destined for recovery operations". In addition, it also urges the EC Authorities to model their new "Shipments of Wastes" regulation on this OECD approach.

OUTLOOK

Nickel consumption should continue to grow at a relatively sustained rate in the medium and long term, although it will fluctuate greatly in the short term due to cyclical variations in general economic activity.

Many factors could result in the continued development of nickel consumption: growth of nickel consumption in industrialised countries in connection with the development of new applications, most of them linked with the protection of the environment (Clean Air Act in the USA, Earth Summit of Rio de Janeiro); booming demand for nickel in the newly industrialised countries (NICs), especially East Asian NICs, and in some Latin America countries due to the construction of new plants and the need for durable goods; reconstruction and reshaping of a civil industry in the former COMECON countries.

Production areas which show the greatest growth potential for the 1990s are located in the countries with the largest and richest mines, especially New Caledonia, Australia and Indonesia.

The recent creation of the "International Nickel Study Group" should improve the availability of reliable statistical information on the market thanks to the increased cooperation of the participating governments. This should help the decision process at all industry levels and significantly contribute to the transparency of the market.

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Precious metals
NACE 224

The EC has the largest refining and fabricating capacity for precious metals in the world, even though its actual mineral resources of such metals are very limited. The recycling of precious metals from scrap and industrial residues has always been an important raw material source for the EC industry. EC environmental legislation now requires all new petrol driven vehicles to be fitted with catalytic converters to reduce pollution. This has stimulated EC demand for platinum group metals.

INDUSTRY PROFILE

Description of the sector

Precious metals include such well known metals as gold and silver and the six platinum group metals: platinum, palladium, rhodium, iridium, ruthenium and osmium.

Precious metal activities can conveniently be separated under five headings: mining; refining and production of metals in unwrought forms; trading, i.e. commodity dealing, investment bars and coins; fabrication, i.e. processing, alloying and conversion of the metals into wrought or semi-manufactured forms, chemical compounds, catalysts and industrial components; manufacturing, i.e. production of goods for sale at retail level such as. jewellery, silverware etc.

Recent trends

Mining

The twelve countries of the EC now possess within their borders relatively insignificant sources of gold and silver and practically none at all for the platinum group metals. What primary precious metals are actually extracted from ores mined in the EC are mainly by-products of copper or lead and zinc mining.

Of the EC Member States, only Spain, France and Portugal appear in the world list of gold producing countries, and in 1992 they yielded only about 0.5% of total world output of 2 217 tonnes. Seven EC countries produce silver (Table 1), but only to a very limited extent: total EC production represents only 2.5% of total world annual output.

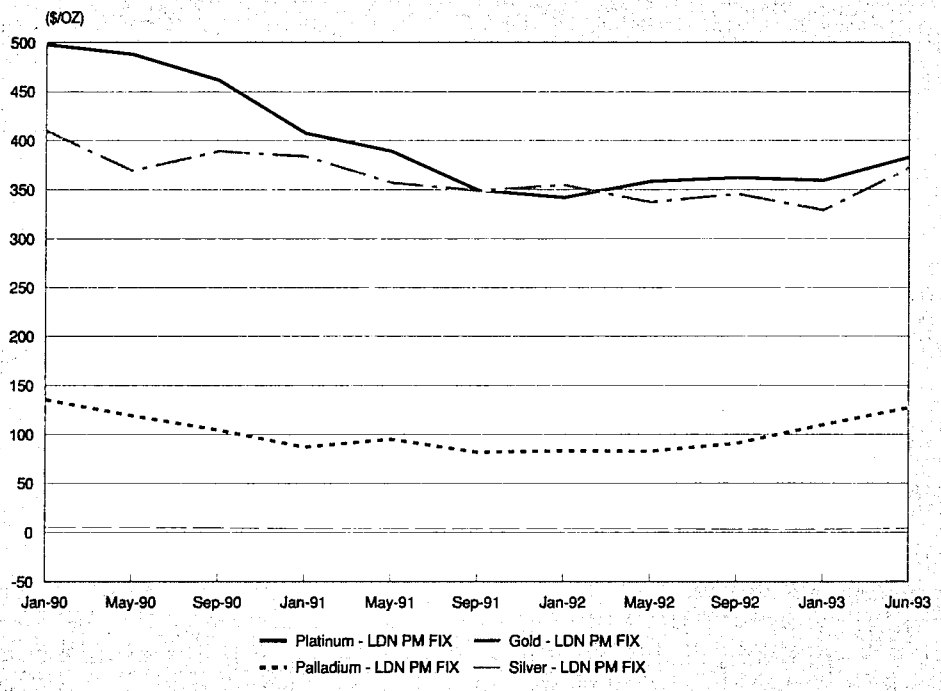
Refining and recycling

The refining of gold, silver and the platinum group metals in the EC takes place either at the specialist precious metal refining and fabricating companies or at base metal refineries equipped to treat such precious metals either as by-products of non-ferrous metal refining or by recovering them from low grade industrial residues and scrap materials. Total precious metal refining capacity of the EC firms is the largest of any one region of the world.

Consequently mines in all parts of the world still consign large quantities of precious metals in crude or by-product forms to the EC refineries. This occurs when local facilities do not exist, do not have adequate capacity or are unable to treat the mine output satisfactorily to achieve optimal recovery rates or generally acceptable commercial quality.

Despite the EC's lack of indigenous precious metal mineral sources it can count on substantial "above ground" raw material supplies in the form of scrap and waste materials sent for recycling both from within the EC and from the rest of the world. There are a number of EC companies who specialise in the collection, pre-processing and trading of such materials before the actual assay and refining stages take place. The cost of recovery and recycling is more than justified by the high intrinsic value of the precious metals contained in the scrap and residues. Typical items are discarded printed circuit

Figure 1: Refined copper Production in market economy countries



Source: World Bureau of Metal Statistics, April 1993

Table 1: Silver
EC mine production of silver

(tonnes)	1988	1989	1990	1991	1992
BR Deutschland	20	22	8	4	2
Hellas	61	52	53	53	53
España	227	220	230	233	233
France	21	20	22	23	23
Ireland	6	7	9	11	9
Italia	16	16	11	6	5
Portugal	4	4	19	20	22
Total EC	355	341	352	350	347
Total world	13 751	14 250	14 275	13 912	13 770
EC portion of world (%)	2.6	2.4	2.5	2.5	2.5

Source: World Silver Survey 1993, The Silver Institute Washington DC, USA

Table 2: Gold
Total gold fabrication in the EC by Member State (1)

(tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België + Luxembourg	2.3	2.2	2.3	2.0	16.2	10.5	8.0	4.4	2.7	2.4
Danmark	0.7	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.9	1.0
BR Deutschland	56.9	56.8	57.7	54.8	57.2	65.3	69.8	77.5	80.8	76.8
Hellas	8.0	9.2	11.6	11.1	10.8	10.8	10.5	10.6	10.1	9.4
España	14.6	13.8	16.7	16.7	18.1	25.2	32.1	36.2	34.6	32.1
France	24.0	22.6	23.4	25.7	27.0	29.3	32.7	39.9	39.3	43.3
Italia	180.3	228.6	261.6	246.9	232.8	273.7	359.2	395.9	430.2	473.3
Nederland	3.5	3.9	4.6	4.7	4.5	5.1	5.7	6.3	7.0	8.0
Portugal	3.3	2.5	3.6	3.6	4.2	5.0	5.7	7.6	9.2	11.4
United Kingdom + Ireland	29.7	31.3	37.8	36.1	43.7	46.1	48.5	50.6	43.3	39.6
EC	323.3	371.7	420.1	402.5	415.3	471.8	573.0	629.9	658.1	697.3

(1) Including the use of scrap
Source: Gold 1993, Gold Fields Mineral Services Ltd.

Table 3: Silver
European silver fabrication demand, 1992

(tonnes)	BR Deutschland	France	Italia	United Kingdom	Rest of Western Europe	Western Europe Total
Silverware and jewellery	420	72	1 390	47	304	2 233
Photography	495	352	78	405	611	1 941
Electronics and batteries	361	187	124	125	211	1 008
Brazing and solders	159	47	59	62	N/A	N/A
Dental	15	3	0	16	N/A	N/A
Mirrors	15	6	25	12	N/A	N/A
Miscellaneous	93	9	31	9	120(1)	681(1)
Coinage	165	56	6	6	16	249
Total	1 723	732	1 713	682	1 262	6 112

(1) Including brazing and solders, dental, and mirrors.
Source: World Silver Survey 1993, The Silver Institute Washington DC, USA

Table 4: Platinum
Breakdown of demand by application in Western Europe

(kg)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Autocatalyst										
gross	780	1 090	2 020	3 730	7 000	7 620	9 640	11 660	14 930	17 880
recovery	0	0	0	0	0	0	0	-160	-470	-620
Chemical	2 800	3 270	2 950	2 330	2 490	1 560	1 560	1 870	1 710	1 560
Electrical	1 400	1 400	1 710	1 240	1 240	1 240	1 240	1 240	930	930
Glass	620	780	930	930	930	930	1090	780	620	470
Investment	1 400	3 730	2 800	3 110	2 020	1 710	1 090	1 240	1 240	1 090
Jewellery	1 400	1 400	1 560	1 710	1 400	2 180	2 330	2 490	2 640	2 640
Petroleum (1)	-310	-780	-620	-160	780	160	310	1 240	930	620
Other	2 180	1 560	1 090	1 710	1 560	1 560	1 400	1 400	1 560	1 560
Total	10 270	12 450	12 440	14 600	17 420	16 960	18 660	21 760	24 090	26 130

(1) In the years 1982-86 the Western Europe petroleum industry sold back to the market more platinum than it purchased new metal.
Source: Platinum 1993, Johnson Matthey

boards, obsolete computers, old photographic film, X-ray plates and solutions, spent electro-plating baths etc.

It is not just the economic aspects that encourage the recycling of precious metals but also the environmental issues where the regulatory authorities are setting ever stricter limits on the tolerable metal content of waste materials sent for dumping.

Base metal refineries with significant precious metal capacities are to be found in Belgium, Germany and the UK. These typically recover precious metals from lead and zinc, copper or nickel ores, as well as low grade scrap materials of all kinds, and they supply the pure metals in the form of unwrought "good delivery" bars or plates, grain or sponge.

The largest EC specialist precious metal refining firms are to be found in France, Germany and the UK. The specialist refiners are also fabricators and are also able to process the precious metals into alloys and chemical compounds and to supply all forms of wrought materials such as wire, sheet, tubing and industrial components of many shapes and sizes.

Trading

The major EC financial centres, particularly London but also Paris, Frankfurt and Luxembourg are significant markets for trading gold and silver as commodities and for investment purposes. The daily fixing prices quoted by the London Bullion Markets and the London Platinum and Palladium Markets are those most widely used throughout the world as reference prices. "Good delivery" gold ingots and silver bars bearing the stamps of the major EC refiners are to be found in the vaults of banks and commodity traders in all the world's financial centres and international monetary agencies. Private individuals and other financial institutions generally prefer the smaller investment bars where once again it is the major EC refiners whose bars carry the most prestigious marks which are recognised everywhere as a guarantee of quality and accurate assay.

Market forces require that trading of the main precious metals on a 24 hour round the clock basis be organised so that forward cover and location swaps be provided for international customers. This push has caused many of the leading EC traders to set up facilities in North America and the Far East to complement their activities in Europe.

Fabrication

Most of the precious metals are fairly easily fabricated either as pure metals or as alloys. Gold in particular is usually turned into specific alloys for jewellery or dental purposes in order to improve its wear-resistance or colour. Because of the high intrinsic value and the wide range of forms and alloys required, such metals are usually fabricated or processed in smaller quantities than base metals. One of the few precious metal products manufactured in tonnage quantities is silver nitrate for the photographic industry. A product that has recently entered the multi-million unit scale of production in the EC is anti-pollution car exhaust catalysts, each containing just a gram or so of the platinum group metals, and some members of the EC precious metal industry are strongly represented in this field worldwide. The EC demand trend is discussed in more detail below.

Manufacturing

Converting precious metal alloys into finished products to be sold to the retail trade, is largely the responsibility of the jewellery, silverware and tableware industries which is outside the scope of this article. These industries, however, are major consumers of gold and silver, especially in Italy, as can be seen from the accompanying EC consumption tables.

Table 5: Platinum
Demand by region

(tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Western Europe	10.3	12.4	12.4	14.6	17.4	17.0	18.7	21.8	24.1	26.1
Japan	29.5	35.5	38.9	31.4	51.3	59.1	51.9	57.5	63.8	57.9
North America	22.4	28.3	31.4	37.0	28.0	26.9	27.9	24.6	25.3	22.2
Rest of Western world (1)	5.6	5.6	5.3	5.3	5.6	9.3	8.2	11.2	13.1	12.0
Total Western world	67.8	81.8	88.0	88.3	102.3	112.3	106.7	115.1	126.3	118.2

(1) Western world refers to market economy countries
Source: Platinum 1993, Johnson Matthey

MARKET FORCES

Demand

The industrial and manufacturing demand absorbs the major share of precious metals fabrication, though gold and silver still play roles in coinage (now mostly commemorative coinage). Gold, of course, remains the main investment metal worldwide even in today's highly sophisticated financial circles, though part of its role as an internationally recognised store of value has been taken over by currency trading and futures. EC major precious metals outlets include: jewellery in the case of gold, photographic products for silver, automobile exhaust catalysts for platinum and dental alloys and electronics for palladium.

Consumption trends are closely linked to the outlook for consumer goods and industrial consumables. In the case of the platinum group metals, EC demand in the last year has, however, been driven by legislation and the Single Market. As a result since 1 January 1993 most new European automobiles have been fitted with catalytic converters to control exhaust pollution and reduce acid rain. Such devices have been compulsory since the 1970s in the US and Japan but only recently has legislation been adopted by the EC and other states of Europe.

Gold and silver are able to rely on the jewellery and tableware markets as a fairly constant source of demand, although this does fluctuate with consumer purchasing power. There is also a small but growing demand for platinum jewellery and watches in the EC. In the case of palladium, world demand has risen recently because of increased use in autocatalysts and what is probably a temporary increase in demand for dental alloys, rather than as a result of any additional needs for jewellery.

All the precious metals except gold are consumed mainly in the industrial regions: North America, Japan and Europe. These three zones currently account for 90% of Western world (referring to market economy countries) consumption of platinum and palladium, about 75% for silver but only slightly less than half of world gold consumption. More than 50% of world gold consumption in 1992 is thought to have occurred in the developing countries.

Gold

The EC accounts for just under 25% of total Western world demand for gold (Table 2). In 1992 EC utilisation is estimated to have increased by 8%, a slightly larger improvement than in previous years. It is Italy which traditionally dominates EC demand. The jewellery industry there used 461 tonnes of gold in 1992, which is about 75% of the total EC usage for jewellery estimated at 620 tonnes. Much of the Italian production is exported to North America, the Middle East and other EC States such as Germany and the United Kingdom, although it is Italy itself which is by far the largest jewellery market among EC member states, consuming some 161 tonnes of fine gold in the form of gold jewellery. Recorded demand for such jewellery rose during 1992 in France, Germany and especially Spain, but remained static or fell elsewhere such as the United Kingdom. In the first part of 1993 EC consumption weakened as recession and currency turbulence affected jewellery purchases.

There was little change in 1992 demand for gold for other purposes. The demand from the electronics industry was static but decorative applications again improved slightly. The use of gold in dentistry once again rose in Germany to meet an estimated demand of 14.2 tonnes, a 20% growth from 1991. This was largely due to an acceleration of dental treatments in 1992 to forestall changes in the health insurance programme which came into force on 1 January 1993.

Silver

Industrial demand for silver in the EC now represents about 33% of the Western world total (Table 3). One principal consumer sector in Europe is the photographic industry, where overall demand has remained steady in recent years. The other is jewellery, cutlery and silver tableware where Italy once again is by far the largest manufacturer in the world. Usage of silver in the electrical engineering and electronics industries is still declining.

Platinum

In 1992 the EC accounted for approximately 23% of Western world platinum demand, up from about 19% in 1991 (Table 4 and 5). This upward trend is primarily because of its use in catalytic converters for the car industry. As from 1 January 1993 the new EC directive on vehicle exhaust emission required all new petrol engine cars to be fitted with such catalytic systems, all of which contain small quantities of the platinum group metals. European car manufacturers prepared for this deadline well in advance. Some 66% of new petrol engine cars built and sold in Western Europe in 1992 were fitted with catalysts as well as a rising proportion of diesel engine cars. However, EC car production has fell in 1993 due to economic recession, so platinum demand in 1993 for EC autocatalysts is not likely to be as high as originally expected.

While EC industrial demand for uses other than car catalysts tends to fluctuate from year to year, European demand for jewellery purposes has been increasing in recent years with exception in 1992 when it remained stable, but in Italy which showed some growth. Demand for platinum jewellery is especially high in Japan. In 1992, 39 tonnes of platinum were used by Japanese jewellery manufacturers compared with 104 tonnes of gold, whereas in the EC jewellery trade the ratio was 2 tonnes of platinum to 620 tonnes of gold.

Palladium

EC demand for palladium represents about 17% of Western world consumption (Table 6 and 7). The use in dental alloys remained comparatively high in 1992, especially in Germany forestalling the 1993 health insurance changes, while electronics usage also increased as industrial capacity continued to expand. The volume of palladium used in the automobile industry of the EC started to increase significantly in 1992 as new technical developments began to be exploited in Europe.

Supply and competition

Gold is mined in most continents apart from Europe and is usually, but not always, the most valuable metal in its ores. The largest output still comes from the Republic of South Africa but mines with cheaper production costs have been opened up in America and the Pacific region. World supply from old gold scrap increased by almost 7% to 435 tonnes as more old jewellery was recycled in the Middle East and India and was in fact the next biggest source after South Africa's 614 tonnes of primary gold.

Silver is largely a by-product of lead and zinc mines, particularly those in Mexico and Peru so far as primary mineral sources are concerned. Some 129 tonnes out of total 1992 silver output of 482 tonnes, is thought to be derived from secondary sources such as scrap and residues from the photographic industry.

Of the six platinum group metals, it is platinum which dominates in the South African primary ores. However in the CIS and Canada where the platinum group metals are found in nickel ores, more palladium than platinum is actually recovered and the CIS is normally the largest supplier of palladium to the Western world .

Much of the platinum group metals used in industry is eventually recycled. As cars fitted with catalytic converters in the

Table 6: Palladium
Breakdown of demand by application in Western Europe

(kg)	1987	1988	1989	1990	1991	1992
Autocatalyst	160	160	160	160	160	1 240
Dental	7 460	8 240	7 780	8 090	9 330	9 330
Electrical/electronics	6 220	6 840	6 530	6 220	6 220	6 530
Jewellery	930	1 090	1 090	1 090	1 090	1 090
Other	2 330	2 490	2 640	2 800	2 490	2 800
Total	17 100	18 820	18 200	18 360	19 290	20 990

Source: Platinum 1993, Johnson Matthey

Table 7: Palladium
Demand by region

(tonnes)	1987	1988	1989	1990	1991	1992
Western Europe	17.1	18.8	18.2	18.4	19.3	21.0
Japan	44.5	47.8	47.1	47.5	56.0	55.4
North America	32.2	31.7	33.3	33.6	34.1	36.1
Rest of Western world (1)	5.3	5.4	5.3	6.7	8.6	8.9
Total Western world	99.1	103.7	103.9	106.2	118.0	121.4

Source: Platinum 1993, Johnson Matthey

1970's and early 1980's in North America and Japan reach the end of their useful life, a steadily growing source of platinum has been spent car catalysts, which now yield the equivalent of about 16% of the platinum currently required for new car catalysts.

The mineral sources of gold and silver are widely dispersed and mining activity is subject to only limited political risk. In the case of the platinum group metals, which rely to such an extent on the sources in the Republic of South Africa and the CIS, there is a risk that internal political events might affect supplies. However substantial stocks are held both by the refiners/fabricators of these metals and also the commodity markets which would be ample for short term needs.

INDUSTRY STRUCTURE

Companies

The principal precious metals refiners and fabricators of the EC operate on an international scale and are world leaders in their field. Prominent names are Degussa and Heraeus in Germany, CLAL in France and Johnson Matthey in the United Kingdom. The US precious metals firm, Engelhard Corporation, is also well established in several EC countries. Major EC base metal refiners with significant precious metal involvement include Union Minière in Belgium, Norddeutsche Affinerie in Germany and Inco in the United Kingdom.

The installed precious metals refining and fabrication capacity controlled by the EC industry as a whole is the largest in the world and exceeds that of equivalent US and Japanese firms. It draws its supplies from all over the world both in the form of primary metal from the mines and secondary or recycled metal. It also sells its fabricated products not only within the EC, but also in the developing countries of Africa, the Middle East and Asia.

The EC precious metal concerns form an advanced technology, high performance industry which is very strongly focused on research and development. This encompasses new uses for the precious metals as well as the discovery of techniques for economising in the quantities of precious metals used in existing applications.

Prices

The main precious metals are all traded on international commodity markets, in particular those of London, New York and Tokyo, and prices can be quoted on a 24 hour basis. Thus refiners and fabricators are able to hedge prices quoted to their customers to avoid the risk of price movements. Gold is the metal perhaps most affected by speculation and is usually sensitive to the world political and economic climate, largely because it is the precious metal of most interest to investors and speculators. Although silver and the platinum group metals are industrial metals to a much greater extent and their prices are therefore, subject mainly to supply and demand expectations, in practice they still move to some extent in sympathy with the price of gold.

For the last few years precious metals prices in US dollar terms have been dropping as supply has been ahead of demand. At the beginning of 1993 however, prices began to rise again as demand in some markets such as the US has recovered and there has been a renewal of speculative interest for investment purposes (Figure 1).

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Cobalt
NACE 224

The EC cobalt industry is the world leader in cobalt powder and oxide production, as well as a major supplier of cobalt salts worldwide. The "cradle" of special cobalt products i.e. powders, oxides and salts is Belgium, where considerable production expertise has been developed since the beginning of the century in the treatment and processing of cobalt metal and raw materials originating in the Shaba copper mines in Zaire. Today, cobalt special products are a worldwide business with products from the former Soviet Union and China appearing in western markets. However, the EC still retains a large proportion of the capacity to satisfy the market, 40 to 45% in fact, with plants operating in Belgium, Germany, France and Great Britain, directly involving at least 7 companies.

INDUSTRY PROFILE

Description of the sector

Cobalt metal is shiny, grey and brittle with a closely-packed hexagonal (CPH) crystal structure at room temperature, which changes at 421 degrees C to a face-centred cubic form. Cobalt is supplied to the end-users either as a metal in the form of pieces or powder or as a special product in the form of fine powders, oxides or salts. The metal is not used as a structural material in the pure form, but always as an alloy or a component of another system.

As the central component of Vitamin B12, cobalt is one of the 27 elements essential to humans. It has unique properties which make it extremely valuable in many industrial applications. It has a high melting point, 1 493 degrees C and retains its strength to a high temperature. It is ferromagnetic, only nickel and iron share this property. It is multivalent and easily enhances catalytic action.

As there are no longer any viable cobalt bearing ores in the EC, cobalt processors rely entirely on imported cobalt feed supplies, be these metal, mining or metallurgical residue or scrap.

All, bar one, EC special products producers have to source cobalt outside their own business. Previously, cobalt supplies in the West i.e., market economy countries, were dominated by Zaire and Zambia, indeed, 70% of metal production came from these two sources in 1990. This situation has changed during the last few years with Russia becoming a net exporter of cobalt so that in 1992, Zaire and Zambia's share had fallen to 50%.

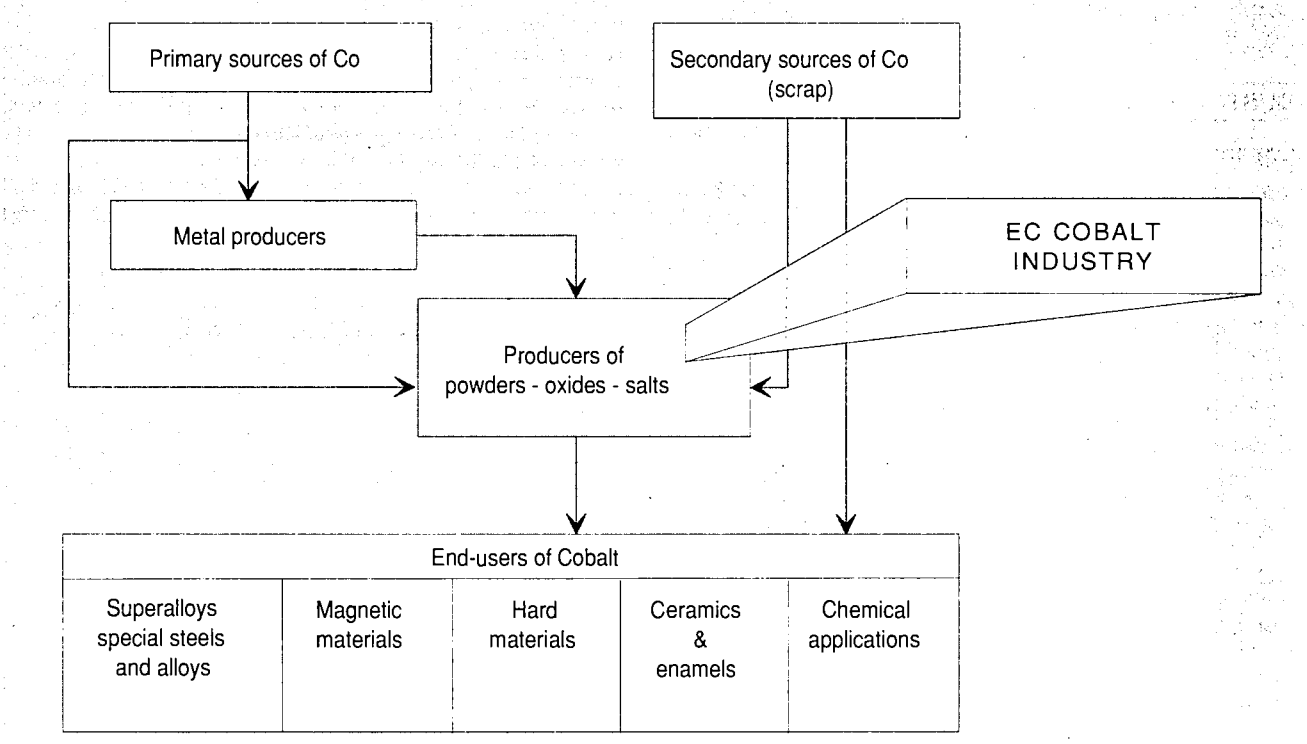
Europe is a major market for EC cobalt special products producers, but they must also compete in export markets as capacity far outweighs European demand. The main markets are the USA, Japan, Taiwan, South Korea and other Pacific Rim countries. These markets contain indigenous competitors and other international companies compete there as they do in Europe with the EC suppliers.

Figure 1 shows the overall cobalt market structure and the EC industry within it. Consumers of cobalt use the metal, as well as cobalt special products, to produce magnets, alloys (super alloys and hard facing), soft magnetic materials, high speed steels, and other cobalt compounds.

International comparison

Demand for cobalt essentially arises in the industrialised countries. Europe, North America and Japan take the lions shares of total market economy countries demand which is currently hovering at a level of 17 500 tonnes per year. Today's geographic distribution of demand is shown in Figure 2.

Figure 1: Cobalt
Structure of the cobalt market



Source: Eurométaux

Table 1: Cobalt
Products and applications

Forms/Products / Applications	Metal (cathodic or powder)	Powders		Oxides	Inorganic salts					
		extrafine	mesh		hydrate	sulfate	chloride	carbonate	acetate	nitrate
Special steels and alloys	x		x							
- high strength steels										
- high t° alloys										
- tool steels										
- Implant a loys										
- other special purposes alloys										
Magnetic materials										
- permanent magnets	x		x							
- soft magnetic alloys	x		x							
- recording tapes treatment						x				
Hard materials										
- cemented carbides		x	x							
- diamond tools		x	x							
Catalysts				x	x	x	x	x	x	x
Pigments/ceramics				x	x	x		x		
Enameling				x						
Metallic Soaps	x				x	x	x	x	x	x
Animal feed/ fertilizer additives						x		x		
Advanced electronics				x						

Source: Union Minière

The cobalt market is a mature one. For 4 000 years cobalt has been used for ceramics; more recently, it has been used in super alloys and magnets for the past 50 to 60 years. There are many new uses in electronic recording, anodising, batteries, amorphous soft magnets, etc. However, these do not currently generate a large tonnage demand. The consumption curve has in recent years been declining, as shown in Figure 3. To some extent, this has been a technological rather than economic shift, although one must to some degree blame the uncertainty about supply which resulted from the late 70's turmoil in Zaire. Demand has fallen due to the development of substitute products which is illustrated by the following examples: nickel super alloys, albeit cobalt containing, replaced cobalt alloys, cobalt-free high speed steels were developed, ALNICO magnets were replaced by ferrites, etc.

Table 2: Cobalt
EC cobalt special products manufacturers

Company	Country	Product
Chemcat	United Kingdom	Salts & Oxides
Chempro	France	Salts
Durham Chemicals	United Kingdom	Salts / Organics
Eramet - SLN	France	Chloride
Eurotungstène	France	Powders
Hermann C. Starck	BR Deutschland	Powders & Salts
Union Minière	Belgique/België	Powders & Oxides

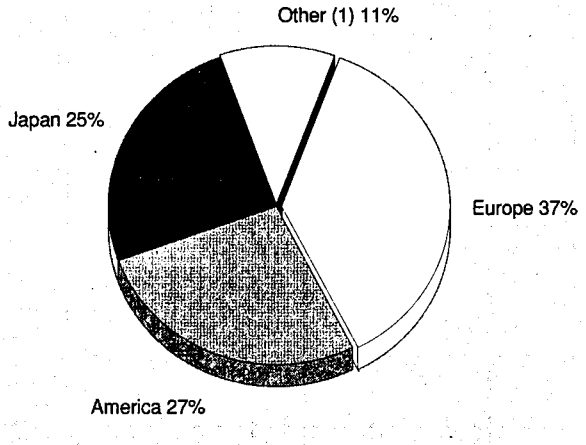
Source: Union Minière

MARKET FORCES

Demand

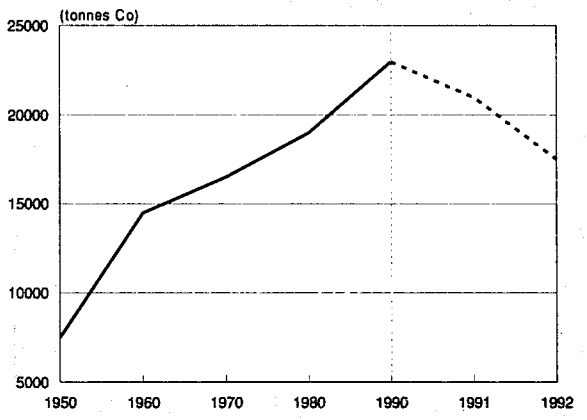
Until the 20th century, cobalt was only available or used as an oxide to produce blue colours. Its modern uses developed with Elwood Hayne's work on heat and wear resistant alloys (Stellite), the development of aluminium-nickel-cobalt (ALNICO) permanent magnets in Japan, and the use of cobalt as a binding agent in tungsten carbide production in Germany.

Figure 2: Cobalt
Estimated geographical breakdown of cobalt demand, 1992



(1) Other market economy countries only.
Source: Cobalt Development Institute

Figure 3: Cobalt
Estimated cobalt demand in the market economy countries



Source: Cobalt Development Institute

Cobalt is consumed in various forms and for many different applications, which are summarised in Table 1.

About 18 000 tonnes of cobalt are consumed each year in the market economy countries. At present, demand from EC customers for special cobalt products is about 3 000 tonnes cobalt per year (estimation is based on the early 1990's), 36% is in the form of oxides, another 36% is in the form of salts, and the remaining 28% in the form of powders. This demand mainly comes from the hard materials industry consuming powders, the pigments and ceramic industry consuming oxides, the metallic soap manufacturers consuming salts, the animal feed and fertiliser sector also consuming salts and the catalyst industry consuming salts and oxides.

It should be noted that cobalt demand in the EC includes an additional estimated 3 000 tonnes cobalt per year, consumed in the form of metal by the steel and alloy industry, the permanent magnet industry and some segments of the chemical industry. As there are no cobalt metal producers in the EC, these requirements have to be imported in full.

INDUSTRY STRUCTURE

Companies

Although the EC has no cobalt mines or cobalt metal production, its industry is extremely strong in the processing of metal and of cobalt bearing raw materials into special cobalt products, i.e. powders, oxides and salts. The rated capacity of the EC cobalt processing plants can be estimated altogether at about 6 500-7 000 tonnes per year.

All the companies listed in Table 2, with the exception of Eramet-SLN (F) which processes its own mining by-products from New Caledonia, rely on feed supplies purchased on the international markets. Their output is not only intended for EC customers, but also for export, since their combined production significantly exceeds EC customer requirements. The EC cobalt processors have one major competitor in Europe, the OM Group, whose major shareholder is Outokumpu (Finland). The OM Group also competes with the EC cobalt processing companies on the international markets, chiefly in the Americas and Asia, which are significant outlets for EC products.

Although there are not many competitors with international scope, those that do operate internationally are fairly significant. Some of them supply special cobalt products as a by-product of other base metal activities i.e. Inco's cobalt oxide is a by-product of nickel-ore processing in Canada; and Rustenburg Platinum's cobalt sulphate is a by-product of platinum ore processing in South Africa.

Supply and competition

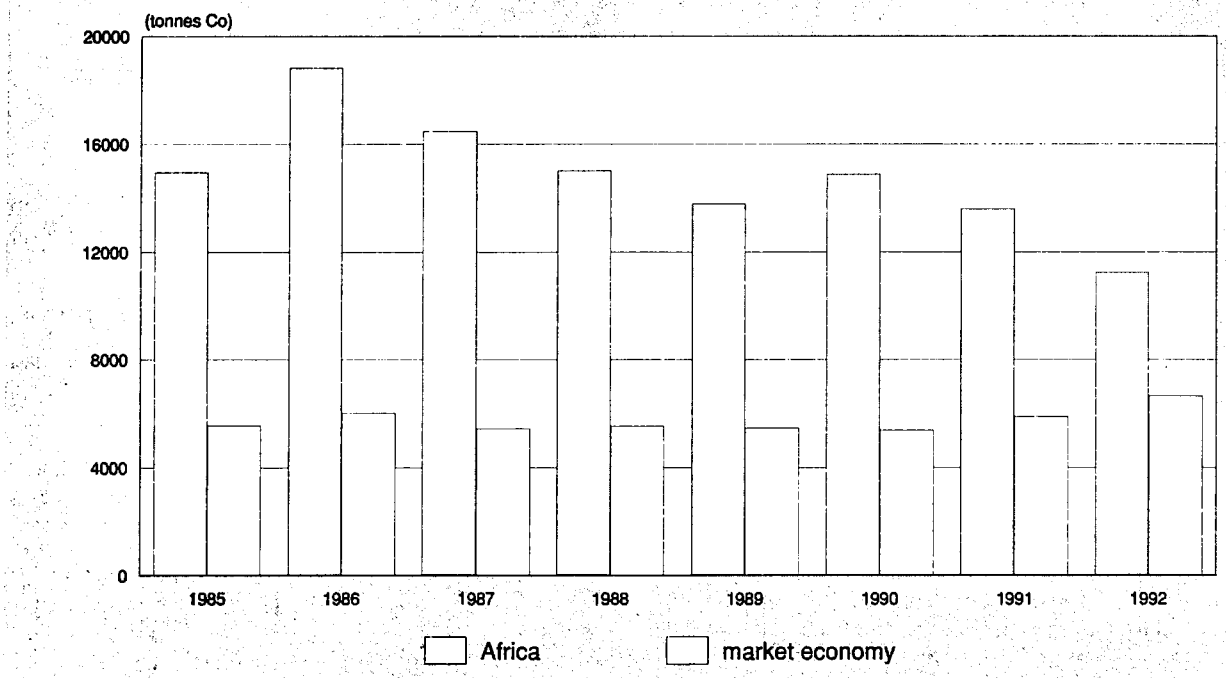
Competition between special cobalt product manufacturers is fierce in salts, strong in oxides and moderate in powders; the EC companies are world leaders in powders and oxides, while they keep up with the rest as major salt suppliers.

A summary description of the cobalt market at large helps to assess the relative position of the EC cobalt industry. The industry responds with diversity of its expertise out of consideration for the diversity of manufactured products and their industrial uses. The industry has experienced the international "spread" of its enterprises, which import their feed materials from remote countries and export their products not only within Europe, but also to all parts of the world. The industry encounters challenges which it must face in order to maintain its leadership and market share when competition is tough and demand has reached full maturity i.e., zero growth rate in the long term.

Mine production

Cobalt essentially arises as a by-product from the processing of copper and nickel ores, but it can also be associated with platinum or other non-ferrous metal ores. It only occurs as a major extracted element in the arsenide ores of Morocco currently exported to China. African mines are by far the largest suppliers of fresh cobalt units from the ground, accounting for nearly 63% of the market economy countries total output. The bulk of mine production is offered directly to the market in the form of metal which is produced in the integrated operations of Gecamines (Zaire), ZCCM (Zambia), Inco and Falconbridge (Canada). The balance of the output is supplied by the other mining concerns, either in the form of oxide or salts, or in the form of cobalt-bearing primary raw materials. Figure 4 shows the development of cobalt supply in market economy countries from 1985.

Figure 4: Cobalt
Cobalt production in market economy countries



Source: Cobalt Development Institute

Metal production

There are five major cobalt metal producers in the market economy countries. Their 1992 capacity and output are outlined in Figure 5. Since 1992, Russia has become a significant supplier of metal to the "western" or market economies market, however, but its actual output, arising at four different refineries, is difficult to assess.

About 65% of metal output is directly supplied to end-users in the special steels and alloys industry, the permanent magnet industry, and some segments of the chemical industry. The remaining 35% are supplied to cobalt processors, i.e., producers of powders, oxides and salts.

Production of powders, oxides and salts

The market for special cobalt products i.e., fine powders, oxides and salts, ranges from 9 to 11 000 tonnes cobalt content per year in the market economy countries. More than 50% of supplies result from metal processing, some 9% are the direct cobalt output of mining concerns (Inco's oxide, Eramet-SLN's chloride and Rustenburg Plat's sulphate), and the balance is produced from cobalt-bearing scrap, mining by-products or metallurgical residues.

More than 25 companies are active in the special cobalt product sector, though not necessarily supplying the full product range: competition is currently extremely fierce in salts, strong in oxides and moderate in powders. Total installed capacity is estimated at 13 000 tonnes cobalt content per year, of which 34% is for powders, 37% is for salts and 29% is for oxides.

Prices

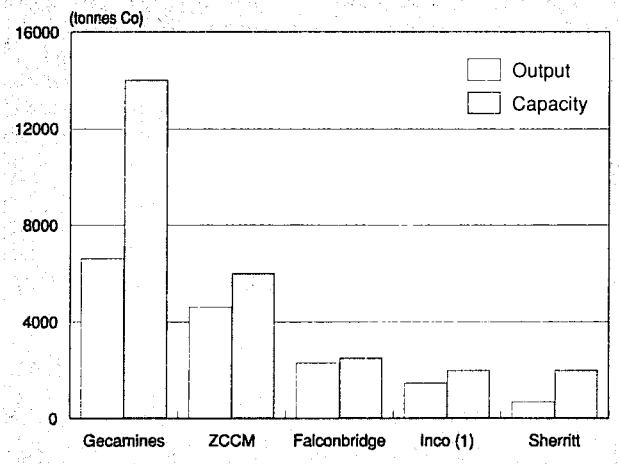
Cobalt has for many years been a producer priced material as shown in Figure 6, with Zaire and Zambia traditionally setting the quoted level.

Free market prices are quoted by trading companies, some of which have become deeply involved in cobalt in the early 1990's. This phenomenon is largely due to the appearance of significant quantities of Russian cobalt in the hands of the trade. The volume of free market traded cobalt is difficult to assess but is probably around 20% to 25% of total supply.

ENVIRONMENT

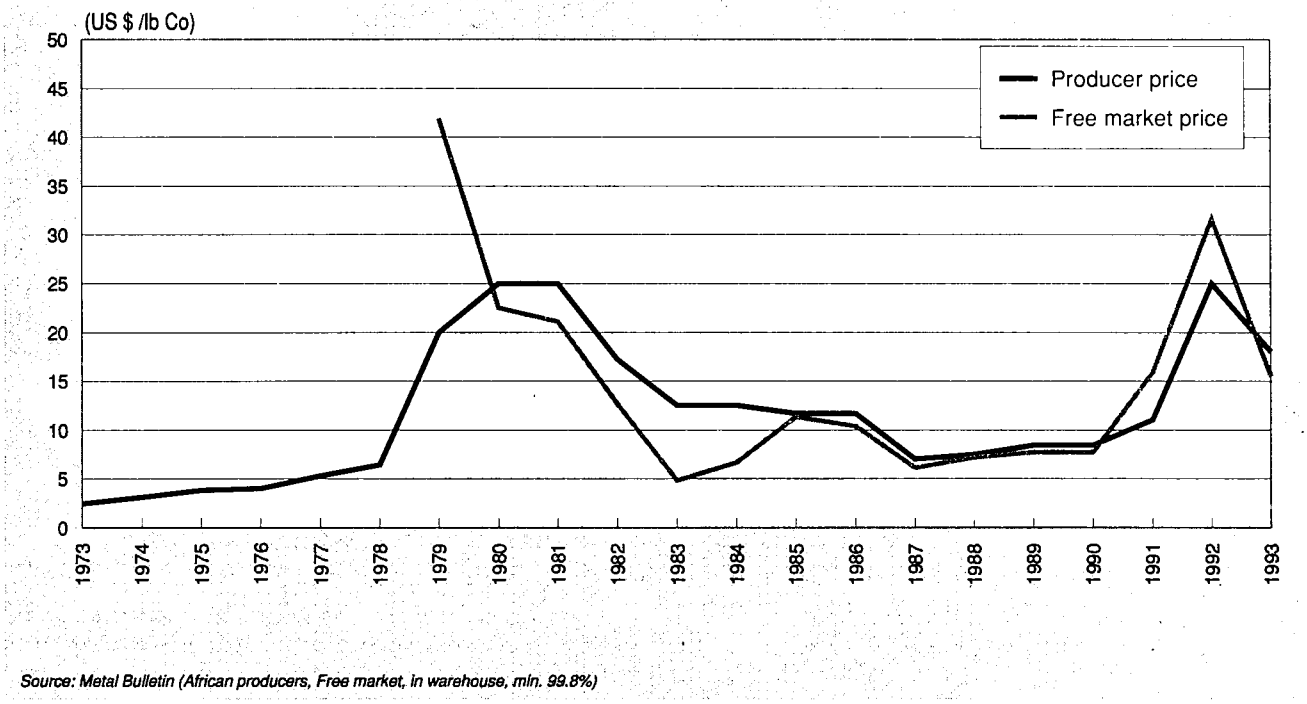
Cobalt is classified as non-carcinogenic in the EC (15th Modification to Directive 67/548/EEC). Material safety data sheets describing cobalt products are commonly available to the users from the suppliers, on request. Cobalt metal, oxides, sulphides and carbonates in the form of powder, are listed in the Seveso Directive (82/501/EEC), but will most probably be withdrawn

Figure 5: Cobalt
Cobalt metal production in market economy countries



(1) Includes cobalt contained in oxide production.
Source: Cobalt Development Institute

Figure 6: Cobalt
Cobalt metal prices



Source: Metal Bulletin (African producers, Free market, in warehouse, min. 99.8%)

from this list in the new version of the Directive currently being redrafted. Current legislation, in force or proposed, regarding Health and Safety is closely followed by the industry, especially with regard to the setting of occupational exposure standards.

Cobalt metal and oxide (Co_3O_4) are on Annex I of EINECS (European Inventory of Existing Chemical Substances) (80/C2760) and the industry is collecting data for submission to the Commission of the European Community, via a leading producer, by July 1994.

OUTLOOK

The EC cobalt industry faces several challenges. Feed stock must be imported due to the lack of indigenous cobalt sources. These sources are changing as the political scene shifts. Currently, the industry must rely on Central Africa (Zaire and Zambia), Canada/Norway (the Norwegian refinery is linked to Canadian mining operations) and Russia (CIS). This source is not new but consumption in Russia has fallen dramatically and surplus production plus stockpiles have rapidly appeared on western markets. To some extent, the new Russian material availability has made the industry less vulnerable to African instability and certainly prices have been more stable as a result.

The EC cobalt special product producers rely heavily on the availability of cobalt-bearing scrap and residue which they recycle. There is therefore great concern about the Basel Convention which, although well intentioned, should not be seen as causing the cessation of vital recycling and avoidance of disposal.

EC producers always face competition but the changes in Russia, and also China, outlined above have also paved the way for sometimes erratic competition from these areas. The industry is, however, strong and in some areas expanding.

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Ferro-alloys
NACE 224

In the wake of its customer industries, steel and aluminium, the ferro-alloy industry has seen its activity stagnate over recent years. Under severe competition from abroad, Community production volumes have fallen. Company restructuring, concentration and specialisation have improved the competitiveness of ferro-alloys and will enable the industry to take advantage of the recovery of its end markets.

INDUSTRY PROFILE

Description of the sector

The ferro-alloy sector in the EC covers the production of various metal alloys, generally from electric arc furnaces by carbothermic reduction of metallic oxides.

The two main product categories are bulk ferro-alloys and special products. Bulk ferro-alloys include: ferro-silicon, ferro-manganese, ferro-chromium, ferro-silico-manganese all of which are consumed in large quantities. Special products category includes: ferro-titanium, ferro-vanadium, ferro-boron, ferro-molybdenum, ferro-niobium, ferro-phosphorus, ferro-tungsten, as well as metals such as silicon, magnesium, vanadium, chromium, and other derivatives which are consumed in much smaller volumes.

A characteristic of ferro-alloys is that they are upstream of the production of other metal alloys, mainly steel and cast iron, and to a lesser degree aluminium, zinc, lead, etc. They enable alloying elements to be safely and economically introduced into metallurgical processes, thus giving certain desirable properties on to these alloys.

Bulk ferro-alloys are used almost exclusively in steel making and steel or iron foundries. Advances in metallurgy and increases in yield due to the growing use of continuous casting have contributed to limiting the consumption of bulk alloys. This trend, which has now slowed down, is counter-balanced by the growing proportion of steels using ferro-alloys, especially stainless steels, manufactured in electric furnaces.

The uses of special ferro-alloys are far more varied, and the proportion used in steel making has diminished over recent years in favour of those used in the aluminium and chemical industries, especially silicone products.

Recent trends

The consumption of ferro-alloys, which is heavily dependent on steel making, reached very high levels at the end of the 1980s. Since then, the slowdown of economic activity has hit the ferro-alloy sector and consumption has fallen steeply between 1991 and 1993.

An increasing proportion of the demand has been covered by imports, firstly from the newly industrialised countries and more recently from the East European countries and the CIS. As a result, especially over the past three years, Community production has declined. Community production mainly takes place in countries with large steel making industries. Current economic difficulties are tending to accelerate the concentration of production on a limited number of sites, especially for the larger volumes of bulk alloys. This concentration of production has resulted in continuing job losses up to 25% between 1990 and 1992. At the end of 1992, the industry employed around 6,000 people.

International comparison

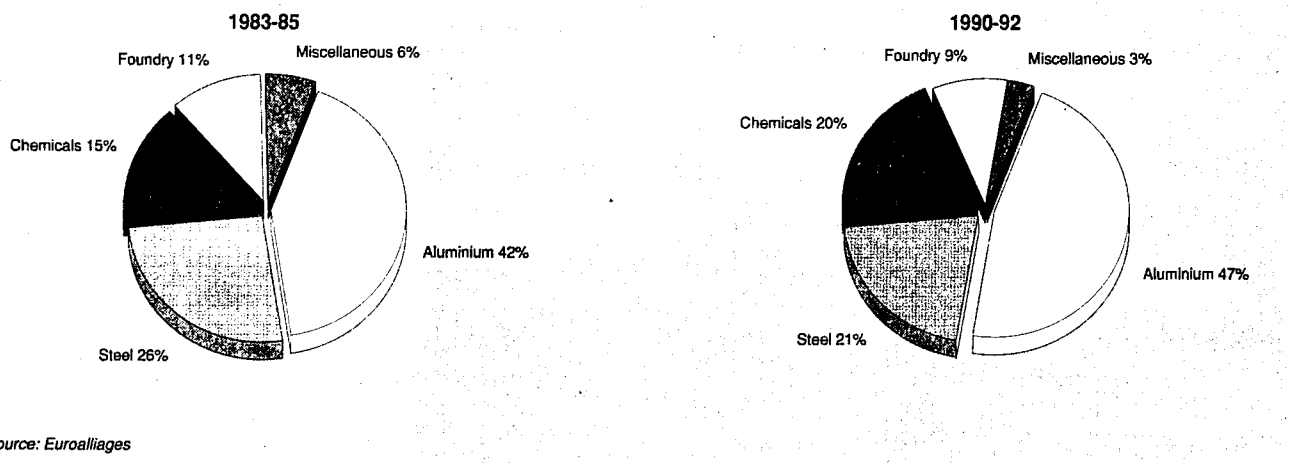
The three large industrial zones of the United States, Japan and the European Community are producers of steel and traditionally also produce ferro-alloys. All three of them have experienced the same trend of a growing proportion of imports in domestic consumption of ferro-alloys over the last ten years. In addition, the European Community, at the heart of world ferro-alloy production, has always had a much higher level of export activity than the other two zones. It is now confronted with the appearance of new producers and intensified international competition.

However, external competition has frequently been unfair, especially over the last few years, and notably when it comes from countries with State run trade. The United States and Japan have reacted to this threat to their domestic sources by imposing earlier and more severe limits on imports, especially anti-dumping duties, than the Community, thereby maintaining that local resources cover 40% to 45% of their needs. Within the EC, the rate of local resources covering need has fallen to 30% - 35%.

Foreign trade

More than three quarters of EC exports are directed to industrial countries. The United States receives almost 30% of EC exports, while EFTA and Japan receive nearly 25% each of total EC exports. Overall, these volumes are falling as the Community's share of the market is eroded by the newly industrialised countries and countries with State run trade.

Figure 1: Special ferro-alloys Breakdown by application



Source: Eurоalliages

Table 1: Ferro-alloys
Production by country

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
BR Deutschland	299	462	350	371	268	365	413	334	208	239
España	273	270	275	270	178	198	218	166	129	82
France	589	675	660	571	556	595	658	617	497	547
Italia	230	290	305	285	262	286	331	254	209	209
United Kingdom	90	85	89	112	107	129	163	162	195	150
Others	144	180	190	132	100	111	107	69	40	30
Total	1 625	1 962	1 869	1 741	1 471	1 684	1 890	1 602	1 278	1 257

Source: Eurocalliages

Table 2: Ferro-alloys
Main Indicators

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	2 576	2 993	2 947	2 860	2 860	3 096	3 335	3 072	2 812	3 035
Production	1 625	1 962	1 869	1 741	1 471	1 684	1 890	1 602	1 278	1 257
Net exports	-951	-1 031	-1 078	-1 119	-1 389	-1 412	-1 445	-1 470	-1 534	-1 778
Employment	N/A	N/A	N/A	N/A	N/A	7800	7700	7400	6900	6000

Source: Eurocalliages

Table 3: Bulk ferro-alloys
Main Indicators

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	2 277	2 657	2 614	2 502	2 494	2.703	2 907	2 654	2 432	2 682
Production	1 394	1 674	1 588	1 479	1 225	1 434	1 623	1 358	1 070	1 058
Net exports	-883	-983	-1 025	-1 023	-1 269	-1 269	-1 283	-1 296	-1 362	-1 624

Source: Eurocalliages

Table 4: Speciai ferro-alloys
Main indicators

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	299	336	334	358	366	393	428	417	380	354
Production	231	288	281	262	246	250	267	244	208	199
Net exports	-68	-48	-53	-96	-120	-143	-162	-173	-172	-154

Source: Eurocalliages

Imports into the European Community have grown over the last ten years to total 65% of consumption.

Although EFTA has maintained its overall market share within the EC during recent years, Latin American countries, like Brazil, and especially the East European countries have made considerable advances. These countries, especially the CIS, have an industrial base with enormous capacity, but low productivity. The collapse of their steel production has made available significant quantities of ferro-alloys which have been exported in order to obtain hard currency.

For logistical reasons most of these CIS exports are sent to the European Community. The Community ferro-alloy industry has therefore been confronted with considerable competitive pressure and has lost ground in its own market. Initiatives have been undertaken to re-establish fair competition which should preserve the future of the Community industry and enable the industrial sectors concerned to guarantee the independence of their sources of supply by maintaining significant domestic production.

MARKET FORCES

Demand

Demand for ferro-alloys is linked to the global development of its main markets, steel and aluminium making and is affected by the cyclical nature of their activities. Beyond this general observation, there are however considerable variations between the different sectors of the market.

Steel making and iron foundries

Practically all bulk alloys and one third of all special alloys are consumed by the iron and steel industries, which include steel making (sub-divided into oxygen steel and electric steel) and iron foundries. The foundries have different consumption requirements for their various types of product as well as their specific consumption.

Oxygen steel represents 67% of steel production in the Community although its share of the total is gradually diminishing. Since oxygen steel has made considerable advances in productivity in recent years with technology improvement like continuous casting, specific consumption of ferro-alloys has regularly declined. With relatively stable demand for steel, this represents a fall in the total consumption of ferro-alloys which is now below 10 kilograms of ferro-alloy per tonne of steel.

Electric steel has experienced a regular increase in its share of production, offsetting the relative decline in the production of oxygen steel. Its productivity has also increased, resulting in a fall in the consumption of ferro-alloys for a given product mix. But the increase in the share of highly alloyed steels, especially stainless steels, has more than compensated for the decline in consumption, and the demand for ferro-alloys has grown in this market segment.

Iron foundries consume a large proportion of the special alloys used in iron metallurgy and their consumption has been more or less stable. The global demand for ferro-alloys for iron metallurgy has followed that of steel, resulting in a decline in demand for ferro-alloys compared with the levels reached in 1989.

Aluminium

The aluminium industry is the second largest customer for bulk ferro-alloys and the largest customer for special ferro-alloys. It uses special alloys, mainly silicon metal and magnesium metal and today consumes almost half of all output in this market segment. Following strong growth in demand up to 1989, aluminium has been hit by recession, especially in the construction and car industries.

Chemicals

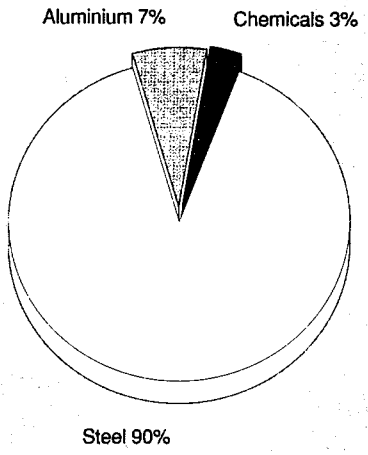
The chemical industry consumes mainly silicon metal, a raw material for silicones, which experienced a considerable growth of 80% over the last ten years. Despite vigorous growth in these products over a long period, consumption nevertheless fell slightly in 1992/93.

Supply and competition

For ten years the Community's ferro-alloy industry has been confronted with market stagnation, practically zero long term growth, and cyclical fluctuations in demand which lead to cyclical variations in price, with troughs which are more and more difficult to absorb. To tailor supply to market developments and competition, producers have undertaken large scale restructuring. Since the end of the 1970s we have seen a continuous and increasing concentration of production on the most productive plants. From 1990 to 1992 alone, 25% of industrial sites were closed in order to concentrate production. In addition, flexible working methods have been adopted, such as winter stoppages, to adapt production to the constraints of a competitive energy supply.

However, these measures have not prevented imports from growing; these imports are frequently sold at dumping prices, especially during periods of economic difficulty, which has allowed imports to continue to grow both in market share and absolute value. This has been particularly marked during the last few years with the appearance of supplies from the CIS, where there is significant production capacity. With the drop in production from 165 million tonnes in the mid eighties to less than 100 million tonnes in 1993, the ferro-alloys that the CIS steel industry no longer requires, have been redirected towards western markets, especially Europe for logistical reasons. These supplies, at prices which bear no relation to the economic costs of production, have created serious distortions of competition. European producers have made representations to Community bodies to ensure that the industry's efforts are not wasted and prevent the industrial sectors concerned from becoming fully dependant on imports. The industry in the Community has simultaneously pursued its initiative to cut costs and provide its customer industries with products and services which exotic suppliers with a different industrial tradition cannot offer.

Figure 2: Ferro-alloys
Breakdown by application, 1992



Source: Eurolliages

INDUSTRY STRUCTURE

Thirty two firms are involved in ferro-alloy production in the EC, some of which are subsidiaries of large industrial groups Viag (D), Pechiney (F) and therefore represent only a relatively limited part of the activities of the groups to which they belong. By contrast there are small companies which concentrate on production of a limited range of ferro-alloy products, or even a single product in which the company is highly specialised. All of them are committed to product quality and customer service.

ENVIRONMENT

Ferro-alloy production uses electric furnaces, generally of the open hearth type, into which are loaded natural products such as quartz, lime, various minerals, wood, etc., varying in physical and chemical composition.

For a long time the ferro-alloy industry has been committed to reducing the quantity of dust produced by the process by installing filters in its factories and recycling to the extent possible the manufacturing by-products. The concentrations which have taken place during the past ten years have speeded up this development by enabling larger furnaces to be built with greater yield, and with emissions which are more easily controlled than those of many small furnaces. These measures are costly and the industry currently devotes a quarter of its investment to environmental protection equipment, thus fully taking into account the European Community's concerns. It would be fair to request from the trading partners the same sort of measures: this is particularly the case for greenhouse gas emissions. By its very nature the ferro-alloy industry, whose basic tool is an electric furnace in which metallic oxides are reduced using carbon, is a producer of carbon dioxide (CO2). A tax on energy consumption and/or CO2 emissions would have no motivating effect since the increasing size of furnaces has already allowed high levels of efficiency. On the contrary, this tax would have a direct and unbearable effect on the competitiveness of Community producers, leaving the field open to less efficient producers in countries where there is as yet little awareness of ecological issues.

OUTLOOK

The 1992/1993 recession, particularly severe in Western Europe although not limited to the region, should give way to recovery in 1994, which would benefit the industry's main customers, the car and construction sectors.

The anticipated growth in the steel making industry will be accompanied by a search for improved productivity with a decrease in the specific consumption of ferro-alloys, although not to the extent seen in the recent past. Therefore, European demand for ferro-alloys should stabilise. Certain sectors, such as silicones, seem set to benefit from sustained growth. There will therefore be a growth in demand for the corresponding metals or ferro-alloys. The measures taken by the Community to maintain fair competition in internal markets should in addition enable Community production to benefit from better economic conditions and permit the Community industry to maintain its independence from external suppliers.

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Overview
NACE 24

The second half of the 1990s should prove to be more favourable for the non-metallic mineral products sector than the first if construction industry forecasts are achieved. Restructuring and modernisation activities will help the EC industry to be even more technically advanced and competitive on a world level than it is at present. Imports have been growing in recent years particularly from countries with low labour costs. The sector is a major user of fossil fuels and is thus heavily involved in environmental issues regarding atmospheric pollution. However, efforts have been made to control sulphur dioxide and dust emissions.

INDUSTRY PROFILE

Description of the sector

Non-metallic mineral products are made up of the following groups: clay products (bricks and roof tiles: NACE 241); cement, lime, and plaster (NACE 242); concrete (NACE 243); glass (NACE 247); and ceramic goods (NACE 248). The working of stone (NACE 245) is covered in Chapter 2 of Panorama. Clay products, cement, concrete, and plaster are used almost exclusively by the construction industry, which also features prominently as a major customer for lime, glass, and ceramic goods (particularly tiles and sanitary ware). Nevertheless these latter products are widely used across a broad spectrum of industries embracing metallurgy, chemicals, food and beverages, electronics, and electrical and mechanical engineering. A number of glass and ceramic items are domestic consumer items.

Recent trends

EC production of non-metallic mineral products was valued at around 90 million ECU in 1992 and involved materials measured in hundreds of millions of tonnes. The real annual growth rate over the 1983-1992 period averaged 1.5% for production and 2.1% for consumption although this hides the fact that the major growth occurred during the 1987-1990 period in response to the relative boom in construction activity. Imports of non-metallic mineral products surged during this period and have continued to grow since. It should be noted that in 1992, imports amounted to 4.5% of total consumption compared to 3.5% in 1983. As an important exporter of many of the products in this group, particularly in the glass and ceramic goods sectors, the EC maintains a clearly positive trade balance even if it has fallen over the period. The current recession in the construction industry is reflected in a marked fall in both production and consumption since 1990.

International comparison

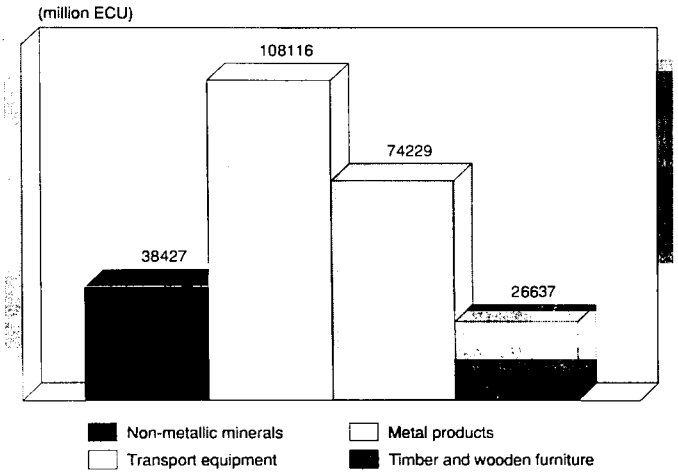
The EC is the world's leading producer of non-metallic mineral products and its 1992 production exceeded in value those of the USA and Japan by factors of 2.3 and 2.5 respectively. The industries of both the EC and Japan have grown in real terms whilst that of the USA has contracted.

Foreign trade

Although over the 1983-92 period, foreign trade played only a minor role in the overall picture: imports average 4% of consumption and exports average 9%. It is actually much more significant in some sectors than others. For this reason the continuous fall in export-import ratio from 3.35 to 1.84 over the 1983-1992 has important implications for the EC glass, ceramic goods, and cement sectors. During the period each of these industries has experienced dramatic growth in low-priced imports: from Eastern Europe and Turkey in the case of glass and cement and from the Far East in the case of ceramic goods. In overall terms the EFTA countries and the USA are also important sources of non-metallic mineral product imports although their shares have decreased in favour of Eastern Europe, Turkey, and the Far East.

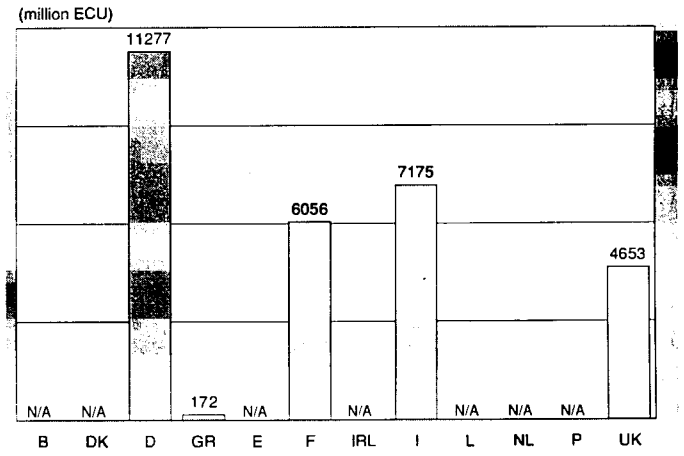
Meanwhile the value of EC exports of non-metallic mineral products has declined in real terms over the 1983-1992 period. This is mainly due to the falling contribution of cement since the level of exports for both glass and ceramic products have been more or less constant during this time. The destinations for these exports are well spread throughout the world although the EFTA countries and the USA have consistently taken between 45-50% of the total value each year. Intra-EC trade expanded rapidly during the 1980s but has since levelled off at around 14% of total activity.

Figure 1: Non-metallic mineral products
Value added in comparison with other industries, 1992



Source: DEBA

Figure 2: Non-metallic mineral products
Value added by Member State, 1992



Source: DEBA

Table 1: Non-metallic mineral products
Breakdown by sector, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Clay products	5 822	6 016	232
Cement, lime and plaster	15 128	15 103	344
Concrete and cement for constructional purposes	27 757	27 955	332
Glass	21 493	22 224	2 488
Ceramic goods	14 240	16 265	3 316
Others	2 612	2 785	504

(1) Except for trade figures, estimates are used if country data is not available.
Source: DEBA

Table 2: Non-metallic mineral products
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	54 489	58 161	58 254	59 726	64 248	72 269	80 380	84 153	86 880	87 052	88 600
Production	59 018	62 778	62 831	63 888	68 079	76 177	84 678	88 136	90 383	90 347	92 200
Extra-EC exports	6 459	6 938	6 993	6 180	5 982	6 409	7 197	7 085	7 116	7 216	7 660
Trade balance	4 529	4 617	4 577	4 162	3 832	3 908	4 298	3 983	3 503	3 295	3 600
Employment (thousands)	1 032.80	1 014.80	959.8	928.3	928.0	933.9	953.4	947.6	924.9	902.5	845.0

(1) Except for trade figures, estimates are used if country data is not available, specially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 3: Non-metallic mineral products
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	1.0	3.5	2.1
Production	0.5	2.8	1.5
Extra-EC exports	-3.7	-0.5	-2.3
Extra-EC imports	-0.4	12.3	5.1

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Non-metallic mineral products
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	6 459	6 938	6 993	6 180	5 982	6 409	7 197	7 085	7 116	7 216
Extra-EC imports	1 930	2 321	2 416	2 019	2 150	2 501	2 899	3 102	3 613	3 922
Trade balance	4 529	4 617	4 577	4 162	3 832	3 908	4 298	3 983	3 503	3 295
Ratio exports/imports	3.35	2.99	2.89	3.06	2.78	2.56	2.48	2.28	1.97	1.84
Terms of trade index (1)	103.8	102.0	100.0	100.5	101.0	102.9	103.4	107.5	107.7	109.3
Intra-EC trade	5 838	6 388	6 731	7 905	8 623	9 796	11 050	11 895	12 175	12 582
Share of total imports (%)	75.2	73.4	73.6	79.7	80.0	79.7	79.2	79.3	77.1	76.2

(1) Includes the working of stone (NACE 2450).
Source: DEBA

Table 5: Non-metallic mineral products
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	32.1	32.7	33.2	36.1	38.8	42.3	42.2	42.4	42.0	42.6
Productivity index	96.9	98.6	100.0	109.0	117.1	127.6	127.2	127.7	126.7	128.3
Unit labour costs index (3)	88.8	94.2	100.0	104.0	109.6	117.0	124.4	131.8	141.6	152.9
Total unit costs index (4)	87.6	94.6	100.0	101.8	107.2	117.4	129.7	135.8	144.8	151.7

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

MARKET FORCES

Demand

The construction industry accounts for over two-thirds of the consumption of non-metallic mineral products and thus the fortunes of the group have tended to follow the somewhat exaggerated peak and trough pattern of the past 6 years. For the same reason the current period of lower interest rates should see a renewal of construction activity which should be translated into increasing demand for non-metallic mineral products in the years ahead. Glass and ceramic goods demand is also partially affected by construction activity but overall consumption is spread more evenly across a range of industries from general manufacturing to food, beverages, and catering.

Supply and competition

Most of the products of this group are major bulk items of relatively low value that are based on local raw materials and are sold primarily to local markets. Transportation costs are always a major consideration and have generally proved a deterrent to competition from distant sources. Some of the higher value products in the glass and ceramics segments have always been exempted from such considerations but in the last decade or so major bulk items such as cement are being shipped increasingly long distances by sea. The enabling factor is the low cost of ocean transportation when large bulk carriers of 20 000 tonnes or more are involved. Thus a modern cement plant close to a shipping point can supply markets at competitive prices on the other side of the globe providing there is a bulk terminal at the other end to handle and store the product. European producers were actually among the first to take advantage of these opportunities but as former importers (for instance, in the Middle East) have installed their own manufacturing facilities not only have the markets disappeared but new exporters have emerged. Thus the market in the 1990s is much more competitive than in former decades and certain regions of the EC have become more vulnerable to competition from countries with low labour costs as in Eastern Europe or the Far East. Nevertheless most EC producers are competitive and will continue to supply the vast bulk of the EC's construction and industrial requirements. The principal threats to this competitiveness would come from any future legislation which reduced availability of raw materials or raised the costs of energy.

Production process

Europe has been at the forefront of many of the technological advances in processing methods employed by the non-metallic mineral products industries: from specifics such as the float glass process and ceramic forming and firing techniques to energy saving measures that apply to the industry as a whole. A close relationship exists between this industry and its equipment suppliers which can be expected to just as fruitful in the future as it has been in the past.

INDUSTRY STRUCTURE

Companies

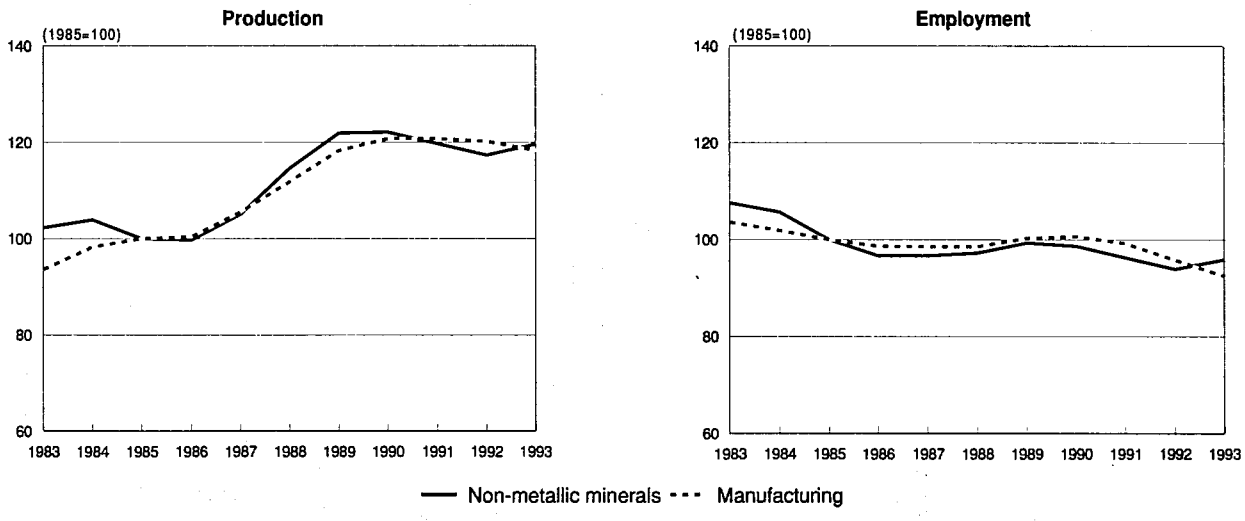
The diversity of products contained in this group is mirrored in the diversity of companies involved. These range from major international construction groups with turnovers measured in billions of ECU and employees into tens of thousands to small family-owned businesses with a handful of employees and a highly regional sphere of interest. Concentration is high in some segments such as cement and glass but low in others such as concrete products, bricks, and ceramics. Concentration is also high in some countries such as the United Kingdom and France but low in others such as Italy, Spain, and surprisingly Germany. However, the pace of concentration appears to be quickening as groups acquire a more obvious pan-European status. The top six non-metallic mineral products companies: Saint Gobain (F), Lafarge Coppée (F), Holderbank (CH), RMC group (UK), Pilkington (UK), and Redland (UK) account for about 25% of total production which is low compared to other industries. Nevertheless it should be recognised that many of the smaller and medium sized companies involved in non-metallic mineral product manufacture are highly efficient, modern, and deserving of international status in their own particular market niches.

Table 6: Non-metallic mineral products
Breakdown by size of enterprise, 1990 (1)

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	75 049	88.6	24.4	20.7
20-99	7 906	9.3	22.4	21.8
100 or more	1 741	2.1	53.2	57.5

(1) Provisional estimates; includes the working of stone (NACE 2450)."
Source: Eurostat

Figure 3: Non-metallic mineral products
Production in constant prices and employment compared to EC manufacturing



Source: DEBA, Census of Manufacturers, Nikkei

REGIONAL DISTRIBUTION

EC production of non-metallic mineral products is widespread throughout the Community. The location of production sites is often governed by the raw materials used e.g. cement factories based on limestone deposits, ceramics industries close to clay deposits, etc.

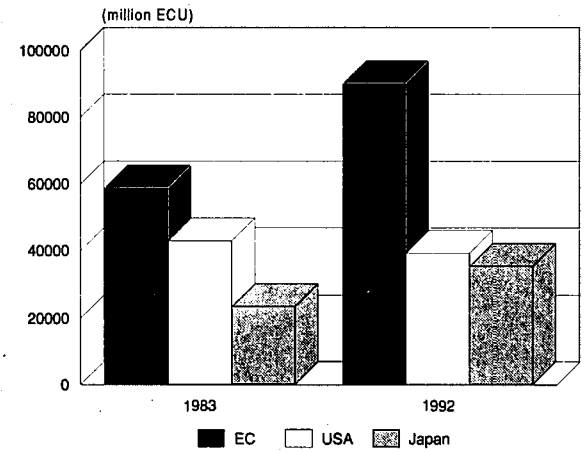
ENVIRONMENT

The non-metallic mineral products sector is one of the major users of fossil fuels and is thus a focus of attention with regard to atmospheric pollution. However, the sector has made major investments to comply with the existing legislation and has a very good record for controlling of sulphur dioxide and dust emissions. The cement industry is turning more and more to substitute fuels in order to reduce its reliance on fossil fuels. The various industries making up the sector have also been highly successful in introducing technical innovations to reduce unit consumption of energy and the glass industry in particular is held up as a model for the ecologically sound practice of recycling. Nevertheless the emission problems concerning the oxides of nitrogen and carbon are proving to be a more knotty problem. A punitive carbon tax could sound the death knell for much of the sector and thus efforts must be intensified to find a solution to treating these gases by methods which do not in themselves consume massive quantities of energy.

REGULATIONS

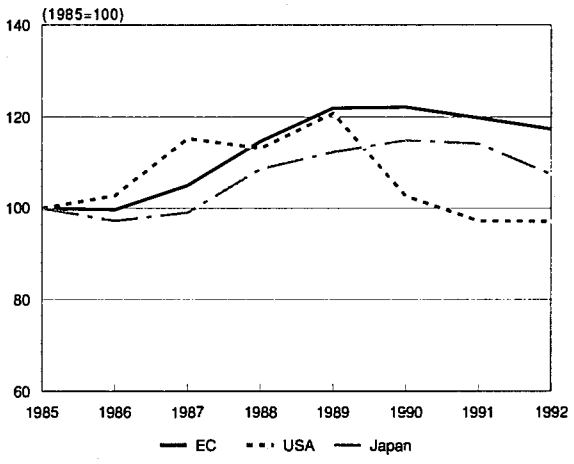
The EC building industry as a whole is in the throes of a major standardisation offensive through the European Committee for Standardisation (CEN). International standards already exist for many products within this sector but for others the move will help to raise standards and there should be an overall improvement in quality control and testing procedures.

Figure 4: Non-metallic mineral products
International comparison of production in current prices



1993 are Eurostat estimates.
Source: DEBA

Figure 5: Non-metallic mineral products
International comparison of production in constant prices



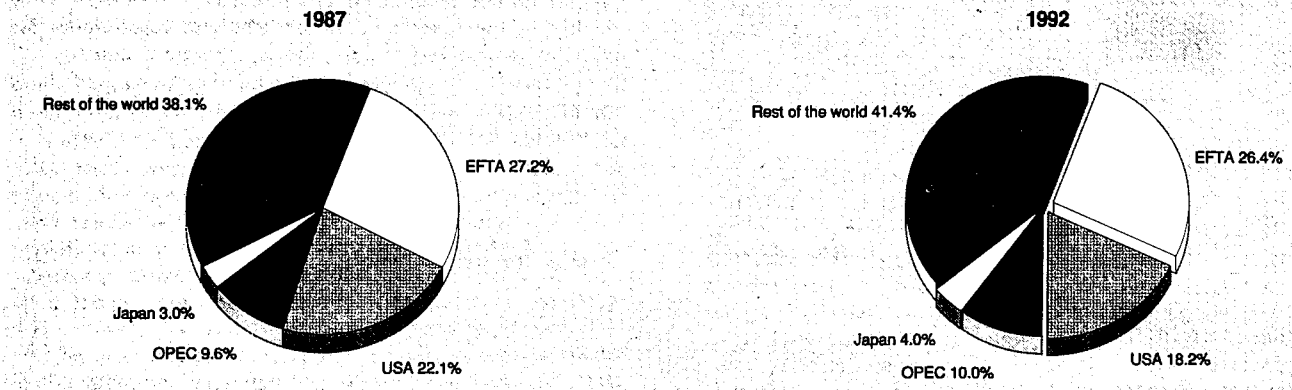
Source: DEBA, Census of Manufacturers, Nikkei

Table 7: Building materials
The eight largest companies in Europe, 1992

(million ECU)	Country	Sales	Profit	Employment (thousands)
Saint-Gobain	F	11 014	346	100
Hanson	UK	10 222	1 523	75
Lafarge Coppée	F	4 520	179	30
Holderbank	CH	4 289	143	35
RMC Group	UK	4 282	82	26
Pilkington	UK	3 353	-26	42
Redland	UK	2 622	112	22
Ciments Français	F	2 168	-190	17

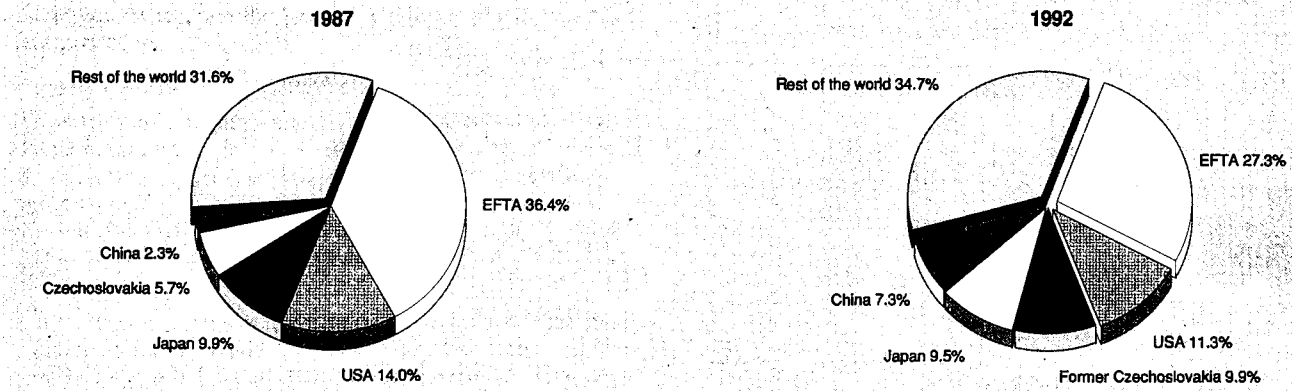
Source: Fortune 500

Figure 6: Non-metallic mineral products
Destination of EC exports



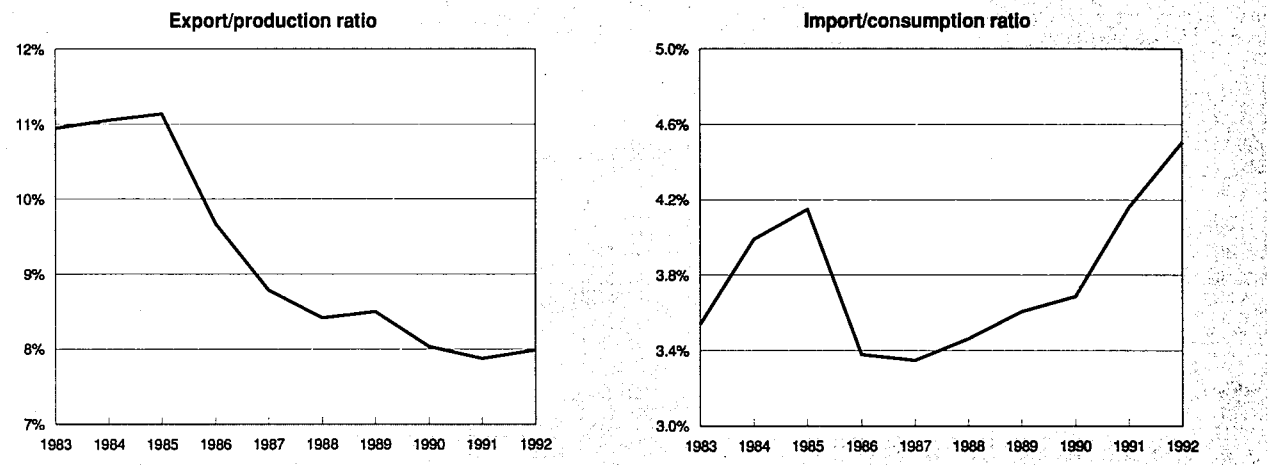
Source: Eurostat

Figure 7: Non-metallic mineral products
Origin of EC imports



Source: Eurostat

Figure 8: Non-metallic mineral products
Trade intensities



Source: DEBA

Table 8: Non-metallic mineral products
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.7	2.7
Production	0.7	2.5
Extra-EC exports	0.0	0.6

Source: B.M.Coope & Partners

OUTLOOK

Demand for non-metallic mineral products is expected to grow steadily in the latter half of the 1990s in response to the more favourable outlook for the construction industry. Although Eastern Europe has been regarded as a source of cheap imports in the past it is now being seen as a major area of opportunity for EC companies operating in this sector.

Written by: B.M. Coope & Partners

Clay products
NACE 241

Clay brick making is one of the oldest crafts in the world and the Ancient Greeks, Romans, and Etruscans can lay claim to being the earliest EC producers. Italy is still the largest producer in what is still the world's most important clay brick and tile producing region. Despite competition from a wide range of products based on concrete, wood, metal, and plastics, the modern clay brick and tile industry continues to be a major supplier to the EC building industry.

INDUSTRY PROFILE

Description of the sector

The principal clay products for constructional purposes are bricks and roof tiles. Clay extraction and treatment (Chapter 207) and brick making tends to be carried out by the brick making company itself as a single integrated operation. Nevertheless there are certain cases where large tonnages of clays are bought in from outside sources: for instance, when low cost by-product fireclays from open cast coal mining operations are available. The products are sold to the construction and civil engineering industries (Chapter 19).

Bricks are available in a wide variety of types based on size, shape, colour, type of processing, end use, etc. They may be solid, perforated (i.e. with a large number of small holes), or hollow (e.g. horizontal core). Northern climes tend to use solid bricks whereas the Mediterranean regions tend to use more hollow bricks. Perforated bricks are common along with solid bricks in Germany, Belgium, and Denmark. Another classification, particularly for solid bricks, divides bricks into commons (suitable for general building purposes, backing, etc.), facings (specially prepared with variations in colour and texture to provide an attractive appearance), and engineering bricks (high strength and low absorption for special load-bearing applications). Nor surprisingly there are strong regional characteristics in brick types as well as national ones.

Roof tiles have a special shape which facilitates roof covering. The production method is the same as for bricks. Generally it is possible to distinguish between the Mediterranean type (the roofs with a slight slope) and the north European type (for roofs with a steep slope). The brick and roof tile industry's main markets are houses, multi storey buildings and pavements. The roof tile industry covers maintenance, repair and transformation of existing buildings.

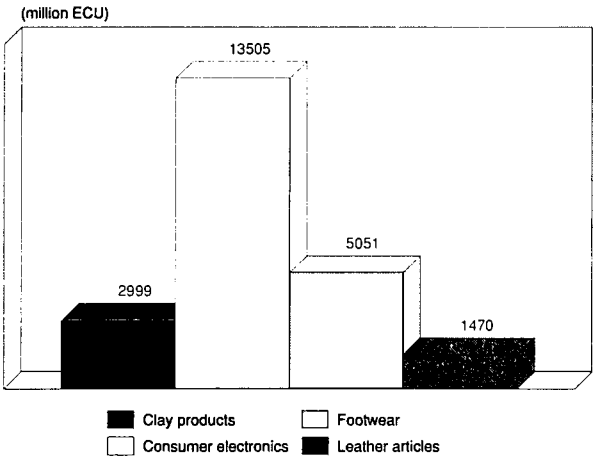
The principal producing countries in the EC are Italy, Germany, and Spain which together account for about 75% of total brick production and 65% of total roof tile output. The United Kingdom, France, and the Benelux countries are also significant producers.

Recent trends

EC production and consumption of bricks and roof tiles grew almost continuously in value terms over the 1983-92 period (at an average 3.5% per annum) although both production and consumption values remained constant in real terms during the same period. In fact the last three years have seen a marginal decline in real terms and a more marked decline is likely for 1993.

The production patterns have been different for individual countries with Italy and Germany showing strong volume growth since 1983 whilst France and the United Kingdom showed initial growth followed by a clear decline. Future growth is likely to be uneven too.

Figure 1: Clay products
Value added In comparison with other industries, 1992



Source: DEBA

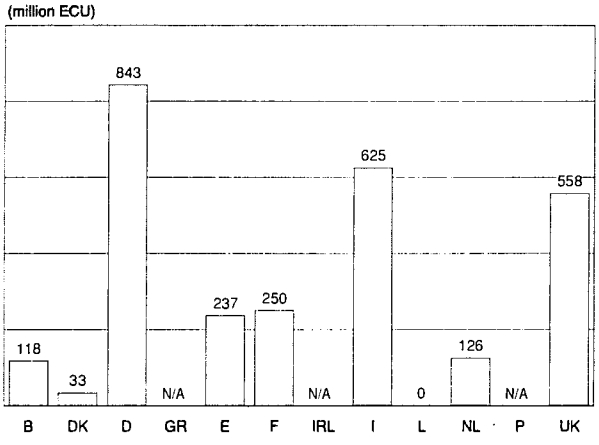
International comparison

The production of clay bricks and roof tiles in the EC is an order of magnitude higher than either the USA or Japan, where other materials such as concrete, wood, and plastics are predominant. The USA has shown a clear decline over the 1983-1992 period whereas Japanese production has remained fairly constant. There are some signs that US sales of facing bricks may now be on an upward trend.

Foreign trade

Foreign trade in bricks and roof tiles normally represents only a small part of overall consumption since the products are relatively high-volume, low-value products best suited to serve proximal markets. The types of products are also designed to meet the particular building characteristics which tend to be of a regional or national nature. Thus extra-EC imports represent less than 1% of total consumption although extra-EC exports are more substantial, averaging around 4% of production in recent years. The export trade can be divided into regular trade with neighbouring EFTA countries and more single-project-oriented shipments to destinations such as the

Figure 2: Clay products
Value added by Member State, 1992



Source: DEBA

Table 1: Clay products
Breakdown by sector

(thousands)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Bricks m3 (1)	29 281	29 790	27 626	28 488	29 186	30 877	49 495	50 881	51 408	45 289
Roof-tiles m3 (2)	29 706	35 051	28 444	32 587	32 019	34 659	37 356	130 311	133 840	132 171

(1) 1983-88, Belgium, Denmark, Germany, Ireland, Italy, the Netherlands and the United Kingdom;
1989-92, Belgium, Denmark, France, Germany, Italy, Luxembourg, the Netherlands, Spain and the United Kingdom.
(2) 1983-89, Italy and the United Kingdom; 1990-91, Belgium, Denmark, France, Germany, Italy, Luxembourg, the Netherlands, Spain and the United Kingdom
1992, Denmark, France, Germany, Italy, Luxembourg, the Netherlands and Spain.
Source: TBE

Table 2: Clay products
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	4 095	4 383	4 274	4 128	4 366	4 987	5 485	5 437	5 701	5 822	5 820
Production	4 310	4 668	4 535	4 362	4 591	5 162	5 680	5 629	5 891	6 016	6 040
Extra-EC exports	226.0	291.3	265.7	240.5	233.7	186.5	211.6	207.5	216.7	232.2	254.0
Trade balance	214.5	284.9	260.3	233.7	224.9	174.1	194.8	192.1	190.3	193.8	220.0
Employment (thousands)	104.2	102.6	94.0	87.4	85.5	85.1	85.4	80.7	77.1	75.0	69.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 3: Clay products
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	0.8	-0.4	0.2
Production	0.5	-0.4	0.1
Extra-EC exports	-5.8	2.6	-2.1
Extra-EC imports	-6.7	30.6	8.3

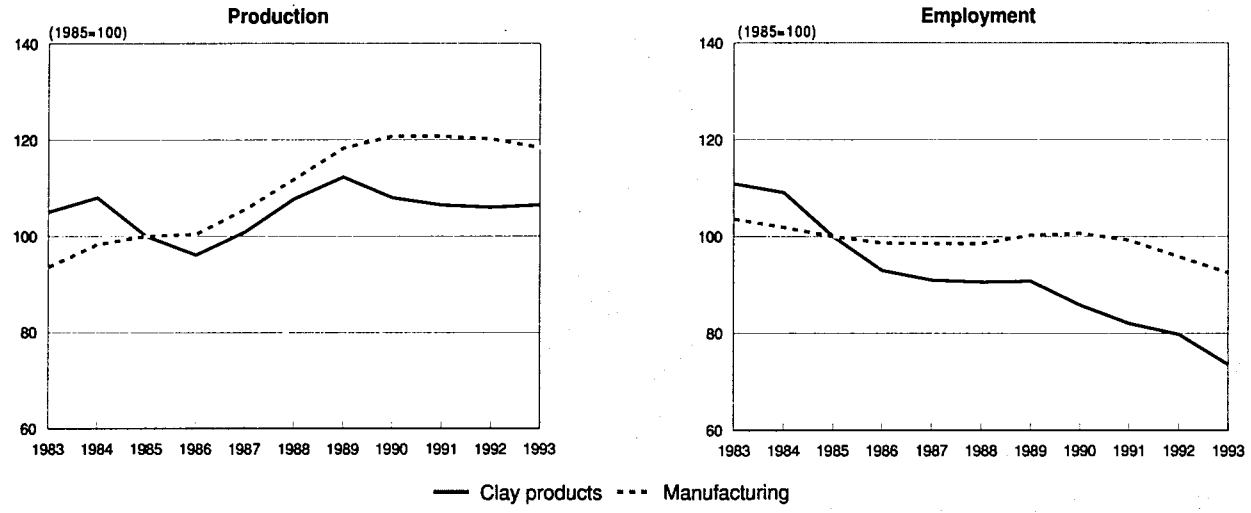
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Clay products
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	226.0	291.3	265.7	240.5	233.7	186.5	211.6	207.5	216.7	232.2
Extra-EC imports	11.5	6.4	5.4	6.8	8.8	12.4	16.8	15.4	26.3	38.4
Trade balance	214.5	284.9	260.3	233.7	224.9	174.1	194.8	192.1	190.3	193.8
Ratio exports/imports	19.7	45.5	49.2	35.4	26.6	15.0	12.6	13.5	8.2	6.0
Terms of trade index	105.7	102.8	100.0	92.2	79.3	77.0	75.5	77.7	82.6	81.1
Intra-EC trade	191.1	204.7	197.9	223.8	235.0	307.7	379.6	396.7	434.1	510.0
Share of total imports (%)	94.3	97.0	97.3	97.1	96.4	96.1	95.8	96.3	94.3	93.0

Source: DEBA

Figure 3: Clay products
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

Middle East and the Far East. Meanwhile intra-EC trade has more than doubled during the past five years, reflecting the increase in cross-border shipments in the region of north Germany, north-east France, and the Benelux countries.

MARKET FORCES

Demand

All bricks and roof tiles are consumed in building and construction and thus the construction industry is almost the sole customer; almost but not quite because there is a small volume of sales to the builders' merchants and the DIY (do-it-yourself) sector. Within construction the main market for bricks and roof tiles is the new residential building sector. As bricks tend to be ordered at the beginning of the construction process, the level of new housing starts tends to be a better guide to demand than more general construction output figures. Bricks are also used in non-residential building for exterior cladding as well as for walls, paving, etc. The maintenance market for roof tiles tends to be more important than for bricks.

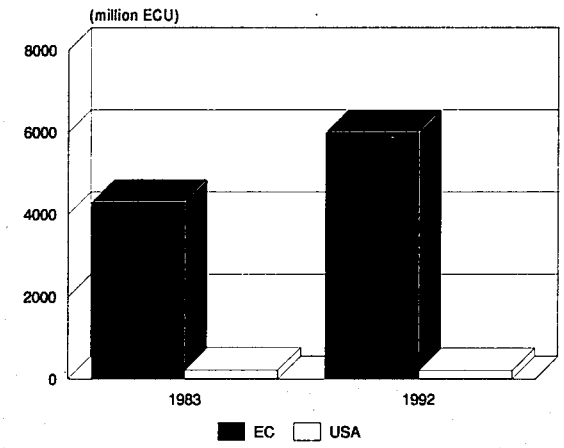
Other factors affecting brick and tile demand include climate, architecture, taste, and local availability and as suggested previously there are strong regional and national differences in demand patterns.

Supply and competition

Overall there is more than adequate capacity to meet existing and expected future levels of demand for clay products in the EC although once again there are regional variations. In some areas continuing overcapacity has led to the closure of older and less efficient brickworks whereas in areas such as the former East Germany the boom in construction is likely to require the installation of new and modern brick and tile making capacity.

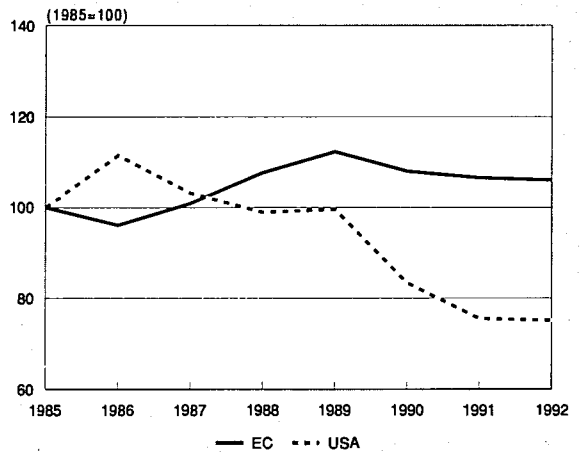
The EC industry meets very little competition from foreign suppliers but increasing intra-EC competition is a firm current

Figure 4: Clay products
International comparison of production in current prices



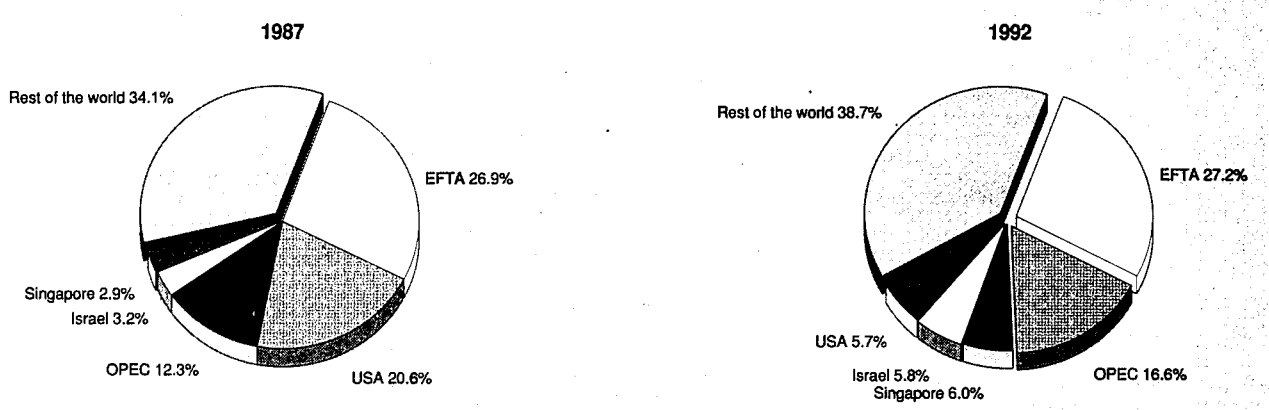
Source: DEBA, Census of Manufacturers

Figure 5: Clay products
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers

Figure 6: Clay products
Destination of EC exports



Source: Eurostat

and future trend. This has been helped not only by the process of standardisation now underway but also by a greater awareness of building practices from one EC country to another and by the increasing international nature of the companies involved. Investments made by major producers in recent years have significantly brought down operating costs through savings in energy and labour costs and through the economies of scale. The quality and the range of products have both been extended.

The most important competition that clay bricks and roof tiles have to meet is from competing materials, ranging from bricks, blocks, and tiles made from concrete or other materials through to completely different building systems.

Production process

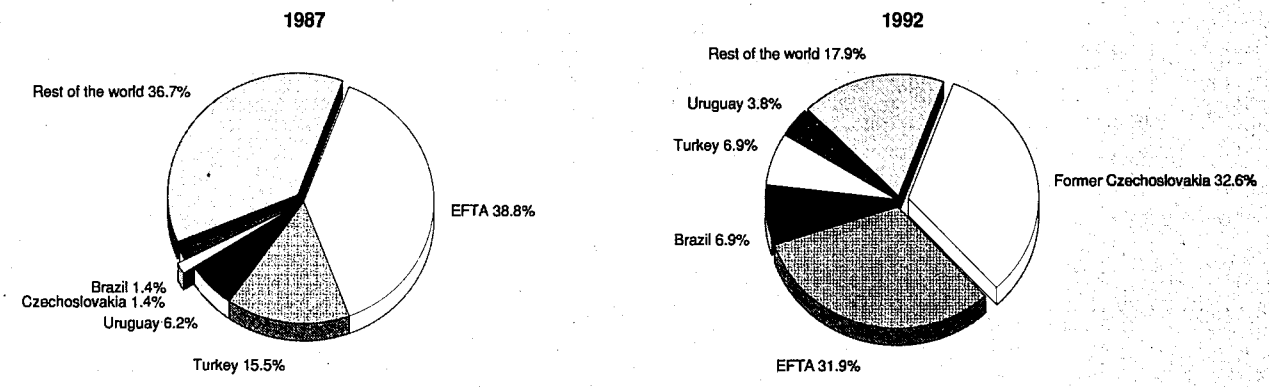
During the past decade the brick and tile making process has undergone major technological improvements at virtually all stages of the process. A more precise understanding of the mineralogy of brick clays has enabled producers to improve properties and exercise greater control of product quality. In a modern plant, large scale mechanised extraction is followed by clay preparation that may now involve pre-treatment (e.g. weathering), blending, crushing, coarse grinding, fine grinding, and mixing. Additives may include plasticity modifiers (such as lignosulphonate to increase or crushed brick grog to decrease), wetting agents (soaps, etc.), colorants (such as manganese dioxide), deflocculants, and last but not least, water. The prepared clay may then be extruded, surface-treated, cut (by wire), and dried before firing in a tunnel kiln. Much effort has been directed in recent years to reducing energy consumption by applying best practice techniques at all stages of the process. Although extrusion offers the most flexible and economical method top produce high quality bricks (including hollow bricks) other methods are still employed. These range from large factories based on dry or semi-dry presses to small factories using hand moulding techniques.

INDUSTRY STRUCTURE

Companies and strategies

Although most of the EC clay brick and roof tile production is in the hands of small or medium sized companies, many of them still privately-owned. In Germany, France, Benelux, and Italy the bulk of production is conducted by companies with annual sales in the 20-60 million ECU range. Most of these companies are based on highly efficient units with mod-

Figure 7: Clay products
Origin of EC imports



Source: Eurostat

Table 5: Clay products
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	26.4	27.2	27.8	31.4	34.7	38.3	38.6	38.0	37.8	40.0
Productivity index	94.9	98.0	100.0	113.1	125.0	137.7	138.8	136.7	136.1	143.9
Unit labour costs index (3)	86.9	93.7	100.0	102.4	108.7	117.6	127.9	134.5	146.6	158.4
Total unit costs index (4)	86.8	94.9	100.0	97.9	102.9	111.4	124.3	131.7	145.1	154.4

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

ern plants and the relatively small size is a reflection of the localised nature of the market. Nevertheless the process of concentration is gaining momentum.

This process of concentration is most advanced in the United Kingdom where the clay brick and tile industry is now dominated by production from the conglomerate, Hanson Industries (IRL) (through its subsidiaries, London Brick Co (UK) and Butterley Brick (UK); from two major diversified construction groups: Tarmac and Redland (UK), and the large brick specialist, Ibstock Johnsen (UK). Other companies of note include Marshalls (UK), Baggeridge Brick (UK), and the building products division of Hepworth (UK). In recent years several of these companies have expanded their activities in other EC countries by acquisition. Redland in particular now operates on a pan-EC scale with its brick making in Germany and Benelux handled through a joint venture with Koramic of Belgium and roof tile activities operated through Braas in Germany and Italy and Coverland in France.

Meanwhile other prominent companies operating in the EC include Wienerberger Ziegelindustrie, Karl Bachl, Erlus Baustoffwerke, Roeben Tonbaustoffe, Josef Meindl, and F V Mueller in Germany; Guiraud Frères, Huguenot Fenal, and Sturm in France; Scheerders Van Kerchove in Belgium; and RDB Edilizia, Industrie Bitossi, and Moccia Irme in Italy. In response to increasing productivity the total number of employees in the industry has fallen from 104 000 in 1983 to less than 80 000 in 1992.

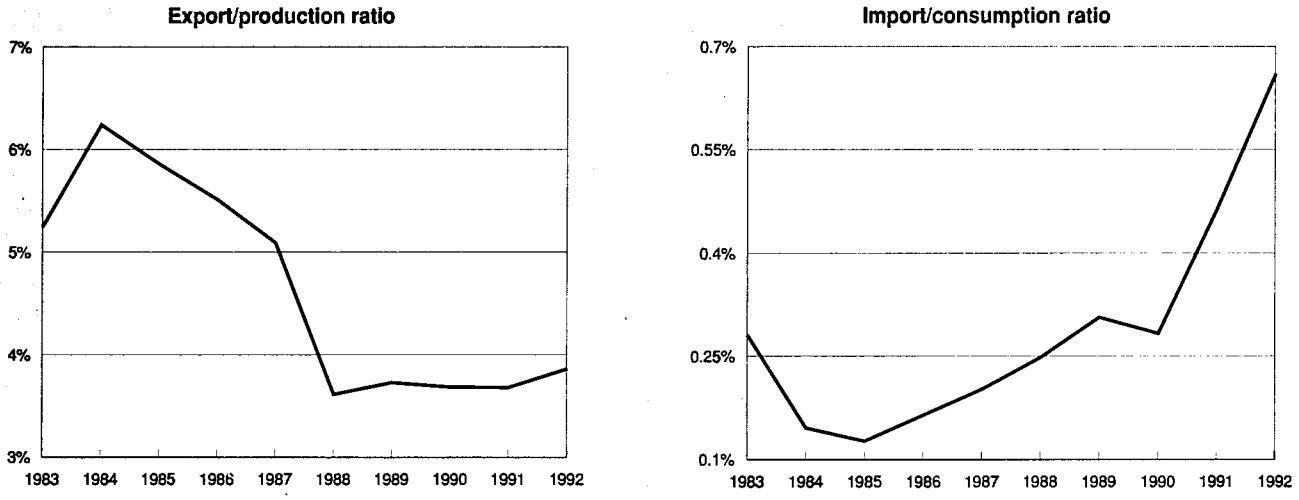
REGIONAL DISTRIBUTION

The location of brick and roof tile manufacturing facilities is governed firstly by the location of suitable clay deposits and secondly by proximity to major centres of building activity. Deposits of suitable clays are widespread throughout the EC wherever sedimentary rocks are in evidence. Thus most operations tend to be concentrated in low-lying regions rather than in upland or mountainous regions.

ENVIRONMENT

The principal environmental issues concerning the clay products industry involve the reparation of former clay workings and the various emissions from the firing process. Clay pit restoration is essentially a mining activity (see Chapter 2) thus the central issue concerns firing. Most modern brickworks tend to use gas as fuel if available although coal, oil, and certain waste materials are also used where local conditions apply. Thus attention must be paid to both gaseous and dust emissions. It should be noted that in recent years the clay products industry has successfully devoted much attention to energy saving techniques based on recycling of waste heat, insulation, and best practice operating methods.

Figure 8: Clay products
Trade intensities



Source: DEBA

Table 6: Clay products - bricks and roof-tiles
The ten largest companies in the EC, 1991

(million ECU)	Country	Sales	Employment (thousands)
Redland	UK	230	2.0
Tarmac Building Materials	UK	189	N/A
RDB Edilizia	I	146	1.4
Steetley	UK	126	N/A
Erlus Baustoffwerke	D	62	0.5
Scheeders Van Kerchove	B	62	0.8
Karl Bachl	D	61	1.1
Wienerberger Ziegel	D	59	0.4
Industrie Bitossi	I	51	0.2
Moccia Irme	I	50	0.5

Source: B.M.Coope & Partners

Table 7: Clay products
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.5	2.5
Production	0.5	2.5
Extra-EC exports	1.0	3.0

Source: B.M.Coope & Partners

OUTLOOK

There are signs of renewed growth in brick production and consumption in the United Kingdom, where the slump in bricks sales has been most marked in recent years. Recovery in other EC countries (apart from eastern Germany) is likely to be slower but the brick and tile industry should enjoy strong demand in later 1990s in accordance with a generally good performance by the construction industry.

Written by: B M Coope & Partners
The industry is represented at the EC level by: Fédération Européenne des Fabriquants de Tuiles et de Briques (TBE). Address: Obstgartenstraße 28, P.O. Box CH-8035 Zürich; tel: (41 1) 361 9650; fax: (41 1) 361 0205; liaison office: c/o Cerame-Unie, rue des Colonies 18-245, B-1000 Brussels; tel: (32 2) 511 3012; fax: (32 2) 511 5174.

Cement
NACE 242

As a result of the economic downturn, consumption and production continued to fall in 1992. The trends in both consumption and production showed marked differences between EC countries. Imports by EC countries continued to grow mainly in Germany while trade to USA dropped.
The outlook for 1994 is not bright as the overall growth in the market is expected to continue to slow down.

INDUSTRY PROFILE

Description of the sector

The activity of the cement industry is connected to construction activity which is often closely linked to the general economic situation. Cement is an important basic material for buildings and civil engineering works, representing major public and private investment.

Cement production consists of two essential phases :

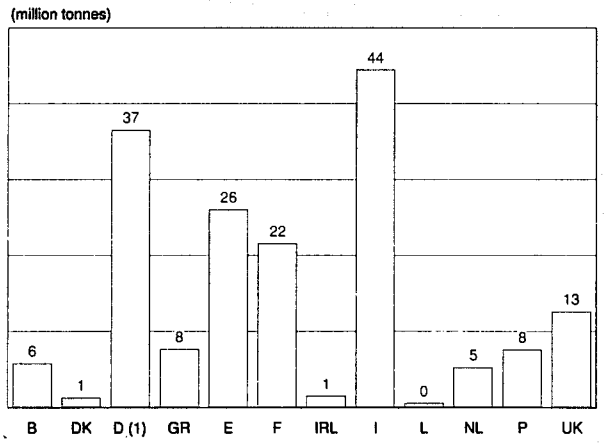
- The manufacture of a semi-finished product, so-called "clinker", obtained from the calcination in a high-temperature kiln (1 450°C) of raw materials (clay, limestone, etc.) previously prepared in paste or powder form depending on the production process used (wet or dry);
- The manufacture of cement as a finished product, obtained by the homogeneous mixture of the ground clinker and calcium sulphate with or without - depending on the type of cement - one or more additional components: slag, fly ash, pozzolana, filler, etc.

Recent trends

Consumption amounted to 171 million tonnes i.e. less than 15% of the world production compared with 21% in 1980.

After seeing a high economic growth rate in Western Europe from 1987-1989, economic activity slowed dramatically in the second half of 1990 and growth virtually ceased in the first half of 1991. Consequently 1991 and 1992 marked a heavy downturn in consumption of cement for a number of EC countries and decreased by a further 1% last year.

Figure 1: Cement
Consumption by Member State, 1992



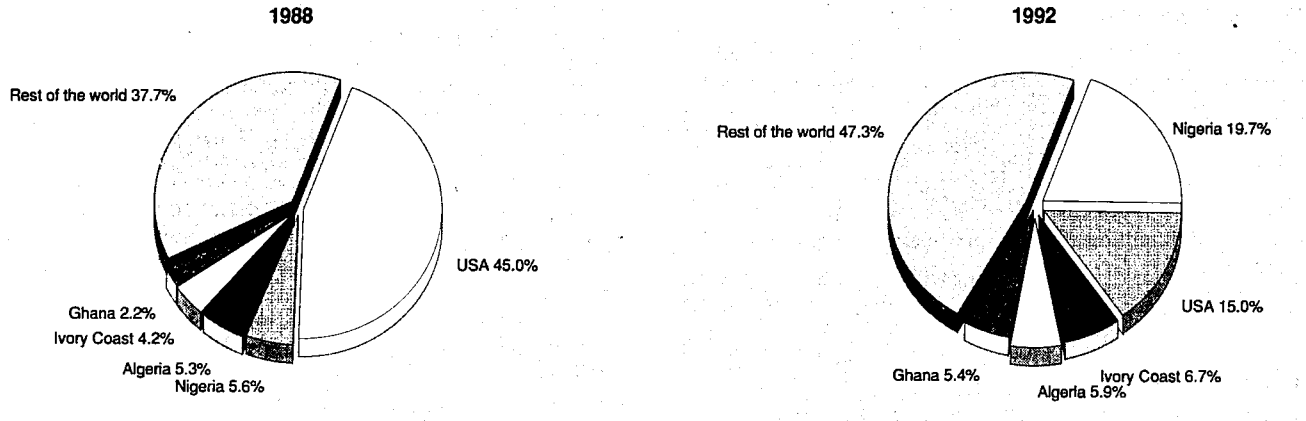
(1) Includes former East Germany.
Source: Cembureau

Differences in countries' trends are, however, large; the United Kingdom, French and Spanish consumption decreased by about 10%, Germany, due to unification of the country, increased its consumption by 10%, but one third of the increasing tonnages was imported from East European countries. Relatively weak consumption growth was registered in Belgium, Italy, Luxembourg and Portugal.

EC cement production amounted to 169 million tonnes in 1992. As for consumption, differences in countries' trends are large: France and Spain decreased by about 10% the United Kingdom by a further 7%, Italy and Greece stayed at the same level, while The Netherlands and Irish production decreased respectively by 6 and 3%; positive percentages were seen in Germany with about 6% and in Belgium and Denmark with an increase of more than 10%.

Overall employment fell to under 60 000 employees, a drop of 25% in 10 years. On the other hand the productivity of the cement industry rose by about 30% during the same period, thanks to the introduction of more efficient and more sophis-

Figure 2: Cement
Destination of EC exports (1)



(1) Based on volume data; excluding special cements.
Source: Cembureau

Table 1: Cement
Main indicators in volume (1)

(million tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (3)
Consumption	146	140	135	138	143	156	165	176	172	171	158
Total exports	29	25	22	20	17	17	16	16	16	19	N/A
Trade balance (2)	24	19	15	13	7	5	1	0	-2	-3	N/A
Employment (thousands)	75	72	69	65	63	N/A	N/A	N/A	N/A	N/A	N/A

(1) From 1990 consumption data includes former East Germany; before 1990 former East German figures are included in the import total.
(2) Total exports - total imports.
(3) Cembureau estimates.
Source: Cembureau

Table 2: Cement
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Consumption	1.2	2.3	1.7
Total exports	-10.1	2.8	-4.6
Total imports	19.1	16.4	17.9

(1) From 1990 consumption data includes former East Germany; before 1990 former East German figures are included in the import total.
Source: Cembureau

Table 3: Cement
International comparison of production in volume

(million tonnes)	1988	1992
Europe	273.4	253.4
Former Soviet Union	139.5	100.0
Africa	50.1	57.0
America	166.6	167.7
Asia	477.8	592.9
Oceania	7.6	7.2

Source: Cembureau

Table 4: Cement
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	503.8	812.1	652.0	508.0	436.2	331.4	328.9	302.6	303.7	299.4
Extra-EC imports	24.2	28.3	34.2	39.6	48.5	118.2	161.6	218.5	281.6	348.2
Trade balance	479.5	783.8	617.9	468.4	387.7	213.2	167.3	84.1	22.1	-48.8
Ratio exports/imports	20.79	28.70	19.08	12.84	9.00	2.80	2.04	1.38	1.08	0.86
Terms of trade index (1)	108.4	105.9	100.0	86.7	81.8	83.5	88.6	85.8	86.1	92.3
Intra-EC trade	258.1	270.2	264.9	286.9	304.2	442.6	522.6	540.6	587.2	674.4
Share of total imports (%)	91.4	90.5	88.6	87.9	86.3	78.9	76.4	71.2	67.6	66.0

(1) Includes lime and plaster (i.e. NACE 242).
Source: Eurostat

ticated production tools, with very advanced automation of operations requiring higher qualifications from the staff.

International comparison

World cement production has been estimated at 1 175 million tonnes in 1992 and the 10 major cement producing countries or group of countries were: China (249 million tonnes), CIS (estimated d million tonnes), Japan (95.8 million tonnes), the USA (73 million tonnes), India (53.7 million tonnes), South Korea (43.3 million tonnes), Italy (41.4 million tonnes), Germany (33.2 million tonnes), Turkey (30.2 million tonnes), Mexico (26.9 million tonnes), and Spain (25 million tonnes).

In 1992 total world production of cement (excluding China) again showed a decrease which was partly influenced by the further collapse of the CIS. The overall market curve (including China) is flat, confirming the downturn initiated in 1990. The West and East European countries witnessed a new decline while the USA and Japan showed an increase of 6 and 4% respectively.

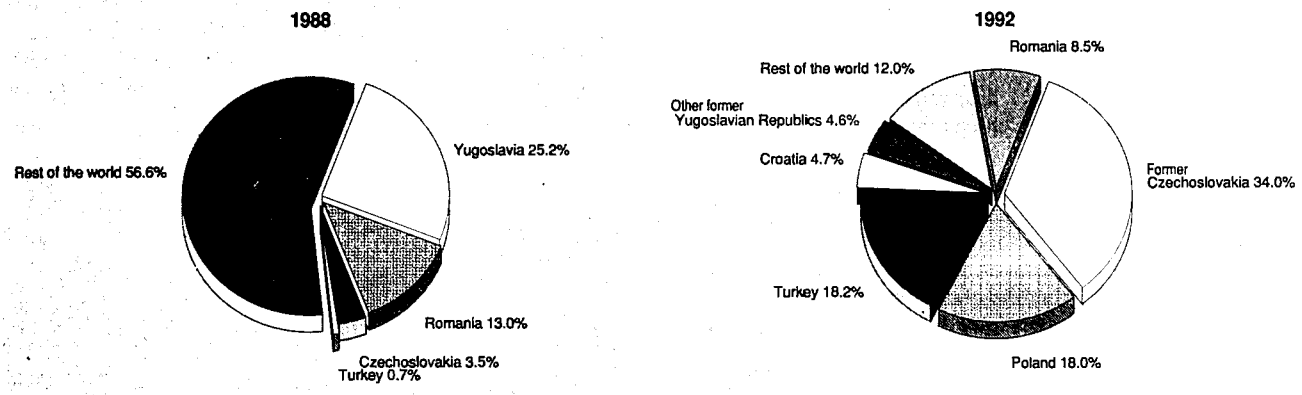
Foreign trade

The geographical distribution of the cement trade is largely influenced by the weighty nature of the product : its modest price per weight unit makes it vulnerable to the effects of transport costs, especially road transport. This is why, most often, cement is delivered to the markets that are closest to the place of production.

It also explains why world trade in cement currently accounts for about 6% only of production. Moreover, it is marked by a very pronounced geographic polarisation. In 1992, 41% of imports were recorded in only six countries: the USA, South Korea, Thailand, Germany, Spain and Italy, while nearly 40% of the world's exports came from four countries: China, Greece, Japan and Turkey. The largest quantities are mainly distributed by sea & water and consumed at a limited distance from the port.

In 1992, Japan again increased its exports by approximately 55% and export volume amounted to 11.4 million tonnes. In 1992 three countries, the USA, South Korea and Germany

Figure 3: Cement
Origin of EC imports (1)



(1) Based on volume data; excluding special cements.
Source: Cembureau

imported more than 6 million tonnes each; the amount of cement imported in Germany increased by 50% these tonnages coming mainly from Eastern Europe.

As expected, trade to the USA continued to drop and now consists of about 6 million tonnes or half that of 1990.

The application of the ITC's (International Trade Commission) anti-dumping duties continued to restrain Mexican, Venezuelan and Japanese exports in 1992.

Imports by EC countries continued to grow in spite of the general downward trend, increasing by approximately 20% in 1992 to 21.7 million tonnes and represent about 30% of total world trade. The imports from East European countries have multiplied 4 times since 1987 and represent about 11%. The largest increase of imports was reported in Germany. Import growth also continued in Spain and Italy during 1992, reaching respectively 13.2% and 8.2% of domestic consumption.

The EC's main exporter was Greece, retaining the same level as the previous year with 44% of production exported.

MARKET FORCES

Demand

As already mentioned, current consumption is linked directly to activity in the building sector and, more accurately, to investments made in residential and non-residential buildings, as well as in civil engineering works. From 1986 onwards, European countries began once again to increase their investment in building and the cement industry quickly recovered from the crisis, to reach consumption levels in 1989 that matched 1980 consumption.

Supply and competition

The EC countries' capacity is currently more than sufficient to cover internal demand. Nevertheless, there is continued exposure to cement imports from East European and developing countries at artificially low prices (dumping conditions). Unfair competition from countries where environmental and social protection is non-existent could have a very damaging impact on the areas where these imports are concentrated.

The legal resources for defence against concentrated dumping at the borders have to be reinforced. Whereas overall economic harm to the EC may appear limited, the same does not hold true at the regional level where the border dumping causes a knock-on effect.

Production process

Cement production requires large quantities of energy. The average energy consumption per tonne of clinker produced in the EC today amounts to less than 900 kcal/kg. This value may vary widely from country to country (from 800 to 1300 kcal), depending on the production method applied. Energy consumption in relation to cement manufacture also depends on the policy pursued by the different national industries as regards investment and the development of composite cements.

The second oil crisis (1979) confirmed the usefulness of the conversion of energy supplies undertaken since 1973.

The industry has continued its efforts in two directions:

- seeking cheaper energy (diversification of fuels)
- rational use of energy (new manufacturing processes, development of composite cements, heat recovery, etc.).

INDUSTRY STRUCTURE

Companies

Restructuring and market positioning of the leading companies is expected to continue.

There are no generally accepted criteria for ranking cement companies or groups, as both turnover and capacity can be defined in different ways. Published turnover in consolidated accounts may include non-cement activities, and the existence of trading affiliates can lead to different quantities of cement being produced and handled by a company. The calculation of capacity control in part-owned companies is treated differently.

Taking into account the above reservations, cement producing groups usually claimed to be the largest five operating companies in the world are: Cemex (Mexico), Heidelberger/CBR (D/B) Holderbank (CH), Italcementi /Ciments Français (I/F), and Lafarge Coppée (F).

ENVIRONMENT

As public concern for the environment steadily increases, so does the activity of the EC Commission and Parliament in tackling environmental issues.

These European bodies highly conscious of their responsibility can be seen in the Commission's strong drive to implement a European Energy/Carbon tax. EC regulatory activity is also extensive in other issues directly related to the European Cement Industry, such as waste classification, incineration of wastes, integrated pollution control, environmental auditing and liability for damages to the environment.

The Cement Industry has therefore devoted much effort to environmental issues, particularly in the finalization, in several languages, of the "European Cement Industry's Approach to the Environment". This document analyses the environmental impact associated with the manufacture and distribution of cement and advises the best way to avoid damage to the environment.

REGULATIONS

A European pre-standard for common cements ENV 197.1 was adopted last year by the Industry through the European Committee for Standardisation (CEN). The pre-standard details composition, specifications and conformity criteria for the traditional and well-tried common cements used in Europe. Cements conforming to the requirements of the pre-standard are termed "CEM" cements.

The pre-standard will now be introduced in the EC and EFTA countries for a duration of 3 (or possibly 5) years and will operate with existing national standards. During this time further work will be carried out and the changes required prior to adoption of a full European standard (EN) will be identified and clarified.

OUTLOOK

As in 1993 the European construction sector is forecasted to shrink by 2%, and the overall growth in the market is expected to slacken; even in Germany where developments in the Eastern Länder are significant, this will not compensate the decline of the rest of the country. Portugal is the only EC country where a slight increase is forecasted. Even if the economy in Western Europe picks up in 1994, there will be a time-lag in its effect on construction and therefore on the cement industry.

Table 5: Cement
Expected real annual growth rates (1)

(%)	1993-94
Apparent consumption	-1.0

(1) Includes former East Germany.
Source: Cembureau

Written by: Cembureau
The industry is represented at the EC level by: Cembureau: The European Cement Association; Association Européenne du Ciment. Address: rue d'Arlon 55, B-1040 Brussels; tel: (32 2) 234 1011; fax (32 2) 240 1020.

Precast concrete
NACE 243.2

After a general status quo in 1991, the sector recently recovered in some countries, closely following developments in the construction sector, which is virtually its only client. Steady growth can be expected for the sector in the medium term. Though the industry is mainly made up of small to medium-sized companies, some mergers and acquisitions activity has taken place. Stricter EC legislation on pollution control will also have its influence on the precast concrete industry. The limited expansion possibilities for mining and quarrying might also pose problems of supply for the industry.

INDUSTRY PROFILE

Description of the sector

The precast concrete industry is the collective name given to all enterprises that manufacture precast concrete products at specially equipped plants at a permanent location and which operate independently of weather conditions. The products are delivered to the construction sector ready to be put in place in building and road constructions, civil engineering works, etc.

Concrete is made from a mixture of sand, water, cement, gravel or other aggregates, and other possible additions. The precast concrete industry as an industrial sector is situated between the sector covering the suppliers (i.e. cement manufacturers and quarries) on the one hand and the customers (i.e. the construction sector) on the other.

The precast concrete industry embraces a wide range of products:

- products for road construction (paving flags, stones and blocks, kerbs, safety and sound barriers, sewerage and drainage pipes and accessories, etc.);
- elements for building construction (masonry units, cladding elements in architectural concrete, floor elements, beams and columns, wall elements for industrial, commercial and agricultural buildings, etc.);
- elements for civil engineering works (bridge girders, tunnel elements, etc.);
- units for various other purposes such as flood protection, urban and garden landscaping, lighting poles, agricultural installations.

Furthermore, the following general characteristics of the precast concrete industry can be highlighted:

- relatively low value-added content of certain mass-produced precast concrete units;
- strong dependence upon the efficiency of the business (i.e. the degree of mechanisation of the production process and the effectiveness of management);
- a predominance of small and medium-sized businesses (often family-owned enterprises). Though some of these businesses have recently been bought up to form bigger concerns, the number of production sites remains largely unchanged (even after the inevitable rationalisation).

In 1992, turnover in the EC approximated 20 000 million ECU and employment was estimated at about 180 000.

National and regional distribution in the precast concrete industry in the EC is very much interrelated and is influenced to a large extent by several factors such as the demographic situation, climatic conditions and the traditional use of certain construction materials.

Recent trends

In the industrialised countries, the activity of the precast concrete industry largely depends on the overall economic climate and on activity in the construction sector in particular, as 99% of the precast concrete production goes to the construction sector. However, trend differences can be observed between residential building, non-residential building and road construction (the latter absorbs roughly 30% of the precast concrete production).

The economic crisis caused a 30% to 40% drop in precast concrete production in the EC with an almost equal fall in employment from the late 1970s to the early 1980s. With the economic revival, production has increased, with figures varying depending upon the country considered.

For the EC countries (for which data are available) production in current prices has grown considerably over the last three years. In 1992, growth stagnated in almost all Member States, except Germany where continued growth was noted, and Italy and the United Kingdom where a strong downturn persisted.

International comparison

Due to climatic conditions, prefabrication is generally stronger developed in the northern countries. This explains the relatively high level of precast concrete activity in the Nordic countries. However, the recent economic crisis has had severe consequences for the activity of the sector in Sweden and especially in Finland where over the last two years a downturn of 40% was noted.

Notwithstanding some local competition from neighbouring East European countries, the production volume in Austria remains satisfactorily. Switzerland is a typically local industry with a very closed market which is probably due to the rather

Table 1: Precast concrete
Main indicators by Member State in current prices, 1992

	B	DK	D	F	I	NL	UK
Turnover (million ECU)	670	N/A	4 876	1 745	N/A	923	N/A
Production (thousand tonnes)	9 100	2 200	59 048	29 282	30 800	N/A	N/A
Employment (thousands)	6.4	4.0	51.6	23.6	32.7	8.5	9.7
No. of precast concrete plants:							
Total	361	120	1 562	1 000	1 450	170	190
With 50 or more employees	20	18	314	60	135	60	N/A

Source: BIBM

Table 2: Precast concrete
Production in current prices by Member State

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Belgique/België	231	232	249	297	347	378	457	501	516	562	560	500
Danmark (1)	215	265	320	387	392	384	365	360	318	318	N/A	N/A
BR Deutschland	2 311	2 411	2 082	2 280	2 402	2 628	2 942	3 338	3 774	5 091	5 100	5 200
France	1 148	1 144	1 216	1 322	1 405	1 561	1 667	1 788	1 819	1 745	1 571	1 539
Italia	1 800	1 710	1 530	1 460	1 530	1 640	1 820	2 010	1 980	1 670	1 900	N/A
Nederland	466	470	475	523	550	633	680	680	660	660	N/A	N/A
United Kingdom	1 695	1 300	1 852	1 821	2 094	2 731	3 012	2 747	2 368	1 626	N/A	N/A

1993 and 1994 BIBM forecasts.
(1)1992 estimated.
Source: BIBM

heavy weight of the product and the inherent transportation possibilities.

The level of activity in the North-American precast concrete industry varies strongly depending upon the product branch. Large structural elements for industrial applications, large-diameter pipes and paving blocks seem, however, the most successful products of the last decade. Concrete masonry units seem recently to have recovered some of the attraction lost in the early 1980s.

Foreign trade

Generally, precast concrete products are heavy and bulky in relation to value. The average value of one metric tonne of precast concrete products is approximately 100 ECU (but for some standardised non-reinforced products manufactured on a large scale, this value can be as low as 35 ECU). Consequently, long-distance transportation of precast concrete products is unusual and trade is mostly limited to a single border crossing. A typical exception is, however, the technologically highly-advanced precast concrete products such as sophisticated cladding elements in architectural concrete.

MARKET FORCES

Demand

The activity in the precast concrete industry strongly depends on the activity in the construction sector, which in turn is greatly dependent on the overall economic climate. As a consequence, periods of high activity peaks in the precast concrete industry are succeeded by low-activity periods leading to costly overcapacity.

A further factor causing variations in activity levels is the financial situation of the public authorities. Approximately one third of construction activity covers public works (involving road construction, civil engineering works, etc.), a field soon afflicted by cuts when the public authorities experience financial difficulties.

Supply and competition

The precast concrete industry faces competition from traditional construction procedures with an intensity varying from country to country and closely related to the marketing skills of the local precast concrete industry.

Table 3: Precast concrete
Intra-EC trade in current prices

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Belgique/België and Luxembourg												
Value (million ECU)	38.7	33.8	34.2	42.7	46.3	55.4	63.6	74.7	70.5	69.9	85.0	100.0
Quantity (thousand tonnes)	738.0	714.0	735.0	783.0	782.0	953.0	1 003.0	983.8	976.0	921.3	1 000.0	1 050.0
BR Deutschland												
Value (million ECU)	65.7	63.0	50.7	47.8	51.0	49.4	64.2	82.5	117.4	190.8	200.0	200.0
Quantity (thousand tonnes)	614.0	560.0	496.0	447.0	433.0	417.0	521.0	599.0	782.0	1 382.0	1 495.0	1 495.0
France												
Value (million ECU)	32.1	44.0	51.6	62.4	69.7	84.9	100.6	104.1	107.4	N/A	N/A	N/A
Quantity (thousand tonnes)	362.0	455.0	550.7	645.5	678.6	822.1	891.7	843.7	872.0	N/A	N/A	N/A
Nederland												
Value (million ECU)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	85.0	92.3	N/A	N/A
Quantity (thousand tonnes)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
United Kingdom												
Value (million ECU)	N/A	N/A	N/A	13.0	16.0	26.0	31.0	46.0	32.8	25.1	N/A	N/A
Quantity (thousand tonnes)	N/A	N/A	N/A	48.3	51.3	93.4	123.2	93.4	64.2	57.8	N/A	N/A

1993 and 1994 BIBM forecasts.
Source: BIBM

Table 4: Precast concrete
Employment by Member State

(thousands)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (1)
Belgique/België	5.5	5.4	5.3	5.0	5.1	5.3	5.7	5.9	6.3	6.4	6.4	6.3
Danmark	3.4	3.6	4.0	4.3	4.8	5.0	4.9	5.8	3.4	4.0	N/A	N/A
BR Deutschland	42.2	40.9	43.6	42.3	43.2	43.7	44.1	46.5	49.9	51.6	50.0	51.0
France	26.2	26.2	23.6	23.3	23.3	23.7	24.2	24.6	24.1	23.6	23.0	22.6
Italia (2)	24.0	19.8	19.2	19.0	23.0	25.0	37.5	38.7	35.3	32.7	33.4	N/A
Nederland	8.2	8.1	7.9	7.7	7.6	7.6	8.0	8.0	8.2	8.5	N/A	N/A
United Kingdom	N/A	N/A	13.0	13.0	13.0	13.5	13.0	12.5	11.0	9.7	N/A	N/A

(1) BIBM forecasts.
(2) 1992 estimated.
Source: BIBM

There is indeed a wide range of substitution products offered, ranging from classical materials such as clay brick and timber to newer materials such as PVC.

Production process

Since non-reinforced concrete began replacing natural stone, timber and cast iron in many applications, the precast concrete industry has become highly mechanised. The rapid technological development of reinforced and prestressed concrete has led to the breakthrough of various plant-manufactured structural elements for building construction and civil engineering works.

Lightweight concrete was first applied in the precast concrete industry for the manufacture of masonry units, wall and floor elements.

The construction boom in the 1960s and early 1970s, as well as the increase in building costs over that same period led to a further industrialisation of the precast concrete industry. Profits were reinvested in both plants and modern machinery such as semi-and fully-automated batching and manufacturing equipment. Handling, packaging and transporting techniques were equally revolutionised.

To date, the following particular technological aspects of the precast concrete manufacturing may be pointed out:

- the manufacture at a plant with a permanent location in controlled conditions;
- the use of a proper scientific concrete technology such as the use of 0-slump concrete, hot concrete and pre tensioning techniques, particular moulding and compaction techniques and accelerated hardening techniques;
- an advanced quality control which goes beyond the checking of the fresh concrete; quality control in the precast concrete industry includes the control of: dimensional accuracy, the properties of the hardened concrete, the position of the reinforcements. This control is done before the product has been incorporated into construction;
- an advanced automation of manufacturing methods and plant, not to mention an increasing level of industrialisation and standardisation.

This specific and scientific approach of the concrete technology helps to guarantee a high and consistent quality of precast concrete products.

Basically, most "new" products in the precast concrete industry are an evolution of existing elements. Nevertheless, the industry has developed (and is successfully marketing) valuable solutions in fields relative to, for instance, environmental problems such as sound barrier walls to protect residents living near highways or railways from noise hindrance.

INDUSTRY STRUCTURE

Companies

As already mentioned, the precast concrete industry remains predominantly composed of small-to medium-sized, generally old family-owned enterprises, and this notwithstanding a rationalisation movement in recent years through the formation of company groups or the selling of family-owned businesses to a holding company.

This movement has been spurred on mainly by two concurrent factors. The first one is fragmentation of family-owned businesses (that had grown to considerable sizes since World War II) due to succession problems. The second one is, in the context of the Single Market, a trend toward increased concentration in view of allowing large construction companies to control supplies on the foreign market they entered, or

Table 5: Precast concrete
Average hourly wage costs by Member State

(ECU)	1985	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (1)
Belgique/België	13.0	14.4	14.7	15.1	16.3	17.2	18.0	19.2	19.2
Danmark	8.5	10.1	11.0	11.0	15.0	15.6	16.0	N/A	N/A
BR Deutschland	11.8	13.2	13.6	14.2	15.0	16.1	17.9	18.0	18.5
France	8.4	9.1	9.4	9.8	10.4	12.0	N/A	N/A	N/A
Italia	9.7	10.9	11.2	12.6	13.3	15.8	N/A	N/A	N/A
Nederland	15.4	16.4	16.7	17.0	17.0	17.9	18.5	N/A	N/A
United Kingdom	N/A	N/A	N/A	N/A	N/A	8.5	8.8	N/A	N/A

(1) BIBM forecasts.
Source: BIBM

Table 6: Precast concrete
Share of consumption by the precast concrete industry in total national cement consumption

(%)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (1)
Belgique/België	17.4	18.7	17.4	18.0	18.6	21.0	21.3	22.2	22.2	24.0	25.0	25.0
Danmark	37.0	39.0	44.0	45.0	45.0	41.0	41.0	40.0	40.0	41.0	N/A	N/A
BR Deutschland	28.0	27.0	26.0	26.0	26.0	26.0	25.0	26.0	27.0	27.0	28.0	28.0
Hellas	N/A	N/A	3.4	N/A	1.0	1.9	2.0	2.0	N/A	N/A	N/A	N/A
España	N/A	N/A	N/A	11.0	16.0	20.0	21.0	22.0	N/A	N/A	N/A	N/A
France	19.0	18.5	18.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	N/A	N/A
Ireland	N/A	N/A	29.0	27.0	27.0	27.0	29.0	N/A	N/A	N/A	N/A	N/A
Italia	13.8	13.4	13.3	13.3	13.2	13.1	13.1	15.0	15.0	12.0	14.0	N/A
Luxembourg	N/A	N/A	12.0	14.0	16.0	19.0	N/A	9.9	N/A	N/A	N/A	N/A
Nederland	30.2	36.0	34.0	35.0	37.0	38.0	38.0	40.0	40.0	40.0	N/A	N/A
Portugal	5.0	N/A	11.1	10.5	10.8	10.7	11.1	10.6	N/A	N/A	N/A	N/A
United Kingdom	N/A	N/A	24.4	27.3	25.0	25.0	26.0	27.0	26.5	26.0	N/A	N/A

(1) BIBM forecasts.
Source: BIBM

creating concrete companies large enough to deal with the big construction companies on an internationalised market.

This rationalisation movement has inevitably reduced the total number of enterprises, but not to the extent one might have expected. Even after these operations most production sites remaind in business, mainly because of the rather heavy weight of many precast concrete products and the transportation costs involved. For instance, after a company in one of the bigger countries had bought up 25 smaller enterprises, some 15 remained operational.

Even though there is not complete information on EC employment in the precast concrete industry, a reasonable estimate is around 180 000 people. The number of employees is spread over nearly 5 000 precast concrete plants, of which approximately 600 employ more than 50 people.

Following on some years of continuing growth in employment (catching up on the strong drop during the years of the economic crisis), this figure has now come to a relative standstill in some countries, while in other (such as the Nordic countries and the United Kingdom) it is falling again as a consequence of the economic crisis occurring in the countries concerned.

On the labour market, wage costs have risen in recent years as a result of reduced working hours, as well as a shortage of skilled labour. The overall average hourly wage cost in 1992 was of approximately 16 ECU.

Skilled manual workers constitute about 25% of employment in the precast concrete industry. These workers are involved in special production procedures such as reinforcement steel bending and netting, and the finishing of architectural concrete (e.g. polishing).

In several Western European countries the limited number of labourers in this field are in particularly high demand, as younger school graduates do not appear to be strongly attracted towards this occupation. To cope with this problem, the industry has set up specific programs ranging from training courses for young adults and/or unemployed people, the publication of manuals, and campaigns designed to improve both the image of the industry and the attractiveness of jobs in precasting. For instance, in recent years the industry in Germany has regularly organised a nation-wide promotion day, offering younger people the opportunity to visit precast concrete plants.

Strategies

Some degree of concentration has occurred in the industry in recent years, varying in nature and intensity from country to country, because either one or more small businesses were bought up by holdings or major industrial groups (often a large building company, a cement factory or an aggregates supplier), or because various smaller concrete businesses have merged.

Besides entering in mergers and acquisitions, the industry also aims at further increasing productivity (estimated to have risen by roughly 40% over the last fifteen years) and improving quality. First of all, the precast concrete industry has raised fixed investment by about 45% from 1985 to 1992. These investments, reflecting significant efforts toward innovation in the sector in recent years, involved not only replacement of older equipment and installations but also an increase in capacity, thus enhancing the competitiveness of plants in their region.

Secondly, precasters have become increasingly aware of the market advantages of guaranteeing the adequate durability of products (durability implying here both soundness and long-term appearance) and improved design. Hence, the active participation of the precast concrete industry in the European harmonisation, certification and standardisation work in view of the implementation of the Construction Products Directive: the CE quality label.

Technological evolution constitutes a further influential factor. Indeed, the technical realisation of new types of beams or girders with, for instance, larger spans, would automatically create a higher demand for these structural elements.

REGIONAL DISTRIBUTION

National and regional distribution are narrowly intertwined.

The precast concrete industry is particularly important in Germany, relatively important and advanced in the Netherlands and Belgium, and to some extent, in France and northern Italy. In some countries, there is a higher concentration of the precast concrete industry in certain regions e.g. the South West of the United Kingdom.

Geographical factors also played an influential role in the precast concrete industry. The more densely populated a region is, the more important and developed the precast concrete industry tends to be. These regions have a higher demand for building, water and road construction and since precast concrete products are heavy, and costly to transport, production takes place near the centre of demand. An example of this is the triangle of dense population in Belgium, the Netherlands and Germany, in contrast to more sparsely populated regions in central France and Spain.

Climatic conditions also play an important role. In general, the further north a country is situated, the more developed its precast concrete industry is. Traditional building activity in northern countries often has to be suspended during the winter due to bad weather conditions, while precast concrete products allow uninterrupted building activity.

Traditional use of certain construction materials has influenced the degree of development and strength of the precast concrete industry in the various Member States. In the Netherlands, for example, a boom began for precast concrete pavers when traditional clay pavers started to become too expensive. This secured the Dutch paving industry a strong position which allowed large-scale production at a favourable cost. Another result of this situation was that transportation beyond The Netherlands' borders became possible. By contrast, the British precast concrete flooring industry has encountered great difficulty in breaking into the traditional timber floor market for low-rise housing.

The percentage of the precast concrete industry in the total national cement consumption illustrates the actual penetration of the precast concrete products on the construction market. This shows a rather positive trend in most countries, especially in those countries where the industry has successfully commercialised its precast concrete solutions. Indeed, by producing certain construction materials at fixed plant instead of producing at the building site, construction costs may be significantly reduced.

ENVIRONMENT

EC legislation on pollution control will also have its influence on the precast concrete industry. The national legislations concerning environmental protection aim particularly at reducing emissions from the raw materials and manufacturing industries. Hence, considerable know-how and capital investments in environmental protection are required of these industries. By means of modern techniques (such as waste water treatment installations), the pollution of air, water and soil may be controlled notwithstanding a growing production; modern techniques will thus help dissociate industrial production and economic growth more and more from environmental exploitation.

In the precast concrete industry, a noise problem may occur as increasing urbanisation encroaches upon precast concrete plants. However, the industry has already recorded some success in reducing noise levels.

Increased restrictions on gravel extraction, anticipated in a number of Member States, could affect the concrete industry by rendering raw material supplies more difficult on the longer term. Raw material shortages might arise in some countries. In addition, the quarries supplying the precast concrete industry with sand and aggregates are either forbidden to extend further, or threatened with closure. Since about 80% of concrete is made up of sand and aggregates (1 m3 concrete requires two tonnes of these raw materials), this may cause serious short-term problems, not only for the precast concrete industry but also for the construction industry as a whole.

Consequently, certain research programmes are being conducted with the aim of recycling concrete debris, crushed concrete and waste concrete as raw materials. Due to requirements for high quality inputs, however, the precast concrete industry has only limited opportunities for using such recycled materials. Moreover, high-quality aggregates are also a prerequisite to meeting the stringent performances demanded as a rule of precast concrete products. Furthermore, they play an important role in one of the major advantages of precast concrete (i.e. smaller dimensions of the components which would reduce their weight, improving transportation costs).

Within the framework of BIBM it has been decided to set up a Task Group "Environmental matters" to examine and suggest answers to the various environmental challenges the industry is currently facing and will have to face in the near future.

REGULATIONS

The Single European Market and the coming into effect of the Construction Products Directive (CPD) had emphasised the urgency of the work on harmonisation, standardisation and certification.

Adoption of common standards and quality certification systems at Community level is essential for the precast concrete industry. The precast concrete industry has a preference for the most stringent level of attestation of conformity, involving product certification by an approved third party. Such certification would help to maintain client confidence in the high quality of the products, improve the quality image of the concrete products, and reduce the chances of having regulatory attestation exist next to some kind of voluntary certification system.

OUTLOOK

In general, 1993 is expected to show very mixed results in the various Member States. Steady growth is foreseen in Germany and a near status quo in Belgium, Denmark and the Netherlands. France entered a period of negative growth in 1992 and no improvement is expected in the near future. A deep recession persists in Italy and other Mediterranean countries due to severe restrictions in public spending and an overall unfavourable economic climate discouraging investments in industrial buildings and, to a large extent, in private housing. The United Kingdom suffered from deep recession since 1991 but the general impression is that the bottom line has been reached with some indications that slow growth is possible in certain areas. As already mentioned, the activity of the precast concrete industry largely depends on the overall construction activity and thus any improvement there will have a favourable impact on the economic situation in the precast concrete sector. The specific advantages of using precast concrete products for the execution of a construction will on the medium to longer term inevitably result in a larger share of the sector in the overall construction volume.

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Ready mixed concrete
NACE 243.6

The year 1992 has marked the first overall fall in production in six years. Prospects for the immediate future are not good with only modest overall increases of 2% expected over the next three years.
The industry is working hard to ensure that EC regulations in being and in prospect will be those that the industry can meet in the normal course of business.

INDUSTRY PROFILE

Description of the sector

The ready mixed concrete industry covers the off-site manufacture of fresh, unhardened concrete and its transport to the location where it is placed as required. It is by definition a local industry offering little or no potential for trade even within the EC. In fact, the fresh product can only be transported for short distances, seldom more than a few tens of kilometres.

The European ready mixed concrete industry is a relatively new industry which has contributed substantially to the modernisation and efficiency of the building construction industry in each country. ERMCO members have, for the past 26 years of the organisation's existence, concerned themselves with improving the quality of their product. They have ensured that the concrete is designed for the purpose specified and have sought means of improving the marketing of the product against its main competitive products: wood, bricks and steel. Although the use of concrete goes back to Roman times, the production of ready mixed concrete from an exclusively designed plant probably started at the beginning of this century with Germany leading production in 1903, followed by the USA in 1913. More widespread use of the product developed when the United Kingdom and France established their industries in the early 1930s.

Today there are few countries in the world which do not have a ready mixed concrete industry. The largest EC producer, in volume, is Italy; Germany follows closely. Then come Spain, France and the United Kingdom.

Recent trends

Over the 1988-1991 period, ready mixed concrete production increased annually at a faster rate than that of the other EC manufactures. In 1992, a 1% decrease was recorded in all EC manufacturing sectors, ready mixed concrete sector as well.

MARKET FORCES

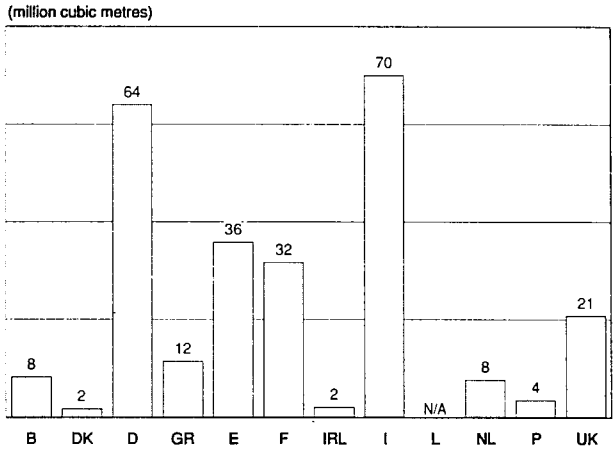
Demand

Total EC production for 1992 was 257.1 million m^3. Production of EC Members of ERMCO in the calendar year 1992 totalled 214.8 million m^3 (85% of the EC total), a fall of 3.57% compared with the previous year. This fall comes after almost six years of increases in production. However, following the Gulf war, the consequent disruptions arising from the break-up of the former Soviet Union and other East European states, and the even greater instability from the conflicts in the former Yugoslavia, have shaken business confidence considerably. Few countries are holding to their previous levels of production, small downturns are not unusual and there are some countries reporting severe reductions of 20% or more.

Another serious aspect of the present recession is the problem which is being caused by the growing practice of Public Administrations and Authorities to delay payments for work completed by the Prime Contractor. In turn, the Contractors are deferring payments to their Sub-contractors and Suppliers to the extent that the continued financial viability of many small enterprises is being seriously threatened.

Members of the European ready mixed concrete industry have confirmed that this is a common practice. ERMCO is actively considering the best means of representations being made to national authorities and to the EC to overcome the difficulties which are being created by this unethical practice.

Figure 1: Ready mixed concrete
Production volume by Member State, 1992



Source: ERMCO

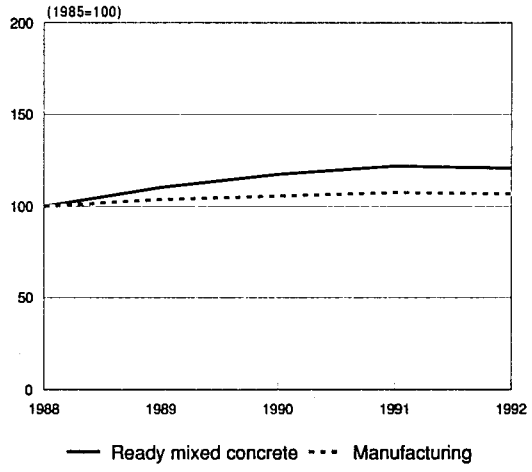
INDUSTRY STRUCTURE

Companies

It will be seen that, on average, there are just over 4 truck mixers to each plant. This varies by country from 3 to 6 per plant, depending on their geography.

Prospects for the immediate future are that production levels will do well to hold to the 1992 totals. Until more settled economic conditions return, no advance of any substance can be expected. At this time, the industry needs to be in a period of consolidation and investment in the infrastructure and the

Figure 2: Ready mixed concrete
Production in volume compared to EC manufacturing



Source: ERMCO, Eurostat

Table 1: Ready mixed concrete
Main Indicators by Member State, 1992

	Production (million cubic metres)	Cement consumption (million tonnes)
Belgique/België	8.3	5.8
Danmark	1.7	1.2
BR Deutschland	64.0	36.6
Hellas	11.5	7.6
España	35.9	26.1
France	31.7	21.5
Ireland	2.1	1.4
Italia	70.0	44.5
Luxembourg	N/A	0.5
Nederland	7.7	5.2
Portugal	3.5	7.6
United Kingdom	20.8	12.6

Source: ERMCO, Cembureau

Table 3: Ready mixed concrete
Number of plants and truck mixers, 1992

	Number of plants	Number of vehicles
Belgique/België	235	1 200
Danmark	100	460
BR Deutschland	2 385	13 784
Hellas	430	2 100
España	803	3 225
France	1 600	6 100
Ireland	142	510
Italia	2 500	9 500
Luxembourg	N/A	N/A
Nederland	195	1 199
Portugal	113	788
United Kingdom	1 150	3 130

Source: ERMCO

environment. On the contrary, the growing unemployment debt is resulting in reduced public expenditure and a lack of investment confidence among private investors, with many major cities having large areas of unused new office and industrial space.

ENVIRONMENT

Pollution of the environment is one of the major political and economic issues in Europe today. The industry's Environment Task Group has been actively involved in studies in a number of areas including:

- Preparation of Code of Environmental Good Practice and Environmental Audit Check List
- Investigations in systems and costs of environment-related investments on ready mixed concrete plants, and the European limits on levels of air, water, and noise pollution.
- Comments to the EC on the proposed taxation of CO2 emissions.
- Compilation of EC Regulations having an effect on ready mixed concrete production.
- Studies of EC Environmental Directives
- Inter-relation of new Initiatives for Environmental Performance
- Studies of Producers liability.

REGULATIONS

The target date of 1992 set for the completion of the European common market standards and the removal of the technical barriers to trade resulted in greatly increased activity both in the years leading up to that date and subsequently. This activity has been concerned with the drafting of EC Directives covering construction products, certification and testing, and of Eurocodes and CEN (European Committee for Standardisation) standards for concrete. These documents place a great emphasis on quality and should enable the standards already achieved by the European ready mixed concrete industry to be fully recognised.

Basic policies for ERMCO Members cover the main aspects of Standardisation and Certification.

For Standardisation the same standards must apply to all types of concrete including ready mixed, site mixed, and precast concrete. For efficiency and economy whenever possible, standards are required to be expressed in performance terms. The industry's technical experts maintain a strong presence on the key CEN Committees and Working Groups and actively disseminate these policies. Difficulties have been created by the absence of a final mandate from the EC to CEN for work on concrete. Meanwhile, the CEN/TC104 Committee on Concrete has made steady progress towards achieving agreement on a new draft EN 206 European Standard for Concrete determining an appropriate Level of Attestation of Conformity; this is to be completed before the end of 1993. In those areas where a single solution has not been found, several alternative solutions have been developed as proposed by ERMCO:

- certification policy states that all concrete including site mixed (contractors) concrete, ready mixed and precast concrete should be subject to the same levels of quality control and attestation of conformity. Priority tasks in the short and medium term are:
- preparation of a quality system for ready mixed concrete which satisfies the Attestation of Conformity requirements for production control and certification in the Construction Products Directive and which is compatible with the Conformity Criteria in Section 11 of EN 206.

A CEN Committee CEN/TC 151 has been set up to define CEN Standards for the safety of construction equipment and building material machines. ERMCO is making comments on the Drafts concerning concrete and truck-mixer equipment and concrete re-cycling plans.

Table 2: Ready mixed concrete
Average real annual growth rates

(%)	1988-92
Production	4.3
Extra-EC exports	9.6
Extra-EC imports	15.8

Source: ERMCO, Eurostat

OUTLOOK

The economic picture ahead is no more promising. Whereas those countries like the United Kingdom, which have experienced the recession for several years, are starting to see slight signs of recovery, others, like Germany and the Medi-

Table 4: Ready mixed concrete
Expected real annual growth rates

(%)	1992-94	1993-97
Production	1.0	1.0

Source: ERMCO

terranean countries, expect it to get worse before it gets better. The rising tide of unemployment is depressing the whole European economy and there will be several difficult years in the future. Recent experience suggests there should be a certain wariness of unknown crises which may lie ahead. A positive step has been the EC Growth Initiative, the plan for economic recovery with investment in the infrastructure. Already Greece, Ireland, and Portugal have submitted detailed plans for temporary loans for relevant activities.

Reacting to the demand for industry-led initiatives, the ready mixed concrete industry, through the individual members of ERMCO, is playing a significant role in establishing realistic standards for concrete manufacture, quality control and environment protection.

Written by: ERMCO
The industry is represented at the EC level by: European Ready Mixed Concrete Organization (ERMCO). Address: PO Box 19, Egham, Surrey TW20 8UT; tel: (44 784) 434 990; fax: (44 784) 435 240.

Glass
NACE 247

The EC is the world's largest glass producing and consuming region. After a period of restructuring and technological advance during the 1980s the EC industry is modern, efficient, and competitive in world markets. Good steady growth during the 1983-91 period has been temporarily halted but is likely to continue beyond 1994. The industry has an excellent environmental record and the container glass sector is at the forefront of recycling developments. As far as flat glass is concerned, the relationship with Eastern Europe may create some problems of low-priced for EC producers that are likely to be outweighed by the mutual benefits of an expanded European market in the later 1990s.

INDUSTRY PROFILE

Description of the sector

The glass industry can be divided into five main sections: container glass (consisting primarily of glass bottles and also known as hollowware), flat glass (consisting primarily of window glass), tableware (domestic glass), glass fibre (for insulation and reinforcement), and special glass (such as optical and industrial glassware). In tonnage terms, container glass accounted for 66% and flat glass 25% of total EC glass production which reached of 23.2 million tonnes in 1992.

The principal raw materials for glass manufacture are mineral products such as silica sand, limestone, dolomite, soda ash, feldspathic materials, and borates as described in Chapter 2. The principal consuming industries are food and beverage processors (for container glass) and construction and motor vehicle industries (flat glass), although the full range of glass products find important applications across the whole spectrum of industry and construction as well as direct consumer items. By any reckoning, the EC glass industry is a major sector, vital to the overall EC economy.

Recent trends

The EC glass industry has displayed excellent growth with production averaging 2.8% and consumption averaging 3.5% per annum in real terms for glass products during the 1983-1992 period. It maintains a healthy trade balance with an annual average 13% of production value being exported over the period. However, imports have grown faster than exports, accounting for 8% of consumption in 1992 compared to 6% in 1983. Both production and consumption were about the same in 1991 and 1992 and in 1993. However, it should be noted that different segments have behaved differently so that the domestic glassware industry has suffered a sharp fall in output between 1991 and 1992 whereas flat glass production recovered from its fall of the 1990-1991 period and container glass accounted for 66% of all glass production.

International comparison

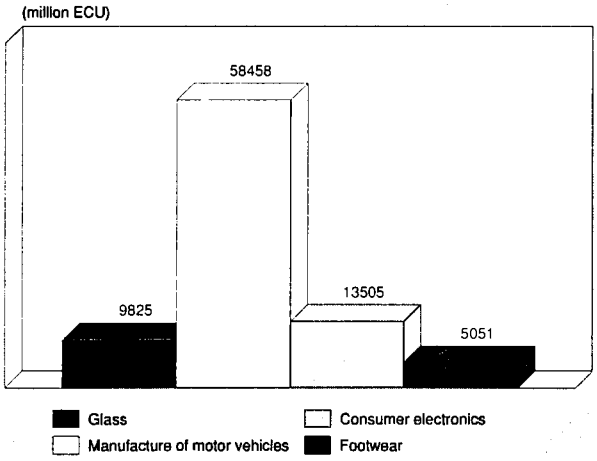
The EC is the world's largest glass producer with a total output of 23.2 million tonnes valued at 22.2 billion ECU in 1992. US glass production was just under two thirds and Japanese production just under the half of the EC total in 1992. However, Japanese production has grown the fastest over the 1983-1992 period and has now a higher per capita output figure than either the EC or the USA.

Foreign trade

As suggested earlier, foreign trade is an important though not dominant part in the EC glass market. In value terms, the EC glass industry is a net exporter although in tonnage terms it is actually a net importer, albeit by a small margin. This can be explained by the types of glass featured in this activity, in which a major element of imports consists of large tonnages of cheap containers and unworked flat glass from Eastern Europe whilst exports contain a major contribution from the domestic glassware sector with high value sales to the USA, Japan, and the EFTA countries. However it varies depending on the countries concerned. There have been big tonnages of unworked glass from Poland, and containers from former Czechoslovakia, and local problems such as Bulgarian bottles distorting the Greek market. However, the biggest single item in imports from the former Czechoslovakia, Poland and Romania, with a larger quantity also coming from Hungary, has been in tableware. There are also increasing imports of float glass, particularly from the Czech Republic.

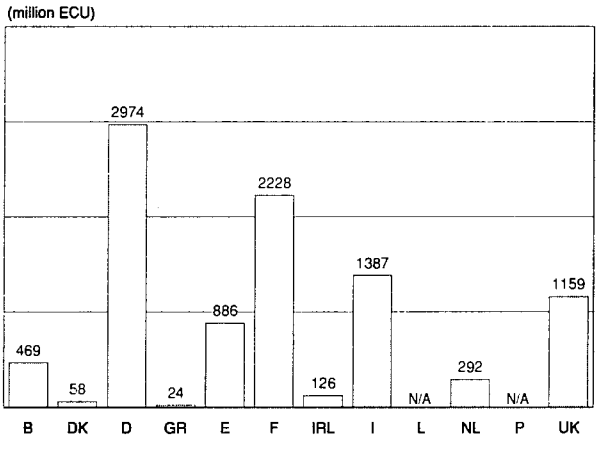
In recent years over 50% of the total tonnage (but only 40% of the value) imported was sourced from Poland, the former Czechoslovakia, Hungary, the former Yugoslavia, and Turkey. Meanwhile the EC imports from the EFTA countries represented in 1992 only 24% of the tonnage but 30% of the value. The USA is also an important source of imports, par-

Figure 1: Glass
Value added in comparison with other industries, 1992



Source: DEBA

Figure 2: Glass
Value added by Member State, 1992



Source: DEBA

Table 1: Glass
Main indicators broken down by sector, 1992

(thousand tonnes)	Apparent consumption	Production	Extra-EC exports
Container glass	15 350	15 304	410
Flat glass (unworked)	5 845	5 692	504
Tableware (1)	769	933	299
Fibres (reinforcement)	408	358	63
Other glass	886	880	179

(1) Excludes Spain.
Source: CPIV

Table 2: Glass
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	12 783	13 667	14 260	14 833	16 294	17 953	19 585	20 488	21 478	21 493	21 600
Production	13 901	14 909	15 641	16 032	17 330	18 990	20 725	21 479	22 258	22 224	22 300
Extra-EC exports	1 893	2 178	2 352	2 210	2 116	2 265	2 566	2 475	2 490	2 488	2 400
Trade balance	1 118	1 242	1 381	1 199	1 036	1 037	1 140	991	781	731	620
Employment (thousands)	255.4	250.3	239.8	234.2	237.0	238.6	246.2	245.2	243.8	236.7	221.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 3: Glass
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	4.8	1.8	3.5
Production	4.1	1.3	2.8
Extra-EC exports	-0.8	0.2	-0.3
Extra-EC imports	5.2	7.7	6.3

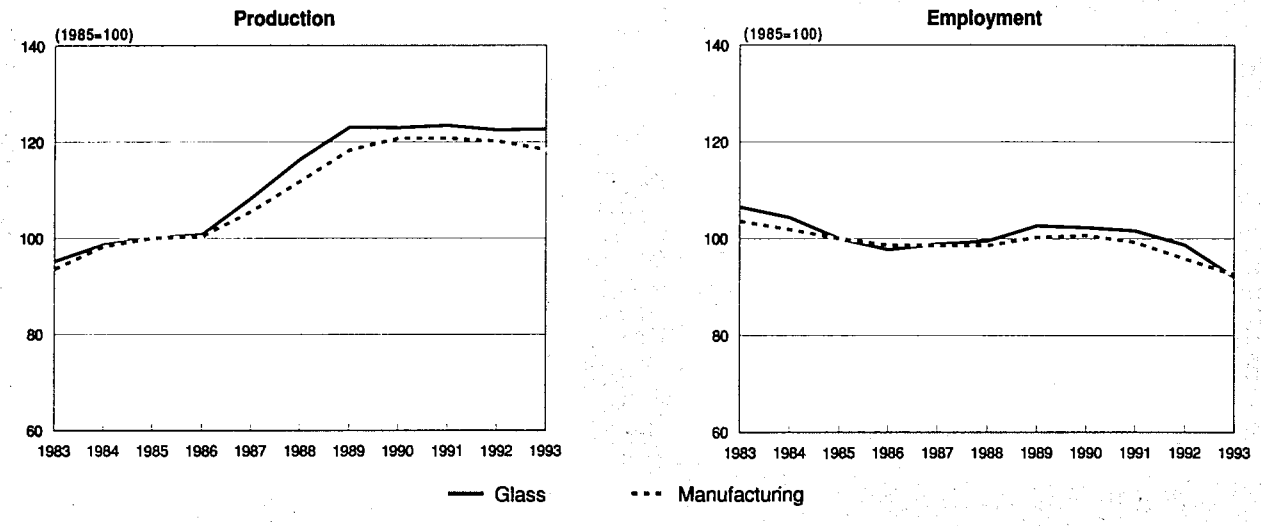
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Glass
External trade broken down by sector, 1992

(thousand tonnes)	Container glass	Flat glass (unworked)	Tableware (1)	Fibres (reinforcement)	Other glass
Extra-EC exports	410.5	504.4	299.1	62.7	179.3
Extra-EC imports	456.3	657.1	135.0	113.3	185.4
Trade balance	-45.8	-152.8	164.1	-50.6	-6.2
Ratio exports/imports	0.90	0.77	2.22	0.55	0.97
Intra-EC trade	1 931.3	1 949.0	338.6	305.1	805.2
Share of total imports (%)	80.9	74.8	71.5	72.9	81.3

(1) Excludes Spain.
Source: CPIV

Figure 3: Glass
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

ticularly for glass fibre but increasingly too for flat glass. The principal destinations for EC exports are the EFTA countries (nearly 40% of the tonnage and around 30% of the value), Japan (15% of the tonnage) and the USA (11% of the tonnage and 20% of the value) but the remaining 45-50% (in value terms) of total exports is spread across a wide range of countries.

Intra-EC trade became an increasingly important element of the market during the 1980s and now accounts for about 25% of total consumption. Belgium is notable as the principal net exporter of glass products in intra-EC trade.

MARKET FORCES

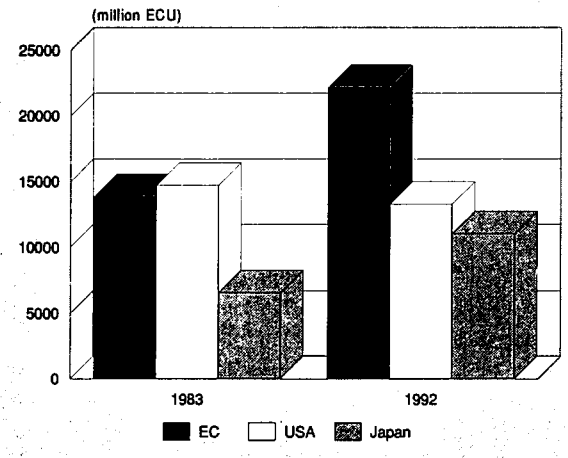
Demand

Glass is used by a very wide range of industries and furthermore up to 15% of sales consist of private consumer products. It is not therefore tied too closely to a single or narrow range of consuming industries. Nevertheless the fortunes of the EC glass industry are seen to be strongly aligned to developments in the food and beverages industry (for container glass) and to the construction and automotive industries (for flat glass), which together account for about 50% of all sales. Glass containers meet strong competition from other packaging materials but particularly from aluminium, plastics (mainly PET), and paper (aseptic cartons) in the beverages sector. After originally losing market share to these other materials, glass has been performing strongly in recent years on grounds of performance, cost, and ecological advantages based on its recyclable character.

Supply and competition

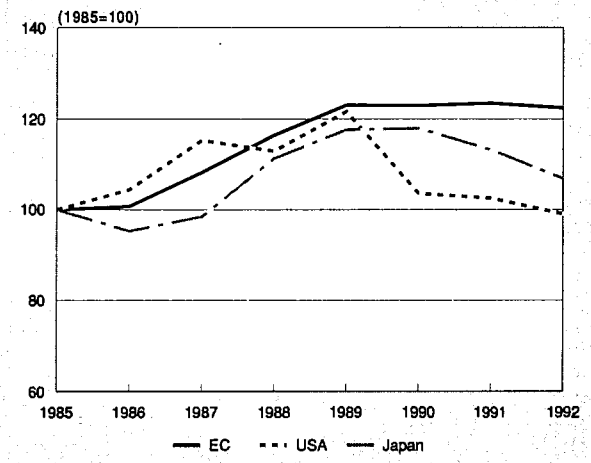
As the world's major consuming region for glass, the EC is a natural target for foreign companies wishing to expand their sales. In the case of the east European countries it is clear

Figure 4: Glass
International comparison of production in current prices



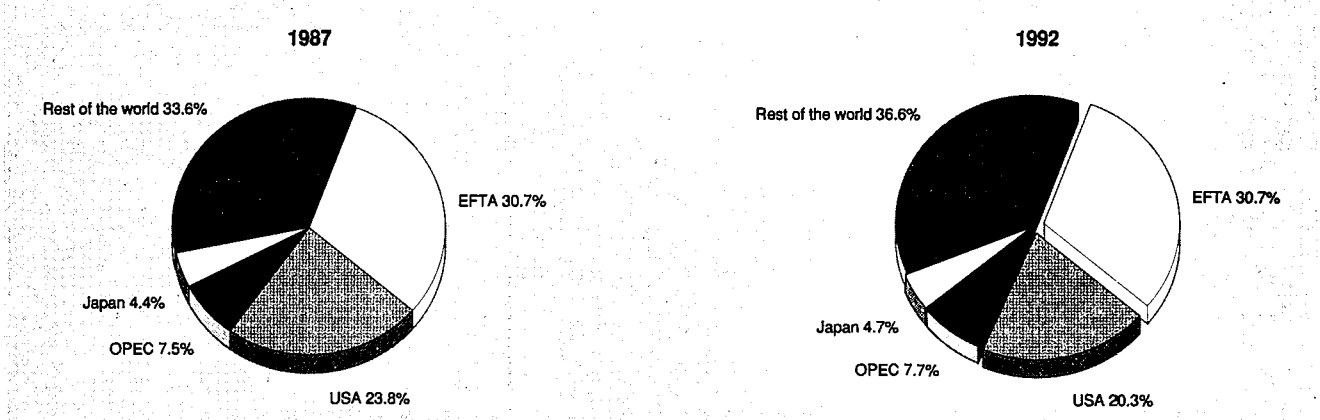
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Glass
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Glass
Destination of EC exports



Source: Eurostat

that the low labour costs and close proximity to markets have provided the platform for the growing export trade described above. In other cases foreign companies have gained major access to the market by acquisition (e.g. the Japanese producer Asahi Glass is the principal shareholder in Glaverbel in Belgium and Maasglas in Netherlands) or by building new plants (e.g. Guardian in Luxembourg). Thus EC producers undoubtedly operate in a very competitive environment although different factors come into play in the different segments of the market.

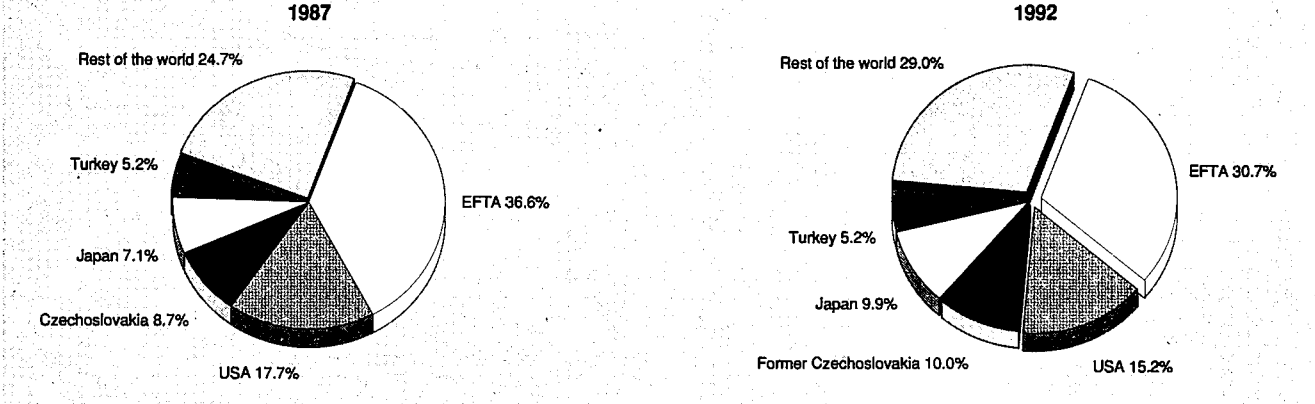
EC container glass producers meet some competition from the cheap European exports but would still see alternative packaging materials as the main threat. The rationalisation programme which was carried out in the early 1980s to combat the twin ills of industrial recession and burgeoning demand for alternative products (e.g. PET bottles) has been highly successful. Glass regained lost ground and producers operated at close to capacity levels in 1989-1991.

Flat glass does not meet the same degree of competition from alternative materials but EC producers have had to meet competition from without (imports) and within (increasing foreign involvement in EC production). The industry has moved from high capacity utilisation in 1987 and 1988 to a situation of increasing surplus capacity which will become more acute as new float glass plants are brought on stream in Poland (Pilkington of UK at Sandomierz), Spain (the Guardian Industries at Tudela, Navarra Province), and France (Euroglass) during the 1993-95 period.

Production process

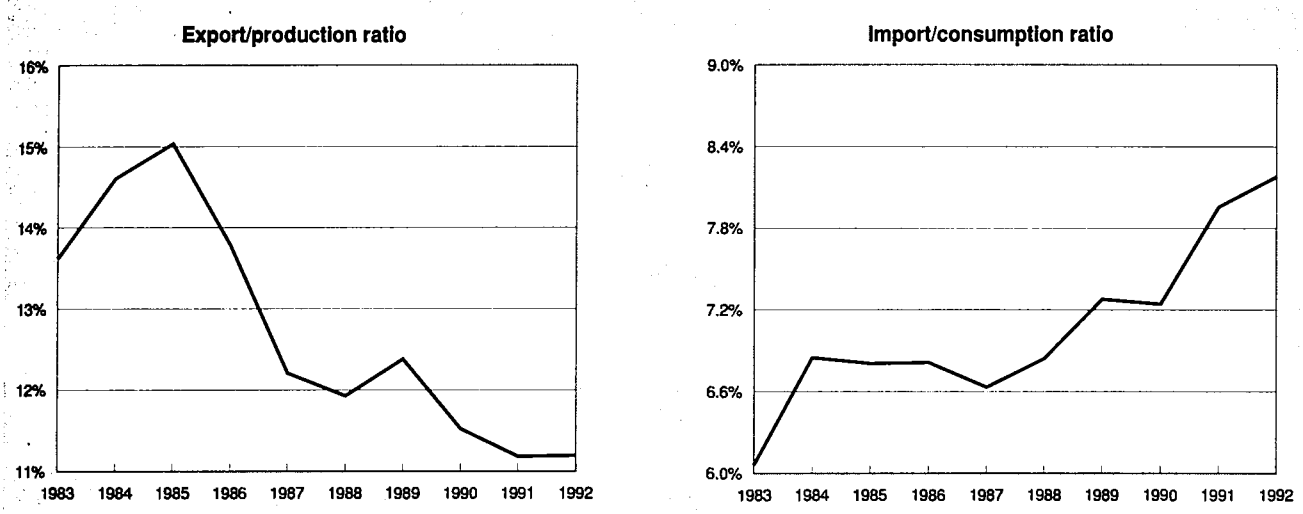
In the glass container sector the past 10 years have been marked by major advances to productivity, process monitoring and control systems, and quality, as well as recycling and light weighting (the production of strong lightweight bottles). Major improvements have been made to furnace performance with regard to energy efficiency, high throughputs, and capability to take an increasing proportion of recycled glass (cullet) as feed material. The efficiency and throughput of automatic forming machines have also improved beyond recognition. Many of these factors also apply to other sectors of the glass industry including flat glass. The float glass process (originally launched over 30 years ago) continues to dominate flat glass production in Europe and has resulted in the closure of all but a handful of older technology sheet glass plants.

Figure 7: Glass
Origin of EC imports



Source: Eurostat

Figure 8: Glass
Trade Intensities



Source: DEBA

INDUSTRY STRUCTURE

Companies

The high degree of concentration in the EC glass industry is a reflection of the large scale and capital intensive nature of modern glass making plant. The EC flat glass industry in particular is dominated by just six companies: Pilkington (UK), Saint Gobain (F), SIV (I), Glaverbel (B, a subsidiary of Asahi Glass of Japan), and the two US companies, PPG and Guardian. Together they account for over 95% of total output.

Saint Gobain is also a major factor in the container glass industry with major manufacturing operations in 6 EC countries. However, a large number of companies are involved in the container glass sector with smaller specialist companies coexisting alongside the larger groups. Other major producers include BSN (F), Gerresheimer Glas (D), Ruhrglas (part of the VIAG group (D), Hermann Heye (D), Nienburger Glas (D), AVIR (I), PLM Group (D, UK, NL), Rockware (UK), and United Glass (UK).

The special glass sector is dominated by the German group, Schott Glas, which is a world leader in the manufacture of optical and industrial glassware. Other important companies in this sector are Corning (part of the US group) of France and Pilkington in the United Kingdom Among a large number of decorative glass producers the largest would appear to be the Waterford Crystal of Ireland although it should be noted that Venetian glass and the famous Murano producers are still highly influential in world markets. There are also Baccara, Lalique, or Crystalleries d'Arques (the latter with cheaper products, but still with high sales) in France, Val St Lambert of Belgium, Calp of Italy, Nachmann Bleikrystall of Germany.

Strategies

Although Saint Gobain and Pilkington are the principal companies operating on a European level a number of other such as BSN, PLM, Guardian, and Schott have important plants outside their home country. A number of companies operating in the EC have also formed alliances in Eastern Europe. These are notably Pilkington in Poland, Glaverbel (Asahi) in the Czech Republic (Glavunion and Obalunion), and Guardian Industries in Hungary (Hunguard).

REGIONAL DISTRIBUTION

The location of glass manufacturing facilities may be governed by proximity to raw material sources (e.g. Belgium with its abundant supplies of high quality silica sand, limestone, and soda ash) or proximity to consuming industries (e.g. where bottle factories are located in wine-growing districts or close to major breweries) or even a combination of these factors tied to good communications.

Table 5: Glass
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 893	2 178	2 352	2 210	2 116	2 265	2 566	2 475	2 490	2 488
Extra-EC imports	775	936	970	1 011	1 080	1 228	1 426	1 484	1 709	1 758
Trade balance	1 118	1 242	1 381	1 199	1 036	1 037	1 140	991	781	731
Ratio exports/imports	2.44	2.33	2.42	2.19	1.96	1.84	1.80	1.67	1.46	1.42
Terms of trade index	101.1	101.9	100.0	100.2	101.0	102.2	102.3	104.7	102.9	104.8
Intra-EC trade	2 666	2 985	3 241	3 567	3 923	4 413	4 945	5 303	5 365	5 409
Share of total imports (%)	77.5	76.1	77.0	77.9	78.4	78.2	77.6	78.1	75.8	75.5

Source: DEBA

Table 6: Glass
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	30.0	30.7	32.6	35.5	38.0	41.5	40.4	40.5	40.6	41.5
Productivity index	91.8	94.1	100.0	108.7	116.4	127.0	123.8	123.9	124.5	127.2
Unit labour costs index (3)	88.7	93.6	100.0	104.2	108.9	116.0	120.0	127.0	136.1	146.0
Total unit costs index (4)	85.1	92.5	100.0	101.6	107.4	114.9	123.9	128.6	134.8	141.7

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Table 7: Glass
Recycling rates

	(thousand tonnes)		(% recycling rate)	
	1988	1992	1988	1992
Belgique\België	166	216	50	54
Danmark	46	75	27	48
BR Deutschland	1 176	2 459	39	65
Hellas	14	30	16	20
España	278	312	23	27
France	676	1100	34	44
Ireland	9	20	10	27
Italia	610	786	40	53
Luxembourg	N/A	N/A	N/A	N/A
Nederland	261	378	53	73
Portugal	31	62	13	30
United Kingdom	264	459	15	26
Austria	98	175	50	64
Finland	2	23	3	44
Norway	3	24	6	44
Sweden	31	76	22	58
Switzerland	156	212	55	72
Turkey	40	52	23	25

Source: FEVE / Glass Gazette

ENVIRONMENT

The glass industry is a major user of fossil fuels and is therefore subject to controls on gaseous and dust emissions. EC glass producers have a good record in dealing with the problems and operate within the limits of current legislation. The industry continues to work to improve existing practice, not only with reducing emissions but also to further improve energy efficiency. On another environmental front, recycling, container glass is probably at the forefront of all major industries in its ability to use both process waste and use of waste glass. In countries such as the Netherlands, Germany, Belgium, and Italy the recycling rate exceeded 50% in 1992 and great strides are being made by more recent converts such as the United Kingdom and Ireland.

Table 8: Glass
The ten largest companies in the EC, 1991

(million ECU)	Country	Sales	Employment (thousands)
Saint Gobain	F	10 758	104.7
Pilkington	UK	3 720	53.8
Schott Glas	D	2 242	31.6
BSN Emballage	F	448	3.0
SIV	I	448	5.3
Waterford Wedgewood	IRL	380	N/A
Gerresheimer Glas	D	365	2.0
Rockware Group	UK	346	5.0
PPG France	F	267	1.5
United Glass	UK	230	2.3

Source: B.M.Coope & Partners

REGULATIONS

The industry is directly affected by EC Directive 85/360 concerning air pollution and provides an ideal example of how caution and foresight must be applied when introducing pollution control measures. New measures will add substantially to costs and put EC producers at a considerable disadvantage to competitors in countries with lower environmental standards. Through products such as double-glazed windows and glass fibre insulation, glass presents major energy saving opportunities and it would be ironic if a possible carbon tax were to penalise an industry making a positive contribution to the overall carbon dioxide equation.

OUTLOOK

The EC glass industry is in good health and likely to benefit from improved industrial performance in the years ahead. Some concern is expressed concerning rising costs of complying with environmental regulations and the flat glass industry may be due for a period of oversupply due to capacity expansions in Europe as a whole. Nevertheless the potential for high growth, particularly in Eastern Europe, would soon minimise such fears.

Table 9: Glass
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.0	3.0
Production	1.0	2.5
Extra-EC exports	0.0	0.5

Source: B.M.Coope & Partners

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Ceramic goods
NACE 248

The ceramic goods industry covers a range of products from tiles, tableware and sanitaryware to refractories and advanced ceramics. It is difficult to think of another EC industry in which the type of company and state of technology covers such a broad spectrum. EC industry stretches from small family companies producing clay-based products according to methods developed several millennia ago to important materials groups at the forefront of developments in advanced ceramics. Modernisation and restructuring will be necessary in some segments to maintain the EC's position as the world's leading producer of this group of products.

INDUSTRY PROFILE

Description of the sector

The principal ceramic products covered under this heading are floor and wall tiles (NACE 248.3); sanitary ware (NACE 248.5); tableware and ornamental ware (NACE 248.6 & 248.7); industrial ceramics (NACE 248.8); and refractory products (NACE 248.1). Other ceramic materials covered in other monographs of Chapter 5 include bricks and roof tiles, and pipes. The products described are based on the industrial mineral raw materials covered in Chapter 2 but in particular on the clays and other silicates (feldspar, talc, sillimanites, wollastonite, and zircon), silica (silica sand, quartz, and quartzite), and mineral oxides derived from such minerals as magnesite, dolomite, limestone, and bauxite.

They are consumed across a wide range of industries but the principal markets are building and construction (tiles, pipes, sanitary ware), domestic and leisure industries (tableware, hotel ware, ornamental ware, etc.), electrical and electronic engineering (insulators); and metallurgy (refractories). The new breed of advanced ceramics (also known as technical ceramics or engineering ceramics) are also becoming of increasing importance to the mechanical engineering sector. Thus ceramic products are not only consumer items but are also vital to a whole range of industrial processes.

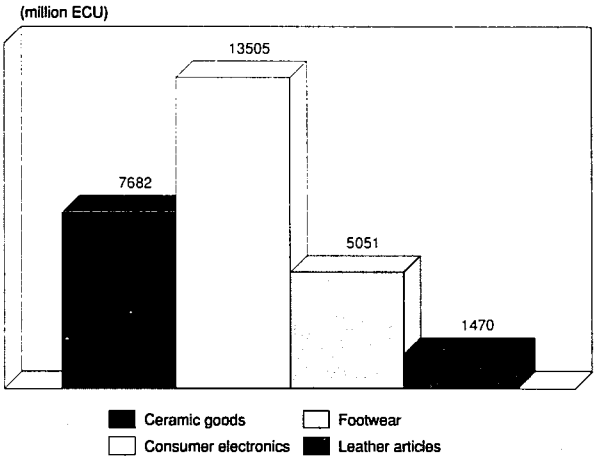
Recent trends

EC production and consumption of ceramic goods showed good steady growth during the 1983-1991 period since when there has been a decline in most subsectors. In real value terms production grew by an average 2% per annum and consumption by 2.7% over the 1983-1992 period. As this suggests, imports have grown faster than exports but the EC is a major net exporter with sales to foreign countries consistently making up about 20% of total production. The contribution of imports to total consumption has grown from 7% in 1983 to 9% in 1992. The downturn in consumption since 1991 has resulted in lower volumes and prices which are most severe in tableware and refractories segments.

International comparison

The EC is generally regarded as the world's largest ceramic producing region but it is well recognised that the fastest growing region is the Far East where Japan, China, and the ASEAN countries have all been displaying spectacular growth during the past decade. Meanwhile the US ceramics manufacturing sector has been somewhat moribund during the 1983-1992 period and indeed the USA is a major net importer of products such as ceramic tiles and tableware.

Figure 1: Ceramic goods
Value added in comparison with other industries, 1992

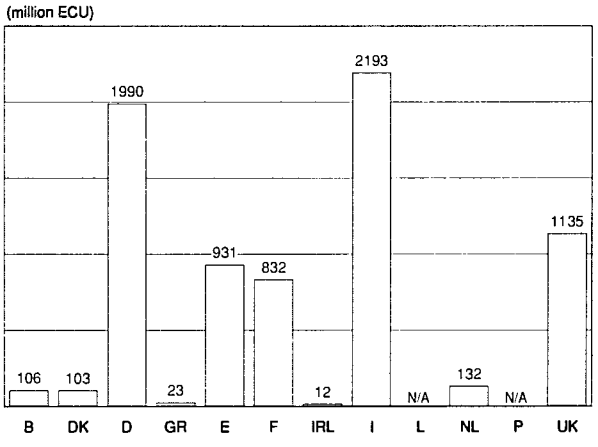


Source: DEBA

Foreign trade

As mentioned earlier, the EC is a highly active participant in foreign trade in ceramic goods, most prominently as an exporter but also as a significant importer of certain goods. Imports are on a clear upward trend and Far Eastern producers such as China, and the ASEAN countries have been particularly successful in penetrating the tableware and ornamental ware segments of the market. It should be noted that although EC exports still exceed imports in value terms for these segments the total tonnage imported (over 300 000 tonnes) was almost exactly double the total export tonnage. This emphasises the point that import penetration is principally at the lower priced end of the market. With regard to non-Asian sources, the EFTA countries are notable suppliers of sanitary ware and refractories whilst the USA is prominent in the areas of refractories and technical ceramics. The Czech Republic (formerly part of Czechoslovakia) is prominent among the eastern European countries supplying white ware products to EC markets.

Figure 2: Ceramic goods
Value added by Member State, 1992



Source: DEBA

Table 1: Ceramic goods
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	8 346	9 819	9 902	10 379	11 088	11 919	13 283	14 276	14 480	14 240	14 200
Production	9 953	11 575	11 799	12 131	12 810	13 881	15 576	16 519	16 521	16 265	16 400
Extra-EC exports	2 185	2 439	2 569	2 458	2 467	2 793	3 216	3 218	3 207	3 316	3 580
Trade balance	1 607	1 756	1 898	1 751	1 722	1 962	2 294	2 243	2 042	2 024	2 200
Employment (thousands)	262.9	266.9	258.1	255.9	254.6	252.0	256.0	257.5	249.4	240.1	221.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
2) Eurostat estimates.
Source: DEBA

Table 2: Ceramic goods
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	4.4	0.7	2.7
Production	3.6	0.1	2.0
Extra-EC exports	0.2	0.3	0.2
Extra-EC imports	3.7	8.7	5.9

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Ceramic goods
Breakdown by sector, 1992

(thousand ECU)	Ceramic tiles			Tableware and ornamental ceramics	
	Consumption	Sales	Employment (thousands)	Production (1)	Employment (2) (thousands)
B/L	181.2	–	–	N/A	1
DK	N/A	–	–	N/A	N/A
D	1 278.3	773.0	11.0	850.5	30.0
GR	139.8	25.5	0.9	N/A	0.9
E	914.6	1 537.7	13.9	N/A	N/A
F	746.8	357.8	N/A	246.9	5.5
IRL	N/A	–	–	N/A	N/A
I	1 794.8	3 630.0	30.3	858.7	N/A
NL	192.9	152.2	1.3	20.1	N/A
P	48.7	N/A	4.4	251.0	8.6
UK	278.8	137.2	2.4	730.3	23.3

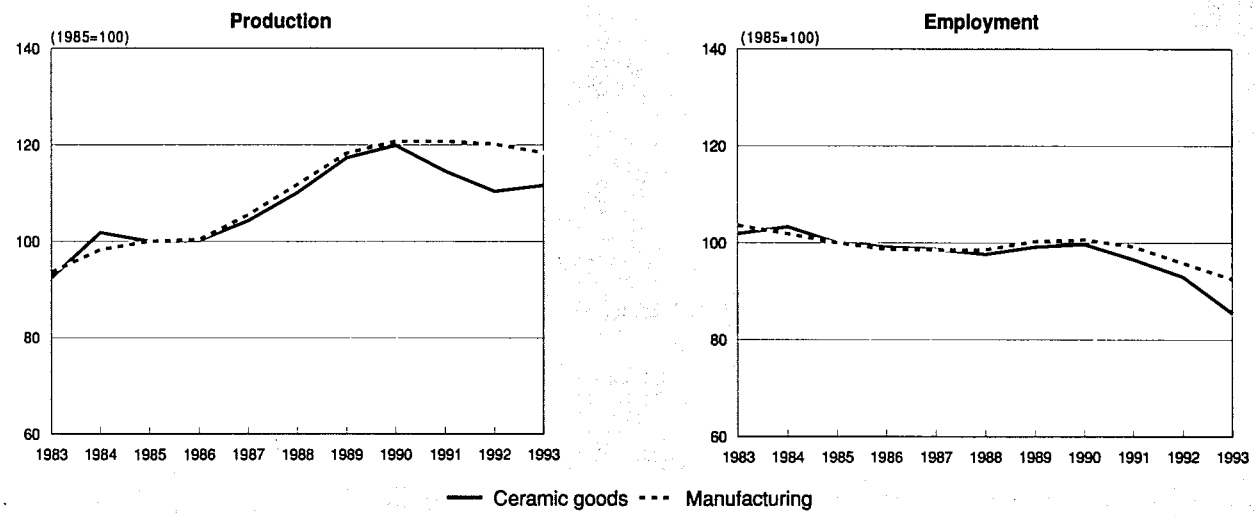
(1) France, porcelain tableware sales and ornamental tableware; United Kingdom, tableware and ornamentalware sales.
(2) Greece, tableware only.
Source: Cerame-Unie

Table 4: Ceramic goods
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	2 185	2 439	2 569	2 458	2 467	2 793	3 216	3 218	3 207	3 316
Extra-EC imports	577.8	682.5	671.8	706.7	745.6	830.9	921.9	974.8	1165.3	1291.6
Trade balance	1 607	1 756	1 898	1 751	1 722	1 962	2 294	2 243	2 042	2 024
Ratio exports/imports	3.78	3.57	3.82	3.48	3.31	3.36	3.49	3.30	2.75	2.57
Terms of trade index	103.4	101.3	100.0	105.2	107.2	109.2	107.5	115.0	114.3	114.8
Intra-EC trade	2 104	2 307	2 416	2 616	2 853	3 146	3 534	3 863	4 020	4 138
Share of total imports (%)	78.5	77.2	78.2	78.7	79.3	79.1	79.3	79.9	77.5	76.2

Source: DEBA

Figure 3: Ceramic goods
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

The EC exports an enormous range of products to destinations throughout the world. The EFTA countries feature prominently across the full range of products whilst the USA is a major customer for wall tiles, tableware and ornamental ware, and refractories. Australia, Canada, and Japan also feature prominently for these items.

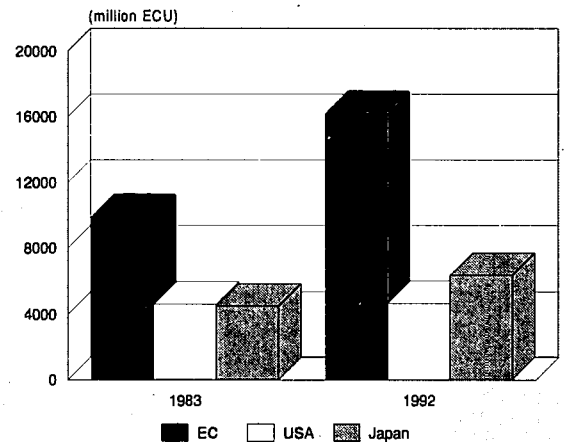
MARKET FORCES

Demand

The building and construction industry is by far the major influence on demand for ceramic wall and floor tiles and for sanitary ware. Demand for these products is well spread across a full range of structures and buildings, from private dwellings to public buildings and industrial structures, and is not just limited by new building. The maintenance and renovation market for tiles and sanitary ware provides an extremely important secondary market and the fact that both form a central element to interior design means that replacement takes place on aesthetic grounds in addition to the more normal reasons of wear and tear. Sales of wall tiles in particular take place on several levels, from large construction companies to the individual DIY (do-it-yourself) enthusiast, and the latter may even buy from a shop devoted to selling tiles, wall tiles, and floor tiles. Fashion trends also constitute a very important element in product replacement.

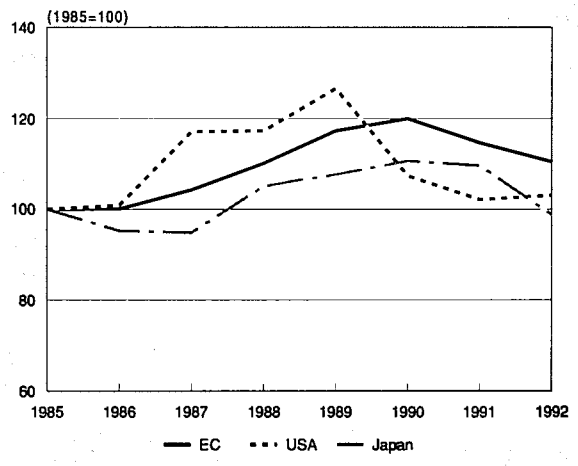
The tableware and ornamental ware segment also takes more than a passing interest in new public building and renovation schemes since hotels, restaurants, hospitals, and the like are all major buyers of tableware. Indeed the special requirements of the hotel and catering trade has given rise to the "hotel ware" sub-sector with specially designed hard-wearing ceramics. Meanwhile the private buyers in this segment tend towards some of the more upmarket products designed by artists and made in prime raw materials such as porcelain and bone china.

Figure 4: Ceramic goods
International comparison of production in current prices



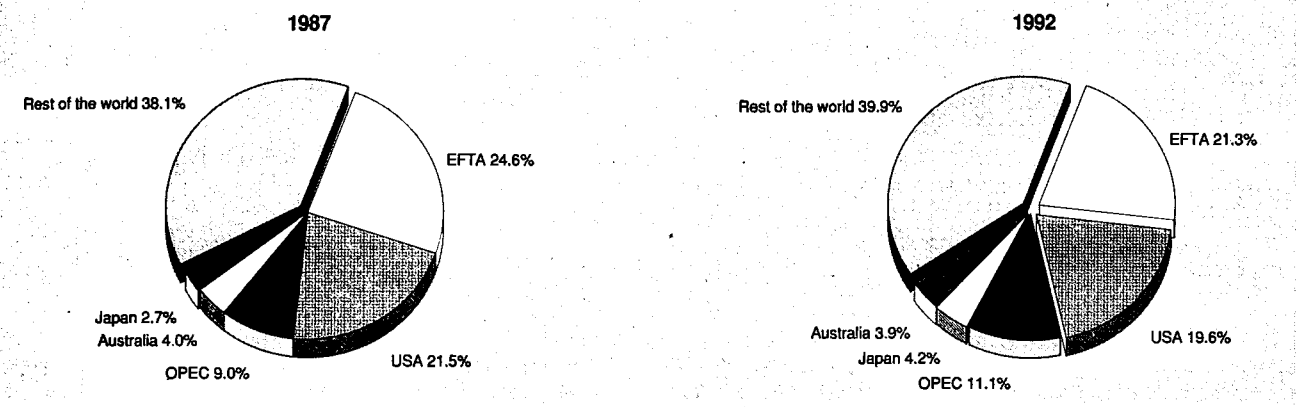
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Ceramic goods
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Ceramic goods
Destination of EC exports



Source: Eurostat

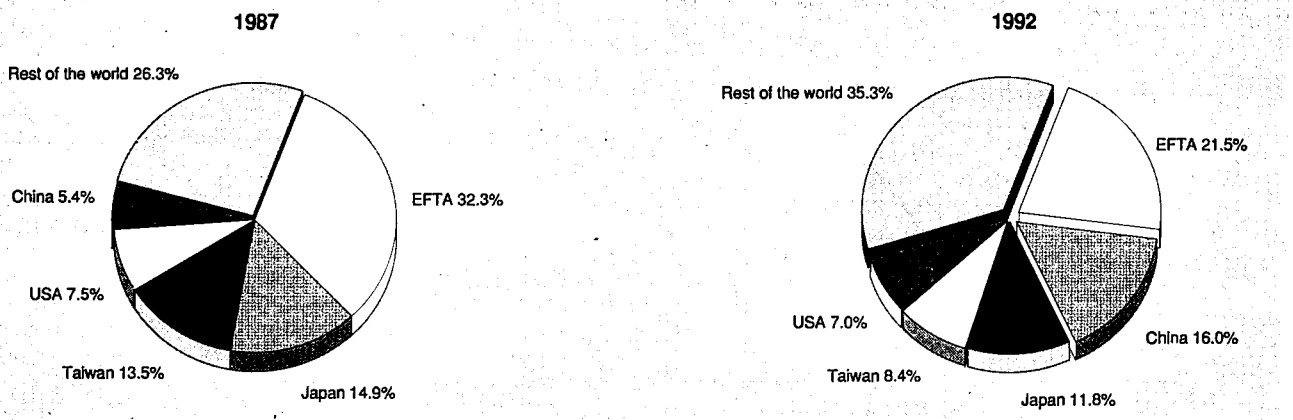
The refractories segment is a fascinating industry in which technical advances continuously reduce the size of the market. Refractories are vital to high temperature processes required to produce metals, glass, steel, cement, ceramics, and a range of other products but the tonnage growth of these products in recent decades has never been enough to counter the decrease in unit consumption brought about by technical advances to processes and materials.

The technical ceramics segment is to some extent based on materials and techniques developed by the refractories industry and adapted towards engineering applications. Certain products such as electrical insulators made of alumina or steatite have actually been around for some time but some of the "newer" ceramics are becoming of increasing importance in electronics, chemical, mechanical, biological, and nuclear engineering applications. Very high growth rates are predicted for materials such as silicon carbide, silicon nitride, sialons, partially stabilised zirconia, aluminium nitride albeit from an initially low volume base.

Supply and competition

The EC ceramics industry has not only centuries of tradition to draw on but also ample supplies of high quality raw materials, a strong and continuously evolving technical base, and an enormous home market. Yet it has proved itself to be vulnerable to competition from geographically distant sources of the Far East. This has been due to a combination of the low labour costs of some of these countries and the fact that producers in these countries have embraced European processing technology to boost their own production. This has exposed the high production costs and overcapacity existing in much of the EC tableware sector. The impact has been the greatest at the lower quality end of the market, causing some EC producers to concentrate on more upmarket products, others to take major cost-cutting measures to remain competitive, and yet others to go to the wall. Vulnerability to Far East competition may also be due to low environmental considerations if any, with resulting lower costs in this area. It is worth mentioning then the problem emerging when some producers send designers to Europe to copy European designs. The end result is that the customer sees on the shelf an EC made product produced to high environmental considerations, standing next to a low priced import which looks exactly the same, but has been made to low, or no environmental standards, and which costs a fraction of the price.

Figure 7: Ceramic goods
Origin of EC imports



Source: Eurostat

Table 5: Ceramic goods
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	25.4	26.9	27.0	28.6	30.4	32.0	32.0	32.6	32.1	32.0
Productivity index	94.0	99.4	100.0	105.9	112.3	118.2	118.5	120.5	118.7	118.3
Unit labour costs index (3)	88.4	95.0	100.0	104.8	110.7	116.2	125.7	134.9	143.2	153.9
Total unit costs index (4)	83.3	94.9	100.0	101.1	106.5	115.8	130.4	137.4	145.8	153.7

(1) Estimates are used if country data is not available, especially from 1990 onwards."
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale."
Source: DEBA

The current downturn in demand has certainly reduced operating margins for even the most efficient producers yet further efficiencies will no doubt be required to survive the worst in order to take advantage of the projected recovery.

Production process

Although the traditional ceramics industry, wheel and the skilful hands of dedicated craftsmen, still retains a niche at the "arts and crafts" end of the ceramic market spectrum, the modern ceramics industry is actually one of large scale, automated processes, close technical and quality controls, and a technically trained workforce. The new techniques introduced over the past 20 years are: dry pressing, pressure casting, isostatic pressing, fast firing, roller kiln firing, plus the use of robotics in glazing and decorating.

INDUSTRY STRUCTURE

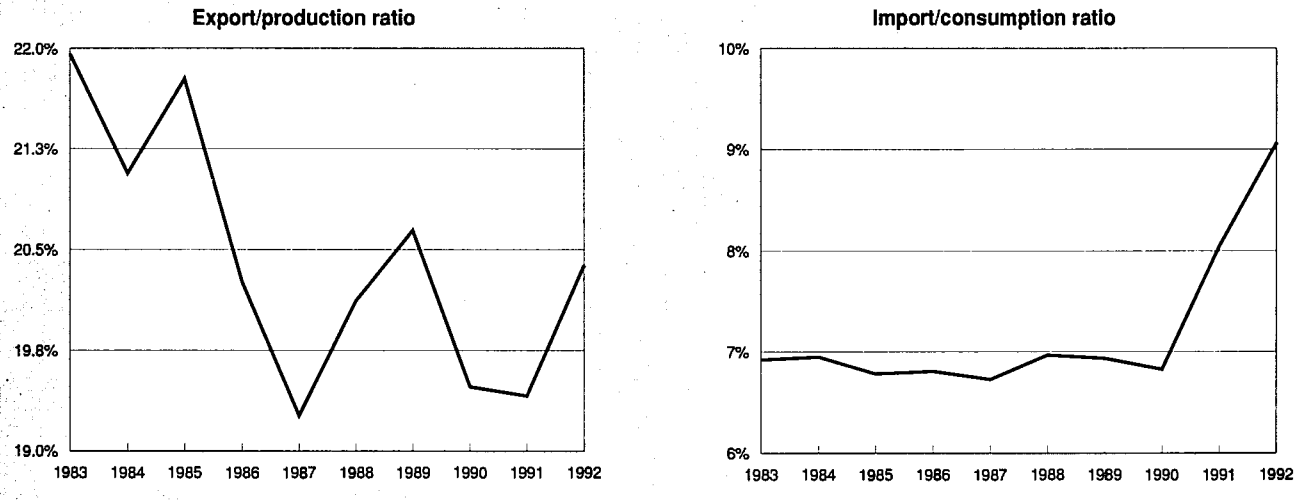
Companies

The EC ceramic goods sector has total production of around 14 billion ECU and employed, in 1992, around 240 000 people involving over 2 500 companies. The figures bear out the predominance of small and medium-sized companies in the overall picture.

Some of the largest companies operate in the refractories sector where a high degree of concentration now exists and where five companies account for about 65% of total European (EC plus EFTA) production. These companies are: Didier-Werke (D), Oesterreichische Magnesit (A), Hepworth Refractories (UK), Sanac (I), and SEPR (F). Other important mainstream refractory producers include Refratechnik (D), the Wulfrath Group (D), Baker-Steetley (UK), Dyson Refractories (UK), AMR Refratarios (E), Dr C. Otto Feuerfest (D), VGT-Dyko (D). Significant specialist producers include Vesuvius International (part of the Cookson group of the UK and major manufacturer of concast refractories and crucibles), Lafarge Refractaire (F, part of Lafarge Coppee and a major producer of monolithic refractories), and the Morgan group of the UK (crucibles, monolithics, and technical ceramics).

The tableware and ornamental ware sector contains a handful of large companies amongst a myriad of small ones. Major groups include the three German companies, Villeroy & Boch, Rosenthal, and Hutschenreuther and the two UK companies, Wedgwood and Royal Doulton. Together these companies account for around 40% of total EC output. In the sanitary ware sector the two major groups operating on a European level are Ideal Standard (I) of the American Standard group of the USA and the Sanitec group of Finland whose interests now include Allia (F), Keramag (D), Pozzi-Ginori (I), and Eurocer (P) in addition to its Scandinavian activities. Other European companies of note include Blue Circle Industries (UK) through subsidiaries Armitage Shanks (UK) and Ceramica Dolomite (I), the Roca group (E), Keramik Laufen

Figure 8: Ceramic goods
Trade intensities



Source: DEBA

Table 6: Ceramic goods
The ten largest companies in the EC, 1991

(million ECU)	Country	Sales	Employment (thousands)
Hepworth	UK	942	10.1
Didier Werke	D	685	7.4
Villeroy & Boch	D	510	6.9
Norcros	UK	505	7.7
Wedgwood UK	UK	384	7.8
Iris Ceramica	I	345	2.7
Royal Doulton	UK	224	7.0
SEPR	F	221	1.8
Hutschenreuther	D	207	5.8
Ideal Standard	I	204	1.9

Source: B.M.Coope & Partners

(CH), and Sphinx (NL) which now operates plants in the Netherlands, Belgium, Germany and France.

The EC wall and floor tile industry is dominated by medium sized producers in Italy and Spain with annual turnovers in the 40-80 million ECU range. The small number of larger groups includes Gruppo Ceramiche Marazzi, Iris Ceramica, Cerim Ceramiche in Italy and Porcelanosa and Fabreza in Spain. Companies in other countries include Villeroy & Boch and ABK in Germany and H & R Johnson (part of the Norcros group) in the United Kingdom.

Companies active in the technical ceramics segment include Hoechst CeramTec, Hutschenreuther, Cerasiv, Wacker, and Didier of Germany; Saint Gobain (through its SEPR, Norton, and Stettner subsidiaries), Pechiney of France; T&N, and Morgan Matroc of UK; and Samatec of Italy.

Strategies

Of late, the segment that has been most active on the mergers and acquisitions front has been sanitary ware, particularly through the Sanitec group of Finland but followed by Sphinx (NL) and BCI (UK). It should be noted that Sanitec's expanding empire also takes in plants in Poland and former East Germany. The continuous restructuring process of the refractories industry has been evident for some time with the most recent major events being the amalgamation of the two Austrian producers, Radex and Veitscher, under the Oest. Magnesit umbrella and the purchase of Steetley Refractories (UK) by J. E. Baker of the USA.

Nevertheless it is clear from the foregoing that the process of restructuring has a long way to go in the tiles and tableware segments of the EC ceramics industry. It seems likely that further amalgamation allied to investment in new equipment will be necessary to improve competitiveness in parts of this industry. However, it should be noted that such streamlining will take place without sidelining the artistic element to this industry. Flair and design play an important role in European competitiveness on both mass production and craft pottery levels.

REGIONAL DISTRIBUTION

A large number of ceramics manufacturing companies continue to operate in regions whose traditional location was based on the availability of raw materials and fuel. Thus despite changing circumstances areas such as Stoke-on-Trent in the United Kingdom, Bavaria and the Rhineland in Germany, Sassuolo in Italy, Castellon in Spain, and Limoges in France have maintained their status as major white ware manufacturing centres. Although the raw materials availability argument also applied to the location of many refractories plants, more modern plants have tended to be built close to major metallurgical centres such as the Ruhr region of Germany and Sheffield in the United Kingdom.

ENVIRONMENT

The larger modern units of ceramics industry are well equipped to deal with existing compliance levels but further restrictions and the imposition of a carbon tax would have a major impact on the whole industry.

OUTLOOK

The consumption of ceramic goods is expected to resume its former levels of growth as EC industry in general moves out of recession. Those companies that have already modernised and restructured can be expected to perform well during the latter part of the 1990s but some of the smaller, high cost concerns will need to invest in new technology to remain competitive against imports. The technical ceramics segment will continue to grow and certain products may develop from "low volume, high value" to "medium volume, medium value" status by the year 2000.

Table 7: Ceramic goods
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.5	2.5
Production	0.5	2.5
Extra-EC exports	0.0	0.5

Source: B.M.Coope & Partners

Written by: B.M. Coope & Partners
The industry is represented at the EC level by: Liaison Office of the European Ceramic industry (Cerame-Unie). Address: Rue des Colonies, Bte. 18, B-1000 Brussels; tel: (32 2) 511 3012; fax: (32 2) 511 5174.

Advanced materials

The advanced materials industry is highly diversified as it includes at least 8 different subsectors. At the world level, the USA is the leader in most of the different market segments. Europe, however, has the biggest world market share in new steels and held, in 1991, one-third of the high-distribution composites segments. For many years, south-east Asian countries have also operated as advanced materials producers. Efforts are made in each different branch of the advanced materials industry to ease the recycling, re-use and recuperation process. Advanced materials have a bright future and many end-uses in different areas.

INDUSTRY PROFILE

Description of the sector

Advanced materials include new or improved uses or technologies implemented in the traditional materials.

Among advanced materials, a distinction may be drawn between structural materials which define the form of industrial objects and functional materials which are used for their physical skills and represent only 15% of the total market.

In this chapter, advanced materials are classified by type of material. They include:

- engineering thermoplastics: polyamides, polyacetals, polycarbonates, modified PPO (PPE-based alloys), thermoplastic polyesters, polyethylene terephtalate, very-grade plastics, elastomeric thermoplastics, fluorinated thermoplastics, new PPs and PEs, PEN;
- engineering thermosets and adhesives: phenolic resins, silicones, engineering adhesives, polyurethanes, epoxy resins, DCPD;
- glasses materials: compound glass, low emissivity glass, composite glass plasticized alloyed glass bottles;
- advanced ceramics: ceramics for catalytic converters, fine ceramics;
- new steels: tinless tinplate substitute; magnetic steel sheets, coated steel sheets, steel sheets with high elastic limit, cold-rolled thin stainless steels;
- new non-ferrous materials: refined aluminium for aeronautics, aluminium-lithium, aluminium sheets for packaging, aluminium alloys for casting, super alloys, titanium, retroactive alloys;
- high-performance composites: HP composites with organic matrix, carbon fibres, carbon-carbon composites, composites with metallic matrix, composites with ceramic matrix;
- high-distribution composites: TP and TS resins, short and semi-long fibres, RTM, SRIM, TRE.

Advanced materials cover a large variety of application areas such as: transport (for steel sheets, fixing, coachwork); building and public works (for ground coating, floors, special steels); electrical and electronic construction (for cables, electrical insulators, parabolic aerials); mechanical construction (valves); sports and leisure (high-performance composites for sport equipment, elastomers for sporting shoes soles).

Automobile, packaging and building and public works are three other important end-use sectors.

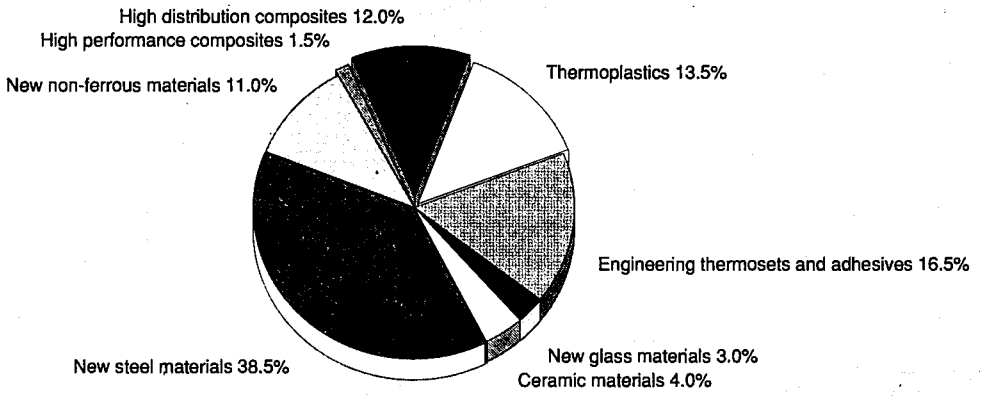
Automobile

This sector makes use of a large range of advanced and traditional materials. Evolutions related to coachwork, motors, glass and seats are numerous. They also concern electronics and telecommunications which will be highly developed in the coming years. Advanced materials used in the automobile sector are for example: new steels (HLE iron sheets, that are thicker and lighter than elastic sheets with the same resistance to the effort) or new non-ferrous steels. Plastics are going to substitute to metals because their energetic content is two times lower and their manufacture needs less energy. For motors, technical plastics improve performance as their surface is smooth and allows a better flowing of fluids. Plastics also allow lower cost of production. New glasses in the automobile area concern: a-thermic glasses which filter IR and UV; therming glass in which very thin yarns are inserted; double lateral glass; half glass and half plastic windscreen to prevent from stone projections; lightening or darkening glasses related to atmospheric conditions; head up displays visions.

Packaging

Packaging is a very important market. In 1992, production of plastics materials reached at the world level about 160 million of tons valued at 210 billion ECU. The main end-user sector for packaging is the agro-food sector which uses also most diversified forms. Plastics satisfy the majority of requirements imposed to packaging materials that are: resistance

Figure 1: Advanced materials European market by product, 1991



Source: BIPE

Table 1: Advanced materials
World and European markets by product

(million ECU)	World		Europe	
	1991	AAGR (%)	1991	AAGR (%)
Thermoplastics	19.6	7.9	6.2	9.3
Engineering thermosets and adhesives	25.0	4.9	7.6	3.9
New glass materials	6.7	7.2	1.4	8.0
Thin ceramics	9.8	10.5	1.4	10.1
Catalytic converter ceramics	2.6	5.9	0.4	11.4
New steel materials	62.6	2.3	17.8	2.2
New non-ferrous materials	19.2	3.1	5.1	3.5
High performance composites	2.7	16.0	0.7	9.0
High-distribution market composites	15.6	6.4	5.6	6.2
Total	163.8	4.8	46.2	4.6

Source: BIPE

to deterioration, impermeability, resistance, asepsis, lightness, mass colouring properties and flexibility of production process. Most of the innovations concern recycling of plastic packaging as well as lightening glass and using white steel in drink cans.

Building and public works

Advanced materials applications are numerous in this sector. Thermoplastic are used for security glass, electrical cables etc. Engineering thermosets and adhesives are used for insulation and mastic. Steels concern building equipment as thermal acoustic, insulator; glass for light façade and composites for canalisations.

Size of the sector

In 1991, the USA held more than 50% of the world market for the new non-ferrous materials and for the high performance composites. Their high share in the new non-ferrous materials market is mainly due to the monopoly they hold on aluminium sheets for pressing and spinning used in packaging. The USA were also the leader in engineering thermoplastics, engineering thermosets and adhesives and in compound glasses.

Japan, for its part, controlled about half of the advanced ceramics market. The average annual growth rate for the fine ceramics, at the world level, was estimated in 1991 at 10.5%. Europe controlled one-third of the world market for high-distribution composites, engineering thermoplastics, advanced glasses and new non-ferrous materials. For new steels however, Europe is the world leader with a share of 28% of the world market, ahead of the USA (23%) and Japan (22%).

Within the new materials, new steels represent the most important market with 38.5% on the European market share. Engineering thermosets, engineering thermoplastics and high-distribution composites come after with 16.5%, 13.5% and 12% respectively.

The average annual growth rate for engineering thermoplastics was estimated, in 1991, to around 9%. Among this category of advanced materials, high ranking pet packaging in plastics have the strongest potential growth rate. Germany represented 30% of the European engineering thermoplastics market. France and Italy followed both with 17% and United Kingdom with 15%.

Table 2: Advanced materials
End-use destinations, 1990

(%)	
Automobiles	22.5
Electrical/electronics	19.0
Mechanical engineering	12.0
Building	11.5
Packaging	8.0
Sports and leisure	2.5
Aerospace	2.5
Others	22.0

Source: BIPE

MARKET FORCES

Future trends in demand

In Europe, advanced materials outlets can be found in the automotive sector, electrical and electronic engineering, mechanical engineering, building, packaging, sports and leisure and aerospace equipment.

The new glass sector is forecasted to continue its annual 4% growth in the coming years; European and Japanese markets will be likely to offer more outlets than the US market. Indeed, during the 1991-2000 period the Spanish, Japanese, French and Italian markets will record the strongest growth rate.

Automobile, railway and electric-electronic engineering are all sectors that offer the best potential of growth in high-distribution composites for the 1991-2000 period. Japan, Europe and the south-east Asian countries will increase their world market share, mainly at the expense of the USA. The world tonnage will reach 5.4 thousand tons in the year 2000.

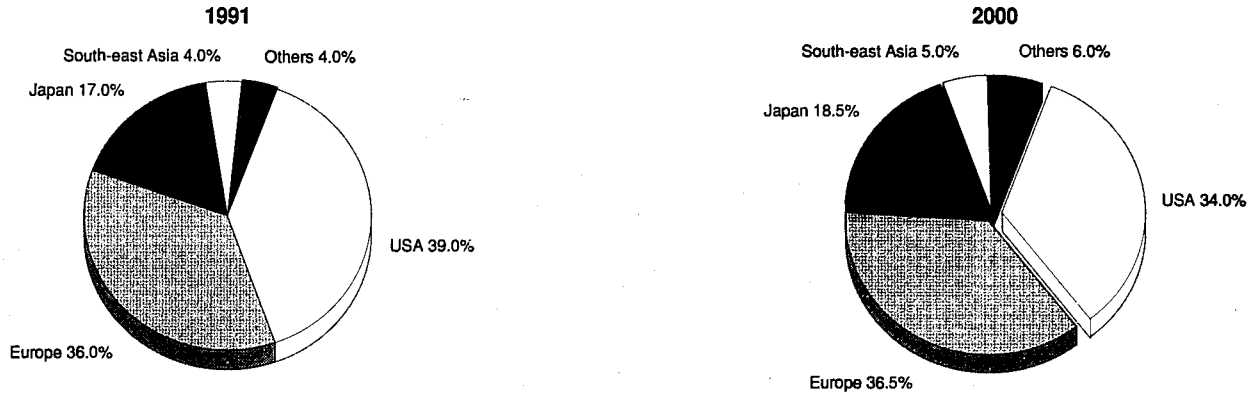
High performance composites enjoy good perspectives for a medium term growth. However, air transport difficulties might lead to a slowing down of production and the stop or reduction of a number of military projects as well as the staggering of European, US and Russian space programs are limiting the short term growth.

In the year 2000, the USA will remain the leader of the new non-ferrous materials world market by controlling a share of about 50% as they did in 1991. In Europe, penetration of aluminium is weaker but its average annual growth might go over 6% in 1996.

The market for new steels is not expected to undergo major changes until the year 2000. Europe will maintain its leadership with a share of 27%, while south-east Asian countries will marginally increase their share.

Japan will remain the leader in the advanced ceramics market and increase its share from 48% to 53%, while a sharp decrease from 32% to 26% is forecasted for the USA. Growth in Japan might be more important than the world average 10.5%, due to powerful end-use sectors and strong and structural supply.

Figure 2: Mass market composites
Share in the world market



Source: BIPE

The USA will remain the leader in the world engineering thermosets and adhesives market in the year 2000, despite a marginal decrease of its share, which will be absorbed by European and Japanese producers.

In the year 2000, the USA will be outpaced by Europe for engineering thermoplastics. The European market will indeed evolve at a faster average annual growth rate which will allow a 50% increase of the European tonnage.

Production process

Over the fast ten years or so a fundamental change in the importance of materials has been occuring. Even if materials represent a small part of the value added of a product, their intrinsic qualities constitute strategic elements for the success of a product. Technical progress has caused a reversal in the production logic and has generated a large variety of materials. Materials are now selected upstream from the specification of the product.

New materials leaders are usually large enterprises active on traditional markets, which are linked to their original know-how. However, these enterprises conceive new materials as an axe of strategic development destined to compensate present and future profitability difficulties on the traditional markets.

INDUSTRY STRUCTURE

Companies

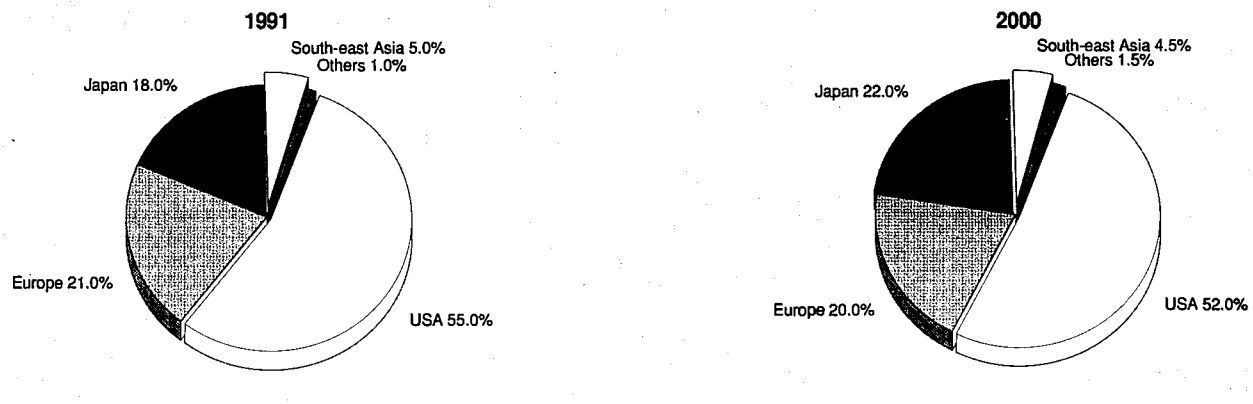
There are several producers of advanced materials. Given the diversity and heterogeneity of this chapter, a distinction between sectors appears to be necessary.

Engineering thermoplastics, engineering thermosets and adhesives are produced mainly by US companies (Du Pont, Dow and General Electric) and their European rivals (Bayer, BASF, Hüls, Atochem, Rhône Poulenc and ICI). The Japanese are also present with Mitsubishi, Ube Ind and Sumitomo, though they hold smaller capacities than their US and European competitors. At present, there is a real explosion of capacity being created in south-east Asia, which might affect the European producers in the short and medium term.

Glass supply is highly concentrated and the main producers are few. The six main ones are: PPG and Guardian in the USA; Saint-Gobain in France; SIV in Italy; Pilkington in the United Kingdom and Asahi Glass in Japan.

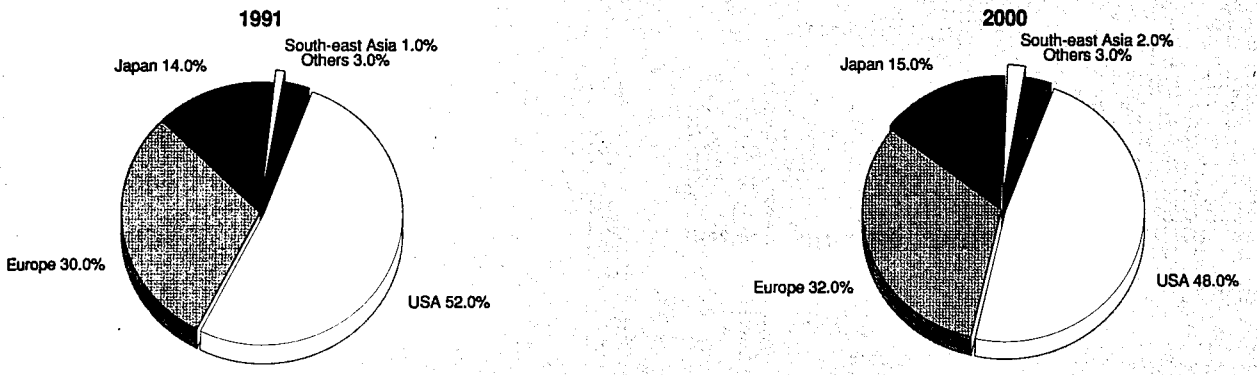
Since recent years there is also a high concentration in the supply of high performance composites to the benefit of bigger chemical groups as Du Pont de Nemours, General Electric,

Figure 3: High performance composites
Share in the world market



Source: BIPE

Figure 4: New non-ferrous materials
Share in the world market



Source: BIPE

Exxon composites (USA); Bayer, Hoechst, BP, ICI in Europe and Sumitomo and Mitsubishi in Japan.

On the other hand, high-distribution composites' supply is not very concentrated. Europe is represented by ICI, BP (UK); Ciba-Geigy (CH); DSM (NL); BASF (D). Americans and Japanese are also present in this area with Du Pont de Nemours, Dow, General Electric (USA) and Hitachi, Sumitomo, Toshiba, Asahi (JPN).

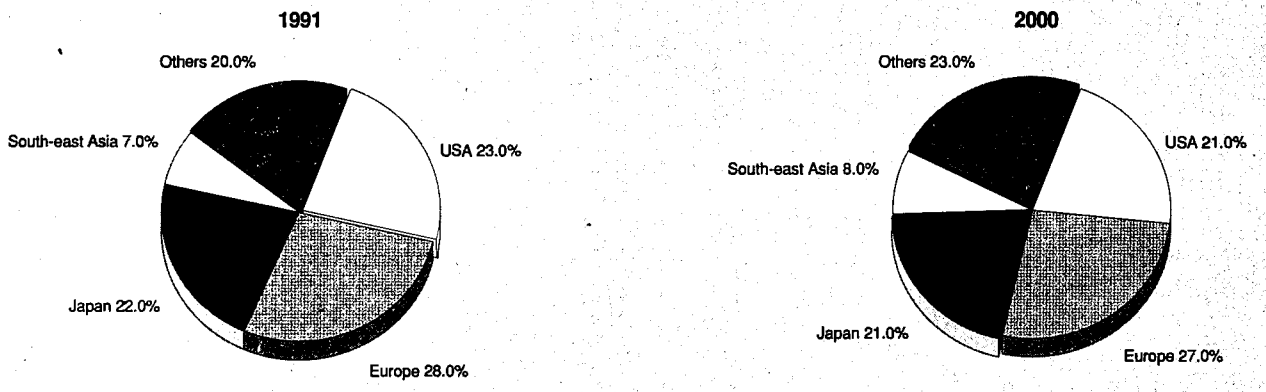
The Japanese companies Kyocera, NGK, NTK, Murata, MFG dominate the market for the world supply of advanced ceramics. Taiwan, Hong Kong or Korea are likely to be new entrants. Ceramic supply for catalytic converters is essentially constituted by the duopole NGK (JPN) and Corning (USA). Given the norms aiming to reduce emissions of pollutants in exhaust fumes and their likely hardening, ceramics for catalytic converters have a bright future with an average annual growth rate of 6% (11% for Europe) during the 1991-2000 period.

The new non-ferrous materials, for their part, are mainly constituted of aluminium for pressing and spinning and of aluminium for moulding. The first component is aimed to packaging (cans and drink) and the world supply is led by American Can (a subsidiary of Pechiney) which has also plants in Japan, Korea and Europe. In Europe, the main producers of drink cans are ANC, Schwalbach, Carnaud Metalbox, and DLM. In the year 2000, the average growth might go over 6% per year in Europe. Growth will be lower in the USA where the penetration rate is already high. Outlets for moulding aluminium mainly concern the automotive sector and remain highly dependent on the sector and on the technical developments. Main producers of moulding aluminium are Alcoa, Alcan, Reynolds, British Alcan, and Pechiney.

New steels are constituted mainly by coated steel sheets and by steel sheets with high elastic limit. The world supply of coated steel sheets is led by the Japanese (Nippon steel, Kobe steel, Kawasaki steel, Nippon, Kokan). Producers of steel sheets with high elastic limit are: for hot sheets: Japan, Europe (Thyssen (D), Usinor (F), British steel (UK)), CIS and USA (US steel, Bethleem steel); for cold sheets: Japan and USA; for production of plate: Europe, Japan, USA, CIS.

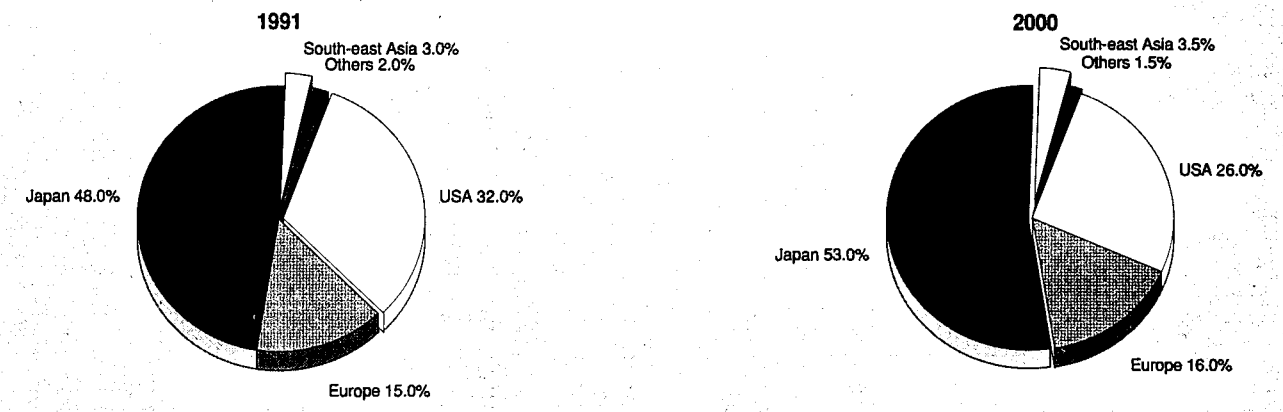
In Europe, Usinor is the world leader of flat stainless products (household equipment, industrial equipment). This market might progress by 2.5% per year in the following years.

Figure 5: New steel materials
Share in the world market



Source: BIPE

Figure 6: Ceramic materials
Share in the world market



Source: BIPE

ENVIRONMENT

Environmental problems can be encountered at each step of the life of a material. Production of certain materials can provoke healthy problems or environmental nuisances. The utilisation phase of materials may also cause the same problems. One of the most representative example is the use of asbestos in buildings. Salvage and recycling of used material generate more complicated problems as both of these operations are specific to each type of material. The OECD, for its part, has drawn up three lists of different materials on the market following their position vis-à-vis the environment:

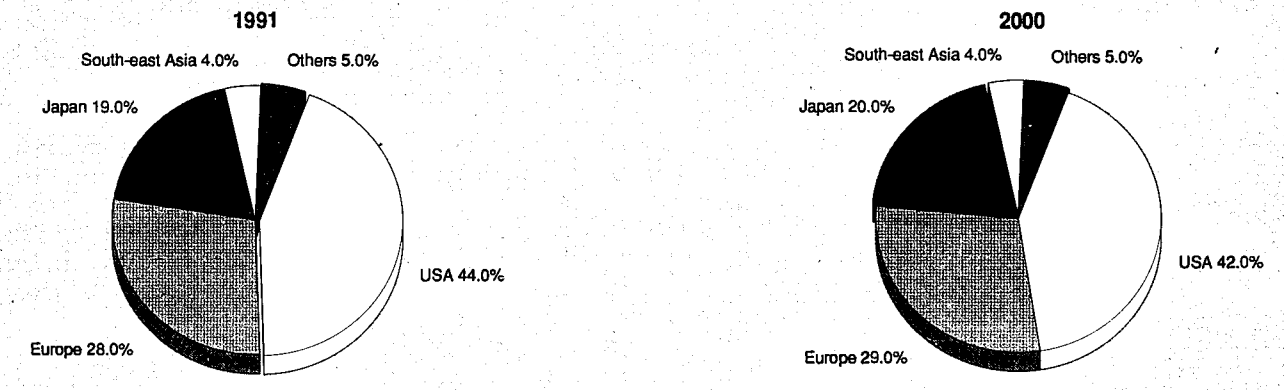
- The green list: material wastes classified under this list are not dangerous and can cross borders of OECD Member States under normal conditions of checking;
- the orange list: material wastes included in this list are bound to supervised controls;
- The red list: material wastes must be highly checked in the import level and during their displacements. The way of eliminating them is also supervised and very strict regulations have been set.

Environmental constraints oblige industrialists producing or using toxic substances to find quick solutions to answer to norms into force. For instance, the Montreal protocol of 1987 (effective since January 1988) announced a 50% reduction of production and of use of CFC for 1999 in comparison with the level reached in 1986. For that purpose, common R&D programs are often established between competing companies.

The environmental requirements in the electricity-electronics area led, for example, to the development of the use of halogen-free high-grade plastics or to a reduction of the use of PU foams. In the aerospace industry and defence, environmental constraints allowed notably the improvement of engine performance afforded by the use of advanced non-ferrous materials and ceramics MMCs, CMCs. It is also worth mentioning the new technology linked to non polluting electrical vehicles which are only in the beginning of their development but whose future is already assured. A number of R&D programs are turned to the manufacture of batteries which still are now not powerful and autonomous enough.

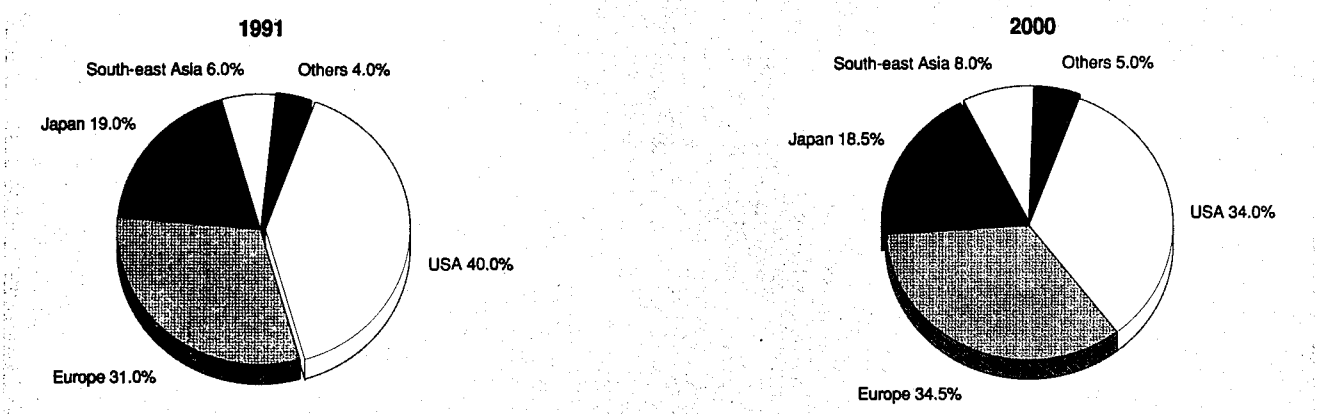
In the automotive sector, manufacturers take account of norms of pollution and energy consumption but also of the recycling or re-use character of the vehicle's components. Recycling

Figure 7: Engineering thermosets and adhesives
Share in the world market



Source: BIPE

Figure 8: Thermoplastics
Share in the world market



Source: BIPE

in this area is intricate due to the large variety of materials of different natures. It is necessary then to be aware of the recycling problem already at the moment of the elaboration of the product.

Measures have already been taken in order to increase professional recuperation and recycling. It is the case for instance of agreements between French public authorities and different inter-professional committees through which professionals commit themselves to increase the use of recycling packaging materials by taxing non-recycling products by virtue of the "pollutant-payer" principle.

Packaging in steel, aluminium, paper, cardboard and glass is easily recyclable. Recycling of plastics packaging is more complicated due to cost and technical reasons; another problem concerns the insufficiency of the collecting and selecting process for the largely used plastics.

Recuperation methods for thermoplastics are: re-use (for PET), recycling by selective collection (until now it is limited to cans), recycling by separation (currently limited to low grade-grade uses), combustion, hydrolysis, pyrolisis, degradability, dumping. Packaging materials evolve in the way of being more competitive on the market and to keep a good image vis-à-vis the environment, and number of innovations are likely to appear. The monomaterial converter has already emerged. It is also worth mentioning the apparition of biodegradable materials. This is undoubtedly the most important technological break trough in packaging.

All these examples illustrate the influence, often positive, and the source of innovation represented by environmental constraints on advanced materials. New environmental concerns create markets for advanced materials and orientate their development in a direction which is quite different of the one which would have been taken without environmental constraints. Finally, we must note the emergence of a slowing down of the multimaterial growth to the benefit of monomaterial for which recycling is easier.

CONCLUSION

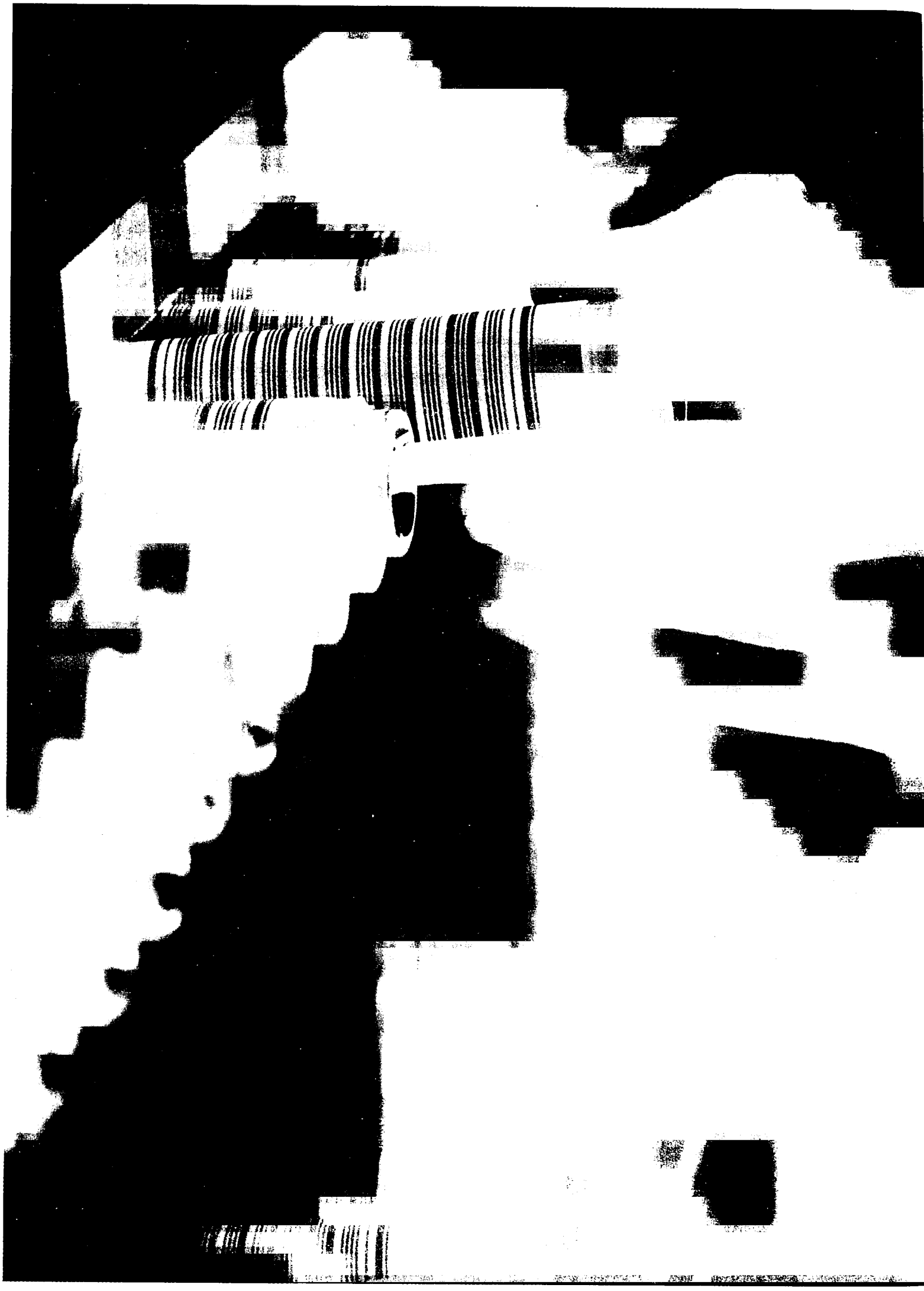
Requirements with respect to advanced materials are going to increase. These requirements concern as well the advanced materials' performance (search for structural qualities coupled with functional qualities) as their environmental acceptability or their economy (easier and cheaper transformation). This convergence between structural and functional materials becomes more and more decisive and implies major consequences in the strategy of enterprises and of public authorities. The re-conception of products and processes, respect of quality and reliability requirements, research of energy economy, creation of new industrial products or new services and decentralisation of human activities depend on control of materials as much as control of information technologies.

In order to cope with these requirements and with the multiplication of technological variables, some recommendations are made to industrialists:

- to favour the mass development of European data banking for materials and to allow a better knowledge of what exists;
- to favour European industrial partnership of the same level as well with up and downstream companies and to privilege integration;
- to develop R&D;
- to develop recuperation, selection and recycling;
- to control production tools;
- to develop industrial thesis on materials;
- to strengthen European position in functional materials and in materials with an electronic or magnetic structure.

Regarding public authorities, support in fundamental research and cooperation, development of formation programs on materials or support of few or non pollutant products are also recommended to facilitate the development of advanced materials and to allow the EC to become more competitive on these market segments.

Written by: DRI Europe, on the basis of a report produced by BIPE Conseil for the EC Commission.



Overview
NACE 25, 26

The EC is the world's most important producer of chemical products, well ahead of its main competitors, the USA and Japan. After several years of solid growth in the mid to late 1980s, depressed prices and overcapacity have characterised the performance of the industry since 1990, as the world's economies slowed down and additional production capacity came on stream. Current overcapacity (not only in Western Europe, but also in East Asia and elsewhere) is likely to continue to depress profits for the next few years. The survival strategy of major chemicals companies hinges on the creation of strategic alliances and joint-ventures to achieve rationalisation in research, production and access to markets.

INDUSTRY PROFILE

Description of the sector

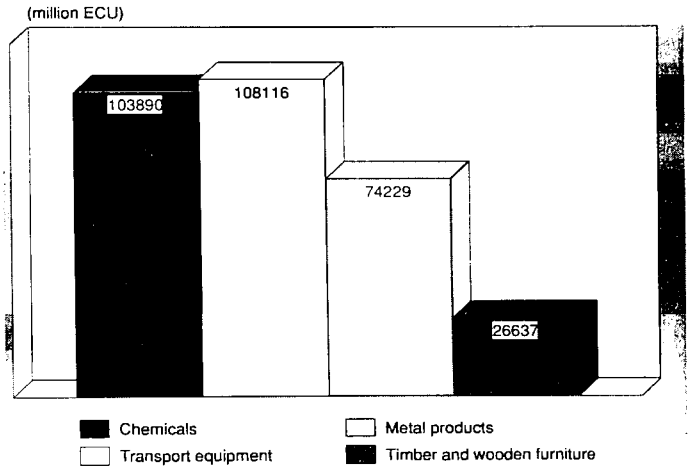
The chemical industry is an industrial branch of very heterogeneous character in which the main activities consist of chemically transforming materials into diverse substances, giving them new physical and chemical properties. For these activities, the chemical industry employs raw materials from the petroleum, mining and extractive industries such as oil, minerals, metals and certain agricultural products. The main activities of the chemical industry correspond to the following product groups: basic chemical products; fertilizers and nitrogen compounds; plastic in primary form and synthetic rubber; pesticides, fertilizers and other agrochemical products; paints, varnishes, and other similar coating products; pharmaceutical and medical products; soaps and detergents, cleaning and polishing preparations, perfumes, toilet preparations; and man-made fibres.

The industry comprises two upstream branches constituting basic chemicals (basic inorganic chemicals and basic organic or petrochemicals) and a series of downstream branches such as pharmaceutical products, agrochemicals, detergents, etc. The upstream sectors' outlets are almost exclusively the downstream sectors, which themselves supply either other industries (agriculture for agrochemicals, the plastics transformation industry for plastics in primary form), or end-users (soaps and detergents, for example).

Compared to the foregoing years, growth in all the main indicators in current prices was marginal in 1990, 1991 and 1992. 1992 saw continuing depression in prices and operating margins as global economies remained mired in recession and new capacity came on stream in Europe and the Middle East.

British, Italian and French based companies were the first in Europe to resort to severe job cuts worldwide. The German economy only came to a standstill during 1992, much later than other EC economies, as until then, German companies were able to profit from increasing domestic demand. The German "big three" (BASF, Bayer, Hoechst) all started, though to a lesser extent, to shed labour in the latter half of 1991 and during 1992, in response to the weakness in their domestic and export markets. These labour savings have resulted in improved labour productivity, but the industry is still suffering from a situation of overcapacity which, in Europe, is not expected to be alleviated before the second half of the 1990s, in the absence of any radical capacity reduction measures. The pharmaceutical sector was the only area which showed some buoyancy in 1992 with sales 5% ahead of 1991 levels.

Figure 1: Chemicals
Value added in comparison with other industries, 1992



Source: DEBA

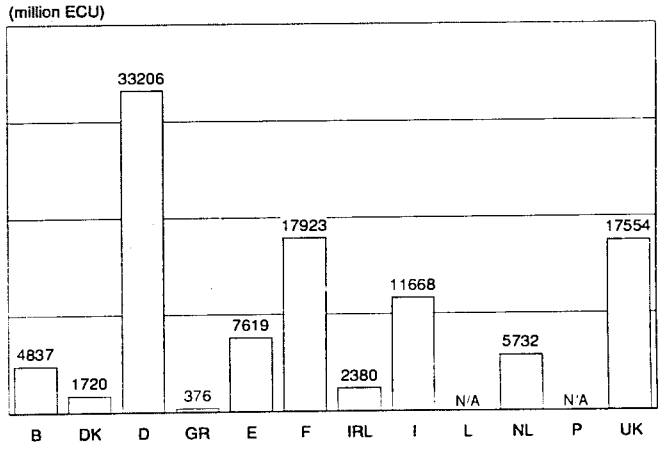
Germany is by far the largest EC producer in terms of value added, representing almost one third of EC value added. France takes the second place, followed in that order by the United Kingdom and Italy.

Recent trends

After a rapid expansion over the 1960s and 1970s, the first half of the 1980s was rather grim, with stagnant production and overcapacity which led to a drastic restructuring of the industry. The restructuring, accompanied by huge redundancies and cutbacks in capacity, enabled the chemical sector to start off from a much stronger base when the economic environment improved from 1983 onwards. The years from 1986 to 1989 were associated with high profits and strong expansion.

Prospects changed in 1990 with the economic slowdown in Europe and North America. Demand from the main clients weakened. The fall of the dollar, which started in 1985, had already led to losses in competitiveness on foreign markets.

Figure 2: Chemicals
Value added by Member State, 1992



Source: DEBA

Table 1: Chemicals
Breakdown by main sector, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Basic industrial chemicals	110 776	112 098	20 944
Pharmaceuticals	63 711	68 601	10 559
Cleaning agents, perfumes and toiletries	34 759	38 079	4 133

(1) Except for trade figures, estimates are used if country data is not available.
Source: DEBA

Table 2: Chemicals
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	182 131	210 206	225 384	210 552	222 121	246 620	273 586	276 801	279 211	282 572	272 000
Production	196 619	227 709	244 062	226 017	237 170	261 903	287 229	287 959	291 437	295 794	290 000
Extra-EC exports	32 820	39 690	43 596	39 042	38 968	42 853	46 309	45 029	47 795	50 077	53 200
Trade balance	14 488	17 503	18 678	15 466	15 049	15 283	13 643	11 158	12 227	13 223	17 000
Employment (thousands)	1 744	1 752	1 755	1 748	1 760	1 760	1 781	1 784	1 768	1 714	1 670

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 3: Chemicals
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	4.9	2.8	3.9
Production	4.2	2.2	3.3
Extra-EC exports	2.4	0.7	1.6
Extra-EC imports	7.7	5.0	6.5

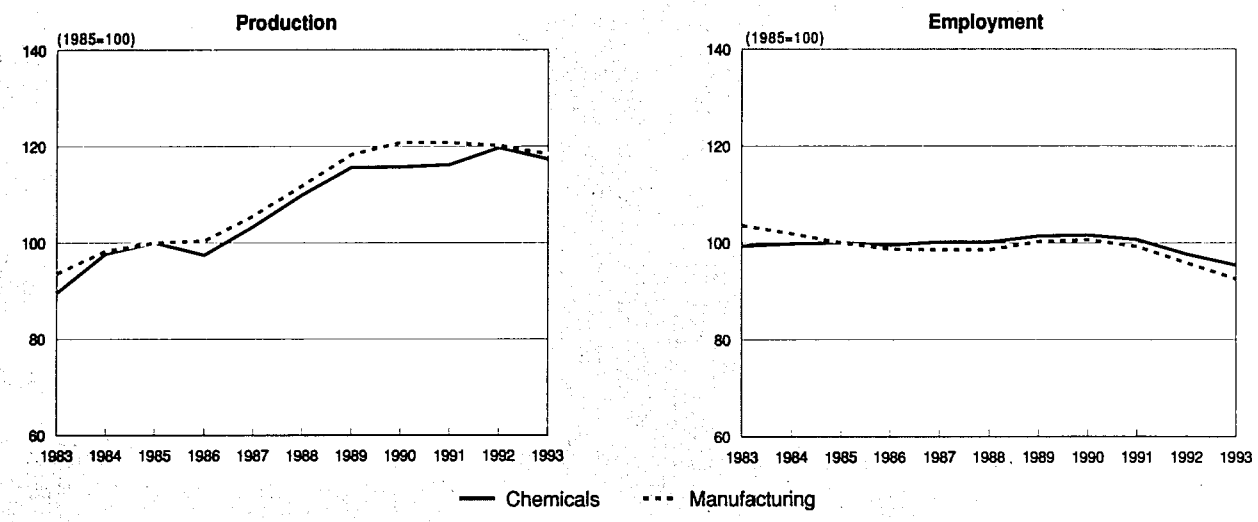
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Chemicals
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	32 820	39 690	43 596	39 042	38 968	42 853	46 309	45 029	47 795	50 077
Extra-EC imports	18 333	22 187	24 918	23 577	23 919	27 571	32 666	33 870	35 569	36 855
Trade balance	14 488	17 503	18 678	15 466	15 049	15 283	13 643	11 158	12 227	13 223
Ratio exports/imports	1.79	1.79	1.75	1.66	1.63	1.55	1.42	1.33	1.34	1.36
Terms of trade index	99.4	99.5	100.0	106.5	110.7	111.5	111.0	114.0	114.0	115.7
Intra-EC trade	46 767	55 486	61 324	60 089	63 012	71 217	80 320	84 405	87 086	89 822
Share of total imports (%)	71.8	71.4	71.1	71.8	72.5	72.1	71.1	71.4	71.0	70.9

Source: DEBA

Figure 3: Chemicals
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

Imports grew, but exports stagnated. With the exception of the pharmaceutical industry, profits started weakening in the first half of 1990. Since then, significant losses have been reported by many of the EC companies, as well as by their EFTA and American competitors and in 1992 and the first half of 1993 many of the biggest chemical companies were still reporting depressed earnings as the upturn in the industry cycle still failed to materialise.

International comparison

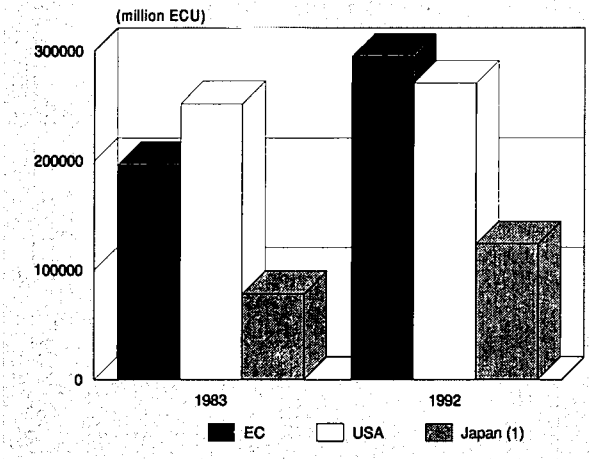
In 1992, US production stood at 91% of EC production, and Japanese production represented some 42% of EC production.

US companies suffered declining sales and profits during 1991, with 60% of the companies showing sales and net profits lower than in 1990. On a weighted average basis, sales were down 2.4% and profits 13.5%, compared to 1990. Just as in Europe, the core of the problem was the overcapacity and the consequent falling prices of commodity chemicals, along with the specialities experiencing sliding demand, linked to the recession.

The development of the US chemical industry differs slightly from that of the EC. American companies have experienced high growth rates during the second half of the 1980s, not only thanks to an increase in domestic demand, but also due to increased exports. Thanks to the weak dollar, American competitiveness in basic chemicals was noticeably improved during the 1985-89 period. Consequently, American companies did not experience the same incentives as their EC counterparts to develop downstream in sectors less sensitive to exchange rate movements.

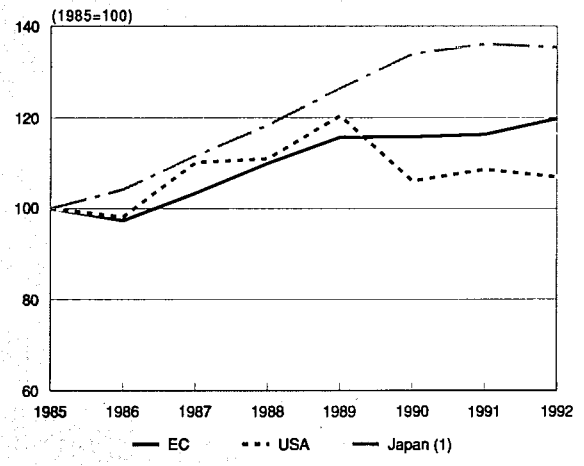
Markets for chemical products have developed fast, particularly in East Asia, but also in Brazil and the Middle East. Although the opportunities for the EC chemical industry are clear, new producers have appeared in these regions. The major share of world production, however, remains by far in the hands of European and American groups. Increased com-

Figure 4: Chemicals
International comparison of production in current prices



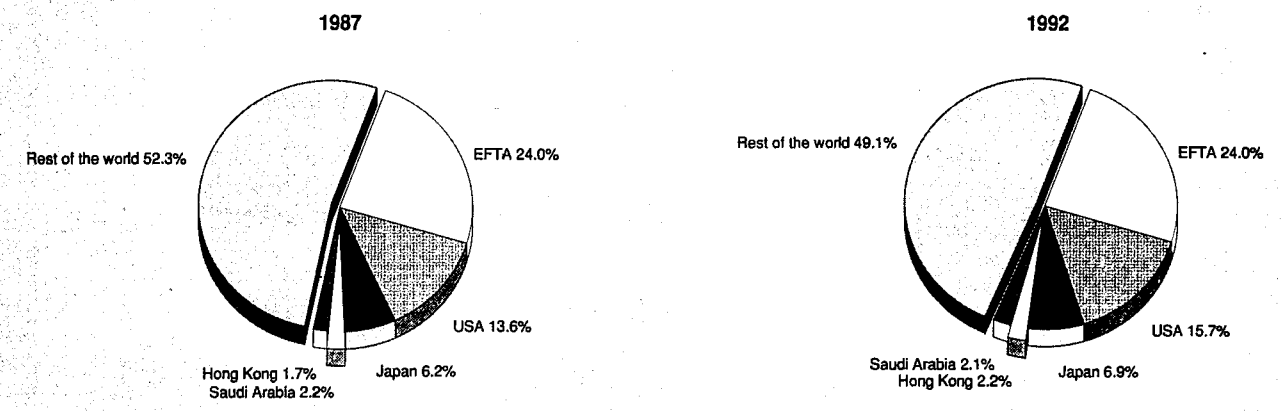
(1) Excluding Japanese Sic 2012, 2019, 2022, 2029, 2033, 2035, 2039.
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Chemicals
International comparison of production in constant prices



(1) Excluding Japanese Sic 2012, 2019, 2022, 2029, 2033, 2035, 2039.
Source: DEBA, Census of Manufactures, Nikkei

Figure 6: Chemicals
Destination of EC exports



Source: Eurostat

petition from new chemical producers risks eroding the competitive position of European producers whose structural and feedstock costs remain higher than in major competing regions in the longer term. A new opportunity exists, however, for West European manufacturers to gain new markets in Eastern Europe to offset the erosion of competitiveness in Asia.

Foreign trade

The EC is the world's leading exporter of chemical products, with exports more than twice the size of those of North America. In 1992, EC companies exported 17% of their production outside of the EC. Traditionally, the EC has a trade balance surplus (along with the EFTA countries). The surplus has been deteriorating since 1986, following the fall in the US dollar and the increasing market presence of export-oriented production capacity, notably in the Arab Gulf region. In 1991-92, however, exports started to pick up again.

Overall, EC exports are specialised in refined chemicals, while imports are in basic chemicals. To a certain extent, the EC imports basic chemicals in order to export refined chemicals. Competitive discipline created by imports is therefore higher for basic chemicals than for refined chemicals.

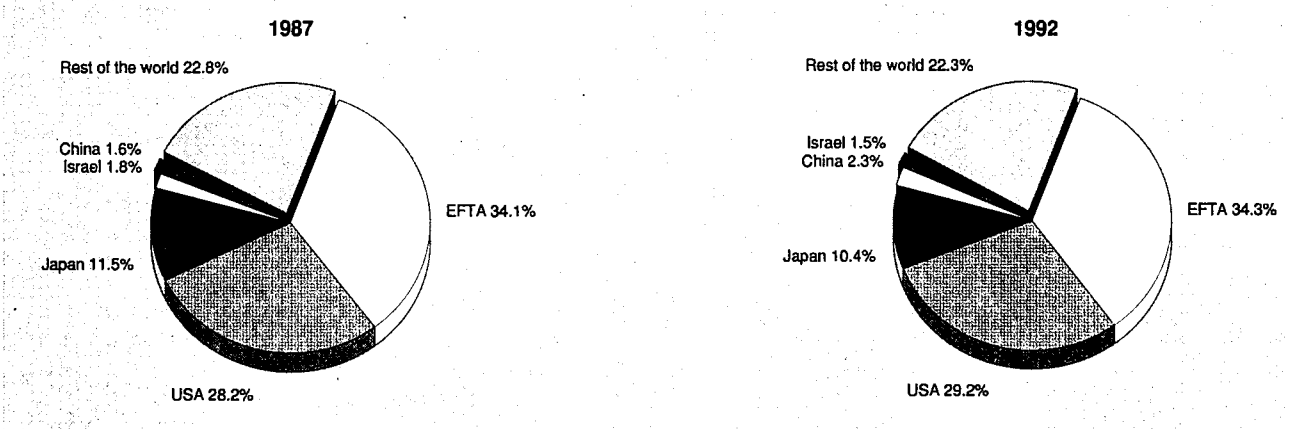
The main destination for EC chemicals exports are the EFTA countries, the USA, the developing countries, and to a lesser extent the Pacific region, including Japan, Australia and New Zealand. Compared to the average EC trend, it appears that Germany and Denmark are more oriented towards Western Europe. The United Kingdom and Ireland export more towards North America, while the proportion of exports towards developing countries is higher in France, Spain and Portugal than in the other EC countries.

MARKET FORCES

Demand

About 65% of chemical product demand stems from industry in the form of intermediate consumption. Apart from the chemical industry itself, which represents about 36% of its own demand, the principal client sectors of the chemical industry are (in decreasing order) the rubber and plastics processing industry, agriculture, metals, mechanical and electrical engineering (the last three together), textiles and clothing, wood and derivates and construction. This considerable self-consumption is explained by the high degree of industrial vertical integration in which the downstream elements, refined chemi-

Figure 7: Chemicals
Origin of EC Imports



Source: Eurostat

Table 5: Chemicals
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	39.5	42.8	43.4	48.4	52.3	57.5	56.8	55.9	56.5	60.6
Productivity index	91.0	98.4	100.0	111.4	120.5	132.4	130.8	128.7	130.1	139.5
Unit labour costs index (3)	87.0	93.0	100.0	104.2	110.6	117.0	124.1	132.9	140.6	153.2
Total unit costs index (4)	83.0	93.6	100.0	90.5	94.1	101.7	111.8	115.0	119.9	127.7

(1) Estimates are used if country data is not available, especially from 1990 onwards."
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale."
Source: DEBA

cals or specialty chemicals, are the almost exclusive outlets for components situated upstream, i.e. the basic chemicals.

The strong expansion of the chemicals sector over the last two decades can be explained in part by factors such as innovation and the replacement of traditional materials such as steel, wood, paper and glass by new materials derived from chemical processes. This substitution factor has enabled the chemical industry to experience premium growth rates, at a level much higher than the average manufacturing growth rates (10% compared to 2% over the period 1970-90). More recently, the contribution of this factor in the growth rate of the chemical industry has diminished, marking the industry's progressive evolution towards maturity.

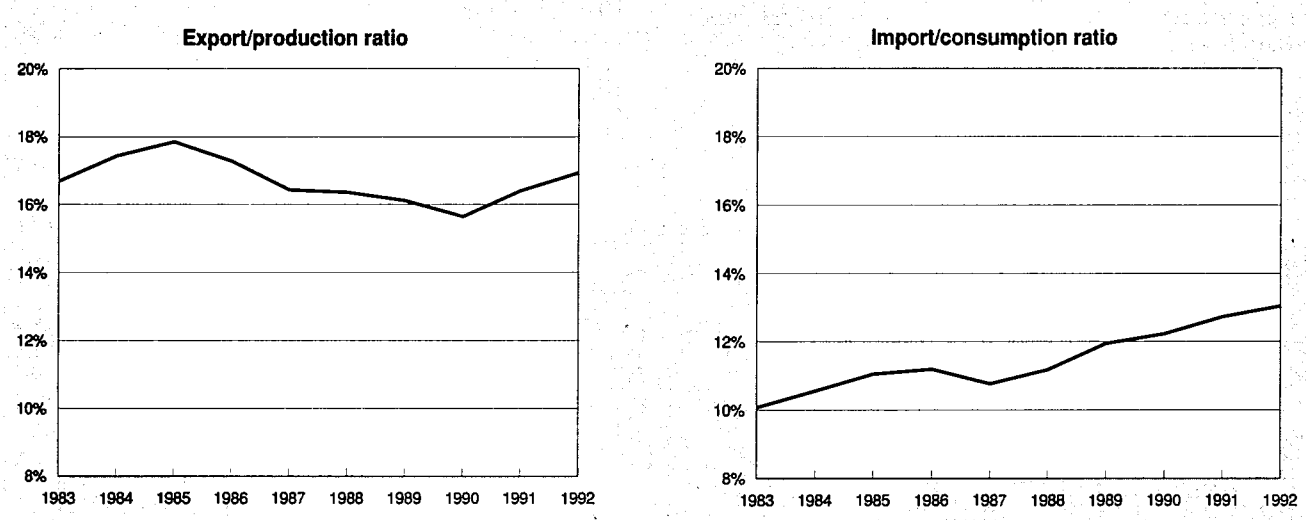
In 1992, weakening demand accompanied by the cyclical slowdown in the European economies led to a continuation of the decline in bulk chemicals' production. Similarly, the recession in North America hampered further export growth. Some industry analysts believe that the recession can be traced back to as far as 1988 when growth in the chemical industry outstripped both GDP at 2.3% and other manufacturing industry at 1.8% (average industry growth over 1980-90 was 3.4%). In 1988 the difference was much larger, with second-half production almost 7% higher than the preceding year's, while GDP was up near 3% from the second half of 1987. The result of the explosive growth was the build-up of large stocks in the chemicals chain. Sizeable destocking occurred during the first half of 1990, and then again in the first half of 1991. The same is occurring again in the second half of 1993, after stock built up in the second half of 1992 and in the first half of 1993.

Demand in other subsectors of the chemical industry continues to be high, such as in pharmaceuticals and in some of the specialty chemicals, which showed steady production growth.

Many EC producers that have established operations within the USA, in response to the unfavourable exchange rates during the second half of the 1980s, have now pinned their hopes on the recovery of demand on this market, as the two engines of growth for the US industry - the automotive and construction industries - showed signs of encouragement early in 1992. Yet industries' expectations remain cautious because consumer lead recovery is doubtful, with consumer spending not rising despite lower interest rates. Another reason for the lack of optimism, despite early signs of recovery of the US economy, is the presence of sizeable overcapacity in the basic chemicals and polymers sectors.

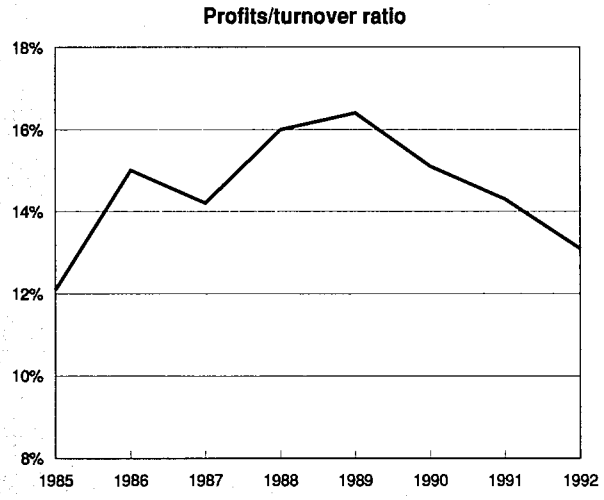
Another important factor in the creation of demand is the continuous effort towards product innovation. EC companies spent around 4.8% of their turnover on R&D in 1990. In specific sectors of the pharmaceutical and agrochemical industry, this percentage can amount to more than the double of that figure. The most innovative fields of R&D include bio-technology and new materials (advanced composite materials, polymers, plastics and ceramics). As a general tendency,

Figure 8: Chemicals
Trade Intensities



Source: DEBA

Figure 9: Chemicals
Pre-tax profits to turnover of the industry



Source: DRI Europe

R&D efforts are more and more focusing on transformations of existing products rather than on true discoveries.

Supply and competition

The future of both bulk and specialty chemicals is clouded by mounting competition. These sectors will increasingly have to focus on higher value-added and more specialised market segments in order to maintain margins.

The pharmaceutical industry will continue to benefit from rising standards of living and growing concerns for health. At the same time, the industry will suffer from government programmes aiming at checking social security costs and especially health care costs.

In basic chemicals, a remarkable part of demand is directed to foreign markets. Export intensities amount to 50% in Germany and the United Kingdom, and around 60% in France. Export markets were hit by the fall of the dollar that increased US competitiveness on markets with low or no product differentiation and high competition. The squeeze in profit margins was emphasised by the upward pressure on oil prices during the Gulf War, although these came down shortly afterwards. Also pharmaceuticals have been losing market share on export markets since 1987. In terms of competitiveness, the specialty chemicals sector is in better shape than the basic chemicals sector. Profit margins, however, shrank in 1991, as a result of growing input and unit labour costs.

Oil and other raw material prices are expected to rise at most only moderately, yet chemical producer's prices are expected to be weak in some sectors and in some countries, leading to unsatisfactory margins.

Production process

The EC chemical industry employs almost 1.7 million people. The majority of employees in the sector has a high level of qualification and training. Since 1974, the sector has had a diminishing labour force, but the upturn in production levels since 1984 has led to a stable employment number until 1990.

The greatest proportion of investment expenditure is at present directed towards productivity improvement, new product introduction, improvement of production processes and environment. In contrast to investment level growth in nominal terms of about 10% over the 1985-89 period, investments have declined since 1990.

The sector is also a big energy user. The energy use is rather concentrated in the upstream basic chemical subsector. The biggest energy user is the petrochemical sector, with electricity and hydrocarbon consumption, including the use as raw material, of 35% to 40% of production costs. Other sectors with high energy contents are plastics (20% to 25%), inorganic chemicals and fertilizers (each about 15%). The refined chemical sector is a relatively small energy consumer, but since the basic industry is its main supplier, it is bound to be affected indirectly by energy price rises. Profitability of basic chemicals is more vulnerable to oil price increases than that of specialty chemicals, since the first one can only with more difficulty pass price rises to consumers, being subject to relatively harsher competition.

INDUSTRY STRUCTURE

Companies

Six of the world's top ten chemical companies are EC based. With about 32 700 enterprises (including small enterprises, with less than 20 employees) in 1990, the chemical industry remains a concentrated sector, with 7.9% of the enterprises representing 79% of turnover. The top ten leading EC companies represented 48.6% of total turnover of the industry in 1990, with the top 5 companies taking 32.6% of turnover.

Strategies

During the 1980s, larger companies were moving into specialty chemicals in order to improve margins and profitability. Mergers and acquisitions (M&A) activity leading up to the Single Market was intense, concentrating almost exclusively on downstream chemicals (plastic containers and film, specialty chemicals, pharmaceuticals, cosmetics, fertilizers) with the objective of strengthening and expanding market share. Also, the fall in the dollar exchange rate encouraged EC companies to undertake major investments in the USA during the second half of the eighties.

In 1990, M&A activity subsided as a result of the uncertainty caused by the Gulf War, the fall in profit margins and the higher interest rates that made funding more expensive. Also

Table 6: Chemicals
Breakdown by size of enterprise, 1990 (1)

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	25 366	77.6	7.2	11.4
20-99	4 748	14.5	10.6	9.6
100 or more	2 595	7.9	82.2	79.0

(1) Provisional estimates.
Source: Eurostat

Table 7: Chemicals
The 15 leading European companies, 1992

(million ECU)	Country	Turnover	Net profit	Employees
Hoechst	D	22 727	458	177 668
BASF	D	22 060	306	123 254
Bayer	D	20 411	747	156 400
Imperial Chemical Industries	UK	16 388	-774	114 000
Ciba-Geigy	CH	12 221	837	90 554
Rhone-Poulenc	F	11 938	256	83 300
Sandoz	CH	7 935	823	53 360
Akzo	NL	7 414	314	62 500
Norsk Hydro	N	7 236	21	34 036
Roche Holding	CH	7 129	1 055	56 335
Smithkline Beecham	UK	7 091	989	53 700
Henkel	D	6 987	170	42 244
Solvay & Cie	B	6 125	235	45 350
Glaxo Holdings	UK	5 801	1 463	37 083
L'Oreal	F	5 489	337	31 908

Source: DABLE

1991, which was influenced by cost reductions and rationalisations, was a quiet year for M&A activity. Fewer big deals were signed than for instance in 1989, for the same number of transactions. A lot of businesses were for sale, however, because chemicals groups considered refocusing their activity upon their core businesses, and selling off of long established acquired businesses that never or no longer fulfilled their promise in terms of profitability. These companies were facing the problem of insufficient buyer interest.

In terms of sectors, pharmaceuticals and specialty chemicals led the M&A scene in 1991. Geographical patterns in M&A still show a preference for Western Europe in terms of chemical acquisitions, which represented 57% of the total in 1991. Transactions in Eastern Europe increased slightly in number to 3% of the total in 1991, and still focus interest from Western countries thanks to the ongoing privatisation process. With a view to investments in Eastern and central Europe especially, which at first sight look like bargain opportunities, companies have realised that successful acquisitions must be based on true economic value, pointing to the importance of starting to take into account environmental expenditures required by national governments.

REGIONAL DISTRIBUTION

Proportionally to GDP, Spain, Belgium, Luxembourg, the Netherlands and Ireland have chemical industries bigger than that of other EC countries. With regard to product segmentation, the German, Dutch and French industries are more oriented towards basic chemicals and plastic materials, while the United Kingdom and Italy have a greater share of pharmaceutical and a few other every day consumer products.

ENVIRONMENT

Environmental problems are particularly noteworthy in the case of the chemical industry. Environmental costs represent some 3.5% of turnover for major European chemical companies, and 15% of new investments. This latter percentage will increase to 20% or more in the decade to come.

The problems raised by the chemical industry with regard to the environment can be separated into the pollution caused during the production process, and the downstream pollution occurring during consumption and disposal of the industry's final products. In the first area the industry is emitting harmful substances into water bodies and into the air, for example NOx and SO2, causing acid rain. The industry is also confronted with the scarcity of tipping sites to deposit solid waste. With respect to global environmental pollution, as a big energy user, the industry is a big emitter of CO2, one of the gases contributing to the greenhouse effect. The industry has solidly opposed a tax on energy use or on the carbon contents of the fuels used, proposed by the EC Commission as a means to achieve stabilisation of CO2 emissions at the turn of the century.

The chemical industry opposes any form of new tax on energy in Europe. On the other hand, in the area of the environmental auditing of industrial installations, the industry has largely accepted the core principles of an EC Commission proposal on eco-audit, according to which industry would voluntarily allow such audits, checked by accredited auditors.

Pollution linked to the use of chemical products can happen either at the time of actual use or at the time of disposal of waste. In the first case, examples relate to the use of solvents in paints and adhesives, and to the contamination of water tables by nitrates in fertilizers. In the area of solid waste disposal, the industry is faced with the successful implementation of plastics recycling infrastructure within 10 years, according to the EC proposal on packaging waste. This will stretch the plastic industry, as the recycling of plastics is generally less advanced than that of other materials used for packaging, such as paper and board, glass or aluminium.

REGULATIONS

The main legislative measures by which the chemical industry hopes for rapid progress on the road to harmonisation cover the following areas: standards, bio-technology, environment, energy, indirect taxation, fewer administrative constraints, transport de-regulation, R&D, competition, and trade policies.

Concerning trade regulations, in the framework of the Uruguay round of the GATT negotiations, much work was devoted to the tariff negotiations. CEFIC, in a joint initiative with its US, Canadian and Australian counterparts, advocates the harmonisation of chemical trade tariffs at 5.5 or 6.5% and the allowance of up to 15 years to bring existing tariffs down to this level. Other trade issues include export controls in extra and intra Community trade, the treatment of anti-dumping complaints, and the generalised system of preferences.

Internal market issues include the support of CEFIC for the EC Commission DG XXI proposal on indirect taxation in order to arrive at a truly harmonised system throughout Member States, minimising bureaucracy.

Table 8: Chemicals
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.5	2.6
Production	1.7	2.4
Extra-EC exports	2.4	3.3

Source: DRI Europe

OUTLOOK

Prospects for 1993 and 1994 are still depressed as the much-heralded economic recovery fails to reach expected levels, and competition for limited growth becomes more intense. Signs that the US economy will pick up remain mixed. High real interest rates are a constraint in Western Europe, where both consumer and industrial confidence remain weak. Demand is unlikely to show significant overall improvement before 1995. Meanwhile, any small increase in output will be driven by advances in pharmaceutical and in cosmetic/perfume activities. Production is likely to be flat in other areas, and continues to decline further in fertilizers. Prospects in the medium term are somewhat brighter, based upon a revival of world economic activity.

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Basic industrial chemicals

NACE 251, 252, 253

The basic chemicals sector has recently been suffering from weakening demand and stiff competition from both North America and the newly industrialised countries. During the second half of the 1980s, export markets for basic chemicals were hit as the fall of the US dollar increased the competitiveness of North American producers. This squeezed profit margins, which was later emphasised by the upward pressure on oil prices during the Gulf war.

INDUSTRY PROFILE

Description of the sector

The basic industrial chemicals sector includes units exclusively or primarily engaged in the manufacture of inorganic chemicals (including fertilisers), electrochemical products, organic chemicals (including those obtained from petroleum and coal), synthetic rubber and plastics materials, mineral pigments and organic dyestuffs, isotopes etc., and in the distillation of tar and benzole. In this classification are considered not only the units producing such basic chemicals but also those units which both produce them and process them into finished products.

The data presented in this monograph correspond to the three NACE classes 251, (the manufacture of basic industrial chemicals and further processing of these products), 252 (the manufacture of chemicals obtained from petroleum and coal) and 253 (the manufacture of other basic industrial chemicals). Given the high degree of vertical integration of the chemical industry, it is difficult to provide separate data for each sub category.

Given the relative importance of the petrochemical sector (it accounts for more than the half of the basic industrial chemicals turnover), a specific monograph follows.

In this monograph particular attention is given to the plastics manufacturing sector, which accounts alone for about a quarter of total basic industrial chemicals employment

Recent trends

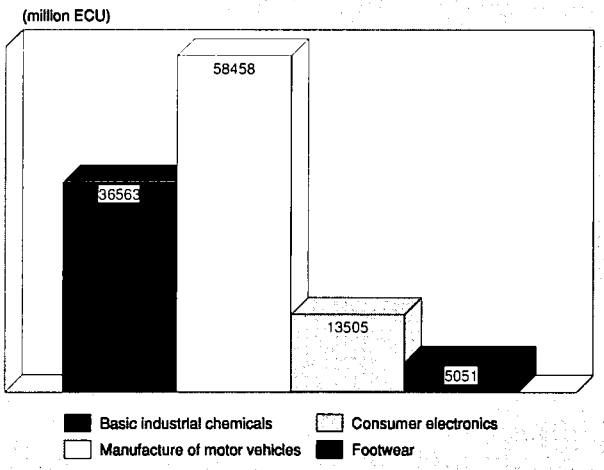
After steady growth in the first half of the 1980s, all the main indicators were affected by a sharp decline in 1986. Due to the fall in the crude oil price and a weakening of the exchange rate of the US dollar, production and consumption (in value) decreased by about 15% and 14% respectively. The continuing slowdown of the European economies since 1990, as well as the recession in the USA and Canada, depressed demand for basic chemicals. During the 1991-1992 period, production and consumption in value decreased by 2.6%.

The reduction in basic chemicals employment, which started in the early 1980s is still going on. During the 1983-1992 period employment in the sector decreased of about 43 000 units with a marked drop of 3.8% during the latter year.

International comparison

In 1992, the EC was the world's second largest basic chemicals producer although by a narrow margin. US production was less than 1% higher than that of the EC, a margin that has more or less remained steady throughout the 1980s. Japan ranks third in the world basic chemicals market, but its production is half the size than the EC and US ones. The importance of the newly industrialised countries (NICs) is steadily growing, and their competition is affecting the position of the EC industry on the world market.

Figure 1: Basic industrial chemicals
Value added in comparison with other industries, 1992



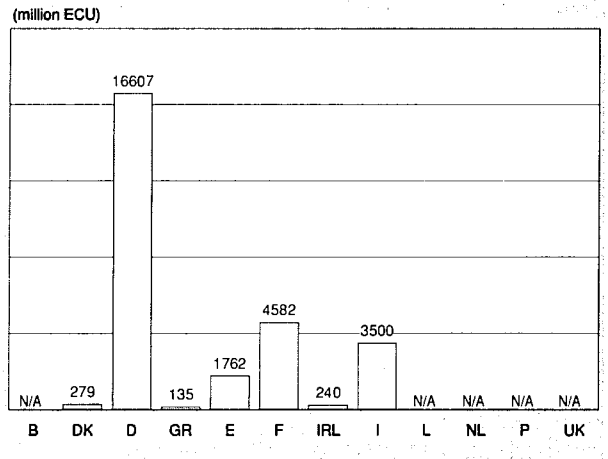
Source: DEBA

In the period 1988-1991, production growth slowed in the EC, the USA and in Japan. Among the three main producers, the EC basic chemicals industry was the most badly affected, due to weakening demand at home. The US industry was also hit by the recession, while Japan was able to maintain a positive, although decelerating, growth rate in production.

Foreign trade

The EC trade balance in the basic chemicals sector steadily decreased during the 1980s because of rising imports and weak exports; in the period 1983-1992 extra-EC imports increased by almost 85% compared to 31% for extra-EC exports. Moreover, all of these gains in export markets were made in the period before 1985, after which time exports have stagnated. The export/production ratio has been quite stable from 1983 to 1992, while during the same period the import/consumption ratio increased by 46%.

Figure 2: Basic industrial chemicals
Value added by Member State, 1992



Source: DEBA

Table 1: Basic industrial chemicals
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	88 044	104 673	110 246	94 699	100 512	110 995	124 047	119 579	113 690	110 776	106 000
Production	93 424	111 375	116 800	99 316	104 948	115 833	126 593	120 147	115 098	112 098	111 000
Extra-EC exports	16 018	19 807	21 468	18 055	18 027	20 627	21 597	19 889	20 966	20 944	22 900
Trade balance	5 380	6 703	6 553	4 618	4 436	4 839	2 545	568	1 408	1 322	4 600
Employment (thousands)	650.2	660.9	661.3	655.7	655.0	646.5	646.0	643.9	631.2	607.1	576.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Basic industrial chemicals
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	5.2	2.1	3.8
Production	4.3	0.9	2.8
Extra-EC exports	3.5	-0.7	1.6
Extra-EC imports	9.6	6.6	8.2

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Basic industrial chemicals
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	16 018	19 807	21 468	18 055	18 027	20 627	21 597	19 889	20 966	20 944
Extra-EC imports	10 638	13 104	14 915	13 437	13 591	15 789	19 052	19 320	19 559	19 623
Trade balance	5 380	6 703	6 553	4 618	4 436	4 839	2 545	568	1 408	1 322
Ratio exports/imports	1.51	1.51	1.44	1.34	1.33	1.31	1.13	1.03	1.07	1.07
Terms of trade index	98.8	97.7	100.0	103.4	110.3	114.0	112.1	119.1	121.8	123.3
Intra-EC trade	27 868	33 185	36 477	34 505	36 026	41 754	46 852	47 790	47 390	47 378
Share of total imports (%)	72.4	71.7	71.0	72.0	72.6	72.6	71.1	71.2	70.8	70.7

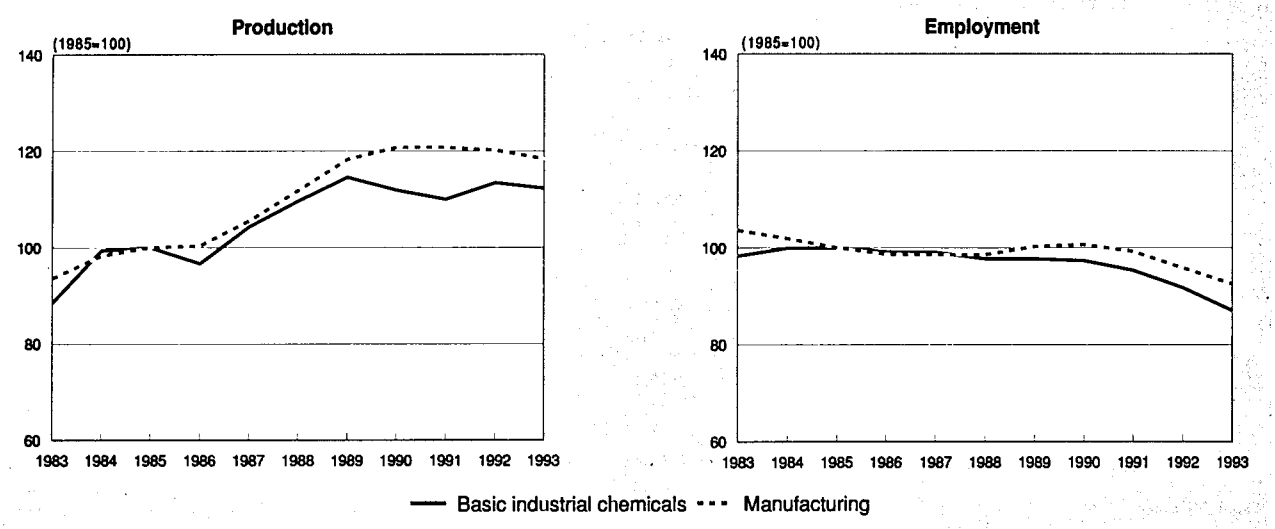
Source: DEBA

Table 4: Basic industrial chemicals
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	36.8	41.4	41.2	49.0	55.0	61.9	61.0	56.7	56.0	60.2
Productivity index	89.2	100.3	100.0	118.9	133.4	150.2	147.9	137.6	135.8	146.0
Unit labour costs index (3)	87.8	93.2	100.0	103.6	110.9	117.0	124.8	133.0	140.6	151.5
Total unit costs index (4)	83.4	95.1	100.0	82.2	86.7	93.5	104.2	105.1	107.2	111.1

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Basic industrial chemicals
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

Export markets for the EC basic chemicals industry are well spread. The EFTA countries and the USA together account for about 43.2% of total extra-EC exports, and Japan for 6.7% only, while the remaining 50.1% is scattered around the rest of the world. As for extra-EC imports, they are more concentrated: about 31% of them come from the EFTA countries, 26.7% from the USA and 8.5% from Japan.

MARKET FORCES

Demand

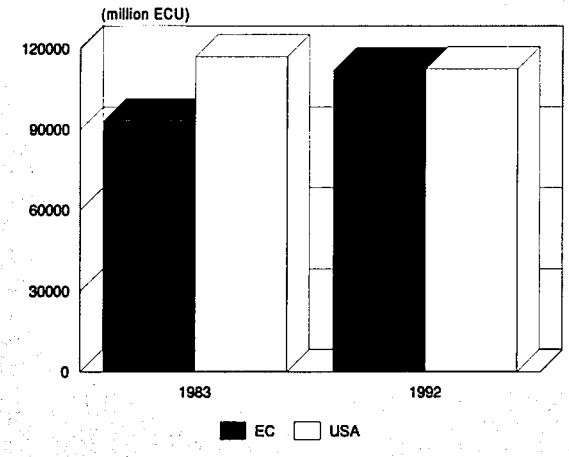
The bulk of domestic demand in the four major economies (D, F, I, UK) comes from speciality chemicals (including pharmaceuticals and agriculture) with a 34% share. Indeed, basic chemical products are mainly used as inputs in other chemical processes. The basic chemicals sector itself accounts for another 26% of its own sales, and the rubber and plastics sector for about 16%.

Plastics

The wide range and the tailoring of their properties for specific applications have led to a vast and diversified demand for plastic materials. The main outlets are to be found in the following industries: packaging with a 38% share, construction and civil engineering (16%), transport equipment (10%), electronics (10%), house wares and toys (5%), agriculture (5%), furniture (4%), health and medical applications, paper and wood, photography and armaments.

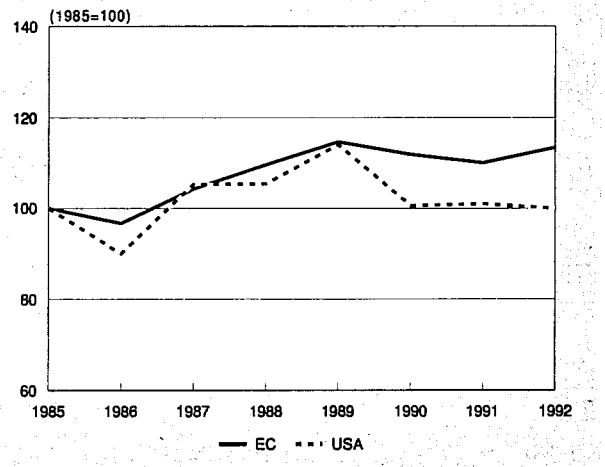
The moderate growth in demand for plastics is attributable to the economic slump, and particularly to the deteriorating conditions prevailing in the end-user sectors such as the automobile and construction industries. Plastic materials have historically developed, at the expense of traditional materials (e.g. glass, steel, wood), in industrial and household goods production. This factor is starting to lose its importance as the market reaches maturity. However these substitution effects now occur between plastics, as with LLDPE (linear low density

Figure 4: Basic industrial chemicals
International comparison of production in current prices



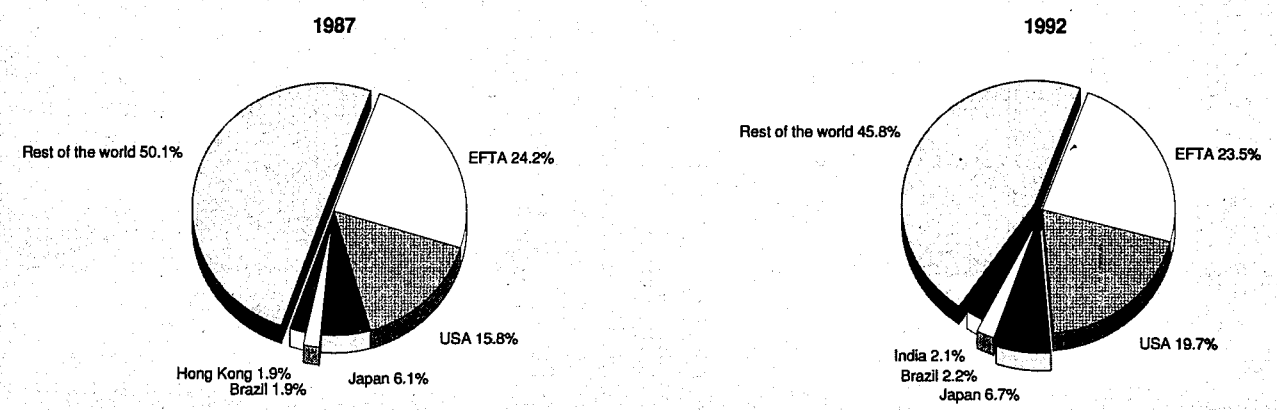
Source: DEBA, Census of Manufacturers

Figure 5: Basic industrial chemicals
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers

Figure 6: Basic industrial chemicals
Destination of EC exports



Source: Eurostat

polyethylene) making increasing inroads into the LDPE (low density polyethylene) market.

Supply and competition

The European basic chemicals industry has a strong technological base, and it compares favourably with the US and Japanese industry from the point of view of research and development. This represents an important strategic condition for a modern industry which depends on the use of more and more sophisticated materials and technologies.

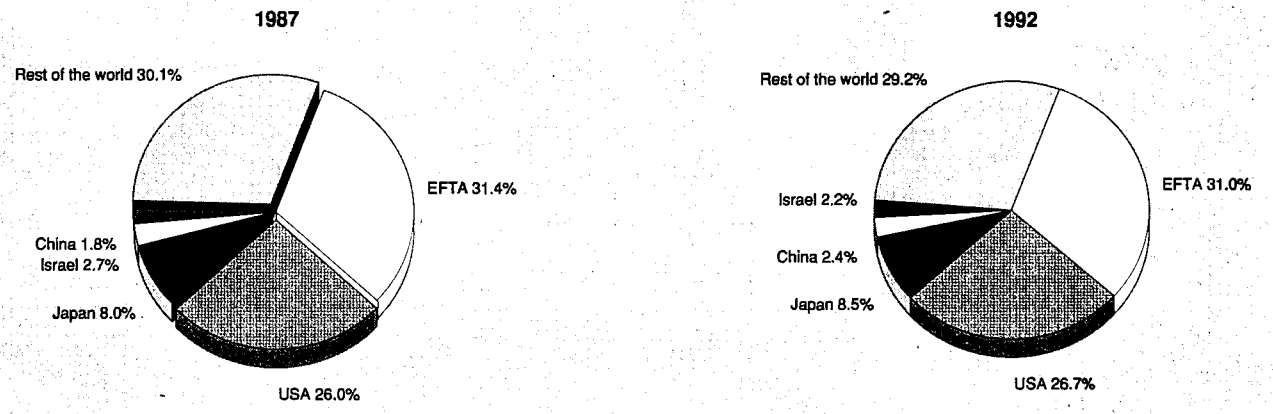
Plastics

Plastics manufacturers produce polymers and synthetic resins mixed with additives to form plastic materials. They absorb about 60% of the output of petrochemical crackers. The main thermoplastic products are: low density polyethylene (LDPE) and linear low density polyethylene (LLDPE), high density polyethylene (HDPE), polypropylene (PP), polystyrene (PS) and polyvinyl chloride (PVC). Thermoplastics represent about two thirds of total plastics production in Western Europe. By way of comparison, European production of these plastic materials is equivalent in volume terms to that of the USA and more than double that of Japanese production.

Plastic material manufacturers are not only raw materials manufacturers: they also help the entire plastic products sector by contributing to the technical and commercial development of plastics applications. Mass market plastics, which represent more than two thirds of total plastics production, have played a vital role in the plastics industry since the Second World War. However, they have been hit by sharp oil price rises and by the economic downturn during the period from 1975 to 1983, which led to production overcapacity. The mass market plastics industry actively rationalised and restructured between 1982 and 1984, adjusting production capacities and obtaining cost reductions. The more recent years have brought an upturn in demand and profits, but since its 1989 peak the market has again been deteriorating. New capacities and fierce competition are driving prices down affecting the whole basic chemicals sector.

Regarding EC competitiveness in the field of the petrochemical industry, during the 1987-1992 period the input costs were higher in Western Europe than in US and Gulf Coast countries, its principal competitors.

Figure 7: Basic industrial chemicals
Origin of EC imports



Source: Eurostat

Production process

Petroleum products and first oil derivatives are used both as raw materials and as an energy source by the basic chemical sector. Fuel and power products represent the major input costs for the basic chemical industry. Therefore, profits in the industry depend to a large extent on oil prices.

High capital investments in machinery and technology are essential in this industry and represent, along with the availability of raw materials, a significant entry barrier. High competition, low product differentiation and heavy environmental constraints also increase the difficulties of the basic chemicals activity.

Any further increase in capacity will probably be cautious, taking account of the experience of the last decade; investment plans are mainly directed towards new processes and product development, as well as towards productivity improvements in order to maintain the industry's competitiveness. Finally, factors determining investment seem to be linked more and more to the environment, notably in areas such as waste management, and to public acceptance of chemical products and chemical industry activities.

INDUSTRY STRUCTURE

Companies

Concentration is clearly higher in the basic chemicals sector, the exclusive domain of large companies, compared with refined chemicals. For example, in Germany, six producers share 80% of inorganic chemical production. Competition is however much more intense than might be believed from the strong concentration. The industry experiences a high potential for competition among the present producers on the market and the new competitors from the oil-producing countries and South-East Asia.

Among the leading EC producers in the field of basic chemicals are six firms: BASF, Hoechst and Bayer (D), ICI (UK), Rhône-Poulenc (F) and Enichem (I). Other main European basic chemicals companies are the Swiss Ciba, Sandoz and Roche, the Finnish Neste, the Swedish Dyno Industrier and the Norwegians Norsk Hydro and Statoil.

Strategies

During the 1960s and up to the middle of the 1970s, the basic chemicals groups' strategy aimed at increasing output and capacity. The 1970s economic crisis highlighted the need to restructure the industry. Company strategies were consequently modified along three main lines: first, product rationalisation, which led to major redundancies; second, increasing installation size, in order to benefit from economies of scale; third, merger and acquisition (M&A) activity in Europe and the establishment of joint-ventures in the rapidly growing Asian markets.

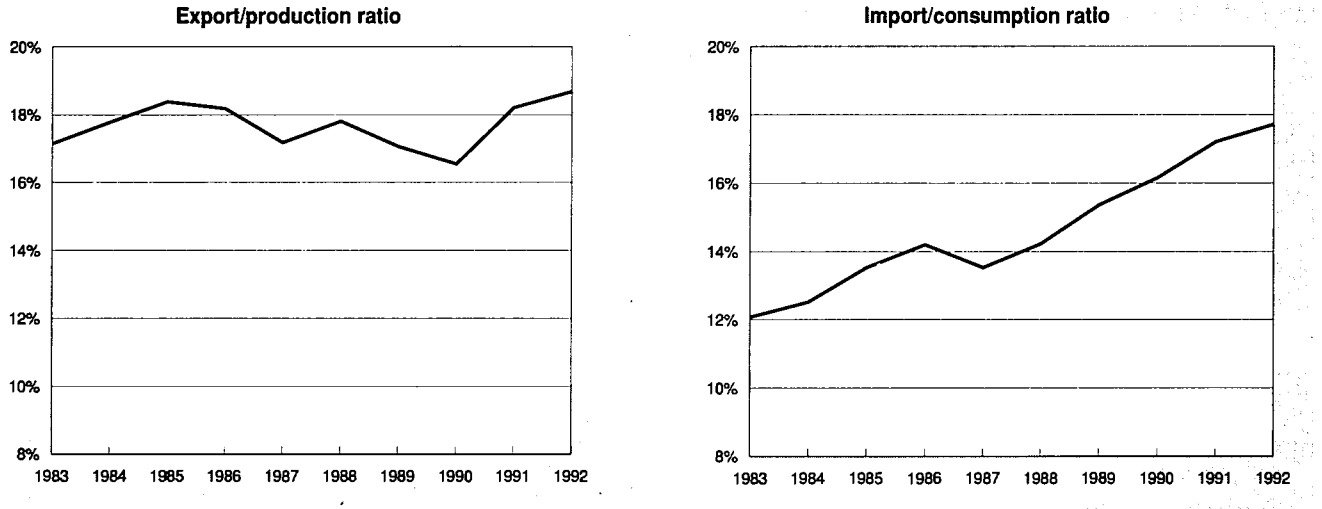
Among the latest joint ventures, strategic alliances and assets swaps we can cite the following ones. ICI (UK) has made such a deal with BASF(D) (polypropylene for acrylic operations). In June 1993, Statoil (N) and Neste (SF) announced an agreement to merge their polyethylene and polypropylene activities. The new company will become Europe's largest producer of polyolefins. Before that some companies had already announced plans to merge their polyolefins activities: Shell (NL/UK) with Montedison (I), and ÖMV (A) with Veba (D); BP(UK) with Enichem (I) have also announced plans to merge their styrene activities. Meanwhile groups like Solvay, DSM, Hoechst, Petrofina or Elf are carrying various negotiations.

On the acquisition, side Hanson (UK/US) purchased the US polyethylene leader Quantum Chemical in June 1993, betting on a fast recovery of the US petrochemical industry, while Solvay, Belgium's largest chemical group, acquired Tenneco's (US) soda ash business for 420 million ECU in 1992. On the European market, the situation of soda ash was deteriorating. The closure of three European plants was announced in 1993: Kalk (D) for BASF, Couillet (B) and Heilbronn (D) for Solvay. This is in line with the surge of low-priced imports from the USA into the EC which prompted the industry to file an anti-dumping case with the Commission.

ENVIRONMENT

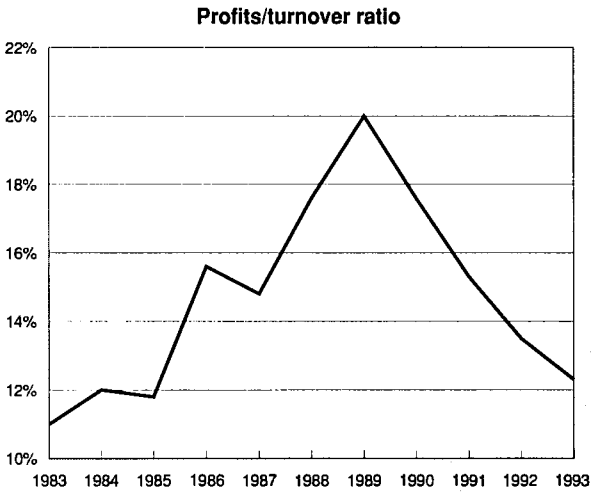
Environmental problems are of particular importance to the basic chemicals industry. The industry itself is well aware of the pollution problems for which it is directly or indirectly responsible and has already undertaken important efforts, often ahead of legislation. Reacting to a tarnished image, the chemi-

Figure 8: Basic industrial chemicals
Trade Intensities



Source: DEBA

Figure 9: Basic industrial chemicals
Pre-tax profits to turnover of the industry (1)



(1) For Germany, France, Italy and the United Kingdom.
1992: preliminary.
1993: estimates.
Source: DRI Europe

cal industry has launched the Responsible Care programme. Its aim is to measure and improve environmental performances, in conjunction with greater openness towards people. On the technical side we witness a shift away from end-of-the-pipe technologies towards waste-minimisation. For the moment, expenditures (both capital and operating costs) aimed at improving the state of the environment represent an average of 3 to 4% of the industry's turnover (reaching up to 8% for some European companies).

As far as plastics are concerned, the main environmental issues are the consequences of plastic contact in the case of medical or food applications, plastics safety with regard to fire and the ecological consequences of plastics disposal. The recycling of used plastics is being developed in some countries, although this process still remains relatively expensive when the extra cost of waste sorting and the plastics recycling itself is taken into account. This has led other EC members to promote ecologically clean incineration of plastics with household wastes to produce energy. The Council is expected to adopt a packaging directive by 1994 which will set standards for the disposal of such wastes. The debate is still open between the merits of recycling versus incineration.

After much debate, the Council adopted, in January 1993, a regulation on the supervision and control of wastes within, into and out of the EC. This amounts to implementing the international Basle Convention on the control of cross-border movements of hazardous wastes and their disposal, which has five broad goals:

- to minimise the generation of hazardous waste;
- to keep cross-border movements of hazardous waste to a minimum;
- to achieve national self-sufficiency in disposal;
- to ensure the informed consent of the receiving country before shipping hazardous waste;
- to end trade of hazardous waste with countries which have not agreed to the Convention.

The draft European Waste Catalogue, part of the EC Directive on wastes as well as the draft Hazardous Waste List, part of the EC Directive on hazardous wastes, will define precisely these various substances.

Finally, a fierce battle is being waged on the issue of toxicity of organochlorines. Some environmentalist movements are calling for a total ban of these substances while the industry is gathering its strength to demonstrate that all but a few compounds (e.g. PCBs (polychlorinated biphenols), CFCs (chlorofluocarbons), dioxin or DDT (dichloro-diphenyl-trichloroethane) are biodegradable and do not bioaccumulate. PVC, a plastic, has been singled out because of its chlorine content.

REGULATIONS

Trade regulations are of vital importance to the basic chemicals industry given its dependence on foreign trade as a source of income. Recent years have seen the active participation of the EC basic chemicals industry in all GATT trade negotiations. The main issues under current debate are the following: improved market access for EC firms which might be obtained with the harmonisation of chemical tariffs; stronger intellectual property protection through GATT; and prohibition of the most trade distorting practices. However, an important focus of the negotiations has been devoted to tariffs. A joint framework agreement for tariff harmonisation in the Uruguay Round has been reached within international industrial circles, which provides for tariff harmonisation at 5.5% or 6.5% and allows up to 15 years to bring tariffs down to the harmonised level.

Recently, five 'essential uses' have been nominated by the United Kingdom Government, for the ozone depleting CFCs, carbon tetrachloride and 1,1,1-trichloroethane. The United Kingdom proposes for 1995-1996 a continued use of:

- carbon tetrachloride in tests to determine hydrocarbon contamination of drinking and waste water sewage sludge, tanker ballast and soils.
- CFCs 11,12,113 and 114 in metered dose inhalers.
- CFC-113 as a solvent for the active reagents (ninhydrin) used to developed. fingerprints.
- CFC-113 as an inert solvent to carry one of the active reagent used to manufacture a range of reverse osmosis membranes and
- For 1995 only, CFC-12 as a diluent for ethylene oxide in sterilisation of chloramphenicol powder used in eye ointments.

Moreover, an EC law specified the use of ozone-depleting substances. Under this law, the CFC-113 should be used as an extraction solvent in a migration test of certain plastics for food packaging; 1,1,1-trichloroethane to dewax toy samples prior to testing heavy metal migration; carbon tetrachloride in the determination of the drug ronidazole in animal feed, as the mobile phase in thin layer chromatography analysis of ground mercury compounds in cosmetics.

Table 5: Basic industrial chemicals
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.3	1.6
Production	1.2	1.3
Extra-EC exports	2.0	1.6

Source: DRI Europe

OUTLOOK

The future of the basic chemicals industry is clouded by rising competition from producers in other parts of the world, particularly in developing countries. Overcapacity will remain in the industry for several years to come. EC companies will continue to focus on cost cutting leading to a further reduction in employment. A renewal of the sector's former rapid growth rates is not likely in the near future.

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Petrochemicals
NACE 252

The petrochemical industry represents more than two thirds of the basic chemical sector and a quarter of the total chemical industry turnover. The sector is going through a period of reduced profitability and losses after the buoyant growth experienced during the 1987-1989 period. Faced with depressed demand and global overcapacity, petrochemical companies are condemned to pursue their modernisation efforts.

INDUSTRY PROFILE

Description of the sector

The petrochemicals industry is defined as the industry that uses raw materials derived from oil or natural gas to manufacture the following products:

primary petrochemicals: unsaturated (i.e. ethylene, propylene, butylene, butadiene, acetylene), aromatics (i.e. benzene, toluene, xylenes, naphthalene), methanol, ammonia, carbon black;

petrochemical intermediates: ethylene, vinyl chloride, acrylonitrile, cyclohexane, ethyl benzene, styrene, phenol, etc.;

petrochemical products: plastics, synthetic fibres, solvents, surface active agents, additives, synthetic rubber, fertilisers and agricultural chemicals.

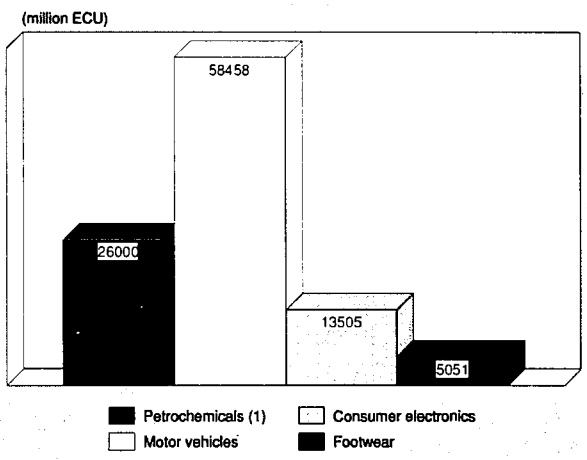
This monograph does not deal with the last category, but its elements are the subject of separate monographs in these and other sectoral chapters. The lack of a common data base for petrochemical products is the main reason for the absence of complete statistical data.

The petrochemical industry is concentrated in Germany and the Benelux countries that hold respectively 27% and 25% of the Community's olefin cracker capacity of ethylene production, followed by France, United Kingdom and Italy, with 18%, 15% and 12%.

Recent trends

During the 1983-1990 period, the supply and demand of primary petrochemical products within the EC was reasonably well balanced.

Figure 1: Petrochemicals
Value added in comparison with other industries, 1992



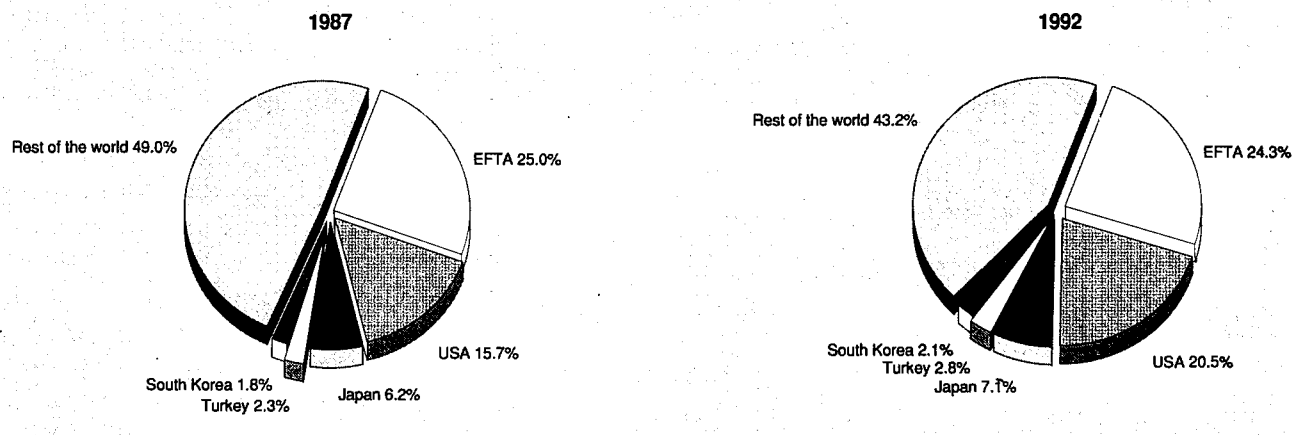
(1) DRI Europe estimates
Source: Eurostat

Extra-EC exports but especially imports grew steadily from 1983 to 1989. However, since then, they have reached both a plateau. In 1992, exports increased of 0.3% and imports fell of 1.0%

In terms of basic and intermediate products, the petrochemical sector accounts for approximately one quarter of the total value added of the chemical industry, that is 26 billion ECU in 1992. Total employment in the basic chemical sector (e.g. including NACE 251 and 253) reached the level of 607 000 in 1992, with a decrease of more than 8% from the 1985 peak.

An analysis of the primary petrochemical products shows strong growth for the main products. It is estimated that in 1992 ethylene production in the EC rose 5.3%, reaching 14.2 million tonnes, while consumption increased by 5.7% to 14.3 million tonnes. As for propylene, its production, which is largely dictated by ethylene demand, increased by 7.3%, reaching 9.1 million tonnes, while consumption reached 9.4 million tonnes, a 9.5% increase.

Figure 2: Petrochemicals & carbo-chemicals (1)
Destination of EC exports



(1) Data includes monomers, intermediate petrochemicals, plastic resins and intermediate inorganic chemicals.
Source: Eurostat

Table 1: Petrochemicals
EC supply of and demand for the primary petrochemical products

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
ETHYLENE										
Actual capacity	13 985	13 443	13 074	12 878	13 230	13 830	13 925	14 350	15 895	16 659
Production	10 846	11 194	11 161	11 636	12 375	13 338	13 050	12 820	13 507	14 225
Consumption	10 923	11 421	11 393	11 813	12 572	13 377	13 122	13 022	13 527	14 296
PROPYLENE (1)										
Actual capacity	7 982	7 751	7 400	7 536	7 885	8 363	8 838	7 255	7 963	8 453
Production	6 067	6 617	6 243	6 632	7 097	7 755	7 734	8 005	8 518	9 143
Consumption	6 281	6 821	6 801	7 151	7 374	7 993	8 057	8 320	8 574	9 390
BUTADIENE										
Actual capacity	2 059	2 051	2 083	1 905	1 983	2 015	2 129	2 159	2 189	2 222
Production	1 653	1 710	1 623	1 552	1 679	1 819	1 815	1 847	1 753	1 786
Consumption	1 167	1 227	1 238	1 208	1 286	1 411	1 405	1 455	1 440	1 488
BENZENE										
Actual capacity	6 586	6 559	6 381	6 611	6 750	6 481	6 861	6 885	6 949	7 108
Production	4 599	4 834	4 796	4 740	5 150	5 475	5 446	5 400	5 439	5 356
Consumption	4 711	5 124	5 077	5 083	5 356	5 956	5 769	5 840	5 636	5 629

(1) Capacity from 1990 onwards is based on non-refinery production (i.e. steam cracking), whereas production figures cover the whole industry.sed on non-refinery production tion (i.e. steam cracking),
whereas production figures cover the whole industry.
Source: CEFIC, Eurostat

Table 2: Petrochemicals & carbo-chemicals (1)
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	11 911	14 666	15 771	13 580	13 648	15 749	16 643	15 378	16 063	16 114
Extra-EC imports	6 892	8 748	9 974	9 028	9 179	10 939	13 357	13 859	14 058	13 911
Trade balance	5 020	5 917	5 797	4 552	4 469	4 811	3 286	1 520	2 005	2 203
Ratio exports/imports	1.73	1.68	1.58	1.50	1.49	1.44	1.25	1.11	1.14	1.16
Terms of trade	99.3	101.0	100.0	106.3	108.6	107.2	109.0	111.9	114.3	115.3
Intra-EC trade	22 090	26 314	28 848	27 276	28 696	33 654	37 678	38 562	38 243	37 983
Share of total imports (%)	75.1	73.9	73.3	73.8	74.1	73.7	72.1	72.3	72.0	73.2

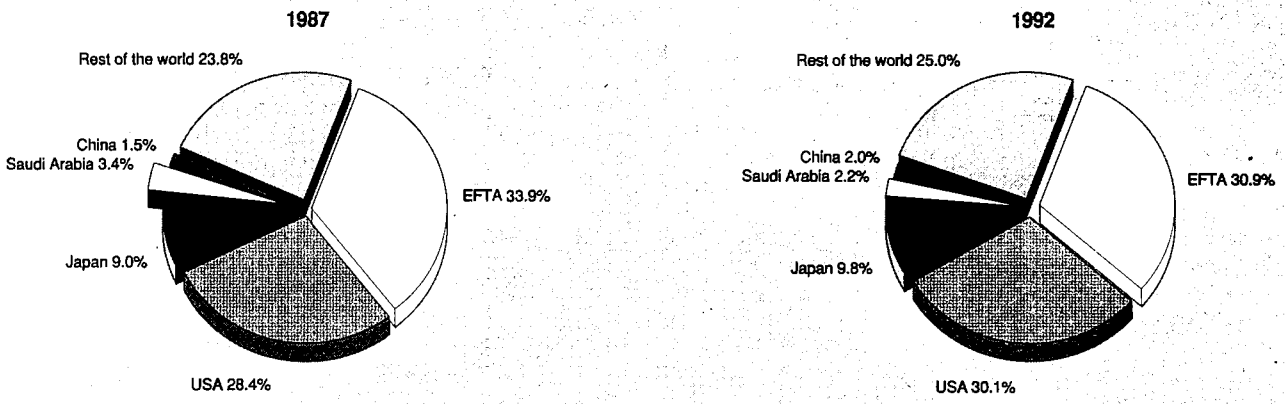
(1) Data includes monomers, intermediate petrochemicals, plastic resins and intermediate inorganic chemicals
Source: Eurostat

Table 3: Petrochemicals & carbo-chemicals (1)
Extra-EC exports at current prices, by country

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC	11 911	14 666	15 771	13 580	13 648	15 749	16 643	15 378	16 063	16 114
Belgique/België, luxembourg	666	859	808	692	643	911	1 051	955	1 042	1 035
Danmark	58	74	82	81	78	135	97	92	72	76
BR Deutschland	5 199	6 154	6 485	6 055	6 142	6 566	6 921	6 417	6 662	6 624
Hellas	18	19	21	21	33	24	38	37	40	40
España	322	614	683	537	538	626	592	606	613	569
France	1 292	1 588	2 084	1 426	1 389	1 618	1 739	1 618	1 718	1 770
Ireland	294	426	421	338	304	374	485	455	592	618
Italia	1 193	1 535	1 619	1 375	1 399	1 755	1 770	1 504	1 587	1 522
Nederland	1 573	1 885	1 835	1 499	1 581	1 839	1 967	1 834	1 867	1 852
Portuga	I18	44	65	49	60	93	73	103	70	57
United Kingdom	1 278	1 468	1 669	1 507	1 482	1 808	1 911	1 757	1 800	1 950

(1) Data includes monomers, intermediate petrochemicals, plastic resins and intermediate inorganic chemicals.
Source: Eurostat

Figure 3: Petrochemicals & carbo-chemicals (1)
Origin of EC imports



(1) Data includes monomers, intermediate petrochemicals, plastic resins and intermediate inorganic chemicals.
Source: Eurostat

International comparison

The EC is a major player in the world market for primary petrochemicals, being the largest producer of butadiene and benzene and the runner-up, after the USA, for ethylene and propylene. EC production, in volume terms, is about twice that of Japan. New producers have recently emerged on the world scene, particularly in South-East Asia (e.g. Korea), Brazil and the Middle East.

Foreign trade

The EC's trade balance with the rest of the world is positive (about 2 200 million ECU in 1992), although it has been sharply decreasing from 1988 due to a strong rise in extra-EC imports. The exports/imports ratio had fallen from its peak of 1.73 in 1983 to 1.11 in 1990. Since then it has been more stable being 1.16 in 1992.

The breakdown by Member States shows the predominance of Germany, which is both the major exporting and importing country in the EC, accounting for 41% of extra-EC exports and 23% of extra-EC imports. In this respect, other significant countries within the EC are the Netherlands, whose figures are respectively 11% and 13%, the United Kingdom (12% and 12%), France (11% and 13%), Italy (9% and 15%) and Belgium (6% and 12%).

The EFTA countries and the USA are the main end markets for extra-EC exports as well as the main source of EC imports: in fact, together they make up 45% of total extra-EC exports and 61% of extra-EC imports. The developing countries also represent an important market for the EC, accounting for 17% of total petrochemical exports.

MARKET FORCES

Demand

The different products of the petrochemical industry are used in a variety of downstream industries such as construction, electrical industry, packaging, transport, metal working, mining, agriculture, rubber and petroleum refining.

The demand for primary and intermediate petrochemicals depends on several factors. First, the economic environment and the growth in end markets; second, inter-product competition (e.g. among different sorts of plastics or among plastics and other materials like steel); third, the emergence of new products; finally, the influence of environmental restrictions.

Table 4: Petrochemicals & carbo-chemicals (1)
Extra-EC imports at current prices, by country

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC	6 892	8 748	9 974	9 028	9 179	10 939	13 357	13 859	14 058	13 911
Belgique/België, Luxembourg	448	585	747	683	716	1 181	1 481	1 593	1 661	1 641
Danmark	203	245	252	243	247	283	286	273	261	260
BR Deutschland	1 633	1 917	2 224	2 066	2 086	2 349	2 905	3 060	3 276	3 241
Hellas	59	73	82	97	102	107	142	151	175	162
España	369	497	515	571	576	691	787	809	883	827
France	1 096	1 280	1 409	1 362	1 369	1 634	1 839	1 951	1 794	1 769
Ireland	85	133	158	96	120	144	191	224	258	250
Italia	1 132	1 420	1 652	1 450	1 438	1 642	2 115	2 072	2 004	2 021
Nederland	799	1 267	1 625	1 301	1 370	1 453	1 885	1 832	1 812	1 852
Portuga	I107	114	105	91	108	145	128	139	156	159
United Kingdom	961	1 217	1 205	1 066	1 047	1 310	1 598	1 757	1 778	1 730

(1) Data includes monomers, intermediate petrochemicals, plastic resins and intermediate inorganic chemicals.
Source: Eurostat

The industry is traditionally very cyclical and since 1992 has started another depressed period that seems to be affecting all the major economies apart some in South-East Asia. In the longer run one can see that the strong growth rates of the 60's and 70's have given way to a modest expansion that could soon end up as the market reaches full maturity.

Supply and competition

The petrochemical sector is currently suffering from severe overcapacity. In fact, during the period 1986-1991, due to lower feed stocks prices and strong economic growth, the industry invested heavily in increasing capacity and flexibility of choice of feed-stocks. Removing the bottlenecks added the equivalent of three new olefin crackers, and three new ones will be operational in 1993-94.

Today, the slowdown of economic growth in the industrialised countries, the creation of capacity surpluses in the main markets and the lack of cost competitiveness of a part of West Europe's industry are a major concern in this region. As a consequence, prices and margins have been falling in 1992, and 1993 has seen no improvement of the situation. All the companies are currently losing money on petrochemical production.

Among other factors affecting the EC industry, we can cite: the presence of too many players with too many manufacturing sites; a lack of integrated pipelines; various types of companies pursuing different goals; the need to complete the integration of the European market.

The cost of raw materials used by the industry remains at rather elevated levels, notwithstanding the decrease in the price of oil that took place after the Gulf war. The price of naphtha reached a level of 152 ECU per tonne in June 1993, a price that is substantially higher than the 115 ECU of July 1990. Moreover, since feed-stock prices are fixed in USD, variations in the US currency deeply affect the feed-stock activity of the industry. This is compounded by the fact that selling prices quoted in local currencies (often linked to the DM) follow the rule of demand and supply, independently of the rate of the USD. In the 1990-1992 period, for example, the relative weakness of the dollar has given an important comparative advantage to US producers vis-à-vis their European competitors.

In the medium term, there is no real alternative to naphtha as principal feed-stock. However, at present, LPG (Liquefied Petroleum Gas), especially ethane, can represent a 20% decrease in production costs versus a typical naphtha cracker. Recently, major European petrochemical companies have sought to take advantage of rapid growth in the industrial gases' market, by setting up pipelines to feed petrochemical sites. However, LPG has volatile prices, requires high capital costs and is in limited supply. Therefore the addition of LPG cracking flexibility is attractive only close to indigenous sources of supply, where it can be selectively used during periods of intense price competition and provide a significant cost advantage.

R&D activity is another relevant cost factor in the petrochemical industry. It is estimated that between 0.8 billion ECU and 1.6 billion ECU p.a have been spent in recent years.

Production process

Product innovation plays a fundamental role in the petrochemical industry. The development of new fuels, such as unleaded fuel, is opening up new perspectives for the industry, particularly for the valorisation of aromatics. For example, several companies are investing in products based on methane, such as MTBE (Methyl Tertiair Butyl Ether), an additive used for the production of unleaded fuel

The petrochemical sector is a heavy consumer of oil products: energy-producing materials account for most of the production cost of a cracker. The growing presence of oil refining industry in the production of intermediate petrochemical products (due to the process by which fuels are reformulated) is an interesting feature of the evolution of the petrochemical industry. The process of unleaded and reformulated fuels implies a change in the share of some components. The major input for the production of intermediate petrochemicals is naphtha, a product of oil refining, which accounts (including condensates) for about 71% of total petrochemical production in West Europe. LPG comes next with a 19% share, and the remainder, 10%, consists of gasoils.

INDUSTRY STRUCTURE

Companies

Activity in the petrochemical field is performed by large-scale European and international groups, which have undergone extensive restructuring following the oil crises and the slowdowns in the economic growth that characterised the end of the 1970s and the beginning of the 1980s. The restructuring has prompted a reduction in the number of producers and sites as well as a shift in emphasis with regard to certain products. For example, during the 1980-1986 period, 8 EC producers of ethylene disappeared through the closure of 29 sites representing a capacity of 4.7 Mt. At the end of 1992 there were 46 olefin crackers operating in the EC with a capacity of 16.5 million tonnes of ethylene owned by 25 companies.

Among the five leading EC chemicals firms, four of them are involved in the production of basic and intermediate petrochemicals, (Rhône-Poulenc (F) has intentionally withdrawn from the field of basic chemicals). Nevertheless, the proportion of activities involving basic chemicals varies among the remaining four: according to 1991 data, Hoechst (D) can ascribe a share of 12% of its turnover to petrochemicals, Bayer (D) 14%, BASF (D) 20% and ICI (UK) 19%. Among the ten non-EC leaders, Dow Chemical (USA) and Exxon (USA) are firmly installed in the European petrochemical sector.

The petrochemical sector is closely related to the oil refining industry for its supply of raw materials. This has engendered the development of petrochemical activities on its own from the refining industry, as part of a strategy of downstream integration. It is worthwhile to note that among the top 15 chemical groups at the world level, four of them are petrochemical subsidiaries of larger oil companies: Shell Chemical (NL/UK), Enichem (I), Elf Atochem (F) and Exxon Chemical (USA). Traditionally these companies focus their production more on basic chemicals than on refined ones.

Strategies

The response of petrochemical firms to the challenges they confront in the market is threefold: to improve the production process and optimise costs; to increase specialisation in some particular product areas; and to implement a dynamic strategy of joint ventures and alliances.

Apart from the traditional elaboration of new products, R&D activity in the industry is principally aimed at developing processes that can increase the flexibility of petrochemical sites in order to better answer to the fluctuations of feed stock of raw materials and of demand.

In the years to come, growth rates in petrochemicals will vary significantly according to the different products. Firms are pursuing a strategy of specialisation, trying to better respond to the exact needs of customers. Producers are concentrating commercialisation efforts on some specific end-markets, such as the car industry, glues and adhesives, fuel additives, etc.

The third main strategy, pursued by firms of the sector, is to build up joint ventures, strategic alliances and assets swaps.

The section of the monograph dedicated to the basic industrial chemicals describes the latest developments, which generally encompass plastics. The new trend is clearly towards creating alliances between the major players of the market.

ENVIRONMENT

Pollution by the petrochemical industry has greatly diminished over the past two decades because of four main factors. First, the closure of plants whose environmental performance was not satisfactory and their replacement with units using clean technologies; second, modifications to the production processes to make them less polluting; third, the set-up of effluent processing plants downstream of the polluting units; fourth, the Responsible Care programme aimed at progressive improvement in environmental performance for the entire chemical industry.

Another main concern for the industry is the proposed energy/carbon tax. The industry is already facing higher prices for energy and feed-stocks than its main competitors (the USA and the Middle East) and is afraid it would be taxed more heavily than other regions in the world.

REGULATIONS

The industry's trade association (APPE) fully supports the proposal made by the whole European chemical industry at the Uruguay Round of GATT negotiations to lower tariffs on chemical goods at a level of 5.5 to 6.5%.

Other trade agreements include the Community's Generalised System of Preference (GSP) as well as Association Agreements with East and Central European states. The former was originally designed to help developing countries by granting them duty free access to the EC. The industry now complains that some of these countries have reached a stage in economic development that doesn't justify that privilege anymore.

The Association Agreements concluded with most East European neighbours aim to create a free trade area within ten years. The industry is particularly worried about the Community instances that might not have the will to apply trade sanctions whenever these are justified. These fears arose from a few cases where Eastern European imports have made spectacular progresses on the Western market (e.g. PVC, melamine). However for the chemical industry as a whole the EC has seen its trade surplus with this region grow from 708 to 1012 million ECU between 1991 and 1992.

Table 5: Petrochemicals
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.5	1.9
Production	1.0	1.2
Extra-EC exports	0.5	1.0

Source: DRI Europe

OUTLOOK

The factor that will influence the petrochemical industry in future is a lack of competitiveness within the global market. The causes of this situation are structural rather than cyclical. An immediate problem which must be addressed is overcapacity, coupled with the existence of a number of production units in the EC with a cost structure which is no longer competitive within the global market.

The dangerous situation of overcapacity will be alleviated by the following remedies: first, an improvement in the European cost structure; second, a reduction in the number and ownership of crackers through joint ventures and alliances; third, the rise of flexible crackers able to receive propane, butane or ethane. However without significant further restructuring of the industry, this problem is unlikely to be solved until the late 1990s.

Another influence will be that investment in environmental protection is steadily increasing, and is expected to rise by about 15% between 1991 and 1994. Legislative requirements, such as the Integrated Pollution Control in the United Kingdom are the main driving force behind this increase.

Finally, during the next decade naphtha is forecast to remain the bulk feed stock, LPG playing a major role be at best only after 2010.

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Paints, varnishes and printing inks
NACE 255

The EC is the world's biggest producer of paints, varnishes and inks, well ahead of Japan. The USA followed closely. Germany alone accounts for about one third of total EC production in volume. The value of EC production in 1992 totalled 13.7 billion ECU.
Given the structure of the industry (paints and varnishes are highly concentrated) and the importance of service linked to sales (repair work, rapid supply to the ink industry), export levels are relatively low.

INDUSTRY PROFILE

Description of the sector

NACE 255 includes paints, paint fillers, varnishes and printing inks. The sector encompasses a full range of products with various applications, of which four main categories are:

- architectural coatings, including exterior and interior house paint, primers, finishing coats, pore fillers, varnish and dyes;
- coatings used for a whole series of industrial products and consumer products (e.g. wood or metal furnishing, automotive industry, aircraft industry, machinery and equipment, household appliances, electrical insulation, film, paper and foil, toys and sporting goods);
- special coatings designed for specific applications or for use in special conditions, including products for the repainting of cars and machines, high-performance maintenance, road markings, bridge maintenance and metallic coatings;
- printing inks used for a series of printing processes (e.g. letter pressing, offset/litho, engraving, flexography, screen printing, etc.)

Paints and varnishes account for around 90% of production measured in volume and 83% of production in value of the paints, varnishes and printing inks sector. In 1992, production of paints, varnishes and printing inks reached a value of approximately 13.7 billion ECU. The indications are that it fell to 13.5 billion ECU in 1993. Germany accounted for nearly 29% of production in value, followed by the United Kingdom and France (18%) and Italy (15%).

Recent trends

Production of paints, varnishes and inks grew at an average yearly rate of 2.3% during the period 1983-88, which accelerated to 5% from 1988-92 led by an increase in consumption. Over the whole period, production grew 3.4% While consumption rose 3.7% per year.

Extra-EC imports rose at a yearly rate of 7.2% during the same period, while export growth has been sluggish particularly over the first period. In 1992, however, the Extra-EC exports reached a value of 2015 million ECU. In 1993, it is thought that extra-EC exports fell by 2.1%

The trade balance showed a surplus of about 2015 million ECU in 1992, but indications are that it was eroded to 1268 million ECU in 1993.

Employment in the sector had recovered steadily after falling to its lowest level in 1988. Indications are that employment fell in 1993, however.

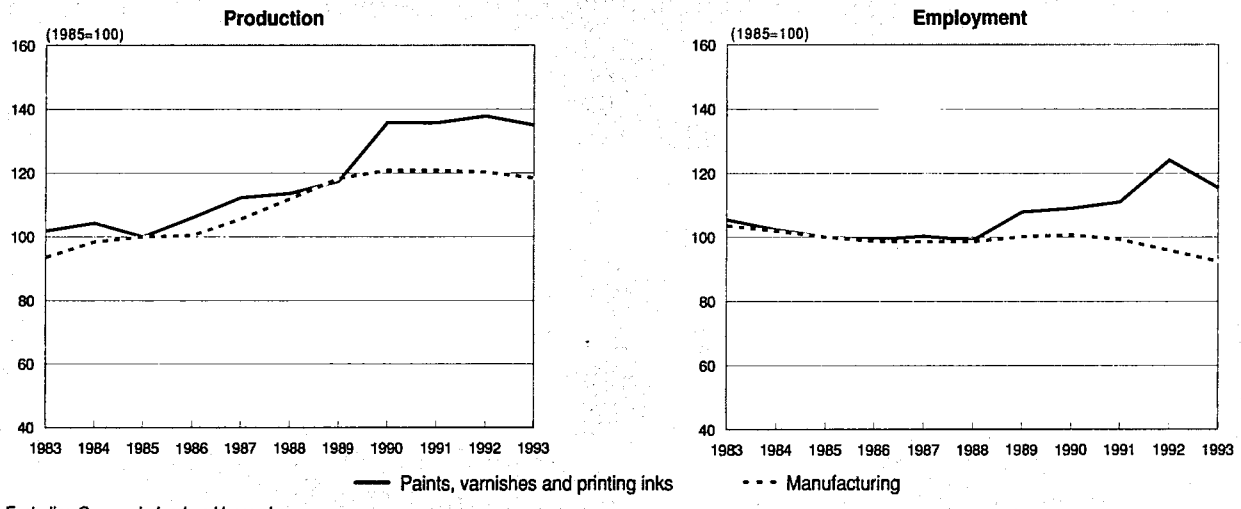
International comparison

In 1983, the USA was the world market leader in paints, varnishes and inks. Its production, however, has been decreasing in recent years and an international comparison of production in constant prices shows that EC and Japanese production grew at a faster rate since 1990. As a result, in 1992, EC was the world market leader with a production reaching 13.7 billion ECU, that is 16% more than the USA and nearly the double that of Japan.

Foreign trade

Paints, varnishes and inks are not generally highly traded. However, this depends very much on the application of the product: while common house paint is sold within a few hundred kilometres of the factory, special aeroplane coatings are internationally traded. The same applies for specialised printing inks. In all the countries with large production capacities, firms chiefly serve their domestic markets. Consequently, be-

Figure 1: Paints, varnishes and printing inks
Production (1) in constant prices and employment (2) compared to EC manufacturing



(1) Excluding Greece, Ireland and Luxembourg.
(2) Excluding the printing ink industry.
1993 are CEPE and Eurostat estimates.
Source: CEPE, DEBA

Table 1: Paints, varnishes and printing inks
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	6 303	6 780	6 889	7 600	8 005	8 466	9 272	11 399	12 136	12 376	12 200
Production	7 197	7 822	7 979	8 637	9 075	9 540	10 450	12 647	13 378	13 741	13 500
Extra-EC exports	1 119	1 306	1 373	1 338	1 390	1 460	1 651	1 734	1 803	2 015	1 970
Trade balance	894	1 042	1 090	1 037	1 070	1 074	1 178	1 248	1 242	1 365	1 300
Employment (thousands) (2)	93.6	90.9	88.8	88.1	89.1	88.0	95.7	96.8	98.6	110.3	103.0

(1) Excluding Greece, Ireland and Luxembourg.
(2) Excluding the printing ink industry.
(3) DRI estimates.
Source: CEPE, DEBA

Table 2: Paints, varnishes and printing inks
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	2.7	5.1	3.7
Production	2.2	5.0	3.4
Extra-EC exports	0.4	5.0	2.4
Extra-EC imports	7.0	7.5	7.2

(1) Excluding Greece, Ireland and Luxembourg.
Source: CEPE, DEBA

Table 3: Paints, varnishes and printing inks
External trade in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 119	1 306	1 373	1 338	1 390	1 460	1 651	1 734	1 803	2 015
Extra-EC imports	225.0	264.0	284.0	300.0	320.0	386.0	473.0	486.0	561.0	649.8
Trade balance	894	1 042	1 090	1 037	1 070	1 074	1 178	1 248	1 242	1 365
Ratio exports/imports	4.97	4.95	4.84	4.45	4.34	3.79	3.49	3.57	3.22	3.10
Terms of trade index	101.2	100.0	100.0	106.2	103.7	106.0	100.3	95.9	94.8	95.5
Intra-EC trade	1 094	1 253	1 366	1 529	1 687	1 917	2 194	2 389	2 568	2 746
Share of total imports (%)	82.9	82.6	82.8	83.6	84.0	83.3	82.2	83.1	82.0	80.9

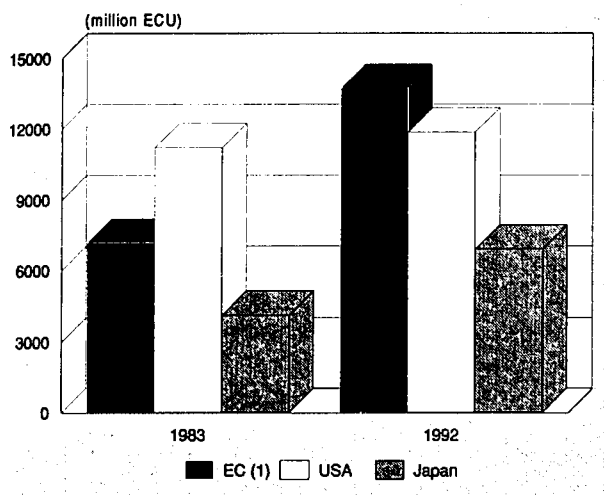
(1) Excluding Greece, Ireland and Luxembourg.
Source: DEBA

Table 4: Paints, varnishes and printing inks
Labour productivity and unit costs (1)

(1985=100)	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	38.5	40.6	43.2	47.6	45.7	46.6	47.2	49.4
Productivity index	100.0	105.5	112.2	123.6	118.7	121.1	122.7	128.3

(1) Excluding Belgium/Luxembourg, Germany and Portugal.
(2) Value added in 1992 prices per person employed.
Source: DEBA

Figure 2: Paints, varnishes and printing inks international comparison of production in current prices



(1) Excluding Greece, Ireland and Luxembourg.
Source: CEPE, Census of Manufacturers, Nikkei

cause of their proximity, EFTA countries are the main trading partners for the EC, accounting for 31% of total extra-EC exports and 58% of extra-EC imports.

MARKET FORCES

Demand

Even if they are grouped in one common NACE category, paints and varnishes have different characteristics from printing inks.

Paints and coatings are widely used in manufacturing industries such as motor vehicles, building and construction, metal products, steelworks, wood, electric appliances, and marine equipment. As for printing inks, they are used to produce newspapers, books, advertising material, packaging and wall coverings.

Paints and coatings are quite vulnerable to developments in the demand for the products of the industry's main industrial clients. This is particularly true with regard to construction, marine equipment and car manufacturing. The vehicle refinishing market is an exception to this rule as consumers hold onto old models and refurbish them when fewer cars are produced or sold. In the level of industrial activity and the demand for durables and investment, production of printing ink is generally less affected by fluctuations than in the paints and varnish sector.

Some clear trends in buyers' preferences have emerged in the recent past. Wood care products are taking an increasing share of the decorative coating market, at the expense of paints. Powder coating is estimated to be the fastest growing paint market in the world, with volume increases averaging about 15% a year during the 1980s; powders contain no solvent and therefore there are less pollution problems. Finally, high demand for high solid paints (i.e. products with a high concentration of pigments), has produced a corresponding reduction in the use of non-aqueous solvents.

Supply and competition

Client industries require quite a long period of time before they accept new coatings. In the automotive industry, e.g. where importance of consumer tastes and the need for high quality products to satisfy requirements of resistance and functionality are particularly important, it is normal to wait at least one year for acceptance, followed by up to two years of trials. The demanding requirements of the client explain why the paints and varnishes industry is spending large amounts of money on R&D activity and advanced technologies.

The market power of the industry's major industrial customers is strong. An extreme example is provided by the EC market of coil coating, (i.e. a decorative or protective coating on freshly produced metal before the main manufacturing step or construction process), which is dominated by major metal producers such as British Steel.

Production process

During the 1980s, the paints and varnishes industry developed new products and adopted new applications driven by rationalisation in its client industries and environmental problems. "High solid" paint and powder fillers (which reduce the losses caused by over spray and allow recycling) are just two noteworthy examples.

In the recent past, production in the EC has been hampered by a technical shortage of raw materials. The shortage and sharp rise in the price of titanium dioxide, which peaked at 2.56 ECU/kg in late 1989, has been followed by a situation of overcapacity. This latter situation has caused prices to decrease to a level of 1.75 ECU/kg in 1992. This substance is at present the most widely used pigment, not only in white paint, but also in the lightning of most other shades.

Companies are also increasingly suffering from a lack of experienced technical staff, resulting from a mounting degree of complexity in the production process and the fall in the number of training facilities.

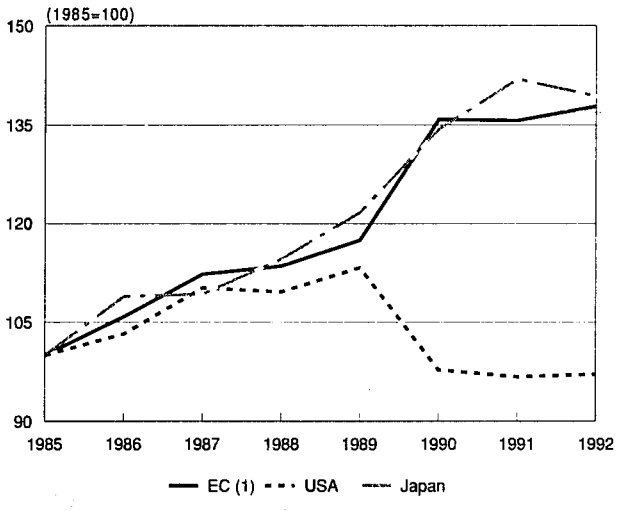
INDUSTRY STRUCTURE

Companies

All Member States have paint production plants, although a considerable number of these are to be found in the major EC countries. In 1989, the ten biggest paints and varnishes companies held about one third of the world market.

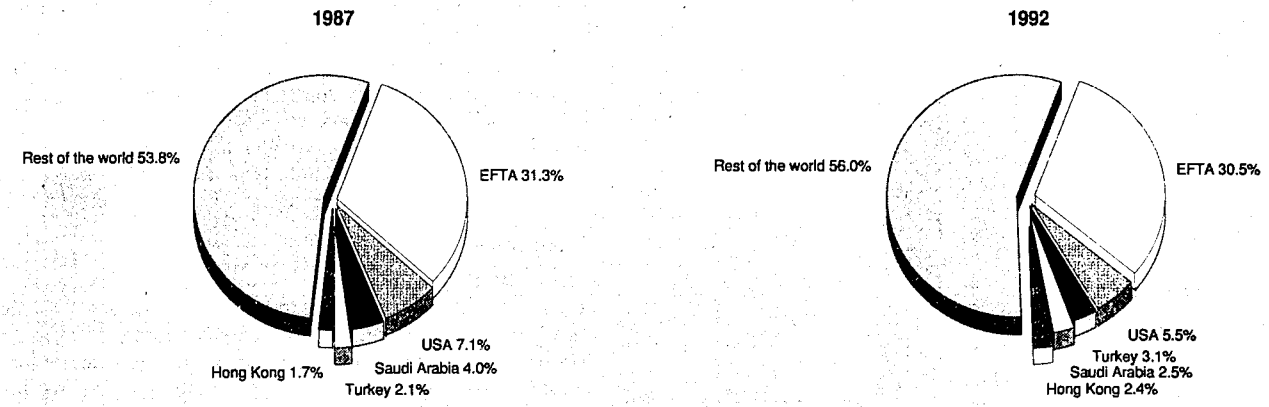
Within the EC market, the leaders are ICI (UK) which is also the world's leading producer, BASF (D), Herberts (D, a Hoechst group company), Akzo (NL) and Courtaulds (UK).

Figure 3: Paints, varnishes and printing inks international comparison of production in constant prices



(1) Excluding Greece, Ireland and Luxembourg.
Source: CEPE, Census of Manufacturers, Nikkei

Figure 4: Paints, varnishes and printing inks
Destination of EC exports



Source: Eurostat

Another major European player is Nobel Industries (S). US companies are also active in the EC: PPG (US) is a major producer, and Dupont (US) also has some production facilities.

Apart from major companies, there is still a large number of small and medium-size companies that survive through specialisation and a high quality of service.

Unlike the paint and varnish sector, there is only a limited number of multinational firms in the printing ink industry. Production units in southern EC countries are, in general, considerably smaller (and often family-run) than in the northern Member States.

Strategies

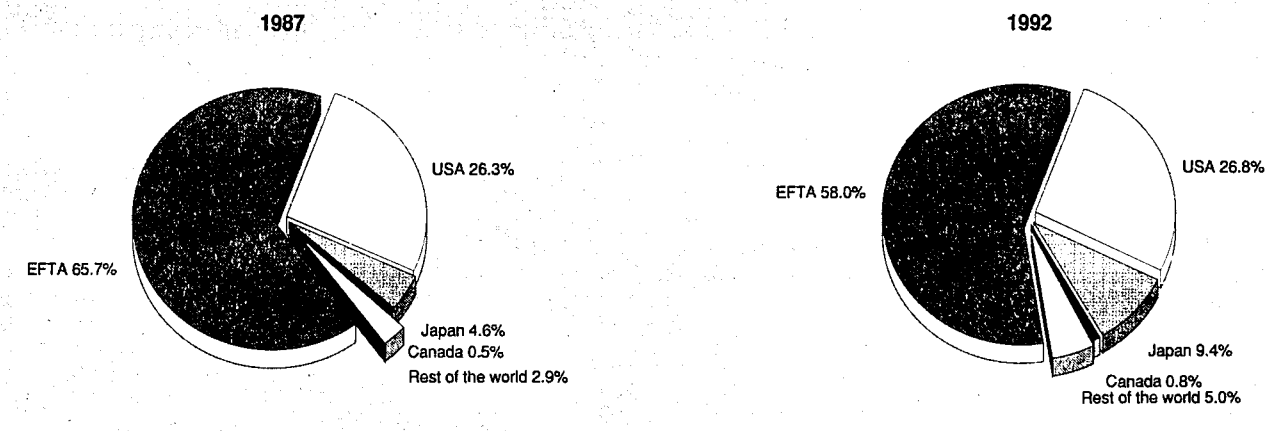
On the world market, there are four true world players in coatings : ICI (UK), PPG (USA), BASF (D), and Courtaulds (UK), while other major companies such as Akzo (NL) and particularly Sherwin-Williams (USA) operate mostly at home.

ICI paints recorded a turnover down on the previous year in 1991 (though profits increased). Similar results in other paint companies in 1991 reflect the recession that predominated in that year. 1992 was similarly badly hit, particularly in the decorative paints market due to a slow down in the housing market.

The sector has been characterised by an increasing number of acquisitions, that reflects the need to reach an adequate size to confront the concentration of distribution networks. The most important acquisitions in 1991 were Akzo's acquisition of MacPhersons' (UK) decorative business and Herberts'(D) acquisition of Becker Powders (UK). However, paint and varnish companies are also frequently using joint ventures in order to gain access to new markets. In 1991, Courtaulds and PPG set up a joint venture for aerospace and defence coating businesses in the United Kingdom and Italy. BASF and Nippon (JPN) did the same in the automotive coating business and ICI and Ferro (USA) followed suit in powder coatings. ICI paints followed a strategy of moving out of non-core activities. In 1991 ICI sold several peripheral businesses including metal pre-treatment and coatings for glass fibre.

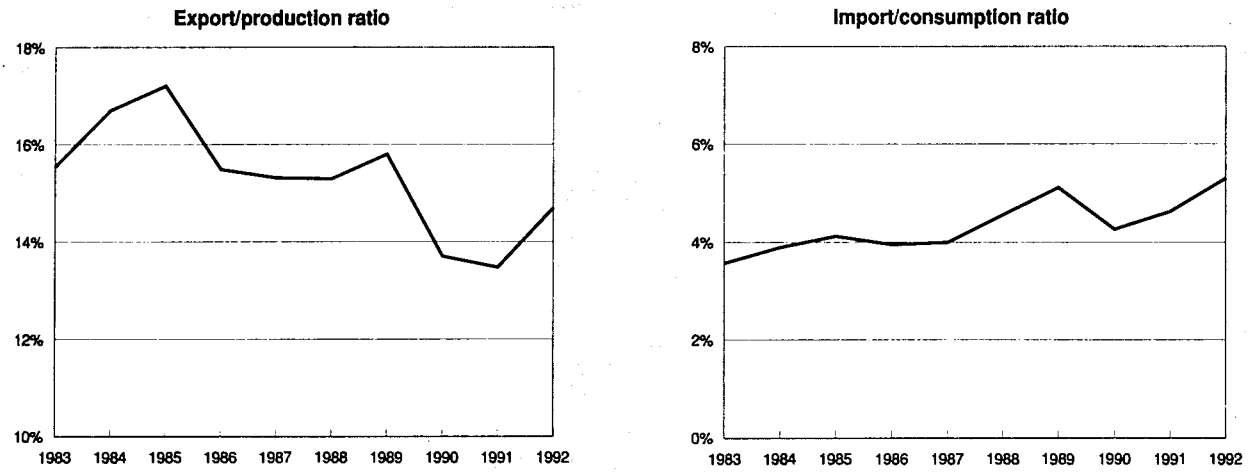
Companies have increasingly tended to invest in the Far East. Thus, paint sales have been booming and further growth is expected in this market. Multinationals are and are likely to be the main players with United Kingdom and Japanese companies currently best placed, closely followed by the companies from Scandinavia and Holland. German and US paint makers have been slow to penetrate the market. Acquisitions in the Far East have been made by companies such as Cour-

Figure 5: Paints, varnishes and printing inks
Origin of EC imports



Source: Eurostat

Figure 6: Paints, varnishes and printing inks
Trade intensities (1)



(1) Excluding Greece, Ireland and Luxembourg.
Source: CEPE, DEBA

taulds, Croda (UK), BTP (UK) and Jotun (N). However, in contrast to European strategies, direct investment and joint ventures are preferred in the Far East paint market as it gives them direct access to the market rather than straight technological transfer. European firms involved in Far East joint ventures recently have included Akzo (UK), Courtaulds, BASF, DSM (NL), Total (F), Becker (D) and Jotun. ICI has opened a plant in Guangdong, China in partnership with Swire Pacific development and the local development corporation

ENVIRONMENT

The main environmental issue affecting the sector is the emissions of volatile organic solvents that are used extensively in paints. Legislation in this area varies widely across the EC. German legislation calls for limits of 150 mg/cubic metre of carbon derived from organic vapours leaving the factory, while in the United Kingdom the limit is set at 50 mg/cubic metre. Although water-based paints are an alternative, they are more expensive and less durable than solvent-based varieties.

The industry is currently devoting a considerable share of its R&D expenditure to solve this problem and has already put forward some successful waterborne coatings. Another environmental concern is titanium dioxide, or white oxide. Paints, lacquer and inks represent around 60% of titanium dioxide consumption in the EC; in its natural state, it damages neither health nor the environment, but its refining is polluting.

As for printing inks, the use of non-aqueous solvents may pose problems similar to those encountered by the paint and varnish industry, even if the more limited number of professional users means that emissions can be controlled more effectively.

REGULATIONS

The EC Commission has put forward several directives on environmental pollution which concern the paint and varnish sector, all of them concerning titanium dioxide. As for solvents, they are not yet the subject of an EC directive.

In 1978, a Commission directive (78/176/EEC) was adopted with the aims of reducing pollution caused by waste and encouraging recycling. A second directive was adopted in 1982 (82/883/EEC) to ensure extensive prevention and to define procedures to control and monitor waste emissions into the environment, including the sea. Finally, in 1983 the Commission submitted a draft directive to harmonise programmes to reduce pollution caused by titanium dioxide using industries; however, in the absence of any consensus, the directive has not yet been adopted.

OUTLOOK

Table 5: Paints, varnishes and printing inks
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.8	3.3
Production	1.5	3.1
Extra-EC exports	2.5	3.3

Source: DRI Europe

Although the paints, varnishes and inks industry is not recession-proof, it is certainly recession-resistant: the steady need for these products by industrial users and by private consumers (professionals or households) means that there are always returns in good and bad times. At the moment, the main concerns for the sector are the environmental protection regulations and the reliance of some raw materials upon the price of crude oil: both these elements can disrupt any increase in volume. Taking into account these factors, the growth rate for production in the paints, varnishes and inks sector as a whole is expected to average around 3.1% per year in the period 1993-97 but production will slow in the latter period while consumption should increase.

Written by: DRI Europe
The industry is represented at the EC level by: European Confederation of Paint, Printing Ink and Artists' Colours Manufacturers' Associations / Confédération Européenne des Associations de Fabricants de Peintures, d'Encres d'Imprimerie et de Couleurs d'Art (CEPE). Address: Avenue Van Nieuwenhuysen 4, B-1160 Brussels; tel: (32 2) 676 7480; fax: (32 2) 676 7490.

Other specialty chemicals
NACE 256.1-256.7

Speciality chemicals are sold on a large number of small or niche markets, for a wide range of applications. Higher value-added, larger profit margins and growth characterise the sector, if compared to the basic chemicals. Competition is not only on price, but foremost on the ability to effectively render service to the client industries, through improving their production processes or products. Environmental concerns form another major drive for innovation in the sector. Partly because of this, the present performance and the prospects of the industry are less bleak than for many other parts of the chemical sector.

INDUSTRY PROFILE

Description of the sector

The manufacture of other speciality chemicals includes a number of products mainly destined for industrial purposes that are described below.

The manufacture of compressed gases (NACE 256.1) includes air gases, acetylene, propane, and carbon dioxide, as well as gas mixtures and various speciality gases (such as argon and other rare gases) that are supplied in smaller quantities in steel cylinders to customers primarily in the engineering industry. Applications in the medical sector include the supply of liquid nitrogen for the conservation of blood, cell cultures, bone marrow and organ transplants. It does not include the delivery of large volumes of primarily the air gases oxygen and nitrogen supplied by pipeline to the steel, chemical and glass industries, nor the gases in liquid form in medium quantities delivered to customers in road tankers.

The manufacture of glues and gelatine (NACE 256.2) includes gelatine, peptone, modified starches and glues. There are two types of glues, liquid and solid glues. Liquid glues consist of a glue-based material liquefied with a solvent, that evaporates after gluing. Solid glues have to be activated by water, solvent or air before they can be used.

The chemical treatment of oil and fats (NACE 256.3) includes the processing of animal and vegetable fats and waxes into a wide range of applications. Their uses as culture media and tablet production aids in pharmaceuticals, in cosmetics, as emulsifiers in food, as wire insulation in electronics, and for the removal of printing ink in paper recycling are just a few examples to demonstrate the variety of the application range. Other client sectors include animal feed, industrial lubricants, leather, mining, paints and coating, plastics and rubber production.

The manufacture of essential oils and of natural and artificial flavouring and perfume materials (NACE 256.4) includes essential oils such as lemon, orange and lime oils, geranium, jasmine, lavender and peppermint oils; flavourings, anti-oxidants, colourings, emulsifiers and stabilisers, and enzymes, all to be used as food additives.

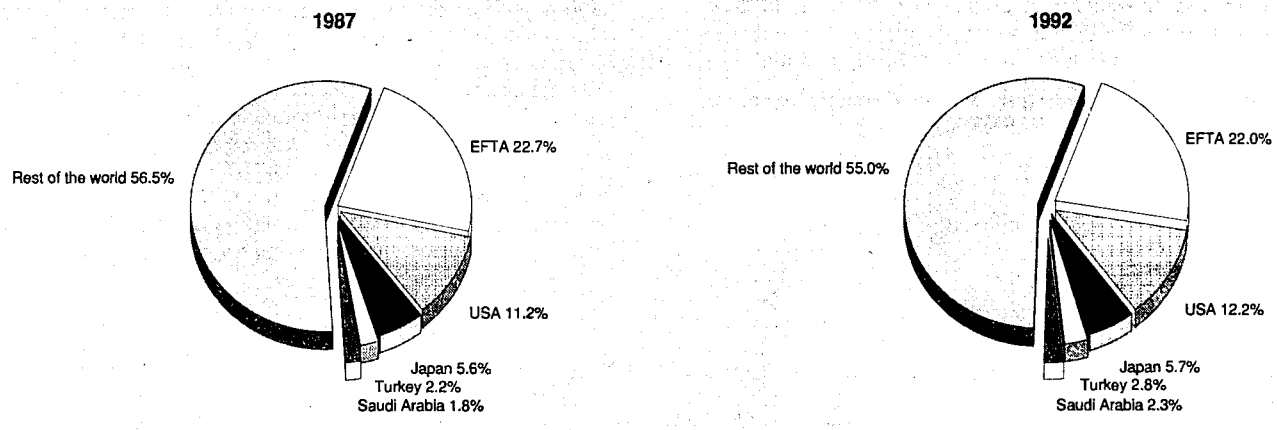
The manufacture of explosives, pyrotechnic articles and matches (NACE 256.5) includes propellant powders, detonators, fuses, matches, flares and liquid gas fuels.

The manufacture of auxiliary products for the treatment of leather and textiles and the manufacture of tanning agents (NACE 256.6) include surface agents (not soaps), lubricants, leather and skin treatments.

The manufacture of miscellaneous chemical products for industrial purposes (NACE 256.7) concerns the production of activated carbon and activated earth: abrasive compounds, auxiliary products for use in mechanical engineering and metallurgy, natural resins and their derivatives, etc.

This chapter includes a wide variety of heterogeneous products, for application in a tremendous number of industrial and household uses. These chemical products differ considerably from other chemical products in the way they are produced and marketed. Indeed their production is often on a small scale, and more and more according to the specifications of one particular client. That is why speciality chemicals are a very service oriented sector and intricate understanding of the clients' products or production process is a prerequisite for successful marketing of the speciality products. R&D is not so much oriented towards new discoveries, rather towards the application of existing substances in new applications.

Figure 1: Other specialty chemicals
Destination of EC exports



Source: Eurostat

Table 1: Other specialty chemicals
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	4 452	5 302	5 767	5 396	5 442	5 822	6 462	6 480	6 614	6 899
Extra-EC imports	2 192	2 662	2 835	2 788	2 733	3 074	3 408	3 587	4 059	4 296
Trade balance	2 260	2 640	2 932	2 609	2 709	2 748	3 054	2 893	2 555	2 603
Ratio exports/imports	2.03	1.99	2.03	1.94	1.99	1.89	1.90	1.81	1.63	1.61
Intra-EC trade	5 622	6 744	7 323	7 194	7 589	8 070	9 129	9 813	10 374	10 897
Share of total imports (%)	72.0	71.7	72.1	72.1	73.5	72.4	72.8	73.2	71.9	71.7

Source: Eurostat

Table 2: Other specialty chemicals
Extra-EC exports at current prices by country

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC	4 452	5 302	5 767	5 396	5 442	5 822	6 462	6 480	6 614	6 899
Belgique/België, Luxembourg	259	313	347	320	308	321	359	379	364	408
Danmark	90	98	98	99	107	74	129	88	82	95
BR Deutschland	1 668	1 960	2 102	2 142	2 236	2 439	2 675	2 668	2 706	2 755
Hellas	27	35	41	17	9	6	9	7	9	11
España	N/A	132	151	105	96	107	111	113	125	149
France	683	821	965	864	851	864	958	964	1 008	1 058
Ireland	55	64	72	72	64	75	91	105	114	162
Italia	395	523	479	413	418	482	537	559	559	665
Nederland	358	437	503	485	459	462	556	512	521	423
Portugal	N/A	43	19	11	11	12	17	15	13	13
United Kingdom	789	876	990	868	882	980	1 018	1 073	1 112	1 160

Source: Eurostat

Table 3: Other specialty chemicals
Extra-EC imports at current prices by country

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC	2 192	2 662	2 835	2 788	2 733	3 074	3 408	3 587	4 059	4 296
Belgique/België, Luxembourg	165	190	186	177	181	196	224	249	307	329
Danmark	67	82	78	78	74	74	76	79	73	82
BR Deutschland	506	661	815	766	797	873	957	992	1 157	1 257
Hellas	18	21	22	28	22	26	30	31	38	41
España	N/A	126	135	141	142	172	203	213	245	258
France	365	465	516	465	475	500	572	574	580	639
Ireland	29	34	55	63	47	46	72	68	101	96
Italia	212	237	268	267	319	423	434	439	537	560
Nederland	264	349	329	436	324	326	324	339	386	429
Portugal	N/A	22	20	21	27	30	31	34	39	43
United Kingdom	407	474	412	345	324	410	483	570	596	564

Source: Eurostat

Speciality chemicals are also characterised by profit margins that are often markedly higher than in the commodity chemicals business.

Recent trends

A general overview of the main indicators for the group of industries included in this chapter is not available. As a general remark, it can be observed that some speciality sales have inevitably felt the repercussions during recent years of the recession in their clients' business. On the other hand, many companies active in speciality chemicals have managed to boost sales in some segments, sometimes offsetting sales volume reductions that they underwent on larger volume markets.

International comparison

Speciality chemicals, with their relatively high value-added and high margins, seem to have attracted the Japanese producers into the market, while they were rather absent, until recently, in general in the chemicals field. In the flavour industry, for example, the most significant recent growth has been in the Japanese industry that is expanding into the international market as a global player.

Foreign trade

Extra-EC exports of speciality chemicals increased annually by 4.5% over the period 1983-92. Imports into the EC rose even faster, at 7.0%. In 1989, exports increased at a faster rate than imports so that the trade balance improved steadily. Since then imports have increased at an average annual rate 5% above exports. This has led to a deterioration in the trade balance as a result of the slowdown in European economies. 1992, however, saw the trade balance recovering slightly. External trade grew slower than internal trade, which rose by 8.6% annually over the same period. The evolution of trade figures for the different countries do not show striking deviations from the general EC trend, although Germany experienced slightly higher than average import growth. Most of the exports of speciality chemicals are destined to the rest of the world and to the EFTA countries, whereas imports mostly originate from the USA and EFTA.

MARKET FORCES

Demand

Compressed gases

Though the weak economic growth since 1991 affected demand for industrial gases in general (including large volumes not part of this NACE) on the EC market, some speciality uses have fared better. Air Liquide (F) and British Oxygen Company (BOC) are the two largest companies producing compressed gases in Europe. Despite the economic slowdown, Germany remains the largest industrial gas market in Europe due to its large chemicals industry. However, the market in the United Kingdom has recently shown the highest growth.

Glues and adhesives

The industry sells to clients in four main customer groups: the construction industry, the furniture industry, the paper and packaging industry, and miscellaneous, which includes the automotive, electronic, shoe and cigarette industries. The manufacture of glues for office and household uses is included in NACE 259 (see the chapter on other chemical products). The sector experienced strong sales growth up to 1989, generated by the favourable economic situation worldwide. Other factors influencing the sales of glues are the development of new products, such as highly specialised metal and plastic glues, sold on niche markets where they replace common methods of connecting like nailing, screwing and welding. The application of glues in these sectors does not merely constitute a substitute material, but often becomes the starting point of technical innovation in the client sector; for instance, since gluing allows the usage of lighter and thinner materials, the construction of cars and aeroplanes with lighter materials becomes a possibility. Such increasingly targeted markets, in which customer needs are well understood, offer large sales potential and good growth prospects, even in periods of economic weakness.

Chemical treatment of oils and fats

Worldwide consumption of basic oleo chemicals (fatty acids, fatty alcohol's, glycerine) is estimated to be over 3.5 million tons. More than one third of this is produced in West Europe. Basic oleo chemicals are only an intermediate step in the total oleo chemicals industry, a provider of jobs for up to 10 000 people in West Europe alone.

The diversity of markets for the oleo chemicals is an important factor for the stability of the industry. The chemical possibilities of renewable oils and fats are rapidly being more and more exploited to take advantage of their ecologically safe properties. One example of current development includes ecologically safe lubricating and hydraulic oils (natural fatty acid esters that will replace non-biological base oils in important applications such as in agricultural machinery, forestry saws, outboard motors, etc.). Legislation enforcing their use in certain applications is already in place in Austria, and Germany and Switzerland are toughening environmental legislation that will improve sales. By the year 2005, it is estimated that lubricants based on natural oils will account for 12% of the West European lubricant market.

A great deal of research is going on to produce new ecologically acceptable surfactants for the detergent's industry, such as new non-ionics, combining oleo chemicals with other natural molecules. In this way markets are created for oleo chemicals through technological advances and sometimes through surfactant substitution. Given the environmental pressure on several varieties of surfactants, specifically related to the toxicology and biodegradability of the product, there is a growing trend to use more natural feed stocks based on plant derivatives rather than petrochemicals. Such products are believed to be less environmentally damaging and are said to lead to milder consumer products for the domestic and personal care sectors.

In 1990, for Europe, the market for speciality surfactants was estimated at 840 million ECU, out of a total surfactant market of 1.82 billion ECU. Although growth in the overall surfactant market is steady, generally matching that of GDP of 1% to 2% per year, speciality surfactants average growth rates of 6% per year on average, with some sectors registering growth of up to 10% per year. Of the total surfactant demand in West Europe, about one third (500 000 tons) goes into industrial applications, many of which can be classified as speciality. End-use sectors include textiles, polymers, petroleum additives, metal working fluids, agrochemicals and food.

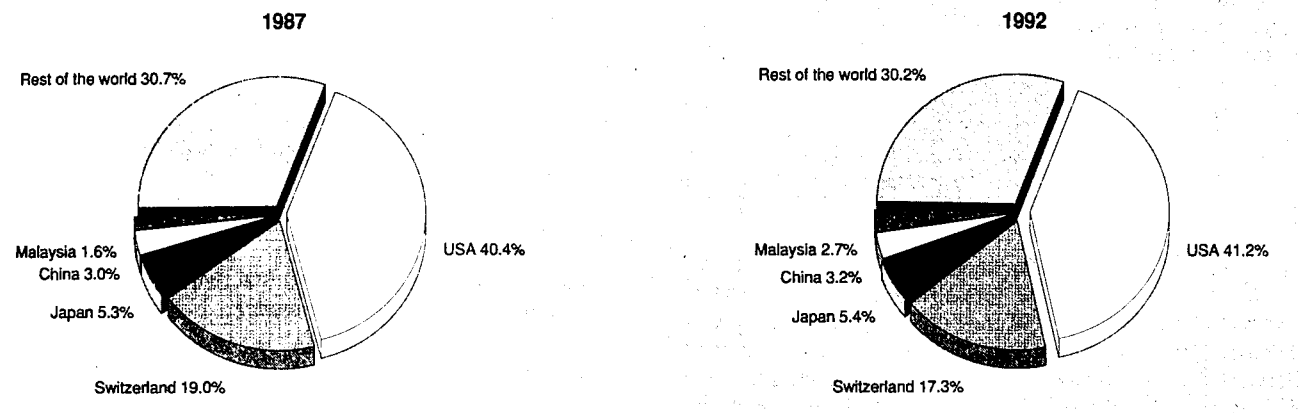
Essential oils, flavouring and perfume materials

Company results show growing demand in this area, deviating from the weaker results of the commodity chemicals divisions in 1990 and 1991. Since the 1960s, the sociological revolution in the kitchen for convenience and speed has driven food flavourings industry growth. In 1990, the worldwide flavour market was valued at some 2.4 billion ECU. Demand, and the industry itself, is fragmented, taking into account of the large variety of flavour profiles and their parameters for technologically efficient application (standardisation, purity, ease of handling, life time, etc.).

Explosives

The development of the explosives industry is strongly linked to activity in the mining sector. In Europe, the mining sector is in a situation of long term decline, hence the outlook for the European explosive's market is poor. Companies are mov-

Figure 2: Other specialty chemicals
Origin of EC imports



Source: Eurostat

ing out of Europe to regions of higher demand and higher growth prospects such as Australia and Asia Pacific.

Auxiliary products for the treatment of leather and textiles

Dyes for the textile industry have recently faced decreasing sales; sales of colourings to other industries show a mixed and sometimes more positive picture (printing inks, paints, plastics, etc.). The business in chrome chemicals, especially tanning agents for leather, is suffering from intense competition.

Supply and competition

The characteristics of the speciality market are the high functionality and specification of the product and lower volumes. On the whole, the speciality end of the market is not feeling the same degree of competitive pressure as the commodity end of the business. Product costs and sales prices are typically higher in speciality chemical business, as are value-added and margins. Purchases of speciality chemicals are often based on performance rather than on price. Technical development, especially product quality and consistency, is becoming one of the leading factors influencing competition on the market at present.

Speciality chemicals are manufactured according to precise specifications related to their final use. The products are constantly evolving to follow innovation in the client industries' products and processes. Detailed knowledge of the client's business, anticipation of the development of his market segment, and fast reaction to his needs are the clues to successful marketing in the specialities segment. For instance, the development by speciality chemical manufacturers of new stabilisers, that substantially increased the fluidity of plastics, have enabled plastics manufacturers to increase their production rhythm. In the same way, the formulation of liquid ultraviolet absorbers has enabled paint manufacturers to simplify production and to reduce costs.

Innovation in the speciality chemicals industry is characterised by minor transformations to existing products rather than by new inventions or breakthroughs. Another important driving force of innovation in the speciality chemicals industry, is the urge towards the controlling of the toxic characteristics of the products, with clients increasingly eager to create a green image for their products.

When the product cycle reaches maturity, even the highest performance additives eventually see their prices drop on the market. This may open new markets for the product. This has happened for the ultraviolet stabilisers, that, originally developed for the plastics industry, have now diversified into the rubber industry.

INDUSTRY STRUCTURE

Companies

Both fully integrated, large companies as well as small niche players are present on the speciality chemicals markets. By means of example, some of the larger companies present include ICI (UK) and Henkel (D) (speciality surfactants), Rhône-Poulenc (F) (flavourings), Atochem (F) (polymers for leather and textiles), Elf Aquitaine (F) (elastomers), Bayer (D) (dyes, pigments, optical brighteners), Hoechst (D) (food additives, pigments, industrial gases), and Tessenderlo Chemie (B) (food additives, gelatine). Fuchs (D) is the largest producer of lubricants based on natural oils.

Strategies

Marketing strategies differ across companies. Some companies follow a product-based approach whereby they try to use their chemical expertise to sell the product in an as wide range of end-products as possible. Another strategy is to focus on end-markets, such as agrochemicals or textiles, rather than on products. This has the advantage of a closer rapport with the client industry, which is important given the service orientation of much of the specialities business.

Product innovation strategies are directed towards minor transformations of existing products, rather than on true discoveries. The research is often oriented in the direction of a better controlling of the toxic consequences of the products and their adaptation to automated production processes. To remain profitable, the companies have to decline or to reject the possible development of a lot of products and extend the possible application range of those they do develop.

The speciality chemicals and materials division of one major producer have been undergoing a process of restructuring since a disappointing year in 1991 when turnover fell principally due to the European recession. In the area of colourings and surfactants, the labour force has been reduced and the product range limited as a mean of cutting costs. Divestments were also made in the areas of surfactants. At the same time strategic investments were made in niches such as biocides and resins.

Table 4: Other specialty chemicals
Expected real annual growth rates

(%)	1993-94	1994-97
Apparent consumption	2.5	3.3
Production	2.3	3.1
Extra-EC exports	4.5	5.1

Source: DRI Europe

ENVIRONMENT

In the industry of speciality chemicals, environmental protection constitutes one of the foremost lines of action to steer research and development of new products. Minimising toxicity has become a criterion for innovation that is as important as efficiency. The industry is bound to follow and even anticipate EC and national environmental regulations that are becoming ever stricter under pressure of the public opinion.

A lot of products containing solvents (e.g. adhesives, paint) have already been abandoned, and pigments based on heavy metals are undergoing the same fate. The strict legislation in these areas has become a real stimulus for researchers to find substitutes or alternatives for lead, cadmium and molybdenum. The same holds for additives for paint, varnish and plastics. The use of plant-based surface agents instead of petrochemicals is another example of the use of renewable raw materials leading to a less toxic end product.

REGULATIONS

Developments on regulatory matters at the EC level concerning the industry included work on the control of movements of waste (e.g. the transport of spent carbon for activated carbon producers), the harmonisation of food additive regulation developed by the EC Commission (flavourings, gases for use in the food industry), and the EC directive on plastic materials that come into contact with foodstuffs (fatty acids). The explosives industry has advised the EC Commission on a harmonised base for approval by the EC Commission for release on the market of explosives for civil use. This would include an effective system of transborder control after abolition of current border controls. Legislation affecting the industrial gases subsector includes the pressure equipment directive (industrial gases), the standardisation of gas cylinders by the technical committee CEN TC 23 (industrial gases), and the drafting of guidelines by EIGA to comply with EC classification and labelling directives.

OUTLOOK

Speciality chemicals face a bright future. The industry is expected to realise high growth and profit margins, similar to the pharmaceutical industry, and unlike the commodity chemicals. One factor at play in the success of the industry is the general tendency towards more technologically oriented products that is believed to be maintained in the future. Public demand for more environmentally friendly products is a second factor that tends to favour speciality production growth. Lastly, the industry has not fully exploited the excellent possibilities in product development, which is a major factor in the expansion of existing markets and in the development of new markets. Production is expected to increase by an average annual growth rate of around 3.1% to 1997, while consumption should increase at an average of 3.3%. Extra-EC exports should see relatively high rates of growth.

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The industry is represented at the EC level by: European Industrial Gases Association (EIGA). Address: Avenue des Arts 3-4-5, B-1040 Brussels; tel: (32 2) 217 7098; fax: (32 2 219 8514); and,
Federation of European Adhesives Manufacturers/ Fédération Européenne des Industries de Colles et Adhésifs (FEICA). Address: Ivo Beucker Straße 43, Postfach 230169, D-4000 Düsseldorf 1; tel: (49 211) 679 3130; fax: (49 211) 679 3188; and,
European Oleochemicals & Allied Products Group (APAG); European Fragrance and Flavour Association (EFFA). Address: Square Marie-Louise 49, B-1040 Brussels; tel: (32 2) 238 9711; fax: (32 2) 238 8288; and,
Federation of European Explosives Manufacturers (FEEM). Address: c/o CEFIC, Avenue E. Van Nieuwenhuyse 4; B-1160 Brussels; tel: (32 2) 676 7211; fax: (32 2) 676 7300.

Agrochemicals
NACE 256.8

The EC is the world leading producer of agrochemicals for crop protection. The EC also maintains a favourable balance in world agrochemical trade, with exports almost twice imports. Growth is forecast in the European crop protection product production, driven in particular by a continuing increase in demand from the developing nations.

INDUSTRY PROFILE

Description of the sector

According to NACE 256.8, the agrochemicals industry can be defined as the manufacture of chemical products for agricultural purposes. There are two major branches within agrochemicals: fertilisers and chemical products for crop protection. This section of the Panorama discusses the latter of these two branches.

Chemicals designated for crop protection include insecticides, fungicides, herbicides, and plant growth regulators, and in future new biotechnological products used to protect plants against disease and pests, currently under development.

The EC is the largest producer of agrochemicals designated for crop protection, with France constituting the major EC market and the third biggest national market in the world, after the United States and Japan. In 1990, the West European plant protection market was estimated at around 5 374 million ECU, that are 26% of the world market. In comparison EC production was 6 204 million ECU representing about 30% of the world market.

International comparison

The EC is the leader in the market of agrochemicals for crop protection. France, Italy, the United Kingdom, Spain, West Germany, Denmark and the Netherlands constitute the major markets in the Community. In terms of real growth, EC countries accounted for five of the top six agrochemical markets in 1990. The EC share in the world's market represented 30%. The USA was the runner up with nearly 24% of the world market. Assuming that volumes and prices in the world market remain more or less stable and proportional to crop acreage, the EC should continue to be the world leader in the crop protection market in the 1990s.

In 1992, however, regarding sales, USA represented 29% of the world total when west Europe was about 27%. Japan came after with a share represented 14%.

Foreign trade

Since the peak in 1985 (1 307 million ECU) the trade surplus showed a steady decline during the second half of the 1980s. More recently the surplus has begun to grow again, but is still far below its mid-1980s level currently standing at about 884 million ECU.

Extra-EC exports in value decreased about 6% in 1992. However, the EC remains a net exporter of crop protection products, mainly of insecticides.

Destination of EC exports has changed. Indeed, while in 1986 the Soviet Union was the EC's most important export market, this region's share of total EC exports had almost halved to 11% by 1991. The OPEC and EFTA countries are now at the top of the list of EC export markets. The "rest of the world", however, remains the biggest destination of EC exports.

Imports decreased 20%. The most important competitors for EC agrochemical firms are the EFTA countries (with just under 50% of total extra-EC imports), followed by the USA at 31%. Extra-EC imports consisted mainly of herbicides.

MARKET FORCES

Demand

Demand for agrochemicals is directly linked to the dynamism of the agriculture sector, which represents almost its only end-market. Demand will thus benefit from any implementation of new techniques in the farm industry, which are aimed at improving the acreage yield. Economic and regulatory factors represent other important parameters influencing demand for agrochemicals. Indeed, demand will be constrained by measures exerted on the farm industry, like the reform of the Common Agricultural Policy, which have direct effects on the volume of agricultural production. Economic factors such as labour costs in the farm industry may contribute to a varying picture of demand across countries: for example, herbicides, which are the largest product group and also the most rapidly growing market segment in Europe, are particularly useful (and largely used) in countries where labour is expensive.

Indirectly, population growth constitutes a major factor influencing demand for agrochemicals, that provide a certain guarantee to maintain sufficient food resources for the growing world population. Climatic conditions have also a significant effect on demand for agrochemicals. Indeed, insecticides for example are more used in southern EC Member States such as Spain and Greece than in northern countries (especially orchards). On the contrary, fungicides that are used to control fungal diseases mainly in high value crops, are increasingly used in north Europe experiencing high rainfall and a cool climate.

Table 1: Agrochemicals
Sales by area and product, 1992

(million ECU)	Herbicides	Insecticides	Fungicides	Other	Total
USA	4 092	1 357	470	312	6 230
W. Europe	2 477	1 001	1 721	506	5 705
Japan	929	1 018	992	68	3 006
Far East	679	1 060	304	161	2 205
Latin America	967	602	390	85	2 044
E. Europe	373	382	178	51	984
Rest	185	856	99	55	1 196
World total	9 702	6 276	4 154	1 238	21 370

Source: County NatWest WoodMac, DRI Europe

Table 2: Agrochemicals
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 243	1 527	1 733	1 600	1 380	1 343	1 404	1 423	1 479	1 392
Extra-EC imports	301.3	374.2	426.3	378.5	392.0	461.2	571.8	593.8	636.4	507.9
Trade balance	941.3	1 152.9	1 306.6	1 221.5	988.1	881.6	832.0	829.7	842.3	883.8
Ratio exports/imports	4.12	4.08	4.07	4.23	3.52	2.91	2.46	2.40	2.32	2.74
Intra-EC trade	1 092	1 413	1 518	1 522	1 477	1 628	1 933	2 162	2 207	2 202
Share of total imports (%)	78.4	79.1	78.1	80.1	79.0	77.9	77.2	78.5	77.6	81.3

Source: Eurostat

Supply and competition

Competition among companies is particularly tough in the crop protection industry. The EC manufacturers hold a strong advance in terms of research and development, thanks to important investments in this activity. Numerous take-overs occurred during the recent years, through acquisitions and mergers, with plant biotechnologies as main targets.

Production process

The main feature is the increasing share of research and development in total sales. On average, the top twenty companies committed 9.7% of total sales revenue to R&D in 1990. Biotechnology has emerged as a key area of research. The main thrust of this research is in the area of plant genetics and the development of biopesticides. Genetic engineering techniques have made traditional plant breeding far more efficient and sophisticated. New plant varieties are being developed with features such as: resistance to pests and disease; resistance to herbicides; resistance to frost or drought; and improved product quality.

Research in biotechnologies will not noticeably reduce total agrochemicals' sales, but will cause modifications to the type of products and to the competitiveness of those involved. The products distributed will be safer for the environment and give stronger pest control, whilst the first results of biotechnology research should appear on the European market early this decade.

INDUSTRY STRUCTURE

Companies

Taking into account the research and development capacity and the production levels or distribution network, the number of companies of importance in the agrochemical industry was estimated to about 40 worldwide in 1985. The majority of agrochemical manufacturers are located either in the USA, Japan or western Europe. Nearly all these firms are multinational chemical companies whose agrochemical segments represent a relatively small part of the total sales of the group to which they belong.

BASF (D) and Ciba-Geigy (CH) are considered as the largest European Companies.

Strategies

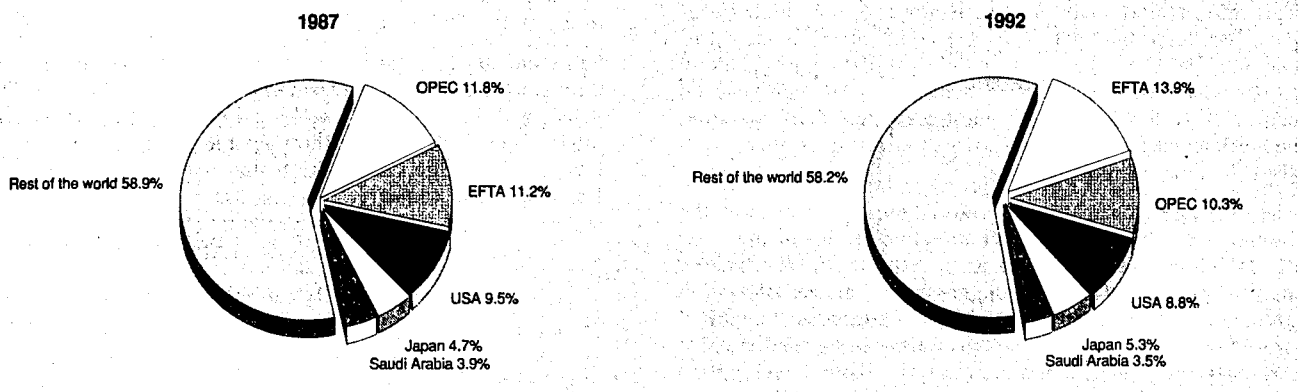
As farmers demand more and more environment-friendly chemicals to treat their crops, agrochemical industrials are committed to ensure they meet new higher regulations. As this constraint is particularly costly in terms of R&D, not all of the industrialists are keen on investing in this field. As a result, restructuring is most likely to take place, mainly in the form of joint ventures, at least for the largest groups. Restructuring has, actually, already begun and groups are looking at the possibility of building up niches either in particular product area or geographical. There have been further developments and mergers, including the Cyanamid (USA)/Shell (USA/NL) agreements and the Hoechsts (D)/Schering (D).

Table 3: Agrochemicals
Breakdown of external trade at current prices, by product

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports										
Insecticides	608.0	768.7	761.6	629.2	541.3	529.0	543.9	500.7	541.6	445.2
Herbicides	289.3	362.0	433.3	383.3	355.6	350.5	351.3	384.9	427.3	388.5
Fungicides	232.4	260.9	396.9	448.5	328.3	328.0	385.7	395.7	374.2	407.7
Plant growth regulators	112.9	135.5	141.2	139.0	154.8	135.5	122.9	142.0	135.7	150.6
Extra-EC imports										
Insecticides	68.6	94.7	96.4	89.9	76.4	96.1	120.6	134.2	128.3	114.3
Herbicides	131.0	168.9	152.4	132.5	168.2	191.2	247.2	252.3	286.0	222.9
Fungicides	80.2	87.4	151.9	120.0	106.9	137.2	180.0	177.7	197.3	145.2
Plant growth regulators	21.5	23.2	25.5	36.0	40.5	36.7	24.0	29.6	24.8	25.5
Intra-EC trade										
Insecticides	239.1	291.2	265.0	260.2	281.3	315.6	357.7	410.4	409.8	386.5
Herbicides	447.9	562.8	640.6	688.9	678.0	761.6	863.5	955.2	1 033.9	1 002.5
Fungicides	317.5	430.2	483.7	439.0	382.2	442.5	574.7	680.7	618.7	669.1
Plant growth regulators	87.3	128.8	129.0	133.8	135.3	108.6	136.7	116.1	145.0	143.9

Source: Eurostat

Figure 1: Agrochemicals for crop protection
Destination of EC exports



Source: Eurostat

REGIONAL DISTRIBUTION

France, Italy, the United Kingdom, Spain and Germany are the largest producers in the EC, and are also the largest consumers of plant protection chemicals, using about 95% of the herbicides, 97% of the fungicides and 77% of total pesticides consumed in Europe.

France, together with the USA and Japan, is one of the three countries representing half the world herbicide's market, and accounted for 10% of the world herbicides' sales in 1990. Today, the largest EC market is herbicides, except in of Italy, where fungicides sales exceeded herbicides in 1990.

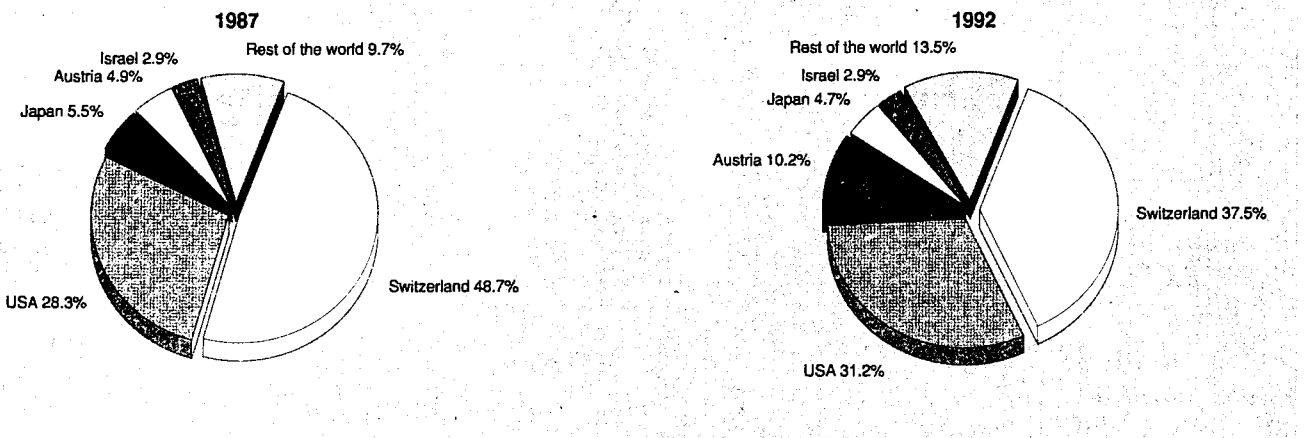
ENVIRONMENT

Whilst respecting environmental needs, the industry must also balance its role of crop protection and the maintenance of reliable food supplies. Advances in the agrochemicals industry are critical in order to limit the risk of agricultural disasters but also to limit the already important losses recorded in potential food production worldwide, due to pests' diseases and weeds (about 30% of the total). The big challenge facing the industry now is thus to find an adequate balance between the respect of green policies and the production needs of modern agriculture. Major resources are invested by the industry each year in this objective. In fact, for every new compound tested, only one in 15 000-20 000 is marketed.

REGULATIONS

The most important concern facing the agrochemicals industry is the recently adopted reform of the Common Agricultural Policy (CAP). The core of the reform is a shift away from price support mechanisms, in favour of direct compensatory payments to farmers. These measures that cover for the moment about 75% of total farm production under CAP regulation, entail full compensation to arable farmers for price reductions provided they participate in a set aside scheme for cereals, oilseeds and protein crops. This combined with the view that compensatory payments should give less incentive to raise production than high support prices, reform of the CAP could

Figure 2: Agrochemicals for crop protection
Origin of EC imports



Source: Eurostat

cut agrochemical sales by about 20%, according to industry sources. Nevertheless, Agra Europe, an independent agency, is casting some doubts on this conclusion. According to Agra Europe, the reform is unlikely to bring about steep falls in EC production of cereals, and thus have such a dramatic effect on agrochemical sales.

This reform, along with the establishment of the Single European Market is going to increase competition in the agrochemical field. As a result, the number of participants is likely to decrease. Also, it is hoped that some cost gains can be achieved by the industry through regulatory harmonisation and efficiencies to offset the expected lowering of prices foreseen in some Member States.

The EC's agrochemicals registration directive, adopted by the Council in July 1991 (another directive set up in the view of the Single European Market), is expected to bring about significant changes in the regulatory control of crop protection products. This measure is aiming at harmonising approval procedures across Europe, setting a European system for active ingredient registration and encouraging mutual recognition of national product approvals by the remaining Member States. So far, the diversities of national product registration requirements have represented important costs for the industry when launching new products.

OUTLOOK

Lower growth of agrochemicals is expected in the European countries, as a result of the CAP reform. Competition among companies will continue to increase, all the more so as R&D costs are becoming increasingly important. Further concentration will occur through mergers and acquisitions, principally in the field of biotechnologies.

Other equally important issues for the future will be the environmental pressures, particularly the general water quality debate and the aspects of intellectual Property Protection, and more specifically Patent Term Restauration/Supplementary Protection Certificate, similar to the one introduced for the Pharmaceutical Industry.

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Fertilizers
NACE 256.8

The prospects are rather different in the field of fertilizers compared with agrochemicals where the EC is confronted by stiff competition from East European and North African countries. The depressed market, along with the crisis of overcapacity continue to affect the performance of the European fertilizer industry, which is committed to further restructuring in order to improve profitability.

INDUSTRY PROFILE

Description of the sector

According to NACE 256.8, the agrochemical industry can be defined as the manufacture of chemical products for agricultural purposes. There are two major branches within agrochemicals: fertilizers and chemical products for crop protection. This section of the Panorama is concerned with the first of these, fertilizers.

The fertilizer industry produces and markets both single nutrient fertilizers (comprising either nitrogen or phosphate) and various compound fertilizers (containing mixtures of nitrogen, and/or phosphate and/or potash). The largest market is for nitrogen fertilizers (about 50% of the total), followed by phosphate (accounting for around 25%).

The vast majority of sales are in the form of solid fertilizers (about 90%), the remainder being liquids. The main reason for this is that liquid products require special handling and storage facilities.

Recent trends

The market for fertilizers has been depressed for years, and has suffered from problems of overcapacity as well as weak demand. Consumption of fertilizers was static or declined sharply in the EC in the last four years, and this trend is likely to continue due to the reform of the CAP (Common Agricultural Policy). Another reason for this decline is environmental legislation. The fertilizer industry is also suffering from an increasing trade deficit. Extra-EC imports, which grew steadily, reached 1.19 billion ECU in 1992 and were about two and a half times the level of extra-EC exports. In 1991 nitrogen output was below 9 million tonnes, and phosphate output was 2.9 million tonnes.

International comparison

The European fertilizer industry accounts now for 12% of world fertilizer production and is the fourth largest world producer after the former Soviet Union, the USA and China.

Foreign trade

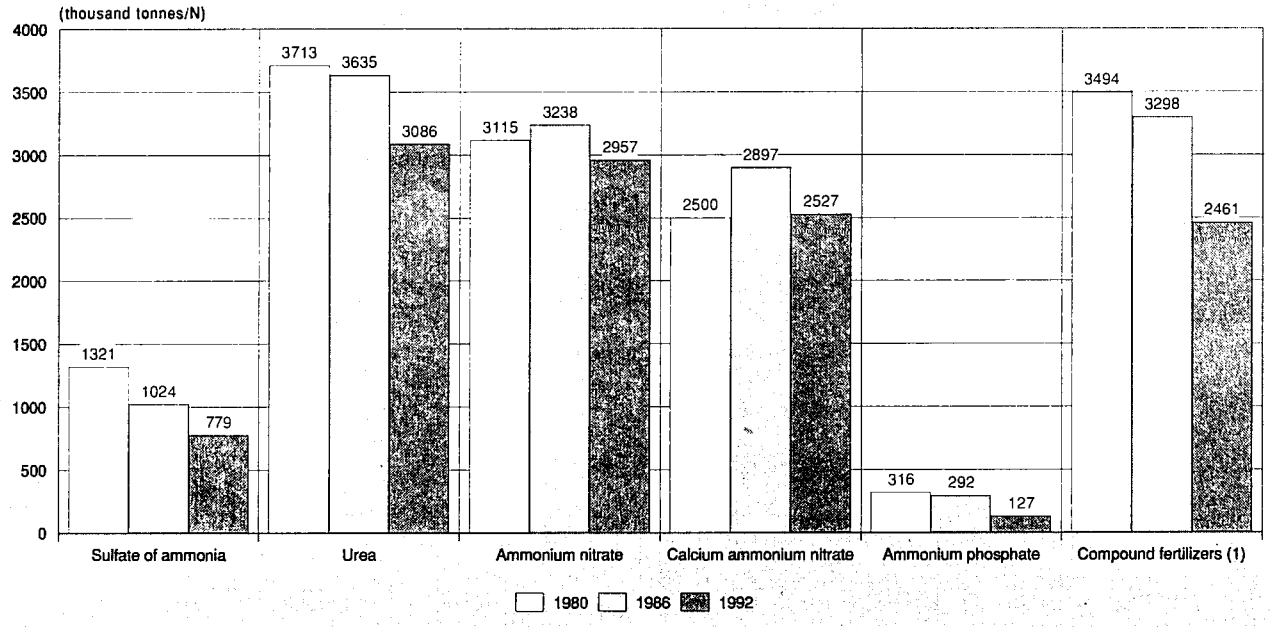
A trade deficit has existed since the late 1980s, but has widened in the past few years, reaching 788 million ECU in 1991. In 1992, it fell back slightly to 688 million ECU. The worsening trade balance is due both to rising imports and falling exports. In 1992, extra-EC imports exceeded 16% of demand while the share of extra-EC exports in production was about 8%. Both trends look set to continue with particular pressure on the import side. The main reason for this is the difference in the cost of natural gas, a key raw material in the production of nitrogen fertilizers, between the EC producers and their competitors, in particular the CIS.

MARKET FORCES

Demand

Demand for fertilizers is directly linked to the implementation of the CAP reform; for example the 15% set aside policy for eligible arable land will have a significant impact. Furthermore, environmental legislation, like the Nitrate Directive, will have a substantial impact on the demand.

Figure 1: Fertilizers
Capacity in the EC



(1) NP/NPK/NK
Source: EFMA

Table 1: Fertilizers
Main indicators at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	6 493	7 355	8 200	8 088	7 012	7 150	7 323	7 087	6 803	7 153
Production (1)	6 400	7 300	8 100	7 600	6 500	6 700	6 600	6 300	6 015	6 465
Extra-EC exports	667	856	935	549	520	579	490	437	476	505
Trade balance	-93	-55	-100	-488	-512	-450	-723	-787	-788	-688

(1) Manufactures made from imported semi-finished products are not included in Community production.
finished products are not included in Community production
Source: Eurostat

Supply and competition

Profitability has been very low for EC manufacturers for many years. Massive restructuring and downsizing have already taken place. Employment in the EC stood at 140 000 in 1983. By 1991 this had been reduced to 40 000, a fall of almost two thirds. EC production capacities have fallen since 1980; very strongly for compound fertilizers, much less so for ammonium nitrate. On the other hand, capacity has increased in the rest of the world although ammonium nitrate has seen much less growth. The EC has retained its share of the world capacity for the latter product but seen a large decline for urea, sulphates of ammonia and compound fertilizers.

The fertilizer industry is very sensitive to the vagaries of world supply and demand and to global competition. Given that natural gas constitutes a large part of the input costs, the main competitors tend to come from regions with access to cheaper gas. In recent years east Europe and in particular the former Soviet Union have become increasingly important players, the reasons being, firstly, a subsidised gas supply, and secondly, a desire to earn foreign capital. Countries with large reserves of phosphates are key competitors in that section of the market.

Given the state of the market the question of fair international trade is becoming increasingly important. In the past, cases of dumping have been proved, and this is still clearly an area of concern to the industry.

Production process

Fertilizer plants are often large integrated operations that process raw materials into inputs for other industrial sectors. These inputs include ammonia, nitric acid, urea, ammonium nitrate, sulphuric acid and phosphoric acid.

The industry is highly dependant on its supplies of raw materials, hydrocarbons (particularly natural gas) and natural phosphates. The sector manufactures heavy and low value added products: from a chemical point of view, the production of fertilizers is a fairly simple process. However, state-of-the-art plants producing high-quality fertilizer products are difficult to engineer and to operate, if they are to have low costs, especially low energy consumption, and to meet environmental legislation. Fixed costs are an important element of the cost structure as the industry is highly capital intensive. On average, they account for about 50% of total costs.

INDUSTRY STRUCTURE

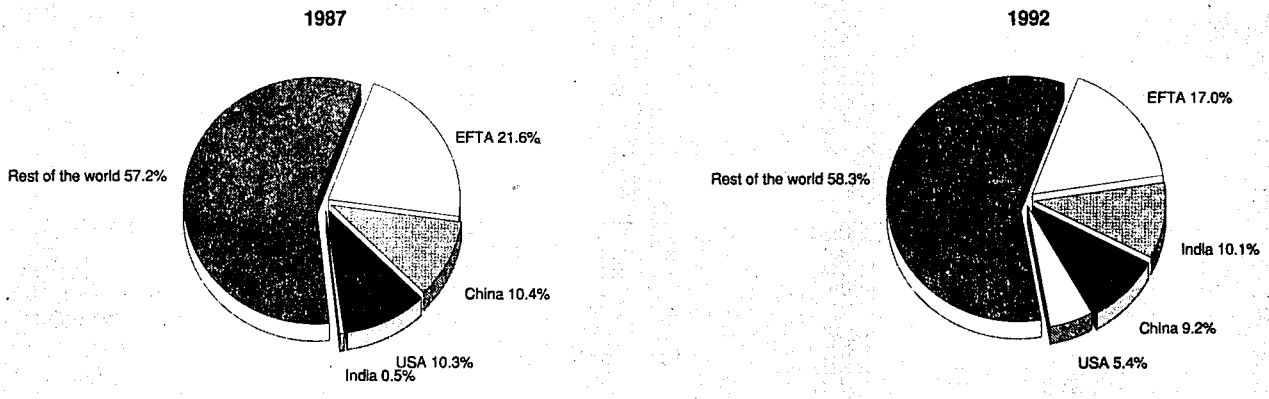
Companies

As a result of the restructuring and downsizing during the 1980s the fertilizers industry has become increasingly concentrated. From 1980 to 1991, the wave of mergers and acquisitions led to an industry where seven companies were responsible for more than 80% of European production. These seven are: Norsk Hydro (N), Kemira Oy (SF), BASF (D), Grande Paroisse (F), Enichem Agricoltura (I), DSM (NL) and Tertiberia (E). Norsk Hydro and Kemira have the largest capacities in Europe.

Strategies

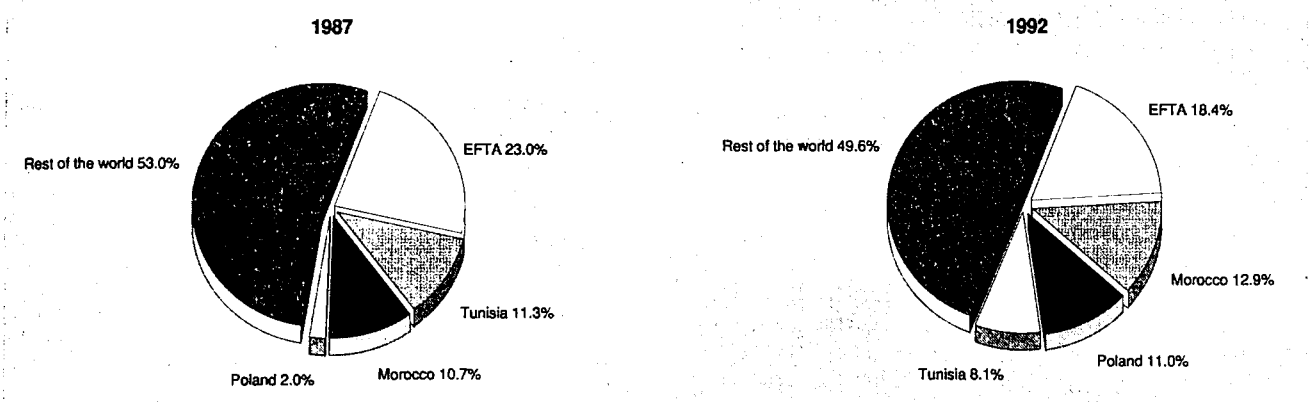
Given the increasing competition from regions that enjoy considerable competitive advantages and reduced demand, further restructuring of the European fertilizer industry is expected.

Figure 2: Fertilizers
Destination of EC exports



Source: Eurostat

Figure 3: Fertilizers
Origin of EC imports



Source: Eurostat

The EC fertilizer industry is committed to a huge restructuring and rationalisation process both within national borders and at EC level. Sales networks have been developed in all countries. Plants have been shut down and production concentrated at the most favourable locations in terms of supply and outlets. Investments have been made in order to improve efficiency and productivity (especially to optimise the use of energy) to produce the best fertilizers and market them in the best way.

REGIONAL DISTRIBUTION

Production capacity for each type of fertilizer is widespread across the Community. However, this is less true now than in the past due to the rationalisation of the industry. This had the effect of concentrating production for the different types of fertilizer in a smaller number of countries. In general those countries that were historically small producers have now largely stopped production completely.

In terms of total capacity across all nitrogenous fertilizers the Netherlands and France have the largest capacity accounting each for 18% of EC total. Other significant producers are Germany, Italy, Spain and the United Kingdom.

ENVIRONMENT

Since the early 1980s there has been considerable concern about the impact of agricultural chemicals and fertilizers on the environment. In particular there has been concern about the level of nitrates in water supplies and phosphorus in water sources and the sea. At the same time farmers have come under increasing pressure to increase yields in order to maintain profitability that has led them to increase the use of fertilizers. However their use is intended to match plant uptake (and in the case of phosphates to correct deficiencies). If they are spread in the right amount and at the right time, the fertilizers cover the plant's nutritive needs and are absorbed nearly completely. The problems caused therefore demonstrate the relatively low capacity of the environment to absorb excess amounts of these materials.

The EC has sought to remedy the situation by placing restrictions on the use of nitrogen in zones vulnerable to pollution. In this context an important document is the Council Directive concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC). In annexe 3 of this document the maximum amount of manure applicable per hectare has been fixed at 210 kgN/hectare (170 kgN/hectare after four years). For its part the industry is concentrating on producing high quality products that ensure even distribution of fertilizers and therefore minimise the leaching of excesses into the environment. However, the consumer (farmer) also has to use fertilizers in a appropriate way in order to have the best "environmental result". Reform of the CAP, to reduce the size of surplus, will also help to reduce the amount of fertilizer used in farming.

The environmental impact from using nutrients in agriculture will be reduced due to improved technology and implementing codes of best agricultural practice. Special attention has to be paid to the rapidly increasing environmental costs imposed to the European fertilizer industry by national and European legislation.

Table 2: Fertilizers
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	666.8	855.9	934.6	548.8	520.0	579.0	489.8	437.4	475.6	504.5
Extra-EC imports	759	910	1 034	1 037	1 032	1 029	1 212	1 225	1 263	1 193
Trade balance	-92.5	-54.6	-99.5	-487.9	-512.2	-449.9	-722.5	-787.2	-787.8	-688.2
Ratio exports/imports	0.88	0.94	0.90	0.53	0.50	0.56	0.40	0.36	0.38	0.42
Intra-EC trade	1 598	1 801	1 903	1 730	1 643	1 654	1 878	1 890	1 676	1 724
Share of total imports (%)	67.8	66.4	64.8	62.5	61.4	61.6	60.8	60.7	57.0	59.1

Source: Eurostat

REGULATIONS

Regulations exist, covering most aspects of fertilizer production and use, and EC level legislation is becoming more common as standards are harmonised across Europe. In addition to normal health and safety regulations, fertilizer producers are subject to emission standards and product quality specifications.

The application of fertilizers is not yet subject to EC wide legislation, and given the importance of local factors such as soil quality, crop and climate, this may no be appropriate.

The fertilizer industry has developed its own code of practice and is willing to contribute to the development of legislation concerning the use of its products.

The fertilizer industry is also considerably affected by other legislative measures such as the CAP. Indeed the most important concern facing the industry is the recently signed Common Agricultural Policy reform. The core of the reform is a shift away from price support mechanisms, in favour of direct compensatory payments to farmers. This measure, which covers about 75% of total farm production under CAP regulation, entails full compensation of farmers for reduction in prices. To further limit supply, it is accompanied by a compulsory land set-aside scheme for cereals, oilseeds and protein crops. Indeed, recognising the fact that compensatory payments could give less incentive to raise production than high output prices, reform of the CAP will reduce fertilizer consumption significantly, according to industry sources. However it has been suggested that the reforms may not bring about steep falls in EC production of cereals, and thus to have such a dramatic effect on agrochemical sales.

OUTLOOK

The CAP reform, along with the establishment of the single European market, is going to increase competition in the fertilizer field. As a result, the number of participants is likely to decrease. However, it is also hoped that some cost gains can be achieved by the industry through regulatory harmonisation and efficiencies to offset the expected lowering of prices foreseen in some Member States.

Unless action is taken to curb imports, the European fertilizer industry will have to make further cuts in capacity in order to maintain profitability. Further changes in the ownership structure are therefore to be expected.

Written by: DRI Europe

The industry is represented at the EC level by: European Fertilizers Manufacturers Association (EFMA). Address: Avenue E. Van Nieuwenhuyse 4, B-1160 Brussels; tel (32 2) 675 3550; fax: (32 2) 675 3961.

Soaps and detergents, perfumes and toiletries
NACE 258

The combined sector of soaps and detergents, perfumes and toiletries was characterised by steady growth during the 1980s. From 1988 onwards there has been a slight deceleration in real output and consumption growth despite the introduction of some innovative products (e.g. liquid laundry detergents, enhanced skin care products). Demand for the industry's products is closely linked to the standard of living, but also to individual tastes and fashion, hence the relative importance of marketing and R&D activity.

INDUSTRY PROFILE

Description of the sector

NACE 258 is divided into two product categories:

- the manufacture of soap and synthetic detergents (NACE 258.1) which covers toilet, household and industrial soaps and washing products, surface cleaners and washing powders; and,
- the manufacture of perfumes and toilet preparations (NACE 258.2) which covers hair products, beauty products, toiletries for men and women and alcohol-based products.

Although being grouped in a common NACE, the two subsectors differ substantially in terms of industry structure and recent trends and will therefore be considered separately when possible.

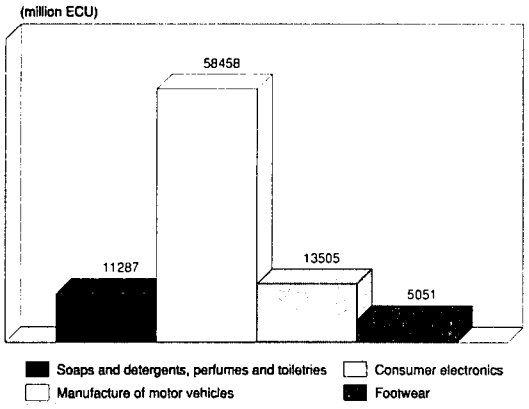
Recent trends

Production in the soaps and detergents sector is dominated by laundry and surface cleaning products, which together account for nearly 90% of NACE 258.1. Among surface and scouring products, liquid products and laundry washing powders together represent more than 90% of total production. The five main EC countries (respectively, by share of production, Germany, the United Kingdom, Spain, France and Italy) account together for more than three quarters of total production of soaps and detergents.

The breakdown by country reveals that Germany, France and Italy (in this order) are the largest markets for perfumes and toiletries, with respectively 26.9%, 23.7% and 18.3% of EC sales. France remains the first producer and has the highest per capita consumption at 72 ECU (ex-factory prices) compared to an EC average of 49.5 ECU per capita. The breakdown by product line in value shows that hair products account for 26.3% of ex-factory sales, followed by toiletries (20.4%) and beauty and care products (19.7%). In 1992, consumption grew by 2.2% to 17 billion ECU, but this figure doesn't fully reflect higher growth in local currencies (e.g. in Spain and the United Kingdom).

From 1983 to 1992, the combined sector of soaps and detergents, perfumes and toiletries performed well: all the main indicators increased steadily, with the exception of employment. Apparent consumption was growing at an annual real average rate of 4.0%, production at 4.1% and employment at a modest 0.8%. In 1992, these indicators had respective growth rates in current terms of 7.1%, 7.7% and -3.0%. The decrease in employment stems from increased automation which led to a strong increase in productivity (+7%).

Figure 1: Soaps and detergents, perfumes and toiletries Value added in comparison with other industries, 1992



Source: DEBA

International comparison

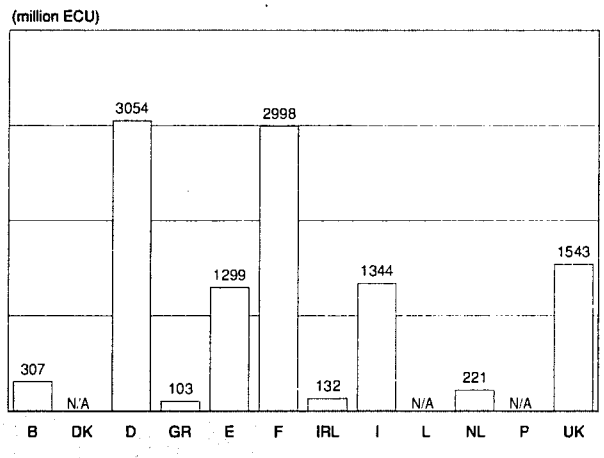
The EC is the world's largest producer of soaps and detergents, perfumes and toiletries. In 1991, EC production was some 40% higher than that of the USA and nearly four times the size of Japan. Figure 5 shows that, during the 1988-1991 period, EC production grew at fairly strong rates of growth of more than 4% per year in volume, while production growth in both the USA and Japan was more variable. In the perfumes and toiletries sector alone, the EC market is first just above the USA and about two times bigger than Japan.

Foreign trade

The EC industry has widespread export markets for soaps, detergents, perfumes and toiletries. Among the most important export markets are the developing countries (which absorbed about 47% of total extra-EC exports in 1992) and the EFTA countries (about 27% in the same reference year). As for extra-EC imports, the EC's main external suppliers in 1992 were again the EFTA countries (above 45% of total imports) and the USA (about 32%).

In the soaps and detergents segment, the level of foreign trade is relatively unimportant, although the exports/imports ratio is far above unity (about 5.1). In 1992, for a total export

Figure 2: Soaps and detergents, perfumes and toiletries Value added by Member State, 1992



Source: DEBA

Table 1: Soaps and detergents, perfumes and toiletries
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	17 632	19 669	21 676	22 513	24 129	26 084	29 030	30 092	32 461	34 759	36 000
Production	19 112	21 418	23 697	24 465	26 110	28 217	31 659	32 923	35 356	38 079	39 800
Extra-EC exports	1 690	1 992	2 311	2 250	2 342	2 590	3 164	3 415	3 633	4 133	4 810
Trade balance	1 480	1 749	2 021	1 952	1 981	2 133	2 629	2 831	2 894	3 320	3 800
Employment (thousands)	189.2	190.6	190.7	191.1	196.2	198.2	203.7	202.8	202.3	196.1	194.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 2: Soaps and detergents, perfumes and toiletries
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	4.6	3.3	4.0
Production	4.4	3.6	4.1
Extra-EC exports	3.4	8.5	5.6
Extra-EC imports	10.9	11.7	11.3

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Soaps and detergents, perfumes and toiletries
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 690	1 992	2 311	2 250	2 342	2 590	3 164	3 415	3 633	4 133
Extra-EC imports	209.6	243.2	290.1	297.7	360.5	456.9	535.0	584.4	738.5	812.7
Trade balance	1 480	1 749	2 021	1 952	1 981	2 133	2 629	2 831	2 894	3 320
Ratio exports/imports	8.06	8.19	7.97	7.56	6.50	5.67	5.91	5.84	4.92	5.09
Terms of trade index	100.6	101.3	100.0	104.2	106.6	100.4	101.0	100.1	100.5	101.2
Intra-EC trade	1 623	1 920	2 183	2 369	2 676	3 056	3 398	3 926	4 554	5 190
Share of total imports (%)	88.6	88.8	88.3	88.8	88.1	87.0	86.4	87.0	86.0	86.5

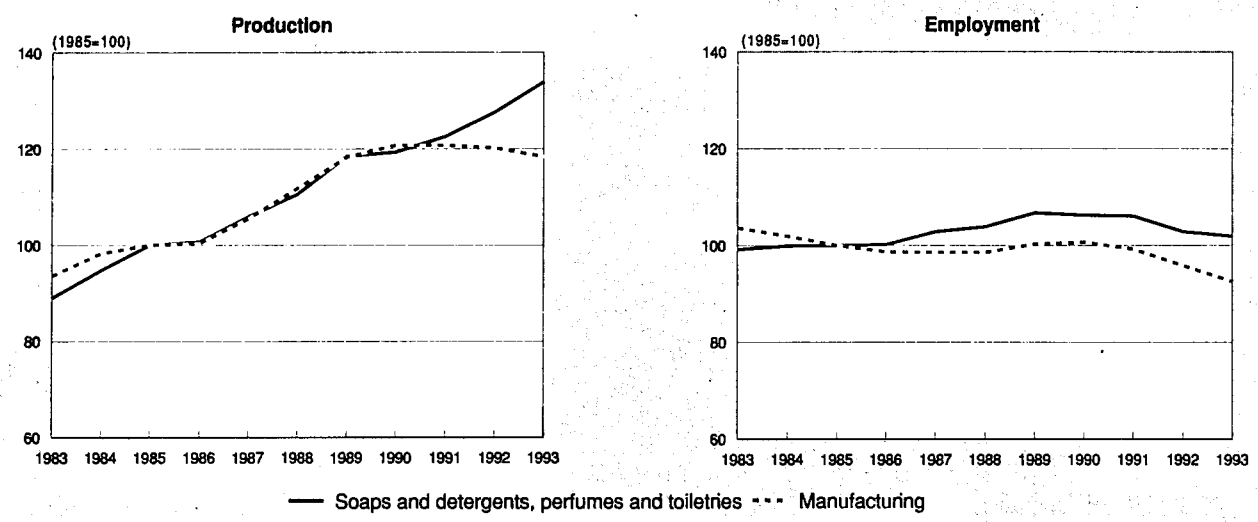
Source: DEBA

Table 4: Soaps and detergents, perfumes and toiletries
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	43.2	44.0	47.0	49.6	51.4	51.9	51.0	52.8	53.7	57.5
Productivity index	91.8	93.6	100.0	105.4	109.2	110.3	108.4	112.2	114.2	122.3
Unit labour costs index (3)	87.8	92.8	100.0	104.7	108.4	114.1	120.8	127.4	135.7	148.9
Total unit costs index (4)	83.5	91.7	100.0	101.8	105.7	113.8	125.5	131.1	141.2	157.5

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Soaps and detergents, perfumes and toiletries
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

value of 1 107 million ECU, the EC imported soaps and detergents to the value of 215 million ECU. Intra-EC trade grew sharply in 1992 compared to 1991, reaching a level of 1852 million ECU, an increase of 21% over the previous year.

The internal structure of trade has remained unchanged in the last two decades: the EC mainly exports washing, surface cleaning and scouring products and toilet articles, but very few domestic and industrial cleaning products. With regard to imports, washing, surface cleaning and scouring products account for about 50% of the total.

By contrast, the perfumes and toiletries segment is more export-oriented, and in 1992 it accounted alone for 73% of the sector's total extra-EC exports. Although its exports/imports ratio is the same as the soaps and detergents segment (5.1 in 1992), extra-EC exports totalled around 3 000 million ECU in 1992, while extra-EC imports almost reached 600 million ECU.

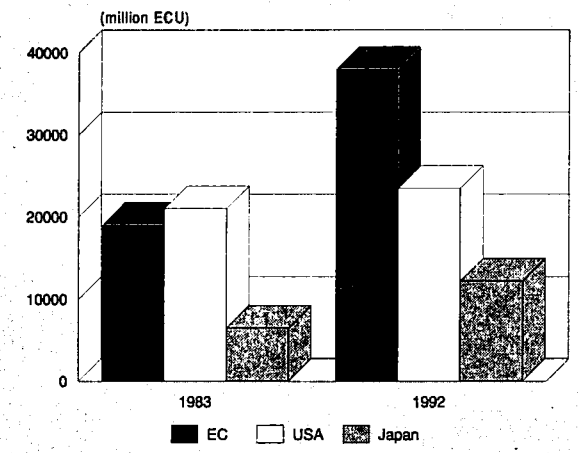
Overall, the combined sector of soaps, detergents, perfumes and toiletries is much more export intensive than import intensive. Close to 10% of EC production is exported, a share that has remained fairly steady throughout the 1980s while the share of imports in consumption is still less than 3%, although slowly growing.

MARKET FORCES

Demand

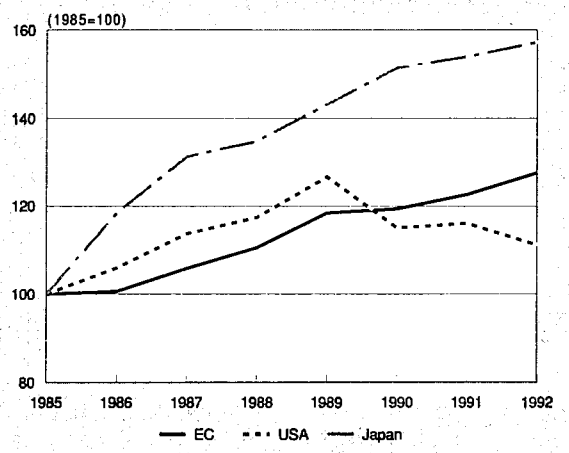
The great majority of soaps, detergents, perfumes and toilet products is sold to households and individual consumers, although for the soap and detergent industry hotels, restaurants and institutional outlets are also important end markets. For both subsectors, marketing and sales promotion play an important role in defining consumer needs. Advertising, which resorts to television as its main medium, is increasing its use of satellite TV in order to promote Eurobrands targeted at the supranational market.

Figure 4: Soaps and detergents, perfumes and toiletries
International comparison of production in current prices



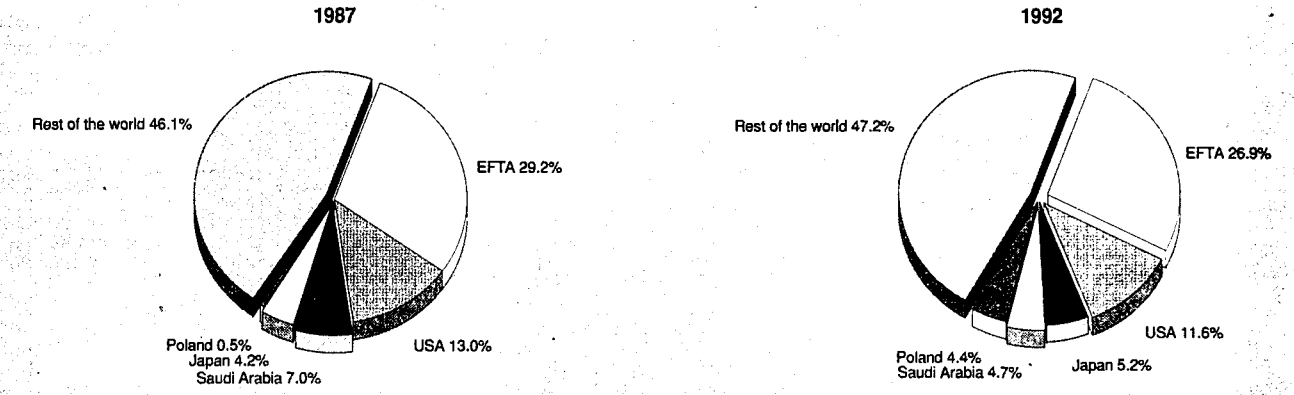
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Soaps and detergents, perfumes and toiletries
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Soaps and detergents, perfumes and toiletries
Destination of EC exports



Source: Eurostat

Soaps and detergents

Soap and detergent consumption is closely linked to the standard of living, but is also influenced by the introduction of new products. During the last few years emphasis on energy conservation combined with the need to take great care of delicate materials has produced a marked trend towards washing laundry at lower temperatures, using detergents in a more concentrated state. The introduction of products operating at lower temperatures has reinforced this evolution in demand. Liquid detergents in particular, which are easy to use, provide such an example. In 1992, concentrated products (liquids and powders) have grown at an increasing pace and they currently account for 40% (in value) of the EC market of detergents. The development of concentrated products has also led to the use of dosing devices to disperse the product better, thus improving its efficiency.

In addition to changes in consumer tastes over time, EC manufacturers must deal with wide differences in habits depending on the country in which they are selling. History and climate conditions can considerably influence consumer needs and demand.

Perfumes and toiletries

The sector of perfumes and toiletries is characterised by a strong link between individual product consumption trends and living standards. Fashion and advertising also have a considerable influence on sales. The main consumer trends that became apparent during the 1980s have led to greater product diversification. For example, the promotion of a more natural look for women, together with the introduction of products such as gels and fixing mousses, explains in part the increased popularity of these products. The initial changes in product patterns in the hair care market influenced the make-up market during recent years.

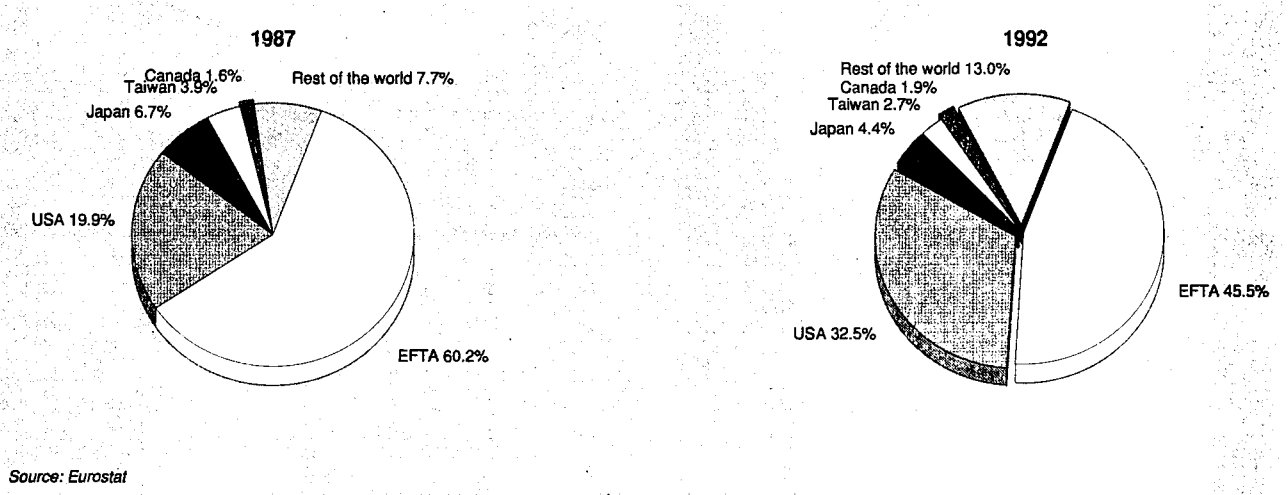
Supply and competition

In addition to inter-industry competition, which is common to both subsectors in the EC, there is external competition in the soaps and detergents sector from distributors, and in the perfumes and toiletries industry from foreign competitors.

Soaps and detergents

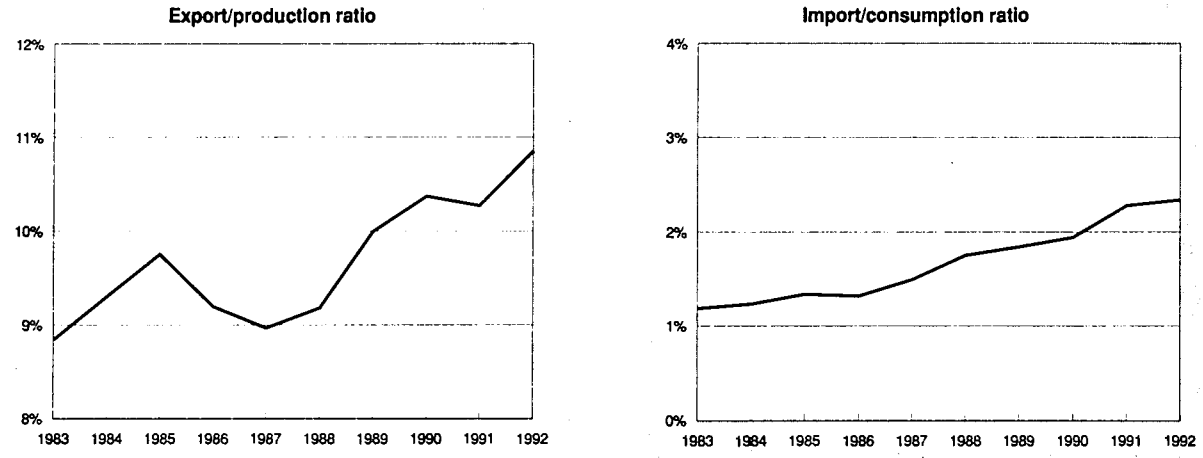
The EC soap and detergent industry operates in a very competitive environment but benefits from considerable potential in developing countries. While the supply of raw materials

Figure 7: Soaps and detergents, perfumes and toiletries
Origin of EC imports



Source: Eurostat

Figure 8: Soaps and detergents, perfumes and toiletries Trade Intensities



Source: DEBA

is widespread, the finished product is distributed by a few northern multinational companies. Within the EC, there is a relatively mature market in the northern Member States, while a sharp growth in the use of cleaning products is taking place in the southern countries.

Over the last twenty years the emergence of hypermarkets has considerably modified the distribution system of the industry. Manufacturers in the soaps and detergents sector have now to face more powerful buying groups. Furthermore, over the last few years, distributors have launched their own products (own label brands) onto the market, thus heightening existing competition.

Perfumes and toiletries

During the last few years, the growth in products for men has been quite sharp, with as yet no indication of any decline. Although such growth is mainly the result of attracting a group of new consumers, the successful promotion of product "loyalty" has stabilised sales. Fashion dictates the trend in new products, demand for which is generated by the general concern for improved grooming and care. Marketing, which focuses more and more on skin hygiene and the protection of the environment, is also responsible for these developments.

Foreign competition has made forays into the industry, with products manufactured by Japanese companies like Shisheido becoming increasingly available on the EC market. The Japanese firm has recently set up a cosmetics factory in the Loire Valley, which reflects the internationalisation of the perfumes and toiletries industry.

Production process

In both sectors, research and development and marketing are an important part of company operations, given the competitive advantage of anticipating future demand on the part of the consumers.

Soaps and detergents

In this very competitive industry, considerable funds are allocated to R&D (on average 2.5% of turnover). Enzyme technology continues to develop and "fat busting" enzymes have begun to appear in premium quality products. Recent innovations have responded to consumer concerns about the environment. The introduction of liquid formulas and the increasing of the concentration of liquids and powders improve cleaning effectiveness and save water and energy.

Perfumes and toiletries

The major companies have been restructuring production to concentrate production in plants specialising in one type of product. They are also investing in new techniques that allow the fabrication of ever expanding ranges of products on a single production line manned by a decreasing amount of workers. In 1992, L'Oréal (F) inaugurated an entirely new factory based on these principles, in the vicinity of Paris.

INDUSTRY STRUCTURE

Companies and strategies

Both subsectors are characterised by the presence of major multinational companies, which are often active both in the soaps/detergents and the perfumes/toiletries segments. Another common characteristic is the strong interest shown by companies for the East European market.

Soaps and detergents

In Europe, the soaps and detergents sector accounts for about a thousand manufacturing and distribution companies, which vary from those that only supply the local market to large international companies that serve the world market. The European and American multinational companies possess a large number of production units within the Community.

The world market for cleaning products is led by five major multinational groups, of which three are EC-based: Unilever (NL/UK), Henkel (D), Benckiser (D), Colgate Palmolive (USA) and Procter & Gamble (USA). At present many of these companies are intensifying their efforts to penetrate other markets, notably by buying out or buying shares in companies often placed downstream of their production process.

In 1992, Central Europe was still a major target for M&A or alliances. Both Benckiser and Henkel created joint ventures in Poland, while Unilever in collaboration with Ferruzzi (I) (with a 20% share) took over a Hungarian company for 100 million USD. There was also activity in fast growing markets. For instance Unilever bought an Argentinean company active in dry detergents and Henkel acquired Sociedad Nacional de Saboes in Portugal.

The industry is seeking a removal of duties applied by East and Central European States on fabric detergent raw ingredients. The industry association (AIS) has been instrumental in drawing to the attention of the Commission the advantages of such a move, since both local companies and joint-ventures

would benefit from improved quality of raw materials at lower costs.

Perfumes and toiletries

The following five firms dominate the world market: L'Oréal (F), Unilever (NL/UK), Shisheido (JPN), Avon (USA) and Procter & Gamble (USA). Among the other important EC firms are Sanofi (F), Wella (D), LVMH (F) and Schwarzkopf (D). Although the major groups grew in strength over the past few years, smaller companies have also managed to maintain their independence, particularly at the national level, operating in niche markets. For instance, The BodyShop (UK) targets the environmentally conscious customer.

After the boom in acquisitions which characterised the late 80's, the sector is continuing this strategy but at a slower pace. In 1992, Elf Sanofi (F), the health-care subsidiary of the petroleum giant Elf, took control of Yves-Rocher (F) a successful mail-order company with a strong "green" touch. In April 1993, Sanofi acquired Yves Saint-Laurent (F) thus becoming number three in the world in the perfume sector after L'Oréal (F) and Estée Lauder (USA). Meanwhile, SmithKline Beecham, the Anglo-American pharmaceutical group sold its bath and body care brands to Sara Lee (USA) and its haircare business to Wella (D). The major multinationals operated on the east European market as well: for example L'Oréal (F) started the production of a perfume in Russia.

ENVIRONMENT

Soaps and detergents

The use of soaps and detergents has at times been associated with water eutrophication, i.e. a decrease in oxygen which engenders an abnormally high level of aquatic vegetation. Water eutrophication continues to be a cause of public concern. It is, however, generally appreciated that detergent ingredients account only for a minor fraction of this form of pollution, which mainly originates in industrial, agricultural and human waste. The view on phosphates has moved significantly and this well researched ingredient is now preferred by a number of respected authorities.

The detergent sector has been active in developing several packaging prevention measures.

The use of more compact product formulas resulted in more compact packagings; separately, reuse has been encouraged by the introduction of refill bags and ecobags. Several companies are actively participating in collection and recycling schemes and have already started to use recycled plastic in detergent bottles.

Perfumes and toiletries

In the last few years, environmental problems have become an important issue both for producers and consumers. All manufacturers within the sector are investigating ways of reducing the effects of their products on the environment. At present, attention is being focused on three specific possibilities: the biodegradable properties of toiletries and cosmetics, the incorporation of preservatives in their manufacture, and the recycling of containers (plastic bottles, aerosols cans, etc.).

Problems relating to aerosols (particularly deodorants and hair fixing products) which contain ozone layer damaging CFCs (chlorofluorocarbons), have already been solved by replacing CFCs with environment-friendly components like butane or propane. The following stage is to use air or nitrogen as a propellant, since they don't present any risk of explosion.

Finally, there is a great industry concern about the current debate on animal testing. The harmlessness of perfumes and toiletries needs to be tested before they are sold to consumers, and so far the only legal way of doing so is animal testing. In its vast majority, the perfumes and toiletries industry refuses a prohibition of such practices until new testing methods are introduced, and at the same time supports R&D efforts to discover alternative methods.

REGULATIONS

The soaps and detergents industry agreed at the end of 1990 on a voluntary agreement with the EC (89/542/EEC) covering the labelling of nineteen substances in detergents. Progress in ensuring compliance within the industry has been self regulating and is regarded by the EC as a textbook example of responsible industry in action.

OUTLOOK

In the medium to long term, growth in the soap and detergent sector depends to a great extent on consumer behaviour and the development of other sectors such as textiles and household equipment. At the same time, protection of the environment and product safety will play an ever increasing role in industrial development. Expansion in sales volumes may be expected with the growing economic prosperity of former East bloc countries, where heavy investment is being made by the major manufacturers. Finally, within the EC, there still remains a considerable growth potential, notably in the South countries.

Table 5: Soaps and detergents, perfumes and toiletries
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	3.3	3.2
Production	3.3	3.4
Extra-EC exports	5.1	4.4

Source: DRI Europe

As for perfumes and toiletries, the prospects for growth vary in accordance with the wide range of products within this industry. Market saturation is likely to slow the sharp growth in hair care products that took place in the EC market during recent years. On the other hand, growth in beauty and skin care products is set to continue, as well as for men's toiletries. In terms of volume the market could soon reach saturation, however, through market and scientific innovations its value should keep growing.

Written by: DRI Europe
The industry is represented at the EC level by: International Association of the Soap and Detergent Industry / Association Internationale de la Savonnerie et de la Détergence (AIS). Address: Square Marie-Louise 49, B-1040 Brussels; tel: (32 2) 230 8371; fax: (32 2) 230 8288; and, Comité de Liaison des Associations Européennes de l'Industrie de la Parfumerie, des Produits Cosmétiques et de Toilette (COLIPA). Address: Rue de la Loi 223, Bte. 2, B-1040 Brussels; tel: (32 2) 230 9179; fax: (32 2) 231 1587.

Pharmaceuticals
NACE 257

The EC is the world leader in terms of pharmaceuticals production and exports. Total EC output amounted to 64 billion ECU in 1992, of which non-prescription pharmaceuticals accounted for a share of about 20%. The sector is also characterised by a constant trade surplus, as well as by a rapid growth of intra-EC trade.
R&D accounts for a large part of investments in the pharmaceutical sector, and its R&D/turnover ratio is one of the highest in the EC industry. The pharmaceutical industry is adapting itself to meet the challenges presented by new developments in technology (biotechnology), politics (upheaval in East Europe), economics (emergence of new competitors), demography (ageing population) and legislation (plans to curb health-care spending).

INDUSTRY PROFILE

Description of the sector

Within the EC, medicinal products are defined according to Article 1 of Council Directive 65/65/EEC (see Official Journal L 22, of 9.2.65 for more details):

- Proprietary medicinal products: any prepared medicinal product placed on the market under a special name and in a special pack;
- Medicinal product: any substance presented for treating or preventing disease in human beings or animals;
- Substance: any matter irrespective of origin (i.e. human, animal, vegetable, chemical).

Medicinal products can be divided into two main groups according to the way of purchasing: the first is prescription pharmaceuticals, which need to be prescribed by a medical doctor to be purchased; the second is over the counter (OTC) pharmaceuticals, which can either be prescribed by doctors or bought spontaneously by the consumer without a prescription (the true self-medication market).

Pharmaceuticals are mainly made from chemicals, but since the mid-1980s biopharmaceuticals (i.e. drugs produced from biotechnological processes) have appeared on the market. They now command an estimated 4% of world sales.

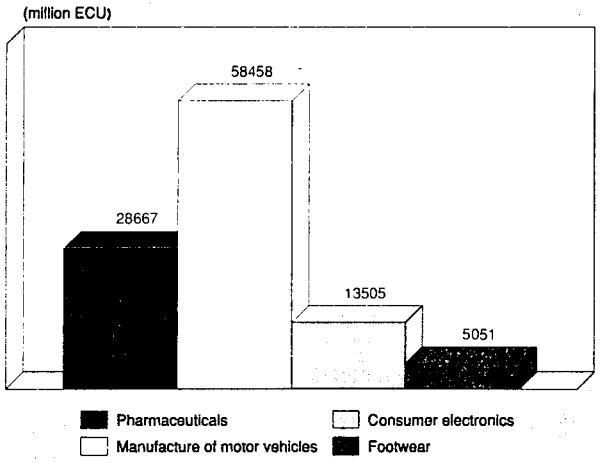
It is not easy to translate the concept of medicinal products into economic terms; until recently, each Member State had its own classification. To avoid confusion, the sector has adopted a grouping of data according to heading 54 of the Standard International Trade Classification (SITC) of the OECD. This heading comprises the entire "medicines" section, as well as the sections covering specific active substances. The key figures presented are based on this definition. Missing data have been completed, wherever possible, with Eurostat data compiled on the NACE 257 definition. The data reported are approximate and therefore should be considered as trend indicators, providing an acceptable basis for comparison.

Recent trends

In 1992, the production of pharmaceuticals in the EC grew in current prices by 5.0%, with all Member States but three enjoying an increase. Most notable were the rises registered in Germany (8.1%) and France (7.8%). In 1993, production growth is estimated to reach 8%.

Total EC consumption of pharmaceuticals increased by 4.5% in 1992 and will continue to grow in 1993.

Figure 1: Pharmaceuticals
Value added in comparison with other industries, 1992



Source: DEBA

During the same period, employment in the EC decreased, for the first time in ten years, by 1.3%. All Member States recorded diminishing or stable employment figures except for Ireland (+7.9%), Denmark (+5.0%) and Germany (+4.1%). In this context, it is important to note that official employment figures are constantly revised. Some countries therefore report strong year-on-year employment growth, but this does not necessarily mean that growth took place in the current year.

Production and consumption in the pharmaceutical sector both increased rapidly from 1983 to 1992, at an average real rate of around 7% per annum. As for trade, growth in extra-EC exports was 2.6% p.a., while growth in extra-EC imports has been stronger, at an average of 5.4%. Extra-EC trade was particularly buoyant in the second half of this period. Altogether, the pharmaceutical sector has enjoyed much higher rates of growth than those of overall manufacturing activity in the EC during the period 1983-1992.

International comparison

In the world pharmaceutical market, the EC is the leading producer. In 1992, the value of production was about one third higher than that of the USA, and about the double of that of Japan. Moreover, compared with the level of 1987, the EC recorded an increase in production of 44% (measured in constant prices) at a time when USA and Japan increased 8% and 17% respectively.

The Japanese pharmaceutical industry has long been focused on the domestic market, an attitude encouraged by the national health insurance system, which has provided the entire population with access to low-cost health care. This has prompted patients to see their physicians frequently, resulting in growing demand for medicinal products and steady expansion of the pharmaceutical industry. In order to control spending on the national health system the government reduced its official drug reimbursement prices by 8.1% in April 1992. This policy is progressively reducing profits on all drugs. As a reaction to declining domestic product prices, the Japanese industry is developing new markets in the USA and Europe, and acquiring foreign firms. Nevertheless, when it comes to medical research, Japanese manufacturers remain far behind their counterparts in the USA and Europe. Well aware of this problem, Japanese companies are investing heavily in R&D in a bid to catch up with their foreign competitors.

Table 1: Pharmaceuticals
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	28 289	31 451	34 922	36 572	39 496	45 492	50 747	55 065	60 943	63 711	65 000
Production	31 268	34 879	38 766	40 357	43 289	49 460	54 889	59 103	65 324	68 601	69 500
Extra-EC exports	4 799	5 508	6 193	6 246	6 302	6 817	7 621	7 974	9 124	10 559	10 700
Trade balance	2 979	3 428	3 843	3 785	3 793	3 968	4 143	4 038	4 381	4 889	4 500
Employment (thousands)	359.7	363.2	365.5	369.5	376.5	385.7	398.3	408.1	413.3	408.0	413.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) DRI estimates.
Source: DEBA

Table 2: Pharmaceuticals
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	7.5	7.1	7.4
Production	6.8	6.8	6.8
Extra-EC exports	1.1	4.6	2.6
Extra-EC imports	3.7	7.7	5.4

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Pharmaceuticals
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	4 799	5 508	6 193	6 246	6 302	6 817	7 621	7 974	9 124	10 559
Extra-EC imports	1 819	2 080	2 350	2 461	2 509	2 848	3 479	3 937	4 743	5 669
Trade balance	2 979	3 428	3 843	3 785	3 793	3 968	4 143	4 038	4 381	4 889
Ratio exports/imports	2.64	2.65	2.64	2.54	2.51	2.39	2.19	2.03	1.92	1.86
Terms of trade index	99.5	97.5	100.0	101.5	102.4	102.6	101.5	97.9	90.7	89.5
Intra-EC trade	3 176	3 776	4 281	4 534	4 813	5 489	6 440	7 287	8 720	9 945
Share of total imports (%)	63.6	64.5	64.6	64.8	65.7	65.8	64.9	64.9	64.8	63.7

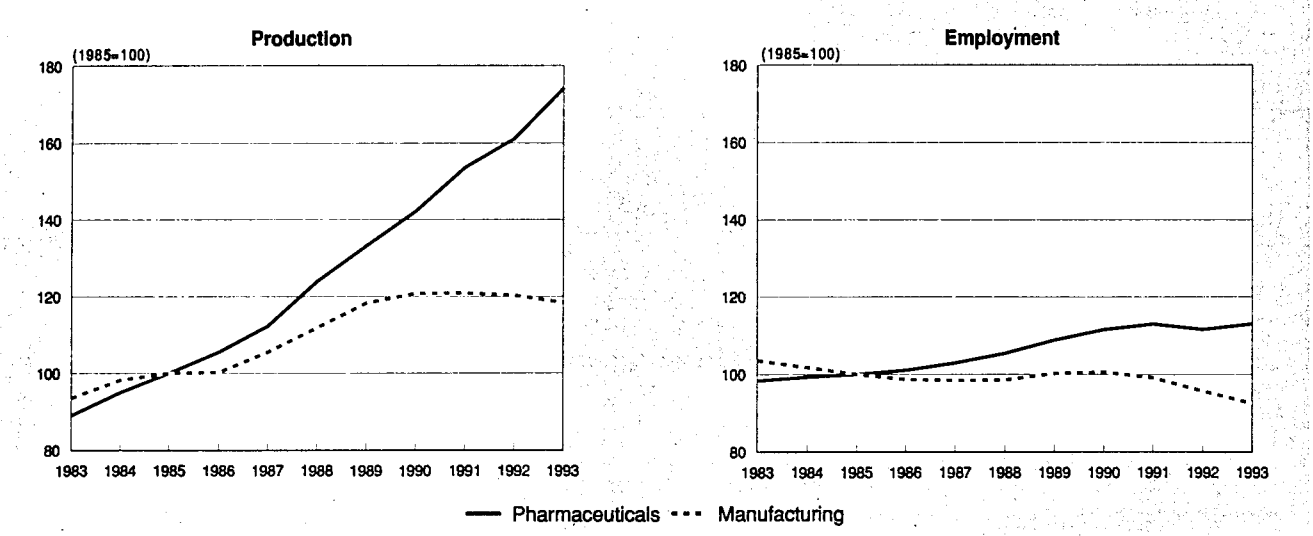
Source: DEBA

Table 4: Pharmaceuticals
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	44.3	46.4	47.5	50.0	53.2	57.6	58.6	61.5	66.0	70.3
Productivity index	93.4	97.6	100.0	105.3	112.1	121.2	123.4	129.5	139.0	147.9
Unit labour costs index (3)	86.0	92.6	100.0	104.9	111.8	119.6	128.2	137.5	145.0	159.7
Total unit costs index (4)	83.3	89.9	100.0	103.3	107.8	119.2	129.4	137.2	147.4	160.1

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 2: Pharmaceuticals
Production in constant prices and employment compared to EC manufacturing



Source: DEBA, Census of Manufacturers, Nikkei

Foreign trade

The EC as a whole is a net exporter of pharmaceuticals in the world market. Within the EC, the major players are Germany with a share of 27% of extra-EC trade, followed by the UK (17%), France (16%) and Italy (11%). Only Italy has a negative trade balance, which dates back to the early 1980s. However, if calculated at ex-factory prices, the cover ratio (production/consumption) for Italy was 1.14 in 1992.

During the period 1983-1992 the export/import ratio of the industry has declined steadily from 2.6 to 1.9. These figures indicate that, although the European pharmaceutical industry remains the world leader, it has been losing ground on foreign markets.

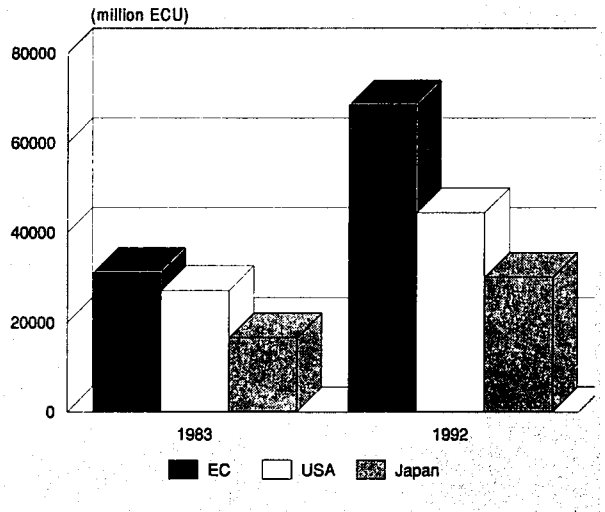
Extra-EC imports come overwhelmingly from western industrialised countries, with the USA and EFTA countries accounting together for 85% of total imports in 1992. On the other hand, export markets for the EC pharmaceutical industry are more dispersed. Developing countries, together with the category "others" (e.g. mainly Middle East and South and Central America), take up for more than half of extra-EC exports, but their share is slowly decreasing due to the growth of the USA and EFTA countries as end markets for the EC.

Intra-EC trade, measured in current prices, show that it has more than trebled in size, rising from 3 176 million ECU in 1983 to 9 945 million ECU in 1992.

ENVIRONMENT

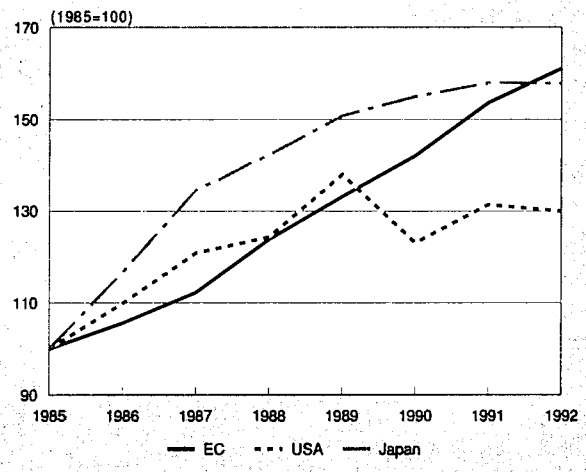
The current discussions on the reduction of packaging and packaging waste can not be separated from the need to provide the consumer with comprehensive information and the need to protect the product.

Figure 3: Pharmaceuticals
International comparison of production in current prices



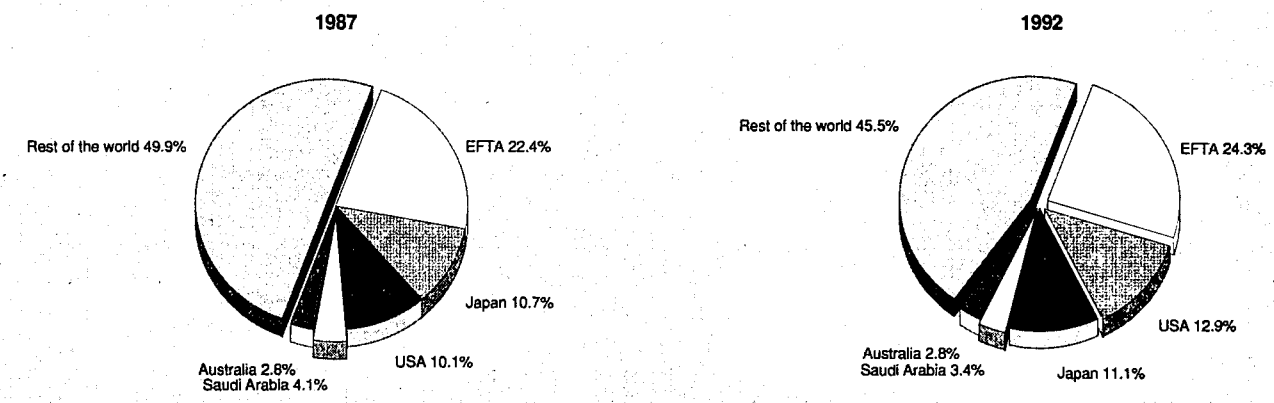
Source: DEBA

Figure 4: Pharmaceuticals
International comparison of production in constant prices



1993 are Eurostat estimates.
Source: DEBA

Figure 5: Pharmaceuticals
Destination of EC exports



Source: DEBA, Census of Manufacturers, Nikkei

Since the product information is contained either on the label or in the patient leaflet, it is essential that product and packaging are kept together until the final disposal of the product. Any measures in the area of packaging recycling or packaging waste reduction must therefore be balanced against these two requirements.

As far as the debate on the reduction of the use of ozone-depleting substances is concerned, account must be taken of the fact that ozone depleting substances may only be used as a means of delivery for drugs in essential use categories. Nevertheless, they should be replaced by non ozone depleting substances as soon as their quality and safety has been demonstrated.

REGULATIONS

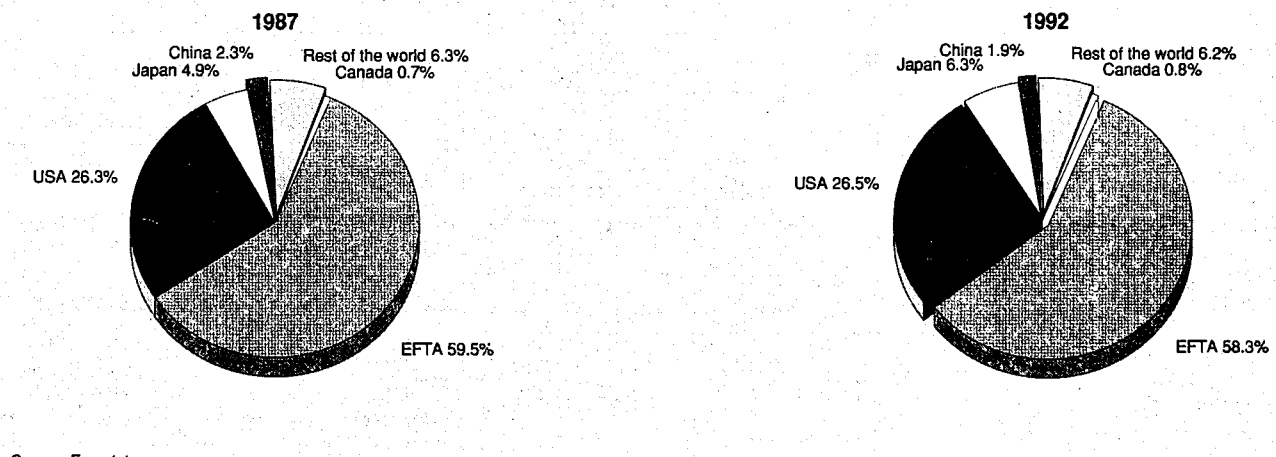
The pharmaceutical sector is doubtlessly among the industrial sectors which are subject to the strictest regulations and controls in the industrialised countries, because of obvious public health and social reasons.

The unification of the European market for pharmaceuticals required a prior harmonisation of the essential health protection rules, of the appropriate mechanisms for a rapid access to the single market and of the socio-economic conditions which are compatible with the free circulation of medicines. All the initiatives programmed in 1985 by the Commission in the field of pharmaceuticals, contained in its White Book, were adopted by the EC Council.

EC regulations on pharmaceuticals cover all industrially-manufactured medicaments, including vaccines, emoderivatives, radiopharmaceutic products and homeopathic products. The existing EC provisions which can be applied to medicaments include binding provisions (regulations, directives), orientative guidelines on the testing procedures prior to the marketing of products, a recommendation directed to those asking for an authorisation for introducing new products in the market, and a detailed guide of good practices of manufacturing. All these provisions have been gathered in the series of volumes entitled "La réglementation des médicaments dans la Communauté européenne", which is available at the Office for Official Publications of the EC.

The legislative framework for pharmaceutical products was definitively changed with the adoption, in March 1992, of the regulation and three directives constituting the future system of authorisation of medicaments: the Council regulation (CEE nº 2309/93), establishing Community procedures for

Figure 6: Pharmaceuticals
Origin of EC exports



Source: Eurostat

Table 5: Pharmaceuticals
The 15 leading pharmaceutical companies in the world, 1991

(million ECU)	Country	Sales
Merck & Co	USA	5 811
Glaxo	UK	5 366
Bristol-Myers/Squibb	USA	5 308
Smithkline Beecham	UK/USA	4 189
Hoechst	D	3 874
AM Home Products	USA	3 802
Ciba-Geigy	CH	3 788
Johnson & Johnson	USA	3 730
Bayer	D	3 587
Roche	CH	3 486
Rhône-Poulenc Rorer	F	3 444
Sandoz	CH	3 443
Ely Lilly	USA	3 357
Pfizer	USA	3 228
Warner-Lambert	USA	2 582

Source: SNIP estimations from annual reports

the authorisation and the surveillance of medicaments for human and veterinary use, and instituting the European Agency for the Evaluation of Medicinal Products; and the three directives 93/39/CEE, 93/40/CEE and 93/41/CEE which modify or abrogate the prior existing directives to complete the picture.

After the European summit which took place in Brussels in October 1993, London has been designated as the seat of the European Agency for the Evaluation of Medicinal Products. In 1995, the procedures for granting Community marketing authorisations will come into force.

Starting from 1995, there will be three marketing authorisation procedures, corresponding to the specific needs of each company and to the public health requirements in the EC:

- a decentralised procedure, covering the large majority of medicaments, based on the mutual recognition principle. This procedure will enable a company which has obtained a marketing authorisation in one Member State to apply to have it recognised in one or more others, and provides for binding arbitration by the Community if they refuse. After three years, during which the decentralised procedure is to remain optional, it will become mandatory whenever authorisation is sought in more than one Member State;
- a centralised procedure, which is mandatory for biotechnological and veterinary medicinal products and is optional for others. The applications for authorisation will be submitted directly to the Agency, and the authorisation will be valid in the entire single market;
- a national procedure, limited in principle to the applications of local interest concerning a single Member State.

These new Community procedures are aimed at easing the free circulation of pharmaceutical products, while at the same time reinforcing public health protection. In particular, they will allow a more rapid access on new products to the whole of the EC.

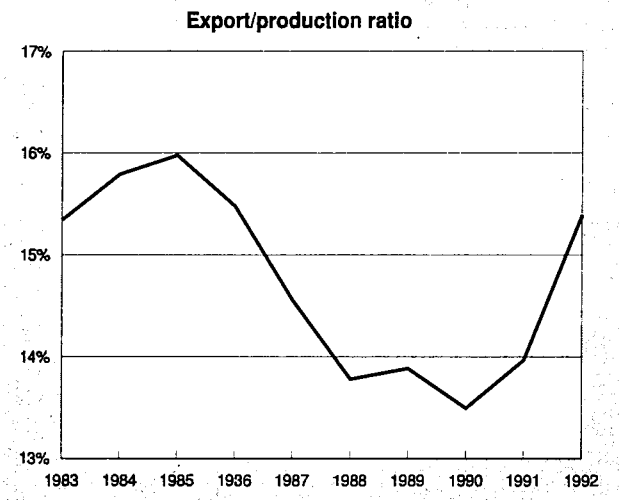
The newly created Agency will consist of a secretariat of about 150 persons, who will provide the various committees and working groups with the necessary technical and administrative support; moreover, they will grant a good circulation of information among the 3 000 experts and national delegates.

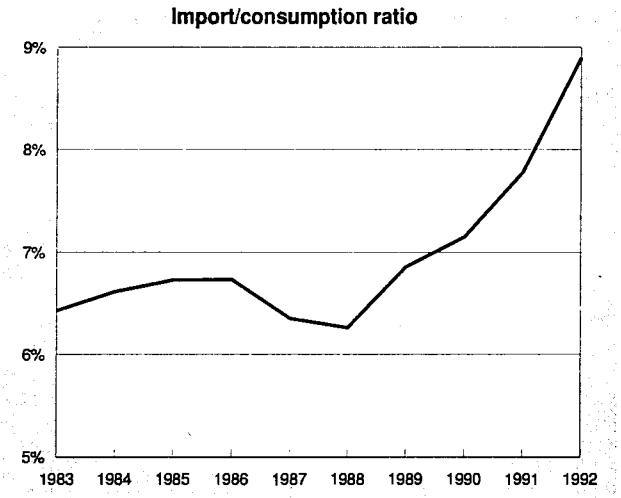
The Agency will allow a better collaboration between national authorities and will work in cooperation with the best European experts for each of the fields it covers, thus granting a very high scientific quality to its recommendations. These will be then transmitted to the Commission which will adopt, after consulting the company concerned, a final decision.

The Agency will also be charged of reinforcing the surveillance of any undesirable effect of medicaments after their introduction in the market, and to coordinate national or Extra-EC inspections.

Finally, a regulation establishing the Supplementary Protection Certificate (SPC) was adopted in June 1992 and came into force on the first January 1993. This measure applies to all products subject to an authorisation in any Member State, i.e. both to prescription and non-prescription pharmaceuticals. The main aim of the SPC is to compensate for the period of effective patent protection lost while a medicinal product undergoes research and development (it takes an average of 12 years from the moment a patent is applied for to the day the product is launched on the market, leaving only a limited

Figure 7: Pharmaceuticals
Trade Intensities





Source: Eurostat

Table 6: Non-prescription pharmaceuticals
Turnover and share of the total pharmaceutical market at public price level

(million ECU)	Turnover					Total market share (%)				
	1988	1989	1990	1991	1992	1988	1989	1990	1991	1992
Belgique\België	500	460	490	492	523	29	30	30	29	25
BR Deutschland	5 100	5 480	5 800	6 015	7 556	36	36	35	34	33
España	695	798	877	980	1 021	13	13	14	13	16
France	4 100	4 220	4 700	5 031	5 266	35	35	37	34	33
Italia	900	990	1 196	1 261	1 348	11	10	10	10	9
Nederland	139	182	217	251	286	9	11	11	12	11
Portugal	N/A	N/A	N/A	45	60	N/A	N/A	N/A	5	4
United Kingdom	1 000	1 090	1 311	1 455	1 778	22	22	20	19	18

Source: AESGP / IMS, 1993

exclusivity period to the innovator to recoup its investment in R&D before imitations appear on the market). The SPC, which may not exceed five years, enables the protection period to reach 15 years from the date of the first market authorisation.

Lately, many governments have introduced regulations in order to curb the spiralling rise in health-care spending. Cost containment measures have included price cuts (in Germany, the UK, Italy and Japan), limits on the value of doctor prescriptions (Germany) or tight controls on the industry's advertising practices directed at physicians (France). The pharmaceutical industry has reacted by pointing out that spending on pharmaceuticals represents only a small proportion of total public spending on health in West Europe and that such controls are putting at risk the development of innovative drugs.

Prescription pharmaceuticals

MARKET FORCES

Demand

Pharmaceuticals are bought mostly on a doctor's prescription, although a distinction has to be drawn between prescription pharmaceuticals and OTC products: prescription pharmaceuticals can be sold only in pharmacies, while OTC products can be sold, in some countries, in pharmacies only, in others in drugstores and sometimes even in food stores. Apart from consumers, other categories of purchasers are medical doctors, hospitals, and other institutions operating in the health-care system.

The demand for pharmaceutical products has recently been greatly influenced by two main factors. First, the ageing of the population, which partly originates in improved medical care and products, is slowly changing the pattern of production to adapt to the specific needs of the elderly. Secondly, the opening up of East Europe has created new market opportunities for the EC industry. The need for more advanced medicinal products has resulted in a growing trade surplus of about 360 million ECU with East Europe in 1992 (+20% compared to 1991, and +112% since 1990).

Finally, the recent initiatives by some governments to control the growth of health-care spending through cuts in the price of medicines is leading to a reduction in demand, which is already noticeable in Germany and Italy over the first five months of 1993.

Supply and competition

Production is very diversified as it meets specific and very diverse demands. It varies in its degree of integration (from the synthesis of basic chemicals to the preparation of finished products) as well as in the type of dosage formulation produced (e.g. tablets, pills, injectable ampoules, or capsules).

Production must meet the demand for both widely prescribed medicines for the treatment of common illnesses, as well as for medicinal products to treat certain rare conditions. In both cases the legislative framework is the same: production standards are very strict and high quality is essential.

Biodrugs, which in less than a decade seized a 4% share of the world market, are the fastest growing segment of the industry. Companies have invested heavily in this domain, either directly in R&D or through participation in emerging biofirms.

Domestically, the EC pharmaceutical industry faces problems of various regulatory environments, pricing policy and patent laws which differ from country to country in the EC. Internationally, it faces strong competition from the United States and Japan.

Production process

Medicinal products depend heavily on research for progress. In 1991, EC pharmaceutical companies invested over 7 billion ECU in R&D, which represents about 11% of the industry's turnover, and is among the highest R&D/turnover ratios in industry. From 1987 till 1991 gross investment remained stable between 5% and 6% of production. As a result of these investments, 97 new molecules have originated from Europe in the period 1988-1992, against 63 for Japan, 52 for the USA and 5 for the rest of the world. Research costs, at about 200 million ECU per licensed medicine, are constantly rising. This evolution is partly due to an increasing regulatory burden

Table 7: Self-medication products
Turnover of the principal products at public price level, 1992

(million ECU)	B	D	E	F	I	NL	P	UK
Cough and cold remedies	71.5	540.0	96.8	525.2	217.5	56.7	14.9	207.4
Analgesics	78.6	604.4	164.1	369.0	106.8	58.2	7.8	243.3
Digestives and intestinal remedies	66.6	380.1	112.7	404.2	243.2	35.5	8.5	157.0
Skin treatment	32.9	304.4	104.2	348.3	161.1	43.8	10.7	167.2
Vitamins and mineral supplements	42.5	373.7	76.2	265.5	137.9	34.8	3.4	119.6

Source: AESGP / IMS, 1993

Table 8: Self-medication products
Turnover and share of the total pharmaceutical market at public price level

(million ECU)	Turnover					Total market share (%)				
	1988	1989	1990	1991	1992	1988	1989	1990	1991	1992
Belgique\België	300	280	311	333	360	18	18	19	18	17
BR Deutschland	2 300	2 430	2 650	2 903	3 447	16	16	17	16	15
España	459	518	598	686	722	11	11	12	11	11
France	2 200	2 420	2 500	2 692	2 829	19	20	20	18	17
Italia	800	890	1 063	1 051	1 215	9	9	9	8	8
Nederland	131	148	184	222	252	9	10	10	11	10
Portugal	N/A	N/A	N/A	45	59	N/A	N/A	N/A	5	4
United Kingdom	600	690	850	956	1 248	13	14	13	13	12

Source: AESGP / IMS, 1993

combined with new technologies such as biotechnology and gene therapy.

INDUSTRY STRUCTURE

Companies

In 1991, three EC companies were among the ten worldwide pharmaceutical leaders: Glaxo (UK, n°2), Hoechst (D, n°5) and Bayer (D, n°9). SmithKline-Beecham, which is the result of the merger of Beecham (UK) and SmithKline (USA), can be added to this group in the fourth place. Of the remaining six, two are Swiss (Ciba and Roche) and four USA-based companies (including the number one, Merck). Within West Europe, other leading companies are from the United Kingdom (Wellcome, Zeneca), Switzerland (Sandoz, n°12) and France (Rhône-Poulenc Rorer, n°11).

Strong competition exists both in Europe and worldwide and no single company has a dominant position: the ten largest companies represent only 22% of the world market.

In biopharmaceuticals, the world top companies are mainly from the USA. In 1992, Genentech had sales (including licensed-out products) of about 1.1 million ECU followed by Amgen with 0.7 million ECU. In the EC Novo Nordisk (DK) is the main player.

Strategies

In order to face new challenges in terms of R&D costs, increasing competition and market diversity, new groupings of major companies have emerged through mergers and acquisitions. This was mainly the trend of the late 1980s. Since then the focus has switched towards alliances between OTC and prescription drugs producers. In July 1993, Warner-Lambert (USA) and Wellcome (UK) announced the creation of a joint-venture to combine their OTC medicines business. Simultaneously, Warner-Lambert concluded an alliance with Glaxo (UK) to market its prescription drugs once they are switched to OTC status. Meanwhile, Merck (USA) agreed to buy Medco Containment, the largest US mail order distributor of drugs, and formed an alliance with Johnson & Johnson (USA) to market OTC products. This illustrates the new strategy of some major prescription drug companies, which have made a strong commitment to enter the OTC market.

In June 1993, ICI (UK) finally demerged its bioscience (pharmaceuticals, agrochemicals and specialty chemicals) business under the name Zeneca. According to 1992 figures, pharmaceuticals represented 40% of its sales and 83% of its profits.

On the R&D side some big traditional companies have decided to bet on biotechnology either through direct investment (Roche (CH) owns a majority stake in Genentech (USA) since 1990, Sandoz (CH) followed with SyStemix (USA) in 1992) or through agreements on individual projects as those concluded by Glaxo (UK) or Merck (USA) with smaller partners.

Pharmaceutical wholesalers, which control 90% of the delivery of prescription drugs, are pursuing their concentration trend. In July 1993, Gehe (D), after a protracted battle, finalised the take-over of OCP (F), which controls 40% of the French market. Three alliances at the West European level have gained 50% of the market in the United Kingdom, 55% in France, 45% in Germany and 20% in Italy. Prescription companies are worried that the wholesalers, with the benediction of governments, could become a driving force in the drive towards lower prices.

OUTLOOK

The last years have seen a shift from strong to moderate growth. The pharmaceutical sector will remain among the fastest growing sectors over the 1990s due to growing concerns for health and an ageing population. However, the widening move towards cost-containment will entail a structural change favouring the cheaper products. This will result in consumption and production growth rates below those that were observed in the 80s. Exports and imports will grow at rates of about 5% per year in line with the recent past. Biopharmaceuticals will keep ahead of the pack with growth rates about 2% higher.

Non-prescription pharmaceuticals

MARKET FORCES

Demand

OTC products can be prescribed by a doctor or purchased directly by the patient without being prescribed by a doctor. Non prescription pharmaceuticals which are bought directly by the patient without being prescribed by a doctor are commonly defined as OTC products or self-medication products. Non prescription pharmaceuticals can be considered as OTC products if they can be advertised to the public and if they are used for minor ailments.

OTC products are generally used preventively and for benign disorders. OTC-purchasing is a well established practice, which brings the following advantages: it reduces the financial burden on the state health-care system; it reduces the doctor's workload in taking care of health problems which do not require medical treatment; and it promotes personal responsibility on issues which affect a person's own health.

There is a certain degree of confusion in the determination of market size for OTC products. The rules governing these products' classification, reimbursement and sales outlets, vary considerably from country to country. The same product is sometimes supplied only on medical prescription in one coun-

try and over the counter in another. There are also several products which may be sold without a prescription but are nevertheless reimbursed or partially reimbursed if prescribed by a doctor.

AESGP/IMS estimates show that the total market for non-prescription medicines in 1992 was about 17.8 billion ECU, while the size of the self-medication market (OTC market) reached 10.1 billion ECU, i.e. 56.7% of the total non prescription pharmaceuticals market. The latter is dominated by cough and cold products and analgesics, and has grown at an average rate of 9.9% since 1987. This compares with an average growth of the total non-prescription market of 9.3% in the years 1987-92.

The importance of the non-prescription potential and the self-medication turnover varies greatly from country to country. The practice of self-medication is well established in the northern Member States including France, while it is quite underdeveloped in the southern Member States. Until recently, OTC products were, at least officially, an unknown phenomenon in Greece.

INDUSTRY STRUCTURE

Companies

OTC products are manufactured both by large companies, which in general also manufacture prescription-only medicines, and by smaller more specialised enterprises. Until recently, the majority of companies in the sector were national companies supplying their respective domestic markets because of differences in Member States' legal requirements and consumer habits. This explains why the market is still fragmented and that there are only very few "Euro-brands" (i.e. OTC products sold under the same name all over Europe). In 1992, the top three companies were Bayer (D) with a share of 3.8% of the European OTC market, Sanofi/Sterling Health (F/USA), with a share of 3.7% and Procter & Gamble (USA) with a share of 3.3%.

Strategies

With a view to obtaining the necessary critical mass to operate effectively in the Single Market and on exports markets, the OTC products industry has also been affected by a certain number of mergers and acquisitions (M&A) operations. The most striking deals have involved prescription drug companies seeking to enter the market for OTC drugs. This has been illustrated in the section dedicated to prescription pharmaceuticals.

OUTLOOK

The demand for OTC products is likely to increase at a steady pace in the following years. This is confirmed by the fact that many pharmaceutical companies are developing their OTC activities. Governments are increasingly recognising the need to support self-medication by pro-active measures. This trend is also affecting the growing market of Central and East Europe.

Table 9: Pharmaceuticals
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	2.9	3.5
Production	3.2	3.8
Extra-EC exports	5.6	5.3

Source: DRI Europe

Written by: DRI Europe, based on information provided by EFPIA and AESGP.
The industry is represented at the EC level by: European Federation of Pharmaceuticals Industries Associations (EFPIA). Address: Avenue Louise 250, Bte 91, B-1050 Brussels; tel: (32 2) 640 6815; fax: (32 2) 647 6049; and, European Proprietary Medicines Manufacturers' Association / Association Européenne des Spécialités Pharmaceutiques Grand-Public (AESGP). Address: Avenue de Tervuren 7, B-1040 Brussels; tel: (32 2) 735 5130; fax: (32 2) 735 5222.

Maintenance products
NACE 259.2

The maintenance products industry caters for a vitally important section of the domestic, institutional and industrial market. It covers a much wider range of product classifications than most other trade groups and is committed to keeping the product range up to date, efficient, competitive and environmentally acceptable. It provides advice and guidance together with manufacturing and packing facilities to the multiples selling their own brand products. The industry includes divisions of multinational groups together with many large and small companies.
The standard of employment is high, with well trained and competent operators in marketing, commercial and technical fields. In recent years demand increased as a consequence of some changes in the demographic patterns. The future of the maintenance products industry is reassuring as figures forecast a continuous growth, for cleaning products, in most of the European countries till at least 1996.

INDUSTRY PROFILE

Description of the sector

Maintenance products are defined as preparations designed to meet the cleaning, preserving and protective requirements encountered in a wide range of domestic, institutional and industrial situations.

They are normally marketed ready for use or may require dilution with water and they are presented in a variety of forms of packaging designed to meet their simple and efficient usage.

The evolution of the European market is essentially an amalgam of the markets in individual Member States. Moreover, within the EC there is considerable variations from country to country in product types and market shares. As a result, a large range of products exists: cleaners and polishes for wood, floor coverings, leather, shoes, metals, cooking appliances, windows, mirrors and motorcars; stain removers, dressings, and household starches; scouring preparations and scale removers; household disinfectants and deodorisers; household insecticides and anti-parasite preparations; hypochlorites and similar preparations for household and industrial purposes; industrial cleaning and maintenance products; all other domestic maintenance products.

Other products are made in some, but not all, EC countries. These include: stain removers, washing and ironing aids and dressings for fabrics; antistatics, mould release agents, defoamers; sanitary ware and drain cleaners; water and effluent treatment products; deodorants and air fresheners; chimney cleaners and firelighters; miscellaneous products, including adhesives and anti-rust agents.

The products concerned cover the following general application areas: maintaining, cleaning or visually improving household articles and domestic, communal, institutional, industrial living and working areas; destroying or repelling insects or animal pests that are detrimental to health or a nuisance in domestic environment; removing, preventing, or masking unpleasant odours; preserving and visualising improvement of materials such as wood, metal, plastic, glass, leather, fabrics, etc.; destroying or inactivating bacteria or fungi that may cause disease or spoil food.

All the products covered by this range are required to achieve and maintain the high standards of domestic health and hygiene deemed necessary in the modern household, institutional and industrial environment.

Recent trends

Over the last decade, imports boomed at around 10% in real terms on average per year, while exports stagnated during the second half of the eighties. However, in 1992, extra-EC exports in value were 30% up on the year 1988.

During the 1988-92 period, extra-EC imports remained low though their growth was important (53%). This kept the trade balance positive.

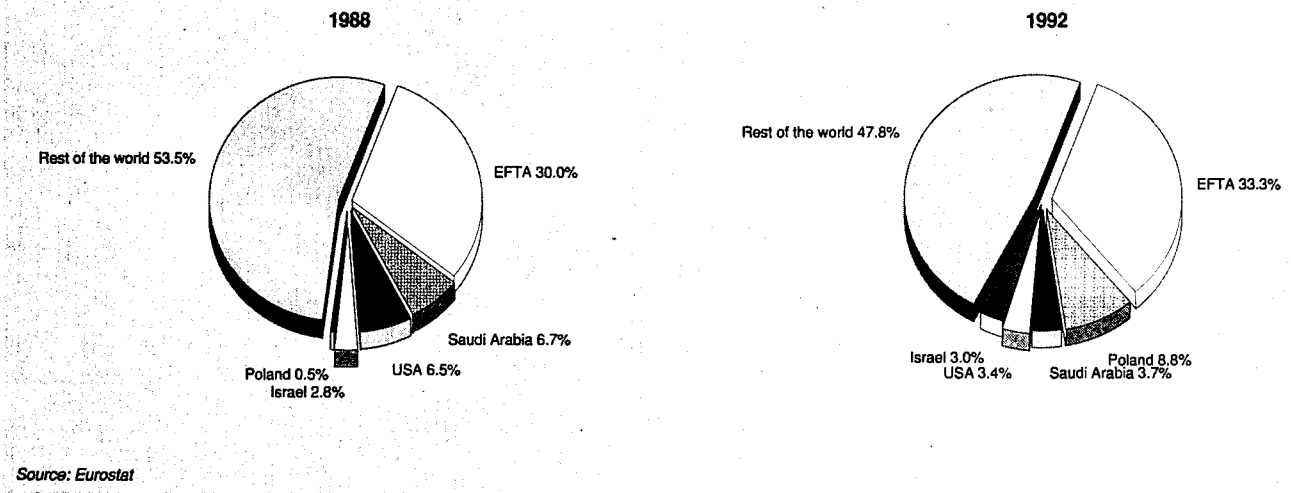
Foreign trade

The EC is a net exporter of maintenance products. In 1992, the EC's world market shares in value were respectively 48% and 45%, mainly for the exports of coachwork polishes and metal polish products. Most of the EC exports goes to developing countries and the EFTA countries.

Regarding EC imports, other polishes represented in value about one third of the world imports in 1992.

As for the origin of EC imports, an important change has occurred since 1988. In 1988, extra-EC imports came mainly from Switzerland (54,5%), while the US was the runner-up with about 20%. On the other hand, in 1992, there was a

Figure 1: Maintenance products
Destination of EC exports



Source: Eurostat

Table 1: Maintenance products
Extra-EC exports in current prices, by product

(thousand ECU)	1988	1989	1990	1991	1992
Hypochlorite	8 561	11 911	11 679	11 095	10 207
Deodorisers	28 134	27 710	26 786	30 344	31 765
Polishes/creams shoes, leather	20 519	14 851	15 332	18 810	22 585
Polishes/creams woodwork	12 069	12 850	14 374	14 183	15 289
Polishes coachwork	10 445	11 916	15 972	15 636	18 466
Metal polishes	11 637	12 751	12 824	15 436	14 589
Other polishes	15 333	16 273	16 879	20 031	18 226
Scouring pastes	11 468	13 170	12 276	14 973	22 155

Source: Eurostat

Table 2: Maintenance products
Extra-EC imports in current prices, by product

(thousand ECU)	1988	1989	1990	1991	1992
Hypochlorite	1 515	1 971	1 702	1 777	3 310
Deodorisers	14 561	17 286	19 638	25 825	30 230
Polishes/creams shoes, leather	5 891	4 341	3 964	5 812	4 808
Polishes/creams woodwork	4 220	5 103	5 047	6 786	4 336
Polishes coachwork	2 474	3 220	3 878	4 759	5 712
Metal polishes	2 704	2 161	2 037	2 678	2 802
Other polishes	7 486	7 767	8 627	10 494	11 783
Scouring pastes	3 216	2 191	1 739	2 336	1 314

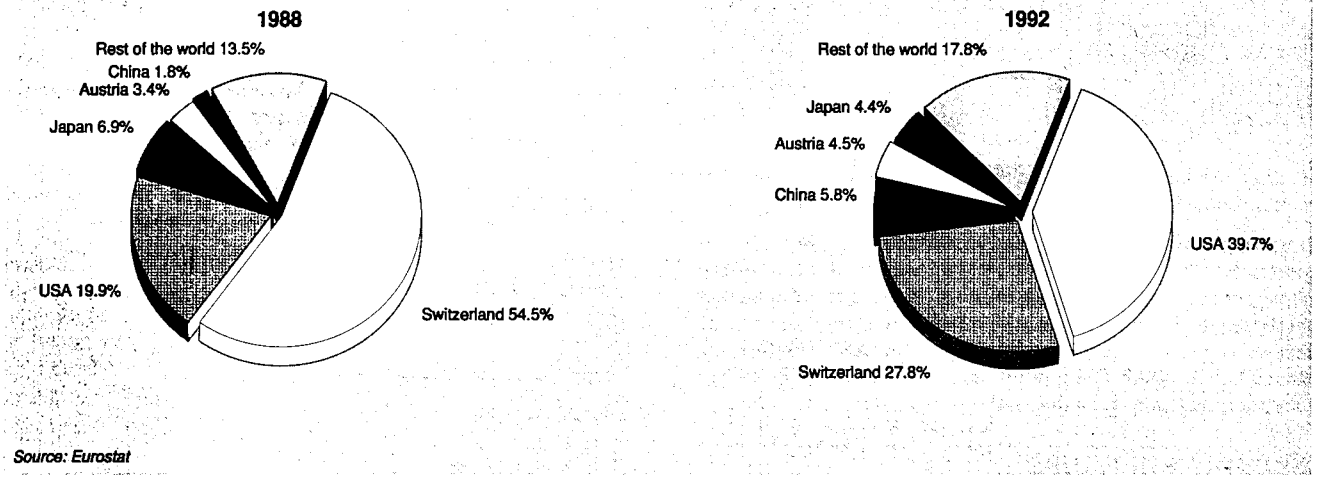
Source: Eurostat

Table 3: Maintenance products
Extra-EC exports in current prices, by country

(thousand ECU)	1988	1989	1990	1991	1992
EC	118 166	121 432	126 122	140 508	153 282
Belgique\België\ Luxembourg	2 025	2 391	2 240	2 837	2 561
Danmark	3 029	2 949	2 967	3 503	4 185
BR Deutschland	30 790	33 407	36 812	40 615	42 696
Hellas	475	636	521	874	1 907
España	15 468	16 618	14 986	15 130	14 423
France	17 820	17 738	19 091	22 224	26 871
Ireland	117	84	980	290	880
Italia	6 476	7 486	9 863	8 506	10 076
Nederland	7 110	11 389	10 917	13 160	18 821
Portugal	172	191	287	416	268
United Kingdom	34 684	28 543	27 458	32 953	30 594

Source: Eurostat

Figure 2: Maintenance products
Origin of EC imports



Source: Eurostat

shift in favour of the US exports towards Europe as they increased their share to 40%, while imports from Switzerland fell to 28% of total EC imports. This may be explained as the result of the important depreciation of the US dollar vis-à-vis the European currencies.

MARKET FORCES

Demand

The long term development of the demand for maintenance products is linked to a number of demographic factors. The ageing of the population brings with it the need for more intensive use of space and thus more frequent maintenance. The number of households is increasing, with more smaller (e.g. single person) households, pushing up demand. The increasing number of women working outside home has changed the nature of demand: more practical products are demanded, designed to help save time.

Consumption of maintenance products varies regionally from one country to the other, according to climate and local customs.

To illustrate this, one may consider the different trends reported in the "Consumer Europe 1993" for the cleaning products sector. In the surface cleaners and scourers subsector (for which European sales amounted to 1 987 million ECU in 1992), the highest per capita consumption in value was in Italy (8.75 ECU) and in Switzerland (7.71 ECU) while the Swedish and the English consumed the largest volume (8.1 kilos and 6.7 kilos, respectively). On the other hand, per capita sales of bleaches and lavatory cleaners (a market worth of 1 387 million ECU) were the highest in Luxembourg (7.01 ECU), Belgium (6.36 ECU), Spain (5.46 ECU) and Italy (4.54 ECU). The main users of air fresheners and insecticides (for which the sales in Europe are estimated at 500 million ECU) are the Greeks (2.27 ECU), French (2.12 ECU) and Portuguese (2.06 ECU). Finally, in 1992, Belgium and Sweden were the two countries where per capita sales of shoe polish (209 million ECU as European total value) were the most important (1.47 ECU and 0.96 ECU, respectively).

Supply and competition

Competition on the market for maintenance products is not only on the quality of the products, but also on ease of use, which is linked to packaging and preparation of the product (e.g. ready to use products rather than products that still need to be diluted with water). R&D in this sector is often geared towards achieving exactly these aspects of product marketing.

Production process

The maintenance products industry implements a continuous programme of R&D to provide new effective products re-

Table 4: Maintenance products
Extra-EC imports in current prices, by country

(thousand ECU)	1988	1989	1990	1991	1992
EC	42 067	44 040	46 632	60 467	64 295
Belgique\België\ Luxembourg	1 701	2 183	1 962	1 973	1 530
Danmark	1 875	2 192	1 492	1 960	3 302
BR Deutschland	13 147	12 701	16 779	24 869	23 699
Hellas	347	673	668	1 030	1 462
España	1 034	1 095	1 401	2 720	3 652
France	5 799	6 370	5 170	5 967	5 417
Ireland	221	231	149	326	382
Italia	3 186	5 373	4 414	4 477	4 795
Nederland	7 308	6 693	6 873	7 070	8 302
Portugal	364	214	293	538	527
United Kingdom	7 085	6 315	7 431	9 537	11 227

Source: Eurostat

Table 5: Maintenance products
Dimensions of the EC maintenance products industry, 1992

Turnover (million ECU)	3 000
Number of employees	25 000
Number of companies	600

Source: FIFE

flecting the latest technology. Consumer safety and environmental considerations are major in product development.

Developments in packaging and manufacturing processes require a flexible work force, employing well paid, high calibre personnel, subject to on-going training programmes. Consumer safety and environmental considerations are always influential factors in product development. Packaging and labelling are conceived to make the product easy to use and safe and to facilitate recycling and disposal.

INDUSTRY STRUCTURE

Companies

The total number of companies and employees is difficult to assess precisely as a significant number of them operate in other consumer related product areas alongside their maintenance product sections, and this leads to some overlap.

It is estimated that the total number of companies active throughout the EC in manufacturing and selling maintenance products is around 600. This includes major international companies operating worldwide as well as many smaller companies supplying their home market. The wage and salaries in the industry are in general above the industrial average.

The total number of employees in the sector remains fairly stable, estimated to be at least 25 000; increased consumer demand has been met by improved productivity.

ENVIRONMENT

In the maintenance products sector, major efforts have been made to develop new types of propellant for aerosols and containers that do not involve the use of pressure. Better labelling, in accordance with EC regulations, should assure consumer safety.

One must be conscious that in a very limited number of usage situations a possible hazard can arise from the improper use of hypochlorites. This can occur if these products are mixed with other cleaners of an acidic type in use.The Hypochlorites Commission caters for approximately 1 million tons of products per annum that provide, at low cost, essential and very effective protection in the public health field The Hypochlorites Commission has strongly supported improved labelling to ensure that hypo chlorites are not used incorrectly, together with a public information programme on their benefits and safety when used correctly.

OUTLOOK

Table 6: Maintenance products
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.2	1.4
Production	1.0	1.2
Extra-EC exports	2.0	2.0
Employment	1.0	1.0

Source: DRI Europe

It is unlikely that the use of maintenance products would be reduced, given their strong integration into many aspects of daily life.

Growth in the maintenance products industry is therefore expected to be modest but constant as it has been the case in the past decade. According to our forecast, production and consumption of maintenance products will increase by about 1% to 1.5% per annum during the 1993-97 period.

Written by: DRI Europe and FIFE
The industry is represented at the EC level by: International Federation of Associations of Maintenance Products Manufacturers/ Fédération International des Associations de Fabricants de Produits d'Entretien (FIFE). Address: Square Marie-Louise 49, B-1040 Brussels: tel: (32 2) 238 9711; fax: (32 2) 230 8288.

Man-made fibres
NACE 26

The manufacture of man-made fibres in the EC is confronted with intense competition particularly from developing and industrialised countries. The European industry is thus turning its attention to higher value added products, while pursuing an investment policy aimed at specialisation and research and development.
The crisis in the textiles and automotive industries, along with the economic gloom which has characterised recent years, brought about a marked fall in demand in 1992. The European industry won't recover in 1993, and will probably record a low level of growth in the latter part of the 1990s.

INDUSTRY PROFILE

Description of the sector

The chemical fibres (or man-made fibres) industry covers three different types of fibres: synthetic fibres, cellulosic fibres, and mineral fibres.

Chemical fibres mainly consist of synthetic fibres which accounted for 85% of world chemical fibre production in 1992. The main synthetic fibres, ranked in with their share of total 1992 world production, are polyester (52%), polyamide (20%), polypropylene (15%) and acrylic (13%) fibres. Cellulose-based fibres include acetates, rayon, rayon staple fibre and viscose. These artificial fibres, which are derived from natural sources such as cellulose, account for the remaining 15% of world chemical fibres production. Although mineral fibres are also part of the chemical fibre sector, they are excluded from the statistics presented in this chapter.

All of these fibres are divided up into sub-categories according to their physical form. Filament is a continuous polymer which is remilled in its molten state via a fine strainer and then solidified by cooling. It is then spun in a variety of ways, depending on how it is to be sold. It can also be cut up into short fibres for use in the manufacture of fabric using traditional machines designed for natural fibres. These short fibres often have very similar characteristics to those of natural fibres.

The preponderance of synthetic fibres over cellulosic products is becoming more and more pronounced. Short synthetic fibres represent the bulk of EC production, with about 55% of the total. Synthetic filaments come second with 34%. Cellulosic fibres, which represented about 22% of total chemical fibres in 1980, now represent a mere 11%.

Among the EC Member States, the largest producer of man-made fibres is Germany (33% of EC production in 1992), followed by Italy (24%). The Benelux and the United Kingdom are also important producers, each accounting for 11% of EC man-made fibres production.

Recent trends

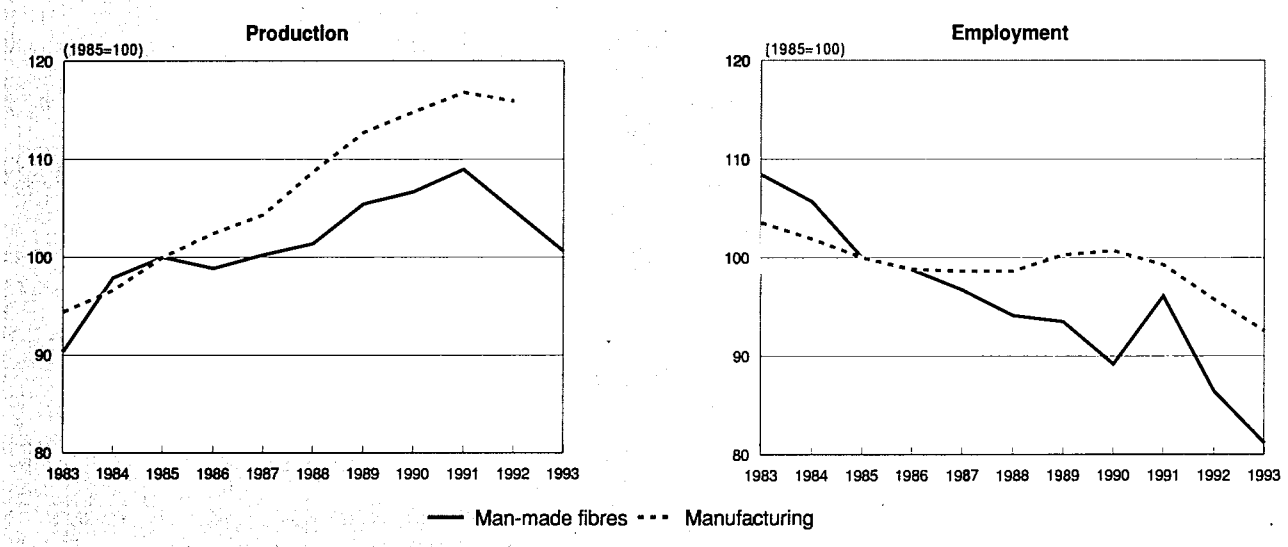
Since 1983, EC production of man-made fibres has grown at an average annual rate of 1.7%. In 1992, EC production in volume decreased by 3.9%, the first decline since 1986 (-1.2%). This production performance was mainly driven by an equal fall in consumption due to a downturn in the textiles and clothing, and the automotive industries in 1992. This output fall is significant when compared to world production which grew at 4.6% in 1992. A sharp growth in Extra-EC exports (9%) didn't prevent capacity rates from decreasing quite significantly.

In 1992, employment fell by 10% to 69 600 units, thus more than offsetting the 7.7% growth rate recorded in 1991 due to the inclusion of eastern Germany.

The EC chemical fibres industry has undergone extensive restructuring since the late 1970s. The low rate of increase in European textile consumption during the late 1970s (following the first oil crisis) contributed to this structural change. Among the other motives for this restructuring were the growing deficit on the EC's textile and clothing trade balance and the development of chemical fibre production capabilities in the rest of the world, not to mention the numerous investments made by EC firms in other parts of the world.

In fact, two waves of production capacity reduction have occurred since 1978. During the 1978-85 period, over 900 000 tonnes, or one-third of the total West European capacity, was cut. Another prominent development has been technological changes which reduced manpower requirements. As a result, employment levels in the chemicals fibres sector collapsed, recording a 39% cut from 1980. This decline was accompanied by a significant upgrade of apparent labour productivity.

Figure 1: Man-made fibres
Production in volume and employment compared to EC manufacturing



1993 are DRI Europe and Eurostat estimates.
Source: CIRFS, Eurostat

Table 1: Man-made fibres
EC production by product

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Synthetic filaments	802	879	919	916	927	962	1 017	1 025	1 076	1 030
Short synthetic fibres	1 384	1 511	1 579	1 568	1 595	1 570	1 625	1 692	1 724	1 690
Filaments and short cellulosic fibres	450	466	419	399	402	426	434	394	379	336
Total	2 636	2 856	2 917	2 883	2 924	2 958	3 076	3 111	3 179	3 056

Source: CIRFS

Table 2: Man-made fibres
Main indicators in volume

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993(1)
Apparent consumption	2 430	2 659	2 745	2 839	2 860	3 003	3 230	3 334	3 375	3 245	3 080
Production	2 636	2 856	2 917	2 883	2 924	2 958	3 076	3 111	3 179	3 056	2 930
Extra-EC exports	492	561	588	516	565	569	496	430	410	447	438
Trade balance	206	197	172	44	64	-45	-154	-223	-196	-189	-170
Employment (thousands) (2)	87.3	85.1	80.5	79.5	77.9	75.8	75.3	71.8	77.4	69.6	65.4

(1) Rounded DRI Europe estimates.
(2) Including former East Germany from 1991.
Source: CIRFS, Eurostat

Table 3: Man-made fibres
Average real annual growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption	4.3	2.0	3.3
Production	2.3	0.8	1.7
Extra-EC exports	3.0	-5.9	-1.1
Extra-EC imports	16.5	0.9	9.3

Source: CIRFS, Eurostat

Table 4: Man-made fibres
External trade in volume

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	492	561	588	516	565	569	496	430	410	447
Extra-EC imports	286	364	416	472	501	614	650	653	606	636
Trade balance	206	197	172	44	64	-45	-154	-223	-196	-189
Ratio exports/imports	1.72	1.54	1.41	1.09	1.13	0.93	0.76	0.66	0.68	0.70
Intra-EC trade	953	1 069	1 154	1 140	1 203	1 359	1 431	1 467	1 481	1 554
Share of total (%)	76.9	74.6	73.5	70.7	70.6	68.9	68.8	69.2	71.0	71.0

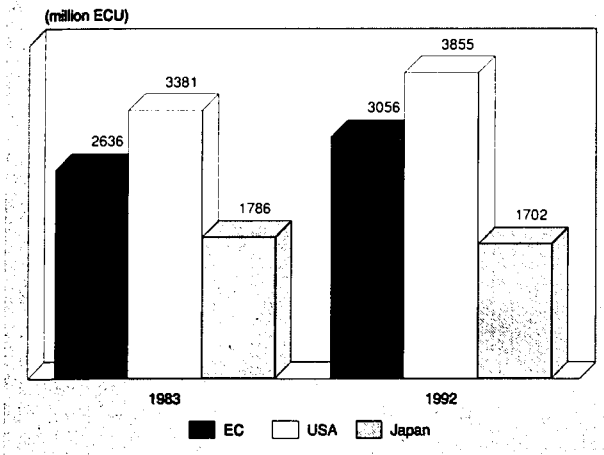
Source: Eurostat

International comparison

Compared to 1977, the EC man-made fibres industry has been losing ground in the production of all kinds of fibres. This is particularly the case in the field of synthetic filaments, where the EC represented less than 12.4% of world production in 1992, down from 20.6% in 1977.

The Japanese man-made fibres industry represents only 9% of world production, while the USA remains the world's leading producer with about 19% of world output, although its position is weakening. Production of the newly industrialised countries (NICs) accounts for an increasing share of world output, displacing the former pre-eminence of both the USA and some EC Member States. In 1992, the combined pro-

Figure 2: Man-made fibres
International comparison of production in volume



Source: CIRFS

duction of Taiwan, China and South Korea reached 25% of world output.

Indeed, the newly industrialised countries are becoming crucial actors in the man-made fibres industry: the most dynamic region is South-East Asia, among which are Taiwan, South Korea, China and the ASEAN countries. For example, while the East Asian countries represented only 22% of world production of polyester in 1980, this share jumped to 40% in 1992 and would be able to rise to 60% of world production of polyester by 2001. Overall, South-East Asian industry should see its share of synthetic fibres grow from 28% in 1992 to 31% in 2001.

In 1992, Japan's production of man-made fibres was stable, while it grew by a steady 3.6% in the USA. Production in the newly industrialised countries continues to rise strongly.

Foreign trade

The EC has a strong rate of import penetration, while the share of its exports in production remains weak. The EC trade balance on man-made fibres has declined steadily since 1983, falling into deficit in 1988 when imports jumped 18% and exports fell 3.7%. Combined with growing imports, at an average annual growth rate of about 10%, in volume, over the period 1983-1992, this has resulted in a steep fall of the cover ratio (exports/imports) which fell from 1.72 to 0.70 over these ten years.

Extra-EC exports, after as modest increase of 2% in 1991, fell back to negative growth rate in 1992 (-4.2%) thus resuming a downward trend started in 1986. 1992 extra-EC imports were stable (+0.7%). Declining demand, along with increasing supply from other regions of the world, put pressure on prices as the weakness of the dollar continued to negatively affect extra-EC exports.

Germany is by far the largest exporter of man-made fibres, accounting for 53% of extra-EC exports. Germany is also the leading importer, with 19% of extra-EC imports. Italy (15% of exports, 19% of imports) and the United Kingdom (13% of exports, 16% of imports) are also big trade players. Only Germany recorded a trade surplus outside of the EC in 1992.

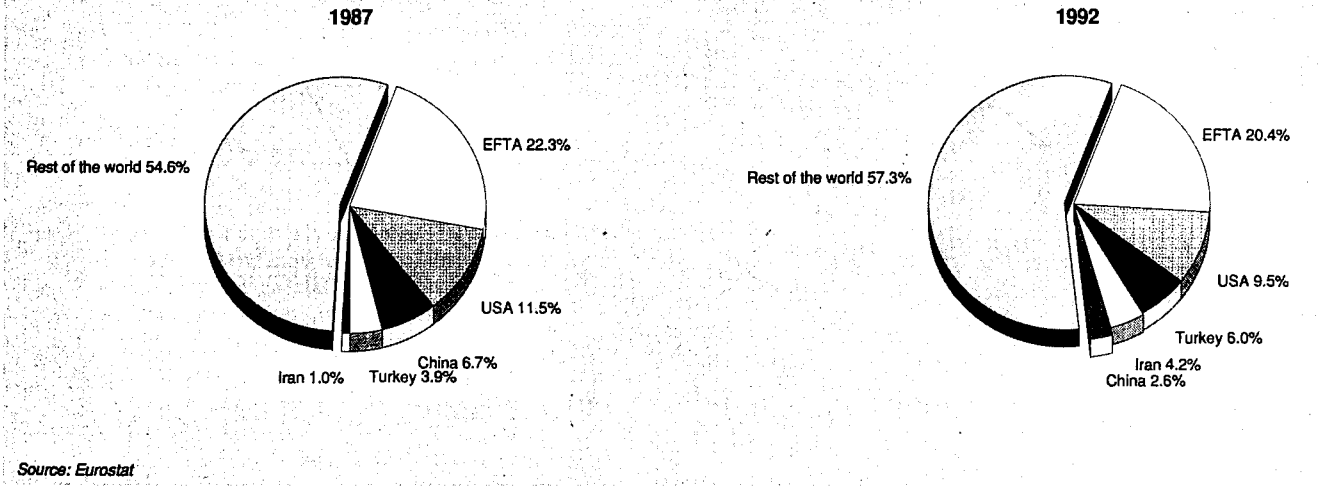
The USA is the EC's foremost national trading partner. Although imports from the USA increased their share over the 1987-92 period, EC man-made fibres exports lost ground in the US market.

Eastern Europe has been an important EC export market. Until 1990, this region had been more important in terms of exports (with about 25% of total extra-EC exports in 1986) than the EFTA countries. Since 1990, however, EC exports to Eastern Europe have fallen drastically.

Although EC manufacturers export less than 15% of their production on average to non-EC markets, extra-EC imports are gaining an increasing share of consumption in Europe, a share which rose to almost 20% in 1992. Extra-EC imports are mainly coming from the EFTA countries followed by the USA. Imports from Japan have increased by 48% from 1987 to 1992.

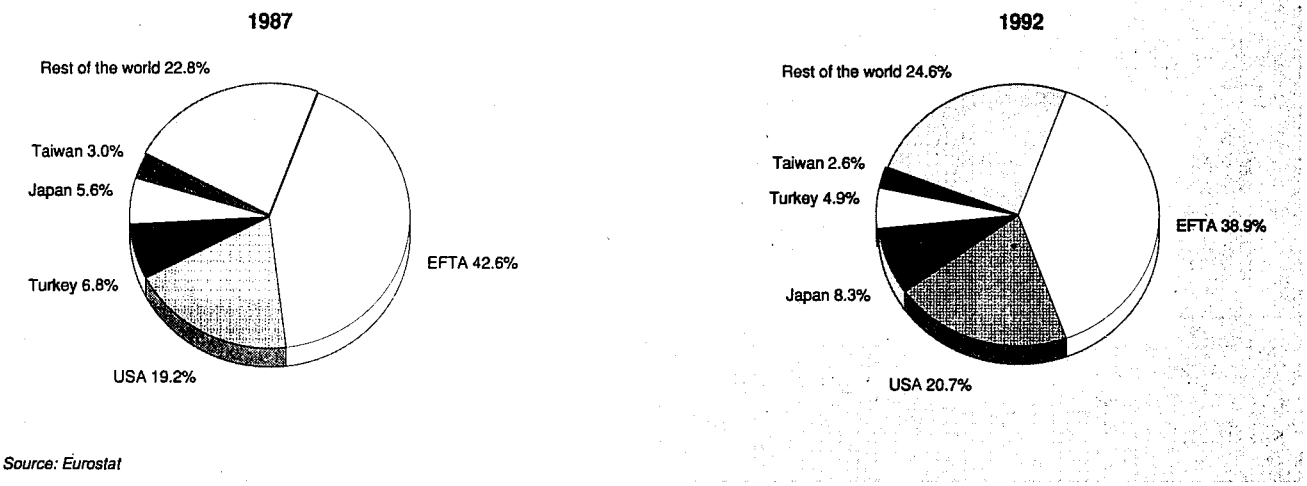
In 1991, intra-EC trade represented about 71% of total EC imports, which illustrates the high degree of trade between the Member States. Intra-EC trade has been raising slowly since 1987.

Figure 3: Man-made fibres
Destination of EC exports



Source: Eurostat

Figure 4: Man-made fibres
Origin of EC imports



Source: Eurostat

MARKET FORCES

Demand

Chemical fibres represent an important share (approximately 66%) of total fibres consumption in the EC. The main end-market for these fibres is the clothing industry, with 47% of total consumption, while fabric for interior furnishings represent another 35% and industrial applications 18%. As consumers account for an important share of demand, overall economic activity and personal disposable income are overriding factors in the dynamics of the man-made fibres. The situation downstream also has a significant influence on the man-made fibres industry. Since 1986, the large increase in imports of textile and clothing products (which has more than doubled in the last 6 years) has hampered the activity of the textile processing industry, thereby reducing EC market shares for textile products.

Looking at consumption of man-made fibres compared to textiles and clothing demand, similar trends emerge, but somewhat lower for fibres. The growth recorded throughout the 1980s in the textiles sector mirrored the overall increasing trend in the consumption of man-made fibres. The relative downturn registered since 1990 in the textiles industry is also noticeable in the fibres sector. The reduction of the European market for man-made fibres has indeed been driven by the disappearance of several of its European clients that have shifted operations to developing countries.

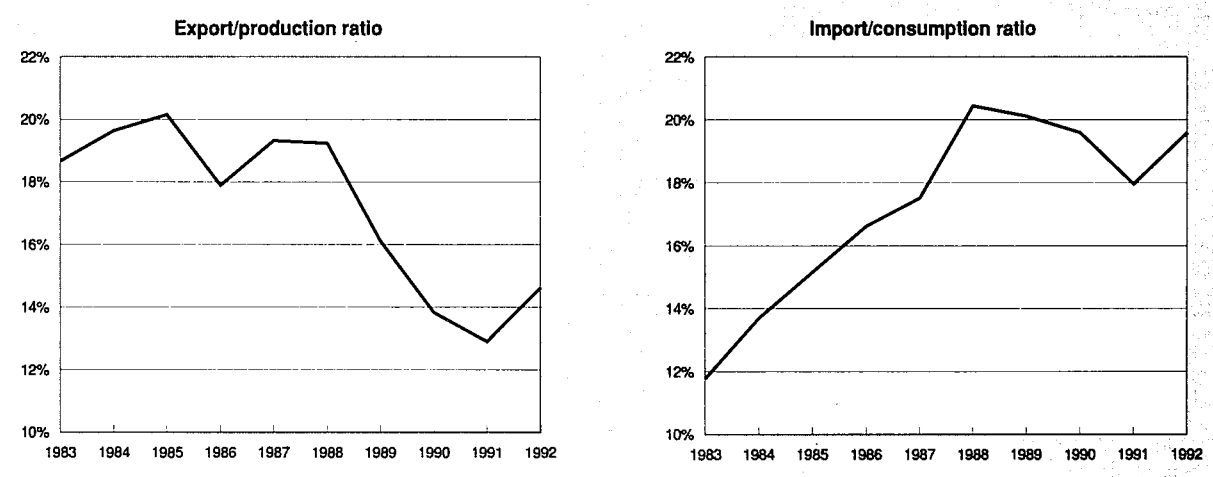
The upturn recorded in European consumption throughout the 1980s has also been a positive factor for the man-made fibres industry. Demand for these products has been driven not only by demographic factors, but also by increased earnings which directly influence the main markets for man-made fibres.

Supply and competition

In the countries for which statistical information is available, the EC industry's competitiveness is put in jeopardy by stagnating productivity growth. Despite the continuing fall of employment levels, unit labour costs have continued to increase in all the Member States, driving down the industry's competitiveness. The integration of the former East Germany in the EC has put another strain on capacity. In this region, many plants have already closed or are facing heavy problems.

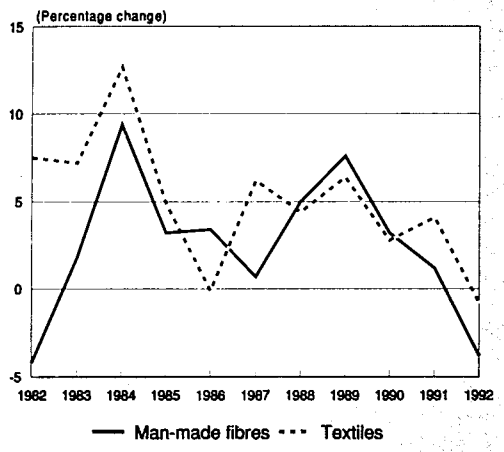
The code that forbids the use of any state subsidy to finance increases of capacity within the EC has been regularly renewed since 1977. This code is well appreciated by an industry suffering from low rates of utilization of production capacities.

Figure 5: Man-made fibres
Trade intensities



Source: CIRFS, Eurostat

Figure 6: Man-made fibres
Apparent consumption growth of man-made fibres versus textiles in the EC



Source: CIRFS, Eurostat

Since 1990, exchange rates have also been a factor in the industry's declining performance in Europe. The weak US dollar continues to benefit US exports to the EC. In contrast, European producers do not only suffer from the dollar's weakness, but production for external markets is often lost when a local producer is established.

The resulting decline in output and the under-utilisation of production capacities has led to a significant fall in EC industry earnings, especially in the second half of 1992.

Production process

Enhancements in the technology of yarn and fabric manufacturing have been a major factor of the increasing dominance of synthetic fibres over natural fibres. Some processes, such as tufting for carpet manufacture, were initially made possible by developments in synthetic fibres technology. Given their particular suitability for a variety of end-uses, man-made fibres, and in particular synthetic fibres, have been able to capture a significant part of the fibres market.

The production process is increasingly capital intensive, following the need for higher technology products. This feature is the main factor that drives up unit labour costs in the sector, as the industry requires a highly skilled workforce.

Two recent innovations have been developed for the clothing industry. Monofilaments (which have properties similar to silk) are geared towards casual wears, whereas Tencel, a new man-made cellulosic fibre developed by Courtaulds (UK) over a period of 14 years, is aimed at the high fashion market. The latter's manufacturing process is a considerable chemical simplification over that of rayon, and environmentally more friendly (through the use of a renewable raw material and the recycling of solvents).

INDUSTRY STRUCTURE

Companies

The man-made fibres industry is dominated by a small number of big companies. Companies are specialised in particular fibres, concentrating on speciality fibres in order to avoid competition from developing countries.

With a production capacity of 1.1 million tonnes, Hoechst AG (D) is the world's largest producer of polyester. Its turnover in chemical fibres amounted to 6 945 million DM in 1992. In polyamides the joint-venture between Rhône-Poulenc (F) and SNIA Fibre SpA (I) control about a third of the West European market, followed by DuPont (USA) with 25%. The latter is also the first world producer, followed by Allied Signals (USA) and BASF (D). For acrylic fibres Enichem (I) and Bayer (D) are the world main producers, recently joined by the joint-venture between Courtaulds (UK) and Hoechst (D). As far as polypropylene is concerned, two EC companies belong to the world top ten, Moplefan (I) and Danaklon (DK). Bemberg (I), and Asahi (JPN) are the world leaders in cellulosic fibres. Courtaulds (UK) and Lenzing (A), Akzo Fibres (NL) and ICI Fibres Ltd (UK) are other major players in the sector.

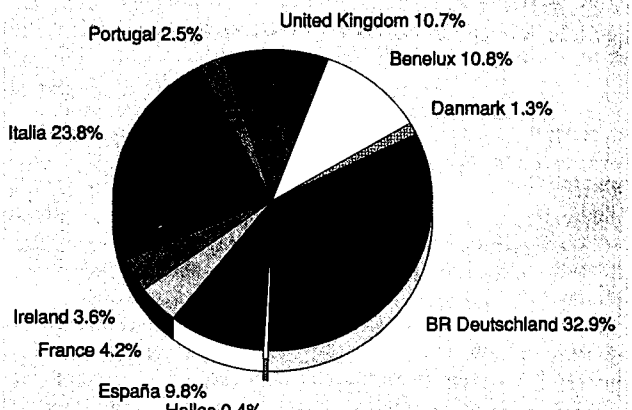
Strategies

The major firms in the man-made fibres industry operate with a very global perspective. Not only do non-EC companies have activities in Europe, but EC companies are present throughout the world. A good example is Hoechst which has a tyre cord capacity of 110 000 tonnes in North America. Meanwhile, the company is also present in the Far East and in China. In terms of sales, Hoechst realises about 85% of its turnover outside Germany.

The new strategy which appeared in 1992 and is still going on in the first half of 1993, is one of specialisation in one type of fibre through asset swaps, sales and alliances. For instance in two separate deals ICI has acquired the acrylic businesses of DuPont and BASF. These two companies have respectively received ICI's polyamide and polypropylene businesses in exchange. In polyamide alliances have been concluded between Allied-Signal and Akzo and between Rhône-Poulenc and SNIA. Another important joint-venture, announced in May 1993 between Courtaulds and Hoechst, concerns both their acrylic and viscose operations. In viscose the new company will command a strong position both in the industrial and textile end-uses. It will also provide Courtaulds with a wider platform to launch its new Tencel fibre on the European market. BASF is a good illustration of this drive towards specialisation. After divesting from viscose, sold to Lenzing in 1992, and acrylic, to ICI, it is now planning to do the same for its polyester operation in the USA in order to focus on polyamide. On the eastern front, Rhône-Poulenc set up a joint-venture with Chemlon SP of Slovakia, the leading producer of polyamide yarn in Central Europe.

Until now, none of these agreements have led to rationalisation of production, despite the capacity crisis which is appearing in certain sectors.

Figure 7: Man-made fibres
EC production in volume, 1992



Source: CIRFS

REGULATIONS

The new strategy of asset swaps and acquisitions in the industry is subject to the approval of anti-monopoly authorities at the national or supra national level. For instance both the European and the US Federal Trade Commissions have approved the ICI/DuPont swap, but in the USA ICI will have to divest parts of its downstream acrylics activities.

The industry is following carefully extra-EC imports to detect any case of "unfair" trade. Under the auspices of its industrial association, CIRFS, it has already won several anti-dumping cases. In 1992 it raised a new one concerning imports of polyester staple from South Korea and India. It is also considering the renewal of old cases that are reaching the end of their five-year term.

OUTLOOK

The EC man-made fibres industry is expected to perform slightly better in the near future. The bulk of the growth will be accounted for by synthetic fibres, especially polyester and polypropylene. Demand for cellulosic fibres will continue to decline.

Table 5: Man-made fibres
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.9	2.5
Production	0.9	1.2
Extra-EC exports	1.5	1.0

Source: DRI Europe

Demand from the industry's main clients is expected to improve in the second half of the decade. The textiles industry will witness a slight increase in production while import growth will lose momentum. The automotive industry is expected to start recovering by 1995, thus contributing to a stronger production performance in the man-made fibres industry.

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Biotechnology

Biotechnology is a small but fast growing, high technology field. At present, most commercial biotechnology production occurs within the pharmaceutical sector. Other areas of increasing importance are the agricultural sector, the food processing sector, renewable energy production and environmental and waste management. Currently, the EC is an important player in the world biotechnology market. Comparatively favourable market conditions in terms of regulation, public acceptance, financial arrangements and intellectual property protection in the USA and Japan threaten EC competitiveness. Investment in the EC by European biotechnology market leaders totalled 1.1 billion ECU, 0.3 billion ECU more than they invested in the USA. The trend for investment in the USA and Japan is for faster growth than in Europe. A significant number of EC companies are specialising in the agricultural sector whereas US companies are tending to specialise in pharmaceutical and diagnostic agents. Japanese companies are specialising in industrial applications.

INDUSTRY PROFILE

Description of the sector

Biotechnology can be broadly defined as the application of scientific and engineering principles to the processing of materials by biological agents. Biotechnology consists of two segments. Classical biotechnology is comprised of fermentation and preservation processes used in the production of beer, wine, cheese, bread, vinegar, etc., where advances have been made predominantly without the use of genetic engineering. Modern biotechnology is characterised by the utilisation of genetic engineering and is a small but rapidly growing segment. Only modern biotechnology will be considered here. Modern biotechnology is based predominantly on recombinant DNA (rDNA) and cell fusion techniques and has considerable potential for a wide range of applications. Major impacts are expected in pharmaceuticals, agriculture and food processing, health (diagnostics), renewable energy, environmental management (including waste management). Large growth in biotechnology equipment is expected to impact on relevant high-technology fields of the electronic engineering sector .

The economic weight of the biotechnology sector is not easy to measure as there are many spin-offs and intangibles. However, at present, commercial biotechnology is virtually confined to the pharmaceuticals' sector. In terms of investment, biotechnology is worth roughly one eighth of the EC pharmaceutical sector.

Recent trends

Over the 1980's there was a 10.6% per year increase in the number of patent applications in the area of biotechnology in the EC. The structure of biotechnology inventions (i.e. those with patent applications in at least two countries) remained roughly stable over the second half of the 1980's. While Germany had the highest share, this fell slightly towards the end of the decade and the United Kingdom was among those that increased their share.

A significant and growing share of Research, Development and Demonstration (R,D&D) is in the agricultural sector, though sales have been relatively small. Worldwide, sales of biotechnology-derived agricultural products total less than 170 million ECU each year. New agro-biotechnology products include a rot resistant tomato and BST (a milk production hormone) with an estimated potential US market of around 180 million ECU. Other agro-biotechnology products in the pipeline are: PST (a lean pork hormone), insect-herbicide-resistant corn and cotton plants, low caffeine coffee and, this year, the first field tests for a genetically engineered apple took place.

Table 1: Biotechnology
Geographical distribution of inventions worldwide

(%)	1986/87	1988/89
EC shares		
BR Deutschland	37.4	35.7
United Kingdom	28.1	28.6
France	18.7	18.5
Other EC member states	15.8	17.2
World shares		
EC	31.0	29.7
USA	41.8	45.9
Japan	18.4	16.1
Rest of the world	8.8	8.3

Source: EPIDOS/INPADOC, IFO

International comparison

In 1992, the European market leaders invested 1.1 billion ECU in biotechnology in Europe, 30% more than they invested in the USA, showing a preference for the European biotechnology market over the US. European investment in Japan was relatively small at around 0.2 billion ECU. However, in 1992, the US had approximately 17.5% more companies involved in biotechnology in the world market than did Europe. This represents a reversal of the situation in 1989 when European companies outnumbered US companies by almost 24.0%. In 1987, public R,D&D expenditure was 56% higher in the USA than in the EC, and in addition the USA benefited from the much larger use of venture capital.

European companies have historically tended to specialise in different product areas than their US and Japanese counterparts. There is a major shift underway towards agriculture and chemical production in Europe (22% and 18% of the total number of biotechnology companies respectively), whilst the USA are focusing on biotechnology equipment (23%), pharmaceuticals (25%) and diagnostic agents (21%). Also, 8% of European companies are involved in development of biotechnology for energy / environmental uses compared to 6% in the USA. Japan is concentrating on developing energy saving processes in chemical and other industries.

In the pharmaceutical market, all three main players are developing and using rDNA and cell merging techniques to produce proteins for a wide range of pharmaceutical products. In the agro-biotechnology market, there are marked differences in product specialisation. European expertise is fairly broad but particularly strong in the area of agro-chemicals. The USA is superior in its level of development in seeds, geared towards to oil and cereal crops. Japan concentrates mostly in fermentation products and biotechnology directly related to horticulture.

Foreign trade

At present, trade in biotechnology-derived products is principally for pharmaceutical applications. Compared with the pharmaceutical sector as a whole, where slightly less than half of extra-EC exports goes to countries outside the USA and EFTA, biotechnology derived pharmaceuticals are much less traded with countries outside these two foreign markets. The biotechnology pharmaceutical products tend to be high value, specialist drugs designed for ailments prevalent in the developed world. Trade in agro-biotechnology is small in comparison and is largely of seeds. Non-compliance with intellectual property rights is a barrier to trade.

Demand

In general, biotechnology is driven by the following factors: rapid advances in knowledge in the basic sciences, particularly molecular biology and molecular genetics; technological advances, which feed back and in turn create a strong demand for high-tech biotechnology equipment; strong demand from the pharmaceutical industry in particular.

Factors hindering demand include the following: concern over the safety of genetically engineered organisms on the natural environment; infringements of international intellectual property rights.

The industry is tightly regulated at present but simplified procedures are currently in force as a precursor to a new directive that will enable an EC -wide system to operate.

In Europe, the non-uniformity of intellectual property rights remains a stumbling block for producers of biotechnology derived products, within the EC domestic market and also in many export markets. The very high levels of investment that are necessary to bring the product to the market necessitate some form of generic licensing enforced through patents. In the past, an estimated 14.5 billion ECU per year have been lost on the world pharmaceutical market due to the non-recognition of patents by many large export markets such as Brazil, Hungary, India and Thailand. If international intellectual property rights were enforced it could increase world pharmaceuticals' sales revenues by up to 8.5 billion ECU.

Agro-biotechnology for food production is presently aiming at increasing both quality and productivity through genetic modification of selected crop plants. In the future this trend should continue, accompanied by a reduction in the cost of agricultural inputs. Non-food uses of animals and plants will become important for the production of antibodies and therapeutic proteins. Recently a patent has been granted in Europe for the use of modified bovine haemoglobin as a human blood substitute.

Agro-biotechnology products have taken longer to be brought to the market than biotechnology derived pharmaceuticals for at least three reasons. Firstly, there are stricter regulations on the release of genetically modified organisms (GMO's) than of biotechnology derived pharmaceutical products. Secondly, in the EC and other developed countries, high technology pharmaceuticals are part of a more profitable and faster growing sector than the agricultural sector. Thirdly, basic research in agro-biotechnology takes longer than for bio-medical products, partly because of the scale (genetically altering a whole organism compared to cells used to produce proteins for a new drug) but also because testing of new strains of crop is limited by seasonal factors and in animals, testing is constrained by the gestation cycle.

In agriculture and food processing applications, regulations are strict. The Deliberate Release and Contained Use Directives issued by the EC have been interpreted in a wide variety of ways. Germany, however, adopted very strict regulations under the 1990 Gene Law that was adopted before the approval of the EC directives by the EC Council of Ministers and contained very strict regulations. So far around 400 GMO's have been released into the environment worldwide. Within the EC the difference in the number of GMO's released by Member States is marked.

An estimated 686 transgenic plants have been released worldwide to date. France, Belgium and the United Kingdom accounted for 74% of the 282 releases in the EC/EFTA region. Oilseed rape, potato, tobacco sugar beet and maize accounted for 84% of the releases. The purpose of the genetic modification has been predominantly to engender herbicide resistance. About 42% of transgenic plant releases in the EC/EFTA region had this trait enhanced.

Table 2: Biotechnology
Geographical distribution of the approved field releases of transgenic plants

Country	Number of releases
France	112
Belgique/België	54
United Kingdom	42
Nederland	33
Finland	12
España	11
Sweden	7
Danmark	4
BR Deutschland	2
Ireland	2
Switzerland	2
Norway	1
EC/EFTA	282
North America	322
Pacific Rim	21
World Total	686

Source: PIP Newsletter, September 1993

Biotechnology also has the potential to provide solutions to many environmental problems and demand is likely to increase with the growing concern over the environment in the EC and the rest of the world.

At present the market for biotechnology derived products is almost totally in the USA, EC, Japan and EFTA countries. The market fails to take advantage of developing biotechnology products, pitched at demand from the developing world for two main reasons. Firstly, the return on the large investments in R,D&D that would be needed to bring the products to commercialisation would be too small to justify. Secondly, if the product was brought to commercial status, the risk attached to non-compliance with international intellectual property rights would be very high. Technology for equity deals may be one viable way forward as a mean of technology transfer in the less high-tech industries, particularly agro-biotechnology.

Supply and competition

The world leader in the biotechnology-derived pharmaceuticals' market is Amgen (USA) with sales of its best selling drugs Neupogen and Epogen totalling 1.3 billion ECU. In Europe, Switzerland (with La Roche), Germany (with Bayer and Hoechst) and Denmark (with Novo-Nordisk) are particularly well placed in the market. As far as attracting investment is concerned, the Netherlands, where many US owned companies have settled, is amongst the most attractive business environments. Germany, with its strict Gene law, has one of the worst.

Production capacity for biotechnology derived products in the EC is increasing rapidly. Since the main driver for biotechnology is advances in basic science, it is important to look at regional investment in R,D&D as an indicator of market potential.

Several factors contribute to the preference for European companies to invest in biotechnology outside the EC. Firstly, the level of bureaucracy that is high compared to USA and Japan. Also, EC and Member State encouragement is relatively low compared to the USA and Japan. In the ten year period before 1992, the EC provided 600 million ECU in consecutive programmes to improve basic knowledge and reinforce biotechnology in Europe. Public mistrust and interest group opposition, both higher in Europe than in the USA or Japan,

are the third factor: lastly, trade barriers, such as a relatively low level of intellectual property protection, are relatively high.

Production process

Biotechnology has made great strides in the field of human health since 1980 when insulin became the first product of genetic engineering and modern biotechnology to reach clinical trials. In the pharmaceutical sector, biotechnology is used in three ways: to produce drugs and vaccines using rDNA technology, to make intelligent screens for new compounds and to apply techniques for rational drug design by understanding molecular structures. Since the early 1980's biotechnology has also branched into other areas. In the field of diagnostics, kits are available that use monoclonal antibodies (MABS) to diagnose such diseases as the AIDS virus. MABS can also be used to direct treatments or attack a target themselves which have important consequences for the treatment of cancer and other diseases. In the chemical sector, biotechnology research is mainly in the field of enzymes (which act as catalysts) with markets such as washing powder.

In the agricultural sector, developments have been in the areas of pesticides, plant and animal health and the increasing of yields. Bio-pesticides are produced using strains of a bacterium Bacillus thuringiensis. They have been in commercial use for over 30 years and, over this period, biotechnology has increased the range of target pests. Plants and animals have been selectively bred for generations to bring out useful traits. However, it wasn't until 1983 that the first rDNA engineered plant was produced. Since then there has been much research and development in the area (known as transgenic plant technology) and over 50 species of crop plant can now be genetically transformed. In addition to increased yield, biotechnology has also enabled increased resistance to pests, diseases and to herbicides, so that weeds can be removed by spraying.

In the food sector, developments have included the genetic modification of plants to improve flavour and smell, lengthen shelf life and eliminate toxins. Also, genetically engineered enzymes can be used to enhance the efficiency of certain areas of food production. For example, Bovine Somatotrophin (BST) increases milk production in cattle, and a rennin substitute (Chymosin) eliminates problems of supply and infections from animal sources of rennin.

The areas in which biotechnology could play a key role in environmental and waste management are: treatment of contaminated land and water; reducing the cost of effective pollution control for hazardous industrial effluent; a reduction in the volume of household, agricultural and industrial waste through bacterial digestion and the use of biodegradable packaging. In addition, the use of biotechnology to engineer organisms to increase the rate of digestion of woody matter would enable the yield of biogas from landfill sites, sewage works and agricultural digestors to be increased.

INDUSTRY STRUCTURE

Companies

According to the EC Commission, there are roughly 4500 bioindustry companies in the USA, Europe and in Japan, taken in a rather large definition and including traditional and modern biotechnology as well as suppliers, distributors, constructors, consultants and producers etc. Of these roughly 4500 bioindustry companies, some 1100 are in the USA, some 400 in Japan and some 3000 in Europe (EC around 2500, EFTA around 500).

The companies active in modern Biotech R&D and production are much smaller in number: some 460 in Europe, the USA and Japan, some 200 in the USA, 80 in Japan, and some 180 in Europe (150 EC/ 30 EFTA), this for a relatively narrow definition of modern Biotechnology, including genetic engineering, cell fusion, cell culture and AIDS therapeutics and diagnostics development.

In a larger definition, adding to the foregoing definition biomolecular modelling, synthesis and engineering/ biocatalysis and biotransformation, chiral compounds, immobilization technologies/ biotech downstream processing/ transgenic organisms, one arrives at a larger scope of modern biotech industry core companies, namely some 850 in the USA, Japan and Europe: some 340 in the USA, some 110 in Japan and some 400 in Europe (some 350 EC, some 50 EFTA).

These latter 850 biotech core companies, in the three areas considered, run some 1270 company activity centers in pharmaceuticals, diagnostics, agro-bio food, environment, chemicals, with 26% pharmaceuticals, 34% diagnostics, 22% agro-food, 3% environment, 15% chemicals. Pharmaceuticals and diagnostics make thus some 60% averaged over the three areas considered, the USA being slightly above this average, Japan and Europe below. The other three industry sector lines are rather close to the total average for the three regions considered.

Most companies run more than one activity center.

Because the field has a large capital requirement and relies heavily on an accumulation of knowledge (often in-house), large companies are prominent in the field. On the other hand in the United Kingdom there are a larger than average number of smaller companies due to exceptional arrangements that have been in force since 1992, allowing biotechnology companies to be floated on the London stock exchange without the usual three years record of trading profits. The smaller companies are hence able to benefit from investment of venture capital that has been possible in the US for some time. In the pharmaceutical sector, the average development costs for

Table 3: Biotechnology
Geographical distribution of major pharmaceutical biotechnology companies in Europe

Sweden	Astra	Procordia	
Danmark	Novo-Nordisk		
United Kingdom (1)	Glaxo	ICI	Medeva
Nederland	Gist-Brocades	Akzo	
Belgique/België	Smithkline Beecham Biologicals	Solvay	
BR Deutschland	Hoechst-Roussel-Behringwerke	Boeringer Ingelheim	BASF
Austria	Biochemie	Immuno	Bender & Co
Switzerland	Hoffman La Roche	Ciba-Geigy	Sandoz
France	Rhône Poulenc-Rorer-Merieux	Sanofi	

(1) The UK also has a relatively large number of smaller specialised companies.
Source: Belgian Bioindustries Association

a new drug in smaller companies average 106 million ECU, almost 50% of those of a large multinational. In the USA, the market is characterised by many small to medium sized companies operating along side large multinational companies. In Japan, the players on the market are almost exclusively large multinationals.

In the EC, Denmark leads the way in sales of biotechnology-derived pharmaceutical products. The company sales of Novo-Nordisk (DK) were around 288 million ECU in 1990, 37% of which was due to the company's genetically engineered rDNA insulin (Novolin), produced in yeast. In 1991, Novolin sales were up 24% to lie at around 370 million ECU. Of the European companies involved in Biotechnology, La Roche (CH) has the largest share of the market. Its alpha-interferon drug brought in 170 million ECU in 1991. It also holds a 60% share in Genentech (USA) whose two best selling drugs Alteplase (tPA and hGh-r) gave sales revenues of 324 million ECU.

Strategies

Alliances or minority shareholdings are generally preferred over acquisitions in the biotechnology field. Large companies see these as a way of allowing smaller, innovative companies the freedom to bring a novel technology to the market, whilst widening their technical knowledge and increasing the opportunities for spin offs. During the late 1980's, European companies spent about 2-3 million ECU sounding out the US biotechnology market by investing in small, specialised Californian companies. The testing period ended when La Roche (CH) acquired a 60% share of Genentech (USA), adopting an aggressive apprenticeship strategy. Since then, European activity in the USA has been increasing. In 1992, La Roche and Genentech together accounted for over 50% of patents filed in the USA.

Three distinct investment strategies can be identified on the part of European companies:

The apprenticeship route, whereby the company brings teams of scientists into contact with the commercial environment in the hope that this will generate other favourable developments for the corporation. Companies following this strategy invest highly abroad. Investment in Japan is motivated by the quality of the market, academic ability, a favourable climate for technological progress and the strength of the Japanese in industrial biotechnology. In the USA, the main factors are academic excellence and a highly attractive regulatory and financial environment;

- The cohabitation route, whereby European companies take a neutral view to international alliances. This strategy is pitched more towards securing existing product and marketing bases than actively to encourage innovation;
- The Euro-centred strategy is practised by large European companies whose market is predominantly in the classical biotechnology industry. Also, those companies with a particularly risk averse strategy will tend to remain Euro-centred.

The consequence of the trend of companies forming strategic alliances in the USA has meant that 71% of product and technology flow from the USA to Europe. Thus, jobs and innovation resulting from European investment are created in the US and not in Europe.

ENVIRONMENT

Biotechnology has the potential to radically transform the environment. While applications of biotechnology include improving environmental and waste management and improving the yield and health of plants and animals, there is also a safety issue over the release of GMO's into the environment. The pharmaceutical sector is presently the largest market for biotechnology and this application has the least impact on the environment. The potential for agricultural biotechnologies and biotechnologies to improve environment and waste management is very great. The market for these applications is growing fast.

Biotechnology can benefit the environment directly in several ways. Using biotechnology to improve the ability of bacteria to digest woody material could improve biogas production from sewage works, landfills and agricultural digestors, boosting renewable energy production. It could also reduce the volume of waste from domestic, agricultural and even industrial sources. Bacteria could be designed to provide effective effluent pollution control at much reduced costs. The decontamination of polluted land and water is another possible application. In oil spills, for example, the use of detergents and the consequent detrimental effects to the environment could be avoided through the use of biotechnology.

In agricultural applications, biotechnology could transform modern farming methods with mixed consequences for the environment. Genetically engendered resistance to pests and diseases could reduce the necessity for artificial pesticides (and improve the environment), while the genetically engendered resistance to herbicides could increase the quantity of herbicides applied (and a corresponding decrease in environmental quality).

Table 4: Biotechnology
Top 10 biotechnology derived pharmaceuticals

Company	Country	Generic	Sales (million ECU) 1990	1991
Eli Lilly	USA	insulin-r	310	369
Novo Nordisk	DK	insulin-r	288	356
Amgen	USA	erythropoietin	235	347
Johnson & Johnson	USA	erythropoietin	127	254
Schering-Plough	USA	interferon-alpha	150	213
Kabi Pharmacia	USA	Hgh-r	187	212
Amgen	USA	G-CSF	0	198
La Roche	CH	interferon-alpha	134	170
Genentech (1)	USA	alteplase (tPA)	178	167
Genentech (1)	USA	Hgh-r	144	157

(1) 60% owned by La Roche.
Source: European Chemical News

The safety of GMO's on the environment is another important issue. The industry is highly regulated, both in R,D&D and in the clinical or field testing of genetically engineered organisms before commercialisation. Currently moves are underway to make it easier for biotechnology derived products to be brought to the market.

REGULATIONS

On one level, biotechnology is a new set of techniques that modify the way in which a number of industrial sectors are approaching R,D&D and production. It is therefore subject to all pre-existing regulations controlling those industries.

There have also been various Council directives and regulations specifically in the field of biotechnology.

Registration of biotechnology-derived pharmaceutical products has been the responsibility of the Committee for Proprietary Medicinal Products (CPMP) and the Committee for Veterinary Medicinal Products (CVMP) as regulated by Council Directive 87/21/EEC. In January 1993, these two bodies were due to have become part of the European Agency for the Evaluation of Medicinal products (EAEMP) when their views would have become binding on Member States. This has been delayed and simplified procedures are operating as a temporary measure.

In the area of health and safety at work, Council directive 90/679/EEC has been adopted to protect workers against the risks to their health and security from exposure to biological agents and to promote the harmonisation of the regulations applied by Member States in this area.

Council directive 90/220/EEC and 90/219/EEC respectively cover the deliberate and contained release of GMO's into the environment. The former directive requires that a risk assessment should always be carried out before any deliberate release of GMO's into the environment. National approval is required for experimental release, thereafter community approval is required for commercial release. After receiving EC approval, the product can circulate freely in the EC. Directive 90/219/EEC requires a risk assessment to be performed on installations carrying out work on GMO's. Flexible precautionary procedures reflect the level of potential risk.

As concerns the juridical protection of intellectual property, the Commission is currently considering three proposals: a directive on legal protection of biotechnological inventions; a regulation on a supplementary protection certificate for medicinal products and a regulation on community plant variety rights.

In the latter, the ruling on whether farmers have the right to re-sow seeds produced by means of biotechnology must be in line with GATT. Additional proposals under consideration refer to the law pertaining to genetically modified animals, animal productivity enhancers, novel food ingredients and processes and transport of biotechnological organisms and micro-organisms.

Table 5: Biotechnology
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	5.5	6.9
Production	5.1	6.1
Extra-EC exports	4.3	4.1

Source: DRI Europe

A move by the European Commission in 1992 established standards in the field of biotechnology with a program conducted by the European Committee for Standardisation (CEN). The standardisation will help support existing legislative actions and in other areas not under specific legislative control. By building a common approach on technical questions, the program should strengthen the competitiveness of the European biotechnology industry. In the past, community support has been given to the biotechnology industry through a number of programs, including BEP, BAP, BRIDGE, ECLAIR, FLAIR, HUMAN GENOME ANALYSIS, VALUE, and MONITOR, that have been designed to improve basic knowledge and reinforce biotechnology in the EC.

OUTLOOK

Given the front-ranking position of the USA, it is expected to continue to act as a magnet for investment. The Japanese industry, too, should experience high growth. Investment is likely to continue to flow out of Europe. By 1995, it is estimated that European investment in Japan and Asia will more than double (albeit from a small base) while investment in the USA should be around 40% higher. An increase of about 30% is expected in Europe.

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Biotechnology can benefit the environment directly in several ways. Using biotechnology to improve the ability of bacteria to digest woody material could improve biogas production from sewage works, landfills and agricultural digestors, boosting renewable energy production. It could also reduce the volume of waste from domestic, agricultural and even industrial sources. Bacteria could be designed to provide effective effluent pollution control at much reduced costs. The decontamination of polluted land and water is another possible application. In oil spills, for example, the use of detergents and the consequent detrimental effects to the environment could be avoided through the use of biotechnology.

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Schering-Plough	USA	interferon-alpha	150	213
Kabi Pharmacia	USA	Hgh-r	187	212
Amgen	USA	G-CSF	0	198
La Roche	CH	interferon-alpha	134	170
Genentech (1)	USA	alteplase (tPA)	178	167
Genentech (1)	USA	Hgh-r	144	157

(1) 60% owned by La Roche.
Source: European Chemical News

The safety of GMO's on the environment is another important issue. The industry is highly regulated, both in R,D&D and in the clinical or field testing of genetically engineered organisms before commercialisation. Currently moves are underway to make it easier for biotechnology derived products to be brought to the market.

REGULATIONS

On one level, biotechnology is a new set of techniques that modify the way in which a number of industrial sectors are approaching R,D&D and production. It is therefore subject to all pre-existing regulations controlling those industries.

There have also been various Council directives and regulations specifically in the field of biotechnology.

Registration of biotechnology-derived pharmaceutical products has been the responsibility of the Committee for Proprietary Medicinal Products (CPMP) and the Committee for Veterinary Medicinal Products (CVMP) as regulated by Council Directive 87/21/EEC. In January 1993, these two bodies were due to have become part of the European Agency for the Evaluation of Medicinal products (EAEMP) when their views would have become binding on Member States. This has been delayed and simplified procedures are operating as a temporary measure.

In the area of health and safety at work, Council directive 90/679/EEC has been adopted to protect workers against the risks to their health and security from exposure to biological agents and to promote the harmonisation of the regulations applied by Member States in this area.

Council directive 90/220/EEC and 90/219/EEC respectively cover the deliberate and contained release of GMO's into the environment. The former directive requires that a risk assessment should always be carried out before any deliberate release of GMO's into the environment. National approval is required for experimental release, thereafter community approval is required for commercial release. After receiving EC approval, the product can circulate freely in the EC. Directive 90/219/EEC requires a risk assessment to be performed on installations carrying out work on GMO's. Flexible precautionary procedures reflect the level of potential risk.

As concerns the juridical protection of intellectual property, the Commission is currently considering three proposals: a directive on legal protection of biotechnological inventions; a regulation on a supplementary protection certificate for medicinal products and a regulation on community plant variety rights.

In the latter, the ruling on whether farmers have the right to re-sow seeds produced by means of biotechnology must be in line with GATT. Additional proposals under consideration refer to the law pertaining to genetically modified animals, animal productivity enhancers, novel food ingredients and processes and transport of biotechnological organisms and micro-organisms.

Table 5: Biotechnology
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	5.5	6.9
Production	5.1	6.1
Extra-EC exports	4.3	4.1

Source: DRI Europe

A move by the European Commission in 1992 established standards in the field of biotechnology with a program conducted by the European Committee for Standardisation (CEN). The standardisation will help support existing legislative actions and in other areas not under specific legislative control. By building a common approach on technical questions, the program should strengthen the competitiveness of the European biotechnology industry. In the past, community support has been given to the biotechnology industry through a number of programs, including BEP, BAP, BRIDGE, ECLAIR, FLAIR, HUMAN GENOME ANALYSIS, VALUE, and MONITOR, that have been designed to improve basic knowledge and reinforce biotechnology in the EC.

OUTLOOK

Given the front-ranking position of the USA, it is expected to continue to act as a magnet for investment. The Japanese industry, too, should experience high growth. Investment is likely to continue to flow out of Europe. By 1995, it is estimated that European investment in Japan and Asia will more than double (albeit from a small base) while investment in the USA should be around 40% higher. An increase of about 30% is expected in Europe.

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Overview
NACE 31

The European Community is the world's largest producer of metal products. The industry's products serve mainly as intermediate commodities for other industries such as mechanical engineering, construction and the automotive industry. Although comprised of a large fabric of small companies, the metal products industry ranks among the largest manufacturing employers in the EC, with a workforce of over 2.1 million.
Due to the present recession in the sector's downstream markets, metal products suffered a significant drop in activity in 1992. Production and consumption are not expected to resume before 1995, as the near term outlook is not quite encouraging for the sector's main customers in the EC.

INDUSTRY PROFILE

Description of the sector

The metal products industry as defined by NACE 31 includes the following sectors:

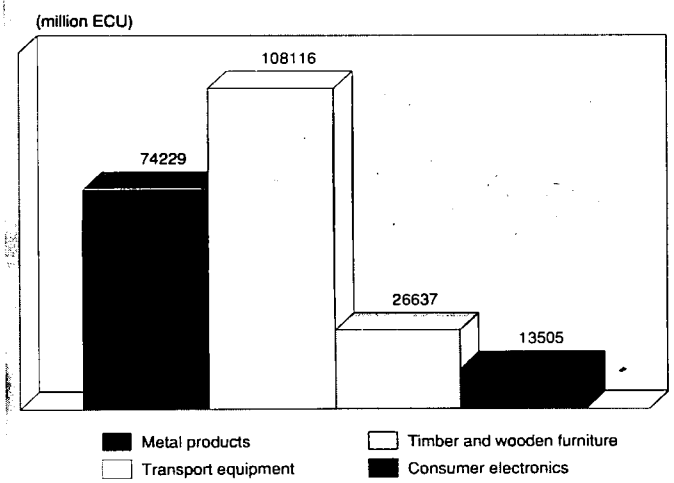
- Foundries (NACE 311), include iron and steel foundries which produce cast iron, ductile cast iron, etc., and non-ferrous foundries which produce copper cast, aluminium cast, etc.;
- Forging (NACE 312), includes transforming semi-finished metal into forged metal products through the use of a die;
- Secondary transformation of metals (NACE 313), involves the production of articles such as lathes, nuts, bolts, springs (excluding furniture and watch springs) and chains (excluding articulated link chains). The sector also includes such processes as galvanising, anodising and enamelling of metals and general mechanical engineering on a sub-contract basis;
- Structural metal products (NACE 314), include the production of metal bridges, frames, doors, windows, railway tracks, etc.;
- Boilers and metal containers (NACE 315), include the manufacture of various boilers, fittings, water tanks, and pipework, etc.;
- Tools (NACE 316), include hand tools, tools for joinery, fixing tools for construction and metal saws, cutlery, metal packaging;
- Other metal workshops (NACE 319).

Of the sectors of the industry listed above, tools are the largest with an output of 71.3 billion ECU, or 39.6% of EC production of metal products. The secondary transformation of metals, with 24.5 billion ECU of output, is also an important sector of the metal products industry.

Recent trends

The European Community is the largest producer of metal products in the world. Of the Member States, Germany is by far the largest manufacturer of metal products, with value added output of above 30.5 million ECU in 1992. As such, Germany provides 41% of the EC metal product value added. The EC four leading Member States represent the bulk of metal product output, as they account for 83% of value added within the EC in 1992. Spain is also a sizeable producer, with output reaching 8.4% of the EC value added.

Figure 1: Metal products
Value added in comparison with other Industries, 1992

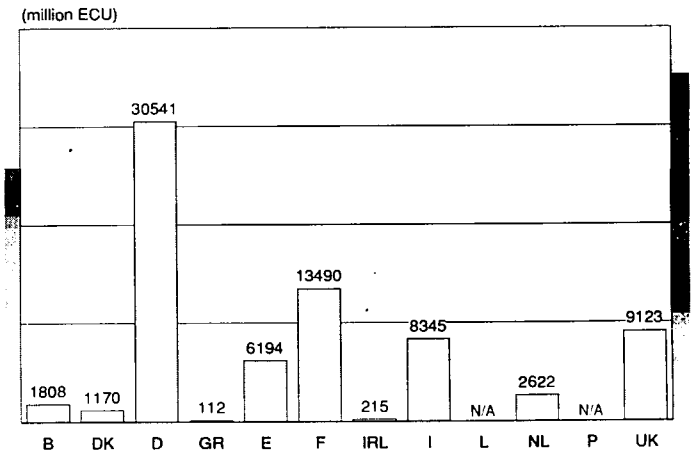


Source: DEBA

The metal product industry also ranks among the largest employers in the EC. With a workforce of over 2.1 million, the sector accounted for 9.7% of EC manufacturing employment in 1992.

In 1992, the metal product industry experienced its first drop in production value in ten years. This cut followed a year of slower growth in the value of production and apparent consumption in 1991, compared to the unusually strong boom reported in the 1988-1990 period. Recessionary conditions in the sector's downstream markets (mainly engineering, transportation equipment and construction) have reversed the booming demand which characterised the industry at the end of the 1980s. Employment figures also feature the halt reported in activity, as the number of employees decreased for the second year in a row, with 79 000 workers axed between 1990 and 1992. This sharp cut in employment follows a two-year period of fast growth, when the industry built up a numerous workforce to answer the strong market upturn reported in 1988-1990.

Figure 2: Metal products
Value added by Member State, 1992



Source: DEBA

Table 1: Metal products
Breakdown by sector, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Foundries	18 744	19 111	991.0
Forging, pressing and stamping	14 443	14 583	545.3
Secondary transformation	24 446	24 525	1 167.0
Boilermaking	18 476	19 498	1 426.5
Manufacture of tools and finished metal goods	69 837	71 730	7 697.4

(1) Except for trade figures, estimates are used if country data is not available.
Source: DEBA

Table 2: Metal products
Sectoral share of production and employment, 1992 (1)

Description and NACE code	Production (%)	Employment (%)
Foundries (311)	10.6	11.8
Forging, pressing and stamping (312)	8.1	7.8
Secondary transformation (313)	13.5	16.3
Manufacture of structural metal products (314)	16.7	15.8
Boilermaking (315)	10.8	10.2
Tools (316)	39.6	36.7
Other metal workshops (319)	0.7	1.4
Total manufacture of metal articles (31)	100.0	100.0

(1) Estimates are ussed if country data is not available.
Source: Eurostat

Table 3: Metal products
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	99 190	105 749	112 718	117 462	123 298	139 593	160 315	172 157	177 181	176 564	173 000
Production	107 589	114 369	121 216	124 559	129 530	145 084	166 336	177 923	182 026	181 211	178 000
Extra-EC exports	12 082	12 789	12 944	11 739	11 321	11 503	13 138	13 362	13 755	14 040	13 900
Trade balance	8 399	8 621	8 498	7 097	6 232	5 491	6 020	5 766	4 845	4 647	4 600
Employment (thousands)	2 168	2 105	2 061	2 032	2 029	2 064	2 153	2 208	2 192	2 129	1 970

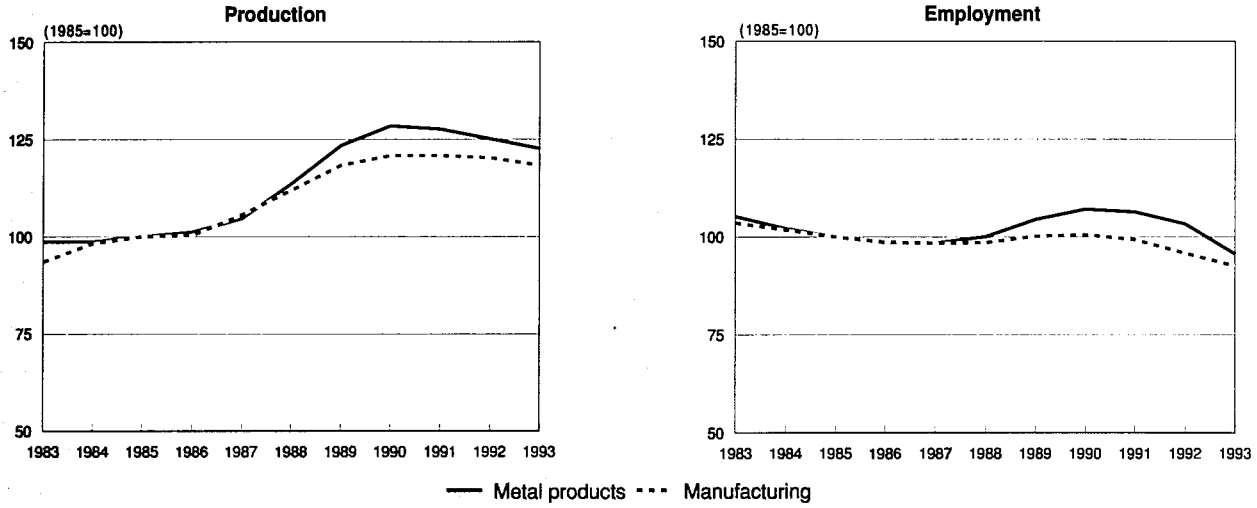
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded DRI Europe and Eurostat estimates.
Source: DEBA

Table 4: Metal products
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	3.8	2.7	3.3
Production	2.9	2.4	2.7
Extra-EC exports	-4.5	1.6	-1.8
Extra-EC imports	6.3	7.8	7.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Figure 3: Metal products
Production in constant prices and employment compared to EC manufacturing



1993 are DRI Europe and Eurostat estimates.
Source: DEBA

International comparison

World production of metal products is clearly dominated by the European Community, followed by the USA and Japan which rank as EC's closest competitors. EC's industry of metal products managed to maintain a better rate of production growth than the USA, but has been outstripped in terms of growth by Japan until 1991. Last year however, Japan's metal product industry joined its major competitors in the downward trend, and cut sharply production to answer plummeting demand.

Competition is also increasing from other parts of the world, mainly from East Asian countries such as Hong Kong, Singapore and South Korea. Several East European countries have also joined the group of EC's significant competitors in the manufacturing of metal products. These countries are particularly competitive through pricing, and are formidable .

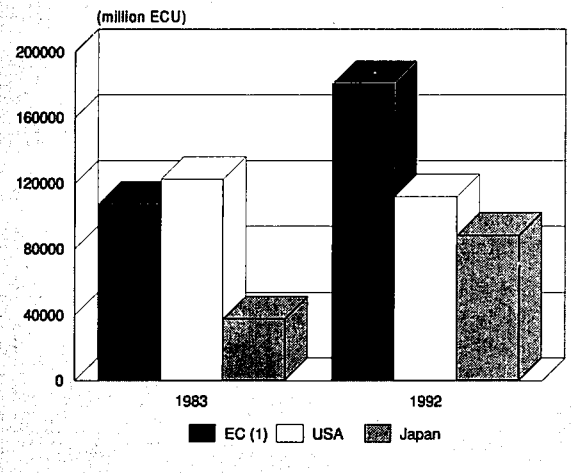
Foreign trade

Although EC countries continue to net a trade surplus, that position has declined recently as a consequence of a halt in exports combined with an increase in extra-EC imports. The metal product industry is not particularly open to trade: external trade accounts for a mere 7.6% of total production. Imports, on the other hand, are growing at a faster rate than exports: the export/import ratio has been steadily decreasing from 3.28 in 1983 to 1.49 in 1992.

The largest importers of metal products from the EC are the EFTA countries with 33% of total extra-EC exports, and the USA with 11.2%. The "rest of the world" represents almost half total extra-EC exports, which gives evidence of the large number of small foreign outlets for EC metal products.

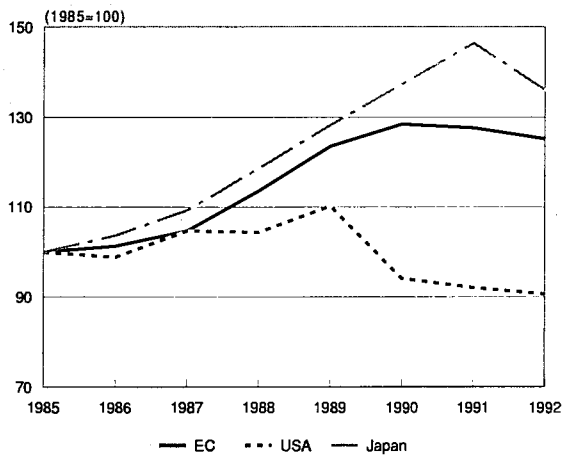
The major importer of metal products into the EC are also the EFTA countries, with a share of about 40% of total EC imports in 1992, followed by the USA with 13% and Taiwan with 7.6% (when excluding the "rest of the world"). Most

Figure 4: Metal products
International comparison of production in current prices



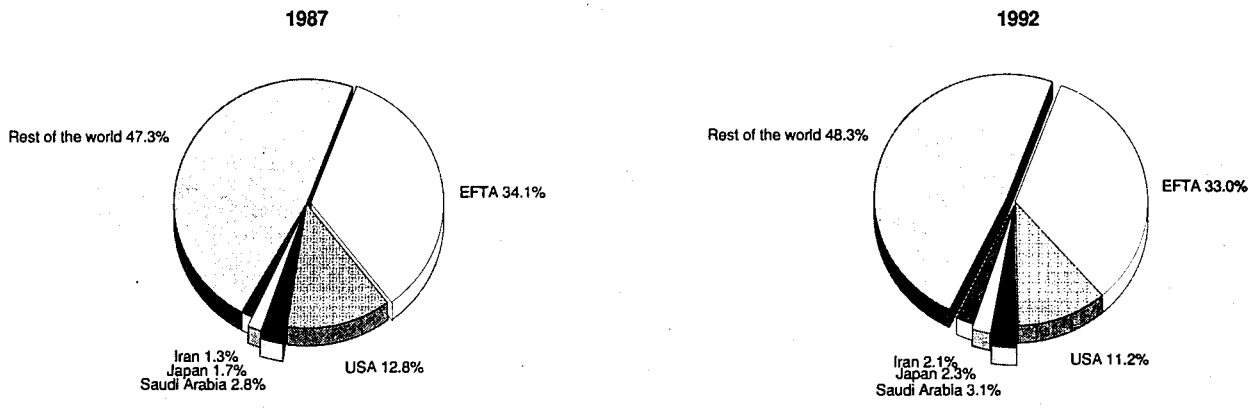
(1) Excluding forging.
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Metal products
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Metal products
Destination of EC exports



Source: Eurostat

competitors lost shares on the EC market during the last five years. EFTA countries, in particular, lost as much as 7.4 percentage points of market share, and Japan 2.3%, to the advantage of an increased NIC's presence: China and Taiwan increased their joint market share from 10% in 1987 to 14% in 1992. Subcontracting to the automotive industry is particularly affected by imports. For example, Japan's plants in Europe are mainly supplied by imports of metal products originating in NICs such as South Korea.

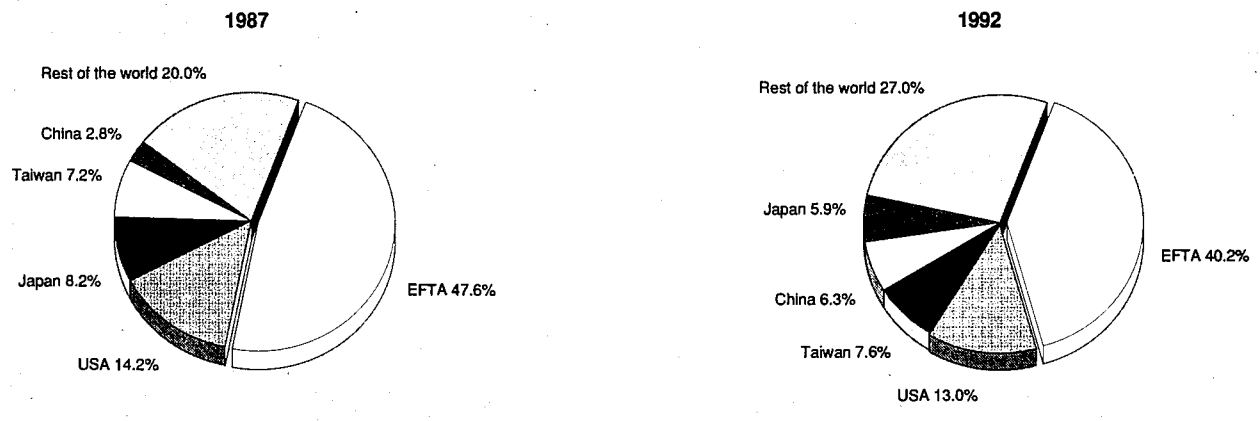
Intra-EC trade has been increasing substantially over the past years and amounted to more than 23 billion ECU in 1992. This high level of intra-EC trade evidences the local nature of the metal product industry, which traditionally supplies national or even regional markets. Intra-EC trade actually represents above 71% of total imports; furthermore, imports from outside the European Community represented a mere 5.3% of EC consumption of metal products in 1992. However, the analysis of recent trends signals increasing inroads of foreign manufacturers into the EC metal product market. Since 1990, extra-EC imports have been severely outstripping intra-EC trade in terms of growth, giving further evidence of an increasing penetration of non-EC metal products into the European Community.

MARKET FORCES

Demand

Most of the industry's products are basically intermediate commodities for other industries, demand is heavily dependent upon the industry's main markets, namely mechanical and electrical engineering, transportation equipment and construction. In the case of Germany, the input/output table compiled by the Statistische Bundesamt provide a significant breakdown of the metal product industry's outlets: almost 44% of all metal products go to the processing industries, above 7% go to the construction sector, and 21.5% are directed to investment activities. Only 5.8% of metal products manufactured in Germany go to final consumers, mainly to the DIY market. Intermediate consumption is mainly accounted for by the motor vehicle manufacture (with over 20% of total sales to processing industries), the mechanical engineering (15%) and the metal product industry itself which is one of its own best customers. Almost all sectors of the metal product industry are linked to these very cyclical downstream industries, which experienced a severe downturn in the last two years: activity in the mechanical engineering collapsed in the last two years as a consequence of a slump in investment climate; the automotive

Figure 7: Metal products
Origin of EC Imports



Source: Eurostat

Table 5: Metal products
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	12 082	12 789	12 944	11 739	11 321	11 503	13 138	13 362	13 755	14 040
Extra-EC imports	3 683	4 168	4 446	4 642	5 089	6 012	7 118	7 596	8 910	9 393
Trade balance	8 399	8 621	8 498	7 097	6 232	5 491	6 020	5 766	4 845	4 647
Ratio exports/imports	3.28	3.07	2.91	2.53	2.22	1.91	1.85	1.76	1.54	1.49
Terms of trade index	104.3	101.8	100.0	102.6	104.1	103.8	101.5	102.1	101.3	102.5
Intra-EC trade	9 391	10 422	11 667	12 763	13 729	15 918	18 548	20 812	22 596	23 175
Share of total imports (%)	71.8	71.4	72.4	73.3	73.0	72.6	72.3	73.3	71.7	71.2

Source: DEBA

industry and construction activity were also severely affected by the economic gloom. As a consequence, domestic sales of the metal product industry declined in real terms in 1991 and collapsed in 1992. No major improvement is forecast for 1993, as the economy will remain in the doldrums until early 1995.

Supply and competition

The recent slump in demand left the metal product industry with excessive production capacity, that contributed to put pressure on prices. In the early eighties, many European producers had carried out major investment projects to improve their production facilities, and to increase their capacities. These investments helped the industry to answer the booming demand it enjoyed at the end of the 1980s.

When demand for metal products started to decline in 1992, the industry found itself with an over capacity which further dampened companies' profitability. Indeed, the drop in demand occurred at a time when the metal products industry was severely affected by strong pressure on the cost side. Unit labour costs actually rose an estimated 71% between 1983 and 1992. Such rise in labour costs has not been matched by increases in productivity, which put the industry's profitability under strong pressure.

There are, nevertheless, significant differences between Member States. For example, Greece has very low labour costs compared to Germany. Greece also reports lower production costs as regards environmental legislation than Germany. Flagrant imbalances between costs of doing business can also be found between Europe and the USA or Japan for example. Such differences make Europe's manufacturers less competitive than their major counterparts, and leave them with the necessity to increase productivity, in an aim to lessen pressure on costs. German productivity, for example, has improved significantly over the past years.

Production process

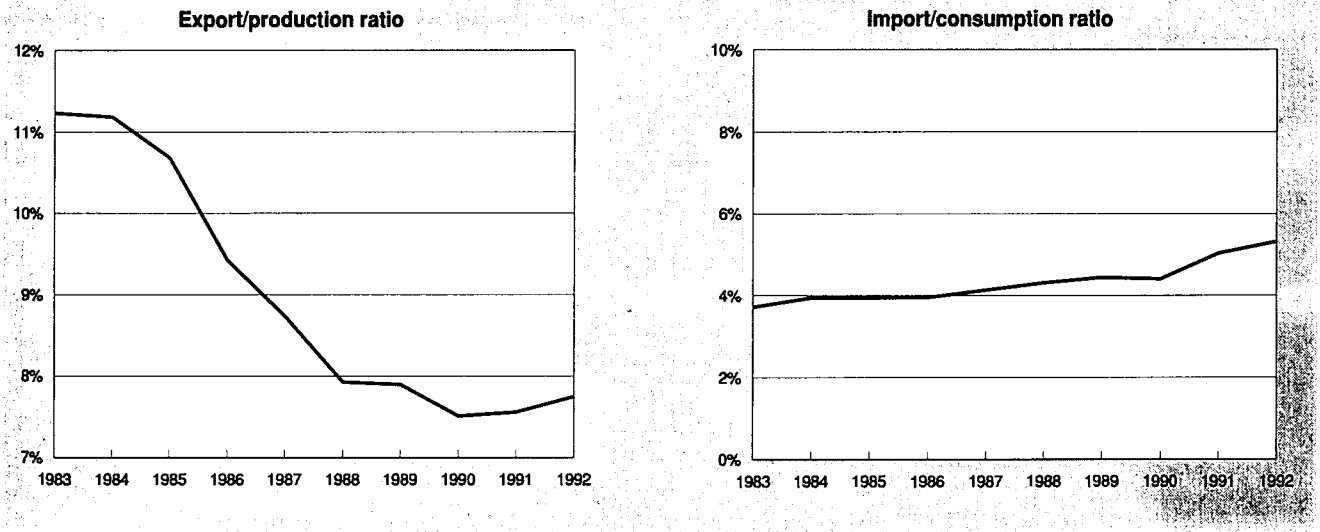
Since the early 1980s productivity gains have been achieved through greater automation of production processes. Apart from the introduction of robotics, the industry is utilising innovations such as Computer Numerical Control (CNC), Computer Aided Design (CAD) and Flexible Manufacturing Systems. As a result, the need for skilled labour in these sectors is increasing. Although firms are striving for greater mechanisation of production, most sectors of the metal products industry remain labour intensive. For example, in the forging industry, personnel costs range between 40% to 50% of total costs (most of the remaining costs being allocated to metal inputs and energy costs).

INDUSTRY STRUCTURE

Companies

The EC's metal product industry is characterised by a relatively low concentration. About 98% of all enterprises employ less

Figure 8: Metal products
Trade Intensities



Source: DEBA

Table 6: Metal products
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	27.8	27.9	28.7	30.1	31.5	32.9	33.1	34.3	34.5	34.9
Productivity index	96.8	97.4	100.0	105.0	109.7	114.8	115.4	119.7	120.3	121.6
Unit labour costs index (3)	87.3	93.8	100.0	105.1	109.6	114.5	121.3	129.6	139.0	149.3
Total unit costs index (4)	86.1	92.8	100.0	103.2	107.2	117.8	129.4	134.4	139.7	146.3

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

than 100 persons. These small companies employ almost 56% of the industry's workforce. As most firms do not serve final consumer markets, they tend not to have brand names recognised by the general public. At the other end of the spectrum, the number of large companies operating in the sector is very small. However, they represent above 42% of the sector's workforce and almost 55% of the sector's turnover. Large firms tend to concentrate on areas allowing economies of scale or necessitating high personnel and financial capacities.

In 1992, the foremost companies operating in the European market included Pechiney (F), CMB Packaging (F). The largest companies tend to be located in the countries which dominate the market, although the top German company only ranked as the fourth largest EC metal producer in 1992. The German industry is indeed less concentrated than France's one, which counts five out of the fifteen largest metal product companies in 1992. The ranking provided below evidences the presence of two major packaging producers, the weigh of which illustrates the higher concentration in this industry than in any other segment of the metal product industry.

Strategies

After the booming period between 1988 and 1990, EC metal products industry found itself in dire straits, with plummeting demand and the accompanying problem of excessive production capacity. Also confronted by harsh financial difficulties, the metal product manufacturers entered in the early 1990s in a deep rationalisation process aimed at cutting costs. This mainly translated into large cutbacks in employment, along with investment reductions. As a matter of fact, ORGALIME estimates that EC manufacturers cut investment by as much as 5% in 1992 and 10.5% in 1993.

As far as firms' structure is concerned, there is, contrary to most of the sector's customers, no obvious trend towards concentration. Mergers and acquisitions are quite rare in the metal products industry. Companies tend to remain independent while strengthening the links built with their traditional customers. The depression nevertheless brought about the need to lessen the dependence on few heavy clients. This concern has encouraged firms to diversify their operations. Many firms are seeking new outlets for products, not only in the European Community, but also on foreign markets. In particular, some companies are currently investing in the most industrialised East European countries, in order to take advantage of the local markets when they take off.

Meanwhile, metal product companies are also reconsidering the composition of their key activities, in order to better answer their customers' requirements.

REGIONAL DISTRIBUTION

For most of the sectors, the high weight/value ratio limits long-distance transport of goods. In order to remain profitable, firms tend to locate near their clients. Modern and efficient metal product mills tend to locate in those regions where high capacity automotive production plants or productive engineering companies are found, or more generally near the major industrial centres of Europe. Given that Germany in particular has a number of relatively large regions of heavy industry, it follows that large number of firms in the metal products industry are in close proximity to such clients. For example, German companies account for 51% of EC forging, and 80% of all German forging companies are concentrated in North Rhine-Westphalia.

ENVIRONMENT

Each of the sectors in the metal products industry has a unique environmental concern. To summarise these issues, a short description of environmental problems concerning individual sectors is in order.

Foundries are very active in recycling materials used during the production process. This sector is also focused on the subject of clean air, and often makes large investments in order to comply with strict regulations. The foundries sector is also an important energy consumer and is very much concerned with the problem of energy conservation.

The forging industry is mainly concerned with reducing noise pollution resulting from the use of forging hammers. Fur-

Table 7: Metal products
Breakdown by size of enterprise, 1990 (1)

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	202 085	88.2	28.5	19.0
20-99	22 819	10.0	28.9	26.0
100 or more	4 184	1.8	42.6	55.0

(1) Provisional estimates.
Source: Eurostat

Table 8: Metal products
Production in constant prices and employment by Member State (1)

Country	Production (million ECU) 1983	1992	Employment (thousands) 1983	1992
Belgique/België	2 515.4	4 022.7	43 012	52 640
Danmark	1 368.9	2 230.1	22 528	31 808
BR Deutschland	37 081.4	54 416.1	621 657	770 991
Hellas	816.0	641.8	18 229	13 157
España	9 422.7	12 108.8	250 181	232 660
France	26 780.6	30 861.9	448 739	380 322
Ireland	463.2	599.1	9 559	8 527
Italia	16 997.7	20 273.5	279 968	219 020
Luxembourg	133.7	414.6	1 906	3 080
Nederland	3 767.2	5 848.4	59 093	75 121
Portugal	851.7	849.5	50 252	33 545
United Kingdom	19 307.3	19360	362 671	308 303

(1) Estimates are used if country data is not available, especially for 1992.
Source: Eurostat

thermore, energy conservation has been emphasised with efforts to use more efficient electro-hydraulic systems to power forging hammers and to utilise waste heat from the forging process.

The electroplating industry (secondary transformation of metals) is particularly concerned with reducing the metal content of the effluent through the introduction of new production processes.

Apart from environmental issues related to production, the boilers and metal containers sector is concerned with the corrosion of tanks containing chemicals and oil products during underground storage.

The light metal packaging industry is presently exploring new programmes which will ameliorate the environmental impact of its products, mainly through the promotion of consumer recycling.

REGULATIONS

At present, directives pertaining to the metal products industry are primarily related to safety standards. One of the more notable examples is a study taking place which would make ISO 9000 standards compulsory not only for EC manufacturers, but also for importers.

One of the major issues confronting the metal products industry is the harmonisation of EC standards. The present difficulty for manufacturers is deciding what standard of production processes will be used in the near future (i.e. existing national standards or a future unspecified EC standard). The unpredictability associated with this situation is an obstacle in making future investment decisions.

The general upgrading of environmental requirements in the EC will have a particular impact on foundries, which might suffer a loss in competitiveness vis-à-vis third countries producers.

OUTLOOK

Improvements in the mechanical engineering, motor vehicles and construction markets are necessary for strong growth in the metal products industry. Due to the ongoing recession in these major markets, a continuing fall is expected in 1993.

Table 9: Metal products
The 15 largest European companies, 1992

(million ECU)	Country	Turnover	Net profits	Employees
Pechiney	F	9 551	30	63 287
CMB Packaging	F	3 628	143	30 270
C.G.I.P.	F	2 361	79	17 587
Schmalbach-Lubeca	D	1 713	40	12 849
Industrivarden	CH	1 460	21	11 737
Gea	D	1 070	40	10 032
Delta	UK	1 068	46	13 540
Buderus	D	1 046	31	11 934
MB-Caradon	UK	903	114	10 290
De Dietrich & Cie	F	552	12	5 900
Senior Engineering Group	UK	451	3	5 512
Elco Looser La Holdings	CH	398	11	3 187
Newman Tonks Group	UK	362	11	5 037
Blagden Industries	UK	312	5	2 857
Soudure Autogene Française	F	311	8	2 727

Source: DABLE

Table 10: Metal products
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-1.0	2.0
Production	-0.5	2.5
Extra-EC exports	1.0	3.1

Source: DRI Europe

1994 will not bring about any relief as the industry's customers remain in the doldrums. Employment in the sector will suffer further cuts over the next two years. Most of European producers will have to wait until 1995 to benefit from a revival in demand . Companies' profitability will be slow to recover, as they will continue to suffer from strong pressures on prices.

In the medium term the outlook is not so discouraging. Efforts to lessen dependence on heavy industry in recent years have already helped reduce the degree of cyclical downturns of demand for intermediate commodities traditionally supplied by this industry. Furthermore, innovations in production processes are also allowing sectors to become more profitable not only by reducing material waste but also by producing products with a higher grade of value added.

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Foundries
NACE 311

With an annual output of around 20 billion ECU, the EC is among the world's largest producers of castings. The greater part of this output is supplied as components to the automobile industry and mechanical engineering firms. The foundry industry is structurally composed of small and medium-sized firms. In many cases, foundries are part of larger companies and produce castings to meet that company's own needs. The customers are, for the most part, large companies.
The marked decline in employment coupled with generally constant production clearly shows the rise in the productivity of labour during the past ten years. The EC's balance of trade is, admittedly, still positive, but imports have risen much faster than exports in recent years.

INDUSTRY PROFILE

Description of the sector

Foundries are industrial subcontractors. The castings which they manufacture are normally used as primary products in other industrial undertakings. Cast end-product companies remain the exception.

Cast products acquire their shape through the fact that metals are poured in the molten state into a mould and solidify in it. This leaves the designer basically free to determine their shape, with the result that both the surface and the cavities may be very complex. Depending on whether the molten metal is given the shape corresponding to the desired product under the influence of gravity, centrifugal force or pressure, in other words, depending on the technique used for making the mould, the following types of casting are distinguished: sand casting, shell casting, chill (permanent-mould) casting, die casting, centrifugal casting, continuous (extrusion) casting, high-quality casting, precision casting and art casting.

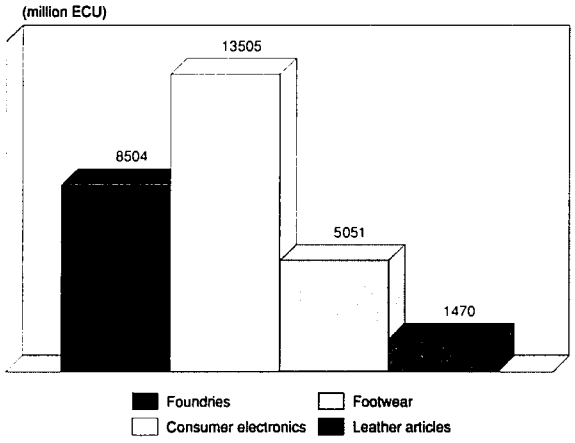
Another possible classification is to make the distinction in terms of the materials used. This classification forms the basis of this paper and also of NACE. A distinction is made in NACE Code 3110, Foundry products, between iron and steel foundries that produce grey cast iron, ductile cast iron (spherical graphite cast iron/malleable cast iron), cast steel and special cast steel (NACE 3111) and non-ferrous metal foundries that chiefly produce aluminium, copper and zinc (NACE 3112).

For each group there are innumerable alloys. Some are standardised. Many are specially developed to meet the customer's specific requirements. Foundries quite often offer up to 200 different qualities or alloys.

The availability of statistical data and their differentiation vary greatly among individual EC countries. Particularly unsatisfactory throughout the EC is the foreign trade data. Many foundry products do not have a commodity number of their own in the foreign trade statistics. They are grouped together with other products under "miscellaneous products". This applies particularly to components supplied to the automobile industry.

In the past, many foundries were established in the vicinity of coal mines or close to iron and steel production locations. In other words, the locations of the foundry industry were raw-material-oriented. Over the course of time, the raw-material orientation has been increasingly replaced by customer orientation. Concentrations of foundries are now found in areas near the locations of their major customers, the automobile and mechanical engineering industries.

Figure 1: Foundries
Value added in comparison with other industries, 1992



Source: DEBA

Recent trends

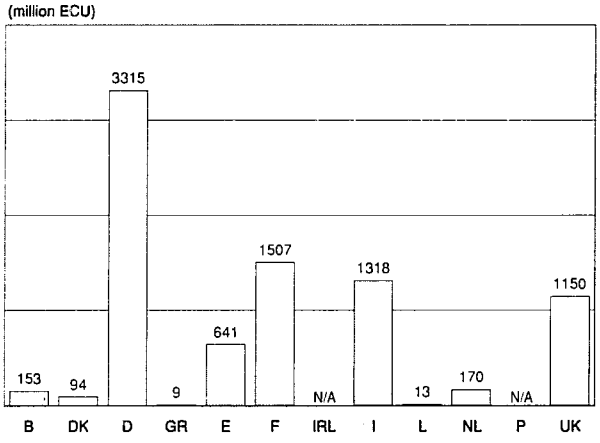
As a result of the protracted boom, foundries were able to increase their output from 1983 to 1989 by 7.9%. Since 1990 quantities produced have been declining again, at first only slightly but quite markedly since the end of 1992. It is expected that in 1993, 19% fewer castings than in 1989 will be produced in the EC.

The fall of 21% in employment from 1983 to 1992 coupled with a quantitative decline in output of only 3% clearly reveals the rise in labour productivity during that period. In terms of value added per employee, the extent of the rise in the productivity of labour becomes even clearer: expressed in 1985 ECU it rose by 28%.

This also highlights the shift towards higher-quality castings: firstly, the share of castings made of non-ferrous metals in total production has risen from 12.5% to over 16%. Secondly, cast products have become increasingly thin-walled, lighter and more complex and expensive to produce.

While the EC's balance of external trade is still positive, the surplus is dwindling steadily. In 1983, the quantity of cast products exported was 2.8 times as great as that of imports. In 1992 the corresponding figure was only 1.6.

Figure 2: Foundries
Value added by Member State, 1992 (1)



(1) Integrated foundries excluded.
Source: DEBA

Table 1: Foundries
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	13 306	14 351	14 695	15 135	14 970	16 901	19 480	19 770	19 377	18 744	18 100
Production	13 795	14 905	15 259	15 659	15 443	17 432	19 992	20 223	19 768	19 111	18 400
Extra-EC exports	762.6	843.7	896.9	865.8	826.2	919.1	962.5	960.0	976.1	991.0	917.0
Trade balance	489.2	553.6	563.6	524.5	473.0	531.1	511.9	453.4	390.8	366.3	300.0
Employment (thousands)	314.9	300.1	283.5	275.9	266.6	269.9	276.8	276.8	264.6	250.3	227.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) DGV estimates.
Source: DEBA

Table 2: Foundries
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	1.4	-0.7	0.4
Production	1.3	-1.0	0.3
Extra-EC exports	0.6	-1.4	-0.3
Extra-EC imports	3.3	7.3	5.1

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Foundries
Breakdown of production by main European producers

	D		F		I		UK		E	
(thousand tonnes)	1987	1992	1987	1992	1987	1992	1987	1992(1)	1987	1992
Ferrous metals	3 215	3 467	1 783	1 961	1 450	1 372	1 210	1 038	701	547
Grey iron	2 169	2 160	929	962	1 168	1 107	742	570	426	294
Ductile iron	861	1 096	735	873	189	185	364	388	174	184
Steel	185	210	119	126	93	80	104	80	101	70
Non ferrous metals	584	633	267	296	483	532	160	127	106	124
Cu-base	72	90	22	22	81	98	42	33	15	13
Al-base	433	464	205	235	338	369	75	64	67	89
Other non ferrous	79	79	39	39	64	65	43	30	24	21
All castings	3 799	4 099	2 050	2 257	1 933	1 904	1 369	1 165	807	671

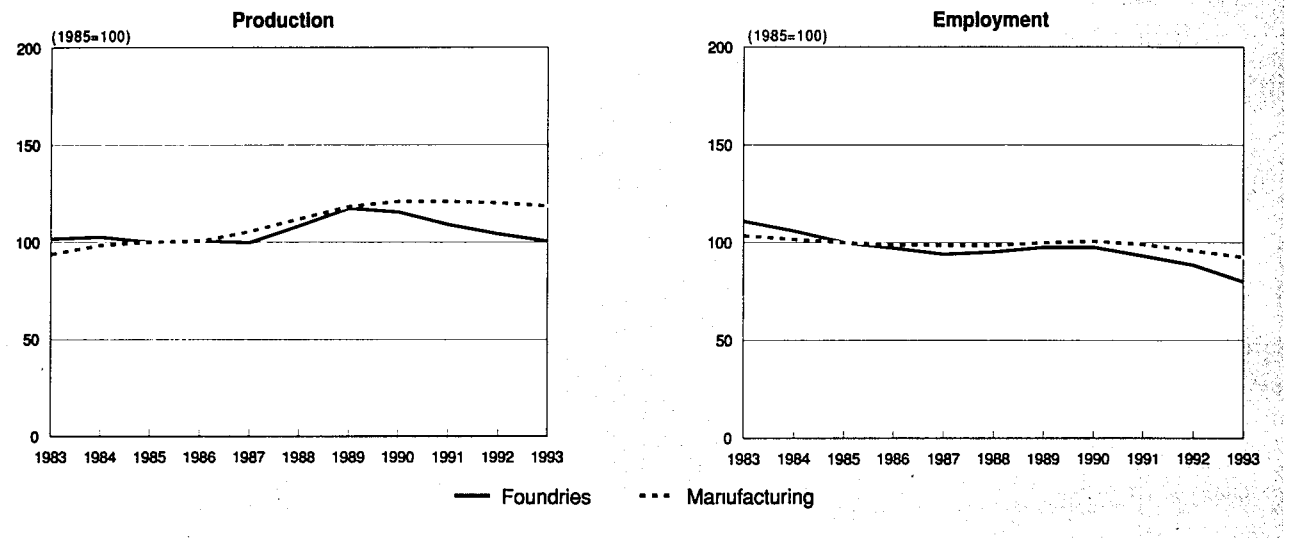
(1) Estimates.
Source: CAEF, Modern Casting

Table 4: Foundries
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	762.6	843.7	896.9	865.8	826.2	919.1	962.5	960.0	976.1	991.0
Extra-EC imports	273.4	290.1	333.3	341.3	353.2	388.0	450.6	506.6	585.3	624.7
Trade balance	489.2	553.6	563.6	524.5	473.0	531.1	511.9	453.4	390.8	366.3
Ratio exports/imports	2.8	2.9	2.7	2.5	2.3	2.4	2.1	1.9	1.7	1.6
Terms of trade index	103.1	101.4	100.0	103.2	104.6	100.1	96.8	95.0	93.7	94.2
Intra-EC trade	720.8	804.4	926.8	1 019.1	1 031.2	1 219.1	1 424.2	1 653.1	1 696.1	1 667.4
Share of total imports (%)	72.5	73.5	73.5	74.9	74.5	75.9	76.0	76.5	74.3	72.7

Source: DEBA

Figure 3: Foundries
Production at constant prices and employment compared to EC manufacturing



1993 are DGV and Eurostat estimates.
Source: DEBA

Regionally, the industry is strongly concentrated within the EC. The Federal Republic of Germany alone accounts for 40% of the value added of the European foundry industry. It is followed by France and Italy with 16% each, the United Kingdom with 14% and Spain with 8%. The five largest manufacturing countries account for 94% of total EC production.

Personnel costs in the foundry industry represent 50% of production costs. The ratio of the sector's value added to the value of its output is correspondingly high.

International comparison

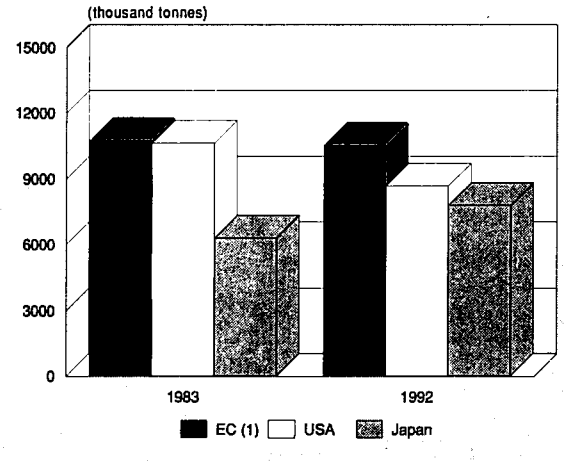
There have been and still are great uncertainties concerning production in the USSR and its successor states. According to the latest publications, the USSR's production in 1990 was 21.3 million tonnes, 13.4 million tonnes of this was accounted for by Russia alone. There are equally great uncertainties about the production of the People's Republic of China, which is said to have risen from 8.9 million tonnes in 1990 to 10.8 million tonnes in 1991.

Consequently, any statements about the world ranking of EC production must inevitably be imprecise. One thing is certain, however: more castings are produced in the EC than in the United States or Japan. It is also certain that the shares of the individual materials are similar in these three economic areas. This applies especially to the share of non-ferrous-metal castings in total production, which is between 14 and 16% in each case.

Foreign trade

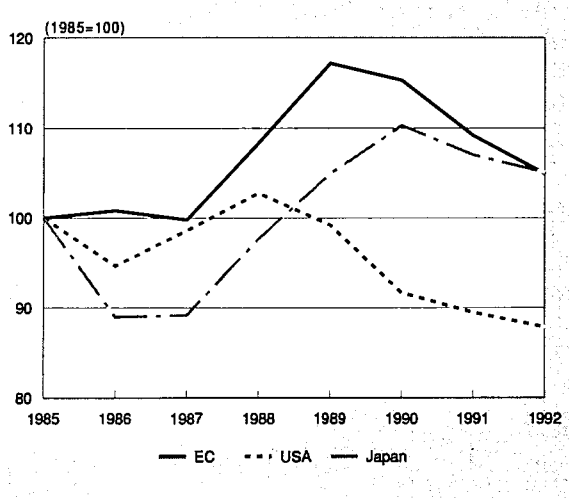
Cast products are made to order according to the customer's specifications and on his behalf. Furthermore, they have to meet increasingly stringent demands. Both these factors necessitate close co-operation and intensive communication between the foundry and the customer. In addition, consideration of the high specific and sometimes absolute weight of castings and their value to weight ratio, together with "just in time" delivery difficulties greatly restricts transportation possibilities (or trade, for that matter) over great distances. The importance

Figure 4: Foundries
International comparison of production in volume



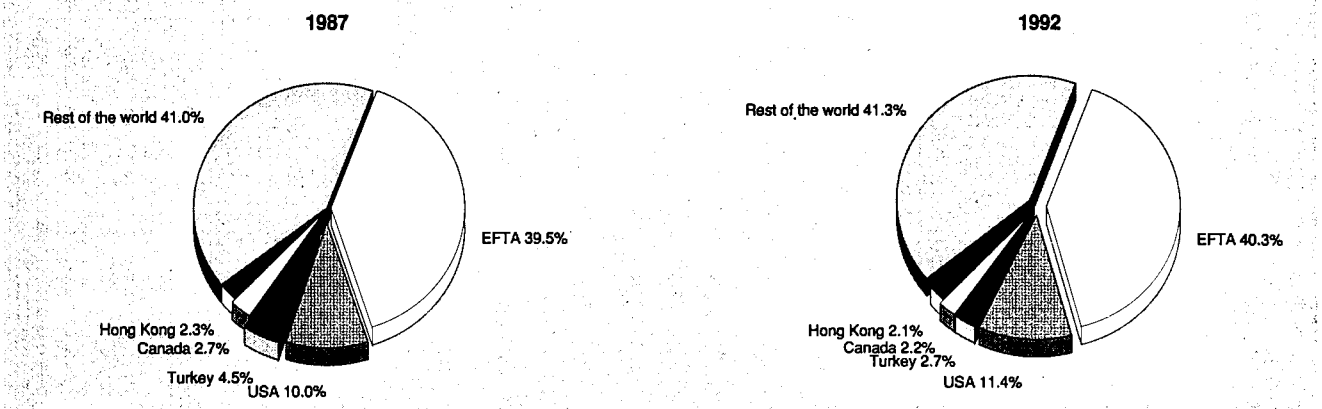
(1) Excluding Denmark, Greece, Ireland and Luxembourg.
Source: CAEF, "Modern Casting", Annual statistics of material process industries (Japan) and DGV estimations.

Figure 5: Foundries
International comparison of production in constant prices



Source: DEBA, US Industrial Outlook, Annual statistics of material process industries (Japan), DGV estimations.

Figure 6: Foundries
Destination of EC exports



Source: Eurostat

of foreign trade is correspondingly slight in comparison with other branches of the economy. In the five most important EC countries, exports represent barely 15% of the value of output. The share of imports in consumption is less than 5%. By far the largest proportion of foreign trade takes place with neighbouring countries: either EC Member States or EFTA countries.

Shipments to distant countries are the exception. They chiefly consist of components or spare parts for plant construction and their value is, as a rule, very high.

MARKET FORCES

Demand

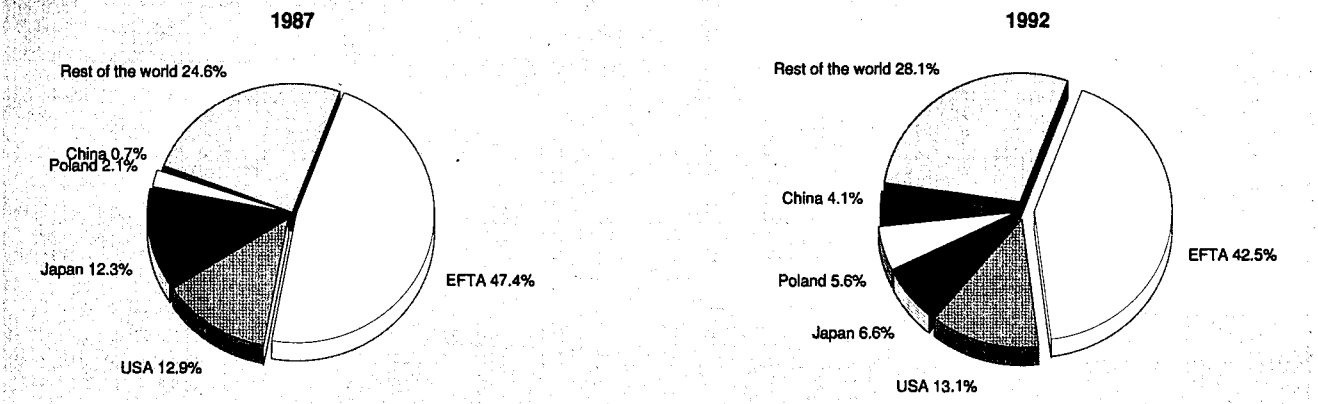
By far, the largest customer of the foundry industry is the automobile industry. Over 70% of the output of light-metal castings (chiefly aluminium alloys) become components for road vehicles. In the case of iron, steel and malleable iron castings, the percent of total EC production shipped to the automobile industry is approximately 35%; total German production was foremost with 42.6% consumed by the auto industry.

Next, is the mechanical engineering industry. Due to the strong world positions of the German mechanical engineering and plant construction industries, supplies of castings in Germany reached their highest levels in at the end of the 1980s (in both relative and absolute terms) but has since declined slightly. In 1992, 28.6% of all supplies of grey cast iron and spherical graphite cast iron went to the mechanical engineering industry; at the end of the 1980s this share was over 30%.

Pressure pipes, pipes and castings are the most important end-products of the foundry industry. They played the greatest role in France where they accounted for 30.1% of total output of grey cast iron and spherical graphite cast iron. Their value (ECU/kg) is, however, very low.

The foundry industry cannot actually be said to be a growth industry. If business cycle influences are eliminated, hardly any change has taken place in the tonnage produced during the past ten years. The fact that the value of production has risen during the same period reflects the shift towards higher-value castings, towards lighter, thinner-walled, harder cored and complex components and towards lighter alloys, especially aluminium-based ones.

Figure 7: Foundries
Origin of EC imports



Source: Eurostat

Table 5: Foundries
Breakdown by product line (1)

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993(2)
Ferrous metals	9 465	9 350	9 452	9 070	8 786	9 374	9 807	9 582	9 459	8 818	7 936
Non-ferrous metals	1 352	1 408	1 425	1 556	1 637	1 765	1 869	1 799	1 812	1 762	1 550
All castings	10 817	10 758	10 877	10 626	10 423	11 139	11 676	11 381	11 271	10 580	9 486
% ferrous metals	88	87	87	85	84	84	84	84	84	83	84
% non-ferrous metals	13	13	13	15	16	16	16	16	16	17	16

(1) Excluding Denmark, Greece, Ireland and Luxembourg.
(2) DGV estimates.
Source: CAEF, Modern Casting

As producers of preliminary products and components, foundries are heavily dependent on the fortunes and demand behaviour of their most important customers. These are primarily the automobile industry and mechanical engineering industries. Both generated high growth rates for the foundries at the end of the 1980s. Both are, however, responsible for the recent decline in foundry output, and both will exert a decisive influence on future developments in the foundry sector.

Casting, as a basic forming process, is in direct competition with sintering. In practice, however, particular importance is attached to the processes of metal reshaping, specifically: forging (hammer forging or drop forging), rolling, pressing (extrusion), drawing and deep drawing. There are also the processes of connection technology comprised of welding, bonding, riveting and bolting.

By far the most important factor in recent years, has been the competition between metals and substitutes such as plastics. The proportion of the latter in motor vehicle manufacture, the making of household articles, pipes or connecting pieces has grown steadily in recent years at the expense of metals demand. The reasons which are leading to the replacement of one material by another include: weight, tensile strength, resistance to pressure and wear, resistance to heat or to rust and acid, ageing behaviour, price and recycling possibilities.

In the future, mineral products such as ceramics or composite materials appear likely to gain market share held by foundry products. Whether they can become generally acceptable will depend chiefly on their price and whether their ability to meet stated specifications.

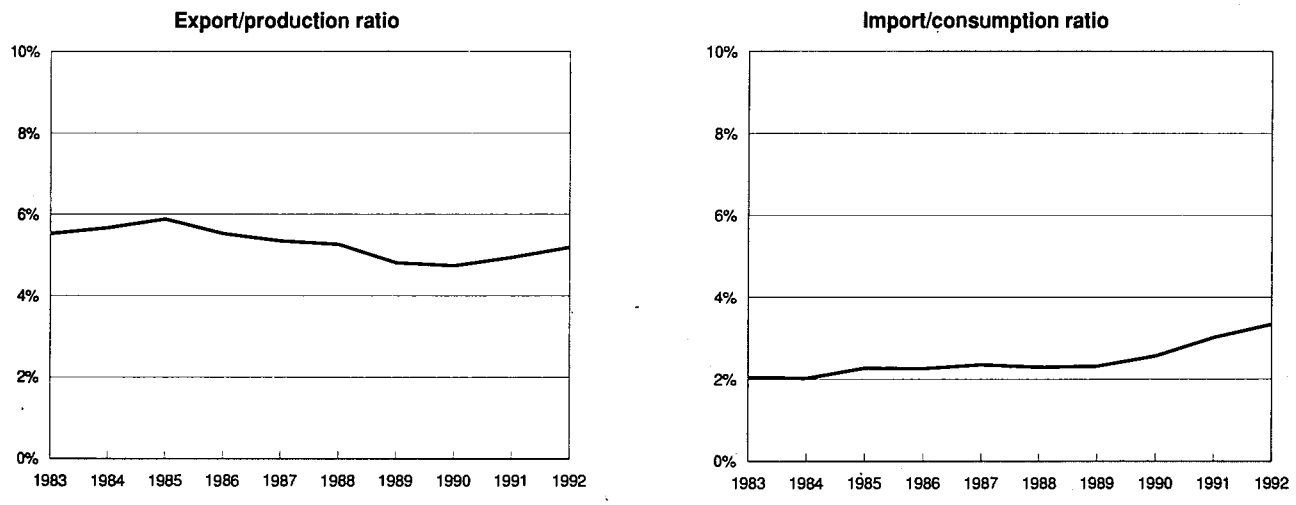
Supply and competition

As material-intensiveness is decreasing in practically all branches of the economy, specific consumption of castings is also declining, as evidenced in the automobile and mechanical engineering industries. The growth rates of the foundry industry are lower than those of their main customers (as became evident, for instance, at the end of the 1980s) and resulted in an appreciable decrease in the long run quantity produced when compared to the quantities produced in 1970 or 1980.

Accordingly, the existing smelting, moulding or fettling capacities are more than sufficient to meet demand. (Surplus capacity is currently estimated at to be about 25%.) This leads to intense competition between foundries, and also makes their market position weak in relation to their main customers. Because of the overcapacity and strong buying power of the major customers, foundries do not have much leeway in price setting, thus creating a low profit to sales ratio.

In view of the EC's single market, the most important repercussions are likely to result from international calls for tender

Figure 8: Foundries
Trade intensities



Source: DEBA

Table 6: Foundries
Major customer industries of grey and nodular iron, 1992

(%)	D	F	I(1)	UK	E
Pipes, fittings	11.2	30.1	29.3	27.3	18.0
Building, domestic	3.7	5.8	N/A	4.9	17.2
Ingot moulds, rolls	1.4	0.5	3.0	3.2	0.5
Machine building	28.6	15.8	26.5	21.4	20.8
Vehicle industry	42.6	34.4	34.2	24.7	28.3
Others	12.5	13.4	7.0	18.5	15.1

(1) Pipes and fittings include building and domestic.
Source: CAEF

for public contracts. This effect, in particular, manufacturers of pipe, pressure pipes and moulded conduits. Furthermore, liberalisation in the transport sector may lead to lower freight rates. Both of these factors not only widen the foundries' range of action, but also shift the competition between foundries from the national to the international plane. To ensure that this competition takes place under fair conditions environmental protection regulations and supplementary personnel expenses must be harmonised.

The making of castings continues to be very labour-intensive. Even where the production process is highly mechanised, for example in large-scale series production, the proportion of personnel expenses in the production costs is 40%. In the case of hand casting, i.e. individual production, the proportion of personnel expense to total cost is as high as 55%. As a result, efforts made to step up labour productivity and reduce personnel expenses have been correspondingly great.

Production process

Metal materials account for 15 to 25% of production costs. The range is due to the differing nature of the materials to be produced, as well as to the ore mix, which in turn depends on the smelting equipment. Factors effecting the proportion of raw material costs in the total production costs are: whether an initial melt is being produced; whether a material is merely being re-melted; and the proportion of scrap, pig iron, (ferrous) alloys or high-grade pure metals contained in the melt. Lastly, the influence of market prices should not be underestimated. In past years, the foundries benefited from a decline in raw materials prices, they are now confronted again with rapidly rising raw material prices.

The proportion of capital costs, depreciation and interest costs fluctuates between 10% and 15% of total production costs. It depends chiefly on the production technique and is naturally larger in the case of highly automated large-series production than in that of hand-moulded individual parts.

And finally, energy costs must be discussed. Here, the foundries still operating with cupola furnaces are the most economical since coke is the main source of energy. Rising quality demands, the decline in the share of grey castings and, conversely, the increase in the amount of cast iron using spherical graphite are, however, causing many foundries to switch to electric furnaces. The share of energy costs for foundries using electric furnaces can rise 15% of total production costs.

INDUSTRY STRUCTURE

Companies

The foundry industry has been able to retain its character as a sector composed of small and medium-sized firms. More than half of all foundries still have fewer than 50 employees, and many are still family-owned. Some of them, as jobbing foundries, work only for other companies. Often, however, they are also part of a larger undertaking, which predominantly produces castings "to meet its own requirements", for instance for use in mechanical engineering and plant construction.

There is no observable trend towards larger company units. Investment in recent years has been mostly for the purpose of increasing labour productivity. A breakdown between iron, steel and malleable-iron foundries and non-ferrous-metal foundries reveals that on average, the former have an appreciably larger number of employees than the latter.

Nevertheless, technical progress has the led sector to the emergence of a few large companies in the foundry For instance, the production of large series has become much more economical due to the development of automatic moulding plants. The increase in capital-intensiveness, however, has necessitated two or even three-shift operations. This has led to the creation of production plants with up to a thousand employees. These usually specialise in making castings for the automobile industry.

Table 7: Foundries
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	26.5	27.0	28.0	30.5	32.1	33.1	32.8	33.7	33.7	34.0
Productivity index	94.9	96.4	100.0	109.2	114.8	118.2	117.4	120.6	120.5	121.5
Unit labour costs index (3)	85.5	92.6	100.0	106.0	110.3	115.9	123.7	132.7	141.5	151.6
Total unit costs index (4)	82.6	92.9	100.0	102.7	104.3	116.8	131.0	133.2	139.4	146.1

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Table 8: Foundries
Number of enterprises, 1992

(production units)	D	F	I	UK	E
Ferrous metals	459	186	383	300	188
Non ferrous metals	441(1)	356	N/A	N/A	79

(1) Only West Gemany.
Source: CAEF

Strategies

Rationalisation and automation has brought about, among other things, automation of sand preparation, the development of automatic casting plants and the development of induction and holding furnaces. In the future, the greatest successes will probably be achieved by the use of CAD/CAM in pattern making and fettling.

The demands made of castings are becoming increasingly high and varied. This necessitates the development of new materials with ever-narrower dimensional tolerances. Castings are becoming thinner-walled, lighter and harder cored with the cavities and surfaces becoming more complex. Other castings are required to be made in ever-increasing size and thus of ever-greater weight. The result is that foundries, too, are specialising more and more and that the industry is steadily becoming more heterogeneous.

Therefore, one cannot speak of general or uniform foundry strategy. An important current topic is the extension of the value added chain from the raw material phase to the end product. The enterprises involved in production (in different industries) may be faced with the need to restructure the distribution of functions within the chain. For foundries, this could mean taking over research and development functions, taking over mechanical processing operations and, via the supply of ready-to-fit components, increasing their own value added.

Where foundries are taken over by other companies, they typically continue to be operated as profit centres of the new owner. The size and equipment of the production plant does not usually change much. That being the case, there are two main reasons for a take-over: the acquiring company's need for castings for their own production to make them independent of other suppliers; and the need to offer customers the complete range of the foundry sector's products, from light-metal to fine-steel castings, from hand-moulded to automatically moulded castings, and from small to large castings, etc.

ENVIRONMENT

Great importance has always been attached to recycling in the foundry industry. This applies particularly to the most important materials used, namely sands and metals. Sands are reprocessed and metals re-melted as reusable material. Used castings are returned to the production circuit as "broken castings" via trade channels.

Even so, total avoidance of waste is not possible. Certain residual materials, especially thermally exhausted moulding sands, which have to be disposed of at tips, will always accumulate. Nevertheless, the foundry industry is trying to devise economically defensible methods of further reducing the quantities of such residual materials.

Keeping the air clean, particularly dust removal, is presently the foremost environment protection measure for many foundries. Strict regulations have to be met. In some cases this will require substantial investments.

Not all foundries will have sufficient financial resources to afford the requisite investment. These will most likely have to stop production after the regulation phase-in period. For many foundries, however, earnings will deteriorate further if the costs entailed by environmental protection cannot be passed on to customers. In this respect, the regulations should be the same for everyone, at least within the EC to curtail the lose of competitiveness of foundries located in more environmentally conscious countries.

REGULATIONS

There are no specific EC directives or regulations which apply exclusively to foundries. Foundries are, however, affected by all provisions relating to: protection of the environment, incidental personnel expenses, trade with associated countries in Eastern Europe, energy prices and public charges (e.g., for waste disposal) and taxation (business taxes, property tax, corporation tax).

OUTLOOK

Foundries presently hard hit by the recession. The quantitative output in the EC in 1993 is expected to be 9% lower than in 1992. Because of non-ferrous-metal foundries' strong dependence on automobile production, their fall in production will be greater than for iron, steel and malleable iron foundries. Apparent consumption is expected to fall by just over 6% in 1993. Extra-EC exports will fall by 5%; the EC's positive trade balance in the foundry industry will also decline 5% from 991 to 941.5 million ECU at current prices. As a result

Table 9: Foundries
Employment, 1992

	D	F	I	UK	E
Ferrous metals	68 155	35 560	22 250	33 836	17 630
Non ferrous metals	35 398(1)	20 458	N/A	N/A	5 850

(1) Only West Germany.
Source: CAEF

of these somewhat gloomy estimates, total employment in the industry is anticipated to fall by 6% to 235 300.

When the fall in economic activity stops, the downward movement of foundry production will also end. This is expected to take place not later than at the beginning of 1994, so slight growth can be expected by the end of 1994, although it is not likely to be more than 2%. Production levels are expected to level off by the mid-1990s.

In the future, it will be even more important for foundries to further improve quality and develop new materials and production processes. The distribution of functions between individual enterprises participating in the value added chain from the basic product to the finished article present foundries with additional opportunities. For example, they could focus on increasing their value added by supplying ready-to-fit components.

Against the background of the labour-intensive production, investment will aim towards rationalisation, further raising the productivity of labour. Progress can be expected to result from the use of CAD/CAM systems in pattern making and fettling since both remain very labour-intensive manufacturing stages.

Table 10: Foundries
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	2.2	0.1
Production	2.0	0.1
Extra-EC exports	-0.3	1.0

Source: DGV

Reducing the production cycle length, minimising production rejects, attainment of "just in time" delivery and quality improvement will be important for the future international competitiveness of EC foundries.

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Forging
NACE 312.1

The forging industry is a typical subcontracting industry with largely medium-sized undertakings. Important consumer sectors are the vehicle industry, mechanical engineering, electrical industry, aircraft construction, etc. With a production volume of just over 3 million tonnes the forging industry of the European Community surpassed both the USA and Japan in 1992. A decline in production has been observed in the forging industry since 1990, essentially due to the recession in Europe. This downward trend will probably continue through the early nineties.

INDUSTRY PROFILE

Description of the sector

The majority of forges are subcontracting plants. In addition to their own products such as universal joint shafts, clamping systems for the construction industry and pipeline fittings, they predominantly offer products manufactured according to customer drawings on the open market.

The hammer forges are sometimes manufacturing departments on a larger scale, e.g. steel mills. The structure of the drop forging shops and of the manufacture of extruded parts, flanges and pipeline fittings consist primarily of medium-sized operations. Some car and bearing manufacturers, for example, produce individual articles in their own production plants, but only where extremely large, recurrent quantities are involved.

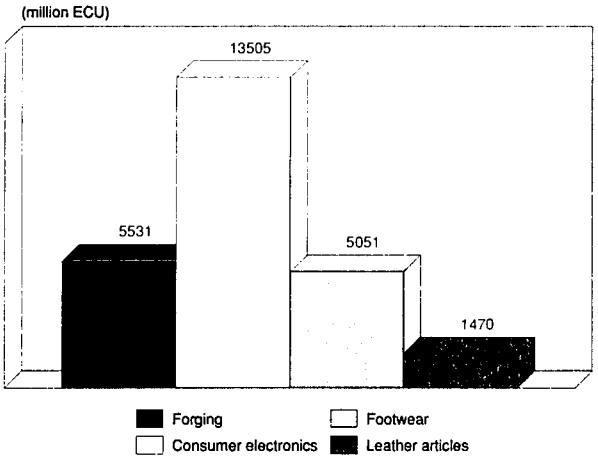
The following product groups are covered by the term forging: hammer forgings, drop forgings, flanges and pipeline fittings and extruded parts. Forgings are mainly semi-finished products, which still require after-treatment such as heat-treatment, surface treatment or cutting at least in subsectors. Articles ready for installation can also be manufactured when special forming methods are used.

The forgings are produced with or without heating of the blank (which is usually offcuts of rectangular sections or round bars or shaped pieces made of thick plate) by shaping tools moved in relation to each other. Whereas the hammer forgings are produced by simple flat or round tools and have a machining allowance of several millimetres. In the case of the other product groups, drop forgings, flanges, pipeline fittings, and extruded parts, an attempt is made to come as near as possible to the final shape of the workpiece through a high expenditure on tools. Operating surfaces or forging products ready for installation can often be produced by a combination of different methods.

Both the most diverse steel materials and non-ferrous metals like Al, Mg, Cu, Ms, and Ni alloys, can be formed by forging. The different deformation capacity of the various materials determines the type of production method and also limits the attainable shape and accuracy. The required properties of the products with regard to strength, structure, workability, etc. are achieved either by the process method itself (heat treatment from the forging heat, cold hardening, etc.) or by subsequent operations (annealing, heat treatment, shot-blasting for strength).

The forging industry manufactures high quality products, which offer important advantages to the consumer particularly from the point of view of weight, resistance to fracture, life and uniformly high quality.

Figure 1: Forging (1)
Value added in comparison with other industries, 1992



(1) NACE 312
Source: DEBA

MARKET FORCES

Demand

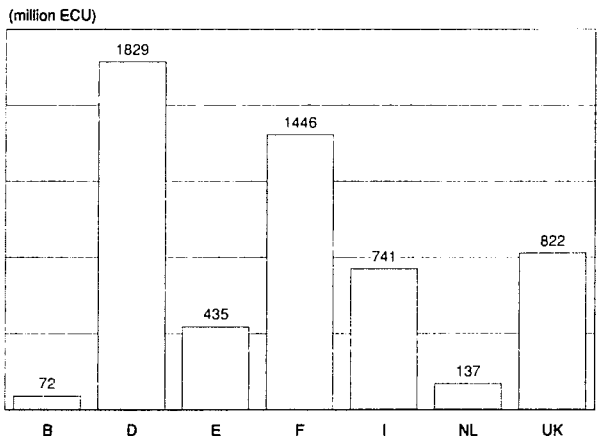
The output trend in the EC Member States varied widely in earlier years. The countries represented in EUROFORGE produced just over 3 million tonnes of steel forgings in 1992 and thus constituted the largest forging producer ahead of Japan and the USA. The drop forging production group easily accounts for the largest proportion of forging products with just under 70%. The rising production trend observed since about 1986 in various countries has again shown a downturn since 1990. The causes are essentially the recession in the engineering industry and the decline in car production for well over 2 years.

INDUSTRY STRUCTURE

Companies

The forging industry structure consists predominantly of medium-sized companies. It has been observed for some time

Figure 2: Forging (1)
Value added by Member State, 1992



(1) NACE 312
Source: DEBA

Table 1: Forging (1)
Main Indicators (2)

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	1 496	1 455	1 368	1 367	1 421	1 649	1 749	1 661	1 555	1 422
Production	1 614	1 605	1 618	1 604	1 648	1 820	1 918	1 831	1 722	1 612
Net exports	118	150	250	237	227	171	169	170	171	109
Employment (thousands)	59	58	56	56	54	55	57	54	51	46

(1) NACE 312.11; Steel forging.
(2) Germany, Belgium, Spain, Italy, France and the United Kingdom.
Source: Euroforge

Table 2: Forging (1)
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	348	415	451	352	345	440	541	545	554	545
Extra-EC imports	119	143	171	160	137	194	260	311	342	405
Trade balance	230	272	280	191	209	245	280	234	212	141
Ratio exports/imports	2.9	2.9	2.6	2.2	2.5	2.3	2.1	1.8	1.6	1.3
Terms of trade index	105.4	103.8	100.0	95.5	99.8	97.9	101.6	100.1	95.7	98.8
Intra-EC trade	282	334	384	360	344	740	766	798	862	880
Share of total imports (%)	70.4	70.0	69.2	69.2	71.6	79.2	74.6	71.9	71.6	68.5

(1) NACE 312; forging, drop forging, closed die-forging, pressing and stamping
Source: Eurostat

Table 3: Forging (1)
Breakdown by major product line, 1992

	Production (thousand tonnes)	Sales (million ECU)
Open die forging	523	895
Drop forgings, of which:	2 084	4 065
drop forging industry	1 622	3 165
in-house forging	462	900
Flanges	227	495
Extrusions	199	575
Total	3 033	6 030

(1) NACE 312
Source: Euroforge

that concentration and cooperation activities are expanding beyond national frontiers. The Netherlands, Ireland, Denmark, Greece and Portugal are not taken into account in this report, because they have no significant forging industry.

About 150 forging companies, accounting for just under 60% of EC production, are active in Germany, which thus occupies first place in the western world. 75% of the companies are located in North Rhine-Westphalia, 11% in Baden-Württemberg, and the remaining 14% are divided equally between the remaining western and eastern German Länder. The size structure of the forging companies is as follows: 36 forges have more than 200 employees, 31 between 100 and 200, 32 between 50 and 100, and 51 companies with fewer than 50 employees. The large companies include Thyssen, Gerlach and Peddinghaus.

Italy is responsible for 16% of EC production. Most companies are located in the north for example, in Piedmont, around Turin, in Lombardy, in the Como, Varese and Brescia regions, in Venezia and in Emilia Romagna. The most important companies are Teksid, a subsidiary of Fiat (90% production is intended for the car industry), the Erber group, Riganti and Casartelli. In Lombardy 10% of the companies account for 50% of the total production. Apart from Teksid the forging companies are typically family businesses.

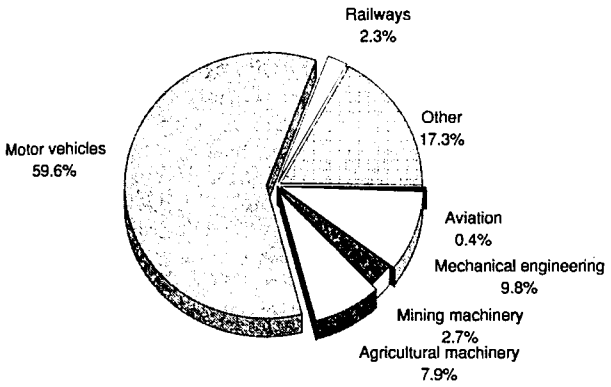
In the United Kingdom who is responsible for 8% of EC production, most of the manufacturers of small forgings are located in Central England in the Birmingham area. The large forgings are generally produced around Sheffield in South Yorkshire. The largest company is United Engineering Steels Ltd. It is responsible for about 45% of UK production. Other important forges are Firth-Rixson, the INCO group and Cameron Iron Works.

France contributes 11% of EC production via 72 companies. The forges are spread around the regions as follows: 25 in the Ardennes, six in the Loire region, 14 in eastern France, 27 in the other regions. Three groups dominate the sector: Ascometall, Forges Stephanoises and Forges de Courcelles.

Spain has only 5% of EC production with 37 companies in this industry. Approximately 30 are located in the Basque region, the remainder in Catalonia, Aragon, Madrid and Galicia. Eight companies have more than 150 employees, five between 100 and 150, nine between 50 and 100 and the remainder have fewer than 50 employees. The most important companies P. Echeveria SA, La Forge Casanova SA, Forges de Villalba SA (Gekanor group) and Forges de Galicia SA together account for about 60% of the Spanish production volume.

In Belgium with only 1% of EC production, 10 companies operate in this sector, and forging is the main activity of four of them. The 10 companies are predominantly small to medium-sized and are located around Charleroi and Liège.

Figure 3: Forging
Sales by end market, 1992



Source: Euroforge

Strategies

The strong pressure of competition, caused by excess capacity, discounts demanded by customers and substitutions, induced the forging industry at an early stage to develop strategies designed to safeguard the competitiveness of its products also in a larger market. These include inter alia: intensification of export activities with simultaneous specialisation and concentration on specific market segments; reduction of the large variety of products with optimisation of the products using modern computer methods (CAD/CAM/CAQ, FEM); increased productivity by rationalisation of production with the aid of interlinked or automated plants; development of new materials with the aim of reducing the costs of the material used or simplified further processing (e.g. heat treatment, workability); production of workpieces with a more accurate shape to reduce the expenditure on finishing; increase in value creation, e.g. by finishing workpieces or production of assemblies; and increase in and safeguarding of the quality standard by application of modern quality assurance methods (FMEA, SPC) adapted to the forging industry.

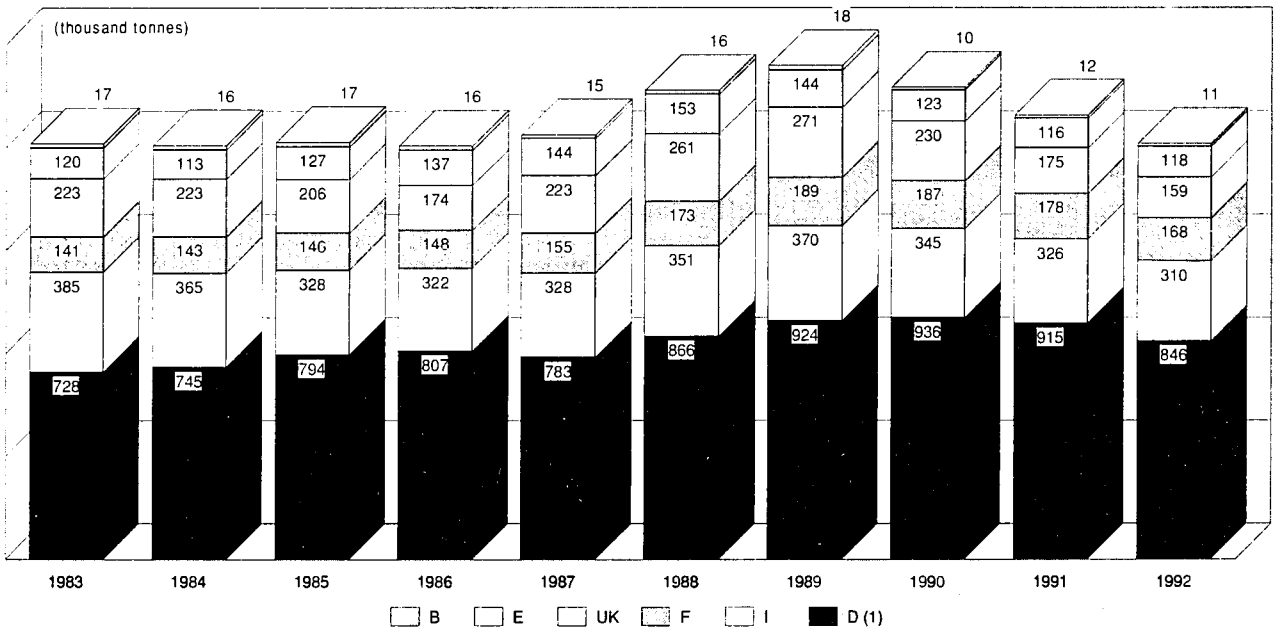
Inter-company cooperation plays an important part in the realisation of these aims. It is a necessary measure designed to safeguard the existence of the forging industry with its structure of predominantly medium-sized companies. Individual companies do not have the wherewithal to independently finance several major projects at the same time. Examples are the CAD/CAM/CAE and the quality assurance project for the forging industry as well as many plant management activities.

With the increase in just-in-time deliveries, proximity to the customer has become an important aspect in selecting suppliers. Hence, there will be an increasing tendency for the forging companies to establish branches or embark on cooperation abroad.

With the introduction of the "Single European Market" there will certainly be an expansion of exports and imports, i.e. competition for market shares will be considerably intensified. Only those companies which are able to increase their competitiveness by implementation of the above mentioned strategies will be successful.

Competition on the forging markets is additionally intensified by substitution. Cast products, sintered parts, composites and sheet metal constructions or combinations of these are suitable alternatives on a still limited scale. Choosing a product depends on several factors according to its purpose. In addition to the price, reliability, safety, weight, life and environmental friendliness are important criteria for decision making.

Figure 4: Forging
Production by country



(1) Including former East Germany from 1991.
Source: Euroforge

ENVIRONMENT

A considerable proportion of the investments in previous years was allocated to environmental protection measures in the forging industry. The main emphasis was on noise protection, energy conservation, e.g. by equipping furnaces with recuperators, replacement of the expensive pneumatic drives for hammers by electrohydraulic systems and by utilisation of the waste heat in the forging process, as necessitated by official requirements. An important advantage of the forging products is that the materials can easily be recycled. For this reason, and others, the increasing substitution by plastics parts over the last few years was again reduced.

OUTLOOK

The forges will continue to depend on their main customers despite the strategies developed. The growth rates of recent years in various European countries will probably not be achieved again in the near future. The trend towards larger company units will also continue on an increasing scale. Questions of location will also have to be discussed again, since the consumers of the forgings are also concerned with supplier proximity.

The measures taken by the forging industry to safeguard its competitiveness on the market will ensure that forging products will continue to account for a significant proportion of industrial production in future. Yet risks in the forging industry remain with their dependence on the economic growth of the main consumer industries and the intensified competition from Eastern Europe and non-member countries. Further opportunities for the forging industry exist through, innovative product development, high quality standard, flexibility and service.

Written by: EUROFORGE
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Secondary transformation of metals

NACE 313

The production of fasteners and hot dip galvanising are the primary activities of secondary transformation of metals; the major outlets are the construction and automotive sectors. The industry is largely nationally and regionally oriented. After continuous growth during the 1980s, production has declined since 1990. The general economic recession and increased competition contributed to this development. Rationalisation and a switch to higher quality products are prerequisites to cope with increased competition. A slight recovery is expected in 1994. In the medium term a more substantial improvement is expected.

INDUSTRY PROFILE

Description of the sector

Data for the secondary transformation of metals industry are classified under NACE 313. The products of this industry are highly diversified and can be divided up into the following categories:

- manufacture of articles on turning machines or lathes, including the manufacture of turned screws (NACE 313.11);
- nuts, bolts, rivets, screws and related products (NACE 313.12);
- springs, except furniture and watch springs (NACE 313.2);
- sintering of metals (NACE 313.3);
- chains, except articulated link chains (NACE 313.4);
- treatment and coating of metals, including zinc coating, aluminising, anodising, enamelling etc. (NACE 313.5); and
- general mechanical engineering on a subcontract basis (NACE 313.6).

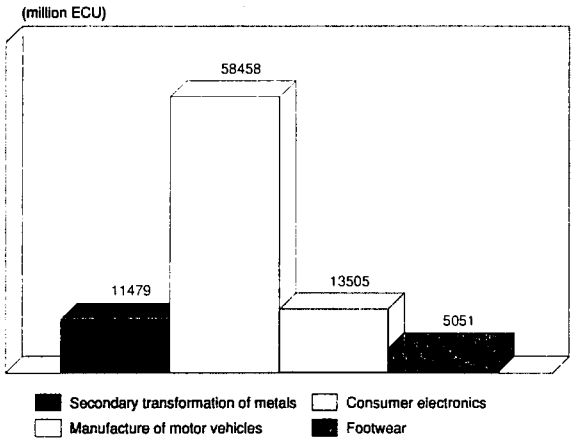
In general, the most important subsectors are the fasteners industry (the first two sectors) and the treatment and coating industry (galvanising).

Fasteners can be divided into two main categories: those which are used for construction purposes, and those which are used for assembly purposes and which do not come under stress or load. From a market point of view however, fasteners can be divided into common fasteners and special fasteners. In the first category price is important, in the second, quality, marketing and delivery time are important.

The purpose of zinc coating is to improve the qualities of the metal. This can be done by several techniques, such as electrolysis. Galvanising, formally "hot-dip" galvanising, involves coating steel with zinc by immersion in molten zinc metal.

Characteristic for the industry is its regional dimension. In general, enterprises in the secondary transformation sector are located near the major industrial centres of Europe. Because of the small scale of many of the firms, long distance transport is not viable in general. To decrease transportation costs, firms must be located near their clients. For instance, in Germany centres of the galvanising industry are in Nordrhein-Westfalen and in Baden-Württemberg.

Figure 1: Secondary transformation of metals Value added in comparison with other industries, 1992



Source: DEBA

Recent trends

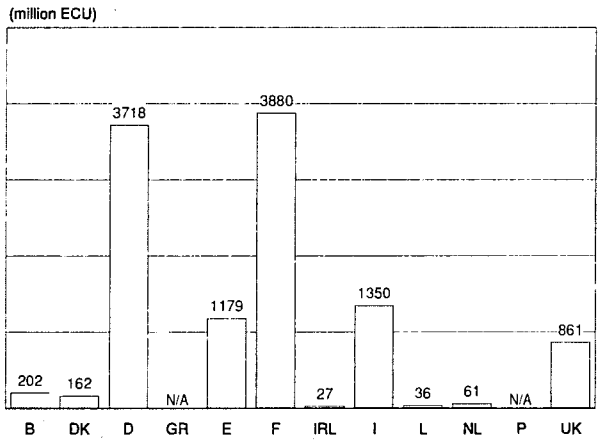
Production in current prices declined by 2.4% in 1992; employment fell, too. Since non-EC trade plays a minor role in this sector - both the export quote and the penetration rate are less than 5% - the adverse development of EC demand accounted largely for the drop in production. The sector recorded a small trade surplus in 1992.

It is to be noted that data for production and employment may differ from those presented in the 1993 edition of Panorama, because of statistical reasons.

With a joint production share of nearly two thirds, France and Germany allow for the bulk of EC production; France is the leading manufacturer. Spain, Italy and the United Kingdom account together for another 30%, leaving the remaining EC Member States about 4%.

The EC output of steel galvanised as fabricated products increased in 1992 by 2% to a total of 4 million tonnes. The increase was much smaller than in the preceding years; from 1988 to 1991 the average growth rate was 7% per annum.

Figure 2: Secondary transformation of metals Value added by Member State, 1992



Source: DEBA

Table 1: Secondary transformation of metals
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	12 622	13 827	15 403	16 258	17 230	20 081	23 723	25 747	25 111	24 446	24 000
Production	12 795	14 082	15 671	16 481	17 411	20 236	23 801	25 804	25 129	24 525	24 000
Extra-EC exports	619.5	789.0	873.5	838.2	814.9	1 026.6	1 176.8	1 133.7	1 126.2	1 167.0	1 150.0
Trade balance	173.6	255.2	267.9	223.4	180.6	154.4	78.0	56.6	18.1	79.1	50.0
Employment (thousands)	296.7	295.7	298.7	301.6	305.8	323.8	344.8	358.8	355.5	346.3	335.0

(1) Except lor trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) NEI estimates.
Source: DEBA

Table 2: Secondary transformation of metals
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	7.1	3.3	5.4
Production	6.9	3.3	5.3
Extra-EC exports	5.3	1.2	3.4
Extra-EC imports	9.2	1.1	5.5

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Secondary transformation of metals
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	619.5	789.0	873.5	838.2	814.9	1 026.6	1 176.8	1 133.7	1 126.2	1 167.0
Extra-EC imports	445.9	533.8	605.6	614.8	634.3	872.2	1 098.8	1 077.1	1 108.1	1 087.9
Trade balance	173.6	255.2	267.9	223.4	180.6	154.4	78.0	56.6	18.1	79.1
Ratio exports/imports	1.4	1.5	1.4	1.4	1.3	1.2	1.1	1.1	1.0	1.1
Terms of trade index	109.6	103.5	100.0	106.1	108.4	111.4	105.6	102.2	99.2	101.0
Intra-EC trade	895.6	1 041.1	1 169.8	1 292.2	1 324.4	1 602.6	1 818.2	1 888.9	1 871.1	1 870.0
Share of total imports (%)	66.8	66.1	65.9	67.8	67.6	64.8	62.3	63.7	62.8	63.2

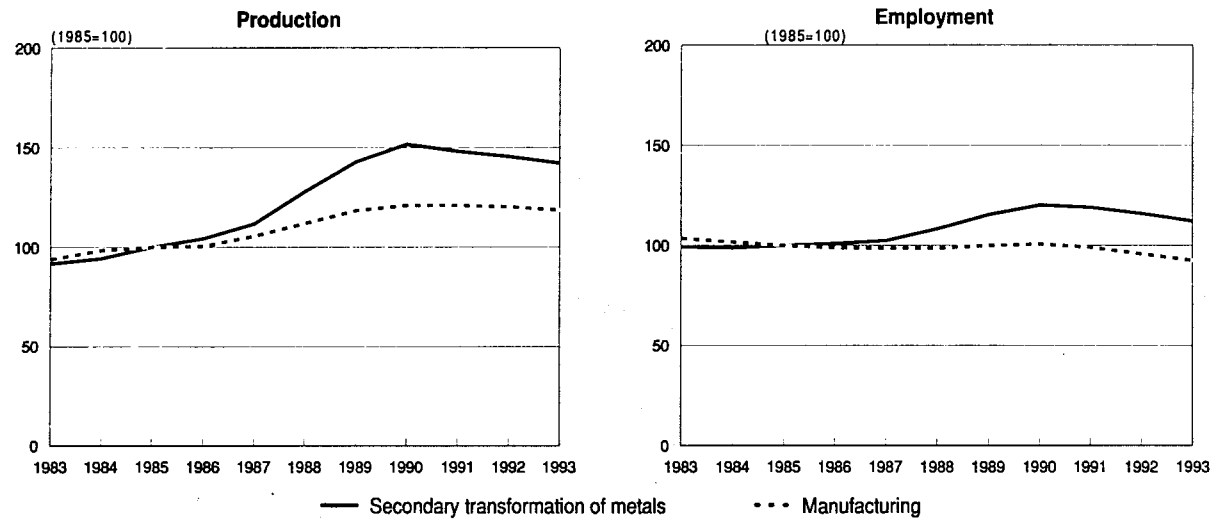
Source: DEBA

Table 4: Secondary transformation of metals
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (2)	25.2	25.2	26.5	27.9	29.7	31.2	32.1	33.1	33.0	33.1
Productivity index	95.1	95.1	100.0	105.4	112.2	117.8	121.3	125.2	124.6	125.3
Unit labour costs index (3)	87.5	93.4	100.0	105.9	109.8	113.8	122.8	132.3	139.1	149.3
Total unit costs index (4)	85.3	92.3	100.0	103.4	107.3	117.8	129.6	135.8	139.0	144.4

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed (thousand ECU).
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Secondary transformation of metals
Production in constant prices and employment compared to EC manufacturing



1993 are NEI and Eurostat estimates.
Source: DEBA

By Member State the development of the output was dissimilar in 1992; in Spain the output declined by 8.5%, and Italy revealed a stable output, whereas the output of the remaining Member States grew. As to the latter category the growth rates varied significantly: from 1.9% in France to 9.8% in Denmark, but most growth rates were in the range of 3% to 5%.

The development pattern of EC production (in current and constant prices) and consumption was similar during the period 1983-1992: a continuous and fast growth between 1983 and 1990, followed by a decline in 1991 and 1992 as a result of the general economic slow down. This had an adverse impact on the demand of main customer industries such as the automotive and construction sectors.

Consumption grew marginally faster than production, causing a slight decline (from 96.5% to 95.5%) in the market share of EC producers. Although this market share is still overwhelming, its decline reflects increased competition from outside the EC, particularly from the Far East and Eastern Europe. The export rate remained fairly stable: it fluctuated around 5% from 1983 to 1992.

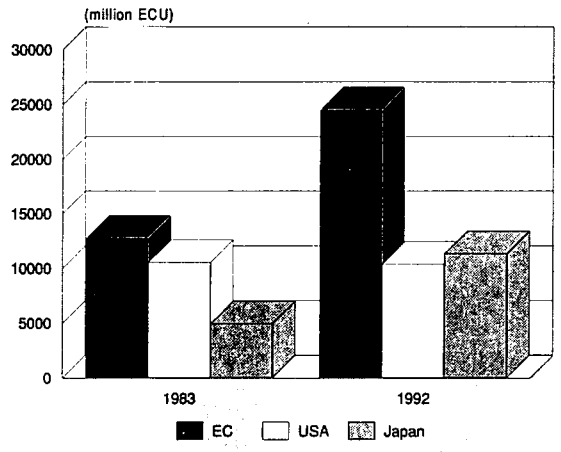
Employment reached its highest level in line with production. In 1990, a record level of nearly 360 000 was attained; in 1992 it was 3.5% lower. Between countries, there is a wide divergence in average firm size. For instance, the average firm in Spain had 9 employees in 1991; in West Germany this was 129.

International comparison

Varying classification systems for industries in the EC countries, the USA and Japan, make an international comparison difficult to make. Some comparisons can be made, however.

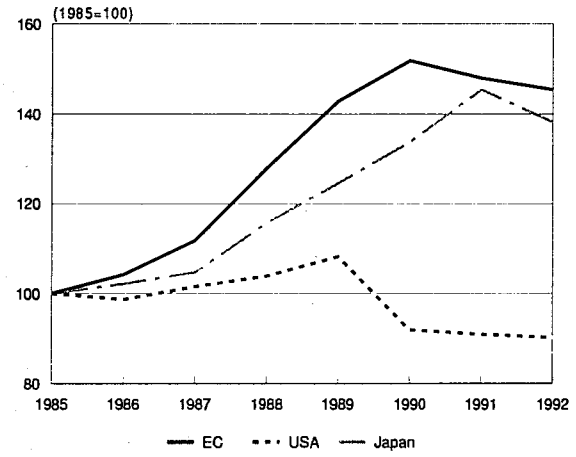
USA manufacturers in the secondary transformation of metals industry recorded in 1992 the third consecutive year of declining production. Compared, in particular with 1990, this fall was only very modest. The weak demand from important

Figure 4: Secondary transformation of metals
International comparison of production in current prices



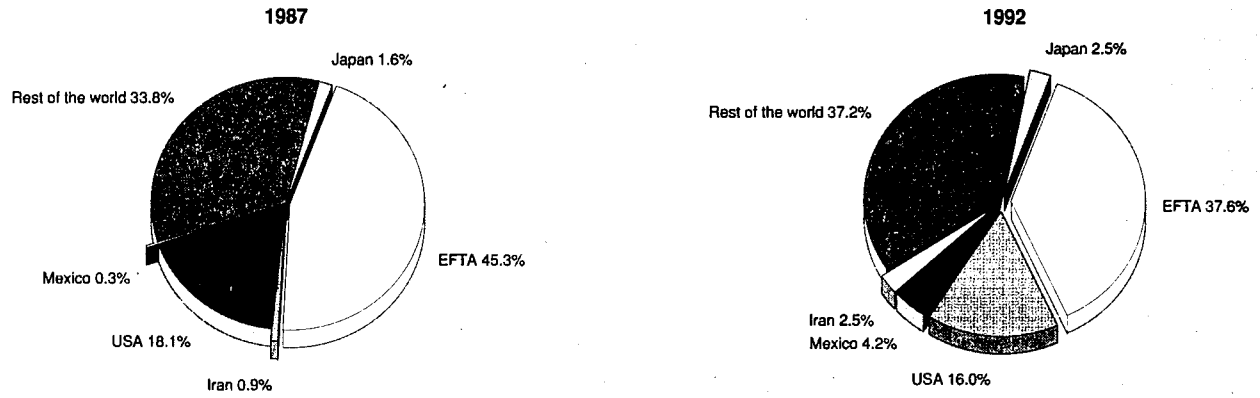
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Secondary transformation of metals
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Secondary transformation of metals
Destination of EC exports



Source: Eurostat

domestic customer industries, particularly the automotive sector added to this effect. On the other hand, since 1985 American exports to the EC increased strongly. USA manufacturers are increasingly serving foreign markets. Most American exports are high quality products, while their imports are mass market products from East Asia, especially Taiwan.

Relatively high production cost caused Japanese fasteners to become less competitive.

Foreign trade

From 1983 to 1989, the EC experienced a continuous rise in foreign trade flows. Since the non-EC imports increased at a faster rate than the exports, 16% and 12% per year, respectively, the export/import ratio declined from 1.39 in 1983 to 1.07 in 1989. After 1989, when the foreign trade flows fluctuated only slightly, this ratio varied between 1.02 and 1.07, implying that since 1989 the trade balance has not been far from zero. The development in nominal terms was reinforced by the decrease in the terms of trade since 1988, although 1992 shows slight improvement as compared to 1991.

Import penetration increased during the 1980s: 3.5% of consumption in 1983 to 4.5% in 1992; the export rate fluctuated around 5%. These low rates demonstrate a major characteristic of this sector, i.e., its national, and often regional, orientation. The export and penetration rate remain modest if the total of intra- and extra-EC trade is considered, namely 12% each.

By far the main export markets are the EFTA countries; the USA ranks second. Together they accounted in 1992 for 54% of the total extra-EC exports, which is less than in 1987 when it was over 63%. the Japanese market is of no significance to these exports.

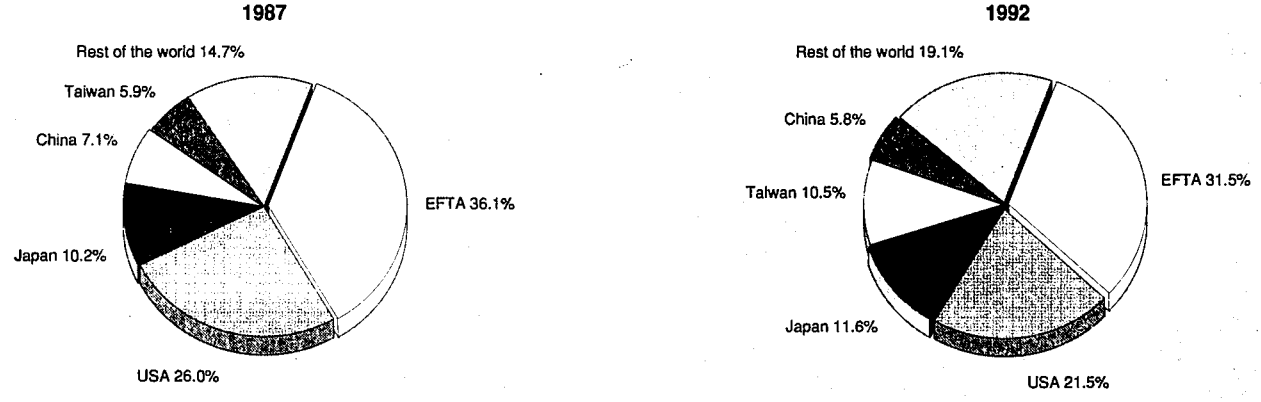
Regarding extra-EC imports in 1992, around 65% were accounted for by only three origins: the EFTA countries, the USA and Japan. In 1987, this share was still 72%, but it fell due to declining shares of the EFTA countries and the USA. Japan improved its position slightly, but its place as the third largest exporter to the EC is becoming increasingly threatened by Taiwan, which improved its position at the expense of EFTA and USA imports.

MARKET FORCES

Demand

The primary client of the fastener industry is the automotive sector. Other important sectors are mechanical engineering,

Figure 7: Secondary transformation of metals
Origin of EC imports



Source: Eurostat

furniture, household appliances, construction and electronics. There is also a relatively small amount of consumer demand for screws, etc. The EC galvanising industry serves more or less the same branches. Three markets allow for nearly 70% of the output of the EC galvanising industry (building and construction, street furniture and power transmission). The building and construction sector is by far the main single client; it takes up 40% of the output of the EC galvanising sector. This sector and street furniture showed a considerable growth between 1985 and 1992, 75% and 65%, respectively, whereas in 1992 the demand for galvanised products for power transmission was lower than in 1985.

Technical and logistical developments in the client industries have a strong impact on the fastener industry. Technologically, the ongoing automation and robotisation of production processes has influenced demand for speciality and high quality fasteners often in a negative way. Most of the standards for screws, for example, are designed for manual fastening. These standards are widely used, and producers can take advantage of economies of scale. Therefore, the price is normally relatively low. This had led to the use of these screws in automated production systems, even though in terms of quality of the end-product, the use of specially designed screws would be preferable.

Supply and competition

Both in the USA and the EC, manufacturers faced world-wide overcapacity in the mass market of fasteners in the first part of the 1980s. This led to fierce competition and price falls. Many producers were forced to leave the business.

The market power of the main clients of the secondary transformation industry continued to increase. This is particularly true for the automotive industry. Japanese competition urged the requirement of more security, just-in-time delivery and increased quality from their subcontractors and suppliers. Consequently the upstream industries bear both the costs and the risks. However, the tendency towards small, family-owned fastener producers precludes the availability of substantial R&D resources.

Further, the EC industry of secondary transformation of metals has to cope with developments in the automotive industry such as the growth of Japanese car production and the increasing use of single-sources by motor vehicle manufacturers. Japan's increasing production of cars within the EC will urge the EC fastener manufacturers to cooperate with Japanese motor-vehicle producers who have different design specifications than the European automobile industry. The increasing use of single-sources by motor vehicle manufacturers means less utilisation of subcontractors and fewer suppliers. Combined with the ongoing tendency towards concentration in the client industries, the mutual dependency of the supplier and client industries is growing.

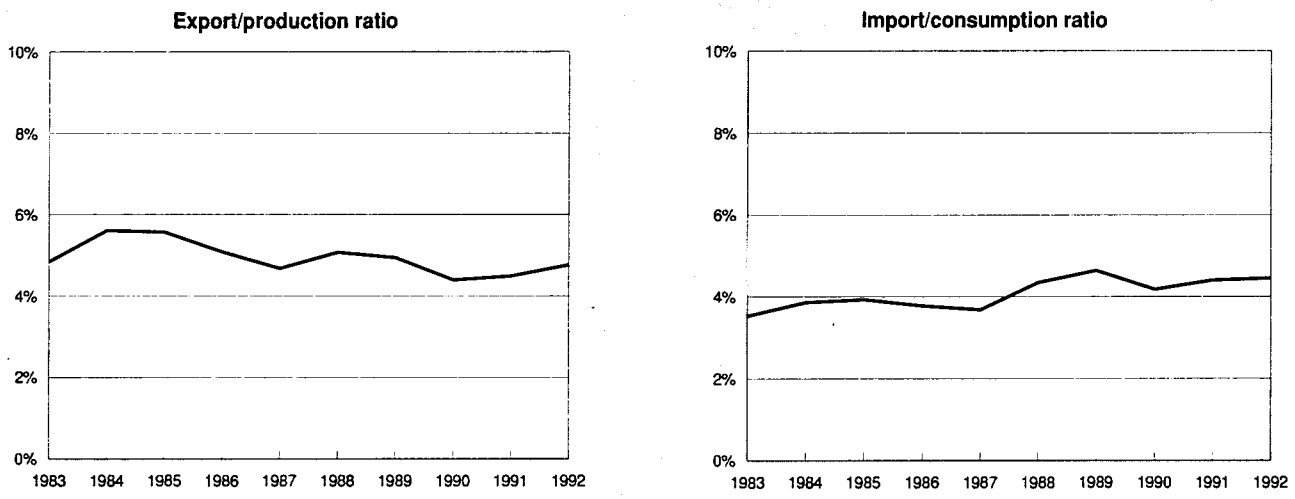
The EC fastener industry is continuously faced with strong competition from East Asia and Eastern Europe in mass production of standard screws, nuts and bolts. In this area there is a worldwide overcapacity. Both EC and non-EC fasteners seek high volume markets, such as Germany. In the mass market there is severe price competition. The standard nuts and bolts from outside Europe are usually destined for the consumer market. The core of the competitive power of the EC industry is sophisticated, specially designed fasteners. The trend in trade is to export high value added products and to import low value added items.

As a result of increased competition costs have risen and prices have dropped. Profits in the fasteners industry reduced to a level which does not allow for necessary investments. It is difficult to change this situation as the industry depends on large suppliers of raw materials and big customers. Companies in the industry have little market power, because they are of limited size.

The galvanising industry is facing increasing cost, incurred by environmental regulation. This gives rise to a trend for mergers; larger minimum plant sizes are required to cope with the necessary investments. The environmental requirements also encourage specialisation; companies which formerly galvanised their products themselves now leave this to specialist hot dip galvanising plants. By servicing a number of companies the unit cost can be reduced.

In spite of the general economic slowdown, hot dip galvanising capacity increased in the early 1990s. The average production increase between 1988 and 1992 was 5.8% per year. The production process has also become more efficient. The average throughout Europe in 1991 was 13 tonnes of steel galvanised for every tonne of zinc consumed, while the average in 1970 was 11 tonnes of steel per tonne of zinc.

Figure 8: Secondary transformation of metals
Trade intensities



Source: DEBA

Production process

Although fasteners are largely standardised products, the manufacturing of tailor-made screws is gaining in importance. An example are multifunctional screws, which can drill, tap and fasten all in one. Automation is necessary to fulfil the needs for more tailor-made fasteners.

The hot-dip galvanising industry has four separate areas: the coating of pre-fabricated products, the coating of steel sheets, the coating of steel wire, and the coating of steel tubes in automatic plants.

Electroplating techniques can be divided into three areas: upgrading of metals, plastic-galvanising and conductor plate technique. The methods include the use of zinc alloys and chromium alloys to fight rust, copper-nickel chromatising, chemical nickel and hard-chromium. The most important alloys in the conventional electroplating process are: copper-tin, copper-zinc, zinc-nickel, nickel-iron, lead-nickel and aluminium alloys. The electroplating technique has gained importance in the field of electronics and printed circuits, which has led to a more efficient use of zinc in electroplating.

Skilled labour is becoming more and more important, because of the increasing use of Computer Numerical Control (CNC), Computer Aided Design (CAD) and Flexible Manufacturing Systems. The use of these new machines and techniques is necessary to be able to produce new kinds of fasteners through cold-forming. Lack of skilled labour is especially a problem here, although the techniques themselves, in particular CNC, help to alleviate part of the problem. Increasing use of CNC can lead to a decrease in labour requirements, which results in a decline in unit labour costs.

Unit labour costs (in current prices) rose an estimated 6.1% per annum between 1983 and 1992; labour productivity in current prices increased marginally more, by 6.2%. In constant prices labour productivity increased by half these rates (3.1%). Although up to date information is lacking, there are indications that the unit labour cost differ considerably among Member States. In 1988, they were 7 600 ECU in Greece, and 24 900 ECU in Luxembourg. The productivity development has also been very dissimilar by country; for example in Greece, it declined over 20% between 1982 and 1989, while in Germany it increased with 20%.

INDUSTRY STRUCTURE

Companies

The galvanising industry can roughly be subdivided in three areas: small enterprises, using primarily hand-skilled labour; larger enterprises, operating more on a manufacturing scale, including in-house production of galvanised metal as part of the production process; and supply of zinc, machines, chemicals, etc., for the galvanising process.

The fastener industry roughly follows a similar pattern, with many small and medium sized enterprises. There are a few, however, that could be classified as medium to large enterprises, with sales over 100 million ECU. The largest companies and dealers are German, which is not surprising given the importance of the German machinery and motor vehicle industries in Europe. Italian, French and British manufacturers are not far behind, however. In the galvanising and electroplating sector, Metaleurop (D) has sales of approximately 140 million ECU in 1990, and in continuous galvanising of steel sheet, Galvanage (L) had annual sales of around 140 million ECU in 1989.

Strategies

Rising cost and decreasing prices urged producers to seek ways to lower production costs, especially through rationalisation. However, in certain segments of the mass market price reductions would not restore competitiveness, as competitors can use cheap labour. In addition to rationalisation, therefore, a switch is made in the product-mix towards quality products. Further, measures have been taken to meet logistic requirements such as just-in-time delivery. All these factors lead to increased investment in new equipment.

In the subsector of speciality products, CNC machines decrease the time and cost of change-overs. The trend toward orders for smaller lot sizes at more frequent intervals and with shorter lead times leads to increased numbers of change-overs for machinery.

The above factors have resulted in increased specialisation and product development in both fastener and galvanising sectors. Subcontracting of galvanising will also become more important, despite the preference of some client industries for single sourcing.

ENVIRONMENT

The electroplating industry is looking for ways to reduce the amount of waste created, in particular the metal content of the effluent. The metals concerned are copper, chromium, nickel and zinc. Efforts are made to develop production processes which generate less effluent by regenerating it and by extending the dipping time. Also, the use of techniques, such as ultra filtration and electrolysis, have the advantage that they do not use additional chemicals. The cascade-washing technique in combination with the recycling of metals could reduce the metal concentration in the effluent from 300 g/l to 0.3 g/l.

Furthermore, recycling of metals out of the galvanic waste disposal is an option, but only if the waste has a high enough metal content, preferably of a single metal. Currently, this is not very practical. Most of the small and medium sized enterprises use third party firms for recycling metals. Also, the traditional technique of the galvanic bath is increasingly being replaced by showering the metal plates. The main waste products of hot dip galvanising - zinc dross and zinc ash - are essential raw materials for the zinc chemicals industry.

REGULATIONS

Standardisation is very important to fasteners. The German quality standard (DIN) is normally used to indicate the quality.

Some manufacturers prefer to meet higher individual quality standards than general standards. However, in general, they support the initiative to make ISO 9000 standards compulsory not only for EC manufacturers, but also for importers.

In the galvanising industry, the possibility of standardising hot dip galvanisation of fabricated products has been studied. A draft based on ISO 1461 has been made. After a period of comment this initiative will presumably lead to generally accepted standards.

OUTLOOK

The strong orientation of the sector towards the common market makes the general economic situation in the EC very influential on its production levels. The effect of the general economic situation on the secondary transformation of metals is magnified because the activity rates of the major client industries such as the construction and the automotive industries, depends heavily on the swings in the EC business cycle.

Cyclical influences and structural factors, such as increased competition from non-EC suppliers, are relevant to the future development of the industry. Therefore, the trend towards specialisation and high-quality products will continue. It will also generate a greater demand for more skilled labour.

Table 5: Secondary transformation of metals
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.0	2.5
Production	0.0	2.5
Extra-EC exports	1.0	3.0

Source: NEI

The EC is currently in a recessive period and, likewise, so is the sector of secondary transformation of metals. In 1992, its production decreased for the second consecutive year. In 1993 the situation will deteriorate further; whereas for 1994, a slight recovery is foreseen. In the medium term the situation is expected to improve.

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European Industrial Fasteners Institute (EIFI). Address: c/o British Industrial Fasteners Federation, Units 5 & 6 Armoury Trading Estate, Armoury Road, Small Heath, Birmingham B11 2RJ; tel: (44 21) 766 7308; fax: (44 21) 773 2902.

Constructional steelwork

NACE 314.1

The scale of the European constructional steelwork industry may be gauged from the total tonnage of steel used which amounted in 1992 to nearly 6.2 million tonnes (mt), making the EC one of the leading world consumers of constructional steel.
Output peaked in 1990 and had fallen by 12% by 1992. It is forecast to decline by some 7% more, bottoming out in 1993. This fall does not fully reflect the overall recession in the construction industry because structural steel has mitigated some of its effects by winning market share from concrete, particularly in the commercial buildings sector, in a number of the EC countries.
Within Europe, the major consumers of structural steelwork are West Germany (1.4 mt in 1992), Spain (1.01 mt), Italy (0.92 mt), the United Kingdom (0.781 mt) and the Netherlands (0.76 mt).

INDUSTRY PROFILE

Description of the sector

Constructional steelwork is the backbone of much of Europe's building industry. It provides the supporting framework for many of Europe's major structures - massive suspension bridges as well as more prosaic road and rail bridges, power stations and transmission towers, high rise office blocks, and countless industrial, commercial and agricultural buildings. These structures are mainly fabricated from hot and cold rolled steel sections and steel plate, supplied by steel producers throughout Europe.

The industrial building sector is the largest user of constructional steelwork, and in a number of countries industrial buildings account for more than half of constructional steelwork production. Other non-residential construction, which includes commercial buildings, is another important user of constructional steelwork, particularly in Italy, Spain, the United Kingdom and France. In agricultural buildings, the Netherlands is by far Europe's largest user of steelwork, followed by the United Kingdom, Italy, France and Belgium.

The use of constructional steelwork in bridges and similar structures used in road and rail networks varies considerably from country to country. The Netherlands appears to be Europe's largest market followed by the United Kingdom and France. An encouraging feature is that a number of countries have reported good prospects for constructional steelwork for bridges - a sector where it competes almost exclusively with concrete.

Available data on constructional steelwork exports suggest that the United Kingdom (65 000 tonnes [t] in 1992), France (50 000 t), Belgium (32 000 t) and Finland (25 000 t) are the largest exporters. However, other countries for which relevant statistics are not available, particularly Germany, Spain and Austria, are known to be significant exporters.

Recent trends

Austria

Constructional steelwork for buildings fell in 1991 and is expected to continue to decline at least until 1995. In 1993 the labour force will be reduced and some production is likely to move to cheaper wage countries, particularly in Eastern Europe.

In Austria the use of steel in buildings is heavily influenced by government contracts. Positive prospects exist in infrastructure investment, for example links to Eastern Europe.

In the private sector, the recession in office and other commercial buildings has been slower to reach Austria than other countries. Steel has only about 5% of the multi-storey market, however, compared with some 20% of the single-storey industrial, agricultural and commercial building market.

Belgium

Constructional steelwork in the Belgian-Luxembourg Economic Union (BLEU) peaked at 240 000 t in 1991, and a 5% decline in 1992 was the result of a 19% contraction in the demand for industrial buildings, which is by far the most important outlet for the constructional steelwork industry. A

Table 1: Constructional steelwork
Production of constructional steelwork

(thousand tonnes)	1988	1989	1990	1991	1992	1993(1)	1994(2)
Belgique/België	252.0	258.0	255.0	280.0	259.0	244.0	234.0
Danmark	93.0	100.0	105.0	97.0	92.0	78.0	92.0
BR Deutschland	1 045.0	1 100.0	1 205.0	1 359.0	1 407.0	1 300.0	1 310.0
España	1 018.0	1 106.0	1 269.0	1 184.0	1 014.0	860.0	900.0
France	616.7	685.9	751.2	696.8	610(2)	551.0	525.0
Italia (3)	925.0	957.0	1200.0	1120.0	920.0	801.0	790.0
Nederland	658.0	631.0	680.0	784.0	760.0	733.0	737.0
United Kingdom	1 218.0	1 323.0	1 101.0	861.0	781.0	809.0	847.0
Austria	65.7	66.9	71.6	67.5	65.0	63.5	61.0
Finland	135.0	150.0	150.0	125.0	95.0	85.0	90.0
Norway	53.3	44.4	42.3	40.2	39.1	46.6	48.0
Sweden	91.0	96.0	83.0	78.0	72.0	64.0	65.0
Switzerland	86.5	73.1	68.2	76.0	65.5	53.2	61.6
Croatia	48.3	53.5	45.9	29.6	N/A	N/A	N/A
Turkey	45.7	30.3	32.1	36.4	34.4	N/A	N/A

(1) Estimate
(2) Forecast.
(3) Consumption.
Source: European Convention for Constructional Steelwork, 1993 Statistical Bulletin (Construction Forecasting and Research Ltd, 1993)

further fall is forecast for 1993 with some stabilisation in 1994.

More than 95% of production is accounted for by three sectors - industrial (79%), agricultural (11%) and commercial buildings (5%). In 1992 there was little change in the high level of activity reached previously in commercial and agricultural buildings but new agricultural building work is forecast to fall by more than 40% between 1991 and 1994 which is expected to reduce steelwork demand in this sector by a similar amount. Demand is also expected to fall in the industrial and commercial building sectors.

In 1991, steel had the largest market share, compared with competitive materials, in two sectors - industrial and agricultural buildings. An encouraging feature is that the amount of constructional steelwork used in industrial buildings was more than 40% higher in 1992 than 1986 due not only to a strong increase in demand for industrial buildings but also to steel's improved market share.

A beneficial trend for steel is also evident in the commercial building sector. Whereas in 1986 and 1987, the consumption of steelwork was essentially for shops, showrooms and garages, there has been a growing trend to use steel framed construction for office buildings, for which there has been a strong demand - particularly in the Brussels area. As a result, office buildings accounted in 1992 for 40-45% of commercial steelwork consumption.

In the agricultural building sector, steel consumption has increased considerably since 1986 because of the material's cost effectiveness and improved durability. However, the negative effects of the Common Agricultural Policy are expected to bring a sharp decline in the market in 1993 and 1994.

Croatia

Because of the war, data for 1992 are not available and a forecast for 1993 and 1994 cannot be provided. However, production of constructional steelwork, which peaked at 53 500 t in 1989, had fallen to 29 600 t in 1991, and informal sources suggest that production has since slumped more dramatically. One major manufacturer, for example, reports a decline in production to a mere fifth of pre-war annual production.

The basic prerequisite for normal development is the cessation of hostilities and political stability.

Denmark

The Danish steelwork industry currently has about 20% overcapacity, competition in the market is fierce and prices low.

Production of constructional steelwork peaked in 1990 and is expected to trough in 1993 before improving considerably in 1994.

The building sector is expected to be weak in 1993 and early 1994. Although industrial activity is unlikely to increase in 1993, better prospects in both the public and private sectors should result in higher steelwork production in 1994 and beyond.

The share of steelwork in single and multi-storey commercial buildings is only a few per cent. There has been little investment in agricultural buildings since 1987 because of uncertainty about future government requirements for environmental protection and the level of subsidies.

Finland

Steel's market share in new construction has grown since the early 1980s from 6-7% by volume to about 15%. An important factor in this success has been the even sharper drop in the real price of steel compared with the falls suffered by competing products.

In the peak years of 1989 and 1990 production stood at 150 000 t. By 1992, the figure was down to 95 000 t, and it is forecast to drop to 85 000 t in 1993 before recovering to 90 000 t in 1994.

Exports are of great importance to the Finnish structural steel industry. At the end of the 1980s they accounted for 30-40% of total production. This proportion fell rapidly to just over 20% in 1991 but is expected to climb back close to 40% in 1994.

An overheated construction industry produced an abundance of commercial and office space in the late 1980s and there is huge over-capacity. Until 1988, steel frames had a market share in this sector of less than 5% but it has stood at 15-20% ever since and today structural steel is widely used in commercial construction, especially large shopping centres.

Industrial construction, which is also currently in a trough, is the most important user of structural steel in Finland. Steel has a market share of 40% in this sector, compared with 20% in the early 1980s, and accounts for 35% of domestic consumption.

France

Structural steel production increased by 33% from 1987 to 1990 when it peaked at 750 000 t. It has since fallen for two successive years and is expected to decline further in 1993 and 1994. Despite the slowdown in economic activity in France's trading partners, exports have held up well, accounting for 50 000 t of the total constructional steelwork production of 610 000 t in 1992.

Preliminary statistical data suggest that production of constructional steelwork has continued to fall in 1993, largely due to the collapse of the market for industrial buildings which traditionally constitutes the main sector of activity for the industry. Between 1990 and 1993, production of constructional steelwork for use in industrial buildings and complexes will have fallen by more than a third.

A continued fall in production is forecast for 1994 despite a turnaround in construction output. Steelwork production in 1994 is expected to be more than 30% below the 1990 level, reflecting steep falls forecast for office and industrial building construction in the three years 1992 to 1994.

There has been a general increase in steel's market share, and this has helped to mitigate to some extent the decline in the overall market. Steel has a predominant market share in the industrial, warehouse and agricultural sectors, and between 1991 and 1992 it increased its market share in most of the eight sectors, mainly at the expense of concrete.

In the industrial sector, market shares were little changed compared with 1992. In warehouses, steel's share rose by 6%, in retail by 16%, in educational buildings (where steel's share is small) by 50%, in sport and cultural buildings by 37% and in a very weak offices market by 23%.

Steel's strong performance overall compared with concrete reflects the increased competitiveness of the material, and cost indices suggest that it is continuing to enjoy this advantage. The future appears bright.

Germany

The economic cycle in structural steel production has generally lagged behind the overall economic cycle by about 18 months. While employment and production generally have been reduced in many sectors during 1992, with a deteriorating trend towards the end of the year, the structural steel industry has shown growth in both eastern and western Germany, albeit not as high as in recent years. In the constructional steel market as a whole, western Germany accounted for 87% of production tonnage in 1992, almost unchanged from 1991.

Compared with most other European countries, Germany's structural steel industry - the largest in Europe - was still enjoying relatively buoyant conditions in 1992. The number of firms, the number of employees and turnover were all still rising. It should be noted, however, that the production total of 2.3 mt provided by the Federal Statistical Office, IFO, DSTV includes about 0.8 to 1 mt of steelwork used in "building elements" not generally considered part of the structural steelwork sector. However, reflecting the deteriorating economic conditions in Germany's trading partners, new export orders fell in both 1991 and 1992. Capacity utilisation also fell in both years.

Calculated on a different basis to exclude steelwork in building elements and other non-structural end uses, the total production in western Germany in 1992 is shown to be 1.41 mt. The downturn in economic activity that started in 1992 is forecast to continue in 1993 and to adversely affect structural steel production. Growth should continue in the new Länder but the impetus given to reconstruction by unification will be curtailed because of generally unfavourable economic developments.

After the monetary and economic union of Germany it was quickly realised that former East German industries made only a small contribution, less than 10%, towards total German production of good and services, and that even this contribution might decline further because of the unsatisfactory state of most industries. A completely different picture was presented by East Germany's structural steel industry. Its share in German production started at over 10%, rose to 13% in 1992 (more than 300 000 t), and is forecast to rise to around 315 000 t in 1993 with a further gain likely in 1994.

A study - Structural Steel 2000 - describes in detail the conditions in the market, which have changed dramatically as a result of unification, the single European market and the emergence of new countries in Eastern Europe. An immediate effect on the German market, with its open borders, has been cheap imports which are well below German costs - especially in the structural steel production sector where there is no opportunity to expand. The study comments that importers appear to have an unrealistic pricing policy and that quality standards seem to have been forgotten. The study shows that in framework and warehouse constructions, structural steel production can be increased and is suited to withstand competition.

Italy

Constructional steelwork consumption totalled 920 000 t in 1992, down from 1.2 mt in 1991. Forecasts of 801 000 t for 1993 and 790 000 t for 1994 may be over optimistic because the corruption scandals have resulted in a virtual standstill of work in the public sector, which accounts for about 50% of production.

For steelwork, the non-residential buildings sector (commercial, education, health and other public buildings) has been one of the most dynamic in recent years, particularly retail and office buildings. A substantial tonnage is also accountable to power transmission. In the near future, investment in buildings for industrial and agricultural uses is likely to be stable, while slow growth is expected in multi-storey office buildings. Envisaged investment in large-scale distribution and the development of hypermarkets and supermarkets suggests that the retail sector should experience sound growth.

In Italy - Europe's largest cement manufacturer and consumer - cement costs about 25% less than the European average, resulting in an unfavourable price differential between steel and concrete.

In addition, a wide difference between the price of steel at the steelworks and for building companies is a major hindrance to the further development of steel in the Italian building industry. Building companies have an unfavourable attitude towards steel and have the ability to condition end users in their choice of materials. Reinforced concrete has a 71% share of the total volume built. Steel's best showing is in the important industrial building sector, accounting for about half of total non-residential building, where steel has a 20% market share.

The Netherlands

Between 1985 and 1990, the value of structural steelwork production increased by more than 40% while the number of firms in the industry employing more than 20 people rose from 219 to 280.

Table 2: Constructional steelwork
Constructional steelwork use in industrial buildings

(thousand tonnes)	1988	1989	1990	1991	1992	1993(1)	1994(1)
Belgique/België	158.0	172.0	170.0	192.0	179.0	168.0	163.0
Danmark	20.0	22.0	24.0	22.0	21.0	18.0	20.0
BR Deutschland (2)	659.0	699.0	741.0	928.0	952.0	890.0	900.0
España	410.0	445.0	511.0	477.0	408.0	346.0	360.0
France (3)	333.5	391.6	445.6	393.4	330.0	280.0	270.0
Italia	330.0	330.0	401.0	380.0	277.0	225.0	210.0
Nederland	79.0	86.0	89.0	96.0	101.0	96.0	98.0
United Kingdom	658.0	745.0	620.0	425.0	398.0	420.0	470.0
Austria	39.6	39.7	41.7	37.5	35.5	33.0	30.0
Finland	35.0	42.0	50.0	44.0	25.0	17.0	18.0
Norway (4)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sweden	48.0	46.0	40.0	34.0	30.0	28.0	28.0
Switzerland (5)	42.5	45.1	40.2	42.7	37.1	28.0	32.0
Croatia	5.6	5.3	5.2	3.0	N/A	N/A	N/A
Turkey	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Forecast.
(2) Includes steelwork used in commercial and agricultural buildings.
(3) Industrial buildings and industrial complexes.
(4) See table 3.
(5) Single and multi-storey buildings for manufacture and warehouses.
Source: European Convention for Constructional Steelwork, 1993 Statistical Bulletin (Construction Forecasting and Research Ltd, 1993)

In the Netherlands, the production of structural steelwork is dominated by what the Project Analyse Bureau calls "Other public" building. Since this sector includes steel for frames and building structures, much of the usage is likely to be in the industrial area (although "Industrial" building is quoted as a separate sector), particularly for distribution warehouses and similar structures. In 1992 other public building accounted for 261 000 t out of a total constructional steelwork production of 760 000 t.

Structural steel's market share in buildings with two storeys was little changed between 1988 and 1991 at 50% - well ahead of concrete's 30%. In buildings with more than two storeys, steel increased its market share in the period from 7% to 12%. Overall, steel increased its share of the multi-storey market from 17% to 26% over the three years.

Norway

Production of constructional steelwork in Norway in 1992 totalled 39 100 t - only slightly down on the 1991 figure of 40 200 t - and it is forecast to rise to 46 600 t in 1993 and 48 000 t in the following year.

The market share of fabricated steelwork in buildings in 1991 was about 23%, with precast concrete accounting for 33%, insitu concrete 26% and other materials 18%. Given the depth of the recession, the tonnage of steel used in buildings has held up well, implying a gain in market share.

Spain

The Spanish constructional steelwork market is among the largest in Europe. Production increased by almost 25% to a peak of 1.3 mt between 1988 and 1990, slightly ahead of the growth in the construction industry as a whole, but fell by 20% in the two years to 1992 to 1.0 mt. A further 15% fall is forecast in 1993, reversing the gains in market share made in the late 1980s, which results from the greater volatility of the sectors in which steelwork is most used.

An improvement in construction activity is forecast for 1994 but this is unlikely to have much effect on constructional steelwork production, since it is in new residential building that the increase in output will be concentrated. However, the price competitiveness of steel compared with other materials should help it to win back some of the market lost since the 1990 peak.

Around two thirds of constructional steelwork is used in the form of steel beams. The industrial sector accounts for more than 40% of total steel beam consumption in construction, followed by offices at around 20%, and "other" building (mostly refurbishment) and "other public" building at 10%.

Steel's market share is highest in towers (90%), industrial buildings (85%), and in the retail and power station sectors.

Compared with the United Kingdom market, Spanish constructional steelwork has a low penetration in several markets, in particular the important offices sector where its share is 30% as against near 60% in the United Kingdom. In a number of other smaller markets such as bridges, health, other public building and education, penetration in Spain also lags considerably behind the United Kingdom, showing that considerable potential exists to develop the market further.

Sweden

According to figures from the Swedish Institute of Steel Construction, the total domestic output of constructional steelwork in 1992 was 70 000 t. However, that figure is based on an annual survey covering approximately 70% of total production so that the true figure for Sweden as a whole is closer to 100 000 t. Output is forecast to fall by more than 10% in 1993.

The industrial sector is the most important market but since peaking in 1988 the production of steelwork for this sector has fallen by 43%. The fall in the commercial sector since its peak in 1989 has been more than 70%. The only sector to show a positive trend has been bridges which is now the second most important market for constructional steelwork in Sweden.

An improved outlook for industrial buildings in 1994 and a continued expansion in the civil engineering sector should result in the first increase in constructional steelwork production since 1989.

Constructional steelwork has about an 80% market share in the industrial buildings sector, so the very poor performance of industrial buildings investment in recent years has had a severe negative impact. A further fall of 14% is forecast for 1993 but the expected improvement in 1994 should bring a 5% increase in output.

Investment in commercial buildings has fallen by around 25% since 1990. A decline in 1992 was particularly marked in hotel and office building but activity in the retail sector was positive, which reduced the overall fall. A decline of 15% in office and retail construction is forecast for 1993 with a further 5% fall in 1994.

Steel has won a large market share in the commercial building sector, accounting for 50% of multi-storey office buildings (as much as 75-80% in certain regions such as Stockholm), and some 80% of single-storey buildings in the retail sector.

Switzerland

Registered orders fell in 1992 compared with the previous year, with overall tonnage down by 14% and value by 15%. These falls were not as severe as those recorded by the building and industrial construction sectors, suggesting that constructional steelwork increased its market share. Exports fell almost 80% and now account for only 3% of the total volume of orders.

The private sector remains by far the most important one for constructional steelwork despite a recent decline. Steel's share of the public sector is falling but remains high.

At the beginning of 1992, order books stretched to 4.7 months. During the year they fell progressively to stand at 3.9 months at the beginning of 1993. This situation has intensified competition and the pressure on prices, which have reached their lowest levels for 20 years.

The recession will probably persist for some time even though the bottom of the current cycle has probably been reached. However, recent falls in interest rates should lead to some improvement in the construction industry from 1994, and the reputation of constructional steelwork can only improve further. Rapid construction, low price and the possibility for recycling are positive factors which are relevant to the near future.

United Kingdom

With the hoped for recovery in the construction industry failing to materialise in 1992, United Kingdom production of constructional steelwork fell by 8%, largely as a result of a fall in commercial demand.

The industrial and commercial sectors, the two largest users of constructional steelwork accounting together for 80% of United Kingdom production, both experienced a poor year in 1992.

Even with a modest recovery in 1993, total constructional steelwork production may not exceed 875 000 t - about 60% of the 1989 peak level of 1.37 mt. Most of the upturn is expected to be for the industrial sector, with a further fall anticipated for steelwork to be used in the commercial sector.

Investment by manufacturing industry in new building and works fell by an estimated 20% in 1992 while steelwork pro-

Table 3: Constructional steelwork
Constructional steelwork use in non-residential buildings (1)

(thousand tonnes)	1988	1989	1990	1991	1992	1993(2)	1994(2)
Belgique/België (3)	12.0	10.0	11.0	13.0	13.0	12.0	12.0
Danmark (3)	7.0	7.0	9.0	9.0	7.0	5.0	7.0
BR Deutschland (4)	275.0	290.0	361.0	201.0	215.0	185.0	180.0
España (5)	489.0	532.0	610.0	569.0	487.0	414.0	432.0
France (6)	144.7	143.8	150.2	162.2	152.0	148.0	133.0
Italia (3)	416.0	440.0	660.0	588.0	490.0	450.0	430.0
Nederland (7)	391.0	355.0	429.0	490.0	472.0	451.0	446.0
United Kingdom (3)	428.0	453.0	350.0	305.0	255.0	250.0	248.0
Austria (8)	14.1	11.9	12.1	11.0	10.0	10.0	10.0
Finland (9)	30.0	39.0	37.0	33.0	25.0	21.0	22.0
Norway (10)	35.0	28.0	25.0	23.0	21.0	22.0	25.0
Sweden (8)	30.0	36.0	29.0	27.0	22.0	16.0	13.0
Switzerland (11)	27.5	18.3	20.0	20.4	20.7	17.4	20.8
Croatia (12)	37.0	40.2	32.6	19.9	N/A	N/A	N/A
Turkey	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Offices, shops, leisure, public administration, health, education, etc. See also individual country definitions below.
(2) Forecast.
(3) Commercial, education, health and other public.
(4) Other public and other (prefabricated buildings and parts for constructions).
(5) Commercial, education, health, other public and other.
(6) Other buildings and other.
(7) Commercial, other public (frames and components for buildings) and other.
(8) Commercial and other.
(9) Commercial, public buildings and other buildings.
(10) Industrial, agricultural, residential and other buildings.
(11) Commercial, education and other.
(12) Other public, which includes commercial, education and health.
Source: European Convention for Constructional Steelwork, 1993 Statistical Bulletin (Construction Forecasting and Research Ltd, 1993)

duction for this sector fell by 6%, implying a gain in market share - a trend expected to continue in 1993 and 1994.

The glut in office floor space in South East England is a serious burden on the office construction sector because traditionally the region accounts for some 50% of offices built in England and Wales. Following an estimated decline of 39% in 1992, output is forecast to fall further in 1993 and 1994.

The floor area of multi-storey buildings completed in steel fell from 7.29 million square feet (677 160 m^2) in 1988 to 4.41 million square feet (409 640 m^2) in 1992. This was notwithstanding the fact that steel had increased its market share during that period to 56.9% and for office construction to more than 70%.

For the commercial sector as a whole, steelwork production is estimated to have fallen to 217 000 t in 1992 from 413 000 t in 1989. An anticipated recovery in leisure/other markets in 1993 is not expected to be sufficient to outweigh the continued decline in orders for office building.

In 1992, the industrial and commercial sectors accounted for 80% of United Kingdom constructional steelwork demand. The other 20% was accountable to agricultural buildings, bridges, power stations, towers and public (non-housing) buildings.

An increase in demand for agricultural steelwork is forecast for 1993 but this may revert to near 1992 levels in the following year. No great change in demand for steelwork for bridges is anticipated for the years immediately ahead but there is the promise of a high plateau of activity being reached in the mid 1990s.

Structural steel has built up a considerable cost advantage over some of the materials against which it competes, and in its most important sectors, industrial and commercial, it is forecast to gain market share. In 1993 steel production in industrial buildings is forecast to increase by 5.5% compared with a fall in the market of 5% and, in the commercial sector, steel production in 1993 is forecast to fall by 4.4% compared to a decline in the market of 18%.

ENVIRONMENT

Today it is recognised that all buildings have an impact on the environment, during their construction, during their life cycle, and again at the time of their demolition. Similarly, there is awareness of the fact that all building materials and components consume energy and create by-products.

A full life cycle analysis of energy and CO_2 levels for structural steel - from extraction of raw materials, production, manufacture, construction, maintenance, refurbishment or demolition, with the further option of recycling or production of a waste product - has yet to be completed: this complex subject is complicated further by such variables as building type, method of construction, and location.

However, steel has the environmental benefit of recyclability, with reclaimed steel that is recycled into products representing 40% of total worldwide steel production. The relative ease with which the steel frames of demolished buildings can be recovered for scrap is a big environmental plus.

Another environmental advantage of a steel structure is that the majority of the construction takes place away from the site, making it a much cleaner system than reinforced concrete, and with the additional benefit that timber is not wasted on shuttering.

A particularly important environmental and practical benefit of structural steel, and one that is increasingly recognised by developers, is its post-construction adaptability. This enables many steel framed buildings to be extended or refurbished that would otherwise be demolished.

REGULATIONS

A condensed version of Eurocode 3, entitled "Essentials of Eurocode 3 - Design Manual for Steel Structures in Building," has been published by the European Convention for Constructional Steelwork (ECCS). This is designed to be simple to apply and contains only those rules needed for the normal day-to-day design of steel structures. While providing simple rules for everyday design, it aims at the same time to the make the concepts of Eurocode 3 itself, which is needed for more advanced design, more accessible.

To provide a bridge between those two documents, ECCS has also produced two supplementary publications - "Worked Examples," which gives a number of typical designs, and "Design Aids," which contains a series of tabulated values for the design equations in EC3.

The importance of making EC3 as accessible as possible is seen as a fundamental part of encouraging designing in steel. Furthermore, the harmonisation of codes is expected to greatly increase the transfer of technology between countries where steel construction is advanced to those where it is not.

The new fire code, publication of which is expected in 1994, will be of particular interest. This will disseminate economic methods of fire protection including new methods of determining fire protection thickness.

There are various ECCS initiatives aimed at promoting the use of steel as a safe material in the fire situation and encouraging use of the Eurocodes to create safe steel structures cost effectively. One such initiative involves the production of a series of normograms covering the design of steel members in fire, based on the methods in the Eurocodes.

OUTLOOK

The constructional steelwork industry, having peaked in 1990, is expected to experience its third successive depressed year in 1993. The increased market share achieved in a number of countries and the keener price of structural steelwork compared with competing materials will be insufficient, in general, to offset the downturn in steel's two most important markets, industrial and commercial buildings.

Despite the forecast of a continuing fall in construction output, however, the United Kingdom - having been among the first into the recession - is expected to experience a modest recovery in steelwork production as market shares are improved at the expense of other materials.

The poor outlook in continental Europe reflects the overall economic situation and, particularly, the excess supply of industrial and office space that exists in many countries.

On current forecasts, 1994 is likely to be a mixed year for the industry. Germany, the largest steelwork producer in Europe, has been following a delayed cycle compared with most other countries since unification. A forecast fall in its production could more than offset increases in several other countries, notably the United Kingdom and Spain. Only when the industrial and commercial sectors improve, which is not anticipated until 1995, is steelwork production across Europe likely to exceed its 1990 peak.

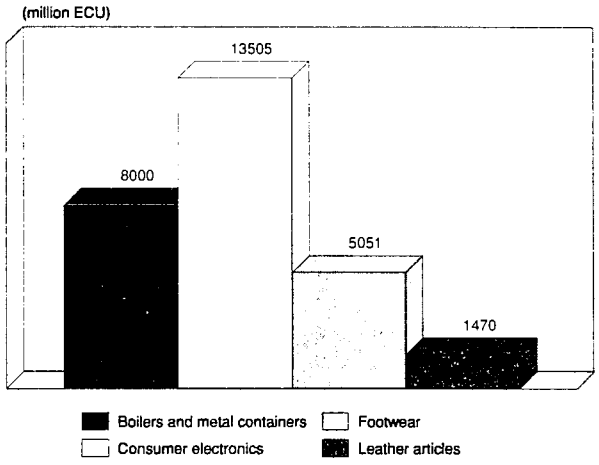
Written by: Access Public Relations
The industry is represented at the EC level by: European Convention for Constructional Steelwork (ECCS). Address: Avenue des Ombrages 32/36 boite 20, B-1200 Brussels; tel: (32 2) 762 04 29; fax: (32 2) 762 09 35.

Boilers and metal containers

NACE 315

The EC boilermaking industry has a regional or national orientation rather than an international one. Nevertheless, the sector has to cope with increased international competition, both within and outside the EC. The boilermaking industry has a variety of client industries of which the energy sector and the chemical industry are the most significant ones. Cutbacks in investment in some of the client industries together with increased international competition caused the EC consumption and production of boilers and metal containers to stagnate, adversely impacting employment. The resulting overcapacity forced restructuring and diversification in the industry. If the sector is to remain strong in an increasingly competitive market, it needs to seek new outlets in rapidly growing industries and to update technical skills. In the short run production and consumption will stabilise; in the medium term a modest growth is expected.

Figure 1: Boilers and metal containers
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

Data for the boilermaking industry are classified under NACE 315. The products of this industry can be divided into the following categories: steam generators and boilers; nuclear boiler construction; fitting for steam generators and boilers; flat and nuclear heat exchangers and condensers for nuclear reactors; water tanks, containers and cisterns; distillation; refining and similar equipment; pipework; and miscellaneous activities, including installation and maintenance.

Since classifications differ within the EC, it is difficult to estimate the importance of the industry in each country.

Recent trends

Production in nominal terms increased by 1.2% in 1992. Consumption grew at a slower pace (0.5%). Regarding the small export rate (7.3% in 1992), EC demand largely determines production. Nevertheless, in 1992 the development of domestic demand and exports equally contributed to production growth. In volume however, production dropped in 1992 (2%). Employment in the EC boilers and metal containers industry was 2.5% lower in 1992 than in 1991.

Considering output, France is the largest EC producer of boilers and metal containers; Germany ranks second; in terms of value added the opposite is the case. Both in output and value added Germany and France accounted for two third of the total EC output in 1992. Italy and the United Kingdom accounted for some 20%.

EC production in current value grew at an average rate of 3.2% per year between 1983 and 1992. The growth was rather unevenly spread over this period; it was particularly large between 1988 to 1990 (9.5% per year), then it slowed down to around 1% in 1991 and 1992. In constant prices, production declined by 2.5% in 1991 and 1992, whereas over the period 1988-1990 an annual increase of 5% was recorded. Employment dropped on average by 1.2% per year.

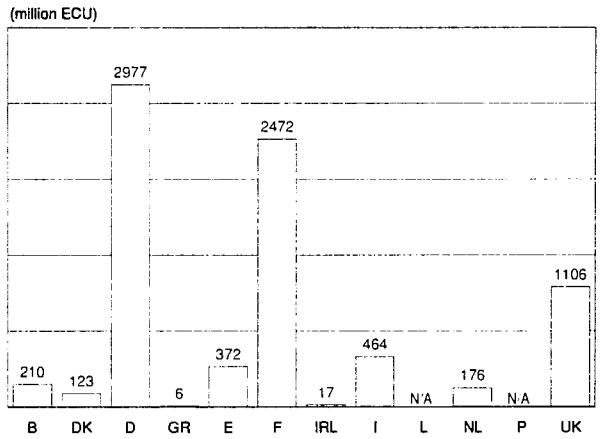
Investments by EC producers fluctuated in the 1980s, with strong growth in 1987 and 1988. No data are available for more recent years, but the general view is that investment growth has declined.

Both French and German production (in constant prices) increased slowly (0.4% to 0.5% per year) from 1983-1992. In 1992, France recorded a significant production fall of 9%, whereas Germany's production increased by 11%. In the United Kingdom, production declined on average by 5% per year between 1983 and 1992, but it recovered slightly in 1992. Italy and Portugal's 1992 production level was in similar to that of 1983; the remaining Member States revealed positive growth rates over the same period. Employment declined in most Member States between 1983 and 1992. Only in Belgium, Denmark and Germany did it increase.

International comparison

The EC is by far the world's largest producer of boilers and metal containers. Its production level is three times that of the USA. Like in the EC, production in the USA is very much determined by domestic demand; in 1992, production (in current prices) was 12% lower than in 1983, which was particularly due to a considerable drop in 1990. Japanese production doubled during the period 1983-1992. However, in 1992 it was only a fraction (2% to 3%) of EC production.

Figure 2: Boilers and metal containers
Value added by Member State, 1992



Source: DEBA

Table 1: Boilers and metal containers
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	13 429	12 906	14 483	14 200	14 279	15 200	16 785	18 051	18 385	18 476	18 500
Production	14 516	14 039	15 568	15 221	15 187	15 973	17 746	19 010	19 249	19 498	19 500
Extra-EC exports	1 284	1 298	1 264	1 205	1 120	956	1 200	1 232	1 252	1 426	1 500
Trade balance	1 086.6	1 132.6	1 085.3	1 021.4	908.2	773.5	961.1	958.7	863.9	1 022.3	1 000.0
Employment (thousands)	244.0	233.5	239.7	231.2	227.4	212.7	216.6	224.9	222.5	216.9	215.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) NEI estimates.
Source: DEBA

Table 2: Boilers and metal containers
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	-1.2	1.5	0.0
Production	-1.6	1.5	-0.2
Extra-EC exports	-7.1	5.7	-1.6
Extra-EC imports	-0.6	15.0	6.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Boilers and metal containers
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 284.4	1 298.1	1 263.8	1 205.2	1 120.2	956.4	1 200.1	1 231.8	1 252.3	1 426.5
Extra-EC imports	197.8	165.5	178.5	183.8	212.0	182.9	239.0	273.1	388.4	404.1
Trade balance	1 086.6	1 132.6	1 085.3	1 021.4	908.2	773.5	961.1	958.7	863.9	1 022.3
Ratio exports/imports	6.5	7.8	7.1	6.6	5.3	5.2	5.0	4.5	3.2	3.5
Terms of trade index	104.4	105.2	100.0	105.4	104.0	117.6	113.7	108.9	108.5	110.9
Intra-EC trade	599.8	672.4	761.9	809.4	940.6	983.1	1 147.9	1 305.2	1 557.7	1 635.8
Share of total imports (%)	75.2	80.2	81.0	81.5	81.6	84.3	82.8	82.7	80.0	80.2

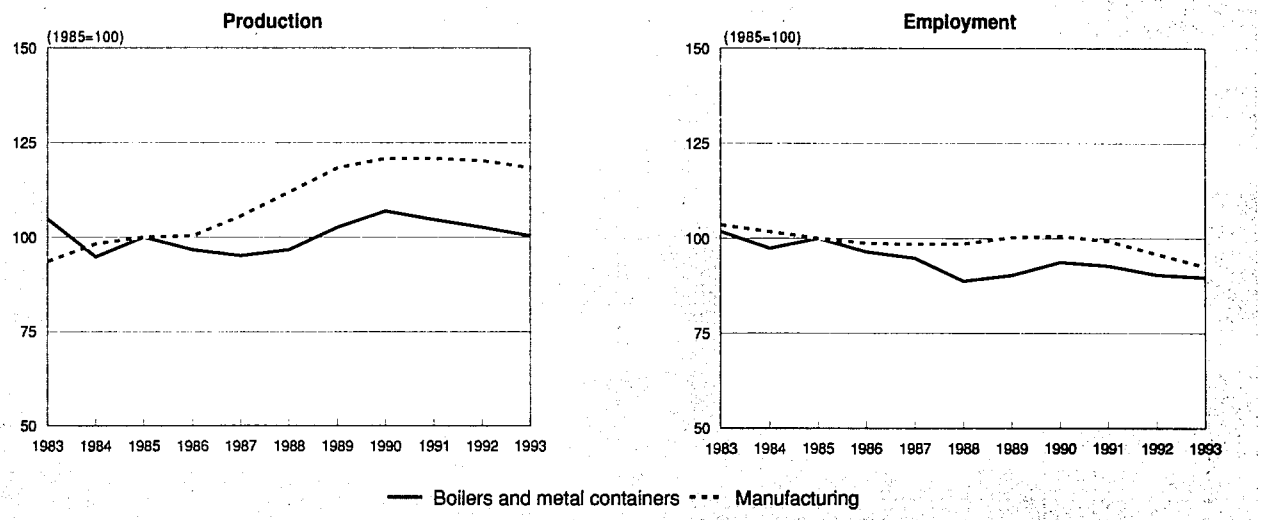
Source: DEBA

Table 4: Boilers and containers
Production in constant prices and employment by Member State (1)

	Production (million ECU)		Employment (thousands)	
	1983	1992	1983	1992
Belgique/België	206	424	4 471	5 801
Danmark	112	256	2 028	3 944
BR Deutschland	4 804	5 017	64 6786	7 094
Hellas	N/A	15	N/A	429
España	520	634	12 023	11 299
France	5 478	5 672	76 696	72 438
Ireland	38	46	802	804
Italia	1 165	1 141	16 085	12 572
Luxembourg	N/A	N/A	N/A	N/A
Nederland	N/A	365	N/A	5 836
Portugal	94	94	6 165	3 601
United Kingdom	3 673	2 302	56 624	32 988

(1) Estimates are used if country data is not available, especially in 1992.
Source: DEBA

Figure 3: Boilers and metal containers
Production in constant prices and employment compared to EC manufacturing



1993 are NEI and Eurostat estimates.
Source: DEBA

Foreign trade

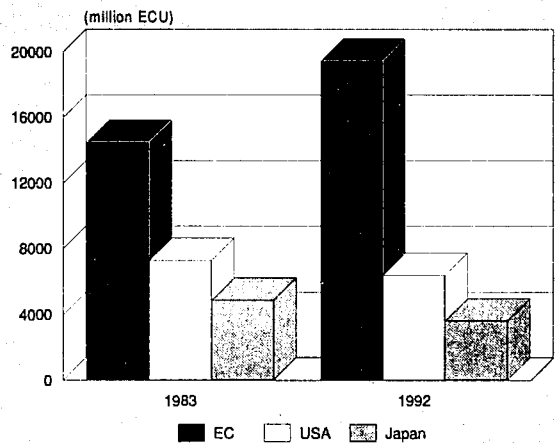
With export rates in the range of 7% to 9% of total production and an import penetration of 1.5% to 2%, foreign trade is of relatively minor importance for boilers and metal containers. This is also true if intra-EC trade is considered; including this trade, the export rate was 16% and import penetration 11%. These low proportions underline the rather limited geographical coverage of most of the enterprises in the sector.

The EC has always been a net exporter of boilers and metal containers. Regarding the declining export/import rate imports grew faster than exports. The trade surplus fluctuated over the years, but for the greater part it was around 1 billion ECU.

About two-thirds of the 1992 EC exports of boilers and metal containers were destined for the countries outside of the Triad, including newly industrialised countries (NICs) and less developed countries (LDCs). Within the remaining one third exported to the industrialised world, the EFTA countries are by far the major destination. In addition they increased their share in the total extra-EC exports from one fifth to one quarter. The very modest share of exports to Japan increased too, whereas the proportion of exports to the USA became declined. Regarding individual Member States, France has sold its specialised nuclear power station technology to industrialising countries, while Germany is meeting demand in Africa and the Middle East.

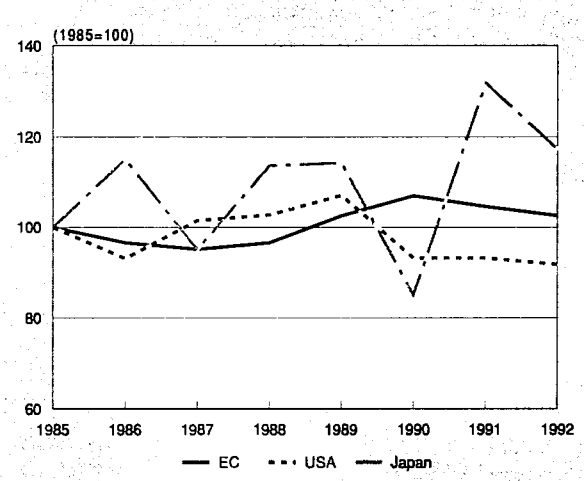
The industrialised world is the main of the non-EC imports. Its share of the EC market dropped from nearly 80% in 1987 to just over 60% in 1992. The EC market share of all countries exporting to the EC declined. For example, the share of the EFTA countries, by far the main origin of the non-EC imports, declined from 51% to 43%. Imports from East European countries have become considerably more important over the past five years: they jumped from 5% of total extra-EC imports in 1987 to 28% in 1992.

Figure 4: Boilers and metal containers
International comparison of production in current prices



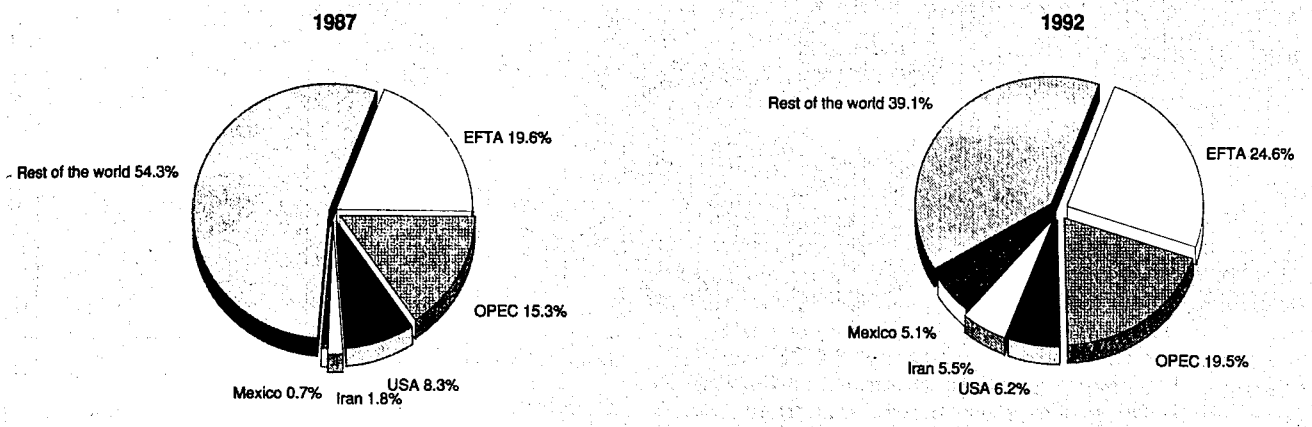
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Boilers and metal containers
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Boilers and metal containers
Destination of EC exports



Source: Eurostat

MARKET FORCES

Demand

The boilermaking industry supplies equipment to many branches of other industries. It produces a variety of capital investment goods for the following purposes (in decreasing order of importance): the production of thermal and nuclear power; the oil and gas industry; the chemical, petrochemical and pharmaceutical industries; the food and drink industry; the construction industry; the iron and steel and metalworking industries; the paper industry; and various other industries including automobiles, textiles, mechanical engineering, cement, rubber and electronics.

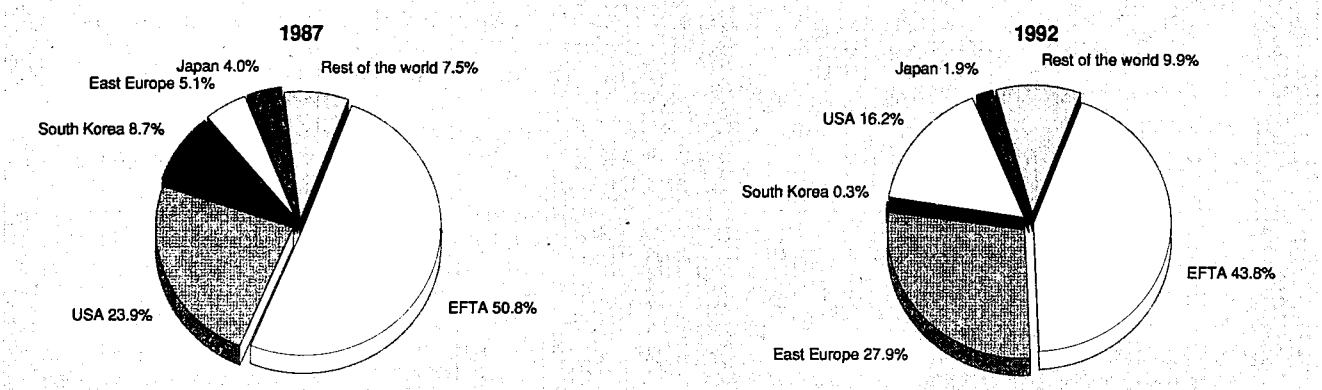
The importance of customer industries varies by Member States. In France, major downstream industries are the: energy (nuclear and conventional) industry, chemical industry, the food and drink industry, the building and construction industry, the and oil and gas; they account for 70% of the sector's output. Major client industries in Germany are the chemical, automotive, engine construction and energy industries. In the United Kingdom, the oil, energy, harbour and shipping, and iron and steel industries are primary outlets, while in Italy, the energy, automobile, harbour and shipping and ventilation industries are major clients. The market has been subject to significant changes, including shifts in the relative importance of the main clients. For instance, demand from the nuclear power industry collapsed due to sharp cutbacks in investments. New major outlets are the food and drink industry and the chemical industry.

Large cyclical and structural swings are significant features of the market for boilers and metal containers. Energy prices have a substantial impact on industry demand for boilers and in energy-saving equipment (heat exchangers), since they affect investment decisions. The relatively low oil prices since the end of 1985 were an important determinant of recent demand trends. Another significant factor influencing demand is the industry's sensitivity to the general economic development. Postponement of investments in downstream industries affects the position of the boilermaking industry. Enterprises specialising in large boilers for heavy industry, such as power stations, are particularly vulnerable to these swings.

Supply and competition

Increased competition in the export markets from emerging East Asian boilermaking firms and from Eastern Europe, together with declining investments in domestic markets and a

Figure 7: Boilers and metal containers
Origin of EC Imports



Source: Eurostat

Table 5: Boilers and metal containers
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (2)	34.4	33.5	33.0	33.5	33.0	35.9	34.8	36.6	36.7	36.9
Productivity index	104.3	101.7	100.0	101.6	100.2	108.9	105.6	110.9	111.2	111.9
Unit labour costs index (3)	89.3	94.3	100.0	104.6	108.4	114.8	119.0	126.8	139.1	145.2
Total unit costs index (4)	94.9	91.5	100.0	101.7	105.0	115.7	126.9	130.9	136.1	141.4

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed (thousand ECU).
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

slow down of investments in developing and OPEC countries, affected the EC industry very badly. Estimated profitability (non-labour income in value added) declined significantly and overcapacity emerged, urging the manufacturers of heavy industry boilers to reconsider their activities. Companies try to become less dependent on their traditional clients, such as the heavy industry by switching to new, but related areas, such as civil engineering.

Production process

Unit labour costs (in current prices) rose at an average rate of 5.6% per year from 1983 and 1992. The growth of labour productivity (in current prices) was less; 4.7% per year. During the period 1989-1992, unit labour cost grew twice as fast as labour productivity: 7% versus 3.2% per year. As a result, the profitability of the industry has increasingly been put under pressure. This is the more so since labour productivity in constant prices (measured in value added) increased only at a rate of about 1% between 1989 and 1992.

Within the industry, system integrators are concentrating their activities on design, contracting and on-site installation. Much of the intermediate assembly work is contracted out to small local firms. The changing economic environment of the boilermaking industry - the need to improve productivity, for instance - increases the need for more skilled labour. Personnel training is a major concern.

INDUSTRY STRUCTURE

Companies

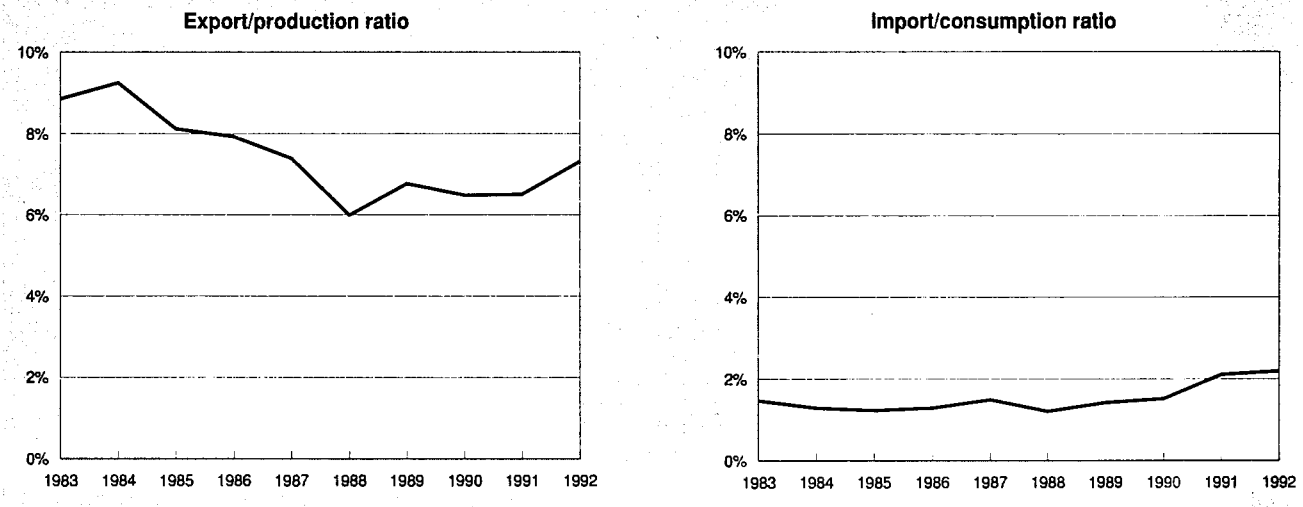
In the boilermaking industry three types of firms can be distinguished: system integrators; product specialists; and activity specialists.

System integrators are the smallest, but most powerful group. They are usually medium-sized firms or divisions of large diversified industrial groups installing systems. They focus on three activities: design and engineering, manufacturing and on-site installation. The principal feature of system integrators is the high value added content of their activities. Raw material input represents about 20% of turnover, whereas labour cost are about 45% due to large design and engineering departments with highly-qualified technical staff.

Product specialists supply equipment such as vessels, boilers and heat exchangers. Owing to the low unit costs of production they have a good international competitive position for specific products. The enterprises, however, tend to be domestically oriented. The firms are normally medium-sized enterprises. Raw material input represent over a third of total turnover. The value added content is less than for system integrators.

Activity specialists are firms which manufacture particularly specialised items, mostly from blueprint of the client. This is the most common type of firm within the boilermaking industry. They are sub-contractors of the system-integrators

Figure 8: Boilers and metal containers



Source: DEBA

and operate on a small scale. Their rather weak basis due to their specialisation hinders export activity.

Enterprises in this sector have regional or national rather than an international orientation. They can generally be found near the centres of heavy industry. the largest companies tend to be located in the countries which dominate the single market, although only one of the ten largest EC firms is located in Germany (Deutsche Babcock). In Germany, there are many medium sized enterprises. Babcock is a special case, however. If all activities of the enterprise in Germany, the United Kingdom and France are taken together, Babcock is the largest EC firm. Other large firms involved in the industry include CLN (I), Degrement (F), Sabroe Refrigeration (DK), Alsthom (F), Industria Cantieri Metallurgici (I), Dexion International (UK), which is a subsidiary of Interlake (USA), Ponticelli (F), Aalborg (DK), Cockerill Sambre (B) and Stork (NL). Both US and Japanese firms have subsidiaries in the United Kingdom.

Strategies

In this market, successful firms are mostly demand oriented, rather than innovative. The relatively weak development of demand, as well as the changing roles of the diverse outlets of the industry, has forced enterprises to reconsider their key activities. Many companies are attempting to lessen their dependence on the heavy industry as the main outlet.

Competition over labour costs forces the enterprises to turn to related areas of work: mechanical engineering, electricity and civil engineering. System integrators offer an ever wider range of maintenance services. Maintenance work is no longer lengthy and infrequent: the ageing of machines and the concern regarding the financial viability of the installations makes quick, frequent maintenance necessary. In areas which require a high level of skill, such as nuclear energy, firms are tending to broaden the scope of their services.

ENVIRONMENT

The boilermaking industry is involved with environmental problems in several ways. Because of the danger of leakage, tanks for underground storage of chemicals and oil products are of increasing concern; much research has been done in the field of corrosion containment and substitute raw materials for tanks. In the USA, about 90% of all new tanks for oil stocking are made of plastic. The discovery that metal tanks corrode not only from outside but from inside as well, stimulated the use of plastic tanks. Installation of underground plastic tanks is very different from metal tanks, and demands a completely different organisation of the work. For instance, the use of a special glue allows only a limited amount of time to connect the pipework.

The market for environmental products such as for cleaning industrial waste water or air pollution is becoming increasingly important. This creates opportunities for the boilermaking industry. Enterprises are likely to have a competitive edge in countries where environmental regulation is already very strict (e.g. Germany and the Netherlands).

REGULATIONS

Already in 1987, a directive on simple pressure vessels (87/404/EEC) was adopted. It relates to unfired vessels of a simple geometry which contain air or nitrogen. These vessels are mainly used as air receivers or braking cylinders. Simple pressure vessels have to fulfil several demands regarding safety in order to receive the CE marking. The directive does not apply to pressure vessels for nuclear installations, to pressure vessels for the propulsion of ships and aeroplanes or to fire extinguishers.

The recent liberalisation of the public procurement in power plant markets is expected to generate significant changes in electrical power equipment supplier firms. More generally, EC energy policy will have a major impact on the upstream industries of the energy sector. But harmonisation of the laws of Member States concerning pressure equipment is still required to establish an internal market for boilers. A proposal for a directive on this subject has been made.

OUTLOOK

To cope with increased competition from outside the Common Market, the EC industry will continue to diversify, and demand for higher and differently skilled labour force will increase. Training will be an important means through which firms can update technical skills. Furthermore, the changes that have been taking place in the industry structure are likely to continue. Firms will redefine their core activities and seek co-operation to survive in the competitive market. More engineering services are likely to be part of this.

Table 6: Boilers and metal containers
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.0	2.0
Production	0.0	2.0
Extra-EC exports	1.0	1.0

Source: NEI

Regarding its low export share the sector depends largely on EC demand, which in turn is very much linked to swings in the business cycle. As a result of the current recession investments in some major client industries are not likely to pick up in the near future. This applies to the heavy and chemical industry, whereas in the short term prospects for the food and drink industry and the energy sector are neither moderate nor bright. The resulting stagnating demand for boilers and metal containers together with low growth and increased competition on the international market will entail a stable production in the short run. In the medium term the business cycle is expected to recover, which will stimulate demand for products of the boilermaking industry in general. Moreover new opportunities stemming from environmental concern in particular could stimulate demand for special boilers and heat exchangers in the medium term. During the period, 1993-1997 EC production and consumption of boilers and metal containers are expected to grow modestly.

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Hand tools
NACE 316.11

Due to the general economic slowdown, the beginning of the 1990s recorded a decrease in average production of 3.3% per year in current prices. Due to increasing competition from outside the EC, demand was increasingly met by imports. Moreover, the export rate dropped and the EC turned from a net exporter into a net importer of hand tools.
EC manufacturers try to cope with increased competition by rationalising their production process and by changing their product-mix towards the production of high-quality products. For the short term, the outlook will remain rather dim; future prospects for the medium term are more positive.

INDUSTRY PROFILE

Description of the sector

The tools industry comprises four principal segments: hand tools, tools for joinery, fixing tools for construction and metal saws. The sector manufactures products including axes, screwdrivers, saws, files, rasps, pliers, shears, spanners, tools for drilling, taps and dies, hammers, planes, chisels, etc.

Although some hand tools can perform the same function as some power tools, they are different products, occupy different market segments and are subject to different regulations. Some hand tools more related to the industry are also treated under NACE 343.1.

Recent trends

Production in current prices declined by 3.7% in 1992. A drop in EC demand together with increased imports accounted for this decline; exports remained virtually unchanged. Imports exceeded exports slightly, continuing a slight trade deficit that began in 1991. International trade plays a major part in the EC hand tool market; 44% of the production is exported; 45% of the consumption is imported.

With a share of 43% in total EC production in 1992, Germany is by far the largest EC producer of hand tools. Other major producers are France and the United Kingdom. They each accounted for 20% of the EC production. Germany (with almost 40% of EC consumption), France and the United Kingdom are also the major consumer markets of hand tools.

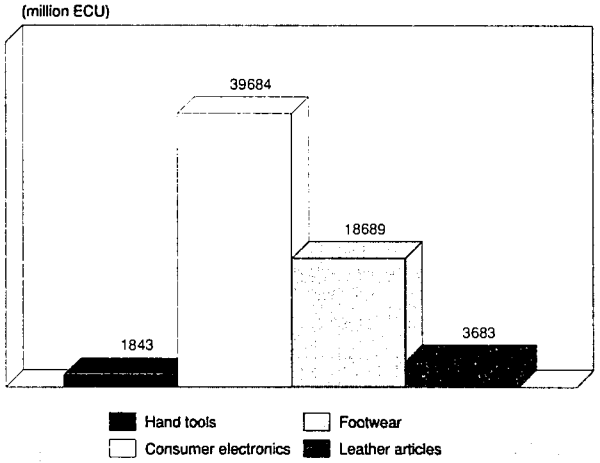
All the Member States except Belgium had lower 1992 production levels than in the previous year; in Belgium the production level remained stable between 1991 and 1992. Italy suffered the greatest production decline (13.2%), followed by France (6.3%); for the other Member States the reduction was 2.5% to 3%.

During the 1980s, production in current prices grew at an average rate of 5.5% to 6% per year. However, due to the general economic slowdown, the beginning of the 1990s recorded an average decline in production of 3.3% per year. As a result, production from 1983-1992 increased by 3.6% per year. Consumption grew at the faster pace of 6.2% per annum. Since demand was increasingly met by imports (45% in 1992 versus 33% in 1983), EC production did not fully benefit from the rise in EC demand. At the same time, the export share of production dropped from 50% in 1984 to 44% in 1992.

Practically all subsectors have to cope with weak demand. One of the more faster growing segments of the market was that of electric power tools. Major consumer countries were Germany (almost 45% of EC consumption), followed by France and Italy with shares of 15% and 11%, respectively in 1992. A fast growing segment is the market for replacement parts and accessories for power tools; growth will probably be generated in this subsector at the expense of the power tools themselves.

Screwdrivers, spanners (mostly used for home car repair) and wrenches are the most important sectors of the do-it-yourself (DIY) hand tool market. The spanner sector was by far the most important until the mid 1980s. It has since suffered a decline due to a reduction in sales of socket sets. The screwdriver sector has been adversely affected by rising sales of cordless drills, which double as cordless screwdrivers.

Figure 1: Hand tools
Production in comparison with other industries, 1992

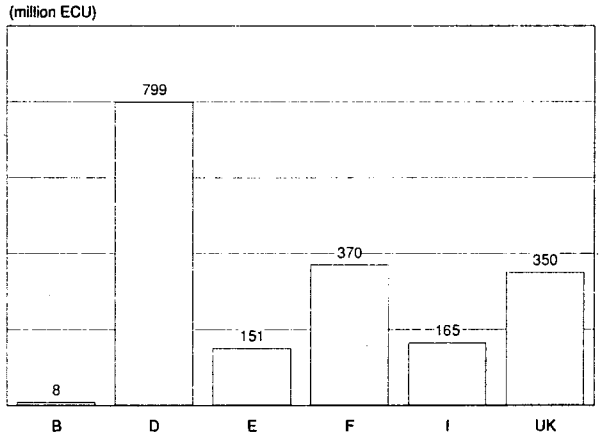


Source: Eurostat, CEO

International comparison

The EC is the world leader in the production of hand tools. The rise of the penetration rate and the fall of the export rate, however, reflect increased competition, in particular from China and other East Asian countries and also from East European countries. These countries are especially competitive through pricing.

Figure 2: Hand tools
Production by Member State, 1992



Source: CEO

Table 1: Hand tools
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993(1)
Apparent consumption	1 092	1 162	1 240	1 270	1 419	1 620	1 714	1 902	1 920	1 867	1 820
Production	1 337	1 449	1 562	1 526	1 563	1 676	1 809	1 974	1 913	1 843	1 790
Extra-EC exports	612	732	792	732	708	718	827	804	805	808	800
Trade balance	245	287	322	256	144	56	95	72	-7	-24	-30

(1) Belgium, Germany, France, Italy, Spain and United Kingdom; exports: whole EC.
(2) NEI estimates.
Source: CEO, Eurostat

Table 2: Hand tools
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	612	732	792	732	708	718	827	804	805	808
Extra-EC imports	367	445	470	476	564	662	732	732	812	832
Trade balance	245	287	322	256	144	56	95	72	-7	-24
Ratio exports/imports	1.7	1.6	1.7	1.5	1.3	1.1	1.1	1.1	1.0	1.0

Source: Eurostat

Table 3: Hand tools
Breakdown by size of enterprise, 1988

Employees	D	E	F	I	Total	%
less than 20	528	15	59	78	680	65
20-100	164	12	62	45	283	27
more than 100	57	6	12	7	82	8
Total	749	33	133	130	1 045	100

Source: CEO

Foreign trade

With a penetration rate of 44% and an export rate of 45% in 1992, non-EC trade played a significant role in the EC hand tool market. Between 1983 and 1992, imports rose three times as fast as exports: 9.5% versus 3.1%, thus creating a negative trade balance in 1991.

In 1992, more than 38% of the EC exports of tools were destined for the EFTA countries and the USA; in 1987 this was 44%. The decline was particularly due to the increase in the EFTA countries' share of their own markets. Conversely, the remaining extra-EC trading partners of the EC became more important for exports; their collective shares rose from some 56% to 61%.

Remarkably, there was virtually no shift in the relative importance of the origins of EC imports. The EFTA countries ranked first, followed by Taiwan and the USA. These countries account together for around two thirds of EC imports of hand tools.

MARKET FORCES

Demand

Demand for hand tools for industrial use is linked to the general level of economic activity. Different factors are important in this respect. In the case of saws and tools for joinery machines and metal saws, demand depends almost entirely on investments made by downstream industries (furniture manufacturers, sawmills and mechanical engineering in general). Demand for tools for construction (including anchor bolts, masonry drills and power tools) is affected by the strength of the building and construction industry, which in turn depends on the general economic climate. The explosive growth of office automation equipment is also responsible for increased demand for high-quality hand tools used in repair work.

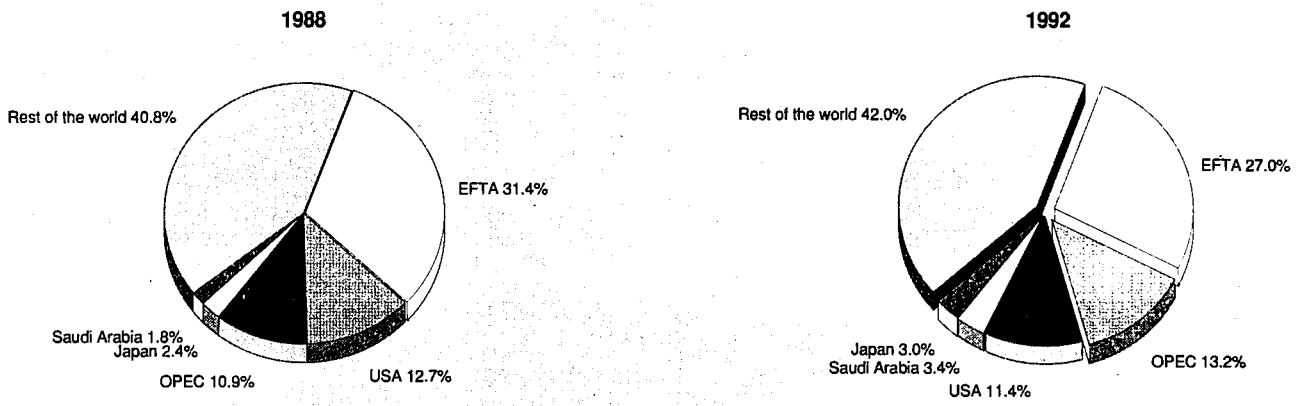
Tools for private use have, in general, a long economic life. When the economy is strong, these tools have a high price elasticity. However, declining disposable income is a strong factor in pushing demand towards the cheaper end of the product range.

The DIY sector boomed in the 1980s with rising home ownership levels. As people became more confident about tackling DIY jobs, they tended to buy higher quality tools. Manufacturers have introduced more advanced products, such as hardpoint saws, to the DIY market in response to this change in demand.

Supply and competition

Depending on the market size, the EC countries can be subdivided into three categories: 'leaders', 'developing' and 'small'. The leading countries, which are large and developed,

Figure 3: Hand tools
Destination of EC exports



Source: Eurostat

include Germany, the United Kingdom, France and Italy. They account together for some 70% of the EC market. Several intensively used distribution channels exist in these countries. They have a long tradition of tooling and DIY activities.

The second group consists of Ireland, Spain, Greece and Portugal. They accounted for an estimated 15% of the market. Modern distribution networks from the leader countries are establishing themselves here.

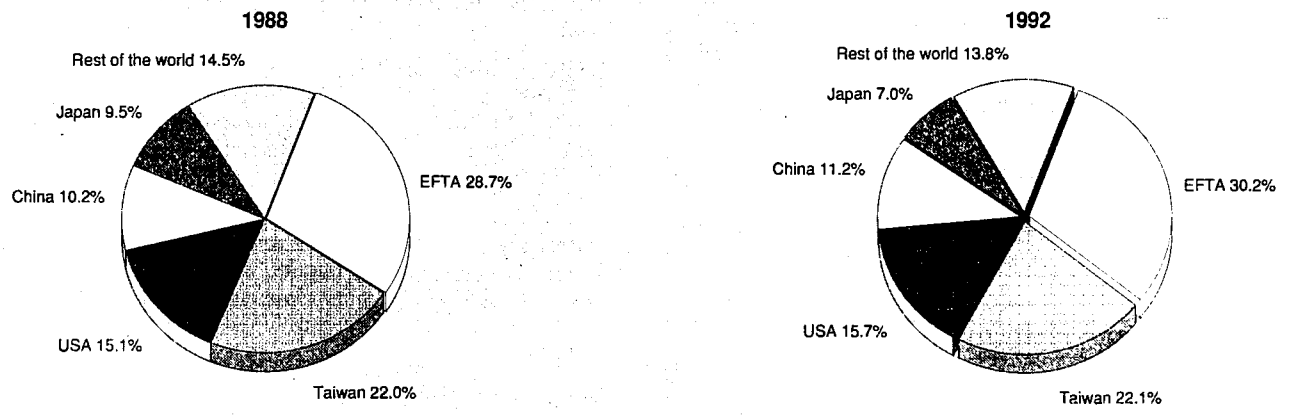
The small EC countries - Belgium, Denmark, Luxembourg and the Netherlands - hold the remaining 15% of the market. They have distribution channels comparable to those in the leading countries.

In the leading countries, some 50% to 60% of all sales of hand tools through the retail trade are accounted for by DIY superstores or multiples. These stores are characterised by wide product ranges, accessible presentation and competitive offers. Another 15% or so of sales go through independent DIY stores, while specialist hardware stores account for a further 18%. Tools for joinery machines and metal saws are partly distributed by retailers and partly sold directly to manufacturers of plant and machinery. In the last few years a stagnation in the DIY market has led to alterations in the distribution system. In France, the medium-sized stores (around 3000 m^2) are having difficulties. Due to a continuous flow of low priced products from East Asia and East Europe, competition has become particularly fierce in this market segment.

Production process

From 1983-1992, labour cost increased at an average rate of 5.5% per annum. The continuous rise in cost, together with a recessive market at the beginning of the 1990s, encouraged manufacturers to rationalise their production processes. At the same time growing supplies of cheap hand tools from East Asia and East Europe urged EC producers to change their product-mix, and to switch to manufacturing of products with a high value added content.

Figure 4: Hand tools
Origin of EC imports



Source: Eurostat

INDUSTRY STRUCTURE

Companies

In the EC, the bulk of the companies engaged in the production of hand tools is small. About two thirds of the firms have less than 20 employees. In the individual Member States, this share varies from 45% in France and Spain to 70% in Germany. Principal reasons for the abundance of small-sized companies are the low value added nature of the products, the wide diversity of the products and the small production runs per item. Moreover, many companies are family-owned, which can limit the acquisition of capital.

The few medium to large, sometimes internationally operating, firms account for the larger part of production. These include SandvikBahco (S), Stanley (UK/F), Rothenberger (D), Hilti (CH) and Facom (F). The Swedish manufacturers Sandvik-Bahco have several production facilities in the EC. This applies also to the US-based Stanley works. In the leading countries, major manufacturers often have a large market share. For instance, 50% of the UK DIY market for screwdrivers is supplied by Stanley and Draper (an importer/packager); 75% of the DIY market for hand drills is covered by Stanley, Draper and Record Ridgeway.

In power tools manufacturing, large enterprises include Bosch (D), Black & Decker (USA), Metabo (D), Peugeot (F), Makita (JPN), Andreas Stihl KG (D), Kango (UK), Hitachi (JPN), Hilti CH), Fein (D) and AEG (D).

Strategies

Fierce price competition due to the increasing volumes of cheaper imports urge many manufacturers to improve their productivity and to reconsider their product-mix. Lowering production costs and making a switch to quality products are prerequisites to remaining competitive. After-sales services are important, too. These qualities are particularly important in high-income countries like Germany. Further, quality and after-sales service are of greater importance in a booming economy than in a recessive one; in a recession, the customers tend to concentrate on price.

Manufacturers are looking for new markets. Eastern Europe can be such a market with large opportunities, provided the worst economic developments can be overcome in those countries. As an example, Stanley Works (USA) has set up a joint venture with the Polish company Fabryka Narzedi Kuznia near Krakow. This deal works in two ways. The new company will take over Kuznia's hand tools manufacturing capacity and make further investments in new equipment and facilities later on. In return, the deal will allow Stanley to manufacture Stanley branded products cheaply and sell them throughout Europe.

REGIONAL DISTRIBUTION

The sector has local, regional and global aspects. Manufacturers who are operating on a small scale and depend on the demand from downstream industries like mechanical engineering tend to be located in the area where these industries are concentrated. For instance, in Germany and Spain, manufacturers are contracted geographically. At the same time however, the big firms in the industry and those engaged in the production of DIY products have a global orientation.

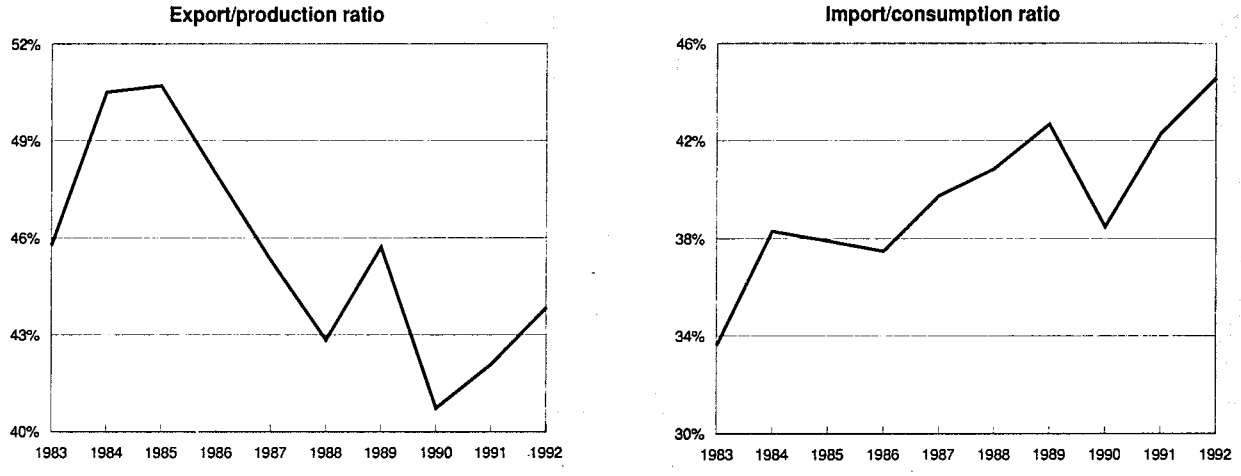
ENVIRONMENT

This subsector is not one of the major polluting branches of industry, so the remarks that can be made with respect to the environment are only general in nature. Regarding intra-EC competition, a coherent approach in ecological issues is mandatory. Otherwise, distortions in competitive power will arise. The EC has indeed become more active in this area (e.g., the carbon tax proposal, and the more general fifth action programme on the environment "Towards sustainability, A European Community programme of policy and action in relation to the Environment and sustainable development").

REGULATIONS

Two directives are of particular importance to the hand tools manufacturing sector: the Low Voltage Directive and the Machine Directive. The European norms have been adopted and published as part of the Directive on Low Voltage (adopted in 1973). With the adaptation of the Machine Directive in 1989, a certain overlap has arisen on the coverage of power tools by the two directives. Some confusion may arise as to the standards and certification procedures to be applied. Efforts are being undertaken by the European Commission, CEN and CENELEC to solve this transient problem.

Figure 5: Hand tools
Trade intensities



Source: CEO, Eurostat

OUTLOOK

Demand for hand tools is closely linked to the general level of economic activity. Due to the economic slowdown at the beginning of the 1990s, the industry was facing declining production and consumption levels. One of the main downstream industries, the building and construction sector, was severely hit by the recession. The recession also had an adverse impact on sales in the private market, although one can argue that poor economic conditions will encourage demand for DIY products as people will tend to renovate and make repairs themselves rather than employing a professional. At the same time, however, declining disposable income pushes demand for DIY products towards the cheaper end of the product range. Regarding the overall decline on retail sales, this negative impact of the recession on demand outweighed the positive one.

Besides cyclical factors, structural influences played a role in the deteriorated market for hand tools. In this respect, especially fierce competition from outside the EC is relevant. In order to enable the sector to maintain its position in the future, structural changes are required. More rationalisation to reduce cost is expected to take place, probably by way of takeovers, mergers and other forms of alliances. At the same time a switch to quality products is foreseen.

Short term prospects of the sector are dim due to the general economic situation. Hence, no quick recovery of the hand tool market is expected. This applies both to the industrial and the private market. Demand for hand tools in the professional market will not pick up soon, since the main client industries will continue to be depressed. In the private market, declining incomes will hit demand adversely.

Table 4: Hand tools
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-2.5	1.5
Production	-2.0	1.5
Extra-EC exports	-1.0	1.0

Source: NEI

The economic outlook for the medium term is better. Regarding the industrial market, a recovery in the downstream industries is expected. At the same time, the structural measures (rationalisation and quality improvement) will have a favourable impact on demand. The economic recovery will bring about a rise in the private market demand, particularly for quality products.

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Metal packaging
NACE 316.4

The metal packaging industry has enjoyed slow but regular growth over the course of the last few years. Substantial production cost savings and significant productivity increases have been achieved, principally due to technological advances. The sector as a whole is characterised by a high degree of competitiveness, given that a broad range of alternative processing and packaging options currently exist or are being developed. The impact of environmental regulations and recycling is particularly important in this sector.

Heavy metal packaging (NACE 316.41)

INDUSTRY PROFILE

Description of the sector

Categorised under NACE 316.41, heavy metal packaging, in contrast to light metal packaging, is packaging manufactured from cold-rolled sheet steel with a surface thickness equal to or greater than 0.5 mm and used in the fabrication of casks, cans and drums with a capacity of between 30 and 220 litres. They are used mainly for the transport of mineral oils, chemical products, paints/varnishes and food.

The most common packaging unit in this sector is the universally produced 210 litre (55 US gallon) steel drum with standard dimensions. The European steel industry consumes approximately one million tonnes of cold rolled steel per annum for the production of some 40 to 42 million new 210 litre steels drums. The annual value of turnover amounted to some 700 million ECU.

Recent trends

After a moderate growth of about 2%-3% per annum during 1991, a decline of similar percentages occurred during 1992 due to the overall recession and the competition of alternative packages such as intermediate bulk containers (IBCs). While the production of open head drums has remained relatively constant since 1990, tight head drum production has steadily decreased by approximately 14% since 1989.

New steel drums are all United Nations approved for the transports of both non-hazardous and hazardous products.

Steel drums, manufactured from only one type of raw material (i.e., cold -rolled steel) are either reused or reconditioned. At the end of their life-span, they are returned to the steel mills as scrap raw materials for new steel without causing any problem to the environment. So, steel drums are in a closed loop in the cradle to cradle concept of product life-cycles. Along with the new drum manufacturers, are the EC drum reconditioners who are active in reconditioning steel drums. They collect, clean, reshape and repaint the drums so that they can be reused again. At present, some 20 million drums are reconditioned every year in Europe.

Empty drums, because of freight rates, usually do not travel longer than distances of 300 to 400 kilometres. For decades, however, a vast amount of drums filled in Europe with many non-hazardous and hazardous products travel successfully all over the world.

Light metal packaging (NACE 316.42)

INDUSTRY PROFILE

Description of the sector

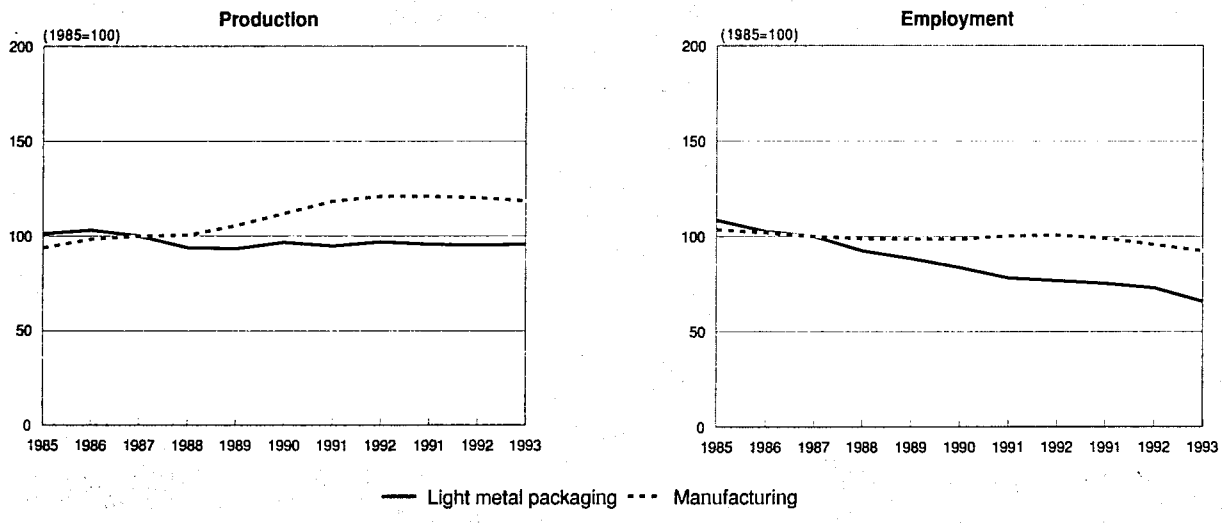
The term "light metal packaging" is applied to all metal packaging less than 0.49 mm thick and with a capacity below 40 litres.

The distinction between "light" and "heavy" metal packaging is by no means arbitrary: not only does it reflect the use of different raw materials as well as different manufacturing technologies, it also relates to entirely distinct consumer markets.

Within the light metal packaging sector, further distinctions apply to specific product groups:

- packaging for foodstuffs, particularly cans for food and beverages;

Figure 1: Light metal packaging
Production in constant prices and employment compared to EC manufacturing



1993 are SEFEL and Eurostat estimates.
Source: SEFEL, DEBA

Table 1: Light metal packaging
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	5 375	5 818	5 884	5 656	5 691	6 106	6 247	6 580	6 809	6 781	6 700
Production	5 585	6 048	6 144	5 875	5 900	6 321	6 561	6 912	7 100	7 119	7 150
Extra-EC exports	302	342	369	328	320	391	490	522	519	519	520
Trade balance	210	230	260	219	209	215	314	332	291	338	450
Employment (000)	73.8	69.8	67.9	62.8	60.1	56.8	53.2	52.2	51.1	49.5	46.0

(1) From 1989 excluding Portugal; from 1990 including former East Germany for production and employment.
(2) SEFEL estimate
Source: SEFEL, Eurostat

Table 2: Light metal packaging
Average real annual growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption	-0.8	-0.7	-0.7
Production (1)	-0.9	-0.4	-0.7
Extra-EC exports	1.0	3.4	2.1
Extra-EC imports	10.2	-2.6	4.3

(1) From 1989 excluding Portugal; from 1990 including former East Germany.
Source: SEFEL, Eurostat

Table 3: Light metal packaging
Production by country in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC (1)	5 585	6 048	6 144	5 875	5 900	6 321	6 561	6 912	7 100	7 119
Belgique/België, Luxembourg	301	322	343	344	349	312	320	334	348	354
Danmark	196	224	236	235	232	185	197	200	218	210
BR Deutschland	1 006	1 105	1 102	1 178	1 164	1 196	1 260	1 426	1 462	1 388
Hellas	N/A	N/A	180	166	165	184	179	167	174	214
España	N/A	399	398	430	459	473	566	597	649	629
France	931	979	1 036	987	957	977	1 018	1 049	1 080	1 073
Italia	596	694	648	598	655	866	986	1 043	991	1 131
Nederland	490	492	494	405	408	408	396	424	450	448
Portugal	92	98	113	103	103	104	N/A	N/A	N/A	N/A
United Kingdom, Ireland	1 441	1 559	1 594	1 429	1 408	1 616	1 639	1 672	1 728	1 672

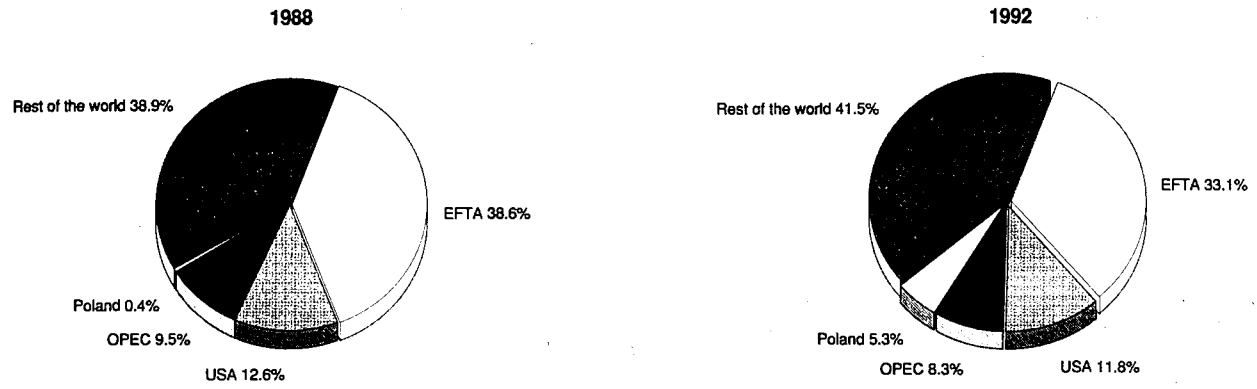
(1) 1983 Spain estimated; 1983-84 Greece estimated; from 1989 excluding Portugal; from 1990 including former East Germany.
Source: SEFEL

Table 4: Light metal packaging
External trade at current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	302.1	341.7	368.8	328.0	320.4	391.4	489.8	522.2	518.9	519.0
Extra-EC imports	91.7	111.6	109.3	108.5	111.9	176.7	175.6	190.4	227.4	180.8
Trade balance	210.4	230.1	259.5	219.5	208.5	214.6	314.2	331.7	291.5	338.2
Ratio exports/imports	3.3	3.1	3.4	3.0	2.9	2.2	2.8	2.7	2.3	2.9
Terms of trade index (2)	102.9	99.5	100.0	104.7	106.8	106.7	105.9	108.5	107.6	109.0
Intra-EC trade	545.9	609.8	647.8	684.9	729.5	941.6	1 068.6	1 216.3	1 351.9	1 415.7
Share of total imports (%)	85.6	84.5	85.6	86.3	86.7	84.2	85.9	86.5	85.6	88.7

(1) From 1989 excluding Portugal.
(2) NACE 316.
Source: Eurostat

Figure 2: Light metal packaging
Destination of EC exports



Source: Eurostat

- various types of light multi-purpose packaging (called general line cans), notably removable-lid cans for paints and varnishes, oil cans, cans for cleaning agents, non-sealed cans for foodstuffs, decorative cans, aluminium dishes, and metal containers for specific industrial applications (e.g., electric battery cases);
- aerosol cans for use as containers for a mixture of gas and liquid, used primarily in the cosmetics, pharmaceutical and cleaning agents subsectors; and
- lids and caps, including crown corks and other types of metal closures (especially for glass bottles), and screw-on caps and lids.

Recent trends

The value of the light metal packaging sector is estimated at some 7.1 billion ECU. In 1992, the sector employed about 50 000 people in approximately 300 firms and used some 3.5 million tonnes of tinplate and 360 000 tonnes of aluminium. Net exports totalled about 340 million ECU in 1992 and apparent consumption reached 6.8 billion ECU.

Current estimates suggest that light metal packaging currently accounts for around 16% of the European packaging market as a whole, ranking it third in terms of packaging industry materials. By way of comparison, paper and board account for 30% of the packaging industry's current requirements, with plastic packaging accounting for a further 30%. The percentages for glass, heavy metal and wood are 7%, 4% and 4%, respectively.

A combination of sectoral restructuring and productivity-boosting measures has resulted in a steady fall in employment in this sector, which fell from 84 000 jobs in 1981 to around 50 000 in 1992. Productivity over the same reference period increased from 70 000 ECU per employee in 1980 (at constant 1985 values) to nearly 140 000 ECU in 1992.

From 1991 to 1992, changes in production by individual countries varied widely from country to country. Of the EC's major producers, Italy experienced increases in production (in terms of current prices) of 23% and 14%, respectively, while Germany, the United Kingdom and France had decreases of -5%, -3% and -0.6%, respectively. Greece had an increase of 23% from 1991 to 1992, however, its production represented 3% of total EC production in current prices in 1992.

Foreign trade

The metal packaging sector is not traditionally characterised by major long-distance international trade for technical and economical reasons. The EC is a net exporter in this sector. Imports, however, are growing at a faster rate than exports: the export/import ratio dropped from 7.1 in 1981 to 2.8 in 1992. Although imports currently represent a little less than 3% of market demand, they have grown significantly over the course of the last few years. Intra-EC trade is increasing substantially and amounted to more than 1 billion ECU in 1992.

MARKET FORCES

Demand

Although originally developed for food products, light metal packaging has developed an increasingly important role in everyday life, thanks to its unique properties compared with other forms of packaging. Food contained in metal packaging can be stored for long periods without any loss in nutritional value or any risk of corrosion or contamination. The primary advantage of this longevity is that products can be more readily transported and stored.

In recent years, economic growth within the sector has been relatively modest, ranging from 2% to 3% per year on average. In 1992, however, stagnation in apparent consumption and production has been observed, due to the poor overall economic situation which affected demand for several types of cans and to unfavourable summer weather conditions in most European countries. As a matter of fact, production figures of the two main types of cans (food cans and beverage cans) are significantly affected by weather conditions during the summer months, as these conditions have an important impact on the availability of vegetables and consumption of beverages. Most of the little structural growth in the metal packaging sector is attributable to developments in the canned foods industry and the emergence of new market segments in canned beverages and aerosols. As far as industrial packaging is concerned, the position is distinctly less positive; this is due to a difficult economic situation in certain consumer sectors (among them the construction industry) and to growing competition from the plastic packaging sector in terms of specific applications, notably motor oils and cleaning agents.

Overall, developments in the light metal packaging sector are strongly influenced by a number of external factors, such as:

- changes in individual consumer preferences and patterns (including a trend towards individual portion packaging in the food industry and more sophisticated methods of preservation) which have prompted an increase in demand for

packaging for sophisticated canned food, pre-cooked dishes and acrosols;

- stiffer competition from new types of packaging (such as compound plastics on impregnated board, ultra-lightweight glass and flexible packaging) and new preservation technology (e.g. deep-freezing or freeze-drying);
- psychological aversion to certain types of packaging and product presentation, particularly where long-life foodstuffs or beverages are concerned.

Production process

At present, light metal packaging production can be broken down as follows: 60% food packaging (of which around 83% is accounted for by foodstuffs and 17% by beverages); 30% multi-purpose packaging; and 10% metal closures and accessories.

Tinplate, blackplate and aluminium are the three principal raw materials used in the manufacture of light metal packaging.

Tinplate is cold-rolled steel sheet less than 0.5 mm thick and coated on both sides with a thin (3g/m2) film of tin. It is used principally in the light metal packaging industry. Some 95% of annual tinplate production (which is to say, approximately 11 million tonnes worldwide) is used by this sector. Among the various properties which make it especially useful for the light metal packaging industry are high mechanical strength, susceptibility to decoration (it accepts print readily), and the fact that a vast range of products can be packaged using this material - notably food and chemical and pharmaceutical products.

Blackplate, usually referred to as tin-free steel, is a steel substrate coated with a chrome oxide compound. Although the technical properties of blackplate are inferior to those of tinplate, it has been widely used in recent years to manufacture products to less exacting specifications. Typical examples include can bases and lids, bottle caps, and so on. The principal factor in its favour is that it is approximately 10% less expensive than tinplate.

Aluminium is the third most popular base material for light metal packaging. Currently, around 10% of world aluminium production is earmarked for the packaging sector. Major uses include dishes, small food cans for fish and meat, flexible tubing, can lids and beverage cans. Use of aluminium for light metal packaging varies significantly by region. Aluminium accounts for 95% of the can packaging for drinks market in the USA (with tinplate accounting for a modest 5%), about 40% in the United Kingdom but only 15% in Germany.

Changes in the relative cost of tinplate and aluminium largely dictate the use of these two materials in the metal packaging sector. While tinplate showed a relative stability of price over recent years, aluminium by contrast registered price increases and decreases of up to 50%, according to the short-time price trends of non-ferrous metals.

Over the long term, however, one can observe a slight move towards more frequent use of aluminium for some types of cans.

Packaging manufacturers, particularly in the foodstuffs subsector, rarely limit themselves to a single technology or to one single type of raw material. The leading groups worldwide each use a broad range of packaging materials.

INDUSTRY STRUCTURE

Companies

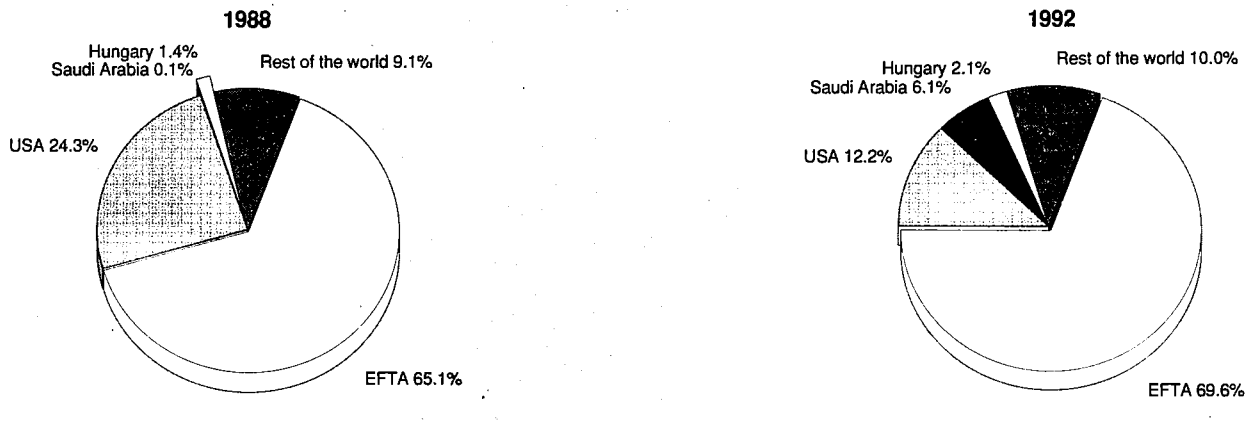
All EC Member States are involved in the light metal packaging sector to varying degrees. The three largest producers are the United Kingdom, Germany and France, which together account for almost 60% of total EC output, which currently equals two-thirds of US output.

The light metal packaging sector is relatively concentrated within the EC. Its structure is based on two categories of companies: large groups that manufacture predominantly standardised products and small to medium-size firms that specialise in customised products.

Standardised products (i.e., those mass-produced on highly-automated production lines) are manufactured by a small number of large companies in each country. This is particularly true with respect to standard-size food and beverage cans, caps and so on.

Several factors impact on concentration within the sector, not least of which is the capital investment implicit in large-scale production. A modern beverage can production line requires an initial outlay of up to 40 million ECU, so only major manufacturers have the requisite financial strength to make such investments. There is also the problem of access to advanced technologies. The trend towards mergers at the level of major industry clients such as food processing groups and brewers has also affected the structure of the light metal pack-

Figure 3: Light metal packaging
Origin of EC imports



Source: Eurostat

Table 5: Light metal packaging industry structure, 1992

	Number of manufacturers	Employment	Consumption Tin plate	Consumption Aluminium
EC (1)	292	49 474	3 494	357
Belgique/België, Luxembourg	9	2 090	217	9
Danmark	13	1 550	94	5
BR Deutschland	48	10 781	688	109
Hellas	15	2 100	101	17
España	70	6 000	409	15
France	36	8 216	567	28
Italia	53	5 002	564	42
Nederland	11	3 323	200	3
United Kingdom, Ireland	37	10 412	654	129

(1) Excluding Portugal.
Source: SEFEL

aging sector. Finally, economies of scale implicit in mass-production are a factor in increased concentration.

Merger and acquisition activity, joint ventures and cooperation agreements between firms is becoming increasingly common. As a result, beverage can production, for example, is now largely concentrated in the hands of five European manufacturers. These manufacturers, which are also the five major industrial groups dominating the light metal packaging sector in Europe are the following: Pechiney (F), which is present in France, the United Kingdom, Belgium, Germany, Spain and Italy; Carnaud Metalbox (F-UK), present in France, the United Kingdom, Belgium, Germany, the Netherlands, Greece, Spain, Spain and Portugal; VIAG - Continental Can Europe (D), present in Belgium, Germany, France, the United Kingdom and the Netherlands; Crown Cork Cy (USA), present in Belgium, the United Kingdom, France, Italy, Germany, Spain and Portugal; and PLM (S), present in Germany, Denmark and France.

Customised products are manufactured in smaller quantities and for more limited markets. Customisation frequently relates to the shape of the packaging (conical or irregular shapes), non-standard sizes (outsize or mini-capacity packages), or product-specific decorative effects. Typically, such customised packaging is produced by small or medium-size firms employing between 20 and 200 people. General-line cans, where product variety and limited volume requires optimal production flexibility, are manufactured principally by companies in this category.

REGIONAL DISTRIBUTION

The geographical spread of companies in the sector is largely determined by the nature of the products they manufacture.

Metal packaging offers the benefits of a comparatively low unit value (the sale price of a standard foodstuff or beverage can is currently around 0.1 ECU) combined with large volume. As the packaging requires significant space in transporting for small unit values, large-scale exporting or long-distance delivery is not very profitable. In practical terms, the maximum sales radius within which a firm can deliver its products on a competitive basis (i.e., taking account of transportation costs) is approximately 300 kilometres. It is for this reason that firms are so widely dispersed throughout every region of the EC. It is also for this reason that food can manufacturers are typically located in predominantly farming regions and general line can manufacturers in industrial areas. A wider market network is achieved as a result of the tendency for large multinational groups of manufacturers to buy up local producers and to rationalise their respective product ranges.

ENVIRONMENT

In volume terms, all types of packaging account for nearly one-third of the 100 million tonnes of waste generated by EC households.

However, metal packaging waste represents only a small part of it: by weight, all types of metal containers account for less than 2% of household waste with drink cans accounting for less than 0.5%. Nevertheless, environmental problems - together with the increasing pressure from certain substitute material - are the major challenge for the sector at present.

In recent years, the EC and most of the national governments have set up environmental policies which often focus on packaging waste. These policies typically have two aims: to increase the proportion of recyclable packaging by discouraging the sale of large quantities of non-returnable packaging; and to promote new forms of environment-friendly recycling.

These priorities have been underpinned by a series of rules and regulations, including an EC Directive dated June 27, 1985 on the packaging of food liquids.

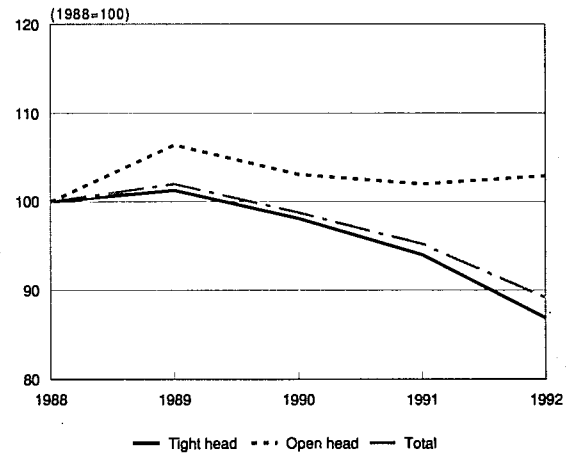
A proposed new Directive covering the packaging industry as a whole was approved by the European Commission on 15 July 1992 and forwarded to the EC Council of Ministers for final approval. This new measure aims at promoting substantial reductions in the total volume of packaging on the market and significantly speeding up requirements relating to the re-use and recycling of all types of packaging. In the long term, 90% of all packaging used in the EC marketplace will be required to be re-usable and/or recyclable.

In this respect, the metal packaging industry seems well placed to comply with future EC legislative requirements because it represents a packaging process which is ecologically sound and capable of reducing waste to a minimum. The advantages for the light metal packaging industry include: the raw materials used are in plentiful supply and will remain so for the foreseeable future; in the case of tinplate in particular, process, recycling and transport-related energy consumption is modest by comparison with other materials; and elimination of downstream consumer waste is relatively simple to achieve given that the packaging material can be selectively recovered and recycled without difficulty.

Steel substrate-based packaging has a salient advantage in that it can be separated and recovered by magnetic means. This also means that steel packaging materials can be recovered even from non-separated domestic waste or after incineration.

As a non-magnetic material, aluminium does not offer this advantage. On the other hand, its high residual value constitutes a major incentive to selective recovery and recycling, an op-

Figure 4: Heavy metal packaging
Development of the number of large drums



Source: SEFA

eration that requires only one-twentieth of the energy required for primary smelting. After recovery, both aluminium and steel are readily reprocessed by raw materials producers in smelters or furnaces to derive new products which exhibit no quality loss.

As far as metal packaging recovery provisions are concerned, certain EC Member States, such as Denmark, Belgium and Germany have already introduced comparatively stringent regulation.

In Denmark, refillable bottles are mandatory for domestic production of carbonated soft drinks, which means that there is an absolute ban on beverage cans.

In Germany, the Töpfer Packaging Ordinance makes distributors responsible for reuse and recycling of packaging outside the public waste disposal system. These obligations are waived for manufacturers and distributors taking part in a "Dual System" organisation which collects, sorts and passes on used sales packaging free of charge for recycling. All collection and sorting costs are financed through the use of an on-pack "Green Spot" symbol. Metal packaging manufacturers participate in this scheme. The ordinance also fixed some collection targets (e.g., 40% of tinplate and 30% of aluminium from January 1993, 80% of all materials from July 1995) and recycling rate targets (e.g., 65% for tinplate in 1993 and 90% in 1995).

In Belgium, an "Ecotax" (environmental tax on beverage containers) is to be introduced in 1994. Other countries have seen voluntary agreements negotiated at the level of public authorities, manufacturers and distributors. This is particularly the case in France ("Eco Emballage" system), and the Netherlands ("Covenant") etc.

As a matter of fact, almost every European country is presently introducing or preparing voluntary or mandatory national measures without any coordination, which may lead to certain difficulties once the EC directive is definitively approved and published.

The recovery rate of metal packaging waste in the EC member countries is already relatively high - around 20-30% on average - but it will show a substantial improvement with the imminent passage of the new EC Directive.

There are also grounds for optimism when one considers the situation in certain non-EC countries. In the USA, for example, more than 60% of beverage cans are now recovered and recycled. In order to improve the present recycling rates, 22 international mass-market manufacturing and user firms, including several producers of light metal packaging, have decided to pool their efforts within the framework of an umbrella group known as the European Recovery and Recycling Association (ERRA) to develop and promote ecologically-sound and commercially cost-effective solutions to the problem of waste processing.

OUTLOOK

A diverging pattern of demand in various user sectors combined with increased competitive pressures exerted by plastic packaging across a broad spectrum of applications will act as a brake on output over the coming years in the light metal packaging sector. Thus, the 1993 output is estimated at ECU 7.2 million, an increase of less than 1% compared to 1992; and output in 1994 and 1995 is predicted to increase again by 2-3% each year, provided the overall economic situation in Europe recovers.

Certain market subsectors will outperform others. The food can industry seems poised on the threshold of a growth period and there is no indication that conventional food cans will be substituted by another type of packaging in the medium term. The pet food sector is currently expanding at between 6% and 10% per year and exhibits solid prospects for the years ahead. The total market for all kinds of beverage cans is projected to increase by close to 20% between 1991 and 1995, with metal cans predicted to substantially increase their current 15% share of this market. Nevertheless, certain EC manufacturers have over-reacted to this potential demand and committed substantial investment which could, in turn, lead to an excess of production capacity in certain regions of the EC. Packaging for miscellaneous applications (such as paints and detergents) should, at best, maintain its current position.

In addition to these specific market developments, there will be significant progress in the course of the next few years in terms of product quality and production line yields. These forecasts are based on a variety of factors, including the development of new materials, the progressive ability to reduce the thickness and quantity of metal substrate as the quality of protective coatings improves, the use of laser welds, the rationalisation of production through the application of stricter standards, the introduction of more sophisticated printing techniques which enable packaging to play a more effective role in product promotion, and steady increases in productivity.

Overall, the tendency towards increased concentration noted in the metal packaging sector, both within the EC and worldwide, seems set to continue in the years ahead.

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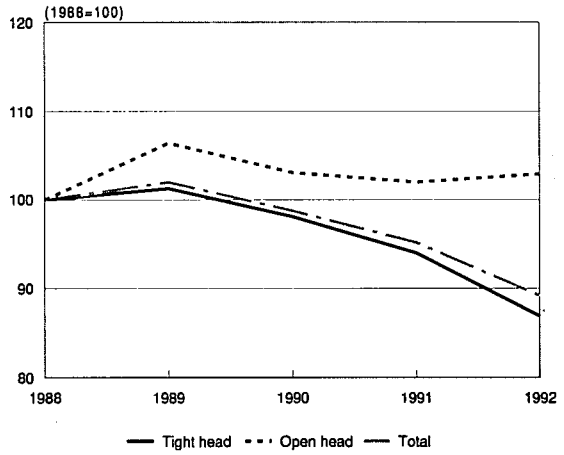

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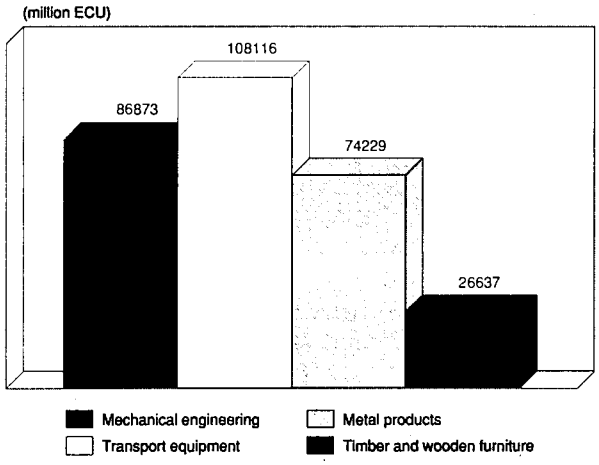
Overview
NACE 32

The mechanical engineering industry supplies almost exclusively capital goods or their components. Hence its development is effectively determined by the cyclical fluctuations in the propensity to invest. It receives additional positive momentum from progressive diffusion of the generation of computer-aided machines, a growing demand for environmental technology and an increasing service content in the products offered. The mechanical engineering industry in the European Community has so far been able to maintain its leading international position, although it is under heavy pressure from the Far East in the field of standard products. In addition, East European manufacturers are crowding on to the market with inexpensive machine components.

Figure 1: Mechanical engineering
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

Mechanical engineering accounts for about 8% of the total EC industrial output.

The wide variety of products resulting from the task of supplying the means of production or their components to all sectors of the economy is typical of the industry. Its range of products extends from the smallest high-precision components such as needle bearings to complete production plants such as steel works and rolling mills. Conventional products such as lathes, excavators, cranes or circular knitting machines, and also robots or lasers for metalworking, lie between these two extremes.

With the integration of micro-electronics in mechanical engineering products and the resulting advance of the computer into production, the range of products provided by the machine manufacturers has undergone drastic changes: no longer the stand-alone machine, but the integrated machine system is now the focal point of the range, and at the same time the purchaser increasingly requires services such as advice, training, maintenance or special software. Product-related services currently already account for over one tenth of the turnover of machine manufacturers. The mechanical engineering industry has traditionally shown great willingness to solve the individual production problems of its customers. This usually necessitates abandonment of quantity production of standardised products and promotes a high degree of specialisation, which also offers good opportunities to small and medium-sized enterprises.

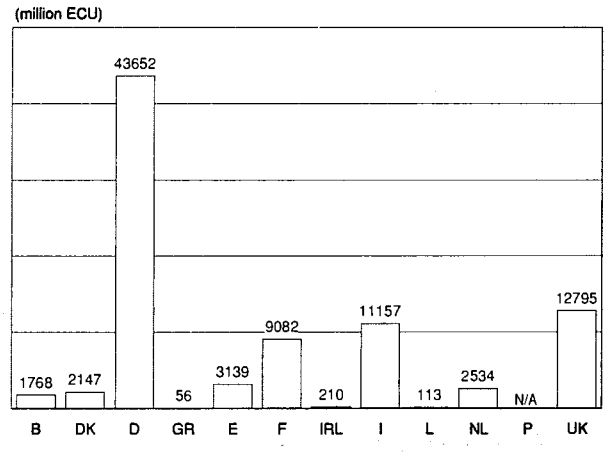
Recent trends

Mechanical engineering regularly experiences stronger cyclical fluctuations than most other industry groups. This is a consequence of its undue dependence on the investment activity of the undertakings, which is highly susceptible to overall economic trends and therefore displays greater movements than other demand units. This applies in particular to capital expenditure on machinery and equipment in industry, into which most mechanical engineering products flow directly or indirectly. This relationship is the key to the development of mechanical engineering in recent years.

An unusually strong investment boom additionally fuelled by pentup demand from the early eighties and the preparations of undertakings for "Europe '93" developed over the 1988-90 period in the EC. Demand for machines in the Community rose by 25% in real terms during the 1987-90 period. As this boom was part of a worldwide upturn which waned somewhat earlier, the machine manufacturers in the EC countries were presented with good sales opportunities in non-member countries in the same period. This sometimes led to bottlenecks in machine production. On the one hand, technical capacities could not be increased at the required pace despite great investment efforts, while on the other hand, manufacturers did not find skilled labour quickly enough.

The subsequent three years 1991 to 1993 were then marked by a persistent decline in investment in the EC. This compelled the mechanical engineering industry to make sharp cuts in production, so that a large proportion of the growth achieved during the preceding boom was lost. The branches supplying components suffered particularly severe set backs. The customers had built up large stocks of anti-friction bearings, gears, fluid units and precision tools during the preceding boom, because they feared bottlenecks in deliveries. These stocks were progressively reduced and demand therefore fell far be-

Figure 2: Mechanical engineering
Value added by Member State, 1992



Source: DEBA

Table 1: Mechanical engineering
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	100 517	110 782	123 621	130 609	134 389	151 501	175 154	190 239	189 857	182 639	171 000
Production	131 571	144 400	160 517	166 388	166 749	183 580	210 788	227 064	225 279	219 182	210 000
Extra-EC exports	44 597	49 040	55 874	55 204	53 081	56 600	64 607	68 358	68 388	68 946	70 000
Trade balance	31 054	33 619	36 896	35 779	32 360	32 079	35 634	36 825	35 422	36 543	39 000
Employment (thousands)	2 361	2 314	2 328	2 340	2 280	2 284	2 359	2 406	2 359	2 245	2 020

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Mechanical engineering
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	5.1	1.2	3.4
Production	2.6	0.5	1.7
Extra-EC exports	-2.0	-1.4	-1.7
Extra-EC imports	6.1	1.3	3.9

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Mechanical engineering
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	44 597	49 040	55 874	55 204	53 081	56 600	64 607	68 358	68 388	68 946
Extra-EC imports	13 543	15 422	18 977	19 426	20 721	24 521	28 974	31 533	32 966	32 403
Trade balance	31 054	33 619	36 896	35 779	32 360	32 079	35 634	36 825	35 422	36 543
Ratio exports/imports	3.29	3.18	2.94	2.84	2.56	2.31	2.23	2.17	2.07	2.13
Terms of trade index	104.4	101.0	100.0	104.2	107.5	108.6	106.4	110.5	109.9	111.5
Intra-EC trade	26 319	29 381	34 193	37 806	41 804	47 831	55 150	60 098	61 255	60 656
Share of total imports (%)	66.0	65.6	64.3	66.1	66.9	66.1	65.6	65.6	65.0	65.2

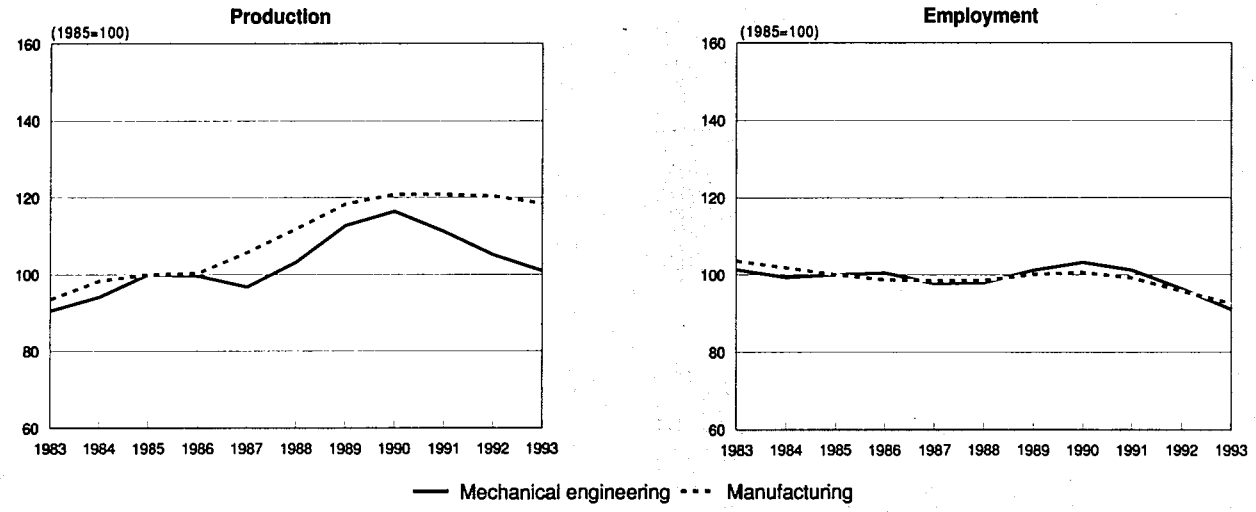
Source: DEBA

Table 4: Mechanical engineering
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	33.6	34.9	36.6	35.9	36.8	38.6	39.6	39.8	39.0	38.7
Productivity index	91.9	95.5	100.0	98.2	100.7	105.5	108.4	108.7	106.5	105.8
Unit labour costs index (3)	87.2	93.7	100.0	106.2	111.3	117.0	124.2	131.8	140.3	151.1
Total unit costs index (4)	82.5	91.2	100.0	104.9	106.3	116.4	129.4	136.7	140.1	146.9

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Mechanical engineering
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

low installation requirements. In addition, the effect on the machine tool industry was above average, not only because it was inevitably at the centre of the downswing as a supplier to the capital goods industry, but also because it is affected by the worldwide fall in armaments production.

During the recession, machine manufacturers had to reduce their workforce drastically in line with the lower utilisation of capacity. In the course of these cuts, 160 000 jobs were lost in the mechanical engineering industry in the 1990-92 period. This figure does not yet include the high job losses in eastern Germany. The increases and falls in demand for machines during recent years have again confronted the mechanical engineering industry with the task of reacting extremely flexibly to cyclical fluctuations. There are indications that this is done particularly well by the smaller and medium-sized firms, which is also a reason why they predominate in the mechanical engineering industry.

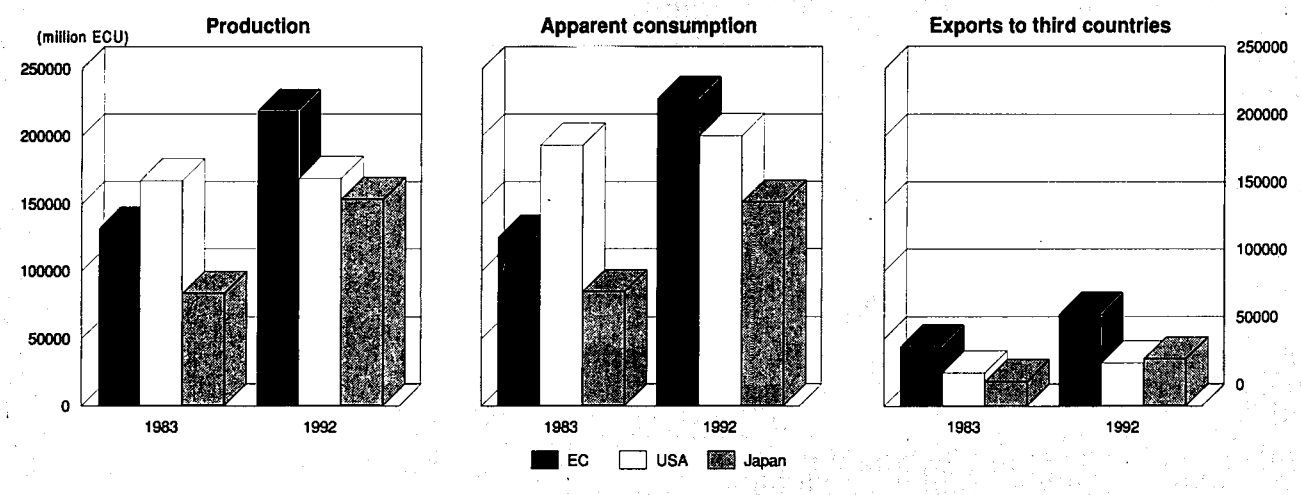
It is to be noted that production and apparent consumption's data's in table 1 (1992) differ slightly from last year's panorama edition due to previous forecasts.

International comparison

The EC is now the largest machine market in the world, having exceeded the market volume of the USA in the eighties. The Community is even more clearly the leader in machine production as, in contrast to the USA, it is a large net exporter. The latter consideration also applies to Japan, which has an output close behind the US one. Within the triad, the American industry fares rather badly because of the long-standing undervaluation of the US dollar.

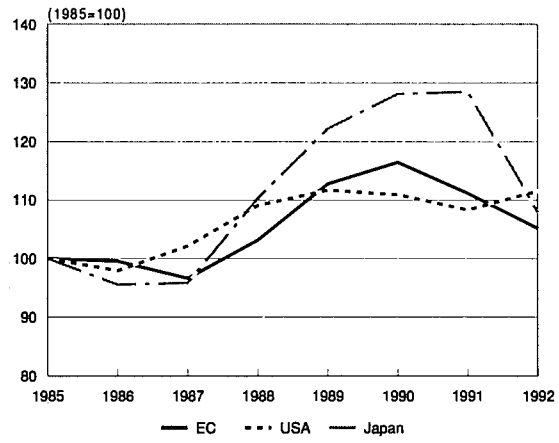
A glance at the real production trend reveals that the machine industry has survived the lack of investment better in the USA than in the EC and Japan: the USA merely sustained a small production deficit in 1991, whereas machine manufacturers in the EC recorded negative rates from 1991 to 1993. Japan had to cope with large production losses in 1992 and

Figure 4: Mechanical engineering
International comparison of main indicators in current prices



Source: DEBA, Census of Manufacturers, VDMA

Figure 5: Mechanical engineering international comparison of production in constant prices



Source: DEBA, Census of Manufacturers, VDMA

1993. The cumulative loss of production due to the recession is probably of a similar order of magnitude in the EC and Japan

Foreign trade

Although the EC countries still achieve a high surplus in machine trade with non-EC countries, this has stagnated in nominal terms since the mid-eighties, which even means a decline in real terms. Until 1990 this was essentially a result of the rapid growth in demand within the Community, which largely exhausted its own production capacities and drew in supplies from non-EC countries. In 1991 and 1992 the world-wide lack of investment then impeded exports, whereas imports initially still benefited from the surge in demand triggered by German unification. In the course of this trend the export/import-ratio compared to non-EC countries fell continuously until 1991. It rose again slightly only in 1993, because there was more demand for machines outside than within the EC.

In 1992 non-EC countries achieved a share of just under 18% in the supply of machines to the EC market, whereas this import ratio was 13% in 1983. The import share of the EC thus exceeds the 16% of the USA and the modest 5% of Japan. The EFTA countries are in the strongest position with a market share of 7%, whereas the USA holds just over 5% and Japan 3%. However, intra EC trade has also increased, i.e. the division of labour has made further progress. Intra-EC trade currently covers one third of the demand for machines in the Community, whereas the figure was only 26% in 1983.

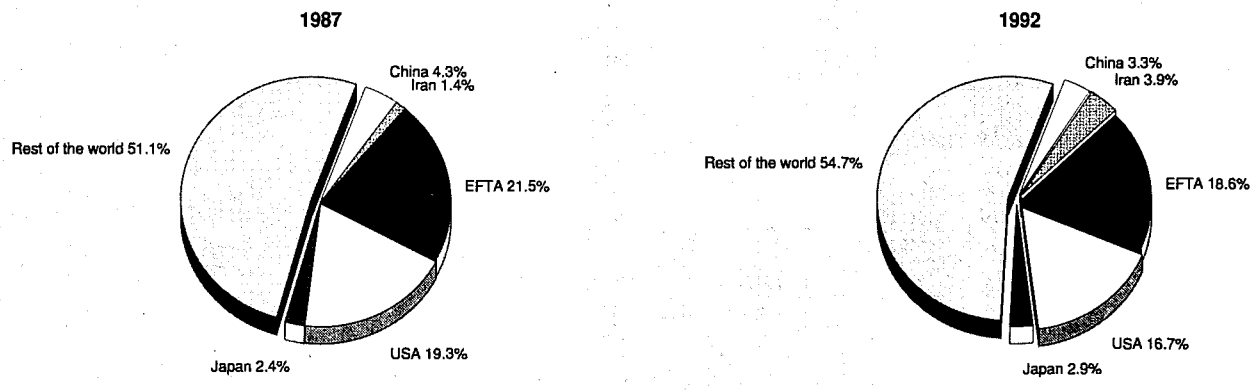
The EFTA countries together form the largest sales market for the extra-EC exports of the mechanical engineering industry, although their share has fallen slightly in recent years. By contrast the USA has again become more important, because its demand for machines has increased since 1992 (see figure 4). Despite high growth rates in the late eighties Japan continues to play a minor role as an export market.

Taken collectively, the developing countries have made up ground as customers for EC machines, thanks essentially to the sharp increase in exports to the Far East - with the exception of Japan. For several years this region has proved to be the most rapidly expanding machine market in the world, from which the machine manufacturers in the EC have also benefited. However, this must not disguise the fact that their position on this expanding market has so far been weak compared with their Japanese and US American competitors. In addition, there has recently been a positive trend in exports to Latin America, where the EC has traditionally enjoyed a better market position than in the Far East, although it is well behind the USA.

A scissor movement was observed in the export trend for the mechanical engineering industry up to 1991: whereas intra-EC exports rose faster than production, extra-EC exports lost a lot of ground. Consequently intra-EC trade, which was only just under 60% of the exports to non-member countries in 1983, almost matched these with about 90%. As this diverging trend was partly also due to different cyclical trends, this shift must not be interpreted simply as an integration success. However, extra-EC exports again rose faster in 1992, and even more so in 1993, because demand in the non-member countries expanded, whereas in the EC there was still a lack of investment. The extra-EC exports of EC machine manufacturers accounted for just over 31% of machine production in 1992 and again increased in 1993. This export ratio is markedly higher than that of Japan and the USA, which are 23% and 19% respectively.

The import of machines from non-member countries has meanwhile increased its share in the market supply of the EC to about 18%. This import ratio clearly exceeds that for the USA, which is about 15%, but is massively higher than that

Figure 6: Mechanical engineering Destination of EC exports



Source: Eurostat

for Japan where imports account for only a modest 5% share of market supplies.

MARKET FORCES

Demand

Well over half the products manufactured by the mechanical engineering industry are finished capital goods. The remainder consists predominantly of preliminary work for capital goods. This includes not only parts such as oil-hydraulic components, but under certain circumstances also an entire turbine installed as the propulsion unit in a ship, or an industrial furnace which becomes part of a cement works. Only a few preliminary products are incorporated in long-life consumer durables, e.g. an anti-friction bearing in a domestic washing machine. Finally, finished consumer durables are the unimportant exception, e.g. a domestic sewing machine, in the range of products of the mechanical engineering industry.

It is more difficult to quantify the dependence of the mechanical engineering industry on the demand from individual sectors of the economy than to describe these overall relationships, because only inadequate statistics are available. An estimate, which shows the following distribution for domestic sales of the industry, can be made for Germany on the basis of the input/output tables of the Federal Statistics Office and the investment calculation of the Ifo Institute for Economic Research: 72% of all mechanical engineering products are absorbed by processing industries, 7% by energy and water supply and the mining industry, 6% by agriculture and forestry and 5% by the building industry. The service sector accepts a total of 8% and the government 2%. As the preliminary work is highly interlinked, the mechanical engineering industry itself is its own largest customer within the processing industries and is followed by vehicle construction and the chemical and electrical engineering industries.

This pattern of dependence, which closely links mechanical engineering to the investment activity of industry, repeatedly imposes on the branch distinct cyclical fluctuations in demand. The industry's investment decisions are susceptible to changes that have already occurred or are anticipated in capacity utilisation, earnings, financing costs or in the general prevailing conditions. It is principally the capital expenditure on extensions which may increase markedly under favourable conditions but again contract sharply in the event of negative aspects.

In past boom years demand for machines in the EC already benefited from the fact that the companies in the Member States also invested on a greater scale in anticipation of the internal market. During the stagnation of investment over the 1991-93 period this factor was unimportant, because firms were largely restricted to capital expenditure on replacements in view of their high excess capacities. In the next upturn, which should occur after 1993, this situation will probably change again. The internal market will then again give additional momentum to companies' investment plans. The EFTA countries are passing through an economic cycle similar to that experienced by the EC. Here, too, investment activity slowed down throughout the 1991-93 period and the next upturn will probably start in 1994. Companies in these countries will also step up their investments with a view to the European Economic Area.

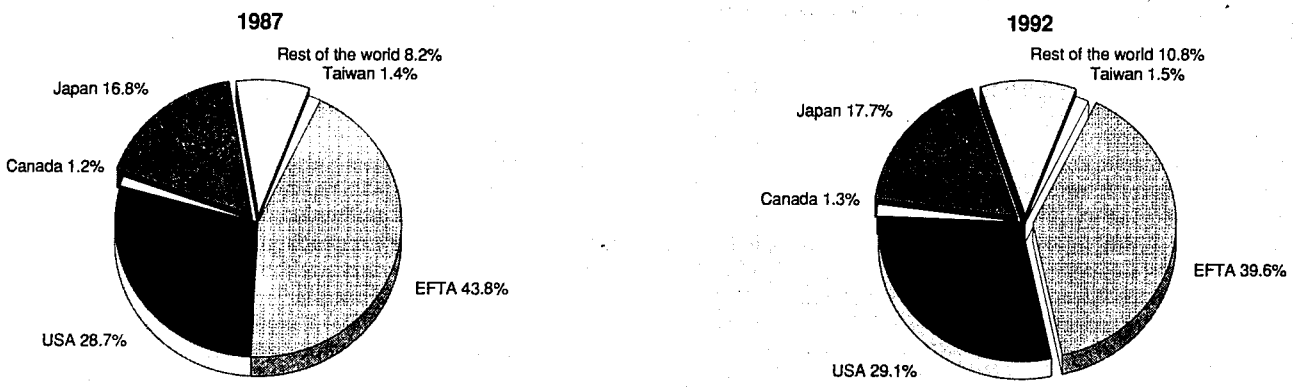
It is still difficult to estimate the sales opportunities in Eastern Europe. Investment activity is already brisk in the Czech Republic, Slovakia, Poland, Hungary and Slovene and will be intensified in future years. By contrast, all other East European countries are still affected by the structural crisis, to which no immediate end is in sight. Meanwhile demand for machines from this group of countries has fallen to such an extent, however, the positive trends will predominate in Eastern Europe.

Outside Europe, demand for machines has already developed favourably in 1993. EC machine manufacturers have thus been able to record an increasing number of orders from North and Latin America, Asia and Australia. In 1994, demand will continue to grow in these regions.

Supply and competition

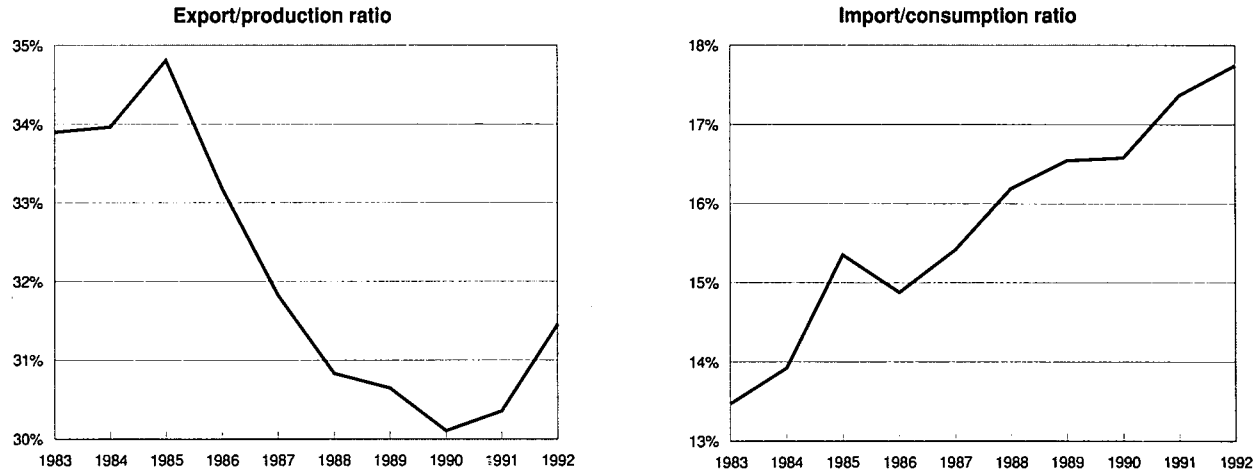
The distinct investment cycles cause sharp fluctuations in employment in the machine industry. For example, capacity bottlenecks occurred in the boom of 1989 and 1990, whereas utilisation of capacity was poor between 1991 and 1993 and employees had to be laid off. If these extremes are disregarded, mechanical engineering production capacities in the EC roughly match sales opportunities. A special case is mechanical engineering in eastern Germany, which was unable to find alternative sales opportunities following the collapse of the former COMECON trade. Hence East German production capacities had to be greatly reduced. This retrenchment has now largely been completed, so that the still existing capacities

Figure 7: Mechanical engineering
Origin of EC imports



Source: Eurostat

Figure 8: Mechanical engineering
Trade intensities



Source: DEBA

have a good chance of holding their own on the market when the next upturn comes.

Mechanical engineering in the EC is under continuous pressure on prices from Far Eastern suppliers, but recently also from Eastern Europe. The Czech Republic, which has a long mechanical engineering tradition, deserves special mention in this respect. In the EC it is principally the manufacturers of components who are under pressure, because many Western European Manufacturers of capital goods like to use the cheap supplies from Eastern Europe to improve their own competitiveness.

In the Far East it is chiefly Japanese competitors who achieve price advantages by large-scale production in the field of technologically demanding standard machines and components. However, these advantages have clearly been reduced by the strengthening yen. By contrast, manufacturers from Taiwan and South Korea are penetrating the markets with low prices in the field of simple products, although this has so far had a greater effect on other markets than in the EC.

Despite this pressure on prices EC machine manufacturers are able to hold their own in international competition. They benefit from the fact that the technology content, quality and additional services are usually more important decision-influencing criteria than the price for the purchaser of a machine. Hence the price elasticity of the demand for machines is lower than that for most other industrial products. However, machine manufacturers in the EC countries are stronger with regard to the other specified criteria.

Despite the keen international competition, producer's prices for machines generally increase at rates above the industrial average. The causes of this phenomenon are an above-average proportion of labour costs and a below-average productivity trend - both the result of highly customer-oriented production, which permits quantity production only in exceptional cases. The available profit figures show that the mechanical engineering industry usually achieves only relatively modest profits, which are also still subject to extreme fluctuations, despite its higher level of price increases.

Production process

The mechanical engineering industry is labour intensive, its labour costs in the EC being 30%. To perform its production task it requires not only a high proportion of engineers, but also a skilled workforce. Hence the availability of these skills is a general local condition for successful machine production. However, bottlenecks in the recruitment of personnel regularly occur in the upturn phases, because the labour market does not offer the required skilled workers as quickly as is desirable.

Supplies from within the industry predominate in the preliminary work purchased by the mechanical engineering industry, which accounts for almost 60% of the production value. Second place is occupied by purchases from the electrical engineering industry, which are on the increase with the advance of microelectronics. High-quality components are involved in both cases. Steel continues to be the most important starting material for the construction of machines, although it is largely purchased in further processed form (castings, steel reduction and structural steel products). No problems are encountered in the purchase of all this preliminary work, because efficient suppliers exist in the EC or worldwide purchase is possible.

The innovation process has clearly accelerated in the mechanical engineering industry in past years. Micro-electronic, which has given rise to a new generation of machines since the mid-seventies, acts as the important pacemaker here. It is characterised by the fact that production machines can be combined with conveyor systems, robots and testing machines to form computer-controlled systems, which not only achieve high output but also permit flexible adaptation to varying production tasks. Hence the use of these machines offers the investor important opportunities for modernisation. The diffusion of this technology is under way; it will support the demand for mechanical engineering products in future years. Mechanical engineering receives further momentum for innovation from the effective application of data systems technology or from production innovations within the industry. For example, computer-aided design (CAD) and computer-aided job preparation (PPS) have been realised in most firms; a feature of the actual production process is the use of flexible production cells. These technologies shorten the total transit time and also permit an even more flexible adaptation to individual customer requirements. With the increasing complexity of the machines produced the purchaser also requires more product-related services such as advice, training, software or maintenance. Hence the proportion of services in mechanical engineering turnover, which has already clearly exceeded 10%, is continuing to increase. These services are provided by the machine manufacturers predominantly under their own management, because high strategic importance is attached to them.

Table 5: Mechanical engineering
Breakdown by size of enterprise, 1990 (1)

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	98 794	82.4	14.6	12.1
20-99	16 683	13.9	23.1	23.9
100 or more	4 437	3.7	62.3	64.0

(1) Provisional estimates.
Source: Eurostat

INDUSTRY STRUCTURE

Companies

In 1990, in the EC there were just under 120 000 companies in the mechanical engineering industry, although about 99 000 of them (82.4%) had fewer than 20 employees. Some 16 000 firms had at least 20 employees, which could be regarded as the lower limit in mechanical engineering for the industrial manufacture of complicated products. 96% of these companies employ fewer than 100 persons and 4% of them employed 100 or more persons.

This classification of company sizes shows that small and medium-sized companies are a feature of mechanical engineering. They are usually highly specialised and manufacture chiefly one-off products and small quantities, because the market segment served by them does not support large-scale production despite intensive export activity. By contrast the relatively small number of large firms is active chiefly in sectors where standard machines or components permit "large-scale economies" or the construction of complete large plants requires high labour and financial capacities.

In all concentration surveys mechanical engineering proves to be one of the least concentrated industrial groups. For example, the six largest companies accounted for a share in turnover of only 8.2%, the ten largest for 11.3% and the 25 largest for 18.7% in western Germany in 1990. It is also noteworthy here that these shares have continued to fall sharply in recent years.

Strategies

The decline in machine production from 1991 to 1993 reflects a lack of investment within the Community and in important nonmember countries but it is not the result of reduced competitiveness of EC manufacturers. This is also demonstrated by the fact that the Japanese mechanical engineering industry suffered a decline in production of the same order of magnitude. However, this general finding does not preclude the fact that the structural problems of individual firms also become apparent in economic troughs. The industry has endeavoured to overcome the recession by rigorous cost management, which also provides a favourable starting point for the next upturn. In addition many firms have stepped up their product innovation, because this is the most important cornerstone of competitiveness in mechanical engineering.

The majority of machine manufacturers expect the completion of the internal market to increase competition, but many also hope for improved sales opportunities. Most companies are planning additional strategic measures to enable them to hold their own in this situation. The expansion of EC-wide sales is clearly in the forefront, but increased innovation is also important in this connection. In addition a minority of them is aiming to achieve cooperation for a better opening up of the market.

The investment activity of the mechanical engineering industry depends heavily on the economic situation of the industrial group; its investment ratio ranges between 4 and 5%. The companies substantially increased their investments in the late eighties; the expansion of capacity was an important reason for investment in this phase. In the 1991-93 period, there was an undue emphasis on modernisation projects predominantly with the aim of curbing the increase in labour costs.

In addition to investments, expenditure on research and development forms the second pillar in the safeguarding of the future of the companies. This expenditure accounts for 2% of turnover in the EC mechanical engineering industry. Experience has shown that this ratio is also highly stable in the economic cycle.

REGIONAL DISTRIBUTION

There is no doubt that Germany is the centre of the EC mechanical engineering industry: in 1992 western Germany accounted for just over 50% of value creation in the Community. Eastern Germany, which is not yet included in the EC figures for statistical reasons, achieved about 5% of the western German value at the same time. The other major machine production countries are United Kingdom with an EC share of 15%, Italy with 13% and France with 10%, followed by a group of countries with shares of about 2 to 3%, which include Spain, the Netherlands, Belgium and Denmark. In all EC countries there are also main regional centres of machine production. In Germany these are Baden-Württemberg and North Rhine-Westphalia, in Italy Lombardy and Emilia-Romagna, in United Kingdom the South-East and Midlands regions, in France the Bassin Parisien and the Region Rhône-Alpes. This distribution shows that the mechanical engineering industry is always located in the industrial heartlands, because it has traditionally sought to be near its main customers.

ENVIRONMENT

The production of machines usually does not cause serious environmental pollution. The noise generated by metalworking was a problem in the past, but it has been greatly reduced by modern machine tools. Further pollution was caused by surface treatment processes such as hardening and electroplating, but these are now generally carried out on a commission basis by specialists outside the machine industry. On the whole the costs of environmental protection are low in the mechanical engineering industry.

On the other hand the mechanical engineering industry is one of the main suppliers of environmental technology. Only the building industry benefits more from investments in environmental protection. With the increasing environmental awareness, as well as with the harmonisation of EC regulations, there will be a growing demand for environmental technology. Consequently demand and also innovation will be stimulated in the mechanical engineering industry, and the high standard specified in the EC will finally also bring competitive advantages in exports to non-EC countries.

Table 6: Mechanical engineering
The 15 largest European companies, 1992

(million ECU)	Country	Turnover	Net profit	Employees
Mannesmann	D	13 882	101	136 747
Thyssen industrie	D	4 271	0	47 073
Deutsche Babcock	D	3 750	31	38 018
Sulzer	CH	3 743	65	31 073
Linde	D	3 733	112	30 424
SKF	S	3 553	-227	54 151
AGIV (1)	D	2 828	51	31 633
Kvaerner	N	2 492	113	23 011
Schindler Holding	CH	2 483	61	32 656
Sandvik	S	2 292	149	28 617
Atlas copco	S	2 134	81	18 494
Kone	SF	1 996	54	21 426
Fag Kugelfisher Georg	D	1 765	-218	30 847
Metra	SF	1 764	-50	15 122
Valmet	SF	1 672	-48	17 204

(1) 1991
Source : DABLE

REGULATIONS

The EC Machine Directive ensures that machinery placed on the EC market measures up to uniform basic safety requirements. EC Member States'regulations, which were often wielded as non-tariff trade barriers, are being replaced by national regulations which comply with the Directive. By contrast, diverse special technical requirements, which demand additional know-how from producers, continue to exist in trade with non-EC countries. However, national export restrictions designed to prevent the supply of high technology or machines relevant to the armaments industry to specific countries often present greater problems to machine producers. Not only EC harmonisation is necessary in this case: simplification of administration is also required.

Except for Portugal and Greece all EC countries have a substantial surplus in machine trade with non-member countries. For many specialists even the EC market is too small to support an adequate production volume. The machine industry in the Community clearly benefits from free world trade.

OUTLOOK

The mechanical engineering industry in Western Europe is also expecting demand to stabilise in 1994 following a substantial increase in its orders from overseas during 1993. Machine manufacturers in the EC can thus anticipate an initial upturn in production in 1994. They then count on the cyclical upturn in investment to develop fully in 1995 and 1996. With this development machine production will again be set on a clear expansion course.

Table 7: Mechanical engineering
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.0	2.7
Production	1.5	2.8
Extra-EC exports	3.0	3.0

Source : VDMA

In the long-term trend, which eliminates the cyclical fluctuations, the mechanical engineering industry in the EC will remain a growth industry. The most important arguments in favour of this view are as follows: diffusion of the new generation of computer-aided machines is continuing and is contributing to stabilisation of demand; in addition the innovation potential of the mechanical engineering industry remains high thanks to microelectronics. Environmental protection requirements offer additional spheres of activity. The internal market and the "European Economic Area" will also provide industry with additional investment incentives in future years. In the longer term it can also be assumed that there will again be better sales opportunities in Eastern Europe, which will probably benefit the mechanical engineering industry in eastern Germany in particular. On the whole EC machine manufacturers will have good opportunities to assert their international competitiveness again. This is indicated, for example, by the patent statistics, which show that the EC is clearly ahead of Japan and the USA with regard to patents relevant to mechanical engineering.

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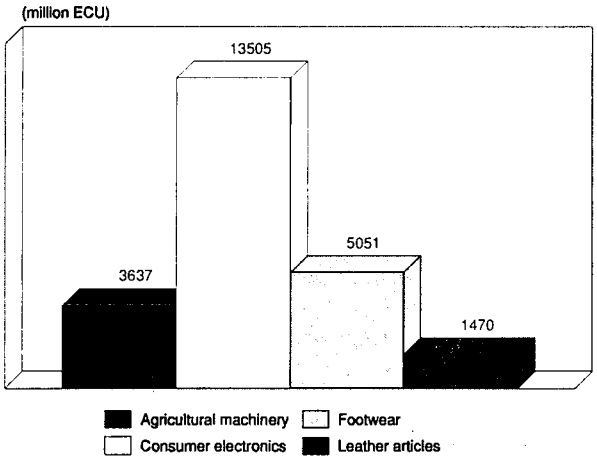
The industry is represented at the EC level by: Organisme de Liaison des Industries Mécaniques, électriques, électroniques et de la transformation des métaux en Europe; Liaison Group of the European Mechanical, Electrical, Electronic and Metalworking Industries (Orgalime). Address: Rue de Stassart 99, B-1050 Brussels; tel: (32 2) 511 3484; fax: (32 2) 512 9970.

Agricultural machinery
NACE 321

Reform of the Common Agricultural Policy (CAP), standstill of the GATT negotiations, the pace of the current trend is fast and unpredictable. European farmers who are faced with such momentous disruptions prefer to postpone their productive investments. this situation has aggravated a structural downtrend of the European markets generated by a saturation of the agricultural machinery fleet. This phenomenon can also be witnessed in other industrialised countries such as the USA, Canada, Australia or in the EFTA countries.
The growth potential represented by East European countries is as yet too uncertain for the European agricultural machinery industry to expect an improvement of the sector based on a solvent demand from these countries. The same applies to developing countries. The main outlet for the European agricultural machinery industry remains its internal market. The recent shocks which have upset the European Monetary System still add to the confusion.
In this context a further decrease in the EC production of agricultural machinery and its markets must be expected.

Figure 1: Agricultural machinery
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

The diversity of animal and vegetable farm products as well as the different stages of processing ranging from simple cleaning to the preparation of marketable products in the vicinity of production sites have led the manufacturers of the farm machinery sector to cover a wide range of equipment totalling around 450 different types of machines manufactured in Europe alone.

The main machines produced are: agricultural and forestry tractors; motor cultivators, motor hoes and motor mowers; machines and implements for soil preparation and soil working; machines and implements for sowing, planting and distributing fertilizers; machines and implements for crop and root harvesting; machines and implements for crop protection or irrigation; machines and implements for cleaning, grading or treating farm products; dairy and cattle-breeding equipment; forestry machinery; transport equipment; storage equipment; lawnmowers; other agricultural and horticultural machines and implements.

The extreme diversity of the equipment offered enables a large number of small and medium-sized companies, which are often specialised in the manufacture of a single type of machine or a range of agricultural machines used in a specific agricultural area of production, to exist side by side with a small number of large multinational or international companies which essentially manufacture tractors and self-propelled harvesting machines.

The agricultural machinery sector in the EC is divided into two segments of similar size : tractors on one side and other agricultural and horticultural machines and implements on the other.

The sector of agricultural and horticultural machinery and tractors is one of the most important of the European mechanical engineering industry, representing about 6% of the total production.

Germany, with 36% of the total added value, is the largest producer of agricultural machinery in the EC, followed by Italy (19%), France (18%) and the United Kingdom (6%). The other countries represent approximately 20% of the total EC added value.

Recent trends

The situation of the sector has substantially deteriorated over the last decade. Over the 1983 and 1988 period production decreased by 1.9% annually in real terms. Since then the annual rate of decrease has reached 6.9% in volume with a notable aggravation in 1993.

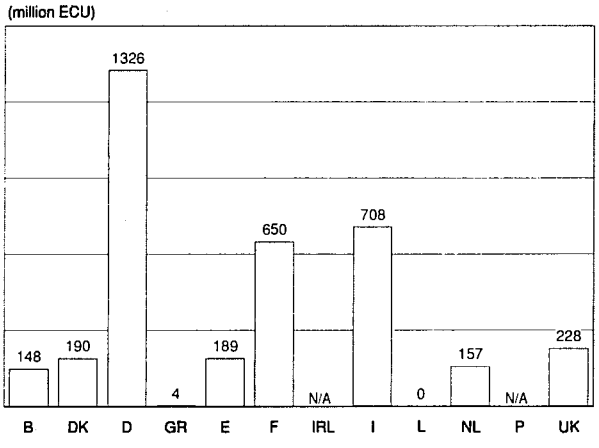
Simultaneously the EC demand for agricultural machinery which had increased by 3% in value per annum during the 1983 and 1988 period, has been declining at an annual rate of 7.3% in volume since 1988, with a recently sharp downturn.

In addition to this depressed European market a decline in EC exports (-1.9% per annum in real terms 1992/1988) has been registered together with an increase in extra-EC imports (+0.9% per annum in real terms 1992/1988).

International comparison

The two major American manufacturers of agricultural machinery have recently introduced re deployment schemes or have resorted to temporary shutdowns whereby European production sites have been relocated in the USA in order to

Figure 2: Agricultural machinery
Value added by Member State, 1992



Source: DEBA

Table 1: Agricultural machinery
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	10 406	10 959	11 518	10 674	10 597	12 246	12 252	12 221	11 028	10 597	9 340
Production	12 505	13 341	13 988	12 605	12 233	13 847	14 057	14 279	12 856	12 026	10 500
Extra-EC exports	2 743	3 062	3 131	2 621	2 394	2 613	2 990	3 146	2 998	2 649	2 390
Trade balance	2 100	2 382	2 470	1 931	1 635	1 602	1 805	2 057	1 828	1 429	1 200
Employment (thousands)	186.1	183.6	177.8	167.3	154.4	149.5	136.0	137.8	130.7	122.3	113.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded CEMA estimates.
Source: DEBA

Table 2: Agricultural machinery
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	-0.8	-7.3	-3.7
Production	-1.9	-6.9	-4.1
Extra-EC exports	-4.0	-1.9	-3.1
Extra-EC imports	5.8	0.9	3.6

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Agricultural machinery
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	2 743	3 062	3 131	2 621	2 394	2 613	2 990	3 146	2 998	2 649
Extra-EC imports	643.7	680.2	660.7	690.1	758.3	1 010.7	1 185.2	1 088.3	1 169.9	1 220.6
Trade balance	2 100	2 382	2 470	1 931	1 635	1 602	1 805	2 057	1 828	1 429
Ratio exports/imports	4.26	4.50	4.74	3.80	3.16	2.58	2.52	2.89	2.56	2.17
Terms of trade index	107.0	105.2	100.0	103.2	106.5	105.5	101.1	104.8	100.0	99.2
Intra-EC trade	2 619	2 844	3 149	3 035	3 000	3 407	3 730	3 801	3 452	3 444
Share of total imports (%)	80.3	80.7	82.7	81.5	79.8	77.1	75.9	77.7	74.7	73.8

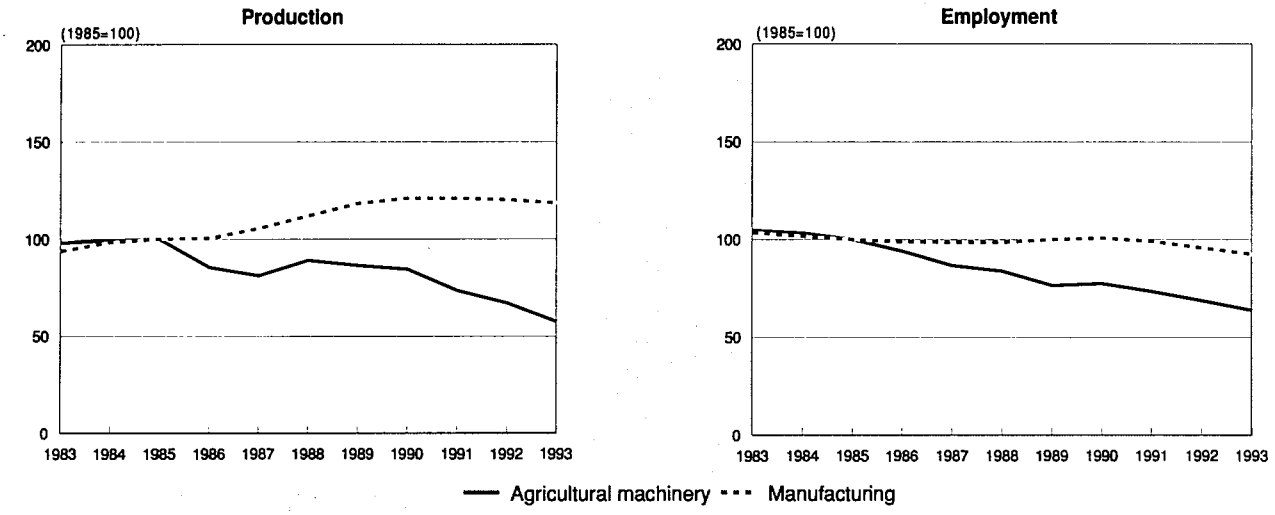
Source: DEBA

Table 4: Agricultural machinery
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	32.6	33.6	33.3	30.5	31.1	35.4	34.5	34.5	30.4	29.7
Productivity index	97.9	100.8	100.0	91.6	93.5	106.3	103.7	103.4	91.2	89.3
Unit labour costs index (3)	87.7	94.7	100.0	105.9	110.2	118.1	119.8	127.9	133.9	146.4
Total unit costs index (4)	86.0	91.6	100.0	98.4	102.5	118.1	133.3	133.4	131.1	135.2

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Agricultural machinery
Production in constant prices and employment compared to EC manufacturing



1993 are CEMA and Eurostat estimates.
Source: DEBA

profit from the exports incentive provided for by a weak USD. The effect of these different measures is beginning to show and should enable the North-American agricultural machinery industry to catch up with the delay accumulated over the years 1990-1992 (-8 % per annum in real terms).

Japan for its part is confronted with the problems affecting its agriculture which is heavily subsidised (more than 12 times the European average per hectare) and with the revaluation of the yen. The uncertainty over the outcome of the GATT negotiations has an adverse effect on the sales of agricultural machinery in this country (-8 % in real terms in 1992 against 1991).

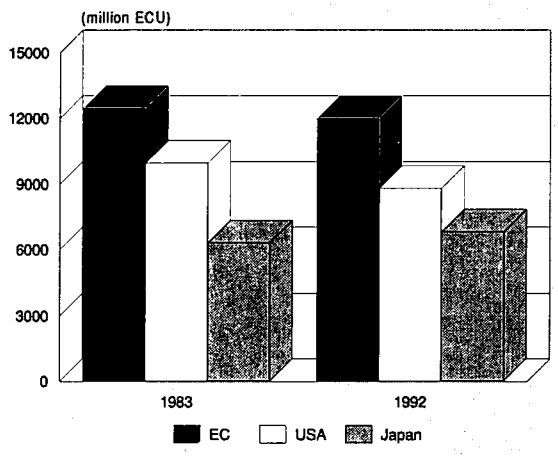
Foreign trade

In 1993, EC companies have exported 22% of their production outside the EC. Total exports, including intra-EC trade, exceed 50% of the total production. Extra-EC exports which had dropped significantly throughout the 1981 and 1987 period, had registered a slight recovery until 1990 but have been deteriorating again notably in the recent years (-29% in volume between 1990 and 1993).

The major EC export markets are the United States (24%) and EFTA countries (20%). It is worth mentioning that Japan now absorbs almost 5% of extra-EC exports.

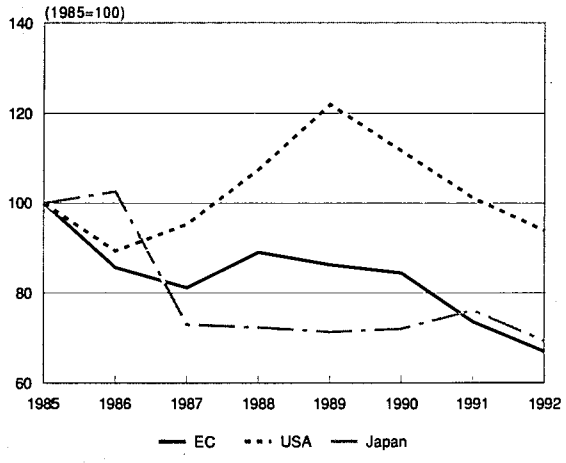
At the same time, imports have continued to increase annually by almost 3.6% in average in real terms during the 1983 and 1992 period. However, the EC remains a net exporter of agricultural machinery as extra-EC imports represent less than 50% of extra-EC exports. The share of the United States in extra-EC imports has increased from 32.2% in 1987 to 42% in 1992 to the disadvantage of the EFTA countries and Japan whose combined share still reached 52% of the total imports in 1987 but has decreased to 42% in 1992.

Figure 4: Agricultural machinery
International comparison of production in current prices



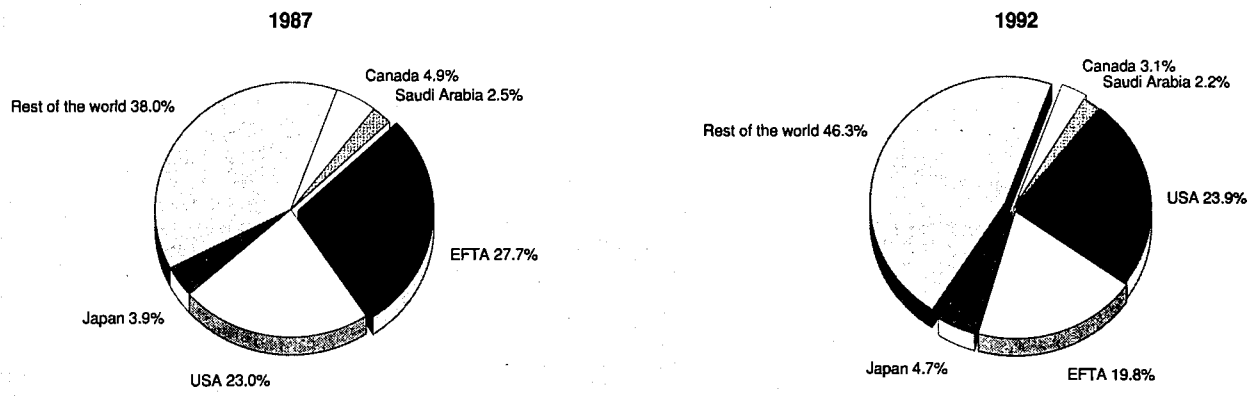
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Agricultural machinery
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Agricultural machinery
Destination of EC exports



Source: Eurostat

MARKET FORCES

Demand

Following the trough observed in 1986 and 1987 European demand for agricultural machinery had slightly recovered in 1988. Since then, a sharp and steady deterioration of the markets has been noted.

As farm income can only partly explain this collapse, a parallel must be drawn between the purchasing behaviour of European farmers and the general environment of the CAP (Common Agricultural Policy) reform which, in addition to the uncertainties it generates, leads many farmers to reconsider their habits in terms of production methods.

An event of such outstanding proportions can be viewed in two different ways : on one hand, the emphasis will be put on the danger of a weakening of competitiveness resulting from a drop in investments; on the other, there will be the temptation to take it as the harbinger of a trend towards the improvement of capital productivity in agriculture.

Irrespective of the angle under which this phenomenon is considered, the fact remains that it is occurring in an unfavourable environment generated by the difficult and lengthy negotiations over the settlement of the farm deal resulting from the Washington compromise compounded by the monetary problems arising from the floating of European currencies and the chronic undervaluation of the USD.

Markets, growth areas, production or distribution chains as well as the customers' behaviour are changing more rapidly than before.

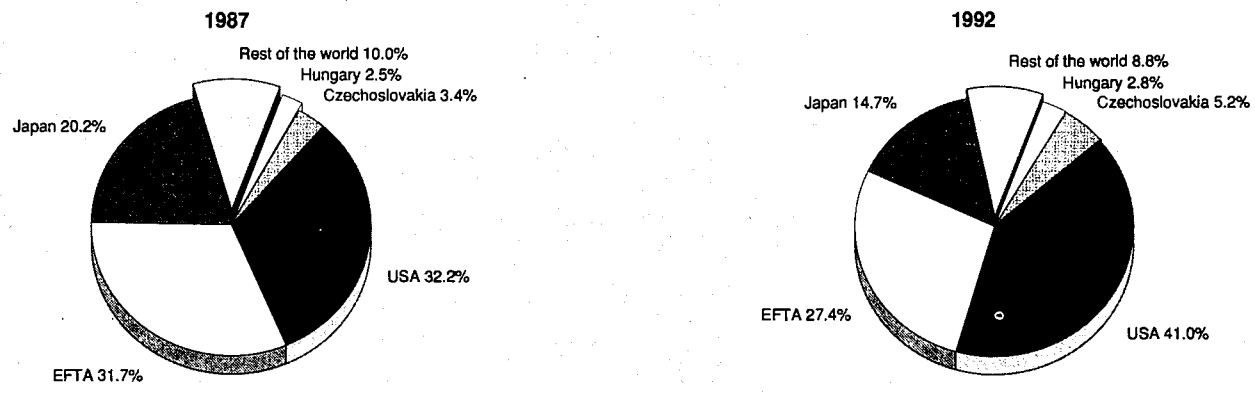
Supply and competition

Europe is the most important world market for farm products although it only represents 6 % of the world's population and 5 % of arable land.

The abundance of outlets as well as the gradual development of EC agriculture owing to the implementation of the CAP have enabled the EC agricultural machinery industry to accompany this development over the years, thus reaching the world's top echelon in the sector. However, it is to be noted that North-American companies' subsidiaries rank among the largest producers of the sector in the Community.

In direct proportion with a decreasing, demand productivity is shrinking every year (-13.5% between 1990 and 1992)

Figure 7: Agricultural machinery
Origin of EC imports



Source: Eurostat

whereas the sector is faced with an excess output capacity which burdens its profits.

Although it is obvious that crises have the virtue of exerting unmatchable pressure owing to the struggle for survival so that what seemed inconceivable yesterday appears possible today, it is however beyond doubt that this negative trend should continue over the next years.

Production process

For many years the European companies belonging to this industry's sector have been investing in robotics and in machining centres in order to optimise their production techniques and facilitate work. Most of them have already implemented the principles of the "just in time" and "stockless" production.

Computer-aided design (CAD) has been introduced in the largest firms, whereby the software is taking charge of the design of tools, forging bolsters and of programmes necessary to the manufacture of the different components of a machine.

In direct proportion with the above-mentioned, a rapid increase in internal investments in the order of 8 % per annum has been observed in the recent period.

Up to now however all these endeavours have only resulted in a 16 % decrease in the added value over the 1988 and 1992 whereas unit labour costs increased by 24 % over the same period.

Nevertheless the conditions for obtaining productivity gains do exist, as soon as a recovery occurs.

INDUSTRY STRUCTURE

Companies

As the companies belonging to this Industry's sector produce a wide range of machines (approximately 450 different machinery types) it is difficult to give an overall picture of the European farm machinery industry.

A large number of small and medium-sized companies (around 4 000) specialised in the manufacture of a machine type or a range of machines are present in the Community beside a few large multinational or international companies.

Most of these large companies produce tractors and self-propelled harvesting machines. The main European manufacturers of this category of machines are FIAT-Geotech (I) which in 1991 has taken over Ford-New Holland, a company established in Belgium and in the United Kingdom, SAME (I), Renault Agriculture (F), KHD and Fendt (D) and the German firm Claas producing combine harvesters and balers.

The large American companies are also established in Europe: Case International Harvester, John Deere and Massey Ferguson.

The activity of the large companies generate around 60% of the turnover in the profession. In order to fight the unavoidable fall of the markets these companies have been led to conclude cooperation or manufacturing agreements with some of their competitors on the world market such as Deere with Zetor-Brno or Massey Ferguson with Iseki (after AGCO, Landini, Steyr and Valmet) to quote the most recent.

When production processes within a group are planned at European level, it often implies exchanges "within the family". For instance, a German plant buys from a "sister" plant in France an intermediary product designed to be fitted into a German product which will be sold in Italy. Such a production circuit requires a minimum amount of precautions as far as cost price planning is concerned : just the opposite of what the current monetary fluctuations offer.

These uncertainties combined with a depressed market entail a certain disruption of the production process which has resulted in a 36% drop in employment figures between 1985 and 1993 and a decrease in the number of companies operating in this sector.

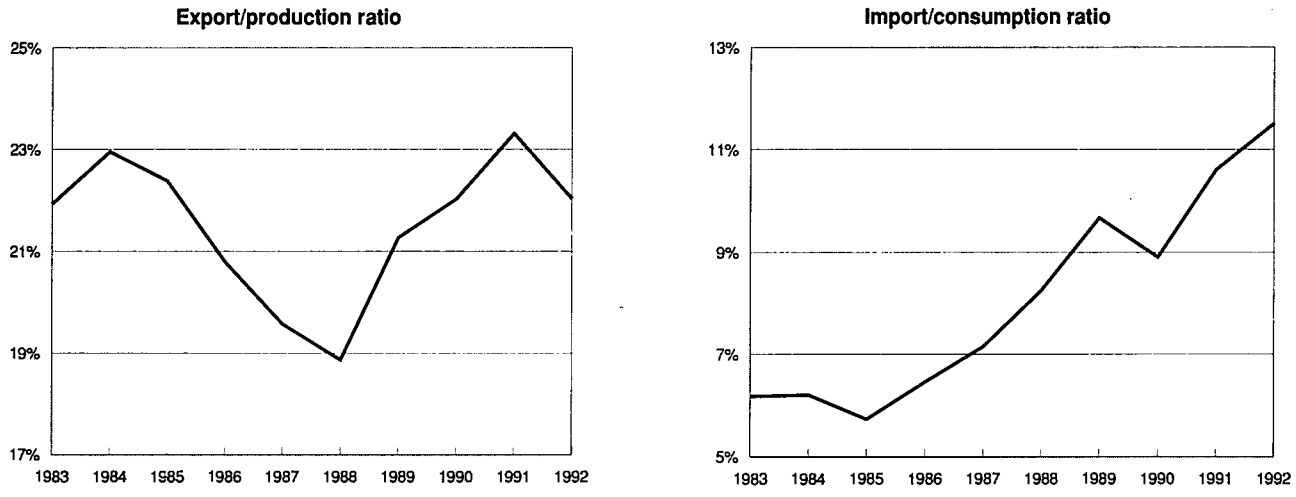
REGIONAL DISTRIBUTION

In 1992 the largest producer of agricultural machinery in the EC was Germany with 31% of the total EC production, followed by Italy (22%), France and the United Kingdom with approximately 15% each.

Germany is also the most important extra-EC exporting country with 42% of the total exports, followed by the United Kingdom (21%), Italy (15%) and France (9%).

In terms of intra-EC trade Germany's share represents 29%, followed by Italy (20%), France (14%) and the United Kingdom (12%).

Figure 8: Agricultural machinery
Trade intensities



Source: DEBA

REGULATIONS

The importance of standardisation in the agricultural machinery industry is always increasing. The implications at commercial level and therefore in the conception and design phases are becoming very real. This is to say that the time when standardisation was considered a side-issue belongs to the past.

This new orientation results from several factors :

- Liaisons (mechanical, hydraulic, electric, electronic couplings) between the tractor which remains the mostly used energy source and the machine are becoming more sophisticated. Their standardised characteristics must be observed if one wants to make tractors and driver machines interchangeable and compatible among them.
- Farmers always require more data on the performances of their machines. These performances must be determined through clearly defined methods, i.e. in standards.
- It is considered that agriculture is polluting the environment owing to the animals' production of organic dejections and the use of chemicals in treatments and fertilising. Construction standards which will enable farmers to measure precisely what they distribute are under current study and will be implemented in practice.
- The "New Approach" principle which has been introduced in Europe to implement EC Directives gives a particular importance to standards.

The importance of this issue has resulted in the abandonment of a strictly national standardisation in favour of a European or international standardisation.

The activity in this field can only increase in the coming years.

All types of agricultural machinery are subject to the Directive 89/392/EEC (modified in particular by the Directive 91/368/EEC which will be totally applied from 1995 onwards), which specifies the essential security and health measures to be respected.

Agricultural tractors are either subject to Directive 74/150/EEC (which deals with four-wheeled tractors with limited maximum speed) and several derived norms, or to the Directive 89/392/EEC.

Table 5: Agricultural machinery
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-5.2	-5.0
Production	-5.6	-5.7
Extra-EC exports	-2.6	-2.6

Source: CEMA

OUTLOOK

As the major outlet of the EC agricultural machinery sector remains for nearly 80% an Internal Market faced with a deep and apparently durable crisis and if the various shocks that the European agriculture (CAP reform, GATT negotiations) will endure are taken as an indicator, it would be unreasonable to expect anything else than the continuation of the 1987-1993 trends for the different markets.

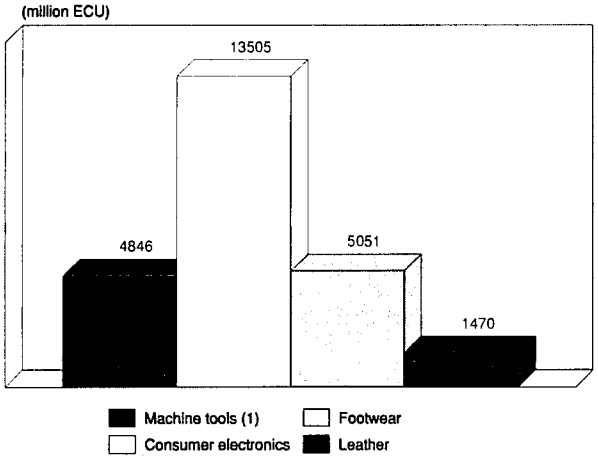
The production of the EC sector and its apparent consumption should further decrease between 1993 and 1997, at an annual rate of 5.7% for the production and 5% for the consumption. Over the same period extra-EC exports would decrease by 2.6% per annum.

Written by: CEMA
The industry is represented at EC level by: European Committee of Agricultural Machinery Manufacturer / Comité Européen des Groupements de Constructeurs du Machinisme Agricole (CEMA). Address: rue Jacques Bingen 19, F-75017 Paris; tel: (33 1) 47 66 02 20; fax: (33 1) 40 54 95 60.

Machine tools
NACE 322

Generally investment goods suppliers face a strong cyclical demand. The machine tool industry that supplies above all machines to investment goods manufacturers enjoys and suffers even stronger booms and slumps.
Several factors that induced a strong demand for machine tools during the latter half of the past decade had gone. Among these were intense investment activities driven by the objectives to introduce new technologies, to prepare for the Single European market and to expand capacities.
These factors disappeared during the current recession and - worsened by a cyclical reaction to the former boom - the machine tool industry in most industrialised countries is hit by a severe recession.
An essential requirement for the EC-machine tool industry's success in this context lies in the economic policy. The Commission of the EC plays a key role in creating an adequate economic frame by reducing capital - and labour costs, as well as supporting a joint European initiative to improve the qualification of the personnel and to expand the efforts in research and development (R&D).
EC machine tool suppliers have a strong technological position in markets for special machinery and systems. However in standardised machines they have lost market shares to their Japanese competitors that have got a strategic price advantage derived from economies of scale and lower factor costs that currently are partly reduced thanks to the appreciation of the Yen against most other currencies.
In the tough competition of the standard machinery market the EC performance could only be improved if economies-of-scale will be increased by co-operations, by further automation of the manufacturing processes and through a reduction of costs.
Success in the standard machine tool markets is of great importance because of the inter-relations with other machine tool segments. Above all this concerns the use of common preliminary components, as controls, spindles etc. If they are manufactured in high numbers, production cost are lower to the benefit of standardised and tailor-made machines. Thus, further market losses of European standard machines suppliers provide a cost disadvantage for suppliers working in other segments and reduce their price competitiveness.
The deep recession is expected to come to an end in 1994 and a moderate recovery could take place. A forecasted macro-economic upswing in the medium term will induce a growing demand for machines, although a boom comparable with the latter half of the 1980s is not expected.

Figure 1: Machine tools
Value added in comparison with other industries, 1992



(1) Estimated
Source: CECIMO, Eurostat, Vieweg

INDUSTRY PROFILE

Description of the sector

The industry provides machines for the processing of metal. Machine tools can be divided into two broad product groups. The first group, cutting machine tools, which accounts for about 70% of the supply, includes among its main products turning machines, milling machines, grinding machines, gear cutting machinery and machining centres. The second group, forming machines, comprises among its main products presses, bending machines and shearing machines.

Nonmechanical manufacturing processes have gained more importance during the 1980s. Especially the demand for electrical discharge manufacturing (EDM) and laser cutting grew stronger than total demand for machine tools.

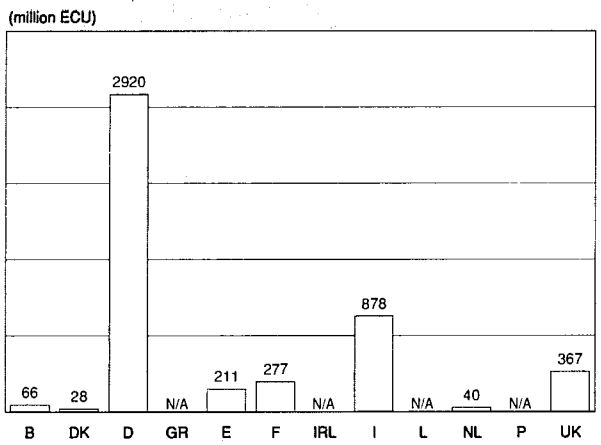
The industry's supply not only consists of standalone machines. Automated production, using flexible manufacturing systems, flexible manufacturing cells (FMS/FMC) and transfer lines are also provided. They include controls, data processing equipment for the application of computer aided design (CAD), production planning systems (PPS) etc. Therefore, machine tool firms provide critical technology to manufacturing companies and play an important role for the efficiency of the production in a broad range of industries.

Recent trends

During the second half of the 1980s European machine tool companies enjoyed a strong growth of the domestic market. The major factors underlying this development were the supply of advanced production technology, the preparation of manufacturing companies for increased competition in the Single Market and the necessity to expand capacities in growing economies. Additionally the poor investment activities in the 1970s had led to an overaged capital stock that required replacement.

In the latter half of the 1980s all these driving factors merged together and demand for machine tools boomed. Within a couple of years the client industries' capital stock grew younger

Figure 2: Machine tools
Value added by Member State, 1992 (1)



(1) Estimated
Source: CECIMO, Eurostat, Vieweg

Table 1: Machine tools
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (3)
Apparent consumption	4 779	4 983	6 001	7 337	8 082	8 568	10 119	11 839	11 398	9 169	6 790
Production	6 605	6 772	7 830	9 162	9 721	10 379	11 910	13 074	12 773	10 767	8 180
Extra-EC exports	2 703	2 855	3 243	3 636	3 309	3 903	4 420	4 204	4 186	3 853	3 160
Trade balance	1 826	1 789	1 829	1 825	1 639	1 811	1 791	1 235	1 375	1 598	1 400
Employment (thousand) (2)	167.0	160.0	164.0	168.0	169.7	168.5	174.8	177.5	168.1	151.2	142.0

(1) Excluding Greece and Ireland
(2) Also excluding Denmark
(3) Rounded Vieweg estimates.
Source: CECIMO, Vieweg

Table 2: Machine tools
Average real annual growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption	7.1	-1.9	3.0
Production	4.3	-2.6	1.2
Ectra-EC exports	2.6	-3.8	-0.3
Extra-EC imports	13.4	-1.7	6.4

Source: CECIMO, Vieweg

Table 3: Machine tools
External trade in current value (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	2 703	2 855	3 243	3 636	3 309	3 903	4 420	4 204	4 186	3 853
Extra-EC imports	877	1 066	1 414	1 811	1 670	2 092	2 629	2 969	2 811	2 255
Trade balance	1 826	1 789	1 829	1 825	1 639	1 811	1 791	1 235	1 375	1 598
Ratio exports/imports	3.08	2.68	2.29	2.01	1.98	1.87	1.68	1.42	1.49	1.71
Intra-EC trade	943	1 050	1 259	1 600	1 781	2 214	2 645	3 268	3 096	2 655
Share of total imports (%)	51.8	49.6	47.1	46.9	51.6	51.4	50.2	52.4	52.4	54.1

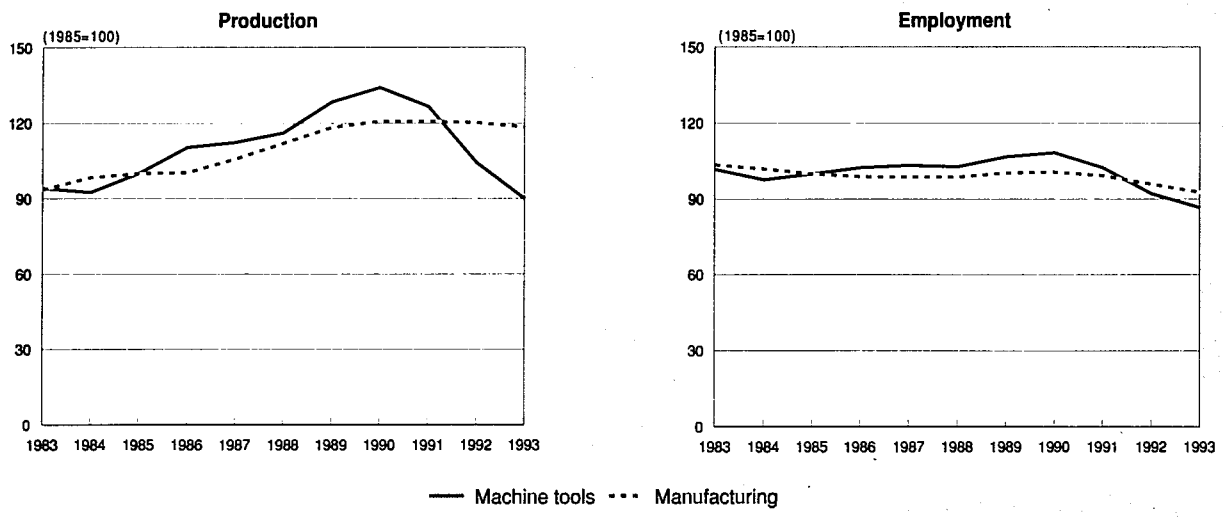
(1) Excluding Greece and Ireland
Source: CECIMO, Vieweg

Table 4: Machine tools
Labour productivity (1)

(1000 ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (2)	21.7	21.0	21.9	23.4	23.9	24.9	25.2	26.3	26.4	24.3
Productivity index (2)	99.1	95.9	100.0	106.8	109.1	113.7	115.1	120.1	120.5	111.0

(1) Excluding Greece and Ireland
(2) Calculated on value added in constant prices of 1985
Source: CECIMO, Vieweg

Figure 3: Machine tools
Production in constant prices and employment compared to EC manufacturing



1993 are Vieweg and Eurostat estimates
Source: CECIMO, Eurostat, Vieweg

and the increase of capacities enabled companies to meet growing demand.

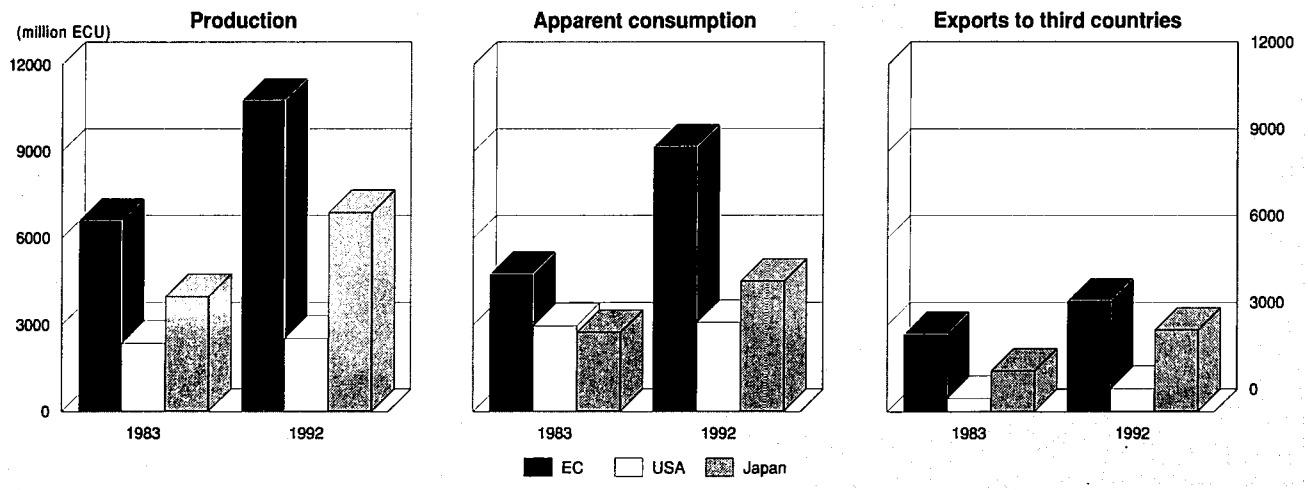
This development took place in nearly all European countries and pushed the demand for machine tools, which grew at a real compound annual growth rate of 7.1% from 1983 to 1988. Deliveries to other markets did not perform that well. The USA, the most important overseas market, went into recession, and total exports only grew by 2.6% over the same period.

In mid-1990, the situation for the EC machine tool industry started to deteriorate. Due to a domestic stimulus induced by the unification, Germany had been the only exception and went into the recession one year later on. The overall economic slowdown led to a reduced utilisation of machinery and equipment in the machine tool manufacturers' client industries. A decrease in profits forced a reduction of the investment budgets and the replacement of old machinery could be delayed because of the capital stock's renewal during the past years.

Generally speaking, since the beginning of the 1990s nearly all capital good suppliers have been facing a severe recession. This down swing took place in nearly all of the industrialised countries. The machine tool suppliers provding machinery and equipment above all for investment good industries have been in the centre of that development. Even the Japanese machine tool industry - most successful during the 1980s - was severely hit. In 1990 its production volume had reached an all time high, but shrunk until the end of 1992 by 30%. In comparison, the EC's and the US' machine tool industry shrunk by 23% and 20%, respectively.

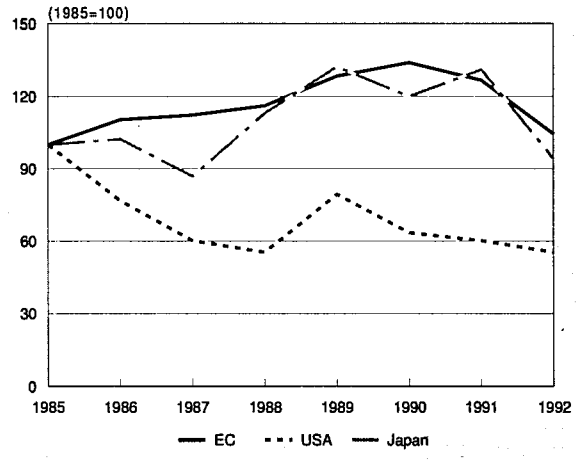
Currently, the United States have experienced a recovery, just gaining momentum. Within Europe only the United Kingdom has seen anything else than a substantial slump in the demand in 1993. The same is to say for East Europe. In the beginning there was optimism that the dissolution of the socialist economies would stimulate demand for machinery and equipment. But the expectations have not come true so far.

Figure 4: Machine tools
International comparison of main indicators in current prices



Source: CECIMO, American Machinist, Vieweg

Figure 5: Machine tools
International comparison of production in constant prices



Source: CECIMO, American Machinist, Vieweg

The EC deliveries of machine tools into the CIS shrunk by 40% between 1989 and 1992. The deliveries into the other countries of East Europe stagnate since 1989, except those to the former Czechoslovakia.

The current situation in the machine tool markets is marked by a worldwide slowdown in demand, with only a few exceptions to the rule. Orders from the Far East are increasing especially from the P.R. of China in 1992 and 1993, and to a lesser extent from the other newly industrialising economies. Growth had also been noticed in the Middle East in 1992 and in Mexico in 1992 and 1993. Since mid-1992 the orders from the United States have increased.

International comparison

The EC is by far the world's largest supplier of machine tools. Its share of worldwide production has increased from about 35% at the beginning of the 1980s up to about 40% in 1992. Second in this ranking is Japan with 25% in 1992 against 14% in 1980. The United States' machine tool industry declined sharply during the past decade and its share on the world production was only 9% in 1992 with better trends over the past two years. The differences in the countries' performance were mainly due to the development in the domestic market.

From 1983 to 1992 the Japanese production of machine tools grew at a compound annual rate of 6.3% stronger than the 5.6% of EC output. Japanese companies also enjoyed a much stronger growth stimulus from foreign than from domestic markets, whereas for EC companies it was quite the opposite.

Foreign trade

During the past decade, the extra-EC exports were much less dynamic than the domestic demand due to poor new order bookings for machine tools from non-European countries, especially the United States. At the beginning of the 1990s the demand from East Europe broke down and put a further damper on exports.

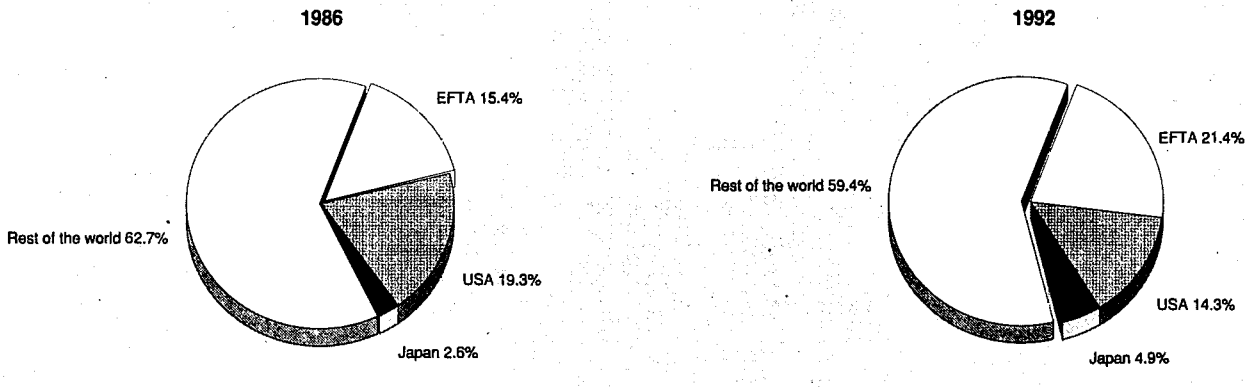
The demand for machine tools in the Far East, in Japan as well as in other countries, boomed during the second half of the 1980s. But the benefit of this development for EC-companies was not that important, because their market shares are lower than in other regions. For instance, the market volume for machine tools in the Far East is more than double as high than that of the NAFTA, but the EC's deliveries to both of these regions are on comparable levels, round about 20% of all EC-exports.

Dependency of EC machine tool industry on foreign demand decreased during the 1980s, partly due to the booming internal demand. In 1992 36% of production was delivered outside the Single European Market compared with about 40% at the beginning of the 1980s. On the other hand, the dependency on foreign supply grew. Currently about one quarter of the EC's apparent consumption is procured from abroad, compared to one fifth ten years ago.

The EC's trade balance with machine tools remained stable during the past decade. Nevertheless, the position of the EC in international trade worsened, because the companies were not able to improve their position abroad as their foreign competitors increased their market shares in the Single European Market.

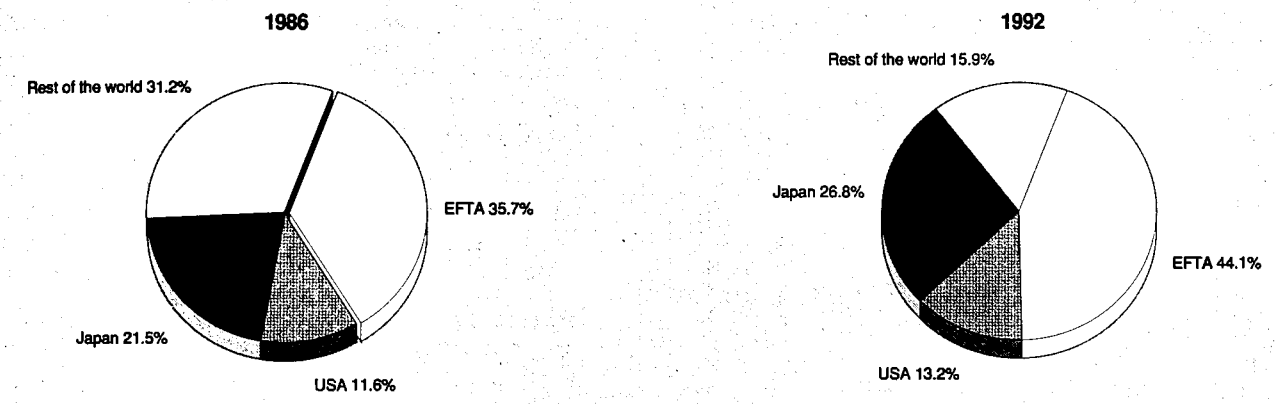
EFTA is the most important origin of machine tools imported into the EC. This is mainly due to the strong position of Switzerland in international markets, a country, whose companies export about 85% of their production and they were able to increase their share on total EC-imports.

Figure 6: Machine tools
Destination of EC exports



Source: CECIMO, Vieweg

Figure 7: Machine tools
Trade Intensities



Source: CECIMO, Vieweg

The next major exporter of machine tools to the EC is Japan. Both countries were able to increase their shares on total EC imports. On the contrary, since 1986 US producers have lost their former importance in the European market.

Japanese companies changed their strategies to penetrate the EC-market during the 1980s. Until 1984 they expanded their shares through imports, but since then this share on the EC-market has remained stable. In the latter half of that decade Japanese suppliers strengthened their position through inward investment. For two years one observes cases of de-investment and postponements of planned activities because Japanese suppliers have also been severely hit by the recession.

Since 1986, US manufacturers have lost their former importance in the European market.

MARKET FORCES

Demand

The EC accounts for 37% of the world machine tool consumption. As in production, the EC is leading in demand. Japan and the United States are second and third respectively.

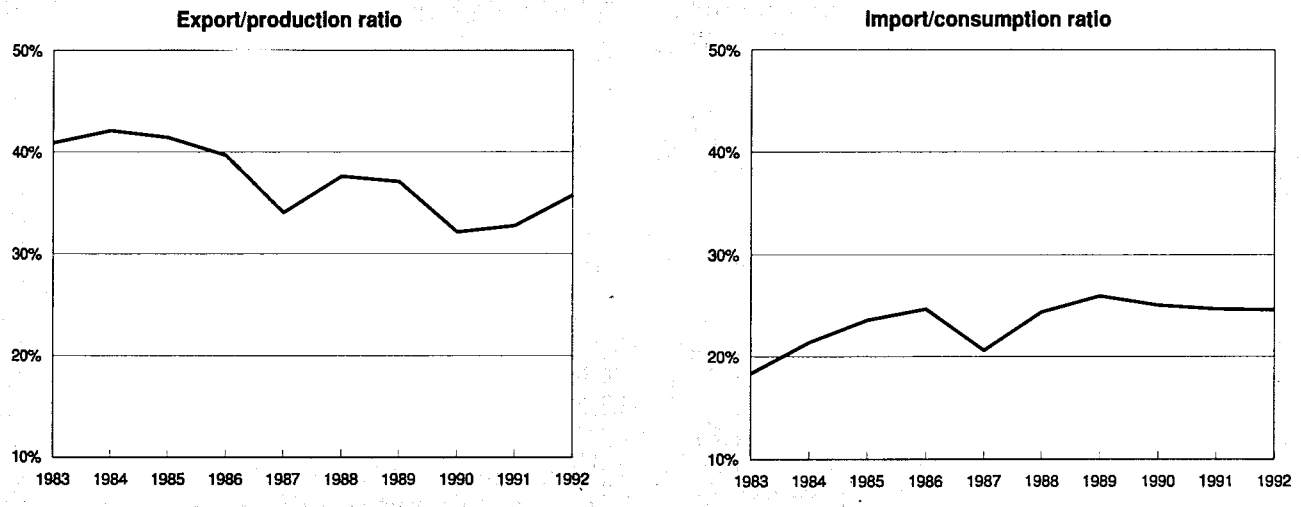
The industry supplies capital goods above all to the manufacturing industries. Most important is the mechanical engineering industry with a share of one third of total EC demand. Second is the automotive industry and third the electrical products industry, with shares of one quarter and one tenth respectively. The aerospace sector is above all important by the demand for advanced technology.

At the end of the 1980s, the deliveries of machine tools to the automotive industry were particularly strong. This development resulted from a growing demand for vehicles and from strategic investments by European car producers to meet the challenges of the Single European market. Currently, the machine tool suppliers are strongly affected by a slump in the demand from this industry as a reaction on the recession in the automotive market.

Supply and competition

The description of the machine tool market requires at least a distinction between two segments with totally different environments. In the past decade the market for standardised machinery has evolved to a volume market with global players. Japanese companies are in the lead, where the price has become a key factor for purchase decisions.

Figure 8: Machine tools
Origin of EC Imports



Source: CECIMO, Vieweg

Table 5: Machine tools
Average size of enterprise per company, 1992

	Number of companies	Number of employees	Employees per company
EC (1)	1 300	152 916	118
B	15	2 133	142
DK	18	N/A	N/A
D	360	89 500	249
E	123	6 858	56
F	140	8 295	59
GR	N/A	N/A	N/A
I	435	29 230	67
IRL	N/A	N/A	N/A
L	N/A	N/A	N/A
NL	24	1 060	44
P	29	1 100	38
UK	150	13 000	87

(1) Vieweg estimates
Source: CECIMO, Vieweg

In this market European companies have difficulties to withstand the tough competition and recorded losses during the current recession. For instance, leading suppliers in the milling and machining centres market had to cut equity and mergers will be necessary to survive.

Because of high investments in production facilities there is excess capacity in some market segments for standardised machines. Even if demand grows strongly, the utilisation of the facilities will stay low for many years. This is mainly due to Japanese investment in Japan, but also in the United States and Europe.

In the volume market European companies face a strategical disadvantage. Their abilities to exploit economies of scale are lower compared to the Japanese and the ongoing price competition caused by the excess capacity poses a threat on them.

In the markets for special or tailormade machinery and production systems European companies maintain a strong position. Because of an increasing level of automation in client industries, which requires a specialised supply of manufacturing processes, software and engineering, these markets grow in importance.

European, especially German, Italian and Swiss strength is built on know how and highly qualified personnel. A specialisation of Japanese machine tool industry on standardised products and of European suppliers in special machinery and systems could evolve in the future. These specialisations can be a danger for European manufacturers, because many specialised machines require key standard components for which some of them must be manufactured in high numbers to reduce costs. Therefore, a further loss in the standard machine markets would make European machine tools more expensive.

Because of the appreciation of the Yen against all other European currencies currently Japanese wages per year are higher than European. However, due to longer working hours the labour costs per time unit are markedly lower. In comparison with Germany Japanese workers offer 40% more hours per year, inducing 30% lower labour costs per hour (1991: ECU 14.5).

Furthermore the dual economy allows Japanese machine tool manufacturers to procure components at extremely low prices. These goods come from subcontractors that only pay minimum wages and require even longer working hours and do not meet usual regulations for the workers' security.

Calculated on a yearly base the labour productivity of the big Japanese companies is higher than the productivity of their European counterparts by roughly 100%. About 40% is due to longer working hours. 20 to 30% are caused by the dual economy providing enormous advantages to the big machine tool manufacturers. The reminder is induced by different factors, as economies-of-scale, standardised products and to a lesser extent organisational advantages.

In addition Japanese machine tool manufacturers derive advantages from an excellent supply of advanced controls. Mainly they are delivered by Fanuc (JPN), the world's leader in numerical controls (NC) with a market share of 50% and by Mitsubishi. Others are of minor importance. Few machine tool companies manufacture their own controls. Especially standard machine manufacturers procure complete packages containing all electric and electronic components and thus enjoy a price advantages.

Production process

The technological progress in electrical drives and controls induced a substitution of mechanical components as gears and transmission units by electrical components. The new components are no longer produced inhouse but generally procured from specialised suppliers. The value added share of total turnover had been decreased.

The procurement of electrical and electronic devices is most advanced in Japan. Although some large machine tool manufacturers prefer the inhouse production of these components many others procure complete packages which reduce the engineering requirements. In contrast, most European companies prefer the procurement of components to their own design and adapt them to their needs. This process causes high costs in research and development (R&D).

European companies lead in research and development and the expenses as a percentage of total turnover is higher than for Japanese companies, (4.5% and 3.2% respectively). But it must be kept in mind that European machine tool suppliers spend a higher share of their R&D funds on a specific design than on basic research compared with their Japanese competitors. An analysis of the most important innovations proves that EC companies are technologically at the fore-front, although in some advanced technological fields as electronics, new materials etc. Japanese competitors are on the leading edge. If the ongoing integration in electronic components will result in a one chip NC-device, Japanese suppliers would enjoy the advantage first.

INDUSTRY STRUCTURE

Companies

In 1992, the European industry consisted of 1 300 companies, of which about 300 had less than 20 employees. The typical machine tool company is medium sized and employs on average a workforce of 118. But there are significant differences in the number of employees. The average German company employs 249, whereas the average Italian company only employs 67 workers. EC firms are small compared with their Japanese competitors. They have on average half as many employees, and a comparison of average turnover indicates an even larger difference. In comparison with US firms, the average EC firm has only 75% as many employees.

The European industry is not dominated by large companies. The top five enterprises account for 17% of the EC machine tool production. For comparison Japan's top five enterprises account for about 30%. The latter were very dynamic during the past decade. At the beginning of the 1980s their share of total Japanese production accounted only for 22%.

Strategies

EC machine tool suppliers expanded their investment budgets by about 50% in the latter half of the 1980s. As a percentage of the turnover the expenditures reached 7%. The major objectives were to meet booming demand, to automate production processes and above all to invest in foreign markets, especially in other European countries. Many companies were not able to finance all these activities with their cash flow and had to open up new financing sources. Some became joint stock companies, others increased their equity or raised loans.

The current recession has hit the entire industry. Especially companies that had strongly invested the preceding years suffer most under the high financial burden.

Losses and the shrinkage of equity induced companies to search for affiliations. They have been looking for strategic alliances in an attempt to stave off bankruptcy. With the help of cooperation agreements companies try to use synergies in production and distribution to achieve cost reduction.

Companies that are working in the volume market must decide with respect to the long term prospects. In view of the competitiveness of Japanese suppliers and overcapacities for many years, the tough price competition will be continued even during the expected upswing. Therefore, the forging of large groups will not be a one-way road to success.

As such, European suppliers in the volume market are strongly dependent on the conditions set by the economic policy. Important fields are social costs, interest rates, qualification of the labour force, R&D and trade policy. In the past Japanese companies enjoyed the benefit of a more favourable policy than the European manufacturers.

REGIONAL DISTRIBUTION

Germany and Italy provide three quarters of the EC machine tool production. Next are the United Kingdom and France. The Spanish industry, fifth in this ranking, has competitive prices and has caught up in the technological development.

In Germany the production of machine tools is concentrated in Nordrheinwestfalen, a traditional region for heavy engineering, and in BadenWürttemberg. The unified Germany comprises another important region, Saxony, situated in the South of the new Länder. In Italy, most of the industry is located in the North, in Lombardia, Piemonte, Emilia-Romagna and Veneto. French suppliers are concentrated around the Ilede-France and RhôneAlpes. In the United Kingdom the machine tool industry is located in the traditional industrialised region of the Midlands, in the SouthEast and in Yorkshire/Humberside. Spanish companies are centring in Euskadi and Catalunya. In Portugal the industry is concentrated around Oporto. In Denmark, Belgium and the Netherlands there are no particular areas of concentration.

ENVIRONMENT

The manufacturing of machine tools mainly consists of mechanical processes as turning, milling, boring, drilling, grinding and assembling. Most of the preliminary products are of metal, and the input of energy is of minor interest. Therefore, the major threat for the environment lies in the use of cooling and lubricating liquids which cannot be easily disposed other than by filtration which allows for a reuse of the liquids. Currently new kinds of cooling liquids, posing a smaller threat on the environment, are being developed.

Hardening and galvanising are used to increase the durability and rigidity of materials and special surfaces such as slides. As hardening by heat treatment is not sufficient, chemical processes are necessary. Most of the machine tool companies do not have their own capacities for these processes and employ specialised subcontractors.

The technological progress has induced some changes in the products themselves. Advanced machine tools are equipped with controls, motors etc. New materials are used as composites and compounds for parts of the machines. Therefore, it is no longer easy to scrap an old machine. The recycling of its components will only be possible if the machine is adequately designed. Companies are beginning to comply with such requirements.

REGULATIONS

The most important regulation in international trade of machine tools is the COCOM rule which was introduced to hinder exports of advanced production technologies to the countries of the former East bloc. In spite of its dissolution this regulation has not been abolished and hampers Western machine tool suppliers from increasing their exports. Although some improvements were made this regulation remains a major handicap.

For intraEC trade there is no major hindrance, although the suppliers must apply for a safety approval in order to deliver their machine tools into other countries. The newly adopted Machine Directive ensures free circulation of machinetools throughout the EC, reduces unnecessary administration and avoids duplication of essential safety requirements. Compliance with the directive is likely to reduce costs for manufacturers who meet harmonised standards.

Other regulations, such as the electromagnetic compatibility directive and the agreements on interfaces between data processing facilities, set standards that ease the combination of products of different EC countries. These regulations are prerequisites for the Single Market and very important for the set up of automated manufacturing processes.

OUTLOOK

A drop of demand for investment goods took place in most industrialised countries. Only the USA and to a lesser extent the United Kingdom, which went into the recession earlier, show signs of a recovery. In fact, for the US the take off has obviously begun, whereas for the United Kingdom leading economic indicators just indicate a stabilisation of the demand, while for other European markets the downward trend continues.

During the first half year of 1993, new order bookings for EC companies declined at a double digit rate compared with the preceding year. German companies suffered most losses, about one third of the orders. French suppliers benefited from

Table 6: Machine tools
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-5.0	2.9
Production	-4.0	2.7
Extra-EC exports	-2.0	3.0

Source: Vieweg

some major foreign orders during the first three months and Italian companies could stabilise their business activity also by foreign new orders. The depreciation of the Italian lira has stimulated exports.

The breakdown of the economies in East Europe had a negative impact on the machine tool industry. The medium term perspectives for deliveries to the CIS remain poor. The lack in convertible currencies and the inability to quickly overcome the political difficulties will hamper the demand. The other East European countries with the exception of the Czech republic suffer under a burden of foreign debts, and the trade with Western countries has been affected by the recession. Due to this framework prospects for deliveries into these countries must not be regarded as very bright in the short term. Therefore the transition of the East European economies will not provide a compensation to the overall slackening of demand.

For the second half of 1994, a recovery for the West European economies is expected. If this comes true, the demand for machine tools will increase too, but presumably there will be a delay as usual in an upswing phase. With regard to the breakdown of the production in 1993, the recovery will not be sufficient to hinder that - calculated on a year by year rate - in 1994 the production volume for machine tools in the EC will be lower than in the preceding year.

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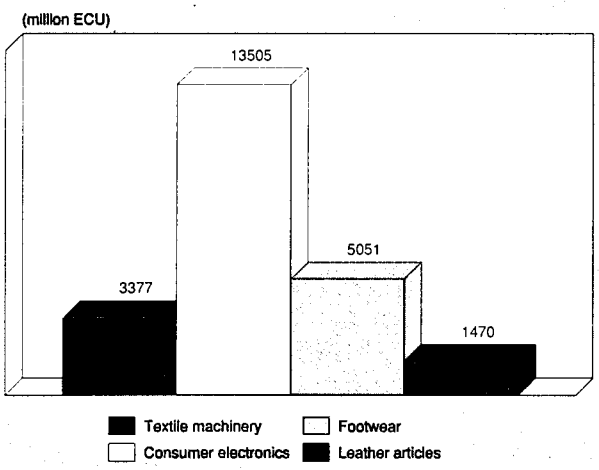
Textile machinery
NACE 323

The EC textile machinery is global rather than regional in nature. Also, it has a high degree of specialisation, which refers both to broad product categories such as spinning, fabric forming, etc. and to specialities. Until 1990, the industry achieved double-digit growth rates (in current prices), but in the beginning of the 1990s, the sector had to cope with depressed demand, the fall of the US dollar and overcapacity. This led to a production decline in 1991. Remarkably, in 1992 producers succeeded in increasing their non-EC sales significantly, which prevented a further fall in production. Competition on the world market is strong, especially from Japan and from the NICs in the Far East and South East Asia. This concerns mainly standard machinery. EC manufacturers will respond to increasing competition by rationalisation and standardisation. Also, they specialise in high-quality and flexible machinery. Since economic recovery is not expected before 1994, in the short term the sector will develop less favourably than in the medium term.

Figure 1: Textile machinery
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

NACE 323 covers the production of machines for textile processing and accessories for such machines. Its main products are: short staple spindles (for short-staple fibres, e.g. cotton); long-staple spindles (for long-staple fibres, e.g. wool); open-end rotors for spinning; shuttle looms for weaving; shuttle-less looms for weaving. These machines spin (natural and synthetic) fibres into yarn; weave or knit the yarn into fabric; dye, print and finish the resulting fabric; and produce garments or other fabric products. NACE 323 also includes the manufacture of sewing machines.

Recent trends

During the 1983-1990 period, EC consumption and production of textile machines in current prices increased continuously at double digit growth rates of some 12% per year; employment rose at an average rate of 1.2% per year. Remarkably, it grew fastest between 1985 and 1987, reflecting the recovery of the sector as a result of a restructuring process. In 1991 the industry had to cope with problems such as depressed demand, the fall of the US dollar and overcapacity. These problems caused a drop in consumption of 23%. Since the imports decreased twice as fast as the exports (16% versus 8%). In 1991, production fell less than consumption (16% in value and by 18% in volume). The set-back in economic activity influenced employment adversely too; employment dropped in 1991 by 6%. In 1992 EC demand continued to fall and so did employment. Because producers succeeded in increasing their non-EC sales significantly, a further drop in production could be avoided, although the 1992 production level was still considerably lower than in 1990: 12% in current prices and 16% in constant prices.

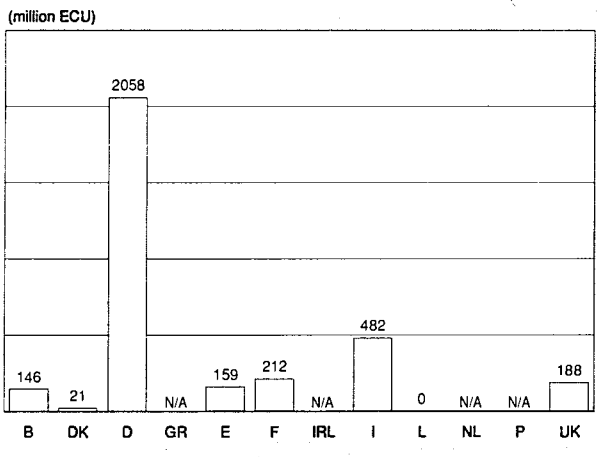
In 1992, due to a sharp rise in exports (13% in current prices), EC production increased by 5%, the export increase outweighed the 6.5% fall in domestic demand. In constant prices the production increase was 2% in 1992. Unlike production, employment declined by 8%.

Germany is by far the largest producer in the industry, accounting for 63%, in value added, of total EC production; Italy followed with 15%. The development pattern of production differed from one Member State to another. In Germany and the United Kingdom the production increased by 6% and 18% respectively, whereas Italy, France and Spain witnessed a drop in their production in the range of 9% to 23%; in Belgium the production remained unchanged in 1992 as compared to 1991.

International comparison

The EC is the world's largest producer of textile machinery, but its traditional predominant position is seriously affected by the rapid growth of the industry in Japan and the NICs; in 1983 EC production of textile machinery was 81% higher than that of Japan, whereas in 1992 the difference was only about 58% Japan's exports are mainly destined for Asian markets. In 1992 EC imports from Japan covered some 8% of total EC demand; the market share of the USA was 3%. Unlike Japan the USA was coping with declining production; over the past 5 years its production in current prices declined on average by about 0.5% per year. In constant prices US production declined in 1992 for the third consecutive year; the production fall was remarkably strong in 1990 (19%).

Figure 2: Textile machinery
Value added by Member State, 1992



Source: DEBA

Table 1: Textile machinery
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	2 768	3 304	3 828	4 430	5 020	5 818	5 851	6 156	4 726	4 418	4 350
Production	4 213	5 278	6 233	7 079	7 762	8 636	9 317	9 638	8 075	8 483	8 600
Extra-EC exports	2 220	2 876	3 476	3 831	4 040	4 322	4 986	5 019	4 629	5 230	5 400
Trade balance	1 445	1 974	2 404	2 650	2 742	2 818	3 466	3 482	3 349	4 065	4 300
Employment (thousands)	98.9	97.9	100.7	102.1	105.1	105.9	107.3	107.9	101.5	93.7	88.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
The entire data's serie differs from the 93 edition of Panorama due to a different source.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Textile machinery
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	11.9	-6.7	3.2
Production	9.6	-3.5	3.6
Extra-EC exports	5.5	-1.3	2.4
Extra-EC imports	5.9	-10.3	-1.6

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Textile machinery
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	2 220	2 876	3 476	3 831	4 040	4 322	4 986	5 019	4 629	5 230
Extra-EC imports	775	902	1 072	1 181	1 298	1 505	1 520	1 537	1 279	1 165
Trade balance	1 445	1 974	2 404	2 650	2 742	2 818	3 466	3 482	3 349	4 065
Ratio exports/imports	2.86	3.19	3.24	3.24	3.11	2.87	3.28	3.27	3.62	4.49
Terms of trade index	100.0	99.5	100.0	101.3	103.9	102.1	104.1	107.0	108.2	108.8
Intra-EC trade	1 100	1 270	1 451	1 807	2 052	2 353	2 437	2 392	2 070	2 030
Share of total imports (%)	58.7	58.5	57.5	60.5	61.3	61.0	61.6	60.9	61.8	63.5

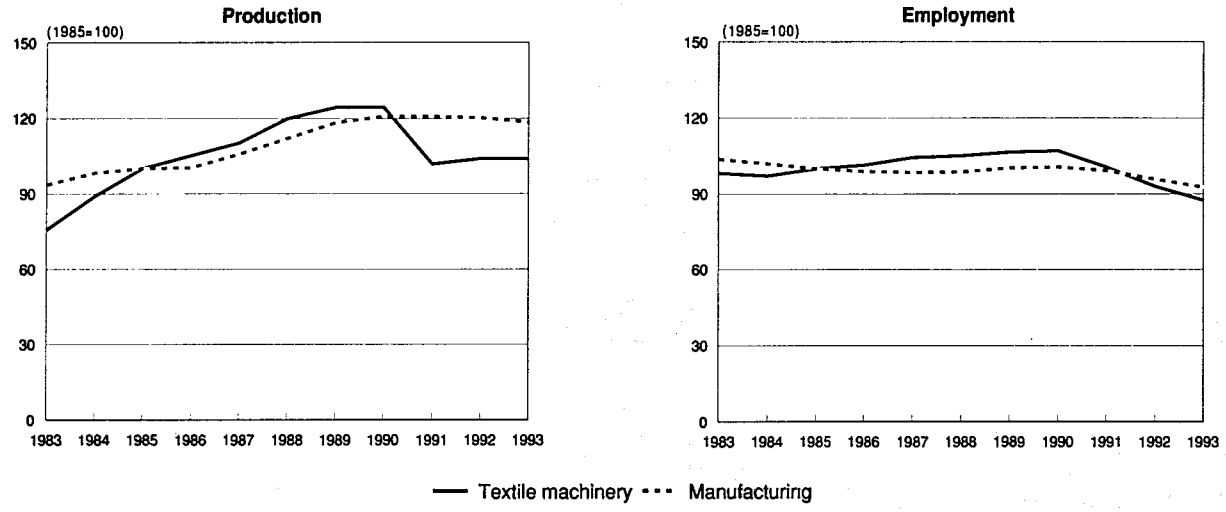
Source: DEBA

Table 4: Textile machinery
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	29.8	33.2	35.8	36.2	36.2	38.4	37.7	37.1	32.7	36.0
Productivity index	83.1	92.5	100.0	101.1	101.1	107.1	105.2	103.6	91.2	100.5
Unit labour costs index (3)	84.6	93.0	100.0	108.0	114.1	120.9	129.1	136.1	141.7	157.0
Total unit costs index (4)	71.9	89.0	100.0	111.9	119.8	131.5	142.4	147.7	143.5	161.6

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Textile machinery
Production in constant prices and employment compared to EC manufacturing



1993 are NEI and Eurostat estimates
Source: DEBA

Foreign trade

Foreign trade plays a major part for textile machinery in the EC. Regarding an export rate of over 60%, the sector can be characterised as highly export oriented. Import penetration is much lower; about a quarter of EC demand is covered by non-EC suppliers.

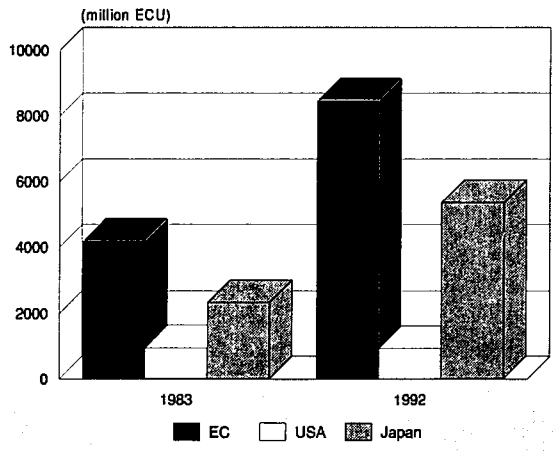
Throughout the period 1983-1992 the EC was a net exporter of textile machinery. Moreover, with the exception of 1991, exports have grown continuously since 1983 (in current prices on average by 10% per year). Until 1990 imports recorded a similar growth rate, but then fell strongly; the 1992 import level was 25% lower than that of 1990.

The development of the foreign trade flows gave rise to a significant improvement of the trade balance, which nearly tripled between 1983 and 1992. The export/import ratio increased from 2.9 to 4.5.

The vast majority of extra-EC exports are destined for the Rest of the World. The major destinations in the developed world have decreased in importance; in 1987 their joint share was almost one third of total EC exports, whereas in 1992 it was reduced to one quarter. Especially the EFTA countries and the USA contributed to this reduced share. As a result the share of the developing countries increased from two thirds to three quarters. Among these the largest market is to be found in Asia, where manufacturers in countries like India, Indonesia, Korea, Taiwan, Pakistan and Thailand invest heavily in replacements and new factories. East Europe and the Commonwealth of Independent States (CIS), where domestic machinery manufacturers are unable to meet the demand both in terms of volume and required technology, are other promising markets. The market in North and South America (Brazil) shows a stabilisation or even a decline.

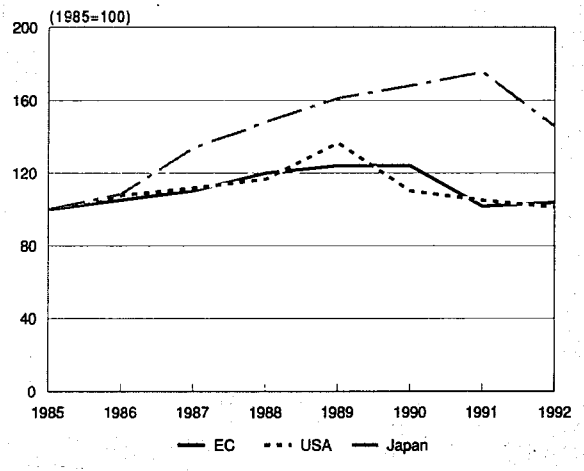
The EFTA countries, Japan and the USA allow for the overwhelming part of the extra-EC imports: in 1992 their joint share was 82%; in 1987 it was 87%. The decline is particularly due to the drop in the share of the EFTA countries, by far the number one origin of the extra-EC imports: their share dropped from over 50% to almost 40%. This decline could

Figure 4: Textile machinery
International comparison of production in current prices



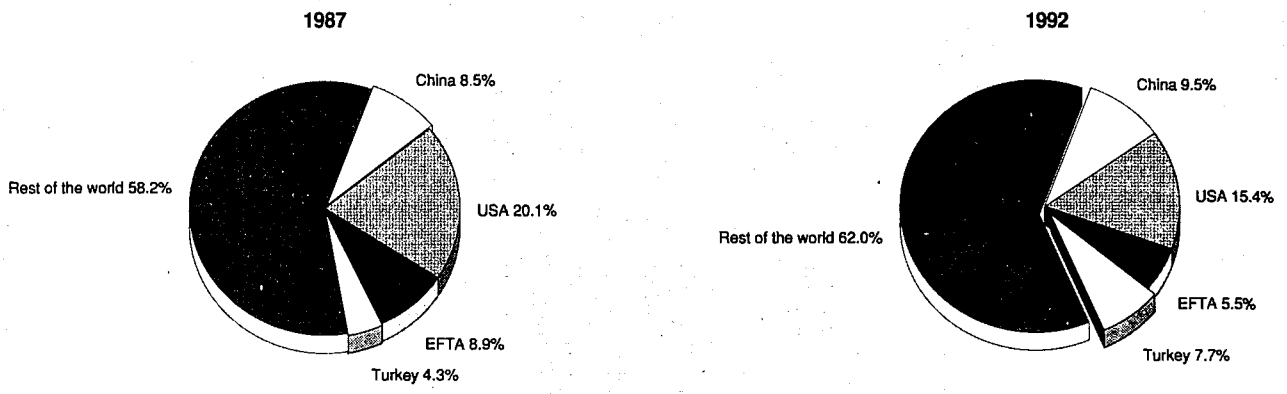
Source : DEBA, Census of Manufacturers, Nikkei

Figure 5: Textile machinery
International comparison of production in constant prices



Source : DEBA, Census of Manufacturers, Nikkei

Figure 6: Textile machinery
Destination of EC exports



Source: Eurostat

partly be compensated by the increase of the market shares of Japan and the USA.

MARKET FORCES

Demand

Demand for textile machinery is naturally linked to developments in textile manufacturing. Since the EC accounts for some 10% of the world's textile manufacturing capacity it is clear that EC manufacturers depend heavily on the demand for textile machinery from non-EC countries. This is reflected in an export share of over 60%. Particularly Asia, with about half of the world's textile manufacturing capacity, is relevant in this respect. Conventional (short staple and long staple) spindles still account for three quarters of world deliveries. They produce superior yarns for some end uses, especially in finer count ranges. The shift to open-end rotors seems to have come to a halt or has even reversed.

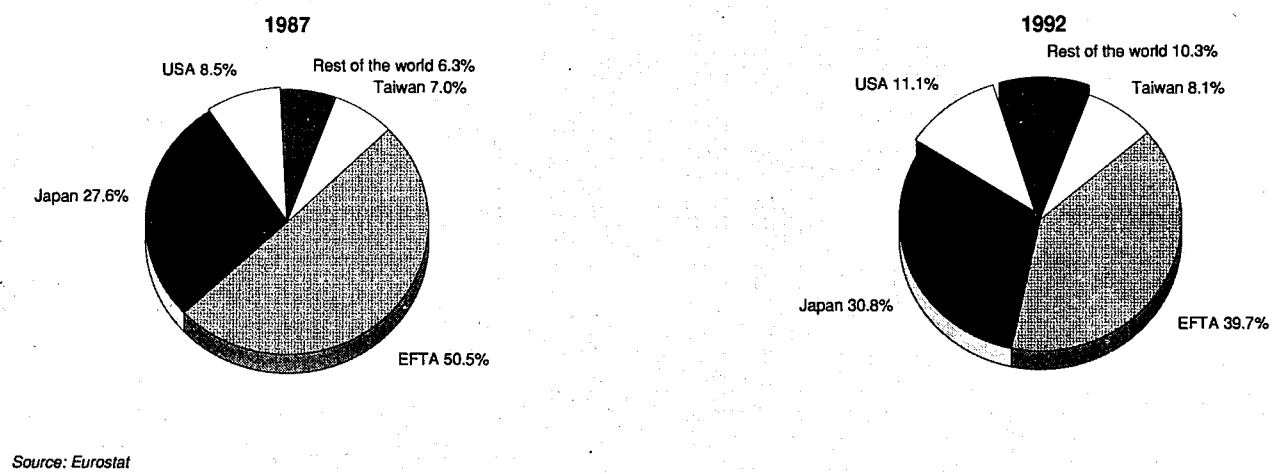
The demand structure for textile machines varies significantly by region. Asian countries are strongly investing in spinning machines with short staple spindles: EC manufacturers mainly require long staple spinning machines used for high quality yarns. The demand for weaving machines reveals a similar picture: nearly all shuttle looms are procured by Asian countries, whereas textile manufacturers in industrialised countries mainly concentrate their purchases on advanced shuttle-less looms, especially rapier/projectile and air-jet spinning machines.

Within the EC Italy is by far the most important market for textile machinery. Over 30% of EC demand for spinning and weaving machines comes from this country. In particular Italian textile companies invest considerably in long staple spindles: 60% of their investments are in these machines. Important customers for open-end rotor spinning machines are in Italy, Germany, France and Spain. EC demand for weaving machines is focused on shuttle-less looms. Again, Italy is the most important in the demand for this type of machinery.

Sewing machines

The bulk of sewing machine output goes to the industrialised countries. European producers sell about 70% of their output to customers in these countries. Germany as a supplier of mature specialised technology sells about three quarters of its exports to these countries; the remaining quarter goes to developing countries. Japanese manufacturers sell about half of their exports to industrialised countries; the other half goes

Figure 7: Textile machinery
Origin of EC imports



Source: Eurostat

to developing countries. PR China is especially a growing market for Japan.

Supply and competition

The EC is by far the largest producer of textile machinery in the world, but non-EC competition is increasing. Price competition in textile machinery manufacturing is fierce. Competition is also complicated due to sometimes volatile currency exchange rates and customers demanding 'soft' credit schemes.

Japanese manufacturers are increasingly becoming a competitor on the world market. They are not only strong in producing machinery of traditional technological standards, but they have also obtained considerable strength in highly advanced machinery. Japan exports the larger part of its production: in 1989 53%. The Japanese have already succeeded in acquiring strong positions in the Asian markets, where demand for standard technology machinery is prevailing. Some 60% of exports go to these markets. Their importance on European and American markets is also growing.

There is also expanding competition from local companies in the newly industrialising countries in the Far East and South-East Asia. These companies produce standard technology machines at low prices and become more and more an important competitor on the Far East and South East Asia markets. In developing countries, companies manufacture machinery under licenses of EC manufacturers, that represents essentially an import substitution policy.

Sewing machines

In terms of supply the most important manufacturers of sewing machines are located in Germany, Japan, the United States, Sweden, Switzerland and the NIC's in Asia. Within the EC Italy and Spain are of limited importance next to Germany. Japan and Germany together account for over 50% of world trade in sewing machines. The NIC's like Taiwan, Hong Kong, Singapore and South Korea have become serious competitors imitating Japanese technology, but selling at lower prices. Industry in PR China is developing and may soon capture the domestic market or even enter the international market.

Production process

Expenditure of EC enterprises on research and development have been significant (5% to 10% of turnover) to guarantee continuous technical and product innovation. Further, marketing costs have also proliferated due to the need to attend international textile machinery exhibitions, especially to have promotion in developing markets.

Innovations have occurred in various fields, such as: new automatic bale feeders, aerofeed systems, high-draft spinning, texturisation, shuttleless looms, needle punch machines, transfer printing, rotary screen printing and computer-integrated manufacture. This led to new machinery in all stages of the textile production process: material handling, yarn spinning, fabric weaving, dyeing, printing and finishing. It also led to automation of machinery functions.

Technological innovation has improved productivity in textile manufacturing a great deal. Over the 1983-1990 period, labour productivity (in current prices) increased continuously at an average rate of 11% yearly. In 1991, however, it fell significantly, by 11%, due to a sharp slump in demand, as employment was not reduced accordingly. In 1992 productivity growth picked up 10%. Unit labour cost increased namely by 7% during the 1983-92 period. This was less than the growth of total unit cost, which rose annually by about 9% on average. This reflects the growing capital intensity of the sector.

INDUSTRY STRUCTURE

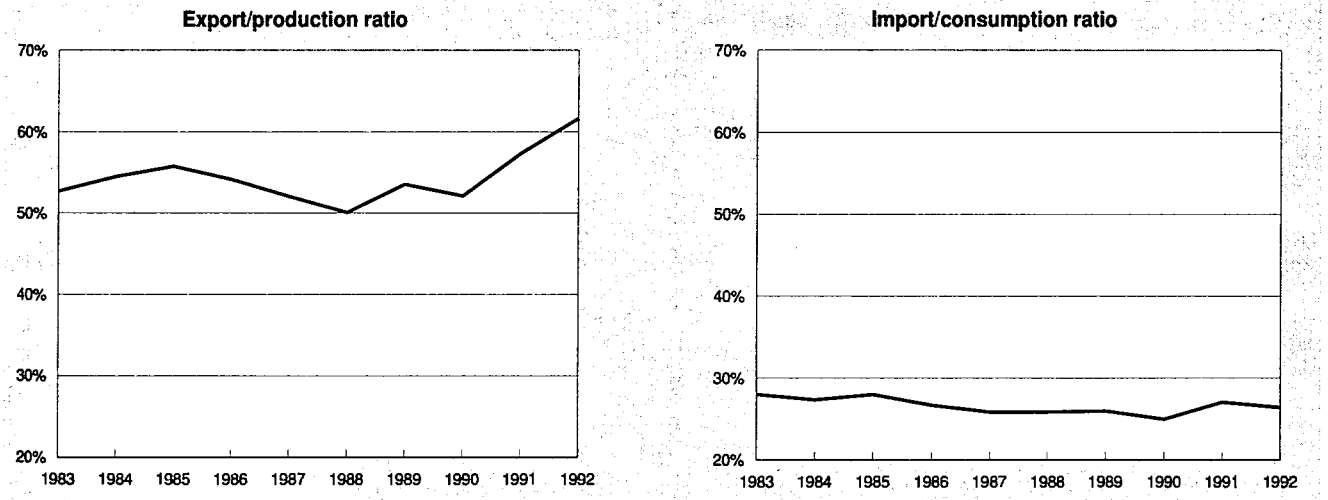
Companies

The EC textile machine industry encompasses some 1100 companies. Many of them are small or medium-sized enterprises. The largest textile manufacturers in the EC by type of machinery are:

- spinning machines: Platt-Saco-Lowell (UK/USA) and Schubert & Salzer (D);
- weaving machines: Dornier (D), Jumberca (E), Picanol (B) and Somet (I);
- knitting machines: Mayer Albstad (D), Stoll (D), Sulzer Morat (D) and Terrot (D);
- dyeing, printing, finishing: Adrioli and Co. (I), Kusters Corp. (D), Stork (NL) and Zimmer (D);
- all categories: Schlafhorst (D), Bentley (UK) and SAMT (F).

The overall structural features of the EC textile machinery industry are determined by two main factors. First, the global

Figure 8: Textile machinery Trade Intensities



Source: DEBA

rather than regional nature of the industry. Most major European textile machinery manufacturers have cooperative agreements in important markets like the United States and the Far East. Such agreements may even be joint-ventures with local companies or fully or majority-owned subsidiaries. Via such agreements they have a basis to service markets like Canada and Latin-America from the USA and the Far East from Asian countries. Second, the high degree of specialisation, which refers both to broad product categories such as spinning, fabric forming, etc. and to specialities within these categories. Pressures on order volumes and profit margins, and increased local competition in some developing markets have encouraged specialisation. Examples are Schlafhorst (D) with a good reputation in spinning machinery, Barmag (D) in spinning machinery for synthetic fibres, Van der Wiele (B) for carpet weaving and Stork (NL) for printing machinery.

Competition from outside the EC comes from large companies in Switzerland (Benninger, Rieter, Rüti, Saurer, Sulzer) and Japan (Fuhuhara, Howa, Murata, Nissan, Shima Seiki, Toyoda). Both countries are key players in the world market. With high efficiency and technologically advanced products they are able to capture a large market share even in countries with strong indigenous textile machine-making capacities.

Strategies

Some major manufacturers have adopted a strategy to reduce the number of variations of machine types within a particular product category or group. This enabled them to optimise the production of machine parts and to match production and orders in a better way.

The industry has also been confronted with internationalisation involving acquisitions, mergers and other forms of cooperation not only within the EC, but also at the international level. In this way specialised individual textile machinery manufacturers aim at becoming a complete supplier to meet with the growing demand for fully equipped, highly automated production plants. Examples are the French SAMT (merger of SACM and ARCT), Rieter (CH) acquiring 51% of Schubert & Salzer (D), Saurer (CH) having taken over Volkmann (D) and Schlafhorst acquiring Zinser (D).

REGIONAL DISTRIBUTION

Germany, a country with a long tradition in machinery manufacturing (some 25% of the total number of EC companies is settled), accounts for some 55% of EC employment in the textile machinery industry; Germany's share in the industry's value added was 63% in 1992. This reveals that the largest textile machinery companies within the European Community are mainly settled here.

In Italy, the second largest EC producer country, the manufacturers are on average substantially smaller; Italy allows for most (30%) of the companies in the EC textile machinery, but for 15% to 20% of EC employment, and for 15% of EC value added. The relatively small size seems to allow maximum specialisation and close customer relationships. For France, the third EC producer of textile machinery, the shares in EC value added, employment and number of companies are virtually identical, indicating that the French 'picture' complies with that for the EC as a whole. As to the remaining Member States it is worth noting that, although Spain and Belgium have a comparable value added, Spain has 40% to 45% more labour employed. Spain reveals the lowest labour productivity in the EC.

REGULATIONS

Regulations on machine safety and health provisions are currently imposed on machine manufacturers. Provisions concern the design, the materials used, the way in which machine operations should be illuminated, machine operations itself, safety against mechanical risks, the application of screens and other safeguarding components, maintenance and machine indications and identifications. Machines complying with the EC regulations will obtain the CE mark.

Further provisions concerning technical standardisation are relevant to the sector. The European institutions on technical harmonisation CEN and CENELEC are developing such standards applicable throughout the Community. International standards for quality control have also been developed such as ISO 9000.

Given the highly export oriented character of the sector, the liberalisation of the world trade through GATT negotiations is of particular relevance to the sector, especially regarding the trade with Asian countries. The Japanese Comprehensive Import Expansion Policy provides an interesting example. Foreign producers have already a share of some 24% in the Japanese market for textile machinery, totalling ECU 852 million in 1989. These imports are overwhelmingly (for about 90%) handled by Japanese importers. The Import Policy together with increasing sales efforts by importers may encourage EC exports to Japan.

OUTLOOK

Table 5: Textile machinery
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.5	1.5
Production	1.5	2.5
Extra-EC exports	2.0	3.0

Source: NEI

Given the high export rate of the EC textile machinery industry developments outside the EC are particularly relevant. On both the EC and non-EC markets manufacturers will have to face increasing competition. The liberalisation of the EC market will encourage intra-EC competition; competition in the exports markets, particularly in Asia, will come on the one hand from further penetration of Japan on these markets, and on the other from import substitution in current export markets.

EC manufacturers will respond to increasing competition by further rationalisation and standardisation on the one hand and by increasingly proceeding to the production of special high-quality and flexible machinery. Technologically advanced machinery, replacing expensive labour, will generally be destined for the industrialised countries; machinery of accepted standard technology will be mainly sold in developing countries, where, as a rule, labour cost are relatively low. The development of advanced machinery includes the application of modern technology: sophisticated automation, electronics, and computer-to-computer communications. Besides technological improvement and innovation of machinery, after-sales-services will be increasingly a competitive weapon.

Despite increased competition and the prevailing global slump, EC production revealed an increase in 1992, especially due to increased exports; EC demand declined. The production development was largely due to a rise in orders of 22% of German manufacturers, who account for the bulk of EC production. For 1993 a further growth in these orders is expected. On the other hand economic recovery is not expected until 1994.

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Food, drink and tobacco processing machinery

NACE 324.11

Within this grouping, the manufacture of food processing machinery is the largest sector. As the European food market is maturing, not only food manufacturers, but also suppliers and manufacturers of food machinery and equipment have increasingly engaged in M&A activity. Production of food is becoming centralised, which, together with rapidly changing consumer preferences, gives rise to the introduction of more capital intensive and research intensive production methods. Demand for more efficient and flexible machinery rises. As a result, the application of robots and industrial automation systems is growing.

INDUSTRY PROFILE

Description of the sector

The market of food processing machinery includes: flour milling equipment, noodle making machines, baking machines, confectionery machines, fermenting machines, dairy product processing machines, meat processing machines, seafood processing machines, rice & barley polishing machines, fruit and vegetable processing machinery, and other machinery. Food processing machinery accounts for the greater part of the production of this NACE.

The production of food, drink and tobacco processing machinery accounted for an estimated 5-6% of total machinery production. In contrast with other machinery sectors demand for, and consequently the supply of food processing machinery is highly fragmented. Within the EC especially meat processing machinery, bakery machinery and fruit and vegetable processing machinery are important segments of the industry.

Recent trends

Germany is the major producer of food processing machinery with an estimated share of 35% to 40%. In contrast with other machinery manufacturing industries the Italian position within the industry is not so strong. Its position is comparable with that of France with an estimated share of 17%. Import penetration in the EC is some 10%, whereas the export rate is estimated at 35% to 40%.

Germany's production rose continuously over the 1980s strengthening its leading position. Dutch production increased as well. Rising exports contributed largely to production growth in Germany and the Netherlands. However, in the beginning of the 1990s German production was also stimulated by a booming domestic market as a result of the reunification. Germany and the Netherlands are net exporters.

Stagnating French production, together with increasing imports from Germany, suggests a weakening French competitive position, since demand remained high. Italian manufacturers on the other hand were confronted with stagnating domestic demand in 1991; the rise in exports was not enough to prevent a production decline in that year. The United Kingdom recorded a considerable production fall in 1991 (16% in current prices, compared with the level of 1989). However, turnover in 1992 increased (by 4% in real terms), suggesting a production increase as compared to 1991.

International comparison

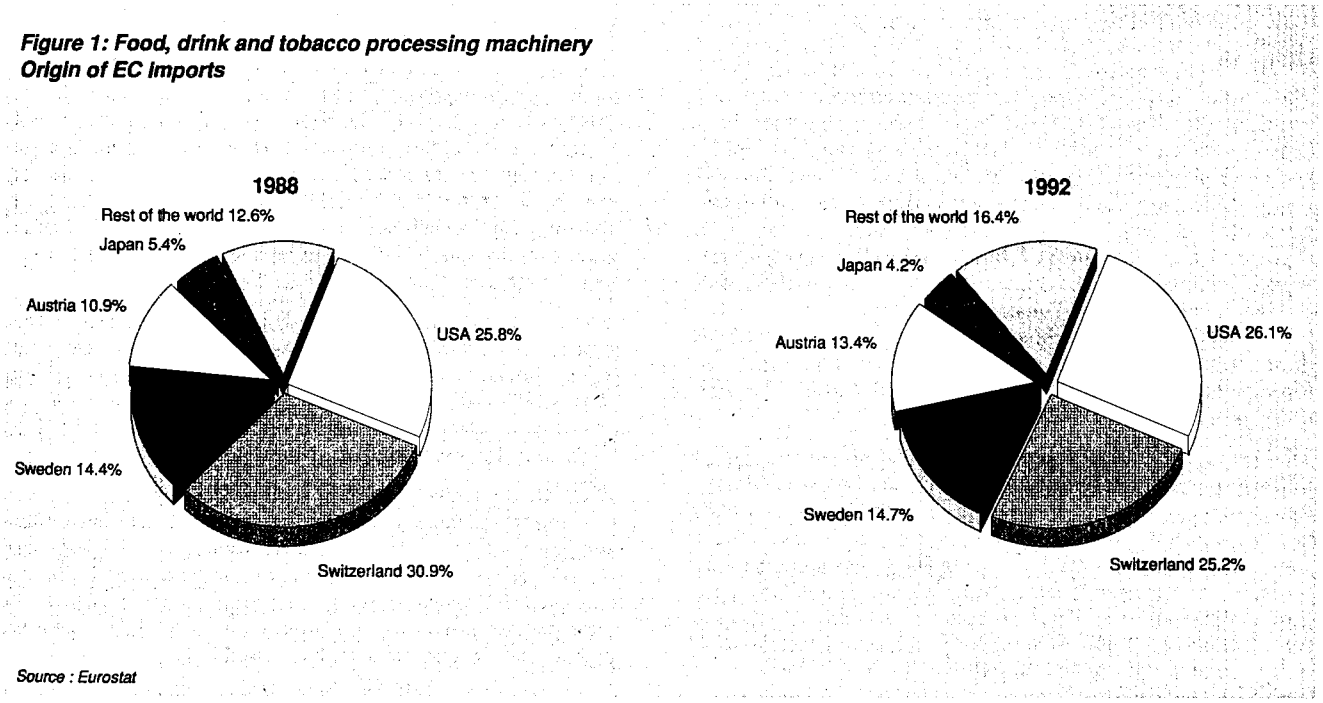
Outside the industrialised countries, the food-processing machinery industry is either non-existent or of a rudimentary character. The industry is strongly concentrated in the developed countries. As the major producers, the EC, the USA and Japan apply differing definitions of the industry, a definite comparison can not always be made.

Available data suggest an isolated Japanese market; both import penetration (1988) and export rate (1989) are about 3%. For the EC, these figures are considerably higher, around 10% and between 35% and 40% respectively in 1990. The USA recorded a higher import penetration than the EC (around 20% in 1989), but its export rate was lower (about 25% in 1989).

Foreign trade

The EC is a net exporter of products classified under this NACE. Moreover, over the 1983-1992 period, the trade surplus increased at an average rate of about 4% per year. The export to import ratio, however, decreased, indicating that the extra-EC imports grew faster than the extra-EC exports: 6%

Figure 1: Food, drink and tobacco processing machinery
Origin of EC imports



Source : Eurostat

Table 1: Food, drink and tobacco processing machinery
Production in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique\België	71	72	73	67	81	88	113	N/A	N/A
BR Deutschland	1 668	1 765	1 938	2 102	2 249	2 385	2 559	2 847	N/A
France (1)	1 017	1 059	1 170	1 230	1 278	1 250	N/A	N/A	N/A
Italia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1 297	1 280
Nederland	410	464	486	536	601	634	593	N/A	N/A
United Kingdom	436	493	539	487	443	519	547	501	473

(1) NEI estimates.
Source : National Statistics

Table 2: Food, drink and tobacco processing machinery
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	2 048	2 151	2 517	2 315	2 227	1 968	2 268	2 662	2 835	2 845
Extra-EC imports	362	406	410	481	483	452	512	544	623	611
Trade balance	1 686	1 745	2 107	1 834	1 744	1 516	1 756	2 118	2 212	2 235
Ratio exports/imports	5.7	5.3	6.1	4.8	4.6	4.4	4.4	4.9	4.5	4.7
Intra-EC trade	973	1 173	1 289	1 397	1 578	1 481	1 732	1 901	2 015	2 082
Share of total imports (%)	72.9	74.3	75.9	74.4	76.6	76.6	77.2	77.8	76.4	77.3

Source: Eurostat

and 3.7% per year on average. Remarkably, the intra-EC trade increased by almost 9%, reflecting the increasing internationalisation of the industry within the EC. In 1983 the intra-trade was 48% of the extra-EC exports; in 1992 it was 73%.

The EFTA-countries and the USA are important destinations of non-EC exports, but their joint share declined from 27% in 1988 to 22% in 1992. The bulk of extra-EC imports originates from the EFTA countries and the USA, allowing together for 82% of total extra-EC imports; in 1987 this share was slightly higher 84%.

MARKET FORCES

Demand

The market for food, drinks and tobacco consumption is maturing in the Western industrialised countries. Further, consumer preferences for these products are changing rapidly and more frequently. The availability of reliable and non-perishable food products is getting more priority. Diet and health conscious consumers are reducing their intake of fats, salt, sugar, and high cholesterol foods, while still demanding flavourful, wholesome and appealing food along with greater convenience and variety. The negative publicity about smoking has caused a shift of demand towards light cigarettes. All these trends create market challenges for the food, drink and tobacco industry and, as a result, for the food, drink and tobacco processing machinery industry.

The development of new products and the implementation of new production lines by food processing companies are costly, but it is a prerequisite to keep pace with consumer trends and to cope with intensifying competition. It is only in this way that they can maintain or even increase shares in core areas, which are considered to yield high profits and long-term growth opportunities. This will result in a continuous search for new products and new processing techniques, where flexibility seems to be the key word.

Other growth opportunities could stem from the economic development of relatively less developed regions with high agricultural potential such as the former East bloc countries. Demand from the East European countries - for instance Poland - but also from China is rising. The main problem for further developments remains the lack of capital in these regions. Because of the primary character of food, the food industry and the food machinery manufacturers are expected to benefit earlier from the industrial and political restructuring processes than other industries. Furthermore, the capital problem may be solved by large food processing multinationals entering the former East bloc countries.

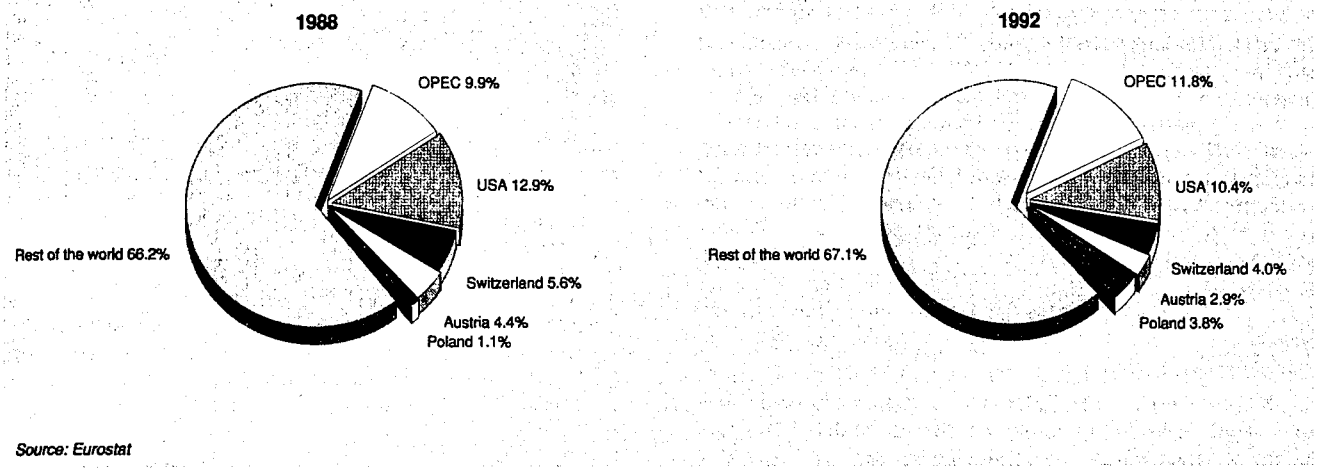
Supply and competition

Compared to packaging machinery, for example, the applications of food processing are less diverse and more limited to specific segments of the food processing industry. Supply is highly fragmented, with manufacturers operating and specialising in one market segment that can differ considerably in size. For instance, the manufacture of meat processing machinery, bakery machinery and processing machinery for fruits and vegetables are relatively large and important market segments with only very specific applications.

Machinery manufacturers have coped with the need of food processors for modern, flexible equipment by introducing more capital-intensive and research-intensive production machinery. New technologies are providing new opportunities for cost reductions, larger-scale production, a higher degree of flexibility and the development of new products.

The growing concentration in food processing urged the food processing machinery and equipment manufacturers to concentrate too. This gave rise to the emergence of large and international machinery producers. Internationalisation encouraged the growth of technology transfer, necessary for the large producers to carry out their own research and take out patents, which can be commercialised.

Figure 2: Food, drink and tobacco processing machinery
Destination of EC exports



Source: Eurostat

Similar to the packaging machinery industry, the Japanese industry is highly oriented on the large domestic market and the considerable requirements for after-sales service. Furthermore, the Japanese industry can not cope with the highly fragmented character of demand in food processing. When the industrial trend moves towards more standardised machinery and equipment, Japan could become a more serious threat on the international market.

Production process

The food processing industry is developing towards less, but larger production centres with the ability to produce a greater variety of products. Concentration of production is developing very strongly in the West industrialised countries and some Asian countries in particular. Consequently, production and process systems have to meet more stringent requirements for flexibility and efficiency. These requirements have stimulated the widespread application of CAD (Computer Aided Design), CAM (Computer Aided Manufacturing) and flexible manufacturing techniques within the industry.

To keep pace with special market demands, food processors and the machinery and equipment suppliers are developing joint R&D programs. These joint forces speed up the development, testing and introduction of new production equipment. The growing attention to R&D programs also demonstrates the importance of the quality of the labour force. In the future the focus will be increasingly on the quality of education and training of employees.

INDUSTRY STRUCTURE

Companies

Intensified competition and changing consumer demand strengthened the process of concentration in most downstream industrial food sectors. The creation of the Internal Market has also been a stimulus to concentration, since it enabled free movement of raw materials and processed goods. Customers within the Common Market can be served from one or a few plants within the EC and production can take place on a larger scale. The concentration process is expected to continue.

A large share of food processing is currently taking place in larger corporations (e.g. Unilever (NL) and Nestlé (CH)). These companies dominate the development of new processes and new products. As a result they are becoming more and more knowledgeable buyers of processing machinery and equipment. Through their transnational information and steering systems, they can obtain specifications, price information, details of materials and other relevant information which puts them in a favourable position to discuss prices and other terms when buying equipment. This could make it difficult for an equipment producer to sell the same type of specialised machinery to more than one large food corporation.

Despite a process of concentration the food machinery manufacturing industry remains fragmented due to different patterns of demand worldwide. The majority of the enterprises are medium-sized and specialise in one or more subsectors of the food machinery industry.

Within every segment of the industry one or more relatively large companies are operative. Companies with over 500 employees are especially active in international markets.

Until the beginning of the 1990s the process of concentration was characterised by horizontal integration. In 1991, however, the Swedish-owned milk and juice packaging group Tetra Pak took over Alfa-Laval, the Swedish manufacturer of industrial equipment, the second largest sector of which was food equipment. The trend towards more concentration by the merger or cooperation of specialised medium-sized companies enables them to offer tailor-made machinery and equipment to meet customer needs. After the Tetra Pak/Alfa-Laval take-over, a development towards vertical integration can also be expected among medium-sized firms.

Vertical integration increases the convenience for customers who can purchase packaging and processing machinery at the same location. On the other hand, horizontally integrated firms will be better equipped to face the future challenges in the largely untapped markets of the less developed countries and East Europe.

ENVIRONMENT

The growing importance of ecological issues is especially reflected in measures against packaging waste. For the manufacture of food processing machinery, however, no specific consequences can be recognised. The more stringent EC-regulations on sanitary conditions during the processing of foods and drinks might enhance the technical requirements for the applied machinery. In general, however, the resulting effects for the manufacturers of food processing machinery are expected to be quite modest.

The increasing number of measures against smoking has already discouraged and will further depress the use of tobacco. A possible prohibition of promotional activities by the tobacco

industry on EC-level, will undoubtedly affect the number of smokers. As a consequence, the demand for tobacco processing machinery by tobacco processors is likely to decline.

REGULATIONS

In 1993, the European Technical Committee for machinery safety and health regulations (CEN TC/153) introduced safety standards, which will also apply to the manufacture of food processing machinery. The central issue of the new regulations - self certification by the industry itself - will give the final responsibility to the various industries to set their specific standards. CEN - the European Normalisation Institute - has the final task to provide detailed European standards. Control on the use of the new standards has been given to the national governments. The European industry would like to see the CEN standards adopted by the International Standards Organisation (ISO) in order to avoid unfair competition on foreign non-EC markets.

In addition, Directive 89/392 will implement additional safety and health essential requirements for this industry, as well as for all other machinery producing sectors.

OUTLOOK

In the short term, the prevailing recession in some major markets will influence demand for food processing machinery adversely. In addition to this cyclical problem the industry has to cope with the structural problem of maturing food markets in the Western world. In response to these two factors, EC manufacturers must increase their export efforts. The markets in the former East bloc are still uncertain. Because of its primary character, however, the food sector is likely to benefit earlier from the political and economical restructuring processes in these countries than other sectors. For the same reason the current downswing of the trade cycle is expected to affect demand for machinery, classified under this NACE less than in other machinery producing sectors.

Table 3: Food, drink and tobacco processing machinery
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.5	2.5
Production	1.9	2.7
Extra-EC exports	2.5	3.5

Source : NEI

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The industry is represented at the EC level by: European Bakery Equipments Manufacturers Association (EBEMA). Address: 13, rue St. Lazare, F-75009 Paris; tel: (33 1) 42 80 44 41; fax: (33 1) 42 85 29 00.

Chemical machinery
NACE 324.12

The dependence of chemical machinery manufacturing on the chemical processing industry played an important role in a number of changes that took place. Quality control and environmental concern have become increasingly important issues. In the 1980s, the chemical plant equipment industry was confronted with several drawbacks, including the fall in oil prices, the depreciation of the US dollar, the recession at the beginning of the 1980s and more competitive export markets. Currently, the industry has once again to cope with sluggish economic conditions. For 1991 the chemical machinery production was estimated at 5.5 billion ECU. Some 90 000 people were employed. The industry is a net exporter. In the short-term the prospects for the industry will be dim; in the medium-term the situation will improve.

INDUSTRY PROFILE

Description of the sector

The chemical machinery industry is classified under NACE 324.12. The products of this industry can be divided into the following categories:

- producer-gas or water-gas generators;
- centrifuges and dryers;
- filtration and purifying machinery for liquids and gases.

Important products in the three categories are: pressure vessels, heat exchangers, process towers and reactors, dryers (rotary, belt, adsorption), piping, filtering engineering, mixers, structural steel engineering, valves and fittings, heavy walled tubulars, air conditioning and jacket piles.

Several products are not specific to the chemical industry. Since classifications differ within the EC, it is difficult to estimate the importance of the industry by Member State. For instance, the production of water purification equipment is usually, but not always, classified under the heading of chemical plant equipment. Other equipment which may or may not be considered chemical machinery in national statistics are furnaces, heat exchangers and pressure vessels. Consequently data should be considered with care.

As to production, data were only available for Belgium, Germany, France, the Netherlands and the United Kingdom.

Recent trends

Production in the EC countries considered totalled 5.3 billion ECU in 1990. The available data suggest a modest production increase in value in 1991 to a level of 5.5 billion ECU. Consumption in 1990 and 1991 is assessed at 4.6 billion ECU and 4.9 billion ECU respectively. The EC is a net exporter of chemical machinery. The export rate amounts to about a quarter; import penetration is some 15%. Employment is estimated at roughly 90 000 people, which implies a productivity of 60 000 ECU per employee in 1990 (roughly the relevant figure in the Netherlands and Italy).

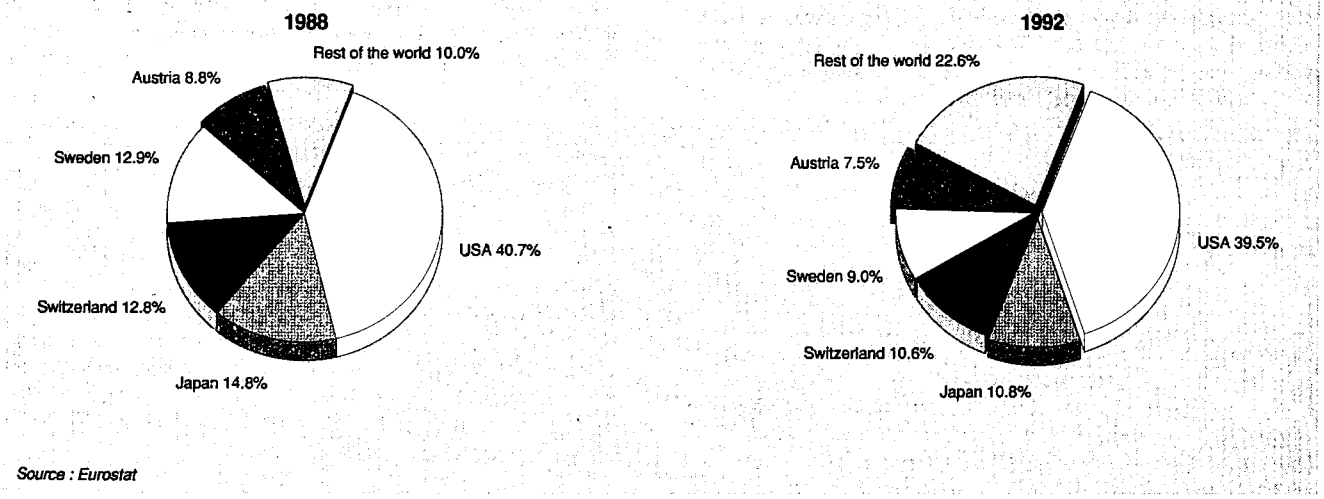
Like in other machinery industries Germany is by far the largest producer of chemical machinery, accounting for 45% of total production of the countries considered. Italy and the United Kingdom follow with 18% and 17% respectively. Hence, these three Member States are accounting for some 80% of total EC production. However, due to the already mentioned differences in statistics, these figures give only an order of magnitude. It is presumed that the French figures underestimate the industry as several enterprises could be subsumed under the food processing machinery industry and under boiler making. Besides Germany, all Member States recorded a production increase in 1990. In Germany, production fell by 14%.

Following the recession after the second oil crisis in 1979, a large shake-out took place in the chemical machinery industry, resulting in a decrease in production capacity, which is currently still lower than 1980 levels. The declining activity in the chemical industry was transferred to upstream industries with a small time lag. The industry faced several setbacks:

- the decline in orders from the traditional industrial countries;
- the international debt crisis which forced several developing countries to stop or postpone investments;
- the subsequent fall in oil prices which put orders from OPEC countries under pressure;
- the fall of the US dollar which started in March of 1985, and, more generally the volatility of the dollar exchange rate vis-à-vis the European currencies.

In current value EC production increased at an average rate of 7.2% per year during the 1983-91 period; in constant prices the growth rate is estimated at 2%. In France and Italy, production value increased respectively by 8% and 16% per year

Figure 1: Chemical machinery
Origin of EC imports



Source : Eurostat

Table 1: Chemical machinery
Production of chemical plant equipment

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique/België (1)	45	55	81	53	57	70	78	79	N/A
BR Deutschland	1 485	1 541	1 829	2 097	2 199	2 417	2 786	2 384	N/A
France (2)	363	322	369	388	362	359	526	569	620
Italia (3)	343	418	634	685	710	760	851	966	1052
Nederland	244	244	255	296	339	397	355	391	N/A
United Kingdom (4)	676	676	669	745	712	705	778	881	995

(1) 1990 estimated
(2) Estimated figures do not include machinery for the oil and energy industries
(3) 1983-87 estimated
(4) Including industrial furnaces
Source : National statistics, ANIMA

over the 1983-91 period. Germany and the Netherlands revealed annual growth rates in the range of 7% to 8%, and 11% for Belgium from 1983 to 1990; the production in the United Kingdom showed the slowest growth: 5% per year throughout the 1983-91 period.

International comparison

Production in the EC is several times higher than that of Japan. No figures are available for the USA due to differences in industry classification. This is not surprising giving the weight of the European chemical, and other more general processing industries. Capital investment in the chemical industry of Western Europe is by far the largest in the world, compared with the USA and Japan. Investments in Japan, however, grew faster than in Europe during the 1980s.

Foreign trade

Throughout the 1983-92 period, the EC was a net exporter of chemical machinery, but the export to import ratio fell significantly, from 3.4 to 1.8. Non-EC exports, indeed, increased at a lower rate than non-EC imports: 11.0% versus 3.8%. The trade surplus has declined since 1990, but recovered a little bit in 1992. Intra-EC trade has become increasingly important. It has grown at an average rate of almost 13% a year over the reference period, due to the increasing degree of internationalisation of the market. In 1983, intra-EC trade represented 44% of the non-EC exports; in 1992 it was 95%.

The bulk of the extra-EC imports are originating from only two groups of countries that are the USA, the EFTA countries, and Japan. However, their joint share declined between 1988 and 1992 from 94% to 80%. In particular the EFTA countries and Japan have lost market to smaller suppliers.

The main non-EC markets for chemical machinery are the EFTA countries and the USA, accounting together for some 32% of total extra-EC exports in 1992. This figure was virtually identical in 1988, but the USA became somewhat more important for non-EC exports, whereas the relative importance of the EFTA countries declined slightly.

MARKET FORCES

Demand

Besides the chemical industry, the chemical plant equipment industry has a number of clients, all of which are processing industries. Among the outlets are: the chemical industry, the petrochemical industry, the pharmaceutical industry, the biochemical industry, food processing industry, water purification utilities, oil and gas exploration and production companies, refineries, power generation plants, environmental application companies, engineering contracting companies and government institutions. Most industries mentioned here follow cyclical business patterns: they are vulnerable to swings of the business cycle.

The development of capital spending in the chemical industries is of major importance for the processing machinery manufacturers. During the upswing of the second half of the 1980s, much of the spending in the chemical industry was directed towards de-bottlenecking, energy-efficiency, and environmental and safety measures, but real expansion investments were not common. The industry managed to maintain high growth rates for a long time.

Demand for chemicals began to decline in the middle of 1989, putting the chemical industry under pressure. With decreased capacity use, increased input prices, and output growing at barely the rate of inflation, the chemical industry does not have the resources to spend on capacity increases.

Factors which had a negative effect on the industry in 1991 included the Gulf war, recession in some major export markets, depreciation of the US dollar and the Japanese Yen. Only the increased demand in former East Germany had a ameliorating effect, which was not strong enough to counter the negative factors. Currently, the prevailing downswing of the business cycle, the cheap US dollar and the slow and uncertain restructuring process in eastern European countries are causing restricted demand for chemical plant machinery.

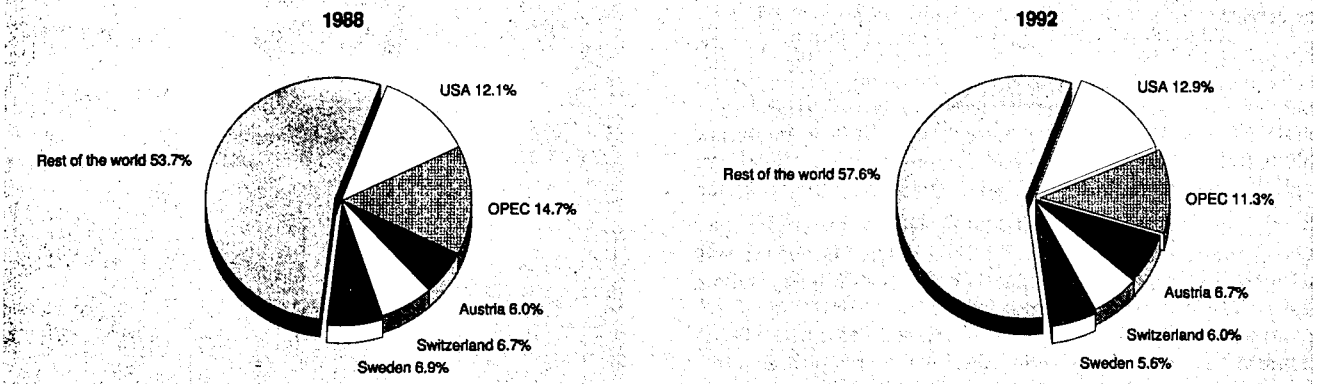
Supply and competition

Chemical machinery manufacturers operate on the world market. This applies not only to large firms, but also to small companies. Reasons behind this are the highly internationalised chemical and related markets, as well as the existence of large petrochemical multinationals. Since most of the machinery is designed for single-piece work, chemical machinery manufacturers from all over the world can bid for the specialised product needs of a multinational client. The competitiveness generated by this practice keeps prices low, and slow to respond to a booming market. On the other hand, in a recessive market prices will tumble quickly.

The dollar exchange rate and the oil price are important determinants of the demand for EC chemical machinery. The prevailing cheap US dollar does not only affect EC exports to the USA. In a more indirect way, a depreciating dollar also affects competition in the EC market, with competitors from abroad. In the past years, several orders have been lost due to high-valued EC currencies and the volatility of the US dollar. The price of oil is especially important for the production of heat exchangers. The relative low oil prices since the end of 1985 has had a significant impact on production.

Chemical machinery manufacturers can deliver their products directly to the end-user, or indirectly through an engineering

Figure 2: Chemical machinery
Destination of EC exports



Source: Eurostat

services firm, for which they act as a subcontractor. In recent, years there has been a trend towards outsourcing of several engineering services by the chemical industry, which has led to a more important role of engineering firms as an outlet for the chemical machinery industry.

Production process

Quality control has been a major concern of the chemical process industries, which has extended to machinery suppliers. Certification under the ISO 9000 series of quality-assurance standards gives companies a competitive advantage. It is fast becoming a prerequisite for competing in business worldwide. Several companies already comply with ISO 9000/9001/9002 quality standards, and others are working to reach these standards. Most of the companies comply already with some national standards, which is necessary to serve different customers in a competitive market.

Interesting technological developments are: size-reduction technology, energy-savings, new materials, new fibre finishes, computer aided manufacturing and engineering, and environmental engineering.

Pollution control is one of the issues that will influence investments of the chemical industry in the near and distant futures. The Chemical Industries Association of the United Kingdom found through a survey that in 1989 spending on environmental protection represented 11% of total capital spending and was expected to double in 1990-1992.

Growing activity in the field of biotechnical research and production will generate growing demand for laboratory and production equipment. Demand will also be of a different nature; nowadays new plants are specifying vessels of 40 000 to 200 000 litres, as compared to vessels of 500 to 4 000 litres previously. These growing and changing needs will cause machinery and equipment for the biotechnical sector to become increasingly important for the chemical machinery industry.

The increasing complexity of the machines as well as the higher quality standards with which they must comply, make it necessary to have more and better skilled labour. It is in this area that shortages are common. In-house training is a possible, but costly solution.

INDUSTRY STRUCTURE

Companies

In the chemical machinery industry there are no large multinational enterprises, although most of the companies engage in exports. Two types of firms can be distinguished: product specialists and jobbers or activity specialists.

Product specialists are firms which design and develop equipment by themselves and can successfully export specific products due to low unit cost. The enterprises normally are medium-sized and export more than half of production. They will usually have technical knowledge of the process in which the machinery will be involved after production.

Jobbers, or activity specialists are firms which manufacture items from the client's blueprint and which are the most common type of firm. They are less export oriented than the product specialists; exports account normally for less than 50% of production. They mostly have a very small knowledge of the processes in which the machinery will be involved.

Table 2: Chemical machinery
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 079	1 041	1 250	1 179	1 119	1 135	1 268	1 418	1 427	1 506
Extra-EC imports	318	390	434	487	511	510	619	689	790	825
Trade balance	761	651	816	692	608	625	649	729	638	682
Ratio exports/imports	3.4	2.7	2.9	2.4	2.2	2.2	2.0	2.1	1.8	1.8
Intra-EC trade	479	597	705	774	827	854	1 050	1 224	1 376	1 429
Share of total imports (%)	60.1	60.5	61.9	61.4	61.8	62.6	62.9	64.0	63.5	63.4

Source: Eurostat

Strategies

The strong dependency on the chemical industry makes the chemical machinery industry not only vulnerable to cyclical swings, but also in a more structural way. One-sidedness can lead to a product-oriented attitude, which can be detrimental in a market in which competition is growing.

Knowledge of the chemical processes can be profitable for an enterprise, because it gives the company the ability to discuss with the customer not only the apparatus, but also the whole process in which it is a part. This is important because optimisation of the process cannot be achieved through optimisation of the individual units. An overall plan must be made.

Companies are diversifying in several ways. One of these is to engage in other markets than the chemical industry. Given the process oriented products, logical markets are the food, pharmaceutical, power and environmental industries. Other companies are applying knowledge of the chemical industry to develop new products for that industry. These companies tend to become niche players. While there are not too many real niches in the world, those companies which find one are much less affected by cyclical downswings.

ENVIRONMENT

It is estimated that in 1991 a world total of 4.4 billion ECU was spent for the prevention, containment, treatment and disposal of air, liquid and solid wastes in the petrochemical industry. A major focus of environmental control in the chemical industry will be waste minimisation.

Environmental concern has and will continue to have a large impact on the chemical machinery industry. The market for environmental products for cleaning industrial waste water, for example, is increasingly important, opening new opportunities to the chemical machinery industry. In countries where environmental regulation is already very strict, such as Germany and the Netherlands, enterprises are likely to have a competitive edge in this area.

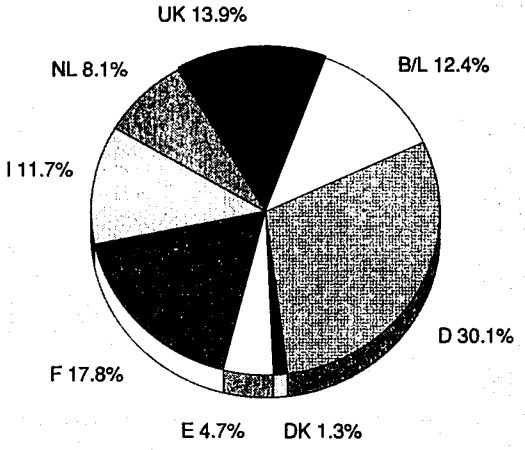
There is however a caveat, the introduction of different environmental regulations can distort the market. Competitive positions can be altered by the strictness of regulations in different countries. Imports from countries with a less stringent policy than the EC could become a serious threat.

REGULATIONS

As in other sectors of mechanical engineering, the EC directive on machine safety is of primary importance. Provisions concern the design, the materials used, the way in which machine operations should be illuminated, machine operations itself, safety against mechanical risks, the application of screens and other safeguarding components, maintenance and machine indications and identifications. The directive is applicable as of January 1, 1993. Until January 1, 1995 however, manufacturers have the option to comply with either the old regulations used in the Member State where the products are sold, or the new EC regulations. Those complying with the EC regulations have the advantage of being labelled with the CE mark, which provides free access to the markets of the EC countries.

The EC directive on simple pressure vessels (87/404/EEC) is also of importance for this sector. The directive concerns simple compressed gases vessels, especially for oxygen and nitrogen. Pressure vessels have to fulfil several requirements regarding safety. After positive testing the manufacturer receives a certificate and can add the CE mark to his product. The directive does not apply to pressure vessels for nuclear installations, to pressure vessels for the propulsion of ships and aeroplanes and to fire extinguishers.

Figure 3: Chemical machinery
Capital investment by the chemical industry, 1990



Source : CEFIC

OUTLOOK

Due to the prevailing worldwide recession and a cheap US dollar, project activity in the petrochemical industry is expected to grow slowly in the near future, with important stimuli from the environmental and health and safety regulations. Prospects for the chemical industry in the Western world are indicating low growth rates in the short-term. Moreover, the slow economic restructuring process and the shortage of foreign exchange, will restrict short-term demand from eastern European countries, although the needs for restructuring, as well as the environmental need for upgrading plants, will create opportunities for the chemical equipment industry. Further opportunities exist in environmental engineering.

Table 3: Chemical machinery
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.0	2.5
Production	1.1	2.8
Extra-EC exports	1.5	3.0

Source : NEI

In the medium-term, however, when more of the opportunities can be seized, growth will accelerate, but it is still expected to be modest.

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Packaging machinery
NACE 324.2

The EC is the world's largest manufacturer of products belonging to this NACE with Germany and Italy as the major producing Member States. While Japanese and American firms benefit from large domestic markets, European firms have turned to export markets making the EC a net exporter. EC competitiveness will increasingly depend on enhanced engineering quality meeting the need for more versatile and 'environmentally friendly' products. This requires much R&D effort and a highly qualified labour force.
Over the 1989-1991 period the EC packaging machinery industry recorded double digit growth rates. In 1992, the growth declined significantly, due to the ongoing recession, the breakdown of East European markets, and the ending of the reunification boom in Germany. As this situation is expected to prevail in 1993, in the short run EC production growth will slow down. In the medium term, when an upswing in the trade cycle is expected, the prospects will improve. The new EC Packaging Waste Directive, will encourage the need for new packaging materials which will be a challenge for the manufacturers of packaging machinery.

INDUSTRY PROFILE

Description of the sector

The machinery classified under this NACE varies widely in use. The industry includes: form, fill and seal machines; combined filling and closing machines, group packaging and filling; accessories, parts and spares. These four groups account for around 60% of total production of the packaging machinery industry; "other machinery" is accounting for the remaining 40%. These products are used in a few main downstream industries.

Recent trends

The packaging machinery industry has been facing quite a favourable development in recent years.

EC production totalled an estimated ECU 6 billion in 1992. Germany and Italy allow together for almost three quarters of this figure. About 64% of EC production is exported, of which 55% has an extra-EC destination. Germany and Italy show an even higher export orientation than the EC on average, namely around 70%. Conversely, these countries have the lowest import penetration. Germany and Italy are both net exporters; all the remaining Member States recorded trade deficits in 1992. Total EC employment for this NACE is estimated at about 55 000 employees.

The breakdown of production stresses the importance of form, fill and seal machinery and the combined filling and closing machinery. Both types of machinery find their applications mainly in the food, beverage and tobacco processing industry.

In 1992, however, the situation deteriorated due to ongoing recession in the major industrial countries, having an adverse impact on domestic and foreign demand. Moreover, the EC packaging machinery industry is suffering from the breakdown of East European markets caused by lack of foreign currency. Finally, the reunification boom in Germany came to an end in 1992. These adverse developments caused a significant drop in growth rates; in Germany, the 1992 growth rate was 5% as against 13% to 15% per year from 1989 to 1991.

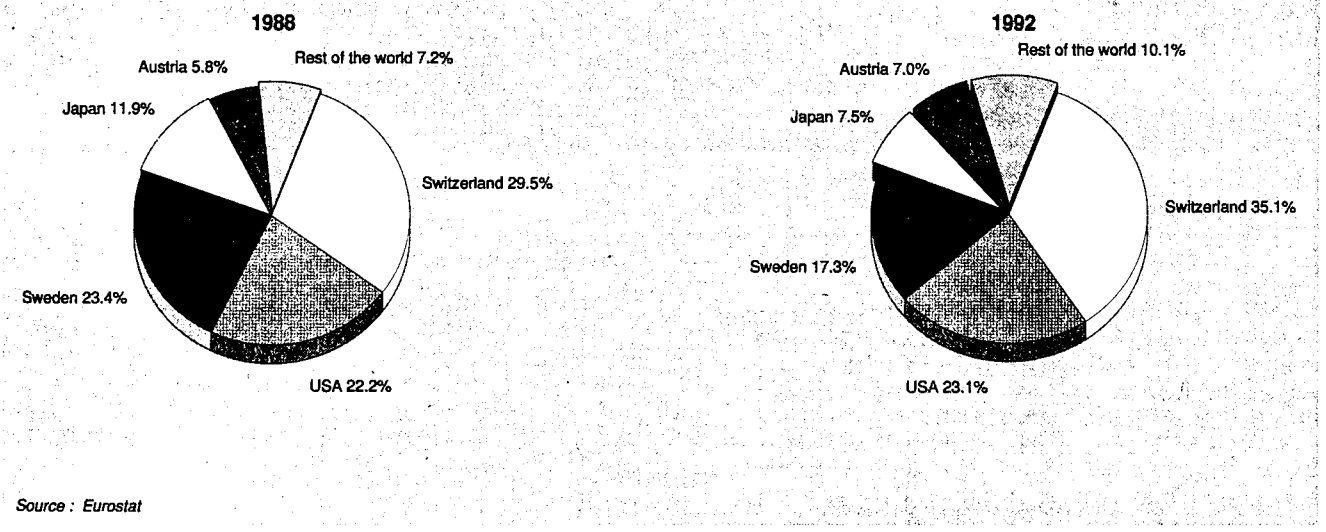
International comparison

The Triad's total production amounted ECU 11 billion in 1992. With 54% the EC held the greater share; Japan accounted for 26% and the USA for 20%. While Japanese and American firms benefit from large domestic markets European firms have turned to exports markets. German and Italy allow together for two thirds of the Triad's exports. Germany is the worlds' largest exporter. For Japan foreign trade is rather insignificant; only 6% of production is exported, whereas only 4% of Japanese demand is covered by imports. For the USA both rates are 25%. The EC is a net exporter and so is Japan, despite its low export orientation; the USA recorded a trade deficit in 1992.

Foreign trade

The EC has a surplus on its trade balance that nearly doubled during 1983-1992 period. Almost 70% of the extra-EC exports are destined for less developed countries or NICs. Within the industrialised world the USA is the most important destination, but its share has declined significantly since 1988. Especially, wrapping machines for candy, tobacco products and sundries were the main EC-products. The lack of a Japanese export orientation, thus far, enhances the market opportunities of

Figure 1: Packaging machinery
Origin of EC imports



Source : Eurostat

Table 1: Packaging machinery
Breakdown of production by product line

(%)

Form, filand seal machines	21.5
Combined filling and closing machines	16.6
Group packaging and filling	8.0
Accessories, parts and spares	12.9
Other machinery	41.0
Total	100.0

Source : Frost & Sulivan

EC-manufacturers in Far East countries. Market demand for European packaging machinery for instance in countries like China and Singapore recorded high increases in recent years.

The extra-EC imports have their origin virtually only in the industrialised world (93%). The EFTA countries and the USA together allow for 85%; the EFTA countries are by far the larger trade partner. However, regarding the relative small extra-EC import flow they meet only 10% to 15% of the EC needs. Japan supplies are only 7.5%, which was lower than in 1988.

MARKET FORCES

Demand

Demand for packaging machinery comes mainly from the food, beverage and tobacco industry; these industries account for an estimated 60-70% of total demand. They are followed by the pharmaceutics, chemicals and related industries. These downstream industries each have their own specific needs. The fact that these industries meet primary consumer needs causes demand for packaging machinery to be less cyclical than demand for other machinery and equipment. The downstream industries require increasingly more efficient, reliable, flexible and versatile machinery, enabling the manufacturers to respond to the further diversification of consumer demand. This causes product life cycles to shorten. More flexible and versatile machinery imply quick change-overs for packaging different products, package sizes and variable quantity production runs.

Supply and competition

Many Italian manufacturers have invested heavily in research and development, and production equipment in recent years. The resulting improvement of the engineering quality of their products is more in compliance with current market requirements, which especially concentrate on flexibility, production speeds and fast change-over times.

The minor Japanese share on the world market and low export ratio can be explained by the industry's comparatively small business scales and the custom-tailored products which require far-reaching after delivery service. For this reason the Japanese have been focusing on the nearby and large domestic market. Once the industrial trend is moving towards more standardised machinery and equipment, Japan will be able to develop similar advantages as they have in the automotive and other industries. However, for the coming years when much attention will still be focused on engineering and tailor-made solutions not much threat can be expected from the Japanese. For example, the export share of Japan in the Extra-EC imports declined during the 1988 and 1992 period from 12% to 7.5%.

In contrast with other US machinery manufacturing industries, the packaging machinery industry seems to have been able to benefit from the lower dollar exchange rate. The US-exports increased by 4% in 1991, and by nearly 10% in 1992, but the export share remains relatively low (around a quarter) if compared to Italy and Germany. The US packaging machinery is noted for its robust construction and sophisticated electronics.

The high degree of concentration in downstream industries such as in the food industry, might result in price cuts and lower margins in the long run. The packaging machinery industry itself, however, is responding with a similar trend towards more concentration and a further internationalisation.

Production process

Like in other mechanical engineering industries, especially where custom-tailored products are being produced, the labour force is an important asset when the engineering quality together with research and development are taken into consid-

Table 2: Packaging machinery
Main indicators, 1992

(million ECU)	D	F	E	I	NL	UK	JPN	USA
Apparent consumption	1 257	635	447	673	177	798	2 827	2 221
Production	2 790	447	308	1 592	171	647	2 895	2 146
Exports world	1 990	231	131	1 103	211	166	180	488
Imports world	457	419	270	184	217	317	112	563
Trade balance	1 533	-188	-139	919	-6	-151	63	-75

Source : COPAMA, NEI

Table 3: Packaging machinery
International comparison of production at current prices

(million ECU)	1987	1988	1989	1990	1991	1992
BR Deutschland	1 620	1 750	2 020	2 330	2 650	2 790
Italia	1 184	1 250	1 330	1 425	N/A	1 592
Japan	1 330	1 730	1 980	2 135	N/A	2 895
USA	1 770	1 830	2 110	2 060	N/A	2 146

Source : VDMA, JETRO, PMMI, UCIMA, COPAMA, Ifo institute

Table 4: Packaging machinery
External trade at current prices

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 495	1 635	1 724	1 600	1 729	1 911	2 093	2 258	2 955
Extra-EC imports	396	389	377	417	462	540	620	639	756
Trade balance	1 099	1 246	1 347	1 183	1 267	1 370	1 472	1 620	2 199
Ratio exports/ Imports	3.8	4.2	4.6	3.8	3.7	3.5	3.4	3.5	3.9
Intra-EC trade	911	993	1 095	1 244	1 424	1 659	1 768	1 970	2 254
Share of total imports (%)	69.7	71.9	74.4	74.9	75.5	75.4	74.0	75.5	74.9

Source : Eurostat

eration. As a consequence, the quality of the labour force and thus the quality of the training programs is a major factor influencing the success of EC-industry in the long run. Therefore, the quantity and quality of education and training should be maintained, otherwise the technological advantage of the industry could fall behind. Furthermore, when demand for well-trained employees exceeds the supply of labour, productivity losses are likely to occur.

Keeping the quality of the labour force, however, should not lead to excessive wage increases. Sharp rises in input prices of materials and labour wages, as happened during the last couple of years, will have a negative impact on the industry's profitability and will cause reduction in investments weakening EC-competitiveness.

Beside the quality of the labour force, the extent to which a manufacturer of packaging machinery is able to meet the customer requirements is also determined by the quality and precision of the own production equipment. The increasing demand for versatile machinery for instance requires advanced production equipment together with high labour skills and large investments in R&D.

INDUSTRY STRUCTURE

Companies

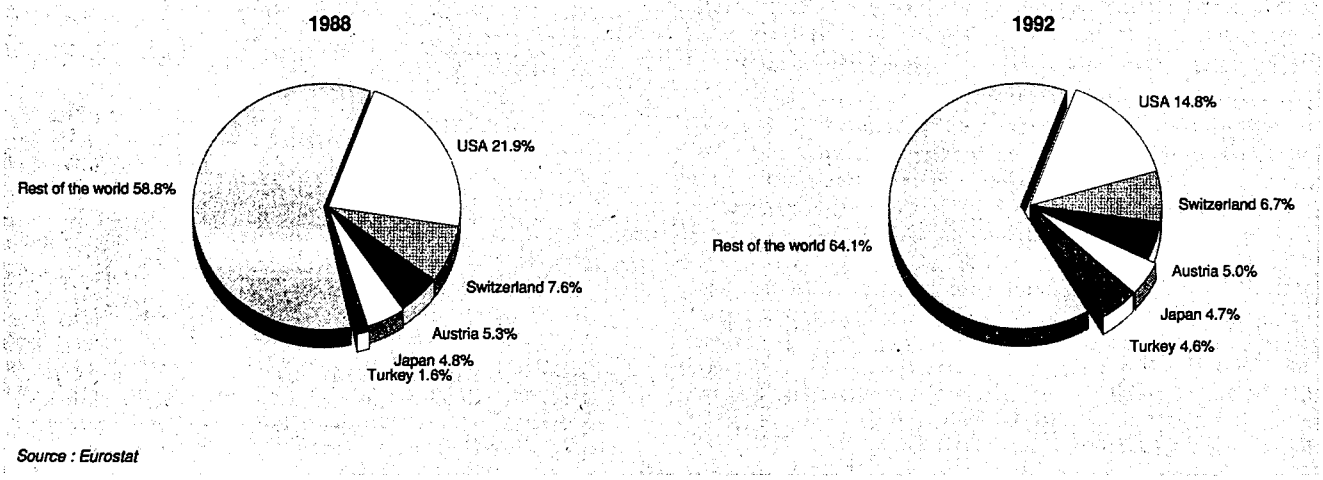
The total number of enterprises in the EC belonging to this NACE is estimated at 1 100. They are mostly medium-sized: on average they employ 50 employees with a turnover of some ECU 6 million. However, these figures vary significantly from one Member State to another. Employment by company ranges from less than 25-30 employees in France and Spain to 90-100 in Germany and the Netherlands; turnover per company varies from ECU 2.5 million in Spain and the United Kingdom to ECU 8.0-8.5 million in Germany, Italy and the Netherlands.

Strategies

In general the enterprises focus on one market niche (e.g. mostly one machine function for a specific industry). Larger firms such as Bosch (D) and AMCA/GD (I), which offer packaging machines for a wide range of industries, are still rare. A trend towards vertical integration might have been set by the two Swedish multinational companies Tetra Pak (milk and juice packaging group) and Alfa-Laval (manufacturer of food and other industrial equipment). Tetra Pak took over Alfa-Laval, thereby creating the possibility of 'one-stop shopping' as packaging and processing machinery can be bought at the same address.

The enterprises, in general, do not only react to market extensions coming from the single market, the German unification and the political changes in the former East bloc countries. Although, developments in specific markets force them to review their company strategies. The general trend towards more concentration by specialised companies merging or cooperating can also be explained by such developments. Cooperation enables them to offer tailor-made machinery and equipment to meet customer needs. A further explanation for the concentration of activities can be the threat of increasing market power of some large multinationals which dominate the downstream markets. This might lead to lower margins for the manufacturers of packaging machinery.

Figure 2: Packaging machinery
Destination of EC exports



Source : Eurostat

On the other hand, the same multinationals, by their expansions in the former East bloc countries, also offer market opportunities for the EC-manufacturers of packaging machinery. This trend of medium-sized companies penetrating more and more into these countries can be observed within the single market. A further internationalisation will also increase the strength of current market positions and will enhance opportunities to benefit from the European unification.

To maintain competitiveness EC manufacturers should invest in new, more efficient and precise production equipment in order to enhance the engineering quality and to reduce costs. An example of successful investments have been the Italian efforts to upgrade the own industry. The increasing demand for more versatile machinery, however, will also require new investments by machinery manufacturers.

ENVIRONMENT

The growing consciousness among consumers regarding environmental issues together with the growing influence of the downstream industries and retail networks on packaging decisions are becoming increasingly determinant factors within the industrial chain. The ever increasing restrictive legislation, particularly in the West and North European countries are controlling the nature of the package and packaging material. There is a growing demand for recyclable packaging material and 'environmentally friendly' packaging. Domestic government or EC legislation can best control the environmental problem. When environmental measures are in line with commercial and financial objectives, more support and initiative can be expected from retailers.

There is evidence of an increase in the use of recyclable packaging materials and 'environmentally friendly' packaging. For the near future a growing use is expected for form, fill and seal machinery caused by the rising demand for snacks and food in thermoform-packages. Further, growth is expected for combined filling and closing machinery and for group packaging.

REGULATIONS

Until now, environmental law and regulations have been limited to national levels. Germany and the Netherlands are in the lead if it comes to actual measures, although other EC-countries - especially those situated in the North part of the EC, have also made progress with governmental legislation. In contrast with the German Ordinance, the Dutch follow the path of mutual agreement. This consensus attitude between Dutch government food industry and retailers in the Netherlands has led to voluntary agreements to retain the deposited glass bottle and move out of PVC packaging. The German Packaging Ordinance, on the other hand, is said to constitute a barrier to free trade within the Community. In order to protect the single market principle, the European Commission has been urged to come to an EC Directive in order to prevent the occurrence of differing national regulations.

In the beginning of 1992, a fourth draft of the EC Packaging Waste Directive has been published. The stated objectives of the directive are: to reduce the amount of packaging waste produced; to require the recovery of packaging waste; and to minimise the amount of packaging waste which goes into final disposal. Practical implementation, however, can take until the mid-1990s. In any case, the packaging industry will be confronted in the near future with discouragement policies which will affect growth in demand for packaging materials. Limitations on raw material usage, less weight of packages and more recycling need not necessarily imply a threat to the manufacturers of packaging machinery. Products need to be packed and delivered to the consumer anyhow, but only the type of packaging material may change.

Only if current excessive packaging is forbidden the industry might be affected. Also, substitution of certain raw materials, induced by environmental concerns, by less polluting materials, might have consequences for the applied machinery. Some currently applied machinery is able to process different types of material and/or reduce the quantity of materials used.

Enforcement of the development and production of new packaging materials could even imply a stimulus for the manufacturers of packaging machinery. Demand for new and innovated machinery would rise and the extra expenses caused by the high development costs would probably be passed on to the end users.

The CEN/TC 146 EC safety standards also apply to the packaging machinery. In each member country, the packaging machinery manufacturers are cooperating with their national standardisation organisation to develop European standards.

OUTLOOK

Throughout 1989 and 1991, the EC industry developed very favourably: double digit growth rates of 13% to 15% per year were achieved. The situation deteriorated in 1992, although the sector's production still increased by 5%. However, since autumn 1992 production has fallen. The adverse development was due to various factors, such as the downswing of the trade cycle in major industrial countries, the breakdown of East European markets and the ending of the reunification boom in Germany.

Although the production is expected to recover by the end of 1993, this is not considered to compensate for the production loss suffered in the rest of the year. On the other hand the decline is expected to be less than in other machinery industries; client industries are less subject to swings in the business cycle, as they are meeting primary consumer needs. After 1993, production growth will pick at a level comparable with that prevailing before the booming years 1989-1991.

A shift in demand to more versatile machinery will stimulate and require further technological development at the supply side. The EC industry already has strong footholds on the world market. However, in order to retain its competitiveness much effort and means have to be put into research and development and maintaining the quality of the labour force.

The new EC Packaging Waste Directive need not necessarily harm the manufacturers of packaging machinery. While measures focus on recycling, less packaging quantities, and less waste of raw materials, the greater part of packages is non-excessive and current applied machinery is often able to process different materials and packaging sizes. Enforcement of the development and production of new packaging materials could even imply a stimulus for the manufacturers of packaging machinery.

Table 5: Packaging machinery
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	2.0	3.0
Production	2.0	3.1
Extra EC exports	1.8	2.8

Source : NEI

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Plastics and rubber machinery

NACE 324.3

The growth of the plastics and rubber machinery sector in the European Community has in recent years been well above the average of the manufacturing sector. This was due to high growth rates in the plastics processing industry and in the automotive sector, the latter being the main application for rubber products. Technologically there are two objectives: the continuation of the development towards automation, and the consideration of ecological issues. Against this background the medium term prospects of the sector are reasonable and competitiveness against American and Japanese products appears to be guaranteed.

INDUSTRY PROFILE

Description of the sector

The plastics and rubber machinery industry manufactures a wide range of equipment including: extruders, injection moulding and blow moulding machines, compression presses, foam manufacturing and thermoforming machines. It also manufactures other equipment not separately classified such as granulators, calendars, mills and a variety of spare parts.

Most of these machines can be adapted for processing plastics or rubbers and cover a range of sizes from small bench-top machines for making very small components to very big machines capable of moulding for example, large storage tanks. The variety of products that can be produced from these machines include expanded polystyrene burger cartons to large building insulation slabs, and medical catheter tubing to large diameter sewer pipes.

The variety of plastics materials that may need to be processed requires that machine specifications can be modified to suit particular processing characteristics. Specialised machinery, such as tyre forming, vulcanisation and associated equipment are particular to rubber processing.

In the European Community, the principal producer countries are Germany, Italy, France and United Kingdom. Switzerland, Austria, Spain, Netherlands and Luxembourg are also active in this field, but can not provide regular statistics. Germany and Italy are the main producers having shares of nearly one half and one third respectively of the EC total. The other countries together account for just one fifth.

The breakdown of the production and consumption figures by type of machinery shows the leading role that injection moulding machines and extruders play in the processing sector.

Recent trends

The plastics and rubber machinery manufacturing industry in Europe has a turnover of 7.2 billion ECU, comprises about 500 companies and employs about 70.000 people.

The apparent consumption in the four principal EC Member States rose by an annual average of 21% between 1983 and 1988, making this sector one of the fastest growing in the EC during the last decade. However, between 1988 and 1992 the equivalent figure was only 4%, due to a decrease in consumption of 21% between 1991 and 1992.

The production of machinery in these countries in 1992 totalled around 5.5 billion ECU, a decrease of about 14% compared with the previous year, reflecting the downturn in the world economy. This situation is only a temporary interruption in the continuing growth of the sector. The industry has solid competitive strengths and its demand is boosted by the continuing investment by the plastics processing sector, which must upgrade in response to both growing demand and intensifying competition on world markets.

International comparison

European manufacturers have always been the technological leaders in the sector and have established a commanding position with around three quarters of the world market.

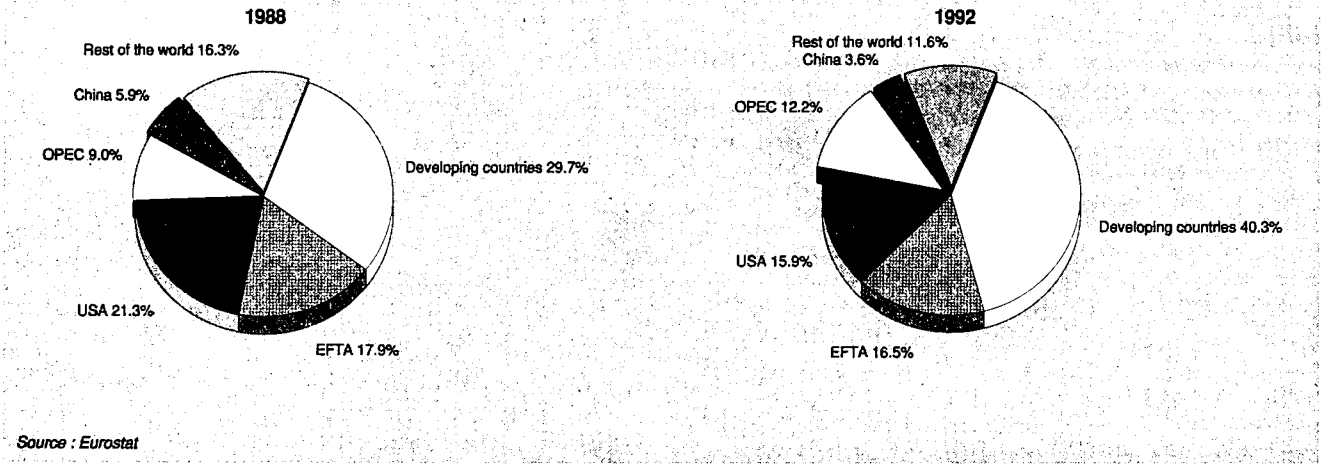
Competition from the USA, Canada and Japan has intensified, but prospects remain good for European manufacturers, whose knowledge and experience still give them an overall advantage.

Foreign trade

Germany and Italy rank first and second respectively in world exports. Japan comes on the third place with only a quarter of the value of German exports of plastics and rubber machinery in 1992.

Following the high growth rates in foreign trade during the 1980s, the slowdown of the world economy has affected both imports and exports from the EC. Most of the trade in the early 1990s has been within the EC, with the United Kingdom and France being the main destinations.

Figure 1: Plastics and rubber machinery
Destination of EC exports



Source : Eurostat

Table 1: Plastics and rubber machinery
Breakdown by sector, 1992 (1)

(million ECU)	Apparent consumption	Production	Total exports (2)
Injection moulding machines	678.2	903.3	616.2
Extruders	538.2	887.9	486.8
Blow moulding machines	259.2	489.0	339.5
Thermoforming machines	123.9	188.5	98.1
Other machines	1 458.0	2 234.3	1 381.2
Parts	454.5	815.0	723.5
Total	3 512.0	5 518.0	3 645.3

(1) Germany, France, Italy and UK only
(2) World exports
Source : Euromap/BPF

Table 2: Plastics and rubber machinery
Main indicators in current prices, 1983-1992 (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	1 099	1 399	1 632	1 890	2 631	2 850	3 557	4 287	4 456	3 513
Production	2 161	2 645	3 271	3 758	4 277	5 085	5 615	6 513	6 386	5 518
Extra-EC exports	1 165	1 431	1 781	1 965	1 838	2 393	2 820	2 969	2 727	2 774
Trade balance (2)	1 062	1 246	1 638	1 867	1 647	2 236	2 058	2 226	2 051	2 006

(1) Germany, France, Italy and UK only
(2) World exports
Source: Euromap/BPF, Eurostat

Table 3: Plastics and rubber machinery
Average annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	21.0	5.0	14.0
Production	18.0	2.0	11.0
Extra-EC exports	18.0	4.0	10.0
Extra-EC imports	25.0	12.0	16.0

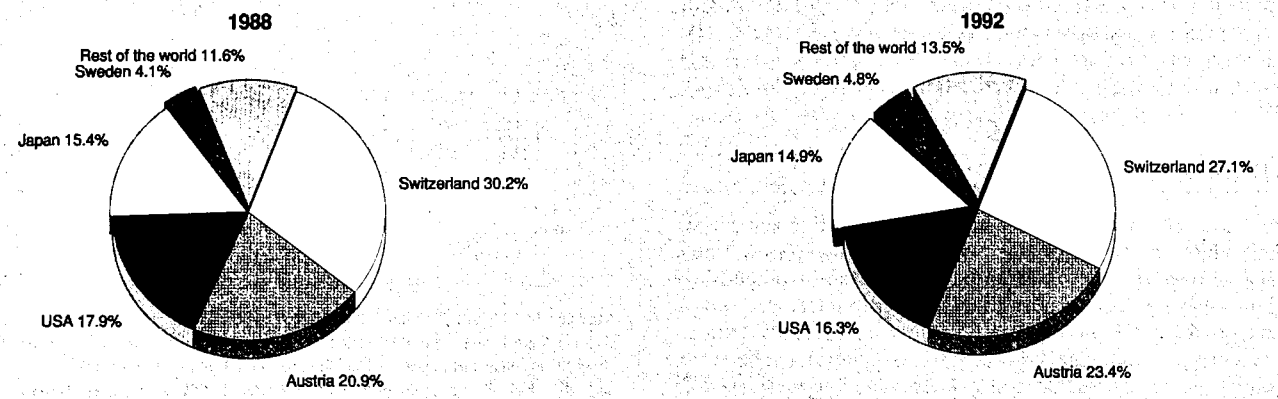
(1) Germany, France, Italy and UK only
Source: Euromap

Table 4: Plastics and rubber machinery
Production and consumption by country

(million ECU)	Apparent consumption	(%)	Production	(%)
BR Deutschland	1 532	44	3 037	55
France	453	13	368	7
Italia	1 277	36	2 005	36
United Kingdom	251	7	108	2
Total	3 513	100	5 518	100

Source: Euromap/BPF

Figure 2: Plastics and rubber machinery
Origin of EC imports



Source: Eurostat

Table 5: Plastics and rubber machinery
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 221	1 574	1 975	2 146	2 053	2 649	3 077	3 280	3 002	3 114
Extra-EC imports	315	418	517	545	651	850	1 000	1 135	1 273	1 241
Trade balance	906	1 156	1 458	1 601	1 402	1 800	2 077	2 146	1 729	1 873
Ratio exports/imports	3.88	3.77	3.82	3.94	3.15	3.12	3.08	2.89	2.36	2.51
Intra-EC trade	724	986	1 190	1 433	1 658	2 056	2 244	2 521	2 574	2 477
Share of total imports (%)	69.71	70.23	69.71	72.43	71.79	70.76	69.17	68.96	66.91	66.62

Source : Eurostat

The single European market already exists in the plastics and rubber machinery sector. Little direct impact can be expected from the completion of the single market programme.

The potential markets expected in Eastern Europe have so far failed to show significant growth.

MARKET FORCES

Production process

The machinery industry is devoting a great deal of its technological resources to the development of computerised control systems and the standardisation of protocols for the links between machinery, ancillaries and central computer systems.

Automation and robotics are now often integral features of modern processing machinery. This has become an essential element of modern manufacturing plants in the drive to improve product quality and output, and to reduce costs and environmental impact.

New plastics materials emerging in recent years, together with new products and applications in almost every field, often require new processes and manufacturing techniques to be developed. The machinery manufacturers therefore are constantly researching, designing and developing equipment to meet new challenges. It is in these areas of expertise that the EC industry is still the world leader.

Table 6: Plastics and rubber machinery
External trade by Member State, 1992

(million ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EC
Extra-EC exports	50.7	52.0	1 707.6	3.1	60.5	309.9	2.6	620.8	117.2	53.1	136.2	3 113.7
Extra-EC imports	67.7	37.9	488.5	5.8	74.3	154.1	18.5	107.8	76.5	16.6	176.4	1 224.1
Trade balance	-17.0	14.1	1 219.1	-2.7	-13.8	155.8	-15.9	513.0	40.7	36.5	-40.2	1 889.7
Ratio exports/imports	0.75	1.37	3.50	0.54	0.81	2.01	0.14	5.76	1.53	3.19	0.77	2.54
Intra-EC trade	279.6	59.6	405.9	32.9	237.5	548.6	40.5	237.7	260.3	68.8	305.4	2 476.6
Share of total imports (%)	80.5	61.1	45.4	85.0	76.2	78.1	68.6	68.8	77.3	80.5	63.4	66.9

Source : Eurostat

INDUSTRY STRUCTURE

Companies

The major machinery manufacturing companies in the EC include Krupp (D), Battenfeld (D), Klockner (D), Mannesmann (D), (including DEMAG and Krauss-Maffei) Sandretto (I), Reifenhauser (D), Engel (A), Stork (NL), Billion (F), Negri Bossi (I), Francis Shaw (UK), Netstal (CH) and Bucher Guyer (CH).

OUTLOOK

There are indications of an upswing in the UK economy in 1993 which in turn has been reflected in the plastics and rubber processing sector. In addition, increasing competition in consumer products markets, particularly in packaging, electrical goods and motor vehicles, has encouraged investment in modern new machinery to improve productivity. The same competitive pressures have also encouraged more extra-EC sourcing of goods from Asia, which has in turn opened up new opportunities for machinery sales in that region.

Japanese competition is slowly growing in Europe and has inevitably some impact on EC production.

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Machinery for lifting and handling

NACE 325.5

The industries in NACE 325 basically produce investment goods. Demand, therefore, depends largely on investment decisions in downstream industries. Manufacturing of lifting and handling equipment allows for some 40% of the sector's total production.
The cyclical pattern of investments gave rise to highly variable growth rates for the industry. EC manufacturers largely cover EC demand, but the share of non-EC suppliers has increased in the past.
R&D and highly qualified labour are essential for the industry. Most companies tend to specialise in certain kinds of machinery, which resulted in a high dependency on specific markets. Recognition of this dependency together with the expected increase in competition in the Internal Market gave rise to merger and acquisition activities.

INDUSTRY PROFILE

Description of the sector

Among the products of the manufacture of lifting and handling equipment "industrial trucks" are an important category. These are defined as any wheeled vehicles, not running on rails, which are designed to carry, tow, push, or lift any kind of load. Other examples of handling equipments are: elevators, escalators, ropeways, cranes pneumatic handling equipment, hoists (electric and pneumatic) elevating work platform, storage and retrieval machines, etc.

Recent trends

In 1991 production of lifting and handling equipment accounted for some ECU 17.5 billion, and consumption totalled ECU 16.5 billion, which was 40% and 42% of the sector's total production and consumption respectively. The export rate was 16%, the import rate some 10%. Allowing for intra-EC trade, these rates were 37% and 33% respectively. The main producing countries of lifting and handling equipment are Germany, France, the United Kingdom and Italy. With a joint share of 95% they accounted for nearly the entire EC production. Germany held the greater share (42%), France and the United Kingdom allowed for 20% each and Italy for 13%.

Production rose by 6.5% (in current prices) between 1989 and 1991. In particular Germany and France contributed to this growth; Italy's production grew only slightly, whereas the United Kingdom recorded a small production fall. The remaining Member States revealed also a decline in their production.

International comparison

Considering the whole NACE 325 category, the EC is the largest manufacturer with an estimated share of over 50% in the Triad's total production in 1992. Around 30% of Japanese production, 23% of the EC production and some 10% of the US production is sold outside the domestic market.

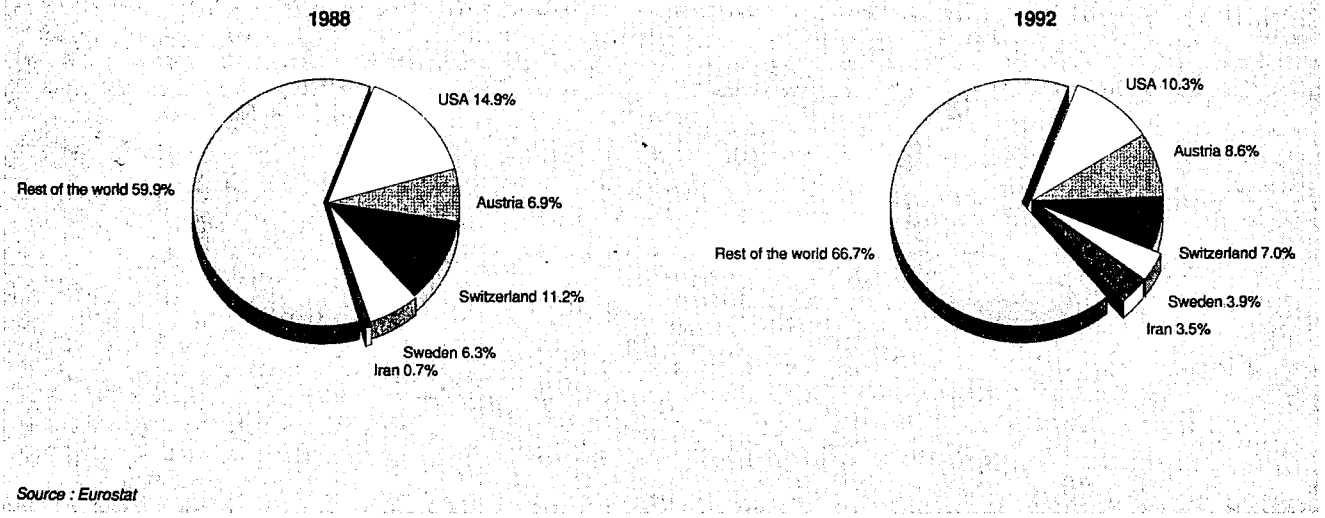
In constant terms EC production declined in 1992 for the second consecutive year. Although data are lacking, the global recession together with declining EC imports from Japan and the USA (in nominal terms) indicate that production of these countries might also have dropped in 1992.

Foreign trade

Extra-EC exports increased in current prices at an average rate of 5.1% per year between 1988 and 1992. However, the growth took mainly place in 1989 when it was 12%. Since 1990 the export level remained unchanged. The annual growth of the extra-EC imports was 8.7% on average between 1988 and 1992. The importance of intra-EC trade is quite considerable: about two thirds of the total imports and some 55% of total exports. Between 1988 and 1992 it grew by 7.5% per year.

Throughout the period 1988-1992 the EC was a net exporter of lifting and handling equipment; the trade surplus fluctuated at around ECU 1.1-1.2 billion. The four main producing countries (Germany, France, the United Kingdom and Italy) are all net exporters. Minor producing countries like Denmark and Ireland recorded trade surpluses too, whereas for Spain the in- and outgoing foreign trade flows balanced; the remaining Member States are net importers of lifting and handling equipment.

Figure 1: Machinery for lifting and handling
Destination of EC exports



Source : Eurostat

Table 1: Machinery for lifting and handling
National production values and employees in 1991 and 1989

(million ECU)	National production 1991	National production 1989	National production (FEM members only) 1991	National production (FEM members only) 1989	Employees 1991	Employees 1989
Belgique\Belgie	120.2	N/A	72.1	0.0	900	600
BR Deutschland	7 426.2	5 543.0	4 950.8	4 105.2	65 000	52 000
España	231.9	237.5	177.8	191.5	2 500	2 800
France	3 598.8	2 846.6	2 609.9	1 992.6	N/A	28 000
Italia	2 348.2	2 268.2	1 674.0	1 781.6	12 280	13 260
Luxembourg	32.5	N/A	32.5	0.0	320	289
Nederland	448.8	N/A	402.7	0.0	N/A	N/A
Portugal	22.1	N/A	22.1	0.0	1 200	N/A
United Kingdom	3 512.1	3 502.4	1 326.2	1 902.8	N/A	N/A
Total EC 9	17 740.6	N/A	11 268.0	N/A	N/A	N/A
Czechoslovakia	152.0	N/A	101.0	N/A	N/A	N/A
Finland	559.7	N/A	433.3	565.8	3 600	3 800
Sweden	553.3	985.7	442.7	776.1	6 300	6 000
Switzerland	995.8	726.6	850.8	659.4	6 590	6 900
Total	20 001.5	N/A	13 095.8	N/A	N/A	N/A

Source : FEM

In 1992 the EFTA countries allowed jointly for 22% of the extra-EC exports, against some 28% in 1988. The share of the USA declined too: from 15% to 10%. The importance of some Asian countries (Iran, Saudi Arabia, South-Korea and Hong Kong) as export destinations increased between 1988 and 1992.

As regards extra-EC imports of lifting and handling equipment, the EFTA countries, Japan and the USA are the main origins. In 1992, they accounted together for 87% of extra-EC imports, which is virtually the same as in 1988. Remarkably, Japan's share declined (from 24.5% to 20%), whereas the shares of the EFTA countries and the USA increased; from 49% to 50% and from 14% to 16% respectively.

MARKET FORCES

Demand

The products of this sector are basically capital goods. Demand for these products is therefore highly dependent on investment decisions of downstream industries. The client industries differ by type of machinery.

Car manufacturing, building construction and companies in the transport and warehousing sectors are of particular interest to the demand for lifting and handling equipment. Moreover, companies which operate their own warehouses for materials or finished products are buyers of lifting and handling equipment. Investments in handling and storage equipment have become decisive factors influencing the operating profitability of manufacturing and processing industries.

Supply and competition

Despite the high volatility in demand, profit rates have remained fairly stable and even improved at the end of the eighties. In years with a declining market one would have expected a tendency to lower prices in order to fill existing capacities with new orders for machinery. However, this has not been the case in the industry: this implies that price competition must be fairly limited. An explanation can be found in factors like quality and technological level of products. Customers are prepared to pay more for high quality products, when efficiency improvements by these products enable a better return.

Production process

CAD/CAM systems are used to design and manufacture machines. Computerisation and application of advanced electronics have also become a basic feature in new machinery, not only to improve the efficiency of the machine itself, but also for machine safety, pollution control, precision in operations and the like. Hence, innovation has become top priority in maintaining competitive advantages.

The industry requires highly qualified employees, which have knowledge about modern technologies in machinery and equipment. Some companies have education facilities for its employees to keep them up to date with these technologies.

Table 2: Machinery for lifting and handling
External trade at current prices

(million ECU)	1988	1989	1990	1991	1992
Extra-EC exports	2 186	2 453	2 669	2 654	2 667
Extra-EC imports	1 116	1 350	1 442	1 588	1 557
Trade balance	1 070	1 103	1 228	1 066	1 110
Ratio exports/imports	2.0	1.8	1.9	1.7	1.7
Intra-EC trade	2 369	2 933	3 288	3 395	3 173
Share of total imports (%)	68.0	68.5	69.5	68.1	67.1

Source : Eurostat

Table 3: Machinery for lifting and handling
External trade by Member State, 1992

(million ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EC
Extra-EC exports	37.7	96.1	1 144.6	3.1	129.4	362.8	20.2	357.0	107.5	2.4	406.0	2 667.2
Extra-EC imports	130.6	49.3	481.8	17.1	129.6	183.4	10.4	125.6	123.5	26.8	278.8	155. 3
Trade balance	-92.9	46.7	662.8	-13.9	-0.2	179.3	9.8	231.4	-16.0	-24.3	127.1	1 109.8
Ratio exports/ imports	0.3	1.9	2.4	0.2	1.0	2.0	1.9	2.8	0.9	0.1	1.5	1.7
Intra-EC trade	340.3	62.1	715.7	38.5	293.7	626.2	37.5	318.2	339.6	91.4	309.6	3 173.3
Share of total imports (%)	72.3	55.7	59.8	69.2	69.4	77.3	78.3	71.7	73.3	77.3	52.6	67.1

Source : Eurostat

Considering the NACE 325 category as a whole, developments since 1983 in labour productivity, unit labour cost and total labour cost indicate that the efficiency of the production processes has increased; labour productivity in current prices increased at a faster rate per year than unit labour cost: 6.8% versus 6.2% per year. Secondly, capital intensity of the production processes has increased; total unit cost increased more than unit labour cost: 6.7% versus 6.2%.

Enabled by a modular production process, using standardised parts and components, lifting and handling equipment has become only customised, rather than standard products. By combining different modules customisation becomes possible. The required increased production flexibility has been obtained by applying modern technology in the production process. Technological development is also proceeding in lifting and handling material itself. For example, as a result of factory automation and automated warehousing, industrial trucks have to be equipped with electronic devices for advanced handling systems. An example of a modern industrial truck is the automated straddle carrier able to locate and move containers without human interference.

INDUSTRY STRUCTURE

Companies

The lifting and handling sector consists of many small companies and a few large groups. The average number of employees per company is estimated at some 125. Large multinationals dominate the industrial truck market. European suppliers like Linde/Still (D), Lansing (UK), Jungheinrich (D), Lancer-Boss (UK), and Manitou (F) compete with leading suppliers from Japan, such as Toyota and Komatsu, and from the USA, such as Hyster and Clark. An important non-EC supplier from Scandinavia is Valmet, which has 60% of the world market in straddle carriers.

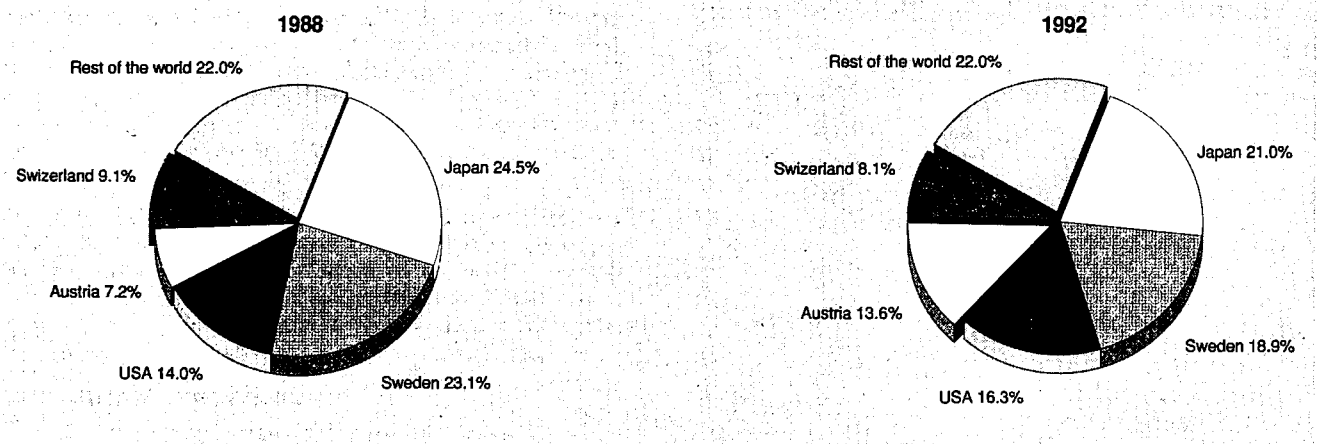
Strategies

In order to cope with increased competition on the EC market after 1992, EC companies are extending their involvement in mergers, acquisitions and strategic alliances with other companies. This process has also involved non-EC companies, aiming at maintaining or extending their position on the EC Market.

Japanese manufacturers have responded to the forthcoming establishment of the Internal Market by building production facilities in EC Member States. Nissan set up a production line for industrial trucks in Spain in 1989. Toyota, Komatsu and Mitsubishi have concluded cooperative agreements with EC sited companies. JCB (UK) linked with Sumitomo; Fiat (I), Hitachi (J) and John Deere (USA) considered a joint venture. Moreover, Krupp (D) concluded an agreement with Komatsu for selling Krupp's mobile cranes in Japan. US manufacturers have also expanded their activities to Europe: Clark and Caterpillar relocated factories to Europe during 1986.

Another reason for concentration is that companies want to centre around the core activities in which they have acquired strong positions. By merging and entering into strategic alliances, the risk of the dependency on specific markets is minimised.

Figure 2: Machinery for lifting and handling
Origin of EC imports



Source : Eurostat

ENVIRONMENT

Energy efficient and less polluting machinery and equipment are increasingly being demanded by the customers of this industry. The customers themselves want their production processes to be as clean as possible, not only as a result of consumer demands, but also to anticipate on restrictive government measures. R&D therefore focuses on these environmental issues.

Industrial trucks for outdoor use fuel-powered equipment have become more common, and restrictions on pollution from exhaust fumes have become more important. Industries are trying to improve on energy efficiency and exhaust pollutants. For battery-powered trucks, mainly for indoor use, battery obsolescence is given more and more attention.

REGULATIONS

The EC Directive on machine safety is of particular relevance to the industries in this NACE, as it is to the other mechanical engineering industries. This Directive, already adopted in 1989, envisages the application of safety standards for EC-produced machinery by January 1st, 1993. However, until January 1st, 1995, manufacturers have to comply with either the old standards prevailing in the Member State where products are sold, or with the Directive standards. The latter has the advantage of the products being labelled with the CE-mark, giving it free access to the markets of all EC countries.

In 1991 the coverage of the Directive was extended to apply also to cranes and other lifting installations and mobile machines. This extension is especially relevant for machinery in the construction industry and industrial trucks in mining and warehousing.

Another important issue is the harmonisation of technical norms and standards throughout the EC. Two normalisation institutes, CEN and CENELEC are currently working on proposals for European standards. There is also a preference to develop standards which meet those on a world level.

Regulations influencing the customers in downstream industries could effect the sector indirectly. For example, the opening up of the Internal Market for public procurement will influence activities in infrastructure construction and public works projects. Companies active in this field will need modern quality machinery in order to challenge the increased competition.

OUTLOOK

Investment in handling and storage equipment is increasingly important. Materials handling is the key ingredient in today's modern production processes where goods are to be conveyed, lifted, stacked on pallets and retrieved. Investments in handling and storage equipment, therefore, are decisive determinants of the profitability of manufacturing and processing industries.

The short term prospects for the sector are rather gloomy, because a recovery of the business cycle is not expected soon. Demand from downstream industries will remain depressed both within and outside the EC. Further, the positive impact of German unification on demand has virtually disappeared. Demand is expected to pick up in the course of 1994. After 1994 the economy will gradually recover, orders will pick up and growth rates may gain momentum again.

Written by: Netherlands Economic Institute
The industry is represented at the EC level by: European Federation of Handling Industries/Fédération Européenne de la Manutention (FEM). Address: Kirchenweg 4, CH-8032 Zürich; tel: (41 1) 384 4844; fax: (41 1) 384 4848. And, Committee for European Construction Equipment (CECE). Address: c/o VDMA, Lyoner Strasse 18, D-60528 Frankfurt, Germany; tel: (00 49) 69 66 03258; fax: (00 49) 69 66 03812.

Transmission equipment
NACE 326.1, 326.2

Due to a further drop in EC demand, in 1992 the EC industry for transmission equipment was coping with the second consecutive fall in production; exports remained stable.
The EC industry's competitiveness depends largely on a high level of technological knowledge. To maintain or improve competitiveness, R&D activities and training programmes are essential. Moreover, competitiveness can be improved by internationalisation. Most of the mainly small companies currently have only local or regional coverage. As regards future development of production and consumption, the situation in the medium term is considered to be better than on the short run.

INDUSTRY PROFILE

Description of the sector

This industry encompasses two subsectors:

- manufacture of transmission equipment for motive power (NACE 326.1);
- manufacture of ball, roller and similar bearings (NACE 326.2).

The manufacture of transmission equipment includes the manufacture of gears, gear assemblies (gearboxes, variable speed gears, industrial gearboxes, high-speed gears and differentials), transmission chains (including bicycle chains) and other transmission equipment. Not included is transmission equipment manufactured for the automotive industry nor hydraulic or pneumatic transmission equipment. Some of the companies in the industry deliver to both the automotive industry and other manufacturing industries, or offer a wide product range thereby covering other products than transmission equipment, gears and bearings.

Germany is by far the largest producer in the industry accounting for 53% of total EC production, in value added. Italy, France and the United Kingdom follow with shares ranging from 11% to 17%. Except for Italy, where the 1992 production was almost 3% higher than in 1991, the major producer countries reached in 1992 lower production levels than in 1991.

Recent trends

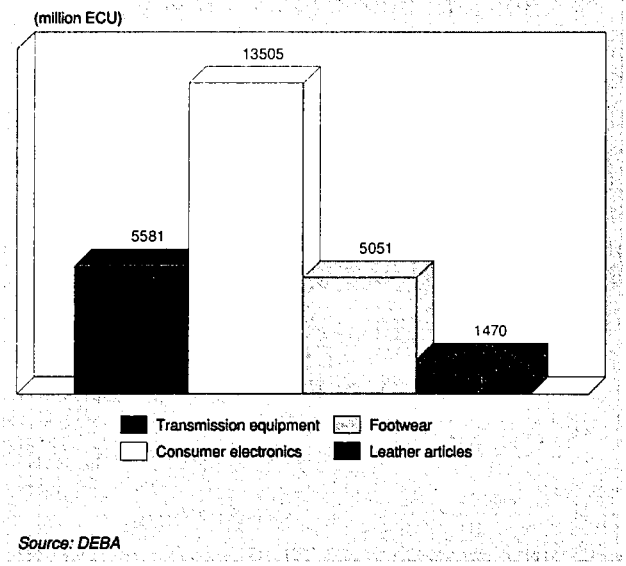
The industry went through a period of growth throughout the 1983-1990 period. In current prices consumption, production and exports increased at an average rate of about 9% per year. High growth rates were particularly obtained in 1984, 1985 and 1989. The positive trade balance grew too; it reached its peak in 1989. Employment peaked in 1990. In the beginning of the 1990s the situation deteriorated. EC demand fell and so did the extra-EC exports. As a result production and employment declined too.

In 1992, production in nominal terms declined by 2.9%. Employment dropped by more than 7%. The fall in production was entirely due to reduced demand in the internal market; non EC-exports remained unchanged. The export share is about a quarter of production; import penetration is about 18%. The EC is a net exporter of transmission equipment.

International comparison

The EC is the world's largest producer of transmission equipment. In nominal terms the EC production level is some 55% higher than that of the USA and about 39% higher than that of the Japanese. In constant prices both EC and US production declined by 4% to 4.5% in 1992. For the EC this was the second, for the USA the third consecutive fall in production. The USA had in 1990 the most significant decline (18%); EC production dropped most in 1991 (12%).

Figure 1: Transmission equipment
Value added in comparison with other industries, 1992



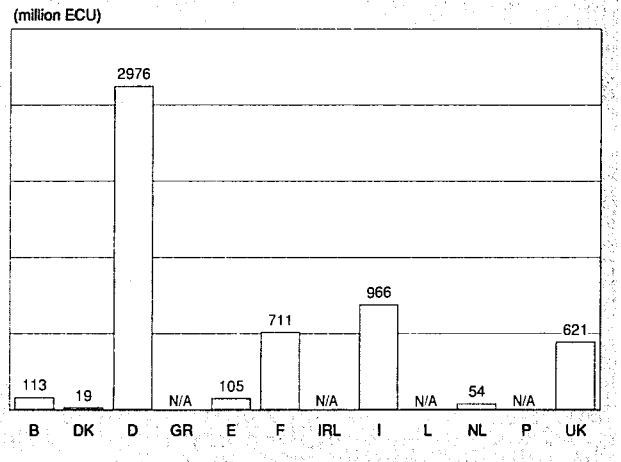
Source: DEBA

Foreign trade

The EC is in general a net exporter of transmission equipment. Moreover, the trade surplus increased on average by some 6% per year over the 1983 and 1992 period. The growth rate was highest (8%) during the period 1983-1990; the trade surplus reached its highest level in 1989 and has fluctuated since.

The export and penetration rates changed only little during the 1983 and 1992 period, although a slightly increasing tendency can be observed for both rates. The export rate was 25% to 26%, and the penetration rate 16% to 18%. Allowing for intra-EC trade these rates were 56% and 52% respectively in 1992, reflecting the importance of this trade. It reflects also the international, but not particularly global character of the sector.

Figure 2: Transmission equipment
Value added by Member State, 1992



Source: DEBA

Table 1: Transmission equipment
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	6 449	7 369	8 249	8 660	8 566	9 264	11 066	11 885	10 924	10 502	10 300
Production	7 146	8 195	9 227	9 695	9 608	10 445	12 281	13 056	11 988	11 640	12 000
Extra-EC exports	1 754	2 094	2 421	2 433	2 401	2 701	3 096	3 236	3 014	3 000	2 950
Trade balance	697	826	978	1 036	1 042	1 181	1 215	1 171	1 064	1 138	1 100
Employment (thousands)	170.9	165.1	171.9	174.7	171.3	168.6	172.5	176.7	167.1	155.2	148.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Transmission equipment
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	3.4	-1.0	1.4
Production	4.3	-1.2	1.8
Extra-EC exports	5.8	-1.2	2.6
Extra-EC imports	1.8	0.1	1.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Transmission equipment
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 754	2 094	2 421	2 433	2 401	2 701	3 096	3 236	3 014	3 000
Extra-EC imports	1 057	1 268	1 443	1 398	1 360	1 519	1 880	2 065	1 949	1 861
Trade balance	697	826	978	1 036	1 042	1 181	1 215	1 171	1 064	1 138
Ratio exports/imports	1.66	1.65	1.68	1.74	1.77	1.78	1.65	1.57	1.55	1.61
Terms of trade index	112.0	104.2	100.0	101.2	99.4	99.1	97.0	99.0	96.8	94.5
Intra-EC trade	1 907	2 183	2 567	2 752	2 868	3 153	3 699	3 925	3 788	3 573
Share of total imports (%)	64.3	63.3	64.0	66.3	67.8	67.5	66.3	65.5	66.0	65.8

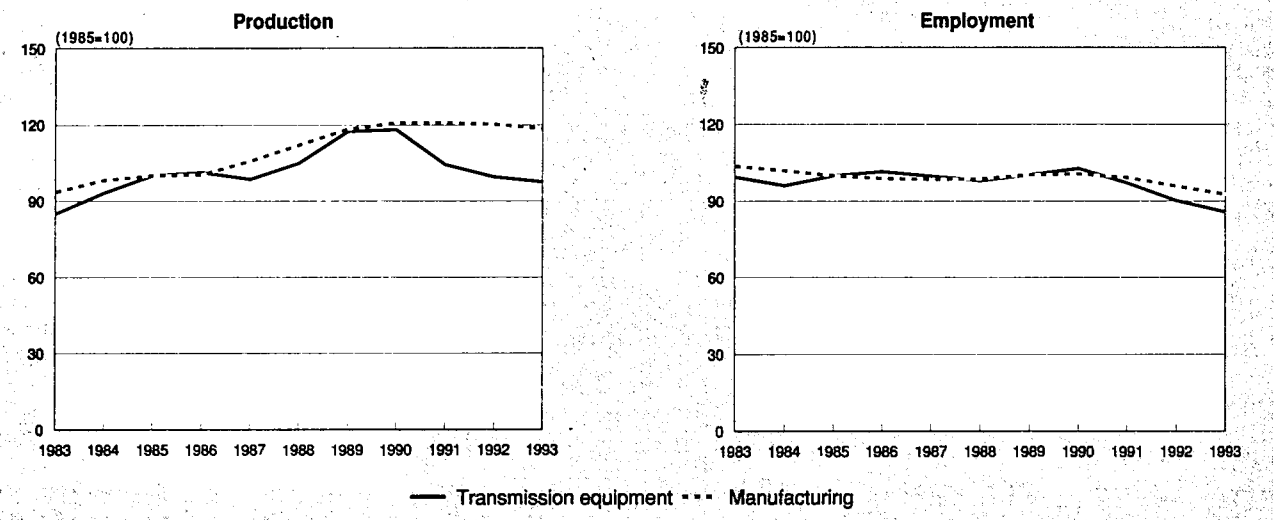
Source: DEBA

Table 4: Transmission equipment
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	30.8	33.3	34.2	33.9	33.4	36.2	38.4	37.5	35.3	36.0
Productivity index	90.2	97.5	100.0	99.3	97.6	106.0	112.4	109.7	103.2	105.2
Unit labour costs index (3)	87.9	94.7	100.0	105.9	110.1	115.8	125.2	131.7	137.9	149.2
Total unit costs index (4)	80.0	93.6	100.0	104.5	106.5	116.1	132.7	137.8	139.3	149.8

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Transmission equipment
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

As regards exports, the EFTA countries are the EC's principal trade partner; the USA ranks second. In 1992, they allowed together for 51% of the total EC exports. In 1987, this share was slightly different (53%). Japan is only of marginal importance to the EC exports of transmission equipment.

The EFTA countries and the USA play also a major role in the EC imports of transmission equipment, but Japan is important too. These three (blocks of) countries accounted together for 80% of total EC imports in 1992; in 1987 this was 86%. The decline is particularly due to the fall in the share of the EFTA countries, which remained however the most important origin of the EC imports of transmission equipment. The USA lost their second position to Japan.

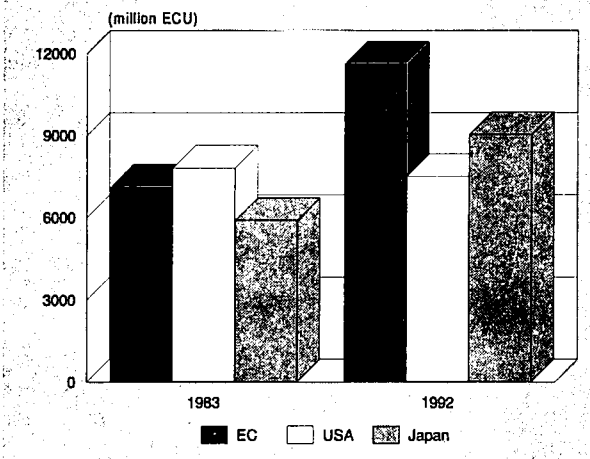
MARKET FORCES

Demand

Customers of this industry are a variety of manufacturing industries. Demand for transmission equipment, therefore, depends largely on investments in capital goods made by these downstream industries. After a period of booming investments in the second half of the 1980s by some major EC and non-EC client industries, both EC and foreign demand fell as a result of disappointing growth rates on the downstream markets within and outside the EC. Profits dropped accordingly, which together with high capital cost was not encouraging for investments in capital goods.

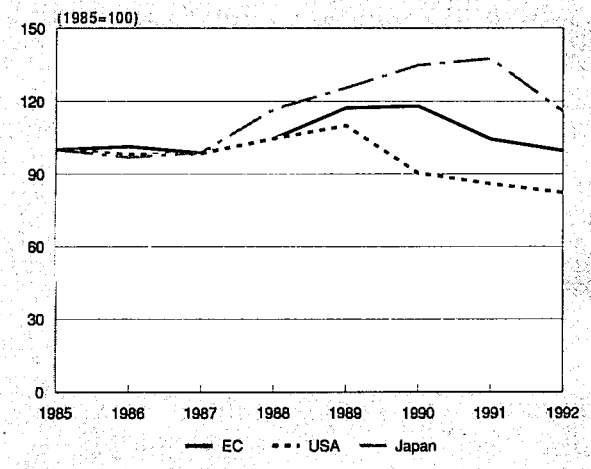
The product range of the industry consists of rather conventional equipment like bearings, cranks and chains. Electronics and miniaturisation are becoming increasingly more important. This may give rise to increased demand for competing transmission techniques like electrical, hydraulic and pneumatic means of transmission. If, and then to what extent, substitution is threatening the manufacture of mechanical transmission equipment depends on the possible applications of other technique-based machinery and equipment. The increasing use and combination of different techniques by the manufacturers of transmission equipment makes it difficult to specify possible substitution effects.

Figure 4: Transmission equipment
International comparison of production in current prices



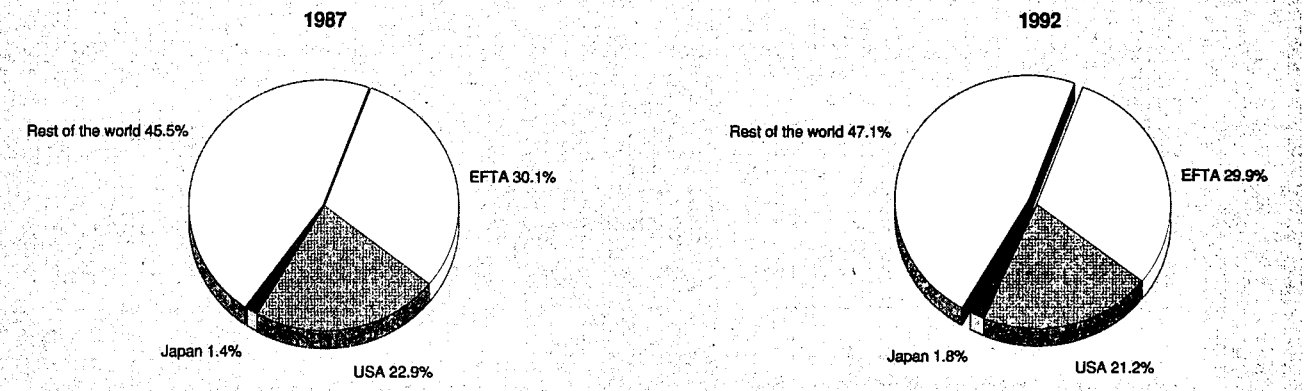
Source : DEBA, Census of Manufacturers, Nikkei

Figure 5: Transmission equipment
International comparison of production in constant prices



Source : DEBA, Census of Manufacturers, Nikkei

Figure 6: Transmission equipment
Destination of EC exports



Source: Eurostat

Supply and competition

Transmission equipment, gears and bearings constitute approximately 3 to 4% of total production of the mechanical engineering industry. The enterprises in the industry offer a wide range of products. A particular feature of the industry is that the manufacturers of transmission equipment supply other investment goods. This is a major reason why the industrial production of transmission equipment has concentrated in countries with an emphasis on investment goods production: Germany, France, Italy and the United Kingdom. Remarkably, Germany recovered slightly from the decline in 1991, whereas the other major producing countries were facing another decline in 1992.

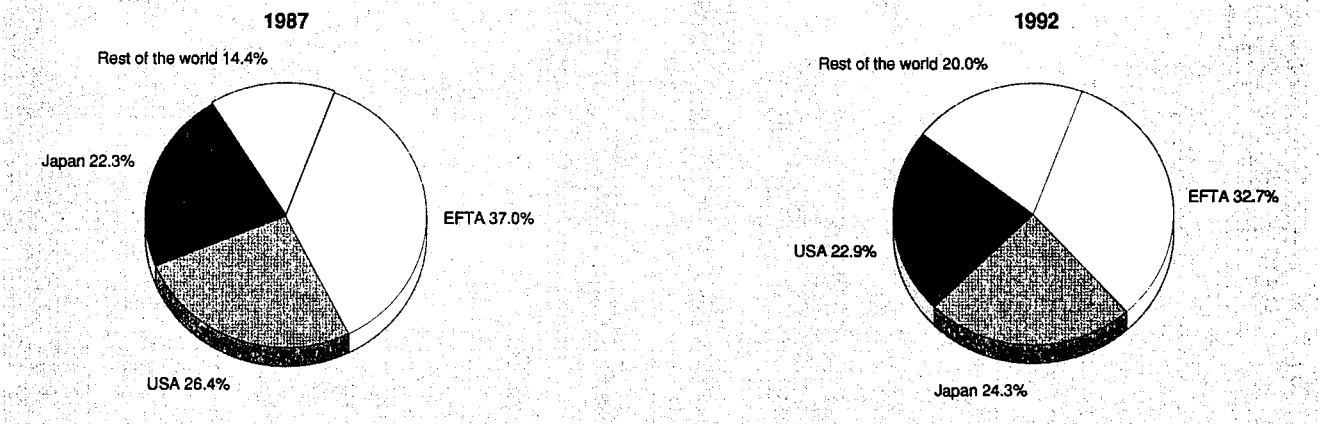
The production fall in 1991 caused lower aggregated productivity rates, but productivity rose again in 1992. If the development of import penetration is considered, the competitiveness of the EC-industry does not seem to have been affected seriously. Nevertheless, the weakness of demand will continue to put pressure on margins as competition will intensify.

Production process

The EC industry's competitiveness depends largely on a high level of technological knowledge. Advanced technological machinery and a well trained labour force are important inputs in the production processes of the industry. Investments in R&D, therefore, are essential. At the same time training programmes must be implemented to keep the labour force informed on the latest technological developments, so that optimal use can be made of R&D results.

Developments since 1983 in labour productivity, unit labour cost and total labour cost indicate firstly, that the efficiency of the production processes has increased. Labour productivity in current prices increased at a faster rate than unit labour cost, namely by 6.7% and by 6.1% respectively. In constant prices the increase was only 1.7% per year. Secondly, the figures demonstrate that the capital intensity of the production processes has increased, as total unit cost increased more than unit labour cost: 7.2% versus 6.1%.

Figure 7: Transmission equipment
Origin of EC imports



Source: Eurostat

INDUSTRY STRUCTURE

Companies

German companies such as FAG Kugelfischer and ZF Friedrichshafen dominate the market. On the market for speed changers, industrial high speed drives and gears, the A.F. Flender Aktiengesellschaft is an important manufacturer.

Most enterprises are medium-sized and often do not operate plants in other countries than the mother country. Only a few EC enterprises are present in several EC countries. Of the non-EC manufacturers the Swedish enterprise SKF already has a strong foothold in the EC with production facilities in the major EC-countries. Like its main competitor FAG Kugelfischer, SKF has also invested in former East Germany. Also, Japanese companies have established some production plants in the EC. With the help of low cost production, low and even dumped prices and a worldwide distribution network, the Japanese have increasingly penetrated into the EC. In 1992, the USA lost its second position in the extra-EC imports to Japan.

Strategies

The European companies still concentrate their efforts in R&D to retain and extend their market position. However, in order to prevent foreign companies from easily penetrating the EC-market, the EC companies should expand operations to a European scale in order to benefit from the opportunities of the EC Internal Market.

ENVIRONMENT

The industry does not seriously threaten the environment. The hardening and galvanising stages of the production process could cause serious harm to the environment, but measures have already been taken to prevent this. As far as products in mechanical power transmission is concerned, noise might be a problem. However, noise levels have been largely reduced as a result of improvements in production techniques. Costs arising from environmental protection in this industry are relatively low.

REGULATIONS

The EC Machinery Directive applies to the industry's products only to a limited extent. The greater part of the output is absorbed by the production of bearings, which does not have a direct impact on the safety of work conditions in the industry. Furthermore, the industry's products are generally used as a component of machinery products. It is at this latter level that safety provisions have to met. For the production processes within the industry itself, however, improved safety conditions of the capital goods, will be favourably received.

Companies will have to invest in quality improvement to meet the ISO 9000 quality standards. In the long run, the industry's competitiveness could be harmed if these quality standards would not be met.

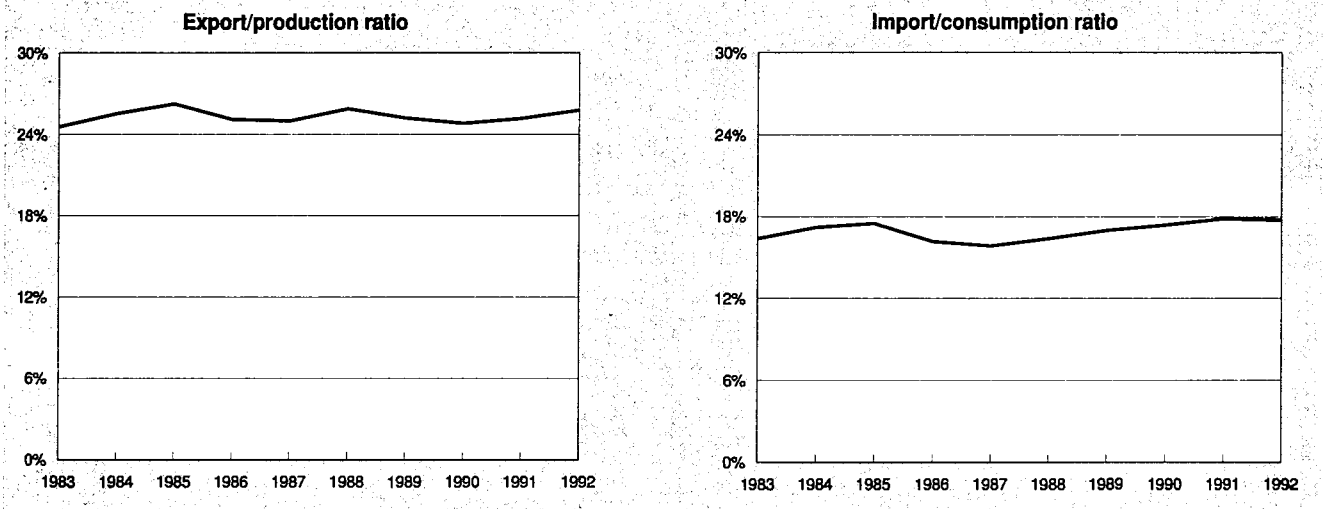
OUTLOOK

Given an export rate of around a quarter the production of transmission equipment depends largely on developments within the EC. The prevailing recessive EC economy is not expected to recover before 1994. In the short run, therefore, EC demand will continue to decline. Production will also decline further, since the short term prospects for the export markets are dim.

In the medium term the economies of the major Western industrialised countries are expected to recover. At the same time competition on the EC Internal Market from non-EC suppliers, particularly from Japan, will increase. This is also true for competition in the export markets. Further, a possible shift in demand as a result of the fast growth of alternative transmission systems, electronic and other, could be a threat to the industry. It is not clear, however, to what extent manufacturers will be hit by the adverse substitution effects.

To cope with increased competition and possible changes in demand, the industry will continue to invest in process and product innovation. Further, the industry will focus on training programmes, whereas, particularly the larger firms will internationalise. It is expected that these measures will enable the industry to benefit from the medium term economic recovery.

Figure 8: Transmission equipment
Trade intensities



Source: DEBA

Table 5: Transmission equipment
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-1.0	2.5
Production	-1.1	2.2
Extra-EC exports	-0.8	2.8

Source: NEI

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The industry is represented at the EC level by: European Committee of Associations of Manufacturers of Gears and Transmission Parts (EUROTRANS). Address: Rue Louis Blanc 39/41, F-92400 Courbevoie; tel: (33 1) 47 17 63 69; fax: (33 1) 47 176370; and, Federation of European Bearing Manufacturers Associations (FEBMA). Address: Lyonerstrasse 18, Postfach 710864, D-6000 Frankfurt 71; tel: (49 69) 660 3516; fax: (49 69) 660 3459.

Woodworking machinery
NACE 327.1

In 1992, the sector revealed a strong fall in demand and production, caused by the economic downswing of the trade cycle and increased foreign competition. Increased competition and more restrictive environmental legislation are major challenges to the industry, urging innovation.
The prospects for the short run will remain gloomy. Demand will continue to decline and so will production. In the medium term the economic situation will improve and innovation will enhance the competitiveness of the EC industry. This will have a favourable impact on demand and production.

INDUSTRY PROFILE

Description of the sector

NACE 327 includes the manufacture of machinery and equipment for use in specific branches of industry. The following industries are categorised under this chapter:

- manufacture of machinery for working wood and similar materials (NACE 327.1);
- manufacture of paper, paper goods making, printing and bookbinding machinery (NACE 327.2);
- manufacture of laundry and dry cleaning machinery (NACE 327.3);
- manufacture of plant for the leather industry, including boot and shoe machinery (NACE 327.4).

More than 60% of total EC-production of this NACE is accounted for by printing machinery. The production share of machinery for working wood is estimated at 20% to 25%, followed by much lower shares for plant for the leather industry and for the manufacture of laundry and dry cleaning machinery. The present monograph will focus mainly on woodworking machinery.

Recent trends

In nominal terms, EC demand for the entire NACE 327 fell significantly (16%) in 1992. At the same time non-EC suppliers succeeded in extending their market share in the EC. As a result EC production dropped seriously too (production fell by 14% in volume terms). The demand fall was partly compensated by a 2% rise in exports. Employment also declined (6%), but less than production. The sector is a net exporter.

After the economic crisis of the early 1980s, the period 1983-1990 featured a strong growth in production and consumption for the whole NACE 327; in nominal terms double digit annual growth rates were achieved (12% and 14% respectively). The trade surplus rose by 7.5% per year. The penetration rate remained virtually unchanged between 1983 and 1990, indicating that EC producers could well cope with increased EC demand. Further, in 1990 total employment was 18% higher than in 1983.

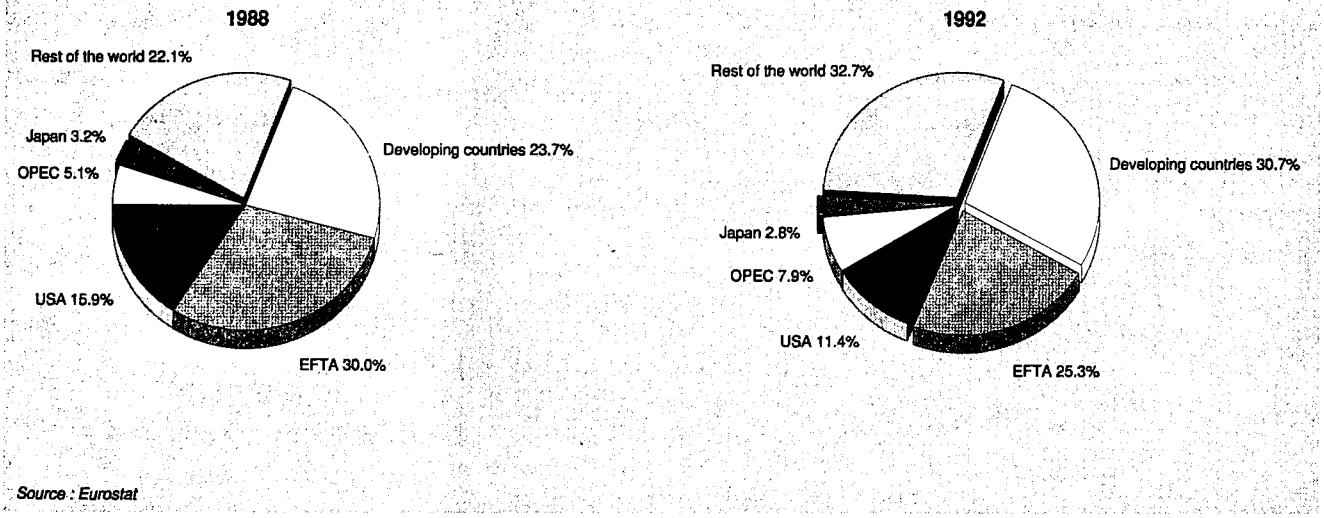
Foreign trade

Extra-EC exports of woodworking machinery reached their peak in 1990, when they attained a value of 942 million ECU. Starting from 1991, the effects of recession have considerably reduced extra-EC exports, which accounted for 760 million ECU in 1992. On the other hand, extra-EC imports remain quite low (188 million ECU in 1992), and the trade balance in the sector is always largely positive. Interestingly, intra-EC trade in the woodworking machinery sector has been constantly lower than extra-EC exports during the 1988-92 period, thus revealing the strong export-oriented nature of the sector.

The developing countries represent the major destination of EC exports of woodworking machinery, and their share has increased substantially during the 1988-92 period to reach 30.7% in 1992. This increase has taken place mainly at the expense of EC exports to the EFTA and the USA, which both decreased from 1988 to 1992.

The EFTA countries account alone for more than two-thirds of total extra-EC imports of woodworking machinery. Austria holds the lion's share with 42.1% in 1992. The effects of the deep recession which affects Sweden is highlighted by the fact that Swedish exports to the EC have more than halved during the 1988-92 period.

Figure 1: Woodworking machinery
Destination of EC exports



Source : Eurostat

Table 1: Woodworking machinery
External trade in current prices

(million ECU)	1988	1989	1990	1991	1992
Extra-EC exports	695	932	942	827	760
Extra-EC imports	133	159	185	215	188
Trade balance	563	773	757	612	572
Ratio exports/ Imports	5.2	5.9	5.1	3.9	4.0
Intra-EC trade	518	629	718	687	645
Share of total imports (%)	79.6	79.8	79.5	76.2	77.4

Source : Eurostat

MARKET FORCES

Demand

The woodworking industry mainly produces investment goods. In the large manufacturing countries like Germany, Italy, USA and Japan there is a strong domestic demand. In some countries the export shares in total production are high, which implies a considerable importance of foreign markets.

Wood-processing industries are relevant to the demand for woodworking machinery. Hence, the final demand for wood and products of wood is vital. Data for three Member States, Germany, Italy and France indicate a considerable increase (15% to 16%) in demand for woodworking machinery in 1991, mainly due to a 36% rise in German demand, as a result of the reunification. Italy revealed a moderate increase in demand of 2% to 3%; French demand decreased by 9%. In Germany some 30% of demand was covered by foreign supplies in 1991; in Italy this was a quarter, whereas French requirements are for over 80% covered by imports. Germany and Italy are net exporters of wood processing machinery. In 1991 their export rates totalled some 60% and 70% respectively; in 1990 this was 70% in Germany, but due to decreased foreign demand it declined significantly. At the same time imports increased, entailing a decrease in the trade surplus by 32%.

Data for Germany and Spain further revealed a drop in market volume in 1992. On the other hand, consumption remained stable in Italy and declined in France (in value terms). Although domestic orders continued to grow substantially, the cyclical downswing in Europe and the USA caused export orders to decline such, that the overall order position deteriorated.

In the demand for woodworking machinery a trend can be recognised towards further automation in order to save on the use of raw materials, to cut energy cost and to increase productivity and competitiveness. Furthermore, automation is aimed for in order to improve safety conditions in the woodworking industry.

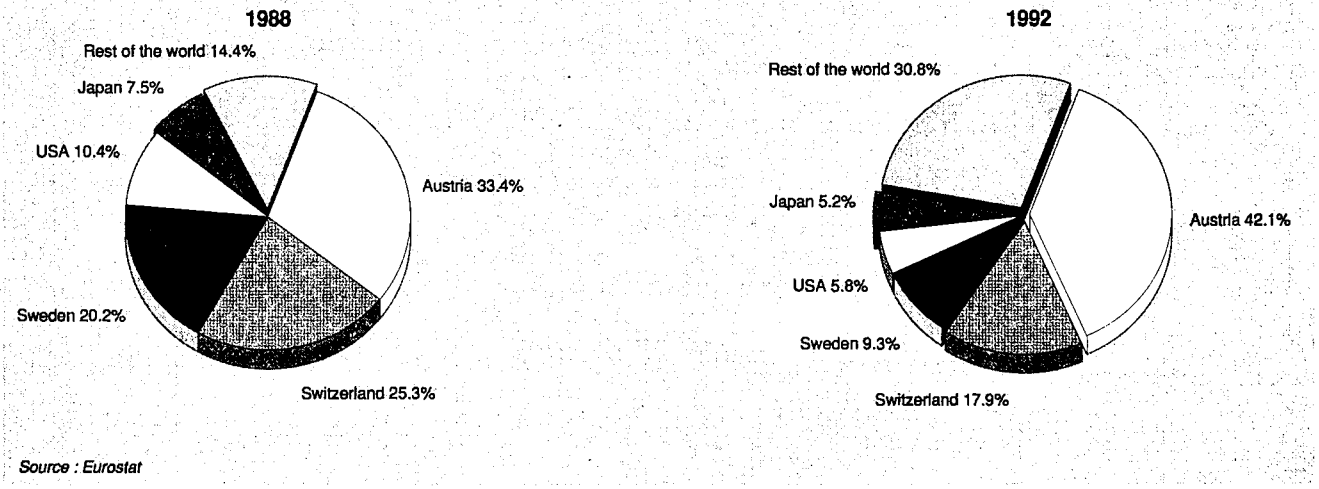
Supply and competition

The decrease of sales in the market caused an excess capacity, and will inevitably further reduce profit margins as price competition will intensify to some extent. However, the composition of the industrial customers are heterogeneous, which leaves room for extra margins especially if customer specific solutions are asked for. In this area, the EC industry is ahead of the competition from Japan and Taiwan. Within the EC, only Germany and Italy are important suppliers of machinery for specific branches.

Aggregate labour productivity (for NACE 327 as a whole) increased on average by 6.6% per year between 1983 and 1992; unit labour cost increased at about the same rate: 6.8% per year. Hence, efficiency in the industry has not improved over the years. This is particularly due to the developments after 1990. In 1991 and 1992 labour productivity fell by 3% and 5% respectively, whereas unit labour cost rose by some 7% in both years. In contrast, between 1983 and 1990 labour productivity increased at a much faster rate than unit labour cost: 9.9% versus 6.8%.

Over the years unit labour cost increased less than the growth of total unit cost (6.8% versus 7.4%), reflecting the growing capital intensity of the sector.

Figure 2: Woodworking machinery
Origin of EC imports



Source : Eurostat

The European woodworking machinery industry, which concentrates on labour intensive custom-made solutions, is negatively influenced by high wage costs due to increasing wages and decreasing effective working hours. On the US-market competition is fierce and the low dollar exchange rate has a negative impact on German and Italian sales. The quality of the European machinery and its after-sales service however, are at a high level and constitute an important competitive edge. In contrast with the European manufacturers Japanese and Taiwanese firms tend to focus on the building and delivery of standard and low-cost machinery.

The European woodworking machinery manufacturers concentrate on specialisation and innovation. Moreover, the industry is considering the EC increasingly as a suppliers market, where besides the traditional suppliers France and Italy, Spain and Portugal are becoming more and more important. Further, manufacturers are aiming at expanding their sales network, particularly through acquisitions. Examples are the Homag Group, encompassing 12 producing affiliates, the IMA group with five producing partners and the Wehrmann group, including, besides traders, six producing companies. Clients in commerce and industry are meant to benefit from the synergy effects of such cooperations.

INDUSTRY STRUCTURE

Companies

Some 780 companies in the manufacture of woodworking machinery employed 43 000 people (i.e., on average 55 employees per enterprise) in 1992, compared to a number of 42000 in 1988. The German industry encompassed around 242 companies in 1992: employment totalled 23 500 employees or almost 100 workers per company. The United Kingdom recorded an average company size of 72. Conversely, in Italy with 298 enterprises employing 11 100 workers, the average company size is much smaller, namely 37. Moreover, only 10% of the companies has more than 100 employees in Italy.

The EC industry is more labour intensive. Production per employee within the EC amounted to ECU 100 000 in 1990, while the same figure for the rest of the world was ECU 115 000. This is partly due to its higher degree of specialisation.

Strategies

Especially on the US market where competition is fierce for EC manufacturers, it will become more and more important to meet the specific market demands in order to retain market positions. In the Eastern European countries companies from the Western industrialised countries (including EC countries) are looking for cooperation (joint ventures) in order to create a strong strategic position, anticipating economic growth in the future. Other manufacturers seem to focus on direct trade with these countries.

REGULATIONS

Relevant to the sector is Directive 89/392, covering all types of machinery. It defines essential requirements concerning machine safety and health provisions. Provisions relate to the design, the materials used, the way in which machine operations should be illuminated, machine operations itself, safety against mechanical risks, the application of screens and other safeguarding components, maintenance and machine indications and identifications. Machines complying with the EC regulations will obtain the CE mark. Machine safety is of particular relevance to woodworking machinery. For specific types of this machinery compliance with the standards may be difficult.

In anticipation of EC regulations for a safer working environment the European manufacturers, therefore, already put much effort in R&D for the improvement of safety conditions of their machinery. In the manufacture of wood-working machinery the trend towards more automation also implies less dangerous working conditions. Although the safety regulations have officially been introduced as of January 1, 1993, there is a transition period until January 1, 1995, in which manufacturers have to comply with either the old regulation prevailing in the Member State where products are sold, or with the Directive standards. The latter has the advantage of the products being labelled with the CE-mark, giving it free access to the markets of all EC countries, provided that the complexity of interpretation of the directive, the increase in environmental regulations to which machinery must comply and the increase in controls will not end up to replace the old technical barriers with new ones and therefore reduce the competitiveness of European producers. The European industry would like to see the CEN standards also adopted by the International Standards Organisation (ISO) in order to safeguard the use of the same safety standards worldwide.

If ISO recognition does not happen, this legislation will probably result in European manufacturers having a two-tier production. Expensive machines with high safety standards will be built for the European market and cheaper versions will be assembled for other markets where safety standards are lower. This may allow European manufacturers to compete with emerging Asian manufacturers on a more equal footing.

OUTLOOK

In the greater part of 1993 the economic recession will prevail. At the end of that year the trade cycle will start to recover and this will continue into 1994. Demand for all product groups in the described industries is therefore expected to grow at a low rate. Further, the trend towards increased competition from non-EC suppliers on the Internal Market and on export markets, which EC manufacturers have been facing in recent years, will continue in the future. Hence, in the short run also production is expected to grow at a very modest pace.

The medium term prospects are considered to be better. This will particularly be due to economic recovery in the EC and on the major export markets. Moreover, the innovative activities of the manufacturers will affect their competitiveness favourably.

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Liquid pumps
NACE 328.3

The EC is the world's largest producer of liquid pumps with Germany as the leading producing country. The EC is a net exporter. Due to the downswing of the trade cycle, and increased competition from outside the EC, production declined in 1992. However, EC manufacturers succeeded in maintaining their export rate. In order to cope with increasing competition within the EC companies tend to internationalise. Demand is expanding from the traditional applications of pumps to others, such as the use of pumps to make production processes less polluting.
The short term prospects for liquid pumps are not very favourable. The business cycle in the EC will not recover soon. The same applies to the current recessive export markets. For the medium term the prospects will improve, when the business cycle will recover. Additional demand can be expected from the rising interest for environmental protection.

INDUSTRY PROFILE

Description of the sector

This NACE includes the manufacture of compressors, pumps and equipment for operating machinery by hydraulic or pneumatic means. Besides liquid pumps the sector also covers compressors and vacuum pumps. However, for these latter product groups little statistical information is available. As a consequence, the description of the sector will mainly cover liquid pumps.

The liquid pumps can be divided into six classes: hand pumps; reciprocating pumps; rotary displacement pumps; centrifugal pumps; other pumps (not elsewhere specified); and parts for pumps.

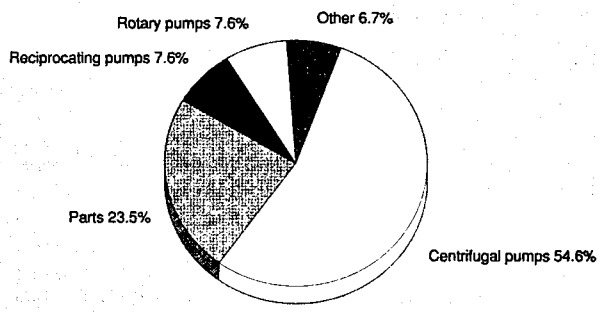
Recent trends

In 1992, both production and consumption of liquid pumps declined. Due to an increase of the extra-EC exports of 7%, however, EC production declined less than EC demand: 1.6% versus 3.2%. The EC is a net exporter of liquid pumps. In 1992 some 30% of production was exported; import penetration is modest: about 15% of EC demand is covered by imports. With a joint share of 78%, centrifugal pumps and parts allow for the bulk of the sector's production.

Germany, Italy, the United Kingdom and France accounted together for almost 90% of total EC liquid pump production. With over 40% Germany is by far the largest producing country. The other three followed at a distance: France has a share of 13%, the United Kingdom covers 16% and Italy's share amounts to 17.5%. Germany's leading position holds for all types of pumps, but it is strongest in hand pumps and reciprocating pumps. Remarkably, all the major producing countries recorded a production decline in 1992, whereas in the other Member States production grew.

Over the period 1987-1992 EC production, at current prices, increased at a slightly lower annual rate than demand: 7.4% versus 7.7%, indicating that the coverage of EC demand by EC producers, although still overwhelming, has fallen: from 86.6% in 1987 to 84.5% in 1992. Although the average increase of production was over 7% per year over the 1987-1992 period, production declined in 1992. Reduced demand on the Internal EC market, due to the prevailing cyclical downswing, and increased non-EC competition on this market, accounted for the production fall. Despite low exchange rates for the US dollar and the Japanese yen and recessive export markets, the export rate remained about stable.

Figure 1: Liquid pumps
Breakdown by major product line in the EC, 1992



Source: Europump

International comparison

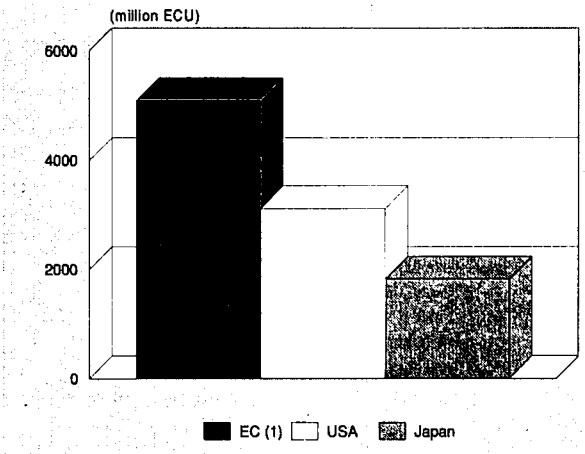
The EC is the world's largest producer of liquid pumps. In 1991, US and Japanese production were respectively 60% and 36% of EC production. US production was 2.4% lower than in 1989. Conversely, Japan's 1991 production level exceeded that of 1989 by 5.4%. These developments comply with the general trend in mechanical engineering showing a weakening position of the USA and a growing Japanese share on the EC and world market.

Both EC and US production are more diversified than Japanese production.

Foreign trade

Both intra-EC exports and imports increased over the 1987-1992 period. Imports increased at a faster annual rate than exports: 10% versus 8%, entailing a decline in the exports to imports ratio from 2.67 to 2.38. Throughout the 1987-1992 period, the EC was a net exporter of liquid pumps. The trade surplus increased at a rate of 6.3% per year.

Figure 2: Liquid pumps
International comparison of production at current prices, 1991



(1) Excluding Greece, Ireland, Portugal and Luxembourg
Source: Europump

Table 1: Liquid pumps
Main indicators at current prices (1)

(million ECU)	1987	1988	1989	1990	1991	1992	1993 (3)
Apparent consumption (2)	2 859	3 041	3 408	4 030	4 274	4 139	4 020
Net exports (2)	651	697	749	833	830	884	850
Production	3 510	3 738	4 158	4 863	5 104	5 022	4 870

(1) Excluding Luxembourg, Greece, Ireland and Portugal. Excluding Denmark, 1987-1989
(2) Exluding Italy. For 1992 excluding Belgium.
(3) Rounded NEI estimates
Source: Europump

Table 2: Liquid pumps
Breakdown of production by product line, 1992

(%)	Hand pumps	Reciprocating pumps	Rotary pumps	Centrifugal pumps	Other pumps	Total original equipment	Parts	Total production
Belgique\België	0.0	0.5	0.7	1.0	3.5	1.1	1.8	1.2
Danmark	0.0	1.0	2.9	5.6	2.5	4.5	11.1	6.1
BR Deutschland	92.9	71.5	38.8	38.4	33.2	42.7	34.0	40.6
España	0.0	0.2	0.6	3.5	3.4	2.8	2.0	2.6
France	4.7	7.5	16.2	16.0	1.0	14.0	10.8	13.2
Italia	0.0	14.3	30.7	21.0	0.0	19.5	11.2	17.5
Nederland	0.0	0.0	0.0	2.6	15.2	2.8	3.9	3.1
United Kingdom	2.4	5.1	10.1	11.8	41.3	12.7	25.2	15.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Europump

Extra-EC imports grew faster than demand, showing that foreign suppliers have become more important on the EC market. Their penetration rate increased from 13.5% to 15.5%. The export rate was in 1992 about the same as in 1989, namely some 30%.

With a growth rate of 12% per year during the 1987-1992 period, caused by strong demand in some major industries, intra-EC trade has been a major stimulus for production during that period. The share of intra-EC trade in EC production increased from a quarter to 30%. In 1992, extra-EC exports and intra-EC trade were virtually similar.

Germany has the highest export value; in 1992, Germany's total exports were 57%; non-EC exports accounted for some 48%. Within Europe, France and Italy are the most important export markets for Germany. In the same year the most important German export markets outside the EC were the EFTA countries and the USA.

MARKET FORCES

Demand

Market demand can be divided into two categories of liquid pumps: standardised pumps and engineered pumps. Both groups encompass a wide range of products and applications. Major markets for standardised pumps are the chemical industry, process industry, construction industry, food industry,

Table 3: Liquid pumps
Production by Member State (1)

(million ECU)	1987	1988	1989	1990	1991	1992
EC	3 510	3 738	4 158	4 863	5 104	5 022
Belgique\België	54	52	59	75	61	63
Danmark	N/A	N/A	N/A	283	296	306
BR Deutschland	1 466	1 530	1 697	1 936	2 098	2 041
España	72	70	90	100	82	131
France	497	572	611	644	672	664
Italia	711	740	821	913	952	881
Nederland	127	112	130	127	139	154
United Kingdom	583	663	751	784	803	783

(1) Including parts
Source: Europump

Table 4: Liquid pumps
External trade at current prices (1)

(million ECU)	1987	1988	1989	1990	1991	1992 (2)
Extra-EC exports	1 041	1 134	1 253	1 404	1 450	1 523
Extra-EC imports	389	436	504	572	620	640
Export/import ratio	2.67	2.60	2.49	2.46	2.34	2.38
Intra-EC trade	864	933	1 097	1 272	1 404	1 533
Share of total imports (%)	68.9	68.1	68.5	69.0	69.4	70.6

(1) Excluding Luxembourg, Greece, Italy, Ireland and Portugal. Excluding Denmark, 1987-1989.
(2) Excluding Belgium.
Source: Europump

shipping, horticulture, civil engineering and the original equipment manufacture (OEM) sectors. Engineered pumps are used in oil and gas industry, the petrochemical and chemical industries, power stations, irrigation and water supply. Both markets require custom solutions, for which an efficient production is needed.

Demand is expanding from the traditional applications into others. An important aspect is the use of liquid pumps for environmental protection purposes. In practically all end-use sectors, such as in the construction and chemical sectors, and the energy sector, pumps contribute to making production processes less polluting.

Supply and competition

The sharp increases in intra-EC trade during the last years in contrast with lower growth rates in extra-EC imports, could be an indication of the strong competitiveness of the EC-industry. In contrast with Japan for instance, the EC-industry - in general - seems to be more diversified into the various segments of the market for liquid pumps and has been able to benefit from growing segments.

Increased import penetration together with the weak global market, however, intensify price competition, causing a fall in profit margins. Most companies in the pump industry serve more than one end-use sector and, although not immune from the general economic cycle, do take advantage of the differing cycles of economic activity for each end-use industry.

Production process

Both capital goods and labour force are important inputs in the production processes of the various pump and compressor industries. The labour force is particularly important in view of technological research and development. As a consequence, the quality of the labour force and training programs is a major factor influencing the success of EC-industry in the long run. Keeping the quality of the labour force at a high level should not lead to excessive wage increases. Sharp rises in wages next to increases in input prices of materials (as happened in recent years) would have a negative impact on the industry's profitability and cause reductions in investments. This will weaken EC competitiveness.

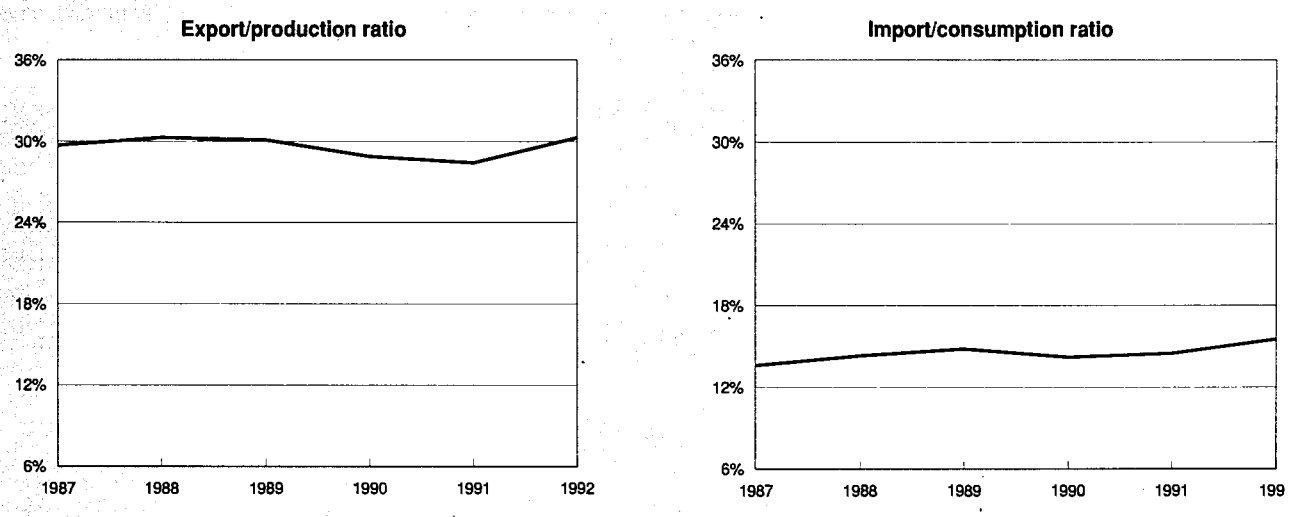
INDUSTRY STRUCTURE

Companies

In general, most of the EC manufacturers of pumps are medium-sized. Most of them have specialised in a certain kind of pump or concentrated on one or more branches of industry.

In order to compete more aggressively on the EC Internal Market, the industry is trying to internationalise. This will bring changes in the structure of the pump sector. In recent years, a number of mergers and acquisitions have resulted in some big pan-European companies such as KSB (D), SIHI (D), Wilo Salmson (D), Grundfos (DK), GEC Alsthom Ber-

Figure 3: Liquid pumps
Trade Intensities



Source : Europump

Table 5: Liquid pumps
Breakdown of trade by Member State in current value, 1992

(million ECU)	B	DK	D	E	F	I	NL	UK
Extra-EC exports	26.0	87.5	730.4	32.0	155.2	N/A	145.2	372.8
Extra-EC imports	39.0	29.8	273.7	39.9	110.4	N/A	71.9	113.8
Trade balance	-13.0	57.7	456.7	-7.9	44.8	N/A	73.2	259.1
Total exports	77.0	265.7	1 249.0	80.1	369.8	379.2	314.5	565.0
Total imports	194.9	92.0	714.4	199.6	345.4	N/A	336.8	333.4
Ratio exports/imports	0.4	2.9	1.7	0.4	1.1	N/A	0.9	1.7
Intra-EC trade	155.9	62.2	440.7	159.7	235.0	N/A	415.6	219.6
Share of total imports (%)	80.0	67.6	61.7	80.0	68.0	N/A	123.4	65.9

Source: Europump

geron (F) and Weir (UK). In addition, a number of non-EC companies have production facilities in the EC such as ABS (S), Ingersoll-Dresser Pumps (USA), Sulzer (CH) and ITT Flygt (S/USA). For the majority of the enterprises, specialised in smaller market niches, joint ventures with similar companies in other EC Member States should be a better means to benefit from the advantages of the European unification process.

Strategies

Weak markets have already forced many companies to capacity and cost reductions to retain competitiveness. The wide deployment of CAD/CAM/CIM (computer-aided design, computer-aided manufacturing, computer-integrated manufacturing) has resulted in productivity improvements and consequently to labour cost savings. This trend is likely to continue. In the standardised pump sector widespread and efficient distribution networks on key markets are becoming increasingly important. Most of the specialised companies will have to put more effort in product innovation and product modifications, both to retain competitive advantage and to comply with the general trend towards products which offer better environmental protection. The latter trend provides the industry with extra demand for pumps for water purification, for example. On the other hand, the same trend has induced the industry to produce less polluting pumps (i.e. without leakages).

REGULATIONS

The European Technical Committee for machinery safety and health regulations (CEN TC/197) has recently introduced safety standards, which also apply to the manufacture of liquid pumps. The central issue of these regulations (self certification by the industry) will give the final responsibility for setting standards to the various industries. CEN has the final task of providing detailed European standards.

Control on the use of the new standards has been given to the national governments. In the Member States with a long industrial tradition (such as Germany), safety and health standards are already established at a high level. For these countries the new EC standards will not have a negative impact on the domestic industries. Other EC countries, however, like Greece and Portugal which currently have much lower standards, could have some difficulty in achieving the European CEN-norms. European industry would like to see the CEN standards adopted by the International Standards Organisation (ISO) in order to avoid unfair competition on foreign markets.

ENVIRONMENT

Besides the quality and safety standards, more environmental regulations can be expected in the years to come. In the European Act of 1987 guidelines are set for the governments of the Member States to work on their own environmental laws. The industry fears unfair competition if these regulations are not applied on a European scale. The manufacturers of liquid pumps, however, are not expected to suffer from growing environmental pressures. Demand has risen for waste water pumps, partly due to the guideline (March 1991) addressing the management and processing of urban waste water.

Noise pollution has been considered a major problem for the industry, but thanks to steady improvements in production techniques and processes, noise has been and will be further reduced. Furthermore, due to growing environmental pressures, reflected in demand, the industry has been induced to manufacture less polluting pumps, with less leakage. Technologically developed manufacturers could take advantage of the environmental pressures, if their products can meet the environmental requirements.

OUTLOOK

The greater part (70%) of EC production is sold in the EC Market where it covers some 85% of demand. Hence, developments within the EC are of primary concern to EC liquid pump manufacturers. In the recent past the downswing of the business cycle together with increasing non-EC competition affected EC production adversely. Increasing exports compensated these negative effects partly.

In the short run the recession will largely subsist. A recovery is expected in the course of 1994. Further, non-EC competition will intensify. Although imports may develop favourably, like in the past, this will only alleviate the problem of declining production. However, it is not unlikely that the low exchange rates for the US dollar and the Japanese yen together with recessive export markets will have an adverse impact on exports. Furthermore, since the economic restructuring process in East European countries proceeds very slowly, a significant upswing of demand is not expected, in these countries, in the short run.

Medium term prospects for the EC liquid pump sector will improve. Firstly, because the business cycle in the EC, by

Table 6: Liquid pumps
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-1.0	1.5
Production	-0.9	1.4
Extra-EC exports	-0.5	1.8

Source : NEI

far the sector's major market, will recover. Secondly, major export markets will recover too. These developments will have a positive impact on demand for liquid pumps. Additional demand can be expected from the rising interest for environmental protection.

Written by: Netherlands Economic Institute
The industry is represented at the EC level by: European Committee of Pump Manufacturers (Europump). Address: Carlyle House, Vauxhall Bridge Road 235/237, London SW1V 1EJ United Kingdom; tel: (44 71) 931 0476; fax: (44 71) 828 0667.

Overview
NACE 34

With a production volume of more than 260 billion ECU and a workforce of nearly 2.6 million, the electrical/electronic industry was one of the largest industrial sectors in Europe in 1992. On the one hand, the sector profits from the strong growth of the market for high-tech producer and consumer goods, of which itself is one of the major buyers. On the other hand, the sector's companies, with their innovative technologies and products, help to enrich the European market for electrical and electronic applications in other sectors of industry and further their technological development.

INDUSTRY PROFILE

Description of the sector

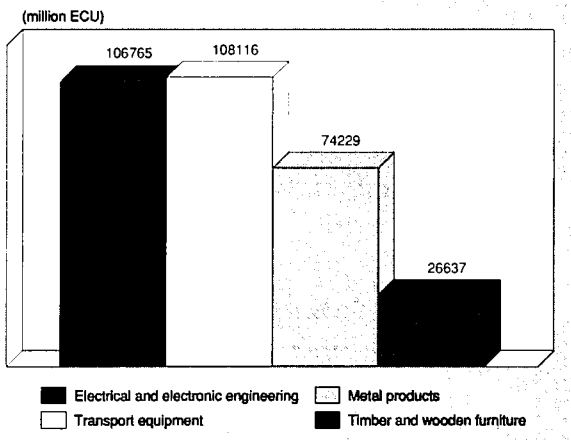
The electrical/electronics industry contributes a share of more than 10% to the total output of the EC industry. With its wide product spectrum, it directly shapes the complex pattern of the modern world and determines the quality of life. Given the importance of microelectronics as a key sector for technological progress, the competitiveness of industry and of whole economies widely depends on the electrical and electronics sector which is one of the main suppliers of infrastructure (power supply, traffic, information and telecommunications) of a country's economy. In statistics, the electrical/electronics sector is covered by the NACE group 34 which contains the following heterogeneous sub-groups:

- insulated wires and cables (NACE 341);
- electrical machinery including electric motors, generators, transformers and switch gear etc. (NACE 342);
- electrical equipment for industrial use and batteries and accumulators (NACE 343);
- telecommunications equipment, electrical and electronic measuring and recording equipment and electro-medical equipment (NACE 344);
- radio and television sets, sound producing and recording equipment (NACE 345);
- electric domestic appliances (NACE 346);
- electric lamps and other electric lighting equipment (NACE 347);
- assembly and installation of electrical equipment (NACE 348).

This statistical classification mostly does not follow the industry's actual market activities and in many cases does not provide conclusive information since the subsectors comprise extremely heterogeneous product groups. Therefore only the most prominent sectoral aspects are covered in detail in the following overview.

It is interesting to note that electronics, - i.e. telecommunications, electromedicine, measurement, control and automation, motor vehicle electronics, consumer electronics, and electronic components -, has registered the strongest growth and won a share of more than 50% in the sector as a whole. The other product groups, too, are increasingly permeated by electronic components. This 'electronification' is accompanied by a vigorous growth of industrial services which deeply change the structure of the net output. This primarily concerns project planning and engineering as well as the development of software which together have attained an estimated share of just under one fourth of the sector's total output. Some segments, as e.g. telecommunications, partly realise up to 50% of their turnover with such custom-specific solutions. The statistics with their underlying hardware production concept misrepresent both the reference quantities and the development because services are covered only inadequately.

Figure 1: Electrical and electronic engineering Value added in comparison with other industries, 1992

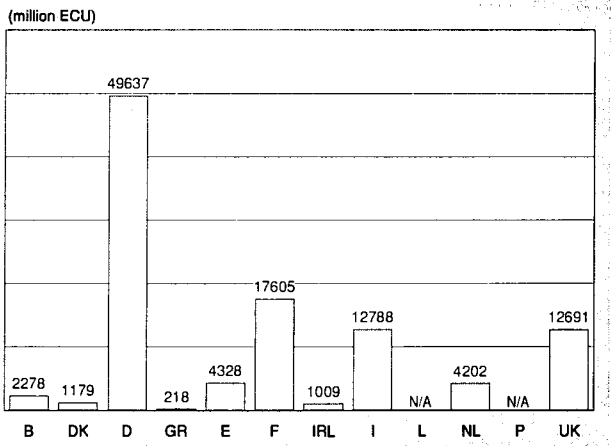


Source: DEBA

Recent trends

In the period from 1983 to 1992, production rose from 146.8 billion ECU to 257.5 billion ECU, in current prices. This is a nominal average growth rate of about 6% a year. In real terms, this amounts to an average annual growth rate of 4%, which is visibly above the remaining industries' development. In terms of net output, the German electrical/electronics sector achieved a share of 43% of the Community total. France accounted for 18%, Italy for 14% and the United Kingdom for 13%.

Figure 2: Electrical and electronic engineering Value added by Member State, 1992



Source: DEBA

Table 1: Electrical and electronic engineering
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	142 666	156 252	168 690	178 442	193 306	216 632	241 042	253 477	266 255	262 827	241 000
Production	146 876	160 256	173 615	181 935	193 517	212 453	235 170	247 532	257 501	257 554	237 000
Extra-EC exports	25 445	29 643	33 216	32 228	32 037	34 216	38 252	39 663	42 487	45 671	46 000
Trade balance	4 210	4 004	4 925	3 493	211	-4 179	-5 872	-5 945	-8 754	-5 273	-4 200
Employment (thousands)	2 724	2 694	2 686	2 695	2 714	2 705	2 753	2 750	2 726	2 633	2 450

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards; both consumption and production series were revised from those published in Panorama of EC Industry, 1993.
(2) Rounded ZVEI estimates.
Source: DEBA

Table 2: Electrical and electronic engineering
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	6.2	2.8	4.7
Production	5.2	2.8	4.1
Extra-EC exports	3.3	5.7	4.4
Extra-EC imports	9.0	5.5	7.4

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Electrical and electronic engineering
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	25 445	29 643	33 216	32 228	32 037	34 216	38 252	39 663	42 487	45 671
Extra-EC imports	21 235	25 639	28 291	28 735	31 826	38 396	44 124	45 608	51 241	50 944
Trade balance	4 210	4 004	4 925	3 493	211	-4 179	-5 872	-5 945	-8 754	-5 273
Ratio exports/imports	1.20	1.16	1.17	1.12	1.01	0.89	0.87	0.87	0.83	0.90
Terms of trade index	109.9	102.8	100.0	105.2	107.1	107.3	105.0	110.6	107.4	106.9
Intra-EC trade	24 218	28 375	32 559	36 332	39 511	45 032	51 686	57 069	60 465	62 437
Share of total imports (%)	53.3	52.5	53.5	55.8	55.4	54.0	53.9	55.6	54.1	55.1

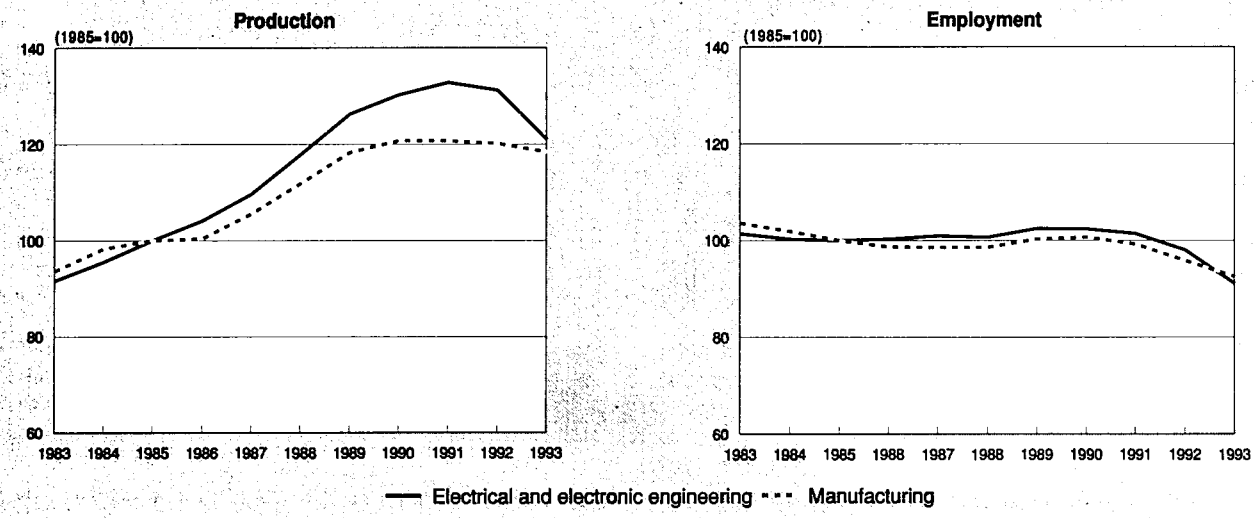
Source: DEBA

Table 4: Electrical and electronic engineering
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	29.9	31.0	32.1	33.2	35.1	37.2	37.6	38.2	39.5	40.6
Productivity index	93.0	96.6	100.0	103.5	109.3	115.7	116.9	119.0	122.9	126.3
Unit labour costs index (3)	88.5	93.9	100.0	105.7	112.8	118.7	124.7	132.1	141.6	151.5
Total unit costs index (4)	85.3	92.5	100.0	104.6	110.2	120.9	132.5	140.6	149.3	157.2

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Electrical and electronic engineering
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

In the 1983-92 period, the major producer countries of electrotechnical and electronic goods recorded an accelerated real growth in production. Only in 1991 did this trend come to a halt in some countries. Among the countries reviewed here, Germany, in terms of production growth, came second after Japan and thus topped the average of the EC countries.

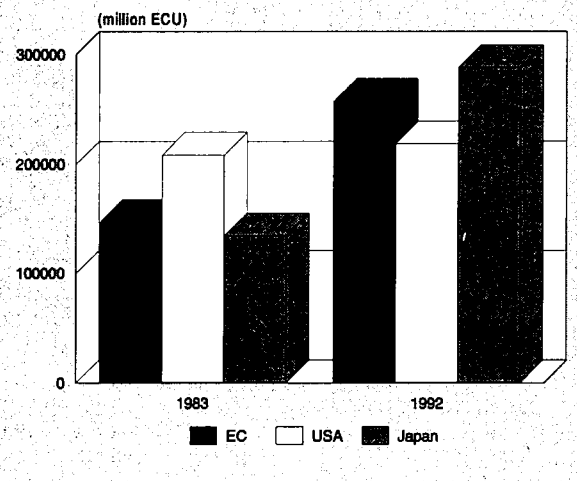
The worldwide slump in 1992 and especially in 1993 brought a shrinkage of the production and market volumes also for the electrical/electronic sector. The electrical/electronic trade cycle thus showed the typical pattern, following the other producer goods sectors with a certain time lag. By contrast, the prospects for 1994 signal that the recovery will come earlier since the worldwide demand for infrastructure investments generates autonomous demand impulses. The workforce was quickly adjusted to the lowered production. Already in 1992, it dropped by nearly a hundred thousand, which means a cutback of 3.4%. In 1993, this shedding of labour force continued at an accelerated rate of 7%. The slight rise in production achieved in 1992 was not sufficiently high to avoid a further heavy rise of 7% in unit labour costs. While Germany, as a result of unification, but also Ireland and Spain, had still growth rates to report, half of all EC Member States already registered declines in their electrical and electronic outputs. The bad business climate in 1992 and 1993 then led the sector as a whole into recession from which it is likely to recover hesitantly in the course of 1994.

International comparison

In 1983, the world market for electrical and electronic products had reached a volume of about 700 billion ECU. By 1992, it had almost doubled to just under 1.4 billion ECU.

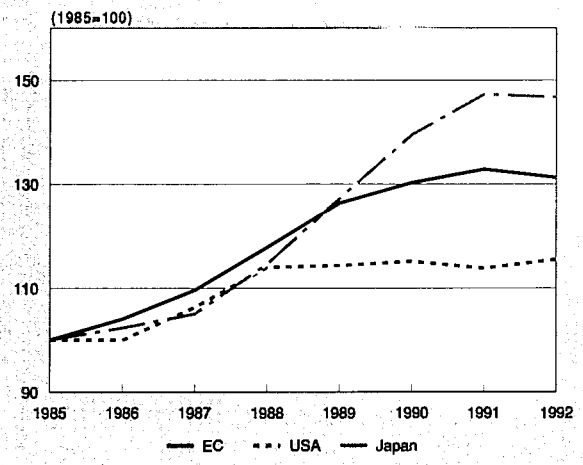
The biggest shares in the world electricals market are held by the United States, Japan and the European Community. These three economic blocs together account for 75% of the world market (including the Eastern bloc). The European Community, with a share of nearly 25%, is the second largest bloc after the United States (27%). Besides the European Community, it was especially Japan whose electrical/electronics

Figure 4: Electrical and electronic engineering
International comparison of production in current prices



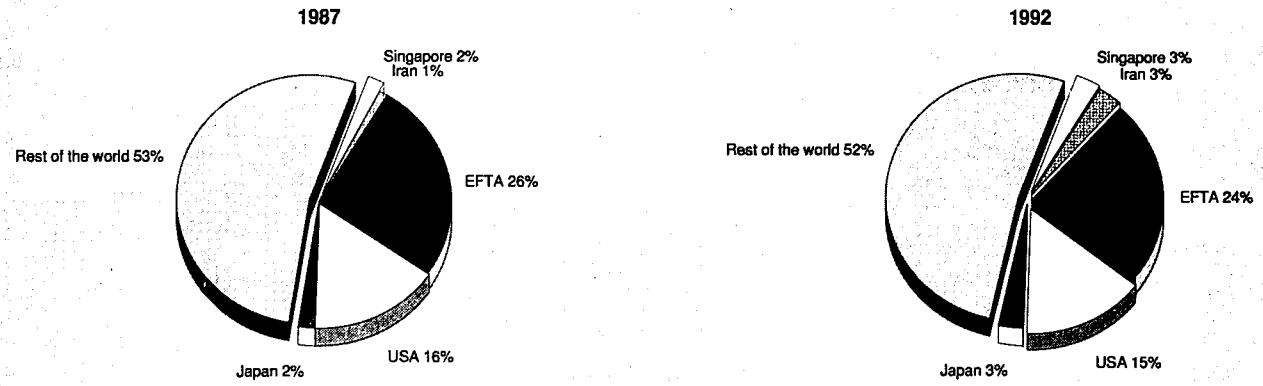
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Electrical and electronic engineering
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Electrical and electronic engineering
Destination of EC exports



Source: Eurostat

industry was afflicted by a deep recession while the US industry, in 1993, is already on the way of recovery.

In 1992, the EC electricals market reached a volume of 263 billion ECU. A production value of 258 billion ECU compared with Community exports of 46 billion ECU and imports of 51 billion ECU. This means an import surplus of 5.2 billion ECU in the trade with third countries. 77% of the Community's demand for electrical and electronic products was met from its own production, 23% originated from non-Community countries. Here, the United States led the league with a market share of 8%, followed by Japan (6%) and Taiwan (1%)

Foreign trade

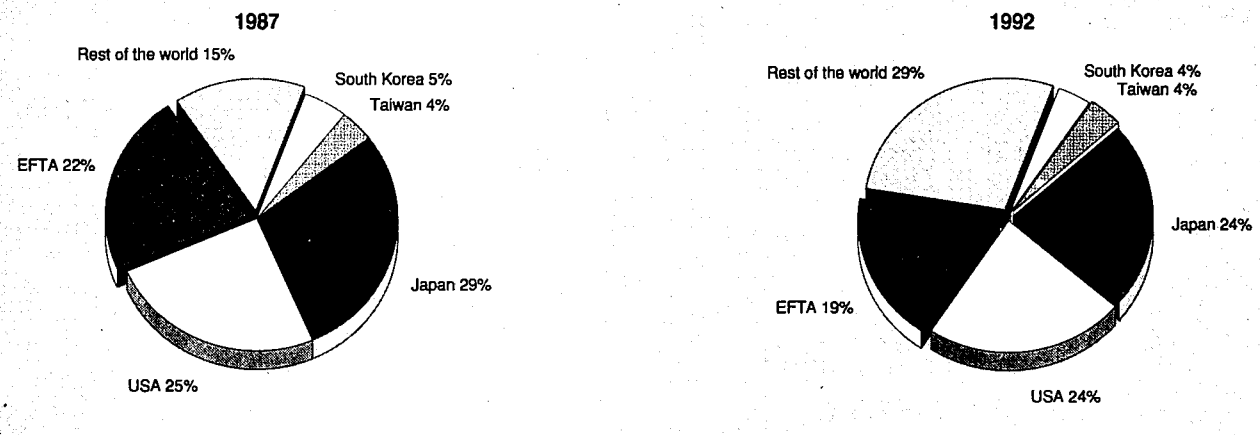
The electrical industry has always been an export-intensive sector. The period from 1983 to 1992 witnessed a strong expansion in world exports (up 150 billion ECU). The three largest exporters Japan, the United States and Germany together accounted for around three fifths of all electrical and electronic exports. Other major exporters are the United Kingdom, France, Italy and the Netherlands.

The European electrical and electronics industry is the third largest exporter of electrotechnical products after Japan and the United States.

In the 1980s, the export growth rate for electronic components was distinctly above the average electrical/electronic growth rate while in other segments such as electronic measurement & control, power engineering, telecommunications and consumer electronics, growth was below average.

Producer goods make up nearly two thirds of electrical/electronic exports, consumer goods and primary materials account for less than one fifth each. The individual product groups vary in their export orientation. Also, their dependence on external markets is decidedly higher than indicated by the export ratio, i.e. the level of goods exported as a proportion of manufacturers' sales. If account were taken of indirect exports, i.e. of equipment which as intermediate products are absorbed by other products, the export ratio would be even higher. Besides motor vehicle construction, indirect exports are primarily found in mechanical engineering. The main end markets for EC exports of electrical and electronic equipment are the EFTA countries and the United States. The main buyers in the rest of the world are the developing countries though their import volumes levelled off in the last few years. The convergence of the international markets which involves stiffer competition has not been without effect on electrical imports. Back in the 1970s, electrical imports already rose faster than

Figure 7: Electrical and electronic engineering
Origin of EC imports



Source: Eurostat

Table 5: Electrical and electronic engineering
Breakdown by size of enterprise, 1990 (1)

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	58 948	82.7	9.0	7.6
20-99	9 121	12.8	12.5	12.7
100 or more	3 210	4.5	78.5	79.7

(1) Provisional estimates.
Source: Eurostat

exports. This trend continued in the years 1983 to 1992. Imports from third countries rose nearly threefold over this period, the average growth rate amounting to about 8% a year. As in the case of exports, producer goods also dominate imports and make up more than three fifths of the Community total. The remaining two fifths are taken by consumer goods and primary materials.

The import ratio which is the ratio of imports to the total supplies of the internal market, rose steadily in the period under review and reached 19.4% for electrotechnical products in 1992.

The regional structure of electrical imports shows that the main suppliers as well as the main buyers come from European countries. Other important sources of supply are Japan and the United States which each account for about one fourth of imports from third countries. Though an absolute rise in imports was noted for nearly all countries , there have been shifts in the import structure. Especially the Japanese suppliers could expand their share, almost exclusively by consumer electronics sales.

The marked revival of external trade in the 1980s in all areas of electrical and electronic engineering reflects the deepening international division of labour. The balance of trade for electrical goods, however, has seriously tended downwards into deficit. While in 1983, the surplus totalled 4.2 billion ECU, the balance was nearly even in 1987. After that, imports rose much faster than exports so that a trade deficit of nearly 5.3 billion ECU was recorded in 1992.

MARKET FORCES

Demand

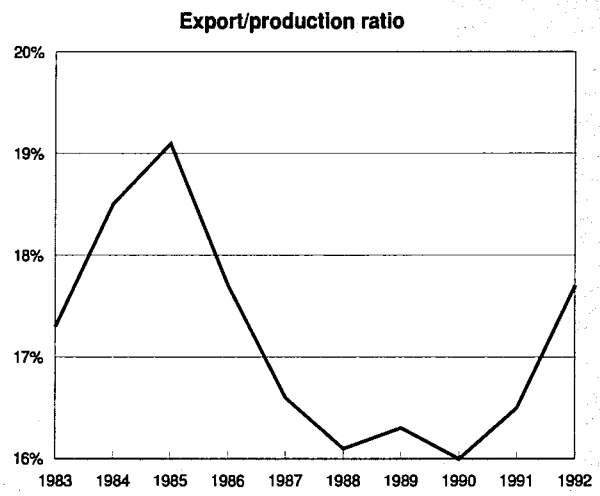
About one third of electrical and electronic production are intermediate products, i.e. electrical and electronic supplies for further processing in the sector itself or in other industries, and two thirds are final products.

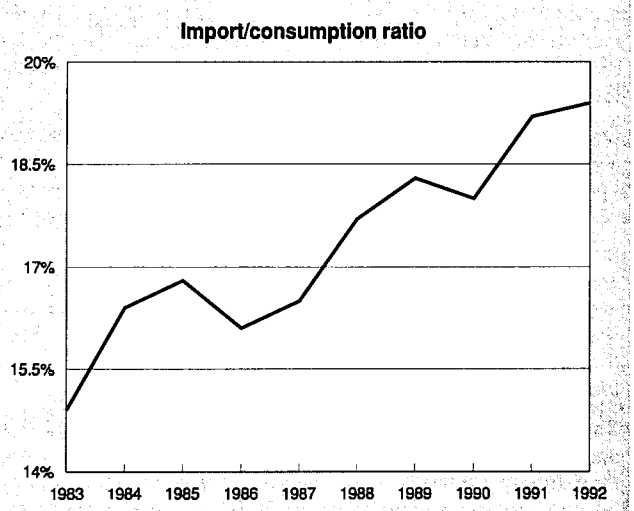
The electrical industry was the principal buyer of its own products, for further processing or for integration into other products. Other important areas of intermediate consumption are mechanical engineering, the services sector and motor vehicle construction.

If the producer goods in the electrical/electronics sector are taken separately, then the services sector is the most important buyer. Within this sector, traffic (including telecommunications) ranks first before public administration and road vehicle construction.

In 1991, more than 60% of all exports of EC countries went to other Member States (intra-Community trade), only about 40% were taken by third countries (extra-Community trade). More than 80 billion ECU of total Community exports, which amounted to 133 billion ECU, remained in other EC Member States. Of these, one third comes from Germany, 17% from the United Kingdom, 15% from France and 12% from Italy. With more than 21%, Germany is also the biggest buyer of electrotechnical and electronic products in the European Community, followed by France (17.5%), the United Kingdom (13.5%) and Italy (13%). In intra-Community trade, only Germany and the United Kingdom achieve trade surpluses, with

Figure 8: Electrical and electronic engineering
Trade intensities





Source: DEBA

Table 6: Electrical and electronic engineering
The 15 largest European companies, 1992

(million ECU)	Country	Turnover	Net profit	Employees
Siemens	D	38 509	880	413 000
Philips	NL	25 752	-396	252 200
Alcatel Alsthom	F	23 621	965	203 000
Asea Brown Boveri	CH	23 524	191	213 420
Electrolux	S	10 723	24	119 200
Thomson	F	10 326	-79	100 800
GEC	UK	7 389	706	93 228
Ericsson	S	6 268	64	66 238
AEG	D	5 745	14	60 784
Nokia	SF	3 150	-61	26 770
Standard Elektrik Lorenz	D	3 123	69	22 665
Polygram	NL	2 912	223	11 094
Ascom Holding	CH	1 856	-26	16 982
SAGEM	F	1 790	54	14 576
Racal Electronics	UK	1 677	62	23 144

Source: DABLE

6 and 3 billion ECU, respectively. The other countries have to accept partly substantial deficits.

Supply and competition

Measured by its products and their applications, the electrical/electronic industry is a diversified sector with a product spectrum ranging from microcomponents through to nuclear power plants. Therefore the overall growth rate tells little about the very differentiated developments of the individual product groups. It appears that the rise in output, in terms of value, has been particularly high in the case of electronic components, motor vehicle equipment, and measurement, control and automation systems. Slow growth is registered in the areas of electricity supply and distribution, of domestic electrical appliances and in consumer electronics. As in the whole electrical and electronic sector, all product groups showed a nearly steady growth in output over the period under review. The different developments of the individual product groups also reflect the changes in demand that have occurred. Moreover, production growth is influenced by technological change, the very complex processes of electrical production ranging from heavy mechanical engineering outfits to miniaturisation in precision mechanics, and by the development of costs and prices and other factors as well.

The different growth rates of the individual product groups led to changes in the production structure. Declines were observed especially for investment goods in the areas of power engineering, domestic electrical appliances and consumer electronics. By contrast, growth was recorded for investment goods in the areas of electronic sector and for components.

On account of the very broad spectrum of electrotechnical and electronic products, close interdependencies have developed, both on the supply and on the demand side, between electrical/electronic engineering and other sectors of industry.

Intermediate supplies involve other sectors of the economy and imports. Intra-corporate supplies, i.e. companies' internal electrical supplies, make up nearly 50%. Extra-sectoral intermediate supplies are claimed especially in the services sector, with trade and traffic (including telecommunications) topping the list.

The major suppliers in the processing industries are the plastics and non-ferrous metal industries. As the iron and steel industry, they supply primarily raw materials and semi-manufactures whereas primary and intermediate products come from various other sectors (plastics processing, iron, sheet and metal working industries, mechanical engineering, paper and glass industry etc.).

The share of the services sector in intermediate supplies has risen steeply while the primary and producer goods industries have lost in importance. This is mostly attributable to material savings in the production process which were achieved through better utilisation of raw and other materials, and to smaller product dimensions. The share of imports in intermediate supplies has steadied at around 15%.

Among the sectors which supply the electrical and electronics industry with producer goods, mechanical engineering comes first. This sector accounts for half of the electrical industry's gross fixed investment. The second largest supplier is the electrical industry itself, followed by the construction industry.

Production process

Among the processing industries, the electrical/electronic industry is the largest employer besides mechanical engineering. Employment in the sector remained more or less stable up to 1991. The sector had a workforce of 2.633 million in 1992. This is 100 000 less than in 1983.

The employment levels developed differently for the individual product groups. So areas with an above-average growth in production (e.g. measurement, control and automation) also reported above-average employment figures. As expected, employment tended downwards in areas with below-average growth (e.g. consumer electronics).

The electrical and electronic industry is one of the most research-intensive processing industries. With between 8 and 10 per cent of its turnover spent annually on research, it tops the research-intensive league (not including the aircraft and spacecraft industry).

INDUSTRY STRUCTURE

Companies

Concentration in the electrical and electronic industry is very high in the Community. About 4% of all firms employ nearly 80% of the sector's total workforce and account for about 80% of its total turnover. It is a remarkable fact that in all EC countries and also in the other industrial countries, the size pattern of the firms is very similar. In all these countries, there is a number of very big firms which cover nearly all product segments and operate on a worldwide basis and then there is a host of small and medium-sized businesses.

Table 7: Electrical and electronic engineering
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.0	4.0
Production	2.0	4.0
Extra-EC exports	4.0	6.0

Source: ZVEI

In 1991, the three largest firms in the sector were: Siemens (D), Philips (NL) and Alcatel-Alsthom (F). It is interesting to note the strong presence of EFTA firms among the top 15 firms, the most important of them being Asea Brown Boveri (CH/S), Electrolux (S) and Ericsson (S).

Strategies

Besides expanding exports, the electrical and electronic industry continues to be strongly oriented towards investment activities abroad (establishment of production centres and marketing facilities). In combination with the extension of existing or opening up of new markets, these investments serve primarily the purpose of effecting sales. Attention is focused especially on the public procurement markets which are subject to the EC utilities directive, and on the South-East Asian area which is presently taken to be the strongest growth market for electronics. High growth potentials, too, are likely to result in the longer term from the dramatic political changes in Eastern Europe.

REGULATIONS

In the view of the electrical/electronic industry, public procurement plays a decisive role in the structuring of the internal market. In the European Community, the contracts awarded by the Government and state-owned companies such as public railways, posts and telecommunications and electricity supply companies account for a high proportion of the gross national product. The liberalisation of public procurement is, no doubt, necessary to take advantage of the benefits of enhanced competition offered by the big market, in the areas of supply covered by the utilities directive. Here, care must be taken to ensure that these EC regulations are really implemented and that the markets are opened up synchronously. But Europe-wide technical standards development, too, is an essential prerequisite for the expansion of trade.

ENVIRONMENT

The production of electrotechnical equipment is not normally harmful to the environment. A different matter, with the changed conditions of consumption, is the disposal of appliances no longer used by commercial and private consumers (e.g. refrigerators, TVs, measuring instruments etc.). As a result of the high supply of the market, a large number of appliances no longer needed becomes available each year. The electrical and electronic industry, especially in Germany and on lines similar to those of the packaging ordinance, developed early initiatives to solve the problems of waste disposal and recycling. It has also, for a while now, adjusted the design and construction of its appliances to a technology aimed at the maximum possible saving of energy. Beside these activities, it is an interesting fact that the electrical/electronic industry, with a variety of equipment, such as measuring instruments and controls, provides the necessary technological means without which no effective environmental improvement, of water, air or noise, is possible.

OUTLOOK

The structural environment of electrical/electronic engineering will continue to be marked by the liberalisation and harmonisation of the markets within the Community and by technological progress. Following the dramatic 8% decline in real production in 1993, a slight 2% growth is forecast for 1994 which is likely to bring a vigorous upturn in the following years. But this growth is not likely to make up for the cutbacks in employment made in 1993 and also expected for 1994. According to latest estimates, the world market for electrotechnical products will have nearly doubled its volume by the year 2000, compared with 1990. In this context, the future-oriented research and development work of the companies and their investment activity play a decisive role.

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Insulated wires and cables
NACE 341

The insulated wires and cables industry manufactures three main products: energy cables, information cables and winding wires. With more than 100 companies and more than 250 manufacturing facilities, the EC is the world's largest producer of insulated wires and cables, followed by the US and Japan. Demand for insulated wires and cables is influenced by two fundamental factors: the development of the infrastructure for electricity and telecommunications, and the general health of the economy.

INDUSTRY PROFILE

Description of the sector

The markets for insulated wires and cables are extremely diverse with applications in virtually all areas of modern life, from the winding wire in the electrical shaver to the optical fibre which provides the basis for the telephone call and to the energy cables which are used in the basic infrastructure of energy generation, transmission and distribution.

Electrical energy cables are fundamental to domestic life and all industrial and commercial activities in all parts of the Community. Wires and cables supply energy from the electricity generation centres to the individual point of utilisation, and differ according to the voltage range.

Information cables have two important areas of application: telecommunications and electronic data control and broadcasting. Recent demand has been strong in the field of telecommunications cables reflecting the massive surge in the demand for new telephones associated with the increasing use of fax machines as well as the demand associated with investment in the telecommunications infrastructure, particularly in those Member States which are modernising and extending the optical fibre network. Demand for information cables is also strong in the multifaceted area of electronic data/control applications and broadcasting. For many of the latest developments in information technology, communications cables, ranging from simple wires to coaxial cables, armoured cables and glass fibres are an important element.

Winding wires are used in all forms of electrical equipment where a magnet is required. Thus every electric motor, transformer, generator, dynamo, etc. requires a magnet or winding wire that is enamelled or otherwise insulated.

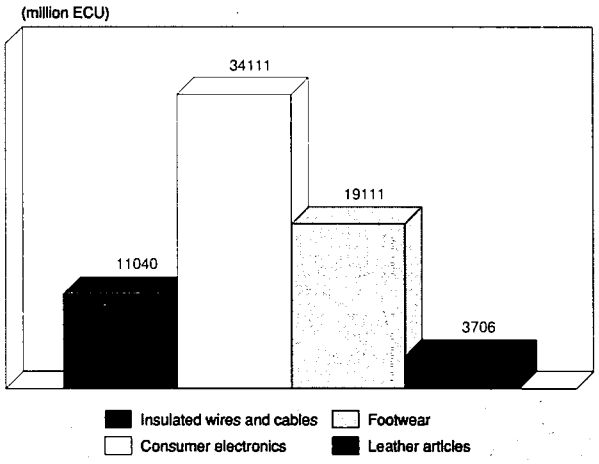
Recent trends

The fastest growing segment of the insulated wires and cables is that of information cables. Between 1986 and 1992, the share of communications cables in total production rose from 23% to 37%, while the share of energy cables declined from 70% to 56%. Winding wires accounted for the remaining 7% of total production value in 1992.

After five years of steady increase of the EC's consumption and production of insulated wires and cables, growth started to tail off in 1990. A sharp downturn in activity occurred in 1991, with apparent consumption plummeting as a consequence of the depression the sector's end-markets were experiencing. In 1992 and 1993, the recession converted into a considerably weaker demand in all EC countries. Demand in Spain and the United Kingdom remained flat, while France and Italy managed positive growth. Germany also reported positive growth of production. This performance should be analysed with caution, however. The German market only managed to retain its previous western level, and the overall growth figure largely benefited from the inclusion, from 1992 on, of activity originating in the eastern Länder. Production in western Germany was in fact actually down.

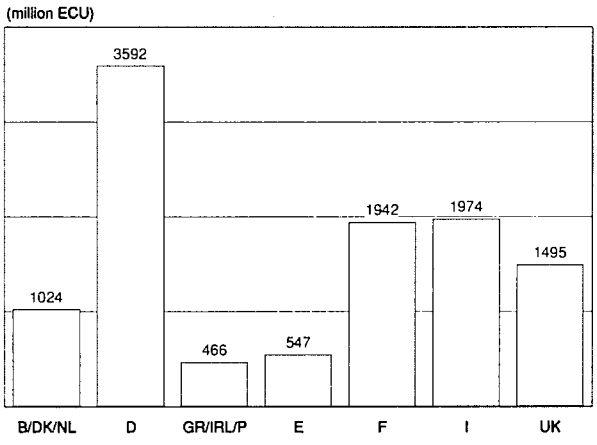
Between 1991 and 1992, employment in the insulated wires and cables industry fell sharply, reflecting recent restructuring and the adoption of less labour-intensive production techniques, but also reflecting the downturn in activity. In 1992, the number of people employed in the sector shrank by as much as 27% to 78 300, with a particularly sharp drop in the United Kingdom, Spain and Germany. As rationalisation of production facilities is bound to continue, employment is expected to drop further, though at a slower pace.

Figure 1: Insulated wires and cables Production in comparison with other industries, 1992



(1) These statistics have been arrived at by converting national currencies into ECU at rates representing the average for the previous year 1991. Resulting from changes in exchange rates during 1992, comparisons from nation to nation and year to year would otherwise be meaningless and the identification of trends, tendencies etc. impossible.
Source: Europacable, DEBA

Figure 2: Insulated wires and cables Production breakdown by Member State (1)



(1) These statistics have been arrived at by converting national currencies into ECU at rates representing the average for the previous year 1991. Resulting from changes in exchange rates during 1992, comparisons from nation to nation and year to year would otherwise be meaningless and the identification of trends, tendencies etc. impossible.
Source: Europacable

Table 1: Insulated wires and cables
Main indicators in current prices (1)

(million ECU)	1991	1992
Apparent consumption	11 478	11 021
Production	11 600	11 039
Extra-EC exports	1 606	1 674
Trade balance	122.4	18.0
Employment (thousands)	107.0	78.3

(1) These statistics have been arrived at by converting national currencies into ECU at rates representing the average for the previous year 1991.
Resulting from changes in exchange rates during 1992, comparisons from nation to nation and year to year would otherwise be meaningless and the identification of trends, tendencies etc. impossible.
Source: EUROPACABLE, DEBA

International comparison

The EC is currently the largest producer of insulated wires and cables in the world. Proximity to the market is very important, particularly for heavy industrial cable, and investment in Europe's infrastructure has thus been a strong source of demand for EC producers. Furthermore, healthy growth in export markets combined to boost annual production growth to more than 5% per year which is similar to rates achieved in Japan over the same period.

Foreign trade

EC cable-makers have always been an important source of cables worldwide with average exports over the past decade topping 1 billion ECU per year. The industry's trade balance, however, has declined sharply over the last several years. Traditionally strong net exporters such as Germany and the United Kingdom both became net importers in 1991. Trade data evidenced a continuing decline of EC's trade surplus in 1992.

The source of the weakness in EC exports can be explained in part by the fact that many former principal export markets have established their own production facilities. Sluggish markets in the Middle East oil-producing countries have been exacerbated by a tendency to greater home production. Opportunities still exist for EC cable makers, however, in countries where the level of technology is still beyond domestic production capacity. In order to benefit from these opportunities, EC companies are involved in joint ventures with local companies. This is particularly the case in countries of Eastern Europe where companies such as Alcatel or Siemens are engaging in ventures with local companies to build telecommunications infrastructure.

In terms of exports markets, the EFTA and OPEC countries are the single most important trading regions. The EFTA countries are not only the largest customers of insulated wires and cables, but they are also important suppliers, accounting for 31% of total extra-EC imports in 1992. Although the US was as important a supplier as the EFTA countries in 1986, its share of total EC imports fell to 19.9% in 1992.

MARKET FORCES

Demand

The three main categories of insulated wires and cables, that is, winding wires, information cables and energy cables, are subject to very different forces of demand.

The demand for energy cables is not only dependent on increases in electricity consumption but also on the demand for new generation and transmission facilities as well as on replacement demand. In the long-term, demand for energy cables will keep pace with the growth of GDP and the associated growth in electricity consumption. The customer structure of the energy cable industry shows the overwhelming share of power utility companies, which in many cases are publicly owned. As a result, the demand for wires and cables can be severely affected by energy policy; privatisation of the United Kingdom energy market was accompanied by a 35% fall in sales of insulated wires and cables.

The demand for information cables is linked to both the development of a country's telecommunications market and the level of advancement of its telecommunications infrastructure. The overwhelming portion of the market is accounted for by the public telephone network operators. The strongest growth is in trunk (long-distance) traffic, where technological developments have substantially reduced cable-costs. The demand for electronic data control cables is expected to continue its steady rise.

The demand for winding wires is naturally linked to trends in end markets such as electric tools and electro-medical devices.

Supply and competition

The production capacity of the EC cable and wire industry has traditionally exceeded demand. Technological improvements, an increase in capital intensity which has changed production techniques and shrinking home demand are the key forces which have combined to change the environment in which manufacturers operate.

The EC cable and wire industry has achieved a world lead in numerous technologies which are important for cable production: non-ferrous metallurgy, insulation physics, rubber chemistry, hightech materials, superconductivity, electrical engineering for power cables and opticalfibre technology for telecommunications cables. The industry's investment in R&D has also translated into new production techniques which have generated higher turnover and a steady decrease in employment, which has brought about a steady increase in productivity.

Production process

Two raw materials are of particular importance to insulated wires and cables production: copper and aluminium. In the EC cable and wire industry, more than 1.4 million tons of copper and about 196 000 tonnes of aluminium were used in 1992. The use of these two main inputs, however, varies according to their price, which fluctuates widely, taking into account the fact that about twice as much aluminium as copper is needed in electrical applications (copper is a better conductor of electricity than aluminium).

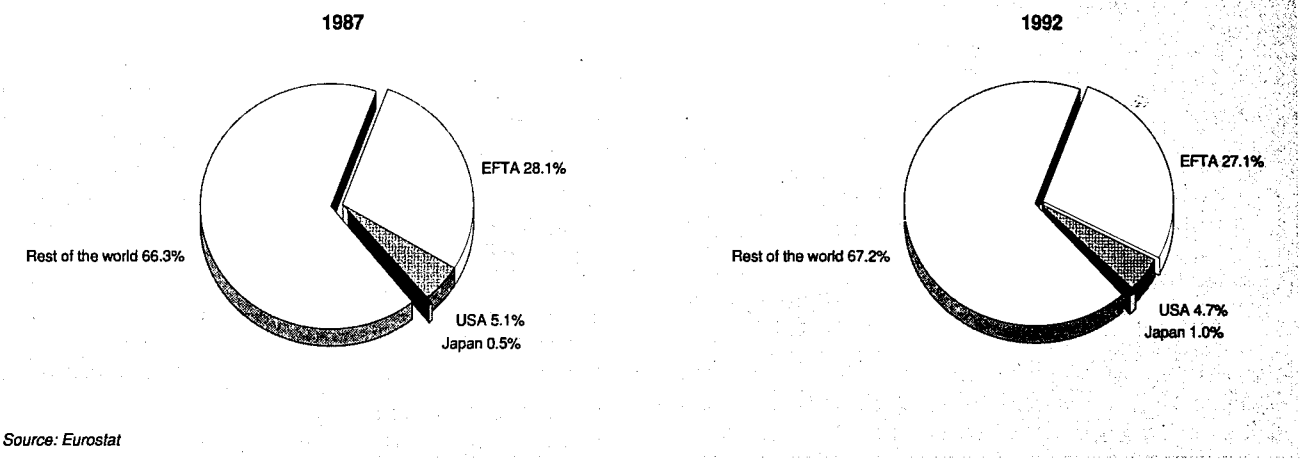
The trend in copper prices provides an example of the degree of this price variability; the price per tonne of copper doubled from 1 592 ECU per tonne in January 1986 to 2 986 ECU in January 1989. The average price per tonne of copper in 1991 was 1 772 ECU. Given these wide price fluctuations,

Table 2: Insulated wires and cables
Breakdown by sector (1)

(million ECU)	1992
Energy cables	6 137
Telecom cables	3 112
Data and control cables	914
Winding wires	877

(1) These statistics have been arrived at by converting national currencies into ECU at rates representing the average for the previous year 1991.
Resulting from changes in exchange rates during 1992, comparisons from nation to nation and year to year would otherwise be meaningless and the identification of trends, tendencies etc. impossible.
Source: EUROPACABLE

Figure 3: Insulated wires and cables
Destination of EC exports



Source: Eurostat

not to mention currency fluctuations, the trends in consumption, production and foreign trade in insulated wires and cables which appear in this report must be viewed in light of the price trends of its main raw materials.

During the last ten years, optical fibre has become another strategic input in the production of telecommunications cables. Optical fibre cables are particularly designed for transmitting data and sound impulses and signals. Perfect substitutes to copper cables in this type of applications, optical fibre cables also provide higher transmission capacity and are much cheaper than metal cables. The industry performed a major substitution from copper to optical fibre in the production of telecommunication cables. This shift accelerated in the last five years leading to a dramatic overcapacity. Although there are similarities between the manufacturing and production technologies applied, the production of optical fibre cables requires a clean, laboratory-type atmosphere, by contrast with the production of copper cables, which basically remains a metallurgical process. As a result, cable manufacturers tended to construct new plants dedicated to the manufacture of optical fibre cables instead of converting copper cable production facilities towards optical fibre processing. Today, as it is experiencing plummeting demand for copper cable, the EC industry faces a gross over capacity, and is actually operating close to break-even.

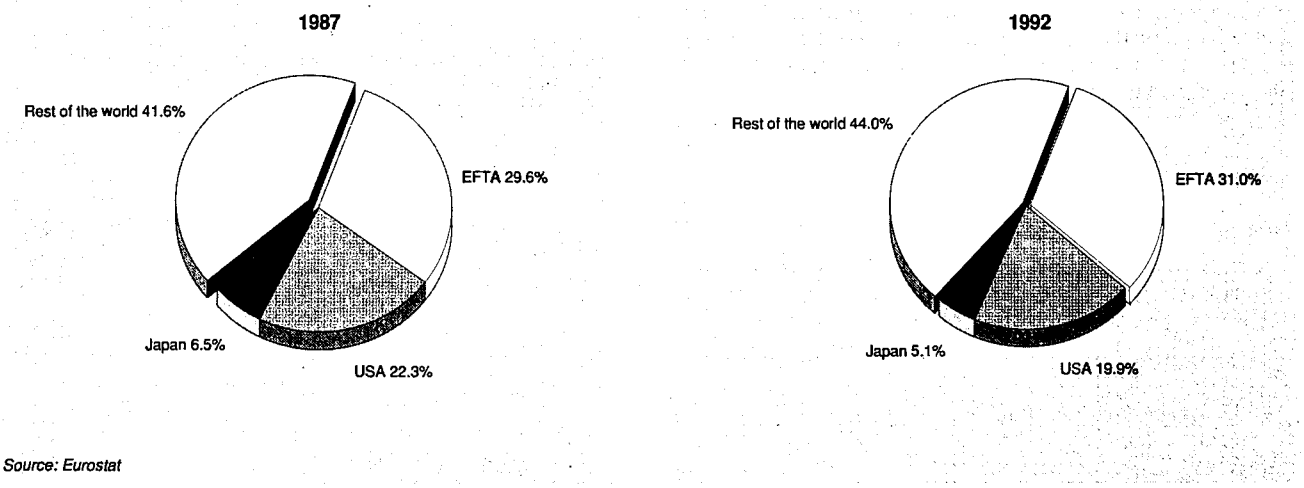
A painful restructuring is thus on the agenda even after the previous rationalisation of production facilities that led to a dramatic fall in employment levels.

INDUSTRY STRUCTURE

Companies

There are more than 100 firms that produce cables and insulated wires in the EC with 250 production facilities and almost 90 000 employees. Production sites are located in all Member States, with the exception of Luxembourg. The major manufacturers of insulated wires and cables are Alcatel (F), BICC (UK), Pirelli (I) and Siemens (D). If all of Europe is considered, ABB (S/CH) should be added to the list. These large companies produce both energy and telecommunications cables as well as winding wires. Small enterprises tend to specialise in one product, often in energy cables, although this varies according to country. In the smaller countries, small companies often manufacture the whole spectrum of products. In the France, Germany and Italy, however, apart from four of the top five large producers, there are many small specialist producers.

Figure 4: Insulated wires and cables
Origin of EC Imports



Source: Eurostat

Table 3: Insulated wires and cables
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 256.8	1 258.9	1 503.6	1 214.2	1 136.9	1 152.0	1 408.8	1 533.1	1 605.9	1 665.3
Extra-EC imports	415.5	536.0	639.7	610.6	725.2	909.1	1 174.8	1 336.5	1 483.5	1 658.3
Trade balance	841.2	722.9	863.9	603.6	411.7	242.9	234.0	196.6	122.4	7.0
Ratio exports/imports	3.02	2.35	2.35	1.99	1.57	1.27	1.20	1.15	1.08	1.00
Terms of trade index	111.1	103.9	100.0	106.7	104.9	100.2	98.4	97.9	93.2	95.1
Intra-EC trade	855.6	1 050.5	1 306.3	1 430.0	1 471.3	1 722.5	2 179.4	2 331.7	2 519.4	2 710.4
Share of total imports (%)	67.3	66.2	67.1	70.0	67.0	65.4	64.9	63.5	61.8	62.0

Source: DEBA

As a matter of fact, about 10% of production volume is accounted for by small and medium-sized companies in the EC.

The increasing share of glass fibre cables in telecommunication cables has led to the fusion of small and mid-sized firms in order to provide the necessary capital foundation for the technologically demanding production process. There are now only about a dozen manufacturers of optical fibre in the EC.

In the past few years, there have been several mergers and acquisitions. Examples are Alcatel's acquisition of the German AEG Kabel AG, BICC's purchase of KWO (D), and Pirelli's purchase of STC (UK). In 1993, further restructuring took place in the EC, with several mergers and acquisitions carried out by large companies, like the purchase of the German communications cables business of Philips by the joint venture between Nokia (SF) and NKF Kabel (NL); Draka (NL) purchased the Dutch communications cables business of Philips. This wave of mergers and acquisitions is not over, as evidenced by the ongoing purchasing process by Alcatel Cable (F) of the undersea communications cables business of Northern Telecom through its subsidiary STC (UK).

The EC insulated wires and cables industry is also characterised by its complete independence from its downstream industries, in spite of the close commercial links they have developed in terms of supply. The industry's activities do not evidence any vertical integration in Europe. The only example of such integration can be found in the USA, with AT&T, the leading telecommunications network operator, also active in cable and telecommunications equipment.

Strategies

To meet the challenges of increased competition, there are three main strategies: investment, research and development and cooperation and concentration. Investment activities have shown an upward trend, at least in the five EC countries for which figures are available. The main motive for investment is an increase in productivity and reduction in costs, especially labour costs. In the years when the cable business was booming, expansion was an additional objective.

Innovation in new products or new processes and production methods are other strategies for keeping up with the competitors.

Mergers, acquisitions, alliances and joint ventures are organisational methods for increasing or at least maintaining competitiveness on the international market. Several large cable manufacturers have made cross-border investments within the EC, either for reasons of cost or for closer proximity to markets. Investments outside of the EC have been made, above all, by French, Italian, British and German cable producers; these have been primarily in North America (USA, Canada), Latin America (Mexico, Argentina, Brazil and Peru) and Africa (Lebanon, Morocco, Nigeria and South Africa). The EC cable manufacturers currently show increasing interest in the emerging and promising East European and Chinese markets. Such investments outside of the EC have been primarily made in order to benefit from growing markets, and also aimed at diversifying into new markets to reduce companies' vulnerability to business cycles and over dependence on mature and declining markets.

REGIONAL DISTRIBUTION

The hub of EC insulated wires and cables is undoubtedly Germany, which accounts for 28% of total EC production and 33% of EC employment in the sector in 1992. The other large producing countries were Italy, France and the UK in decreasing order of importance in production terms. A glance at the regional distribution gives evidence of the gravitation of production of insulated wires and cables towards the industrial heartlands. Relatively limited by high transportation costs, particularly for heavy industrial cable, producers have made near their main customers who are predominantly located in central and western regions of the EC. The latter area accounted for more than 72% of EC production in 1992 and occupied greater than 76% of total EC employment in the sector.

ENVIRONMENT

Generally speaking, cable manufacturing is not a burden on the environment. The manufacturing process is clean and the materials used are normally non-toxic; those posing potential risks are strictly regulated. The cable industry has been very responsive to environmental concerns. In 1993, the manufacturers actually expressed this environmental consciousness by producing a voluntary code of practice.

The industry puts particular attention in its use of raw materials and its design of products minimising the potential hazards of their installation and use. Specially designed cables with reduced flammability are available and there are already acceptable alternatives to PVC and other compounds in areas with fire risks. Cable makers no longer use materials containing dioxin and are investigating the possibilities of substituting materials containing halogens. Cable insulation without halogens emits little in the way of toxic fumes. This is particularly important in public areas, in transport and warehouses as well as any place frequented by people or housing combustible goods.

REGULATIONS

Regulations that relate to technical standards, the use of dangerous preparations and health and safety all have implications for cable makers although there are no specific directives which are directed to the industry. The directive on harmonising national provisions on electromagnetic disturbance levels (89/336/EEC), for example, lays down the rules to which

cable and other electrical equipment manufactures must adhere.

On another front are the public procurement directives which liberalise the awarding of public contracts. The market for insulated wires and cables has been dominated in the past by the public utilities (both in energy and telecommunications) which often favour national suppliers. With the liberalisation of the tender procedure and procurement, competition within the EC will intensify. Harmonised standards will also allow EC manufacturers and their foreign competitors to penetrate other markets than their own.

OUTLOOK

The outlook for the EC insulated wires and cables sector is rather diverse across the three main categories, as they are subject to very different forces of demand. The development of the information technology market and the expected increase in personal communications will dramatically increase demand for information cables. There is a tremendous scope for the development of this market, which will further benefit from the ongoing market deregulation. Prospects are rather promising for optical fibre cables, the demand of which will increase steadily while demand for copper cables will drop sharply. Equally, if not more important, will be the impact of privatisation and the liberalisation of public procurement on the energy and telecommunications sectors.

The market for energy cable is now fairly limited as the energy infrastructure is virtually complete in the EC (with the notable exception of the east German federal states which represents a significant outlet for the industry in the EC). As for telecommunications and energy cables, sales possibilities in Third World markets will increase only slightly; despite great needs, improvement in the infrastructure is making no or only very little progress due to limited financial leeway.

Table 4: Insulated wires and cables
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.0	3.0
Production	2.0	3.5
Extra-EC exports	3.5	4.0

Source: DRI

The demand for winding wires, influenced by overall trends in the manufacturing industry in the EC, will face a further decline in demand as its main client industries (such as the automotive and domestic appliances industries) remain in the doldrums in the short term. In contrast, demand for data and control cables will remain buoyant. EC's industry will face fierce competition in this market segment, however, from computer-producing countries such as Japan or the USA.

In the long-term, demand for energy cables will strongly depend on the growth in GDP and the associated increase in electricity consumption. The demand for data and control cables as well as for winding wires will be primarily influenced by overall trends in the manufacturing industry in the EC. Telecommunications cables will remain the fastest growing segment, and will benefit from increased deregulation and the associated development of individual applications.

Written by: DRI Europe

The industry is represented at the EC level by: European Confederation of Associations of Manufacturers of Insulated Wires and Cables (EUROPACABLE). Address: rue du Luxembourg 19-21, B-1040 Brussels; tel: (32 2) 513 0612; fax: (32 2) 502 2169.

Electrical machinery
NACE 342

After demand for products of the electrical machinery industry boomed during the second half of the eighties, production growth rates flagged down in the recent past. Indeed, overcapacity in the electricity generating sector and the decline in investment activity dampened demand for the industry's products.
Competition from outside the EC increased as well, particularly in the field of mass production of standard types of equipment.
During the course of the nineties, demand for the industry's products is expected to grow, mainly boosted by demand from the developing countries (South East Asia, China and East Europe). Domestic demand is expected to increase at a slower pace, in line with market saturation due to the investment boom in the recent past.
Competition from countries outside the EC is expected to rise during the next several years, as common technical standards within the EC are likely to ease the grip on this market for foreign competitors. Thus, EC firms have to increase their cooperation efforts, to streamline production and improve cost competitiveness.

INDUSTRY PROFILE

Description of the sector

The electrical machinery industry comprises two main sectors: the manufacture of machines, apparatus and instruments for the production and conversion of electricity; and the manufacture of equipment for the distribution of electric power.

The first subsector covers the production of electric motors, electricity generators and rotary converters, transformers, current rectifiers, electromagnets and electromagnetic apparatus.

The second subsector covers the production of apparatus for closing, opening, and protecting electric circuits of 1 KV or more (high-voltage switch gear), installation equipment up to 1 KV (low-voltage switch gear), and fixed and variable resistors, including potentiometers.

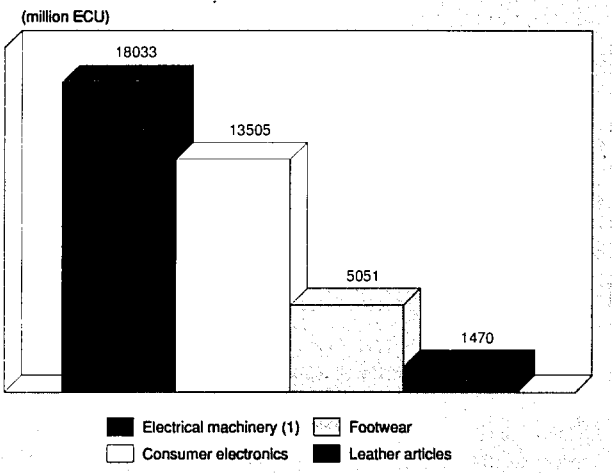
Germany is the most important producing country in the EC, with about 41% of total EC production, measured in terms of value added, followed by France (33%), the United Kingdom (14%) and Italy (10%).

Among manufacturing industries, the electrical machinery industry is of important economic weight. Measured in terms of value added in 1992, its output was about 30% higher than that of consumer electronics.

Recent trends

The electrical machinery industry in the EC enjoyed favourable development conditions over the last years. Production increased by 2.4% per year in volume from 1983 to 1992, a rate slightly below the overall growth of the manufacturing sector (2.8% per year over the same period). Demand for the products of the industry grew at a faster rate, of some 3% per year in volume. During the last few years, however, the industry was confronted with strong competition from outside the EC. Extra-EC imports grew by nearly 9% per year in volume from 1983 on, to reach some 8 500 million ECU in 1992 (i.e. some 20% of apparent consumption). After slow growth from 1983 to 1988, exports to countries without the EC grew briskly, at some 5% per year in real terms from 1988 to 1992.

Figure 1: Electrical machinery
Value added in comparison with other industries, 1992



(1) BAK estimate
Source: DEBA

The industry is highly export oriented, with sales outside the community of about 22% of production in 1991. The trade balance has been positive throughout the last decade, but has deteriorated considerably over time.

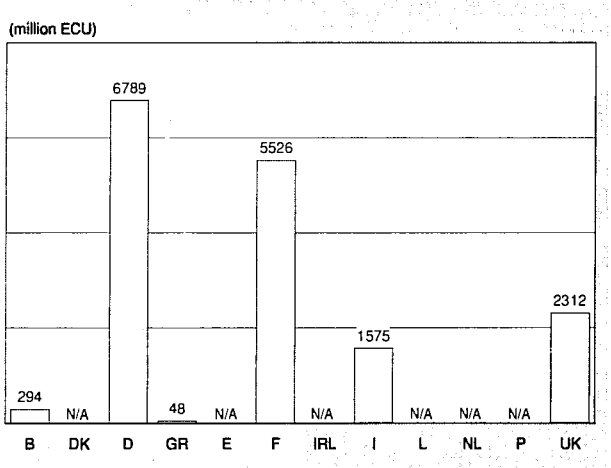
International comparison

The EC is the most important producer of electrical machinery within the triad. In 1992, Japanese production represented about 82% of EC production, while US production represented about 68%. Japanese production increased fastest, by roughly 41% from 1987 to 1991, an annual average growth rate of some 9% in volume. EC production developed more moderately, at roughly 3% growth per year in volume from 1985 to 1992. US production increased by only 1% per year over the same period and has actually been declining since 1989.

Foreign trade

The most important feature of the last decade was the fast growth of imports, which gained by more than 13% per year in value from 1982 to 1991. The EFTA countries were and remain the most important exporter to the EC, providing about

Figure 2: Electrical machinery
Value added by Member State, 1992



Source: DEBA

Table 1: Electrical machinery
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)
Apparent consumption (1)	28 137	29 732	32 063	33 883	35 976	39 317	43 003	45 663	44 830	43 303	41 500
Production (1)	32 318	33 196	35 828	37 369	38 758	41 857	45 530	48 490	47 520	46 336	44 600
Extra-EC exports	6 945	6 996	7 656	8 234	7 779	8 570	9 666	10 286	11 151	11 546	11 700
Trade balance	4 181	3 464	3 765	3 486	2 782	2 540	2 527	2 827	2 690	3 033	3 100

(1) BAK estimates
(2) Rounded BAK estimates
Source : Eurostat

Table 2: Electrical machinery
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	4.1	2.0	3.1
Production	2.8	1.9	2.4
Extra-EC exports	1.4	4.7	2.9
Extra-EC imports	11.9	5.1	8.8

(1) Except for trade figures, BAK estimates
Source : Eurostat

Table 3: Electrical machinery
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	6 945	6 996	7 656	8 234	7 779	8 570	9 666	10 286	11 151	11 546
Extra-EC imports	2 764	3 532	3 891	4 748	4 997	6 030	7 139	7 459	8 461	8 513
Trade balance	4 181	3 464	3 765	3 486	2 782	2 540	2 527	2 827	2 690	3 033
Ratio exports/imports	2.51	1.98	1.97	1.73	1.56	1.42	1.35	1.38	1.32	1.36
Terms of trade index	111.3	102.8	100.0	102.1	101.6	102.9	101.5	105.0	100.8	99.8
Intra-EC trade	4 349	5 054	5 679	7 249	7 834	9 056	10 435	11 693	12 232	12 818
Share of total imports (%)	61.1	58.9	59.3	60.4	61.1	60.0	59.4	61.1	59.1	60.1

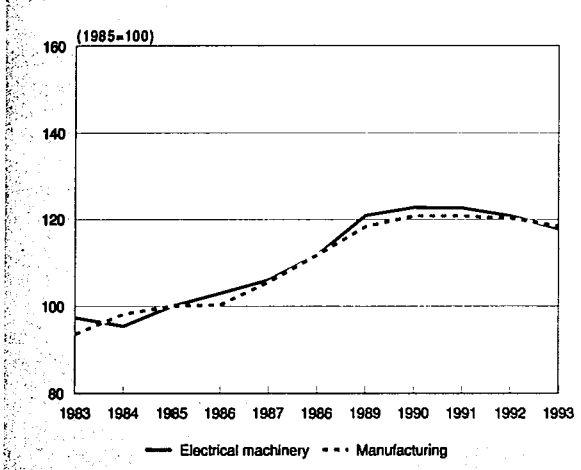
Source : Eurostat

Table 4: Power transformers
Trade by Member state, 1992

(thousand ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EC
Extra-EC exports	64 945	9 199	166 322	2 292	31 277	141 975	4 235	74 975	26 169	23 690	76 001	621 080
Extra EC imports	10 784	17 255	99 709	1 383	16 167	40 651	10 076	27 929	14 406	4 406	60 838	303 604
Trade balance	54 161	-8 056	66 613	909	15 110	101 324	-5 841	47 046	11 763	19 284	15 163	317 476
Ratio exports/imports	6.0	0.5	1.7	1.7	1.9	3.5	0.4	2.7	1.8	5.4	1.2	2.0
Intra EC trade	53 912	8 896	88 081	4 345	39 782	74 131	7 205	19 920	44 853	13 200	44 955	399 280
Share of total imports (%)	83.3	34.0	46.9	75.9	71.1	64.6	41.7	41.6	75.7	75.0	42.5	56.8

Source : Eurostat

Figure 3: Electrical machinery
Production in constant prices compared to EC manufacturing (1)



(1) BAK estimates
Source: DEBA

29% of total extra-EC imports. Switzerland, in particular, is an important competitor for EC producers. The United States and Japan both hold a market share in EC countries of slightly above 20%. During the last years, however, all the traditional competitors (with the exception of Japan), have been losing market share in the EC, mainly to the benefit of the developing countries, whose market share increased from 20% in 1987 to 28% in 1992.

Extra-EC exports grew by 5.8% per year in value from 1983 to 1992. The most important market for EC producers is the developing countries' group (including the East Asian NICs) which received about 60% of total extra-EC exports in 1992. EFTA countries receive about 26% and the United States about 13%. The main feature here is the increasing importance of the fast growing markets in South East Asia for EC producers.

The EC trade balance has remained positive, with exports about one third higher than imports. The surplus in the trade balance, however, has declined.

Trade within the EC has been growing fast, by some 13% per year, over the period 1983 to 1992. The share of intra-EC trade, out of total EC imports, has remained more or less constant, over the same period. The most important intra-EC exporter in the EC is Germany, with about 42% of the total, followed by France (19%), the United Kingdom (10%) and Italy (9%).

MARKET FORCES

Demand

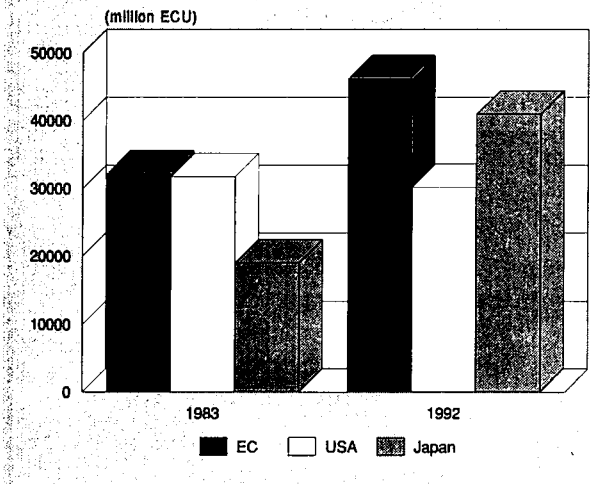
In the field of the electrical machinery's industry as a whole, demand for the products increased considerably over the last several years. Considering the heterogeneity of the industry, demand analysis must be done separately for the different subsectors.

Demand for products closely related to manufacturing processes benefited mostly from the investment boom that started in the second half of the eighties. The EC manufacturing sector made efforts to expand production capacities and to improve production efficiency in expectation of the Common Market. These increased efforts provided producers of electric motors, electromagnetic apparatus, low- voltage switch gear (opening, closing and protecting electric circuits of less than 1 KV), installation equipment and fixed and variable resistors with robust and fast growing demand. Product innovation contributed to the demand performance as well: one example is the switch from DC converters to three phase converters. In the last few years, however, following the decline in investment activity, demand for the industry grew more moderately.

Subsectors, more closely related to the production and conversion of electricity, went through a quite different development pattern over the last decade. Fast growing demand for electric power during the second half of the eighties resulted in the expansion of electrical energy supply, as well as of distribution networks. Producers of equipment such as electricity generators, transformers and high-voltage switch gear (opening, closing and protecting electrical circuits with more than 1 KV), benefited from this demand boom during this period.

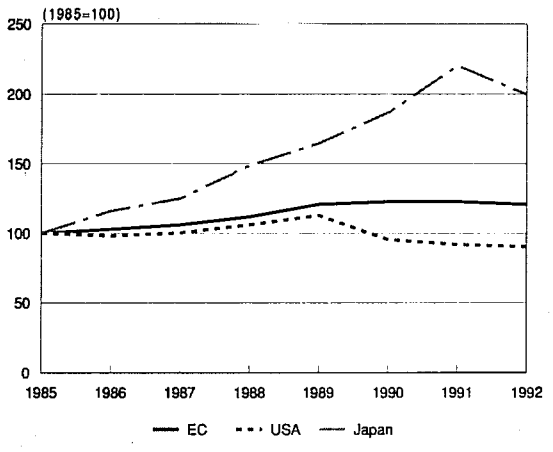
In the last few years, however, the demand picture has changed. With the slowdown of electricity demand growth, as a consequence saturated markets, along with the fall in prices of fossil fuels and energy saving measures, demand for products

Figure 4: Electrical machinery
International comparison of production in current prices



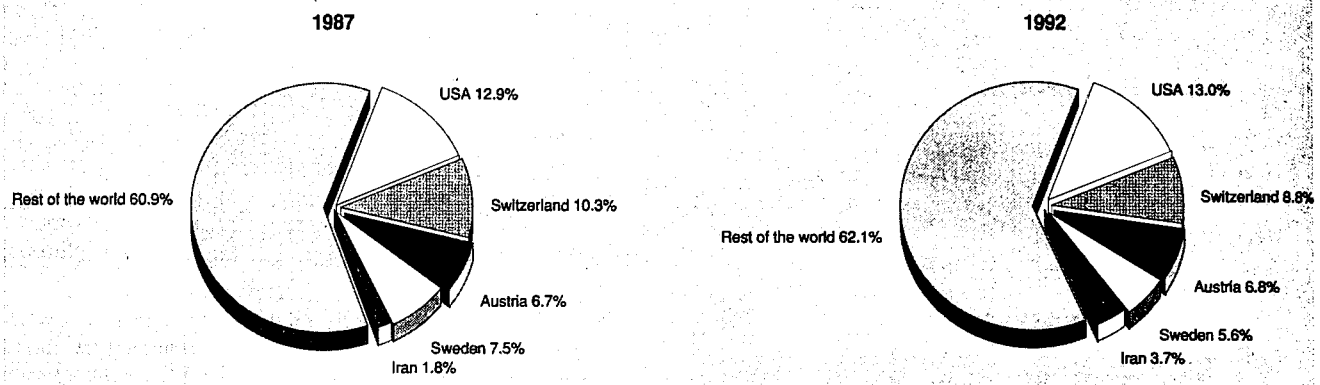
Source: BAK, Census of Manufacturers, Nikkei

Figure 5: Electrical machinery
International comparison of production in constant prices



Source: BAK, Census of Manufacturers, Nikkei

Figure 6: Electrical machinery
Destination of EC exports



Source: Eurostat

related to the generation and distribution of electricity has been declining. Electricity distribution companies have now completed very substantial investments in most of the EC countries, with the result that the industry now has significant excess capacities. Investments in these areas will therefore be oriented towards replacement, rather than towards capacity increase, at least for a number of years.

In addition, the recent downturn in general economic activity has affected demand for the industry's products, as decisions to invest in power stations are closely tied to expected growth of GDP. Another hampering factor for demand on international markets, which could partly compensate for losses on the domestic market, is protectionist measures, which limit the opportunities for EC producers, as the production of electric energy is regarded often as "strategic".

Supply and competition

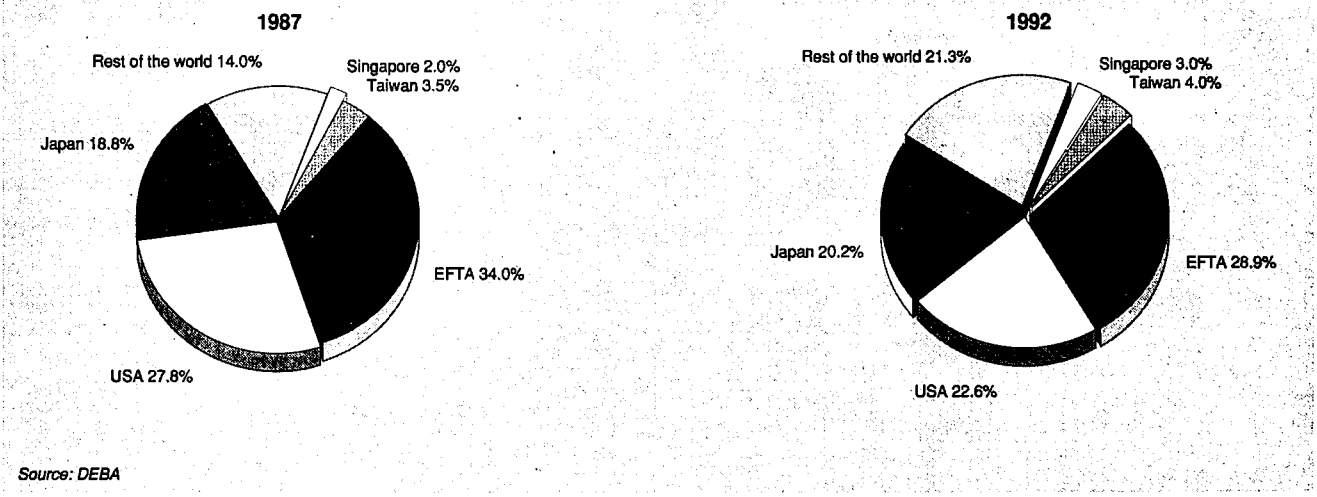
In line with the increased in demand, production of electrical machinery in the EC production grew briskly over the last decade. In high-voltage switch gear, the EC is the most important producer, with a world production share of 35% in 1990. The share of the United States reaches roughly 28%, slightly above Japan's (26%). In the field of low-tension switch gear, the situation is nearly the same, with the EC in the leading position (35% in 1990), followed by the US (24%) and Japan (20%). Both, the United States and the EC, have lost production share, while Japan has increased its share over the last decade.

The sharp increase in imports from outside the EC, resulted in a decrease of the EC trade balance. Consequently, the import- consumption ratio increased from some 10% in 1983 to about 20% in 1992.

In the field of transformers, imports increased sharply during the last years, so that the ratio of exports to imports dropped from over 6 in 1982 to around 2 in 1991. The most important competitors are the United States and Japan, as well as South Korea and the EFTA countries (mainly Switzerland and Sweden).

In the field of low-tension switch gear, competition from outside the EC increased as well, mainly from Japan and the East Asian NICs. The latter are highly competitive in terms of prices, as a consequence of lower production costs, subsidised input prices and dumping policies. As to the Japanese,

Figure 7: Electrical machinery
Origin of EC imports



Source: DEBA

Table 5: Power transformers
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	546	489	439	421	376	412	484	510	568	621
Extra EC imports	102	137	146	158	159	220	271	259	280	304
Trade balance	443	352	293	264	253	263	239	309	341	317
Ratio exports/imports	5.3	3.6	3.0	2.7	2.6	2.2	1.9	2.2	2.2	2.0
Intra EC trade	160	209	209	208	224	254	309	378	402	399
Share of total imports (%)	61.0	60.4	58.9	56.9	58.5	53.6	53.2	59.4	58.9	56.8

Source: Eurostat

who dominate the market in South East Asia, they tend to specialise in mass production of standard type of equipment, which allows them to benefit from economies of scale.

Regarding high-voltage switch gear, on the other hand, world trade amounts to only about 23% of world production; this relatively low share is explained by the protected character of public markets.

Intra-EC trade in the electrical machinery industry increased considerably as well. This development is mainly the result of the opening of electricity markets to competition, in line with the advent of the Common market in 1993, stimulating efforts by producers to get a foothold in other EC member countries.

INDUSTRY STRUCTURE

Companies

The larger companies in the industry usually operate in a wide range of fields, while smaller firms are usually active only in a few subsectors; some firms work in niche markets, producing only one or two types of products.

The industry is dominated by a small number of very large companies, which operate in a wide range of electrical engineering activities. The most important are ABB (CH/S), the largest producer in the EC, Siemens (D), AEG (D), and GEC-Alsthom (UK/F).

In addition, there is a large number of more specialised small to medium-sized companies, as for example Transfo (F) and Pauwels (B), which specialise in the production of transformers.

Around 35 000 people are employed in the high-voltage switch gear industry in the EC; in the field of low-voltage switch gear, Germany alone, the largest EC producer, employs 48 000 people.

The larger firms in the EC operate on global markets, where they face strong competition from the United States and Japan. The smaller companies, on the other hand, are oriented towards niche markets, where they produce client-oriented equipment. Consequently, these firms often operate on the national market only, or even in regional markets.

In the United States, an important company is the Westinghouse Electric Corporation, which is a premier producer of transformers, besides its other varied activities. In Japan, the most important companies are Mitsubishi Electric Corp. and Kawasaki Heavy Industries Ltd, both in the field of electric power generation equipment.

Strategies

The EC electrical machinery industry has a relatively strong position in its own market. Nevertheless, competition from outside the EC has been growing over the last few years, often due to cost advantages, in particular regarding the East Asian NICs. Efforts of EC producers, therefore, need to be oriented towards cost reduction. On the other hand, EC firms also need to increase their R&D expenditures as well, to improve the performance of their products. To meet these and other challenges, companies are investing efforts to streamline production, through mergers and acquisitions.

In the field of transformers, the weakness of demand, in the face of excess production capacity, has brought about numerous structural changes, as many of the Community's producers were forced to close production units and to rethink their product range.

Another strategy would be for EC companies to increase their export efforts towards growth markets such as East Europe and the developing countries. China in particular is one of the most important promising potential outlets as the fast developing economy requires ever-growing sources of power. However, to succeed in these countries, EC firms will need to gain a foothold there, through joint ventures, cooperation agreements, subcontracting and the like. Thus, to facilitate its penetration in East Europe's markets, Siemens (D) has formed a capital tie-up with Skoda, a Czech maker of heavy electrical equipment; these two companies plan to set up a joint venture in Czechoslovakia to manufacture equipment for nuclear, thermal and hydroelectric power generation plants, as well as anti-pollution devices. Other similar agreements are the tie-up of Hitachi with General Electric of the US, for collaboration in the area of heavy electrical equipment; one result of the agreement has been the two firms' take-over of the Georgia based High Voltage Breakers Inc.. Another important tie up is the agreement between Mitsubishi Electric Corp. and Westinghouse, in the field of electric power generation, to seek enhanced competitiveness in advanced technology. These trends to increased co-operation between companies are expected to continue in the future.

REGIONAL DISTRIBUTION

Regarding the various subsectors of the electrical machinery industry, Germany is the largest producer in the transformer industry, as well as in high-tension and low-tension switch gear. Germany leads also in exports of transformers into the EC member countries (20% of intra-EC trade), as well as extra-EC exports (29% of total EC exports).

In the field of high tension switch gear, the production share of the German firms has been declining during the last decade from 42% of total EC production in 1980 to 36% in 1990, mainly to the benefit of Italy, which increased its production share from 14% to 17% during the same period. In the same subsector, the share of exports by the German firms out of total EC exports declined during the last decade from 36% in 1980 to 30% in 1990. French firms, in contrast increased their market share from 30% in 1980 to 44% in 1990.

Table 6: Electrical machinery
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.6	2.4
Production	1.5	2.1
Extra-EC exports	3.0	3.5

Source : BAK

ENVIRONMENT

Ecological concerns regarding the production process are not of major importance for this industry. In the past, the use of PCB (polychlorinated bi-phenyls) to isolate the wires in the body of transformers did represent an environmental danger, but this has since been discontinued.

On the other hand, it is likely that the industry will benefit indirectly from increased concerns about emissions damaging to the environment. Coal fired power plants, for example, may have to be substituted for by cleaner electrical energy generating methods.

REGULATIONS

The Directive 89/392, dealing with the standardisation of health and safety requirements of machines, is of particular importance to this industry. Machinery must conform to these regulations in order to be eligible for the EC label.

Two other important directives for this industry are the Low Voltage Directive (73/23/EEC) and the Electromagnetic Compatibility Directive (EMC; 89/339/EEC)

OUTLOOK

In the short term, prospects for the electrical machinery industry in the EC are somewhat pessimistic, as demand will grow only moderately. Those subsectors closely related to industrial investment activity will continue to suffer from the low propensity of companies to increase their production capacities. With the expected economic recovery in one to two years time, demand for this group of products is expected to start growing again. New markets in developing countries (in the short- to medium-term), and in East Europe (in the medium-term), will provide stable sources of demand growth in the future. In developed countries, on the other hand, demand is expected to grow only moderately, if at all. Competition from outside the Community is expected to stiffen, particularly from the East Asian NICs and Japan.

Subsectors related to the construction and expansion of power plants and distribution systems will experience moderate demand growth as well. Recent investments in the expansion of electricity networks, mostly of them completed by now, have led to overcapacities, at least in EC countries; demand for new equipment there is expected therefore to decline. Demand for replacement equipment, on the other hand is expected to be stable. The trend towards more efficient use of energy is an additional factor for a slower future growth. Within the EC, new demand can be expected in South Europe and in Ireland, where additional infrastructure and high-tension links are planned. New demand may also come from the East Asian NICs, East Europe and China. However, stiffening competition on these markets is to be expected. In East Europe, competition stems from the Polish, Bulgarian and the CSFR electrical machinery industries, which are important manufacturers in the field of high-voltage transformers. In China and South East Asian markets, Japanese companies as well as home grown producers will be the strongest competitors.

Within the EC, competition is also expected to increase, as common technical standards and trade liberalisation foster cross-border competition among EC member countries, besides easing also penetration by extra-EC competitors.

Written by: BAK
The sector is represented at the EC level by: Comité de coordination des Associations de Constructeurs d'appareillage industriel electrique du Marche Commun (CAPIEL). Address: c/o ZVEI Postbox 700 969 D-6000 Frankfurt/Main 70; tel: (49) 69 63 02298; and,
Comité des Associations de Constructeurs de Transformateurs du Marché Commun (COTREL). Address: c/o Fabrimetal, Rue des Drapiers 21, B-1050 Brussels; tel: (32 2) 510 2521; fax: (32 2) 510 2561.

Electrical equipment for industrial use

NACE 343.1

Demand for electrical equipment for industrial use is highly sensitive to the general economic situation. The industry covers indeed a variety of subsectors producing investment goods, as well as intermediate goods used for the subsequent treatment in the industrial production process.
The decline in investment activities in the beginning of the nineties resulted therefore in a decrease in demand for the industry's products. Prospects for the short term are somewhat pessimistic, as the poor economic situation is not expected to change significantly before the middle of 1994. After this turning point, the industry should benefit from investment-led growth during the course of the nineties.
The competitive position of EC producers in the industry is quite good and the trade balance is positive, though deteriorating. Mainly in the field of mass-production products, competition from low cost producers is becoming potentially dangerous.

INDUSTRY PROFILE

Description of the sector

The electrical equipment for industrial use sector comprises a number of little related subsectors:

- electrical equipment related to internal combustion engines, to motor vehicles and other means of transport, and to traffic;
- electrical industrial and laboratory furnaces, ovens and other types of heating equipment;
- equipment, machinery and materials for electric welding and cutting of metals;
- hand held electrical tools;
- other electrical apparatus, appliances and equipment for industrial use.

Activities in this sector are spread among a large number of producers who are either narrowly specialised or active in a number of subsectors. Given the sector's heterogeneity, its analysis must be done by subsectors, rather than on the sector as a whole.

Recent trends

Over the last five years, total extraEC exports of the industry as a whole have remained more or less constant, but with significant year by year fluctuations. ExtraEC imports, on the other hand, increased by some 8% per year in value, during the same period. As a result the trade surplus, some 800 million ECU in 1988, fell by half over the period. Trade among EC member countries has been growing considerably as well, at an annual rate of about 8% per year, similar to that of extraEC imports. Consequently, the share of intraEC imports out of total EC imports has remained unchanged. In 1992, the value of intraEC trade was more than two times larger that of extraEC imports.

In 1988, total consumption of welding equipment in Germany, France, Italy, the UK, Spain and the Netherlands was about 870 million ECU. About half of the total represented arc welding equipment, 40% resistance welding equipment, and a little over 10% other types of equipment, such as laser and electron beam machines. Within these six countries, Germany was the largest consumer with some 44% of the total, France followed with 22% and Italy with 16%.

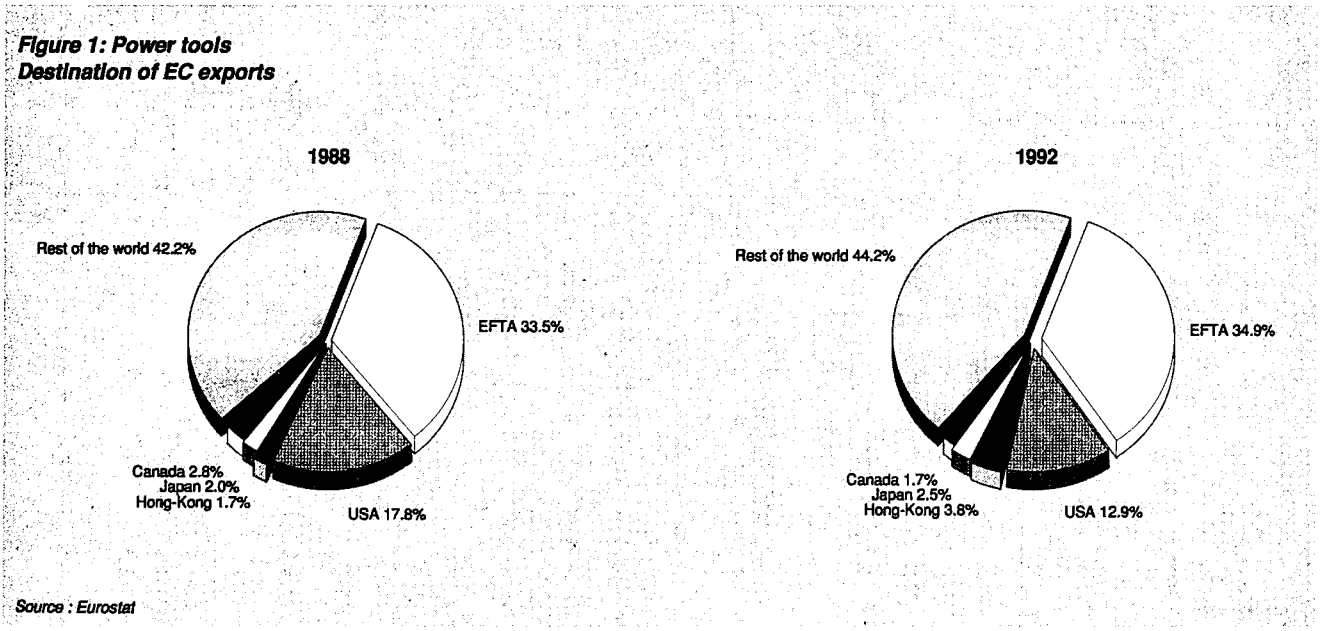
International comparison

For power tools, EC producers are faced with strong competition from abroad as well. The most important competitors for EC producers are the EFTA countries, with more than half of extra-EC imports. Japan is also a strong competitor and supplied with about 23% of import demand from outside the Community. Both areas, however, lost market share in the EC, mainly to the benefit of producers from China, which could increase their EC market share from close to nil in 1988 to about 6% in 1992.

The EFTA countries are an important trade outlet for EC producers as well; in 1992, about 35% of extra-EC exports were delivered to this area. Exports to the United States are far behind with about 13%.

For welding equipment, the most important competitors for the EC are the EFTA countries with some 63% of extra-EC imports in 1992. The share of Japan is about 15% and that of the United States about 13%. The share of the EFTA countries slightly increased over the last few years, mainly to the detriment of the USA's and Japan's.

Figure 1: Power tools
Destination of EC exports



Source : Eurostat

Table 1: Electrical equipment for industrial use
External trade at current prices

(million ECU)	1988	1989	1990	1991	1992
Extra-EC exports	1 822	1 881	1 790	1 941	1 784
Extra-EC imports	1 015	1 149	1 218	1 331	1 386
Trade balance	807	732	572	610	398
Ratio exports/imports	1.79	1.64	1.47	1.46	1.29
Intra-EC trade	2 308	2 662	2 805	2 982	3 144
Share of total imports (%)	69.5	69.8	69.7	69.1	69.4

Source: Eurostat

Table 2: Power tools
Trade by Member State, 1992

(thousand ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EC
Extra-EC exports	9 950	1 075	273 909	137	9 594	19 617	355	41 442	13 562	914	59 684	430 239
Extra-EC imports	30 332	8 568	263 473	7 463	35 160	109 930	7 007	87 906	60 965	5 409	77 742	693 955
Trade balance	-20 382	-7 493	10 436	-7 326	-25 566	-90 313	-6 652	-46 464	-47 403	-4 495	-18 058	-263 716
Ratio exports/imports	0.33	0.13	1.04	0.02	0.27	0.18	0.05	0.47	0.22	0.17	0.77	0.62
Intra-EC trade	81 058	17 872	102 501	15 487	50 069	149 544	4 751	99 678	53 146	18 825	53 508	646 439
Share of total imports (%)	72.8	67.6	28.0	67.5	58.7	57.6	40.4	53.1	46.6	77.7	40.8	48.2

Source: Eurostat

Table 3: Welding equipment
Trade by Member State, 1992

(thousand ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EC
Extra-EC exports	9 565	6 509	119 671	895	3 712	30 417	4 675	56 313	17 015	822	35 374	284 968
Extra-EC imports	11 304	11 205	95 122	7 423	21 462	24 071	1 049	36 455	25 910	2 682	61 680	298 363
Trade balance	-1 739	-4 696	24 549	-6 528	-17 750	6 346	3 626	19 858	-8 895	-1 860	-26 306	-13 395
Ratio exports/imports	0.85	0.58	1.26	0.12	0.17	1.26	4.46	1.54	0.66	0.31	0.57	0.96
Intra-EC trade	56 049	10 779	62 240	5 429	72 629	58 721	8 107	59 872	45 352	9 977	47 244	436 399
Share of total imports (%)	83.2	49.0	39.6	42.2	77.2	70.9	88.5	62.2	63.6	78.8	43.4	59.4

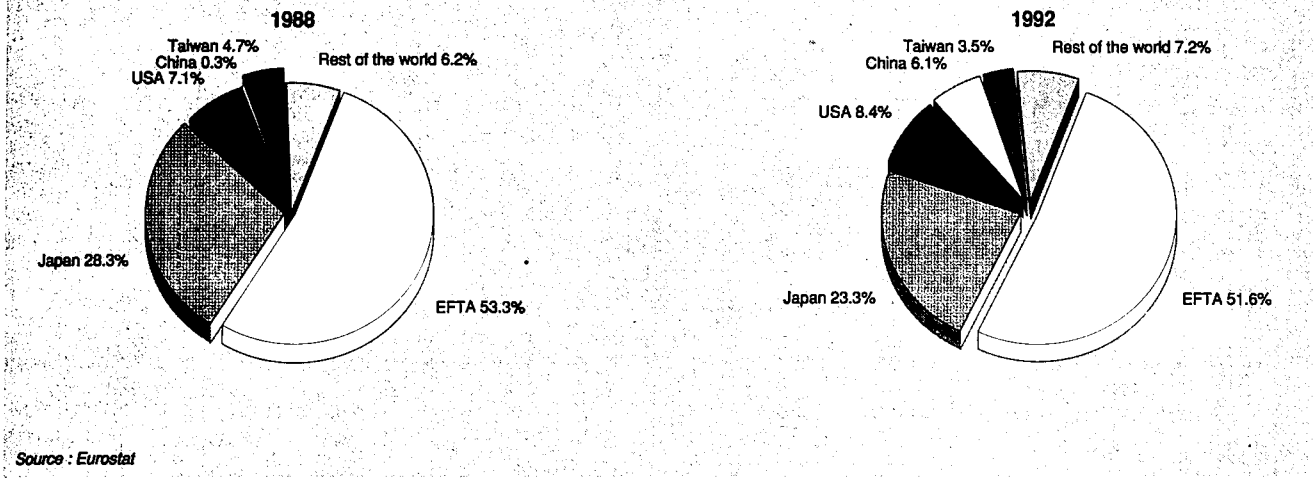
Source: Eurostat

Table 4: Power tools
External trade in current value (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	257	301	355	363	371	397	439	449	439	430
Extra-EC imports	284	316	317	373	392	498	556	606	697	694
Trade balance	-26	-15	38	-9	-21	-101	-117	-157	-259	-264
Ratio exports/imports	0.91	0.95	1.12	0.97	0.95	0.80	0.79	0.74	0.63	0.62
Intra-EC trade	278	350	382	405	464	521	584	642	661	646
Share of total imports (%)	49.5	52.5	54.6	52.1	54.2	51.2	51.2	51.4	48.7	48.2

(1) EC10; 1983
Source: Eurostat

Figure 2: Power tools
Origin of EC imports



Source : Eurostat

Foreign trade

The tendency towards increasing import penetration, observed in the sector of electrical equipment for industrial use as a whole is felt particularly in the welding equipment subsector, while exports to countries outside the EC increased by about 2% per year in value from 1983 to 1992, extraEC imports increased by nearly 9% per year in value, more than doubling during the same period. In 1983, the value of imports was about half that of exports; in 1992, the value of imports was slightly higher than that of exports, leading to a negative trade balance.

On the export side, the most important clients for EC producers of welding equipment are developing countries (including the East Asian NICs), with some 39% of extraEC exports in 1992, followed by the EFTA countries (26%). Most interesting in this context is the sharp decline of the aggregate "rest of the world" from 45% in 1988 to only 10% in 1992. This results presumably from the collapse of demand in East Europe. The strong growth of intraEC trade, by about 9% per year over 1983 to 1992, resulted in a nearly stable share of extra EC imports out of total imports (about 40%), over the same period. The most important intraEC exporters are Spain (17% of total intraEC exports) and France (16%).

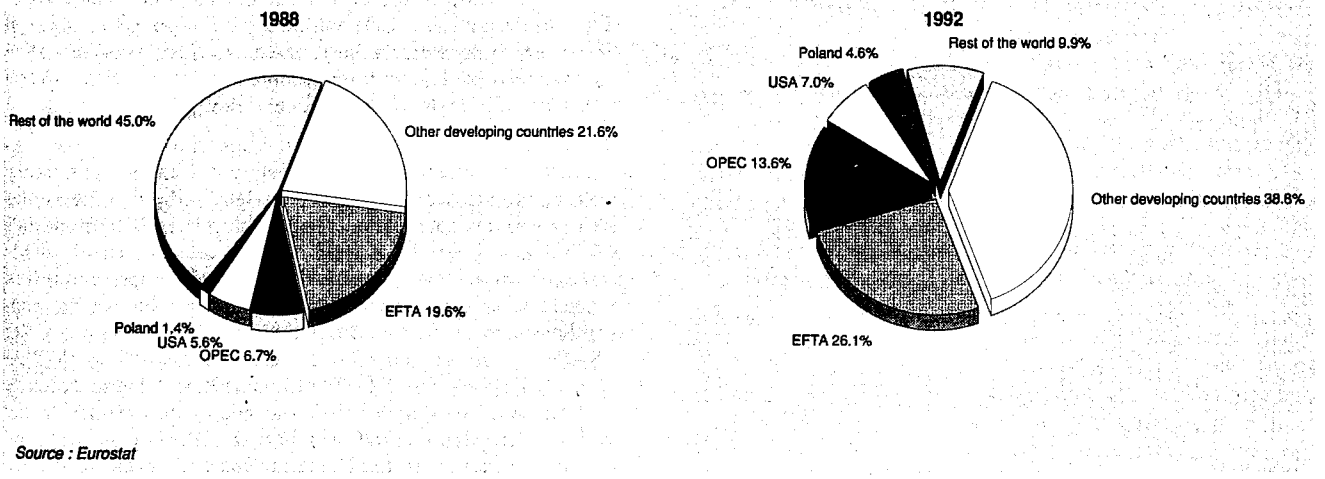
For power tools, the EC trade balance was negative throughout the period 1983 to 1992. ExtraEC exports increased by roughly 6% per year in value over the same period, but imports from outside the EC increased by more than 10% per year. The result was a sharp deterioration of the trade balance, from slightly negative in 1988 to a deficit of over 260 million ECU in 1992. IntraEC trade in power tools developed quite favourably during the last ten years, growing by nearly 10% per year from 1983 to 1992. The most important intraEC exporter is France, with some 23% of total intraEC exports, followed by Germany with about 16% and Italy (15%).

MARKET FORCES

Demand

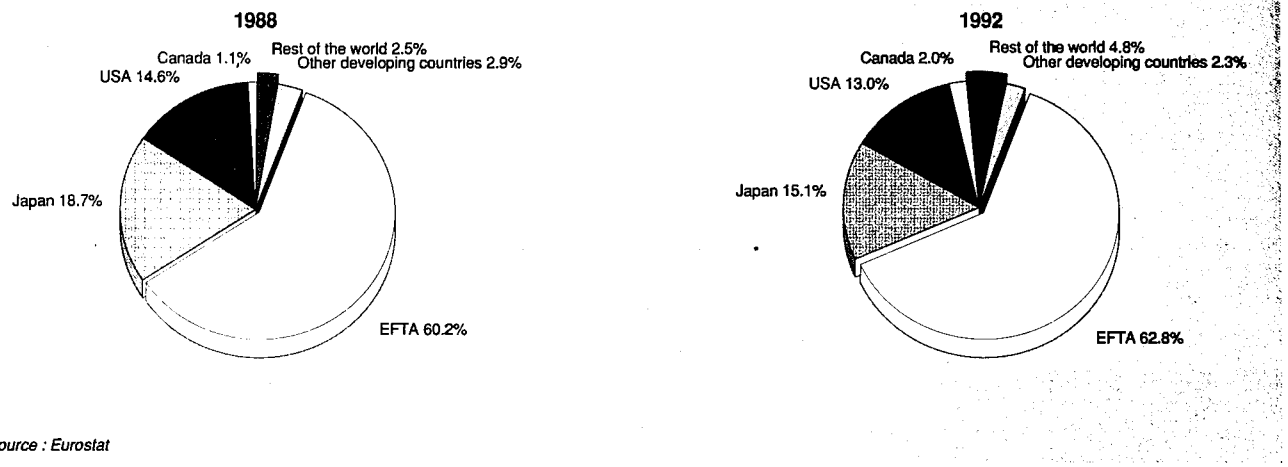
Apart from power tools, whose demand is determined to a large extent by private household expenditure, the industry's products are either intermediate goods used as inputs in other industries, or investment goods used to increase production capacities or production efficiency. Even welding consumables (filler materials) are not actually consumed as such but are used in connection with the production of durable investment or consumer goods such as cars and ships. Demand for the

Figure 3 : Welding equipment
Destination of EC exports



Source : Eurostat

Figure 4: Welding equipment
Origin of EC imports



Source : Eurostat

industry's products, therefore, is determined mainly by the evolution of production in a large number of client sectors, most of them of the investment goods category are:

- electrical equipment related to internal combustion engines, motor vehicles and other means of transport, and traffic where demand is determined by the level of production of transport equipment, and by replacement needs;
- furnaces and ovens, where demand depends mostly on construction activities or replacement for certain types of manufacturing plants, as well as of levels of R&D activity;
- welding equipment and materials, where demand depends mainly on activities in the transport industry, which includes the construction of cars, ships and aircraft's, but also on a wide range of other activities such as the production of cans, crosswire products, steel constructions, pipelines;
- electrical tools, where demand is mainly driven by small scale manufacturing, maintenance, arts and craft, hobbies and doityourself activities.

For most products of the sector, swings in the general level of economic activity will cause even wider swings in demand. Thus the fast pace of economic growth, which has characterised most of the developed world during the second half of the eighties, has also brought fast growth in demand for the products of the sector; on the other hand, the worldwide slowdown in economic activity, which started in 1990 and is widely expected to last at least until the end of 1993, has caused sharp drops in demand for all the industry's goods.

Supply and competition

The EC is leading in most types of electrical equipment for industrial use, with a large number of firms, providing the various needs of their client industries. Competition among EC member countries is very intense, but less so from outside the EC, as many of the products and types of equipment are custommade to a certain extent, according to the specific needs of the client industry. The strong cooperation between supplier and user is more important than pricing issues. For more massproduction products, however, such as power tools, completion from low cost producers is potentially dangerous.

In the case of welding equipment, especially so equipment for car assembly lines, nearby producers, or at least ECbased producers, have usually the edge over potential suppliers from other countries. On the other hand, "transplant" production facilities are almost always equipped by inhouse suppliers of the mothercompany. A good example is found in the case of Japanese car transplants in the UK, which have bought virtually all of their equipment in their own country.

Price and profit in the industry follow the vagaries of the business cycle. During the period of fast demand growth, prices and profits were high, as production was running into capacity constraints. Lately, however heightened competition over shrinking markets has caused prices and turnover to drop and profits to plunge.

Production process

For most of the sector's products, raw materials and energy represent a small portion of production costs. R&D is a very important input, as products must adjust to changes in production processes in the client industries. A major part of the labour force is skilled. Technological change is rapid, as already mentioned, but evolutionary rather than revolutionary. In particular the adoption of major innovations, such as laser cutting/welding technologies or electronbeam welding, may be held back by reluctance on the part of client industries to master new, untested, production processes. This happens too when other problems appear such as the high cost of the certification process. It is the case, e.g. whenever a new technology is being introduced in the aerospace industry.

INDUSTRY STRUCTURE

Companies

The industry is undergoing a wide ranging process of restructuring, with smaller firms merging into larger ones, both within each country and across borders. In each subsector and sometimes in specialised fields within a given subsector, one can find a small number of large integrated firms, often active in other sectors also, and small, more specialised, firms strong in a particular field or in a nichemarket.

Regarding the welding equipment subsector, one should distinguish between at least two fields: arc welding and resistance welding. In the arc welding field, where individual machines are of relatively small value, but consumption of fillermaterials represents a large part of welding cost, sales are usually made through a network of distributors. One finds there about half a dozen of major companies that are the product of the consolidation process carried out over the last 10 years or so: ESAB of Sweden and the UK, MesserGriesheim/Norweld/Lincoln (D/I/USA) and SAF/Oerlikon (F/CH). These recently merged companies under their old and/or new names in the various European markets. Hobbart & Miller of the USA are also major players in the European market. In the resistance

Table 5: Welding equipment
External trade in current value (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	263	277	309	341	333	394	333	315	371	285
Extra-EC imports	139	167	174	167	201	250	273	266	313	298
Trade balance	123	110	135	173	132	144	60	48	58	-13
Ratio exports/imports	1.89	1.66	1.78	2.04	1.65	1.58	1.22	1.18	1.19	0.96
Intra-EC trade	199	258	285	308	296	391	424	424	444	436
Share of total imports (%)	58.9	60.7	62.1	64.9	59.5	60.9	60.8	61.4	58.6	59.4

(1) EC10; 1983
Source: Eurostat

welding field, the number of players is much larger. Some companies have grown out of the resistance welding field to become major automation companies, and are mainly involved in the production of transfer lines used for the assembly of automobiles. There, one finds a number of big players: Sciaky - the major independent in Europe (F), Renault Automation (F), KUKA (D), Comau a subsidiary of Fiat (I), LambTechnikon (UK) and Stadco (UK), and another half dozen or so of smaller firms in different countries. The Comau of Italy has also other fields of activities, in machining operations. Other companies in the resistance welding field make more standard machines such as: classic spot welders, projection seam welders or various types of specialised equipment. These comprise a number of very large companies (500 workers and more), such as Sciaky, Comau and Renault Automation, again, and smaller companies in the range of 150 workers who tend to subcontract more of their work. These are: British Federal (UK), SciakyUK (UK), Ideal (butt welders and transformers) (D), Elrex (transformers) (D), Dalex (D) and PRD (F). Sciaky produces also, under a different brand name and separately, conveyors and mechanical handling equipment. Most of the firms in the industry operate internationally, at least in a number of EC countries.

Strategies

Demand for electrical equipment for industrial uses is and will remain subject to the vagaries of economic cycles, rising in times of investmentled growth, and plunging in times of slow growth. Firms in the sector, therefore, must be organised in ways that enable them to respond fast to fluctuations in demand high levels of automation, a maximum of outsourcing for the production of components, highly skilled manpower and high flexibility in employment and wage costs. R&D is an important factor in maintaining competitiveness, as is close cooperation with client sectors to best adapt products to needs and to build up customer loyalty.

ENVIRONMENT

Production processes in the sector of electrical equipment for industrial uses are little concerned with ecological issues energy consumption is low, emission of noxious fumes or other pollutants is negligible.

Recycling for the industry is rarely a problem as the industry produces relatively low volume and high value added products, with a large share of recyclable metals in their materials composition. For the arc welding industry, fumes represent a problem at the user's end, due to the special composition of the different types of electrodes used in the welding process. The danger is not for the environment in its usual sense but for the workers; it is dealt with by the use of aeration systems, filters, masks and similar.

REGULATIONS

The only regulations concerning the industry are those concerned with norms and their homogenisation across the EC. Only standard components are concerned, such as transformers, electrodes' sizes, cables and similar. Most of the equipment produced by the industry is highly specialised, and built to satisfy specific requirements, and there is little scope there for exogenously imposed normalisation. Some types of equipment produce electromagnetic radiation and the EC commission is working on a regulation to reduce its possible negative effects on workers and the nearby environment.

Other important directives that affect this sector are the Machines Directive (89/392/EEC), the Low Voltage Directive (73/23/EEC) and the Electromagnetic Compatibility Directive (EMC; 89/336/EEC).

OUTLOOK

The outlook for the industry of electrical equipment for industrial use is closely related to the outlook for its client industries. The car industry has been in the doldrums for the last three years in the EC, and is not expected to recover significantly until mid 1994. Later on, however, prospects are rather good, particularly so in the longer run after the midnineties once the East European market reawakens. This in turn will foster growth in the subsectors related to the automobile's industry electrical components for motor vehicles and in the welding industry. Demand for traffic related equipment has remained strong in a number of EC countries, mainly France, Spain and Germany, thanks to wide ranging railroad development projects. This is expected to continue in future.

Table 6: Electric power tools
EC consumption by Member State, 1992

(%)	
Belgique/België	3.7
Danmark	1.9
BR Deutschland	44.9
Hellas	1.4
España	5.0
France	15.3
Ireland	0.5
Italia	11.3
Nederland	5.1
Portugal	1.1
United Kingdom	9.8

Source: Bosch

Table 7: Electrical equipment for industrial use
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.8	3.3
Production	0.5	3.0
Extra-EC exports	0.7	3.1

Source: BAK

Demand for other types of equipment is expected to benefit from the general recovery of business investment in the EC, forecast for 1993 onwards.

In general, demand (and consumption) for the industry's products is expected to decrease in 1993, is expected to start growing at a slow pace in 1994 and begin a recovery to relatively high growth rates in later years. In the mid-term forecast, production is expected to grow at similar rates as both extraEC imports and exports should follow similar growth paths as demand. In the longer run, export growth should outstrip import growth, thanks to the development of demand in Eastern Europe.

Written by: BAK

The subsector of welding equipment is represented at the EC level by: European Welding Association (EWA). Address: Varrolaan 100, NL-3584 BW Utrecht; tel: (31 30) 588 588; fax: (31 30) 588 200.

Batteries and accumulators

NACE 343.2

Increased use of portable electrical and electronic equipment, coupled with booming sales of motor vehicles stimulated demand for the industry's products over the last few years.
In the recent past, however, EC producers are faced with flat to declining demand, coupled with overcapacities in the field of batteries and accumulators, resulting in a rapid decline in prices.
Stiffening competition from outside the EC, mainly in the field of accumulators, contributed to the pressure on prices. Imports from outside the EC rose by over 8% in value, from 1985 to 1992.
Short term prospects for the industry are unfavourable. A weakening demand for starter batteries (about 45% of the industry's total production), following the sharp declines in motor vehicles' production, is expected to cause a sharp plunge in production.
The medium-term outlook is somewhat more positive, but environmental concerns and stiffening competition from South East Asian producers will represent serious challenges for the industry in the course of the nineties.

INDUSTRY PROFILE

Description of the sector

The batteries and accumulators industry can be subdivided into two main subsectors: the production of primary batteries, which are not rechargeable, and that of rechargeable batteries, i.e. accumulators.

There are six types of primary (non-rechargeable) batteries: zinc carbon batteries, the first type of dry batteries but still in use; longer life alkaline manganese batterics; mercuric oxide batteries; silver oxide batteries; zinc air batteries; and lithium batteries.

Accumulators are of two main types: lead acid batteries and nickel cadmium batteries.

Depending on their use, they can be further subdivided into : drive batteries, stationary batteries and starter batteries. Drive batteries are employed to operate electric motors to propel vehicles, in particular handling equipment, but also, lately, electric cars. Stationary batteries are used mainly for the operation of emergency devices such as alarm and control systems and as back-up, in case of power-breaks. Starter batteries are utilised in motor vehicles to provide electric power until the internal combustion motor has been started.

The most important producers of batteries and accumulators in the EC are Germany, France, Italy, the United Kingdom and the Netherlands.

Recent trends

Over the last few years, EC demand for starter batteries did increase considerably, with total sales (including imports from outside the EC) rising by 1.8% per year in value from 1983 to 1992, to reach some 48 million units by the end of the period. Sales batteries of European origin (including Switzerland and Sweden) increased by 1.2% per year in value over the same period. Demand from the motor vehicles' industry increased also at about 1.2% in average per year in value, from 1983 to 1992. Demand from industrial customers, with a weight about two times larger than that of car manufacturers, grew at a slower rate of 1% per year in value during the same period.

On the other hand, imports of starter batteries from outside the EC grew rapidly by 3.4% per year in value, to reach some 28% of total sales in 1992.

In the recent past, however, EC demand for starter batteries has declined, as the recession dampened demand in general. In particular, sales to car manufacturers declined by some 5% from 1990 to 1992.

International comparison

The most important competitor from abroad for EC producers is Japan, with more than 35% of total extra-EC imports. The United States and the EFTA countries follow, with a market share of roughly 20%, each. Developing countries reach a market share of about 22%. On the export side, by the far most important markets for EC producers are the developing countries (roughly 40% of extra-EC exports) and the EFTA countries (33%).

Foreign trade

Over the last few years, the EC batteries and accumulators' industry has been facing stiffening competition from countries outside the EC. While exports grew by about 3% per year in value from 1985 to 1992, imports increased at an annual rate of more than 13% over the same period. Thus, the EC trade balance turned negative from 1987 on, with imports exceeding exports by about 40% in 1992.

The most important exporter to countries outside the EC is Germany, with about 30% of total extra-EC exports in 1992; France follows with about 24%. Regarding imports, the most important market in the EC is Germany, with roughly 33% of extra-EC imports, followed by the United Kingdom, with about 18%.

Table 1: Batteries and accumulators
Main Indicators (1)

(thousand units)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Domestic sales by Western European producers (2)										
-to car manufacturers	9 649	9 452	10 035	10 198	10 745	11 032	11 962	11 576	11 470	11 056
-to other customers	21 035	19 922	21 731	20 955	22 159	20 554	21 111	22 105	23 418	23 044
Imports (3)	9 993	10 707	11 256	11 495	12 888	12 880	13 153	13 584	14 192	13 580
Total sales	40 677	40 081	43 022	42 648	45 792	44 466	46 226	47 265	49 080	47 680

(1) Austria, Belgium, Denmark, Germany, Spain, Finland, France, United Kingdom, Italy, the Netherlands, Norway, Portugal, Sweden and Switzerland
(2) Including imports by battery manufacturers
(3) Excluding imports by battery manufacturers
Source: EUROBAT

Table 2: Batteries and accumulators
External trade in current value

(million ECU)	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	489	463	403	449	480	510	551	573
Extra-EC imports	392	401	444	538	629	640	810	812
Trade balance	97	61	-41	-89	-150	-129	-260	-239
Ratio exports/imports	1.25	1.15	0.91	0.84	0.76	0.80	0.68	0.71
Intra-EC trade	881	904	960	1 048	1 203	1 307	1 437	1 415
Share of total imports (%)	69.2	69.3	68.4	66.1	65.7	67.1	63.9	63.5

Source: Eurostat

Competition among EC producers has been stiffening as well, with intra-EC trade growing at roughly 7% per year from 1985 to 1992. However, given the fact, that extra-EC imports increased even more, the share of intra-EC imports out of total imports declined from 69% in 1985 to 64% in 1992.

MARKET FORCES

Demand

Demand for the products of the industry as a whole increased considerably during the last decade. In the field of non-rechargeable (primary) batteries, market growth was roughly 2% per year in volume. Primary batteries are used in high fidelity equipment (50%), games (20%), lighting (11%), watches and alarms (11%) and photo equipment (8%). Demand for this product depends therefore mainly on private consumer expenditure. Increasing use of battery driven devices, spurred by product innovation, was the main factor for the favourable development of demand. The short-living zinc-carbon battery is being gradually substituted for by the longer-lasting alkaline battery, whose life is nearly three times longer; the latter accounts at present for roughly 40% of the market in the EC. Newer developments in this context are zinc-air and lithium batteries, which contain no mercury. On the other hand, however, the longer life of the batteries affects demand negatively, despite the increased use of battery driven devices.

Demand for rechargeable batteries (accumulators), which are increasingly used in portable types of equipment that require relatively large amounts of energy, has been booming during the last years, particularly since 1985, when nickel-cadmium rechargeable batteries went on sale to the general public. The annual growth in sales over the last few years is estimated to 15% to 20%. Accumulators based on the nickel-cadmium principle are not only lighter but also live longer (5 to 10 years) than conventional accumulators, which results similarly to the above mentioned effect regarding primary batteries, in a decrease of demand growth.

Among accumulators, the most important segment is that of starter batteries (mainly used for motor vehicles, construction machinery, agricultural machinery and aircraft), with some 55% of total production of rechargeable batteries; drive batteries follow with about 25% of the total and stationary batteries, with about 8%. In West Europe as a whole, the market for starter batteries represented some 48 million units in 1992. About one third goes into new motor vehicles, and most of the remaining two thirds represent replacement demand for older vehicles. Replacement demand depends mainly on the size of the motor vehicles fleet, while demand for new starter batteries is highly cyclical, and follows the fluctuations in motor vehicles' production. As the size of the motor vehicles fleet keeps increasing, replacement demand keeps increasing as well.

Supply and competition

Increased in competition from outside the EC is mainly concentrated on accumulators, since the most important producers of primary cell batteries have also production facilities in EC countries. Nevertheless, dry batteries producers are faced with a rapid decline in prices a consequence of over capacities, built up on the basis of overestimates of the market's growth potential.

As said, competition from outside the EC has been rising in the field of accumulators, particularly from Japanese, South Korean and Indonesian firms; as contended by EC producers, the price competitiveness of these products is not due only to lower production costs, but also to subsidies on raw materials and an export-dumping policy. The fact that the production process requires little skilled labour represents apparently an important comparative advantage for low labour cost countries. In particular EC producers of starter batteries have been faced with fast growing imports, of 3.4% per year from 1983 to 1992.

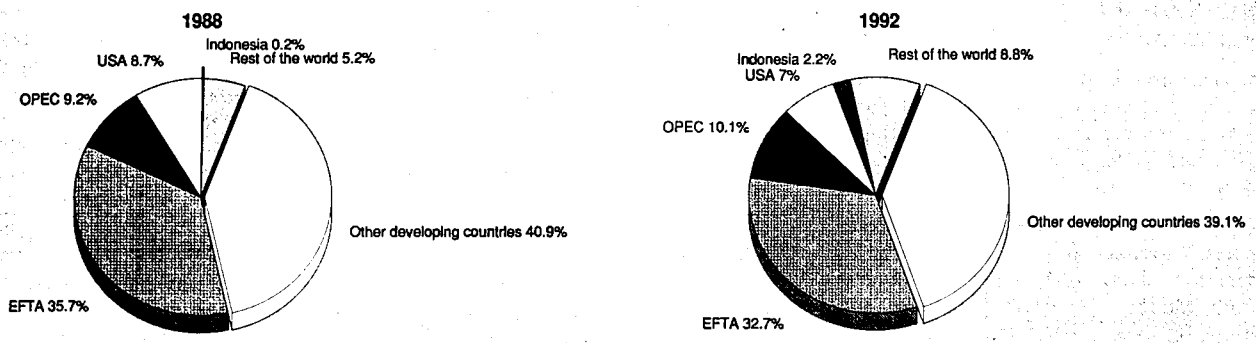
In the face of increasing competition from outside the EC, and overcapacities within the EC, the market suffers from strong downward pressures on prices.

Table 3: Batteries and accumulators
External trade by Member State, 1992

(million ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EC
Extra-EC exports	47.3	12.0	170.4	2.4	30.9	138.3	1.0	49.0	26.4	7.6	87.8	573.2
Extra-EC imports	31.8	19.5	272.4	16.7	43.3	89.6	13.4	82.2	91.9	2.4	148.5	811.9
Trade balance	15.5	-7.5	-102.0	-14.3	-12.3	48.7	-12.4	-33.2	-65.5	5.2	-60.7	-238.7
Ratio exports/imports	1.49	0.61	0.63	0.15	0.72	1.54	0.08	0.60	0.29	3.10	0.59	0.71
Intra-EC trade	119.4	34.9	269.0	24.1	116.0	236.5	22.2	198.6	180.0	31.0	183.6	1 415.3
Share of total imports (%)	79.0	64.1	49.7	59.1	72.8	72.5	62.3	70.7	66.2	92.7	55.3	63.5

Source: Eurostat

Figure 1: Batteries and accumulators
Destination of EC exports



Source : Eurostat

Production process

In 1990, the subsector of primary batteries employed about 15000 people in West Europe, in a total of 10 factories. In the accumulator industry, about 40000 people were employed in some 80 factories. As a result of slowing production growth and the need to improve productivity in order to reduce costs, in a world of stiffening competition, employment levels are expected to keep falling over the next few years. This is made possible by the relatively low level of sophistication of the production process, which eases automation efforts.

INDUSTRY STRUCTURE

Companies

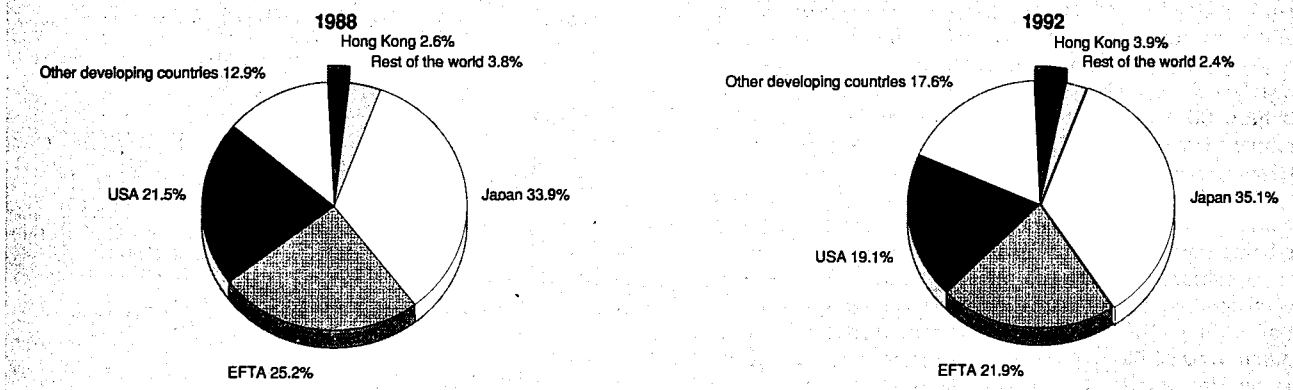
There are about 10 factories producing primary batteries in West Europe. This field of production is characterised by a high degree of concentration, with about 80% of the market being covered by the four largest manufacturers: the US based Duracell (UK), Varta (D), Philips (NL) and the US based Ralston Energy Systems (CH). Other important players in this field are the American Kodak, and the Japanese Sanyo and Matsushita.

In the field of accumulators, there are about 25 manufacturers in the EC. The most important are Varta (D), Bosch (D), the company Saft and CEAC (F), jointly owned by the Italian Fiat and the French Alcatel Alsthom, Hawker (UK) and the firm Tudor (E). The largest EC producer is Varta, active in both primary batteries and accumulators; this company has 35 subsidiaries spread over several regions in the world, among them Latin America and the Far East, in addition to its traditional markets in Germany and the EC. The group realises roughly 40% of its turnover in portable batteries, 27% in starter batteries and nearly 23% in storage batteries for industry. Regarding starter batteries, the number of manufacturers declined from 18 West European producers in 1988 to 10 producers in 1991. Following the increasing globalisation of their main clients, virtually all EC producers are operating at least on the European market at large and many of them, globally.

Strategies

The batteries and accumulators' industry in the EC is characterised by surplus in the production capacity, and by strong and growing competition from outside the Community. Together, these factors ensure that the downward trend in prices will continue over the next years.

Figure 2: Batteries and accumulators
Origin of EC imports



Source : Eurostat

To combat the squeeze on profits and to reduce costs, companies have had to rationalise production. In particular, efforts are oriented towards more concentration, in order to gain economies of scale. The American Ralston (based also in Switzerland) for example, has taken over in France the firms Wonder and Mazda. Since the beginning of 1992, Varta's and Bosch's battery activities have been consolidated, in the jointly owned VB Autobatterie GmbH (D).

The concentration process can be illustrated by the fact that in 1988, 18 producers existed in West Europe, while in 1991 10 producers were only active. Three companies, Varta/Bosch, CEAC, and Tudor hold together a market share of roughly 60% in West Europe.

Companies are also investing to penetrate new, expanding markets. Examples are the German firm Varta, that is establishing subsidiaries in countries as diverse as Finland, Argentina, Mexico, Brazil and Singapore, and the French Saft, that is doing the same in Korea and Finland, from where it hopes to penetrate markets in South East Asia and in East Europe. EC firms have to invest in R&D efforts to increase the quality of their products and to counteract competition from extra-EC firms that are highly competitive in terms of technology (USA & EFTA). Improvements can be made in the direction of longer-life for the products or in the context of environmental concerns.

Smaller companies are forced to operate in niche markets, which are very demanding in terms of technology and quality. The problem is, however, that these firms may face difficulties in financing R&D expenditures; cooperation in the development of new products could be the answer.

REGIONAL DISTRIBUTION

Within the EC, the main producers of primary batteries are Germany, France, Italy, the United Kingdom and the Netherlands. This is also where the most important firms are located. In primary dry cell batteries, the largest world producer is the American group Duracell.

In rechargeable batteries, the leading producer of the Community is France, with its company Saft; the biggest producers in the world, however, are the Japanese companies Sanyo and Matsushita.

ENVIRONMENT

Some of the most important product innovations in the industry over the last few years are related to concerns over the environment. Most important in this respect is the reduction in the heavy metals content of non-rechargeable batteries, namely of mercury, which has traditionally been used in both saline and alkaline batteries. Two directives of the European Commission in 1982 and 1984 require the reduction of mercury waste. Since 1985, the primary batteries industry in the Community has cut the amount of mercury discharged from batteries into the environment by half, and has undertaken to reduce this by a further 84%. The reduction in mercury waste has been the result of two developments: first, it has been possible to reduce by 97.5% the content of mercury in alkaline-manganese batteries, compared to 1985 levels, and to eliminate thus the need for them to be collected separately; second, mercuric-oxide batteries (containing 30% mercury) are being replaced by zinc-air batteries (around 1% mercury) and by lithium batteries (no mercury at all). Other environmental concerns are oriented towards recycling batteries. Some Member States of the Community have already introduced separate waste collection for primary batteries containing mercury. In 1991, the EC Commission proposed a directive about batteries containing harmful substances. This proposal had to be turned into national directives until September 1992. This directive requires for producers to take back used batteries, so that the materials can be recycled. The problem is, however, that the required low energy and low emissions recycling techniques are not available at the moment, except for lead recycling. In the field of lead-acid accumulators the recycling ratio is already close to 100%, in nickel-cadmium batteries it is about 60%. Besides the technological aspects of the problem, its economics are no less important as the use of recycled materials is likely to increase production costs. If international competition does not face the same requirements, EC producers could lose price competitiveness. Another factor liable to increase costs to customers is the decision of the EC Commission to impose a deposit on batteries, as an incentive to return them to the seller.

OUTLOOK

The prospects for the batteries and accumulators' industry are somewhat pessimistic for the short-term. The decline in motor vehicles production and in industrial investment in general is likely to affect demand for starter batteries, as well as for drive batteries and stationary batteries. Demand for dry batteries on the other hand, is less sensitive to cyclical fluctuations; production there should perform better than in accumulators.

In the medium term, the outlook for the industry as a whole is quite positive, as the expected economic recovery should stimulate demand for the products. In the field of primary batteries, demand growth will be stimulated by the development of better, longer lasting products, such as lithium batteries, which last about seven times longer than ordinary batteries and contain neither mercury nor cadmium. The trend towards the development of ever smaller appliances requiring ever smaller and ever more powerful batteries will further feed demand growth in the future. On the other hand, the decline in the quantity of energy needed in portable devices may dampen demand to a certain extent. In the field of accumulators, EC producers of starter batteries will be increasingly faced with strong competition from outside the EC, mainly in terms of prices. In addition, existing over capacities will strengthen pressures on prices in this area. Drive batteries and stationary batteries, on the other hand, will perform somewhat better, as the position of EC producers in this field is quite strong through the supply of services, a very important feature there. In addition, considerable demand for high energy drive batteries could possibly be created by the eventual development of electrically driven motor vehicles; the time horizon for actual use of such cars, however, is at the moment unpredictable. Finally, demand for stationary batteries will benefit from developments in the field of telecommunication, with ever more facilities requiring protection against power failure.

Table 4: Batteries and accumulators
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.8	3.3
Production	0.5	2.0
Extra-EC exports	3.0	4.8

Source : BAK

Written by: BAK
The sector is represented at the EC level by: European Portable Battery Association (EPBA) and Association of European Accumulator Manufacturers (EUROBAT). Address: P.O. Box 5032 CH-3001 Bern; tel: (41 31) 382 2222; fax: (41 31) 382 0311.

Domestic electrical appliances
NACE 346

The domestic electrical appliances' industry in the EC has been faced with changing in demand trends over the last few years. High saturation rates have dampened demand growth, when economic conditions were good in general; on the other hand, the effect of the economic downturn since the beginning of the nineties has been partly compensated for by the re-unification of the two German States.
Another important feature of the last decade has been the concentration process that took place in the industry during that period.
Prospects for the industry in the medium term are somewhat more optimistic as anticipated recovery of the housing sector and of consumer spending stimulates demand for the products of the industry. In addition, product innovation and the pressure to replace products using ecologically dangerous chemicals should keep demand growing in the course of the nineties.

Competition on the other hand is expected to keep increasing and will force companies to increase their mergers and acquisitions (M&A) efforts, as well as to streamline production in order to reduce costs.

INDUSTRY PROFILE

Description of the sector

The domestic electrical appliances' industry comprises the following products:

- domestic electric refrigerators and freezers;
- domestic electric washing machines and equipment;
- domestic electric dishwashers (including parts);
- other domestic equipment with electric motors (including vacuum cleaners, floor polishers, grinders and electric apparatus for treatment of hair and skin);
- boiling-plates, cookers and similar domestic electric heating appliances;
- other domestic electric heating appliances (including hair dryers, electric ironing appliances).

Compared to other manufacturing sectors, the domestic electrical appliances' industry is of relatively minor importance, as its output is about 58% of that of consumer electronics', measured in terms of value added in 1992.

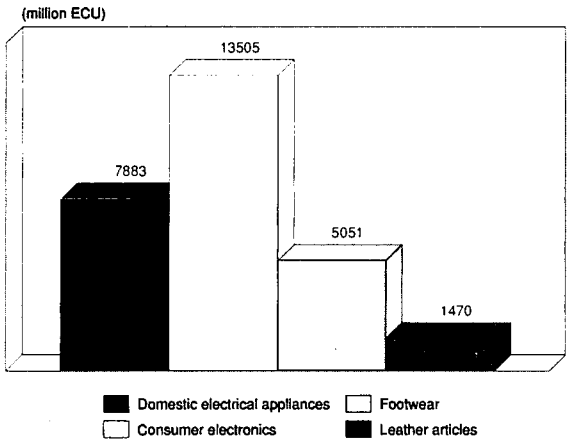
Within the EC, the largest producing country is by far Germany, with about 40% of the total in 1992. Italy follows with some 22%, France with roughly 14% and the United Kingdom with about 10%.

Recent trends

The domestic electrical appliances industry experienced a quite favourable development during the last few years, slightly above the average of manufacturing as a whole; while production in the manufacturing sector increased by 2.8% per year in volume from 1983 to 1992, production of domestic appliances grew by 3.3% over the same period, to reach some 23 700 million ECU in 1992.

Demand for domestic appliances, measured in terms of apparent consumption, increased by 3.5% per year in volume over the last few years. In the recent past, however, the EC industry has lost momentum. The decline in consumption

Figure 1: Domestic electrical appliances Value added in comparison with other industries, 1992



Source: DEBA

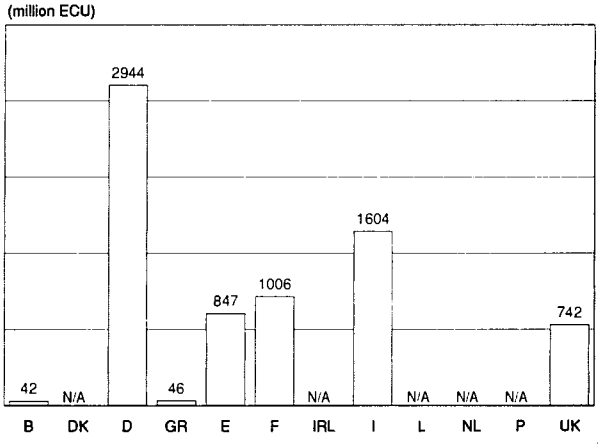
growth in the 1988-92 period caused a decrease in production growth as well, in spite of the sharp rise in export growth to countries outside the EC (10.3% per year in volume).

Over the first half of the 1983-92 period, the industry has been faced with a fast growth of imports from outside the EC, particularly in small appliances and microwave ovens, causing the trade surplus fall by half. From then on, however, the decrease in demand growth led to a decline in import growth as well, resulting in a considerable improvement of the EC trade balance, from 2.3% of production in 1988 to 5.2% in 1992.

International comparison

The most important producer of domestic electrical appliances within the Triad is the EC. Production here was about one fifth larger than that of the United States in 1983 and more than the double, at current prices, in 1992. From 1985 to 1992 production in the EC increased by more than 4% per year in real terms, while that of the United States rose by an annual 1.7% only. On the other hand, in Japan, production increased at a faster rate of some 6% per year in volume

Figure 2: Domestic electrical appliances Value added by Member State, 1992



Source: DEBA

Table 1: Domestic electrical appliances
Main indicators at current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993(2)
Apparent consumption	13 883	15 165	14 963	16 127	17 230	19 550	20 713	20 936	22 924	22 475	21 800
Production	14 727	15 950	15 754	16 882	17 763	20 014	21 433	21 954	23 654	23 722	23 000
Extra-EC exports	1 667	1 858	1 991	2 095	2 108	2 332	2 791	2 939	3 027	3 785	3 810
Trade balance	843.2	785.9	790.8	754.6	533.1	464.0	720.1	1 018.7	730.7	1 246.6	1 200.0
Employment (thousands)	252.0	243.3	231.6	227.2	225.4	233.7	229.4	230.0	230.1	222.6	222.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded BAK estimates
Source: DEBA

Table 2: Domestic electrical appliances
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	5.2	1.4	3.5
Production	4.4	2.0	3.3
Extra-EC exports	4.1	10.3	6.8
Extra-EC imports	14.9	6.4	11.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Domestic electrical appliances
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 667	1 858	1 991	2 095	2 108	2 332	2 791	2 939	3 027	3 785
Extra-EC imports	823	1 072	1 200	1 340	1 574	1 868	2 070	1 920	2 297	2 539
Trade balance	843.2	785.9	790.8	754.6	533.1	464.0	720.1	1 018.7	730.7	1 246.6
Ratio exports/imports	2.02	1.73	1.66	1.56	1.34	1.25	1.35	1.53	1.32	1.49
Terms of trade index	105.4	101.1	100.0	102.8	105.6	106.2	105.6	110.3	109.5	109.8
Intra-EC trade	3 102	3 155	3 478	4 006	4 437	5 042	5 739	6 401	7 170	7 805
Share of total imports (%)	79.0	74.6	74.3	74.9	73.8	73.0	73.5	76.9	75.7	75.5

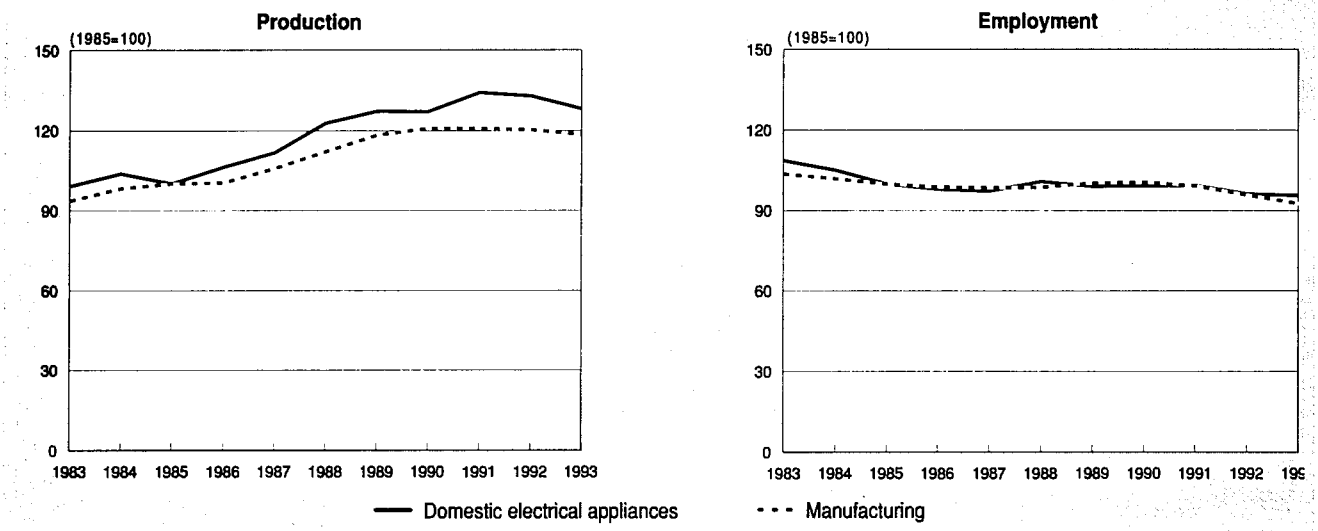
Source: DEBA

Table 4: Domestic electrical appliances
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	25.5	25.9	26.4	29.1	31.1	33.1	32.2	33.0	34.7	35.4
Productivity index	96.4	98.0	100.0	109.9	117.7	125.2	121.9	124.8	131.4	133.9
Unit labour costs index (3)	90.1	94.9	100.0	107.3	114.7	119.4	127.1	137.5	143.3	154.2
Total unit costs index (4)	86.1	96.8	100.0	108.8	114.7	124.0	138.2	142.0	152.3	160.7

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Domestic electrical appliances
Production in constant prices and employment compared to EC manufacturing



1993 are BAK and Eurostat estimates.
Source: DEBA

from 1985 to 1991. In 1992, however, Japanese production fell by a steep 15% in real terms due mainly to a sharp fall in domestic demand.

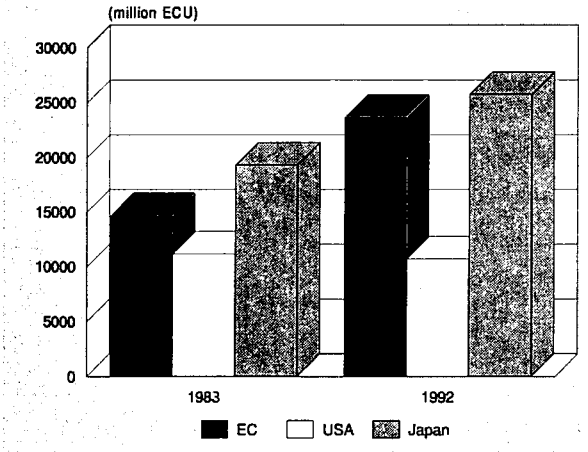
Foreign trade

The development of trade with countries outside the EC has been dynamic over the last few years. Trade among EC Member States increased as well over the last few years, at an average annual rate of about 11% from 1983 to 1992 to reach about 7800 million ECU in 1992.

From 1983 to 1992, extra-EC exports increased by some 10% per year in value. Important markets for EC producers are the EFTA countries, with some 35%, and the aggregate "rest of the world" including the developing countries and the East Asian NICs, with more than 50% of extra-EC exports. The United States and Japan are markets of relatively minor importance for EC producers. The main feature of EC exports over the last few years has been the decline in importance of the traditional markets: while about 49% of total extra-EC exports had been delivered to the EFTA countries in 1987, the latter's had declined to 35% in 1992. The most important exporting countries within the EC are Italy (32% of total intra-EC exports), Germany (30%) and France (14 %). Germany is presently the largest importer of white goods within the EC, with about 22% of intra-EC imports, a result mainly of the unification of the two German states.

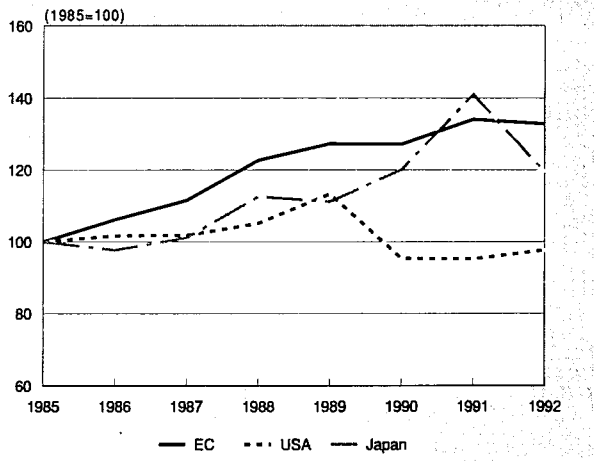
Competition from outside the EC has grown fast over the last few years. Extra-EC imports have increased by roughly 11% from 1983 to 1992. Thus, the share of imports out of apparent consumption increased from 6% in 1983 to 11% in 1992. The aggregate "rest of the world" (including the developing countries and the East Asian NICs) increased its market share in EC countries during the last years from about 42% in 1987 to roughly 53% in 1992. EFTA countries are important suppliers as well, with some 31% of extra-EC imports. Remarkably, Japan's market share has been declining over the last few years: in 1987, about 22% of imports from outside the EC came from Japanese suppliers; in 1992, their

Figure 4: Domestic electrical appliances
International comparison of production in current prices



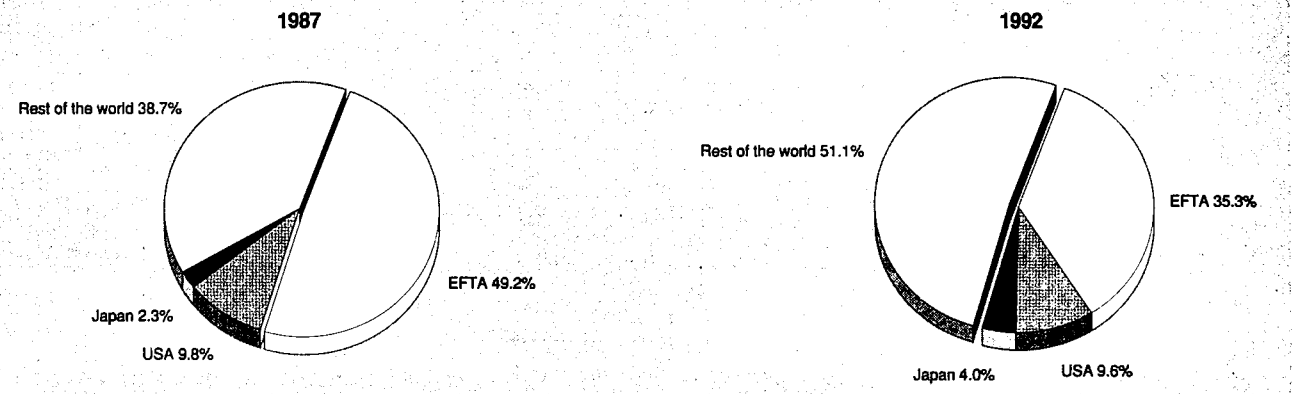
Source: DEBA, Census of manufacturers, Nikkei

Figure 5: Domestic electrical appliances
International comparison of production in constant prices



Source: DEBA, Census of manufacturers, BAK

Figure 6: Domestic electrical appliances
Destination of EC exports



Source: Eurostat

share had declined to only 6%. A decline of competitiveness against other fast-growing economies and increased efforts of Japanese producers to build up production facilities in the EC are the main explanatory factors in this context.

During the 1989-92 period, total German imports increased at a rate of 17% per year in value, to the benefit mainly of other EC Member States, who increased their exports to Germany by 20% per year over the same period. German imports from countries outside the EC increased somewhat more slowly, at some 14% per year.

As a result of the strong competition from outside the EC, the share of intra-EC imports out of total imports has declined from 79% in 1983, to 76% in 1992.

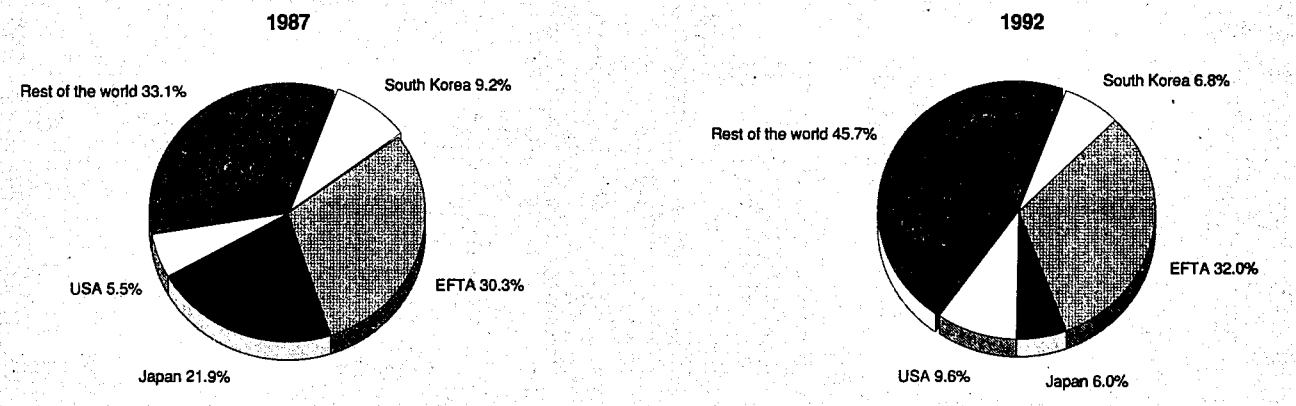
MARKET FORCES

Demand

Demand for domestic electrical appliances depends mainly on consumer expenditure and residential construction. In line with the economic upswing during the eighties, the industry experienced favourable demand growth, with apparent consumption increasing by 5.4% per year in value from 1983 to 1992. Since the end of 1988, however, demand growth has flagged, following the slowdown of economic activity. In addition, demand has been affected by the high degree of market saturation in most of the subsectors of the industry: in refrigerators, ownership rates had reached nearly 100% by 1989, and nearly 90% in both washing machines and vacuum cleaners. Ownership rates of freezers (41%) and dishwashers (23%) were considerably lower, but grew as well during the last decade. Once saturation is reached demand for the product is bound to weaken considerably, as they are then bought mainly for replacement purposes.

On the other hand, there are several factors that may compensate, at least partially, for the decline in demand for domestic electrical appliances. One factor is the role of product innovation: the introduction of electronic components in order to improve efficiency and to simplify use may boost demand to a certain extent; changes in the social structure of the population over the last few years, have stimulated demand as well: an increase in single person households kept growing the number of households making first purchases. Another important factor in the recent past, has been the unification of the two German states resulting in sharp increases in demand for German manufacturers as well as for other EC producers.

Figure 7: Domestic electrical appliances
Origin of EC imports



Source: Eurostat

As a result of the structural problems in the former East Germany, however, the demand boost lost recently its momentum and production growth has returned to pre-unification levels.

Supply and competition

EC producers of domestic electrical appliances are confronted with strong competition from abroad. The largest source of extra-EC imports is from the EFTA countries, representing more than 30% of the total. One of the world's largest and Europe's number one manufacturer is Swedish Electrolux (with most of its production facilities in the EC), with a market share of some 17% in West Europe.

As a consequence of relatively high transportation costs, extra-EC exports and imports represent only small parts of production and consumption. In particular, competition in large domestic electrical appliances is concentrated mainly among producers on the West European market. In some fields, however, competitors from East Europe are gaining market shares as well. The most important competitor in the dishwasher sector is again Swedish Electrolux, with a share of about 86% of total extra-EC imports. For washing machines, the picture is similar to EFTA countries supplying some 54% of extra-EC imports. Recently, Slovenia managed to build up its market share from nil in 1988 to some 18% in 1992. For vacuum cleaners, competition comes mainly from the United States (22% of extra-EC imports) and the EFTA countries with some 19%; China follows with some 18% in 1992. Poland tripled exports to the EC from 1988 to 1992, reaching some 20 million ECU, corresponding to a market share of roughly 13%. For refrigerators, the picture is similar to the EFTA countries and the United States as the most important competitors. Competition from East Europe, however, has increased considerably over the last few years: in 1988, Slovenia, Russia and Poland exported goods worth some 6 million ECU to the EC; in 1992, the export value was eight times higher and reached a market share of about 10%. In the field of small appliances, competition also comes from developing countries and the South East Asian NICs. For irons, for example, Singapore is a major competitor for EC producers, supplying nearly 50% of demand from outside the EC. The share of Chinese producers is about 32% at present.

Competition among EC producers has increased as well over the last few years. This development was stimulated by increasing concentration in the industry, as well as by the efforts of EC firms to increase their market share in order to compete in the single market.

Recently, producers in Germany and France have been hit by a loss in competitiveness following the appreciation of the French Franc and the Deutschmark against other European currencies.

INDUSTRY STRUCTURE

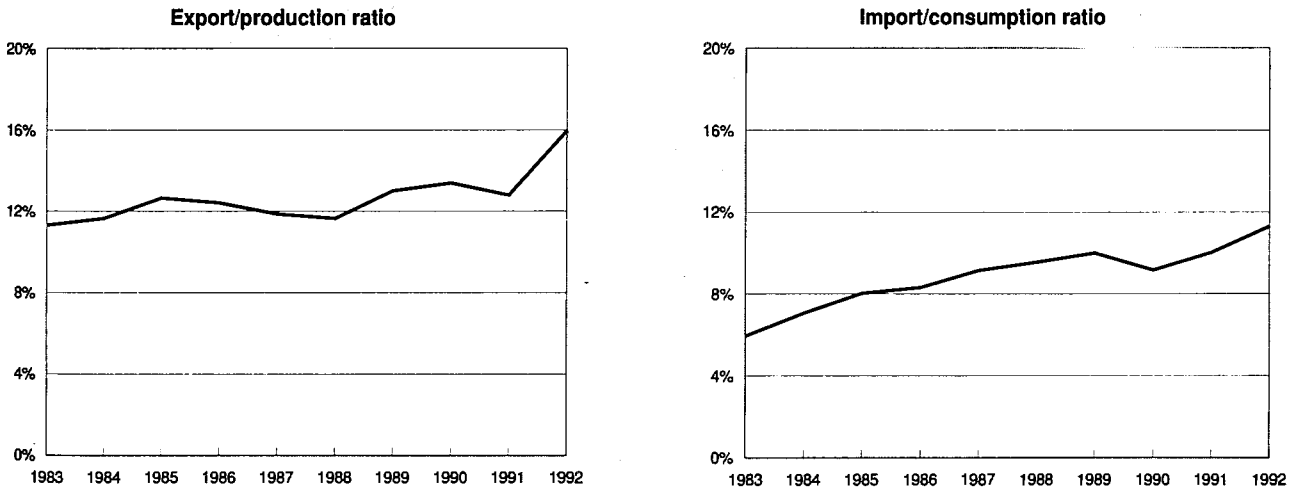
Companies

Compared to other industries in the manufacturing sector, the industry of domestic electrical appliances is highly concentrated. The manufacturing process is characterised by mass production, to benefit from economies of scale. The world's largest producer of large domestic appliances is the firm Whirlpool (USA). Europe's largest producer of household appliances is located outside the EC: Electrolux (S), with a market share of some 17% in the EC. As already mentioned, however, most of its production facilities are located within the EC. Other important producers in the field of large appliances are AEG Hausgeräte (D) and Bosch-Siemens Hausgeräte (D). An important producer of washing machines and dishwashers is Thomson Electroménager (a subsidiary of the state owned Thomson S.A.), recently acquired by the Italian firm Elfi (Elettrofinanziaria); the name of the new company will be Brandt Electroménager, and employ some 10 000 workers. In the field of small appliances, the most important firms are Philips (NL), Moulinex (F), and SEB (F). Other important producers of white goods are Candy (I), Merloni (I), Miele (D) and G.E./Hotpoint (UK).

Strategies

As already mentioned, the industry of domestic electrical appliances is highly concentrated. Important M&A activity took place during the eighties: in 1980, some 810 producers of domestic appliances were active in the EC; by 1989, the figure had declined to 430. Overcapacity, a feature of the recent past, is expected to lead to continuing consolidation efforts during the nineties as well. In the recent past, some important regrouping took place: Bosch (D) and Siemens (D) merged their appliances divisions together, Whirlpool (US) now owns the appliances' division of Philips (NL), Elfi (I) bought the Thomson Electroménager from France, Rosières (F) was taken over by Candy (I) and Scholtes (F) was taken over by Merloni

Figure 8: Domestic electrical appliances
Trade intensities



Source: DEBA

Table 5: Domestic electrical appliances
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.5	3.0
Production	0.3	2.8
Extra-EC exports	1.5	4.0

Source: BAK

(I). Nowadays, France has no production of washing machines, refrigerators and dishwashers under domestic ownership. The only production of white goods under French ownership takes place in the companies Moulinex and SEB in the field of small domestic appliances. Another important consolidation in the field of washing machines took place in the beginning of 1993: AEG and Electrolux started to produce washing machines together, to benefit from the effects of mass production. Further cooperation between these two companies is expected.

Another strategy aiming at reducing costs is the placement of production facilities in low cost countries to improve competitiveness on the world market. Beside this, a hollowing out production to reduce production costs, could take place, by producing components in low cost countries.

Beside cost reduction measures, new markets have to be found, mainly in the fast growing regions of South East Asia and in potential markets in East Europe. Electrolux for example, bought Lehel in Hungary in 1991, a producer of refrigerators. Such measures could serve as a springboard to other countries in the region.

ENVIRONMENT

Regarding ecological issues, the industry of domestic electrical appliances is faced with a number of problems. The most important is the use of CFCs in refrigerators, which has to be eliminated by 1995, even though the industry is not a heavy user of CFCs (4.3% of the "Montreal Protocol" base figure). Some firms have already introduced refrigerators without CFCs. Another impact on the environment stems from the use of water and energy in appliances. The industry's efforts, in order to reduce the environmental strain, are oriented towards the manufacture of products that use less water and less energy. Another problem, in particular for German producers, resides in scrap disposal regulations, that are planned to come into force in 1994. Companies expect these to increase their costs by some 15%.

REGULATIONS

There are two Commission directives that are particularly important for the free movement of domestic electrical appliances within the EC: these are the Low Voltage Directive 73/23/EEC of 19 February 1973 (JO no. L77 of 26 March 1973) and the Electromagnetic Compatibility Directive 89/336/EEC of 3 May 1989 (JO no. L139 of 23 May 1989).

OUTLOOK

Prospects for the domestic electrical appliances' industry are somewhat pessimistic for the short term. Demand is expected to drop in 1993 and to remain flat in 1994. In particular, producers from Germany and France will be affected by weak foreign demand in 1993, following the appreciation of their currencies, on top of weak domestic demand. In 1994 as well, both consumer expenditure and residential construction activity will remain weak, causing demand to recover only slowly. High ownership levels will further affect demand for the industry's products negatively.

In the medium term, an improvement in consumption and production can be expected, as the economic recovery boosts demand for the products of the industry. Product innovation, to save energy and water, should create demand for a new generation of appliances. Environmental concerns will also boost demand for refrigerators and freezers, with the phasing out of CFCs in these products until 1995. Dishwashers and freezers are expected to boost the growth rate of the industry in the nineties, as these products have considerably lower ownership rates up to-date.

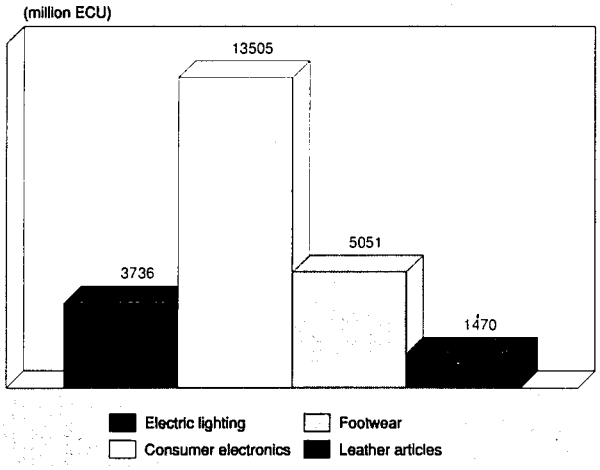
Competition from outside the EC is expected to increase as well during the nineties, particularly in the field of small appliances. EC producers will thus have to increase their efforts to reduce production costs. Rationalisation efforts will result in a further decline of employment figures in the industry in the course of the nineties.

Written by: BAK
The sector is represented at the EC level by: European Committee of Manufacturers of Electrical Domestic Equipment / Conseil Européen de la Construction Electrodomestique (CECED). Address: c/o ANIE, 2 Via Alessandro Algardi, I-20148 Milano; tel: (39) 232 64299; fax: (39) 232 64212.

Electric lighting
NACE 347

The electric lighting industry in the EC experienced fast growth in the period 1983 to 1992. Robust growth in both business and dwelling construction was the main driving forces over that period. In addition, product innovation contributed to the favourable development of demand during the course of the eighties.
Competition from producers of the East Asian NIC's has been increasing during the last few years, leading to a gain in EC market share, mainly to the detriment of traditional suppliers from the EFTA countries and the United States.
Prospects for EC producers of lamps and lighting equipment in the medium term are quite favourable, as the expected economic recovery increases demand in the course of the nineties. Product innovation, particularly in the field of energy saving lamps and lighting equipment, will provide an additional boost to demand over the next few years.

Figure 1: Electric lighting
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

The electric lighting industry can be divided into two main subsectors:

- electric lamps, which include incandescent lamps, discharge lamps and dual lamps for lighting purposes;
- electric lighting equipment, which comprises indoor electric lighting equipment, special purpose electric lights, portable lights, outdoor lights, spotlights (excluding lights for motor vehicles) and parts for electric lights.

In the EC, the sector is of minor economic weight within the larger aggregate of electrical engineering. The value added in 1992 was equivalent to 28% of consumer electronics. The most important EC producer country of electric lamps and lighting equipment is Germany with some 50% of the total; France follows with 15%, the United Kingdom with 14%, Italy with 9% and Belgium with 6%.

Recent trends

During the recent past, the industry in the EC enjoyed a favourable growth climate: while production of the manufacturing sector as a whole grew by roughly 3% per year in volume from 1983 to 1992, production of electric lighting equipment increased by about 5.2% in volume during the same period. Employment in the lighting equipment sector increased slowly by about 1% in average per year, to reach some 101 000 employees in the industry by the end of the period.

The fast rate of growth over the period analysed was mainly concentrated in the second half of the last decade, thanks to a healthy economic climate that boosted demand. From the beginning of the nineties, however, EC production more or less stagnated in real terms.

Demand, as measured in apparent consumption, grew at a rate well above production growth, of about 6.0% per year in volume from 1983 to 1992. During the same period, imports exhibited dynamic growth, of some 10% per year in volume. Exports grew considerably as well, but less dynamically than imports, at some 4% per year. The EC trade balance, however, remained positive over the whole period.

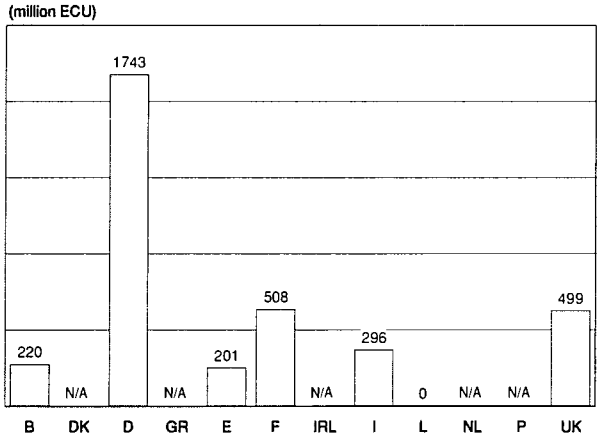
International comparison

The most important producer country in the field of electric lamps and lighting equipment is the United States, with an output nearly two times as large as that of the EC. The development of the US industry, however, was not as dynamic as that of their competitors from the EC. From 1985 to 1990, EC production increased by about 7% per year in real terms, while production in the United States was more or less stagnated. Consequently, their respective shares of world production changed over the last decade, to the benefit of EC producers.

Foreign trade

The lighting equipment industry was characterised by a fast increase of imports over the last decade. In nominal terms, imports increased by an annual average rate of about 12% over the last 10 years. Thus, some 13% of demand were satisfied by imports in 1992, against a 1983 figure of 11%. Important competitors are the EFTA countries, with about 25% of total extra-EC imports. More than half of extra-EC imports, however, stem from the aggregate "Rest of the world", mainly from developing countries, which are included in this aggregate. In this context, it is important to notice that traditional suppliers lost market share in the EC to the benefit

Figure 2: Electric lighting
Value added by Member State, 1992



Source: DEBA

Table 1: Electric lighting
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993(2)
Apparent consumption	3 881	4 267	4 834	5 268	5 848	6 689	7 746	8 177	8 482	8 580	8 450
Production	4 337	4 842	5 482	5 825	6 300	7 129	8 203	8 637	8 822	9 075	8 980
Extra-EC exports	866	1 042	1 158	1 107	1 063	1 175	1 323	1 314	1 319	1 587	1 670
Trade balance	456.1	575.2	647.6	556.7	452.6	439.9	457.0	460.5	340.1	494.3	530.0
Employment (thousands)	97.6	87.1	100.0	98.8	101.0	103.4	111.1	107.7	104.4	101.1	100.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards; the appareent consumption, production and employment series were revised from what were published in the Panorama of EC Industry, 1993.
(2) Rounded BAK estimates.
Source: DEBA

Table 2: Electric lighting
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	8.7	2.8	6.0
Production	7.4	2.7	5.2
Extra-EC exports	0.8	8.9	4.3
Extra-EC imports	8.3	12.0	9.9

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Electric lighting
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	866	1 042	1 158	1 107	1 063	1 175	1 323	1 314	1 319	1 587
Extra-EC imports	409.5	467.0	510.0	550.6	610.4	735.1	865.7	853.0	978.6	1 092.3
Trade balance	456.1	575.2	647.6	556.7	452.6	439.9	457.0	460.5	340.1	494.3
Ratio exports/imports	2.11	2.23	2.27	2.01	1.74	1.60	1.53	1.54	1.35	1.45
Terms of trade index	102.0	98.7	100.0	104.1	104.8	110.2	105.2	112.8	110.0	112.1
Intra-EC trade	1 179	1 288	1 497	1 739	1 924	2 121	2 389	2 556	2 640	2 744
Share of total imports (%)	74.2	73.4	74.6	76.0	75.9	74.3	73.4	75.0	73.0	71.5

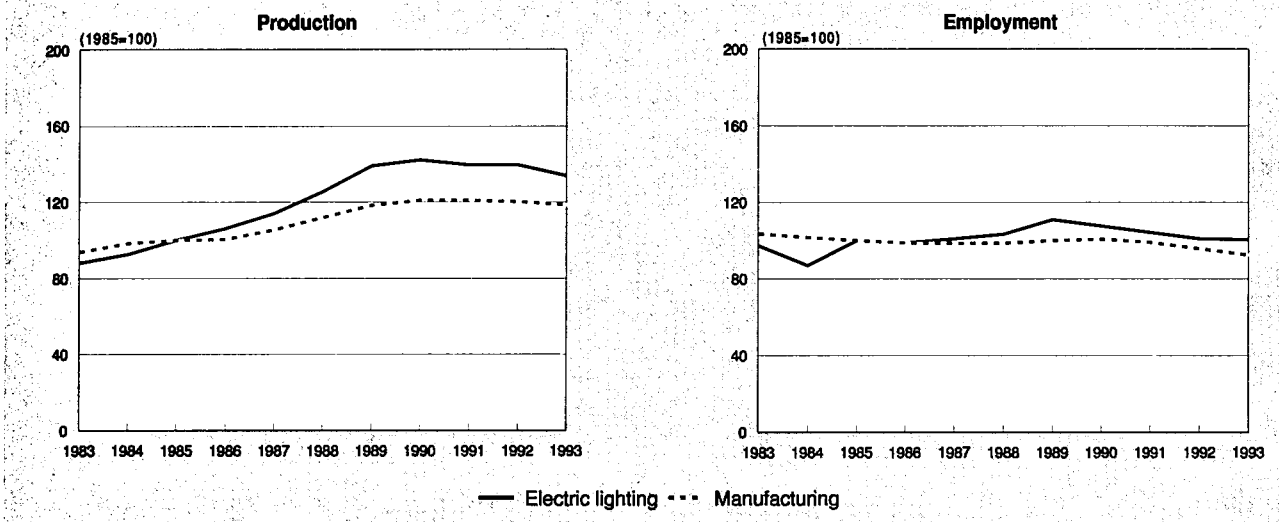
Source: DEBA

Table 4: Electric lighting
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	27.7	31.9	28.7	30.1	31.8	34.0	33.4	35.8	35.9	36.9
Productivity index	96.4	111.2	100.0	105.1	110.9	118.6	116.5	124.7	125.3	128.8
Unit labour costs index(3)	88.8	106.9	100.0	106.1	112.0	118.7	123.7	132.7	141.3	150.6
Total unit costs index (4)	81.2	100.9	100.0	107.2	113.1	123.7	133.8	143.6	153.1	163.3

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Electric lighting
Production in constant prices and employment compared to EC manufacturing



1993 are BAK and Eurostat estimates.
Source: DEBA

of developing countries. Extra-EC exports grew dynamically as well, though at a much slower pace than imports and increased by 7% per year in value over the last 10 years. For EC producers, the United States and Japan are markets of secondary importance, with about 15% of extra-EC exports delivered to these areas. More important are the EFTA countries with an export share of more than 30%.

Trade between EC member countries increased by 10% per year from 1983 to 1992; its volume is more than two times as large as imports from outside the Community. The most important intra-EC exporters are Germany and Italy, each with some 23% of the total in 1992, followed by the Netherlands (18%), France (11%) and the United Kingdom with about 5%.

Over the last decade, the share of intra-EC imports out of total imports declined slightly to the benefit of extra-EC imports, from about 74% of total imports in 1983 to 72% in 1992.

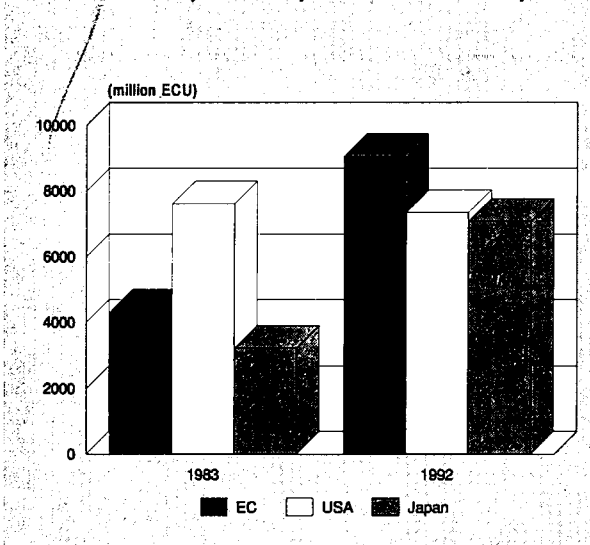
MARKET FORCES

Demand

Demand for products of the electric lighting industry is driven mainly by replacement demand (for lamps) and needs for the equipment of new buildings, dwellings and development projects (for lighting equipment). Much of replacement demand is insensitive to cyclical fluctuations, but the pace of growth of disposable income, as well as technological innovations and fashion trends, can affect replacement rates.

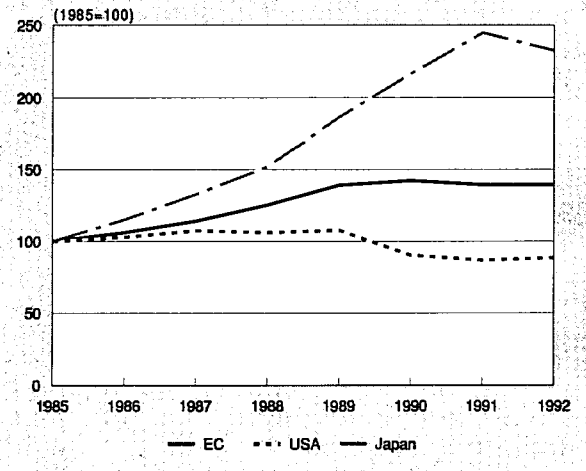
Demand for the equipment of new buildings, on the other hand, is highly cyclical, depending as it does on the level of construction activity. Electric lamps, one of the two main subsectors of the industry, are used mainly in private dwellings, industrial and offices buildings and for street lighting. A smaller part of demand for electric lamps stems from the motor vehicles' industry and from the photographic industry. For electric lighting equipment, the second of the two main

Figure 4: Electric lighting
International comparison of production in current prices



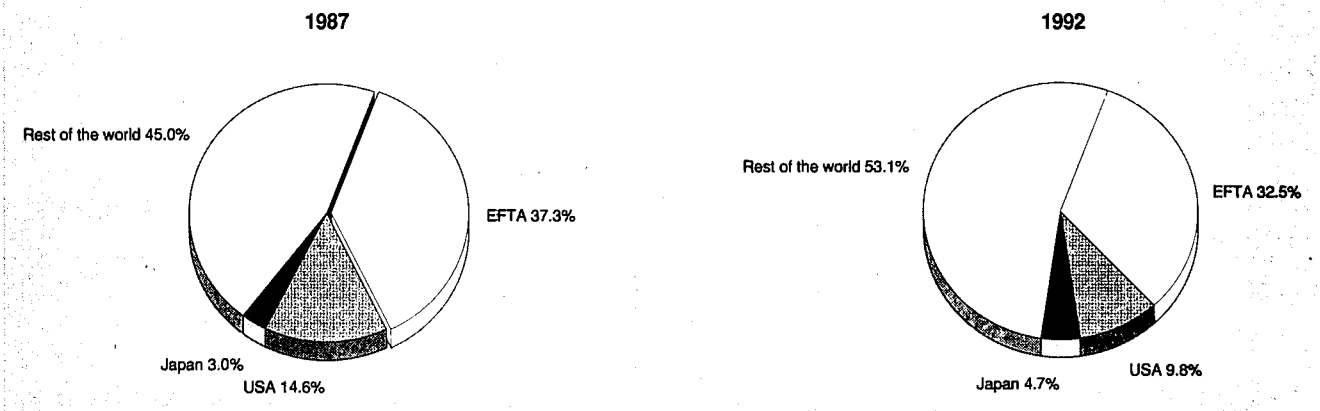
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Electric lighting
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Electric lighting
Destination of EC exports



Source: Eurostat

subsectors of the industry, business and public construction activity are the more important sources of demand Thus, the industry did benefit considerably from the boom in EC construction activity in the second half of the last decade. The recent downturn in private and public construction activity, on the other hand, coupled with the plunge, taken lately by the production of motor vehicles, have considerably affected demand for the products of the industry.

Product innovation has been an important driving force for demand as well over the last years. New products, such as halogen lamps, discharge lamps and compact fluorescent lamps, which live longer and use less energy, have increasingly gained acceptance, causing a gradual shift in demand from cheaper lamps to high-grade equipment.

Supply and competition

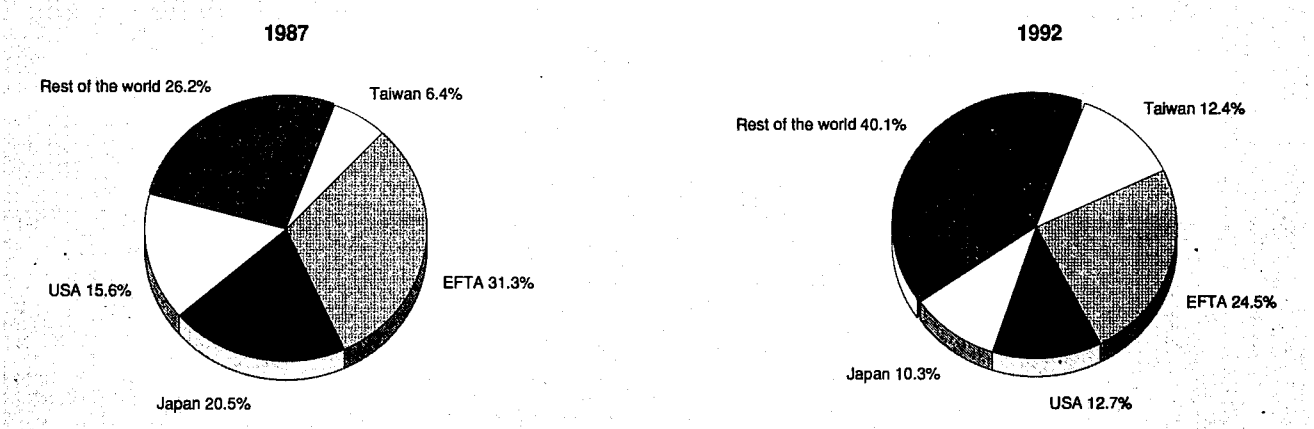
In 1983, among the Triad (the United States, Japan and West Europe), the US were the most important producers of electric lighting equipment and lamps, with about 50% of the total, followed by the EC, with some 30%; Japan was in the third position, with roughly 20%. Competition for EC producers increased considerably during the last few years, as the share of imports from outside the EC increased from some 11% in 1983 to 13% in 1992. In particular, imports from Taiwan increased from 2.5% of total extra-EC imports to roughly 12% recently; China managed to increase its market share in the EC as well. Imports from Japan, China and other Eastern countries increased particularly in the field of halogen lamps.

Trade among EC member countries enjoyed fast growth as well during the last decade, at a rate of roughly 10% per year in value. The increase in international trade in general is partly the result of the concentration process that took place in the industry during the last years.

Production process

The considerable increase in production was accompanied by meagre growth in employment figures, of roughly 0.4% per year from 1983 to 1992. The electric lighting industry employed roughly 101 000 employees in 1992, down from a peak of 111 000 in 1989. Productivity, measured in value added in constant prices per person employed, increased significantly, by 3.2% per year for the same period. Regarding individual EC countries, the fall in Spain's workforce was the steepest: from 1983 to 1992, it fell by some 66%.

Figure 7: Electric lighting
Origin of EC imports



Source: Eurostat

INDUSTRY STRUCTURE

Companies

In electric lamps, EC production is dominated by a small number of large firms. The tendency in that subsector of the industry is to concentrate activity in a few large firms, to profit from economies of scale, and to make it possible to muster the huge resources necessary for intensive R&D activities. All of the firms there are operating internationally, in most cases worldwide. The most important firm in the EC is Philips (NL), the multinational electrical goods producer, which plays a central role in assuring the dominant position of the Netherlands as Europe's number one in electric lamps. The market share of Philips is about 40% in Europe and 20% in the United States. Another important firm is the German Osram (a division of Siemens), who bought the American part of Sylvania from GTE. Osram is now one of the world's three largest producers of lamps, along with Philips and General Electric (US). The latter bought in 1990 the producer of lamps Tungsram (Hungary) and in 1991 the lamp division of the European firm Thorn EMI (UK).

In the subsector of electrical lighting equipment, production is much more fragmented. Many of the firms operate only regionally, or even locally. The most important firms are Siemens (D), Trilux (D), AEG (D), Philips (NL) and Thorn Lighting (UK). Important firms in other countries are Zumtobel in Austria and Lithonia, Cooper and GTE in the United States.

Strategies

EC firms in the electrical lighting industry are faced with stiff competition in the field of technologically advanced products, by traditional competitors from the United States and the EFTA countries; in the field of less technologically advanced products, the main competitors are the East Asian NIC's and China, benefiting from lower costs of labour, raw materials and energy. As a result, EC producers have to increase their efforts to improve production efficiency, to compensate for unit cost advantages in lower value added products, presumably through increased substitution of labour by capital, i.e. more automation of production. In the field of technologically advanced products, on the other hand, EC firms have to increase R&D expenditures, to maintain competitiveness with other industrialised countries. Efforts in this field are already apparent, as shown by the increase in inward investment, that was nearly four times as high in 1989, compared to 1983. This means also that the above mentioned trend towards increased concentration is likely to continue in the next few years. The concentration process is likely to be accompanied by further reductions in the industry's labour force.

REGULATIONS

The most important European Commision regulations concern the harmonisation of legislation applicable to electrical equipment. These should stimulate trade between EC Member States and are likely to facilitate competition from abroad as foreign competitors will no longer have to adapt their products to different national systems.

The penetration of the EC market by halogen lamp imports from Japan, China and other Eastern countries, has stimulated the Commission of the EC to impose for 1990 provisional anti-dumping duties, as high as 85.4% on halogen lamps imports from Japan.

ENVIRONMENT

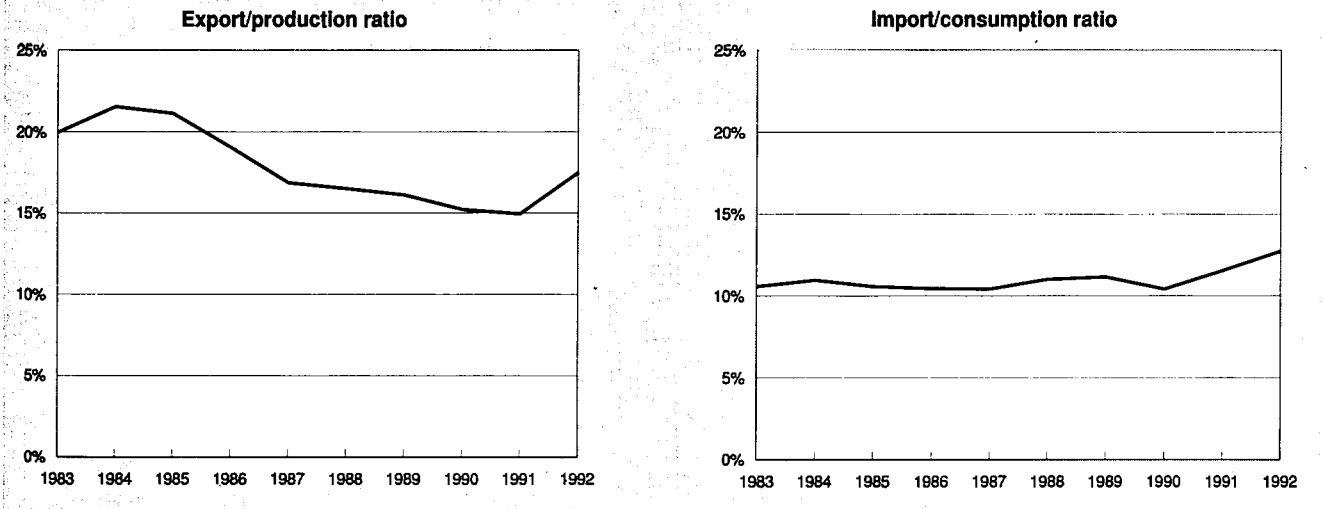
Compared to other industries, environmental issues are of minor importance in the electric lighting industry. Gas-discharge lamps contain some toxic materials such as mercury, antimony and lead. Another problem in this context is the use of packaging materials, given the fragile nature of the products. Industry efforts are oriented towards the reduction of eco-toxic materials, the reduction of packaging materials and the development of re-usable or recyclable materials for packaging.

OUTLOOK

Prospects for the EC electric lighting industry are somewhat pessimistic in the short term, as the downturn in construction activities will dampen demand for the industry's products. The decline in demand, however, is dampened by ongoing replacement demand, little affected by cyclical fluctuations.

In the medium-term, demand and production are foreseen to gain momentum, stimulated by the expected general economic upswing, to reach again their past high growth rates. Product

Figure 8 : Electric lighting
Trade intensities



Source: DEBA

Table 5: Electric lighting
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	2.4	3.0
Production	1.5	2.5
Extra-EC exports	2.8	3.2

Source: BAK

innovation is expected to keep boosting demand, as recent research and development efforts of EC firms are oriented towards electronically regulated lighting devices, improvements in light emitting efficiency and in colour rendering and further reducing the size of electric lamps. These developments will presumably entail declines in the EC production of incandescent lamps, which will be displaced by top-of-the-range products. Competition from without the EC, particularly in the field of low end technology, can be expected to increase in the nineties.

Written by: BAK
The sector is represented at the EC level by: The European Lighting Council (ELC). Address: 31, rue Montoyer B-1040 Brussels; tel: (32 2) 513 6085 fax: (32 2) 514 3386

Overview
NACE 33, 344, 345

The development of a strong electronic sector -that includes subsectors like computers and office equipment, telecommunications equipment, electronic components and consumer electronics- is strategic for the development of the overall EC economy. Since 1991, the EC electronic industry has entered a phase of deep crisis caused, on one hand, by the economic recession, and, on the other hand, due to problems very specific to all the electronic sectors linked to the increased global competition and the dramatic drop of prices and profit margins. For EC companies, the crisis is particularly deep in comparison with US and Japanese companies which are more internationalised.
The EC has points of strength in the electronic market reflected in the fact that at least two or three EC companies rank among the world's top fifteen. All of them are well diversified in complementary sectors. However most of the major EC electronic companies suffered losses in 1992 and the first half of 1993 with the exception of the telecom equipment suppliers. The role of the EC is indispensable in supporting co-operative R&D and promoting the European integrated market.

INDUSTRY PROFILE

Description of the sector

The electronics industry includes: computers and office equipment (NACE 33), telecommunications equipment (NACE 344), electronic components (NACE 345) and consumer electronics (NACE 345.1 and 345.2).

The products manufactured by the computing and office equipment are:

- hardware: portables, notebooks, microcomputers, minicomputers, workstations, mainframes and network equipment;
- peripherals: printers, disks, monitors, keyboards and CD-ROM players;
- office equipment: electronic typewriters, electronic calculators, electronic cash registers, electronic accounting machines, dictation equipment.

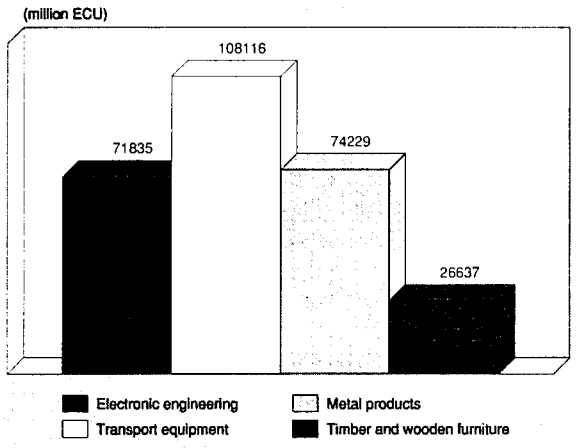
Telecommunications equipment main product categories are public switching, transmission, terminals, private switching, data communications and mobile communications.

Consumer electronics comprises: audio-visual products for domestic use and its accessories, such as colour and monochrome televisions, video recorders, video cameras and camcorders and audio equipment in general. The electronic components sector includes active, passive and electromechanical components.

All the electronic goods, either directed to consumers or to business, are based on microelectronics: and the dynamics of all electronic sectors is directly determined by technological developments in the microelectronics field. Increased intelligence and functionality, downsizing and downpricing characterise the production of every electronic sector.

The EC electronic sector is very important in economic terms: its value added is 70% of the transport equipment industry, almost as large as the metal industry's and 10 times as much as the value added of the timber & wood furniture sector. Because of its central role in the advanced information economies, the electronic sector is strategic for the development of the overall EC economy. Moreover, the sector is expected to grow more than any other large economic sector, automotive and transports included.

Figure 1: Electronic engineering
Value added in comparison with other industries, 1992



Source: DEBA

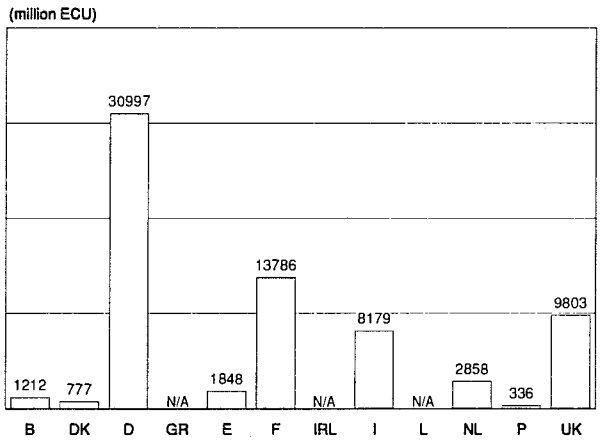
EC production is located primarily in Germany followed by France, the United Kingdom and Italy. These four countries account for about 90% of the total value generated by the electronic sector.

Recent trends

Both apparent consumption and production decreased in 1992 due to the recession and the continuous fall in prices. In particular, the slow down was very harsh in consumer electronics, in computer and office equipment and in components, whereas the telecommunications equipment market still increased.

In the EC, apparent consumption of electronic goods has consistently increased over the period 1983 to 1992 at a compound annual growth rate of 6.5%, whereas production has increased at an average rate of 6.2% and extra-EC exports at a rate of 6.9%. On the contrary, employment has decreased, reaching in 1992 its level of ten years ago.

Figure 2: Electronic engineering
Value added by Member State, 1992



Source: DEBA

Table 1: Electronic engineering
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	99 386	117 317	130 554	134 269	144 168	167 077	182 599	192 285	201 179	196 141	180 000
Production	91 417	107 614	121 608	124 813	131 571	147 383	159 776	168 904	174 586	171 168	158 000
Extra-EC exports	16 047	20 934	25 062	23 037	23 682	24 908	27 789	28 334	30 615	32 242	34 700
Trade balance	-7 968	-9 703	-8 946	-9 456	-12 597	-19 694	-22 823	-23 381	-26 593	-24 974	-22 000
Employment (thousands)	1 481	1 508	1 544	1 550	1 556	1 557	1 580	1 574	1 558	1 489	1 420

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Electronic engineering
Breakdown by sector, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Electronic components	21 373	12 300	4 564
Computer and office equipment	60 759	46 259	9 984
Telecom, electronic measuring and recording equipment	83 930	85 225	13 370
Consumer electronics and music recording	51 453	39 684	8 888

(1) Markets are non-additive as they do not follow specific NACE codes; except for trade figures, estimates are used if country data is not available.
Source: EECA, DEBA

Table 3: Electronic engineering
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	9.6	2.8	6.5
Production	8.9	2.9	6.2
Extra-EC exports	7.3	6.3	6.9
Extra-EC imports	10.4	4.2	7.6

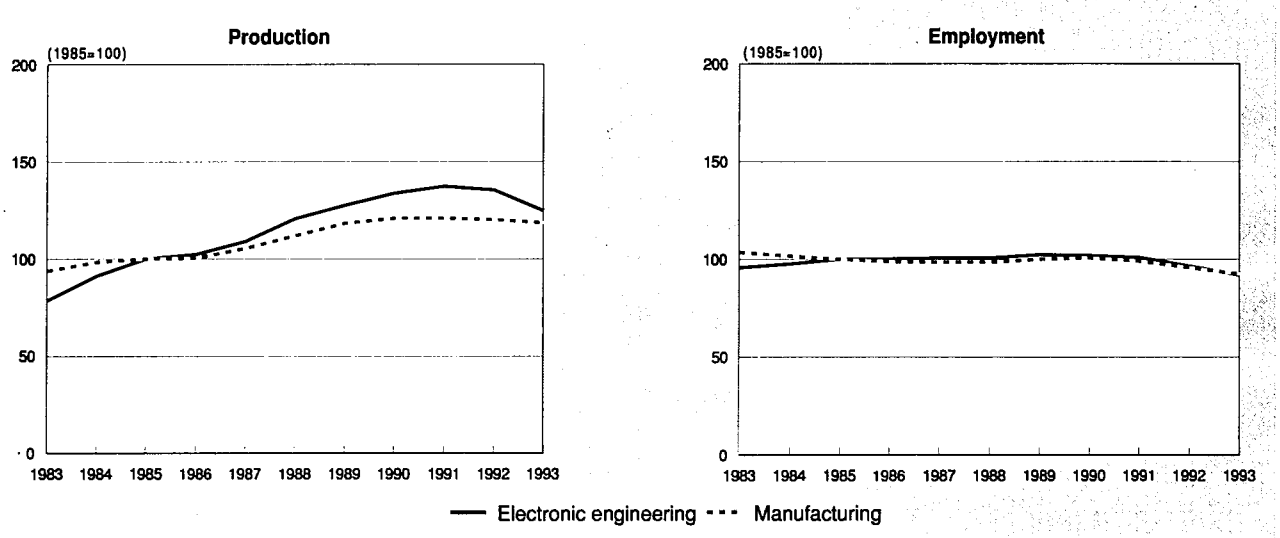
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Electronic engineering
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	16 047	20 934	25 062	23 037	23 682	24 908	27 789	28 334	30 615	32 242
Extra-EC imports	24 015	30 637	34 008	32 493	36 278	44 602	50 612	51 715	57 208	57 216
Trade balance	-7 968	-9 703	-8 946	-9 456	-12 597	-19 694	-22 823	-23 381	-26 593	-24 974
Ratio exports/imports	0.67	0.68	0.74	0.71	0.65	0.56	0.55	0.55	0.54	0.56
Terms of trade index	110.6	103.2	100.0	104.4	107.1	106.5	100.2	105.1	101.9	99.4
Intra-EC trade	21 502	27 367	32 938	33 691	36 696	41 454	48 463	52 471	54 899	55 454
Share of total imports (%)	47.2	47.2	49.2	50.9	50.3	48.2	48.9	50.4	49.0	49.2

Source: DEBA

Figure 3: Electronic engineering
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

International comparison

Broadly speaking, EC companies compete worldwide in all market segments. However, the consumer electronics market is dominated by Japanese companies and, to a lesser extent, by newly industrialised countries (NICs) (Korea, Taiwan, Honk Kong, Singapore) in the low value added consumer products segment. American and Japanese companies dominate the computer and office equipment market, but American companies set the worldwide standard in the sector, i.e. they control the guidelines of information technology developments. American and Japanese companies also control the microelectronics market. US companies, like Intel and Motorola, control the microprocessor segment where they impose worldwide standards, while Japanese companies are strong especially in the electronic memories market (particularly, dynamic random memory or DRAM).

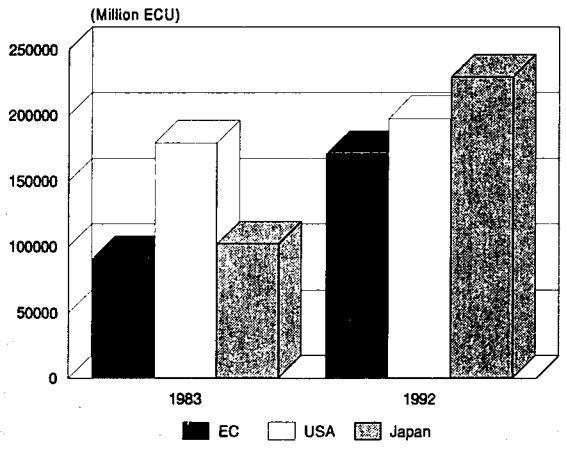
EC companies are very competitive in the telecom equipment market where North American companies (like AT&T, Northern Telecom and Motorola) and Japanese companies (like Fujitsu and NEC) are also very strong. Above all, Europe has a growing importance as a huge market for global suppliers. In fact, Europe is the world's most important market for telecom, computer and office equipment and it is the second largest market in the world (after the USA) regarding consumer electronics.

Foreign trade

From 1987 to 1992, the percentage of exports to the USA (22% of total exports), Japan (which absorbed just 3-4% of the total) and lesser developed countries (42-45%) remained more or less stable. Exports to EFTA decreased from 30% to 24% in favour of rising exports to the OPEC countries that, in 1992, came to account for 8% of the total.

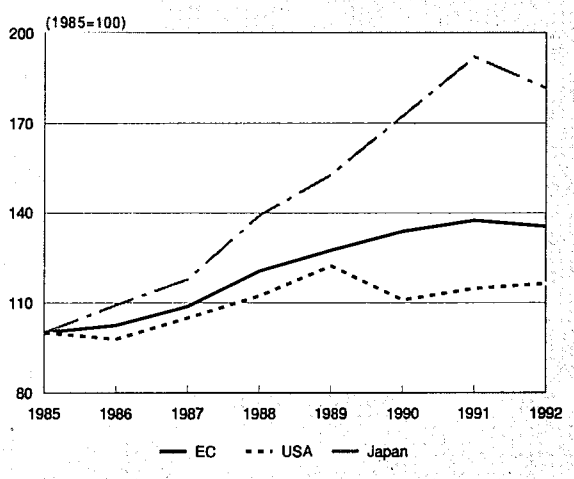
Extra EC imports have grown more than extra EC exports over the period 1983 to 1992: in fact while imports grew at a compound annual growth rate of 7.6%, export grew by 6.9%. The trend partially reversed from 1988-1992: in that period exports grew at a rate of 6.3% while imports grew

Figure 4: Electronic engineering
International comparison of production in current prices



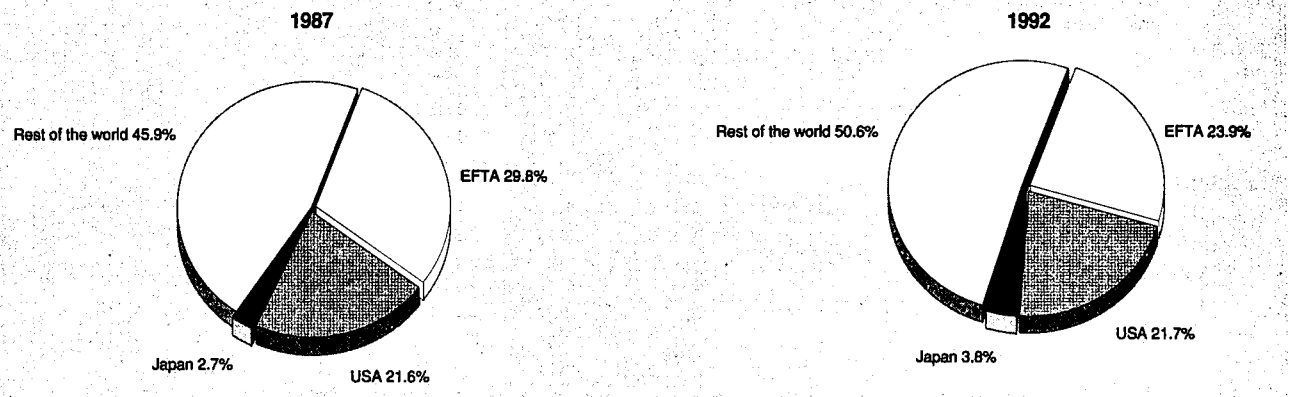
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Electronic engineering
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Electronic engineering
Destination of EC exports



Source: Eurostat

just 4.2%. The EC trade deficit with the rest of the world has more than doubled in ten years and in 1992, it nearly reached 25 000 million ECU. It's very likely that the negative trend will continue.

The only sector where the trade balance is positive is telecom equipment. Computer and office equipment and consumer electronics show the widest trade deficit. Infra-EC trade grew very fast and more than doubled in the last ten years.

From 1987 to 1992, the percentage of imports from the USA, EFTA and Japan decreased, whereas imports from Taiwan and other NICs increased consistently.

MARKET FORCES

Demand

Business customers constitute the principal market for electronic goods. Computer and office equipment products, telecommunications equipment (especially regarding private data and voice networks) and electronic components (which enter as basic components in every manufactured electronic product or system) all target business customers.

The public sector market is quite important considering that national public operators constitute the main market for telecommunications equipment. The consumer market is important for consumer electronics producers, and increasingly so for telecom terminals (like wireless telephones) and home computer suppliers.

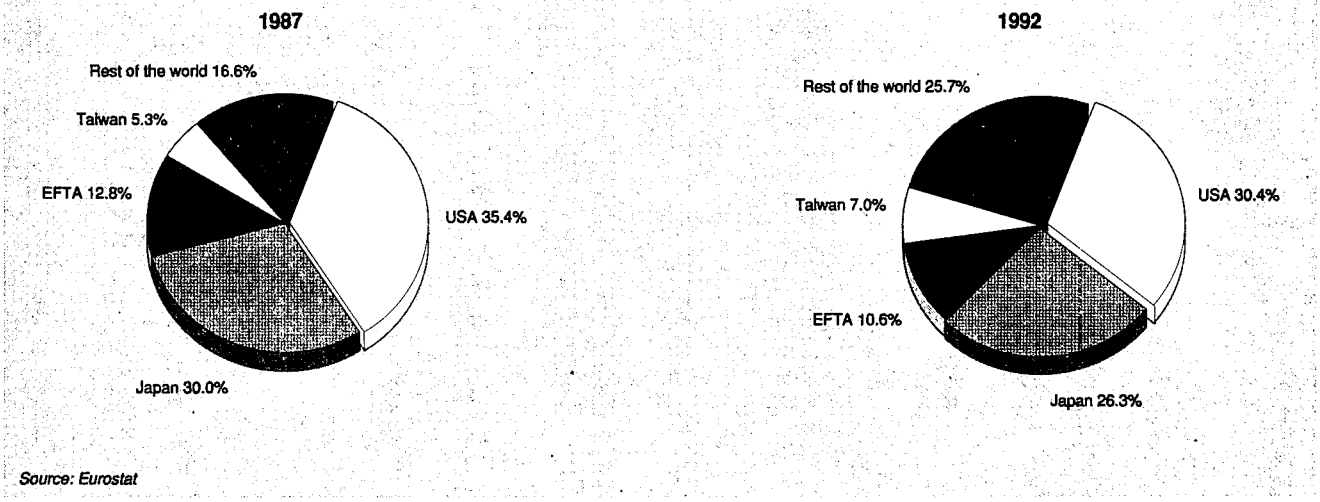
Demand depends heavily on the economic cycle: the recession of the past two years has significantly reduced consumer demand and to a lesser extent, demand by businesses' given that expenses in information and communications technology are strategic for business customers. Budget restraints in Member States also had an impact on telecom expenditure, despite the fact that Member States are implementing important modernisation plans for their networks.

Despite recession, electronic markets have expanded in volume due to large prices decreases. Demand is also becoming more differentiated and sophisticated and competition is spreading also in the most protected (and more profitable) public sector markets.

Supply and competition

In the electronic sector, competition is global: it is acknowledged that no important producer could survive until the

Figure 7: Electronic engineering
Origin of EC Imports



Source: Eurostat

Table 5: Electronic engineering
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (2)	32.4	35.4	36.8	37.7	40.4	43.5	44.2	45.4	46.7	48.3
Productivity index	88.0	96.2	100.0	102.4	109.8	118.3	120.0	123.5	126.9	131.1
Unit labour costs index (3)	88.0	93.4	100.0	104.9	112.8	119.2	125.9	132.7	142.5	151.8
Total unit costs index (4)	80.1	91.1	100.0	102.2	107.6	120.3	129.1	138.2	147.5	155.2

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed (thousand ECU).
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

year 2000 without gaining world leadership at least in one, even small, niche of the world market.

Many American and Japanese electronic companies have R&D and production units in Europe, especially in the United Kingdom, Germany and France, even if new installations are decreasing because of the current crisis and overproduction. Other competitors preferred to acquire European firms (like Fujitsu with ICL (UK) and Nokia computer (SF) or to set up joint ventures such as Northern Telecom with Matra (F).

Broadly speaking, non-EC competitors are less present in the European telecom equipment than in other electronic sectors. Many European companies are also global, especially in the telecom equipment and consumer electronics sectors. In the computer and office equipment sector, however, EC companies suffer for not being internationalised to the extent that their American and Japanese counterparts are.

It is acknowledged that EC companies have a high degree of scientific and technological expertise, but they also have large disadvantages because of the high cost of labour (in comparison to South East Asia) and a high cost of capital (in comparison to USA and Japan).

Production process

The supply of electronic goods is characterised by high levels of R&D expenses: for instance R&D expenses could account for 15-20% of the electronic component suppliers revenues. In microelectronics and in telecom equipment sectors, R&D expenses are often higher than the production expenses. Moreover, supply is affected by a dramatic reduction in product life cycles because of rapid innovation in microelectronics. Therefore, economies of scale and rapid return on investment are needed. In the latter respects, it is becoming increasingly important for major electronic companies to be vertically integrated or to have strong links with the components suppliers and be suitably diversified.

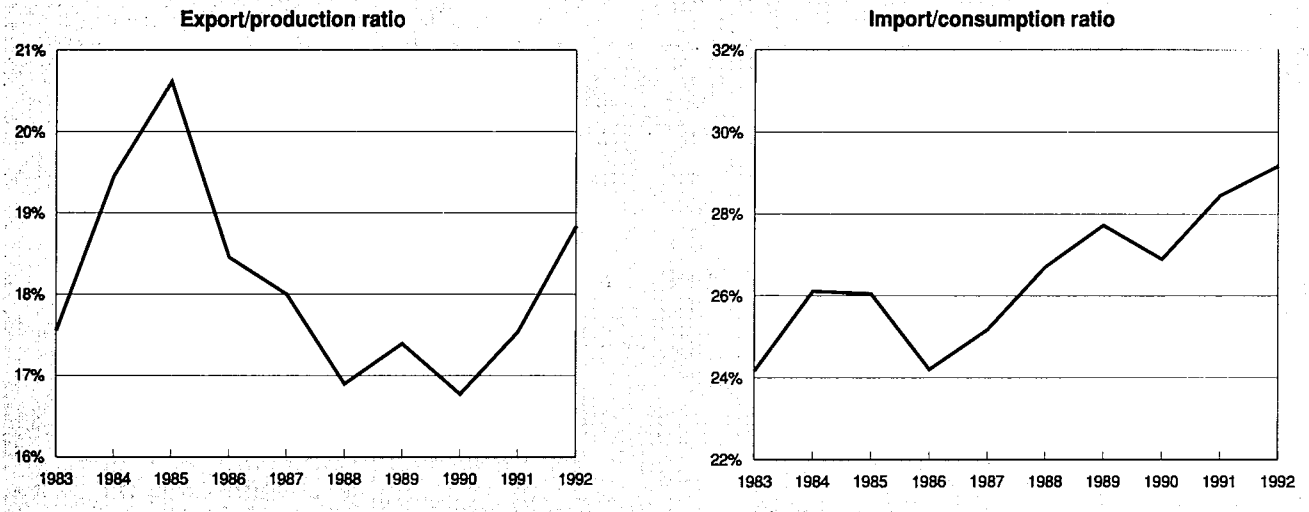
Innovation is a key to success via control of world standards and the opening up of new business opportunities that allow for early exploitation of large profit margins before prices fall due to competition. Major innovation in electronic fields will be pocket computers, Personal Digital Assistant (PDA), High Definition TV, Integrated Services Digital Network (ISDN), broadband high speed networks to communicate voice, data and images, and GSM (Group Special Mobile) networks for mobile communications.

INDUSTRY STRUCTURE

Companies

In each electronic sector there are at least two or three European companies in the top fifteen world ranking. These are Philips (NL), SGS-Thomson (F) and Siemens (D) in the components industry; Siemens, Olivetti (I) and Bull (F) in the computer industry; Alcatel (F), Siemens, Ericsson (S) and Bosch (D) in the telecom equipment industry; and Philips and Thomson

Figure 8: Electronic engineering
Trade intensities



Source: DEBA

Table 6: Electronic engineering
Breakdown by size of enterprise, 1990 (1)

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	58 948	82.7	9.0	7.6
20-99	9 121	12.8	12.5	12.7
100 or more	3 210	4.5	78.5	79.7

(1) Provisional estimates; NACE 34
Source: Eurostat

in consumer electronics. All of them are diversified in complementary sectors.

Many EC companies suffered losses in 1992 and the first half of 1993 with the exception of the telecom equipment suppliers who, in any case had to face smaller profit margins. Broadly speaking the EC industry has its point of strength in the telecom equipment sector while it is weaker (in comparison with global competitors) in other sectors like computer and office equipment and consumer electronics.

Strategies

Every EC electronics company is engaged in big efforts to restructure, to cut costs, become leaner and reduce marketing time. Technological and commercial partnership agreements have become commonplace in the industry; joint ventures, alliances and take-overs between EC and extra EC companies are also very frequent in order to reach the right dimension to compete in the global market and to share technological know-how and market power.

In the future, the trend towards setting up networks of alliances for specific products/markets will intensify: in fact, the convergence between telecommunications, computer, software and media industries is limiting the ability of companies to face alone the new and more complex electronics markets.

ENVIRONMENT

The EC electronics industry is in a good position to play a positive role because it does not have a very relevant impact on environment - wastes or chemical emissions are secondary output in most of the production processes, at least in comparison with most other industries. Furthermore, the electronic industry is very innovative and often renews its production processes also with the aim of reducing polluting emissions. CFC (chlorofluorocarbons) waste (one of the main causes for the reduction of the ozone layer) has been reduced before the legislation that will completely forbid its use has came into force. An important goal is to minimise the residual waste and re-cycling hardware. Some of the main problems to be solved concern re-cycling cathode ray tubes, that contain toxic materials, and plastic components.

Environment-sensitive policy is often a successful strategy for the electronic companies: in fact consumers are becoming more and more sensitive to environmental problems and prefer to purchase products with a low environmental impact, while employees are becoming increasingly conscious about working for an environmentally friendly company.

REGULATIONS

The EC plays a central role in the industry's development by promoting European market integration and fair competition among EC and extra-EC players (for example through anti-trust legislation and directives concerning public contracts). One of the main goals of the EC is to open the EC market on the assumption of a mutual response from non-EC countries.

The EC is also funding strategic and pre-competitive co-operative research programs (like Jessi in microelectronics and Race in telecommunications) and it is promoting new advanced applications (like Trans European digital Networks) that benefit all the EC electronics industries. The EC also promotes financial aid for less developed and disadvantaged EC regions that aim to upgrade the technological content of their capital stocks.

OUTLOOK

Although the electronic market is very likely to remain flat over the next few years, there are few doubts that in the medium and long term it will grow more than any other traditional industry. Unfortunately, it's also very likely that the EC trade deficit in electronic goods will widen in the coming years. Competition from American and Japanese companies will increase and EC companies will have to sustain large efforts in R&D expenses and in industrial investment to win the competitive challenge. Alliances between companies are expected and the industry will surely concentrate more and more.

Despite present financial difficulties, East European countries present attractive market opportunities because of their proximity and untapped potential. Innovative markets and products - created by the convergence between consumer electronics, telecommunications, computer and media technologies - are foreseen as presenting opportunities in the next years. However, multimedia systems and networks constitute the major opportunity for the future.

Written by: Databank Group - Teknibank

Electronic components
NACE 345

The electronic components market has experienced moderate, and more recently, declining growth, in comparison to most of the 1980s. The effects of recession, combined with the European industry's difficulties to cover the competition gap with respect to North American and Japanese companies, have caused a turnaround in industrial strategies that have become more global market oriented. Industry players continue to form alliances as a means of imposing their standards, particularly in the areas of microprocessors and Digital Signal Processors (DSPs).
Mergers and acquisitions, international joint ventures and the setting up of USA and Japanese manufacturing facilities in Europe will probably characterise the coming years. In the medium to long term, as the consumer markets for computers, communications and automotives develop further, Europe is likely to recover market share.

INDUSTRY PROFILE

Description of the sector

The electronic components sector includes three main categories of products.

- Active components: semiconductors (typically integrated circuits and discrete semiconductors), microcircuits, valves, tubes and optoelectronics components;
- Passive components: all types of capacitors and resistors, inductors and other magnetic and ceramic components;
- Electro-mechanical components: printed circuit boards, connectors, relays, switches, keyboards and other functional devices.

The electronic components are mainly directed as inputs to the following sectors: telecommunications, computers, consumer electronics, military, automotive, automation systems, controls and instrumentation for industrial and non industrial applications (building, security, environment, etc.) and medical equipment.

Recent trends

The negative trend concerning the production of electronic components began in 1991 by declining from 12 845 million ECU in 1991 to 12 300 in 1992 and 11 200 in 1993, with some exceptions for a few segments of product. Extra-EC export trends follow those of apparent consumption, dropping from 5 237 million ECU in 1991 to 5 070 in 1993. As consumption dropped more harshly than production, the trade balance reduced its negative spread, from -9 473 million ECU in 1991 to -9 073 in 1992.

Since 1984, the employment trend has been discontinuous, depending on economic and technological factors, out of which the continuous process innovation in components manufacturing and the increasing location of new manufacturing facilities in low labour cost countries are the most important ones. Total employment fell from 233 000 in 1991 to 197 000 in 1993 with the trend likely to intensify.

The trend in apparent consumption has been on the decline, falling from 22 318 million ECU in 1991 to 21 373 in 1992. Estimates for 1993 show a stagnation to 21 500 million ECU. In the period 1988-1992, the average real annual growth rate of apparent consumption was low, extra-EC imports were increasing, while production and extra-EC exports were decreasing. So far, the European firms are both losing market share in the domestic market and unable to succeed in the foreign markets.

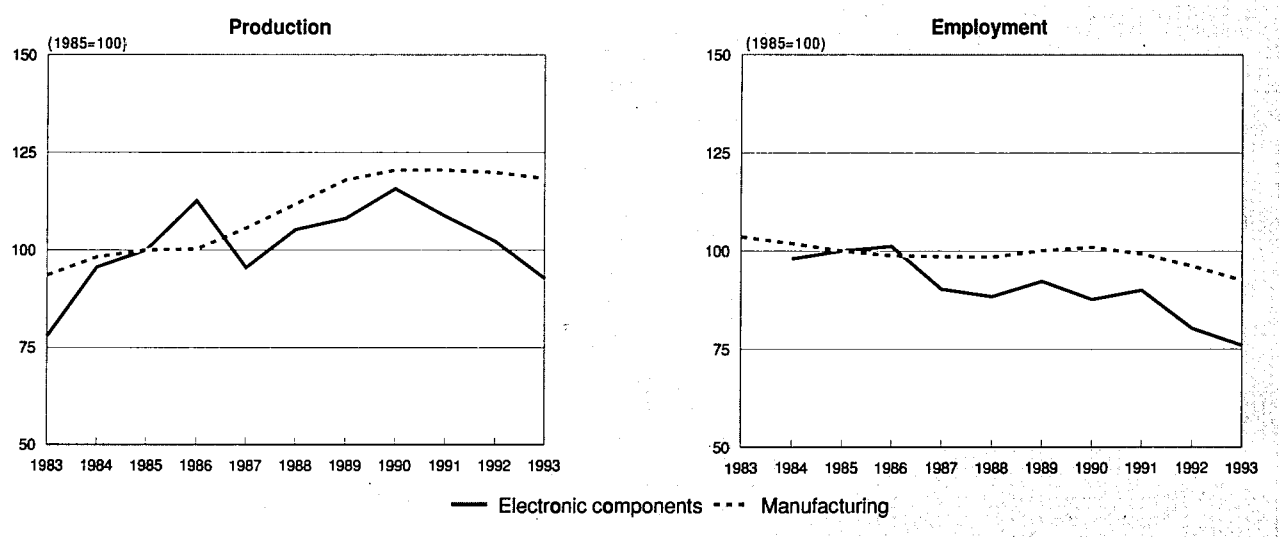
International comparison

Europe is the third largest market for semiconductors (19% of the world market share in 1992), after Japan (33%) and North America (30%). The European market share has been decreasing over 1991-1993 because of recession and globalisation of the electronic equipment manufacturing industry. Despite the strong effort to develop a competitive European components industry - by supporting pan-European R&D projects (like JESSI) and by favouring intra-European joint ventures and mergers - the results are still not satisfactory.

Foreign trade

The exports/imports ratio concerning the passive components (0.74) did not vary in the period 1991-1992. The exports/im-

Figure 1: Electronic components
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: EECA, DEBA

Table 1: Electronic components
Main indicators in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)
Apparent consumption	10 915	15 682	16 491	17 436	16 686	18 732	20 984	21 679	22 318	21 373	21 500
Production	7 545	9 721	10 535	11 934	10 205	11 591	12 264	13 345	12 845	12 300	11 200
Extra-EC exports	2 441	3 348	4 195	3 594	3 064	4 705	4 879	5 193	5 237	4 564	5 070
Trade balance	-3 370	-5 961	-5 956	-5 502	-6 481	-7 141	-8 720	-8 334	-9 473	-9 073	-10 000
Employment (thousands)	(2)N/A	253.9	258.9	262.0	233.8	229.1	238.9	227.2	233.1	208.1	197.0

(1) Rounded Eurostat estimates.
(2) 1984 and 1985, excluding Spain; 1988, excluding Belgium.
Source: EECA

Table 2: Electronic components
Breakdown by sector, 1992

(million ECU)	Apparent consumption	Production	Extra-EC exports
Printed circuit boards	2 872	2 490	190
Integrated circuits	7 755	2 105	1 695
Connectors	2 010	1 810	444
TV and monitor tubes	1 340	1 251	189
Discrete semi-conductors	1 848	1 035	664
Capacitors	1 296	876	271
Film circuits	1 021	555	197
Inductors	872	576	217
Switches and relays	629	554	228
Others	1 730	1 048	469

Source: Eurostat

Table 3: Electronic components
Average real annual growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption	8.6	2.1	5.7
Production	6.2	-0.7	3.1
Extra-EC exports	12.2	-2.3	5.5
Extra-EC imports	12.3	2.9	8.0

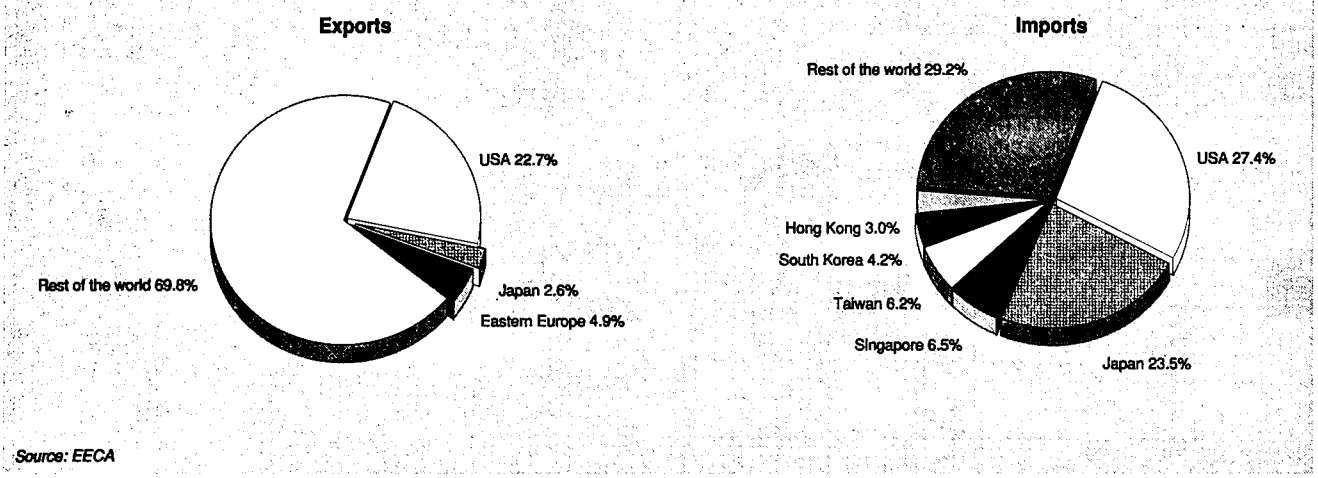
Source: EECA, Eurostat

Table 4: Electronic components
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	2 441	3 348	4 195	3 594	3 064	4 705	4 879	5 193	5 237	4 564
Extra-EC imports	5 811	9 309	10 151	9 096	9 545	11 846	13 599	13 527	14 710	13 637
Trade balance	-3 370	-5 961	-5 956	-5 502	-6 481	-7 141	-8 720	-8 334	-9 473	-9 073
Ratio exports/imports	0.42	0.36	0.41	0.40	0.32	0.40	0.36	0.38	0.36	0.33
Terms of trade index (1)	106.6	99.9	100.0	106.6	106.1	106.4	99.8	105.0	98.7	93.5
Intra-EC trade	4 564	5 755	7 212	7 594	7 482	9 693	10 755	10 777	10 891	N/A
Share of total imports (%)	44.0	38.2	41.5	45.5	43.9	45.0	44.2	44.3	42.5	N/A

(1) Nace 3450.
Source: EECA, Eurostat

Figure 2: Electronic components
Destination of EC exports and origin of EC imports, 1992



Source: EECA

ports ratio of the electro-mechanical components was more than 1, whereas in the other segments extra-EC exports were lower than extra-EC imports. Overall, the higher decrease of extra-EC imports improved the trade balance as measured by the exports/imports ratio, that fell from 0.36 in 1991 to 0.33 in 1992.

Most European exports are absorbed by smaller markets, while only a minor share of export is destined for the USA and Japan. On the contrary, EC imports of active components come primarily from the USA (28%) and from Japan (22.4%). As for passive components, Japan accounts for 29% of import and it overtook the USA (25%). The increasing importance of the South-East Asian countries is underlined by a global EC-imports share of about 22%.

Regarding the active components segment, extra-EC exports decreased from 4 767 million ECU in 1991 to 4 369 million ECU in 1992. Extra-EC imports also followed a downward trend. The exports/imports ratio in 1992 (0.61) recorded a slight decrease from the previous year (0.65). The EC trade balance concerning the different categories of semiconductors was negative in the period 1990-1992, displaying a strong and increasing dependence on extra-EC imports.

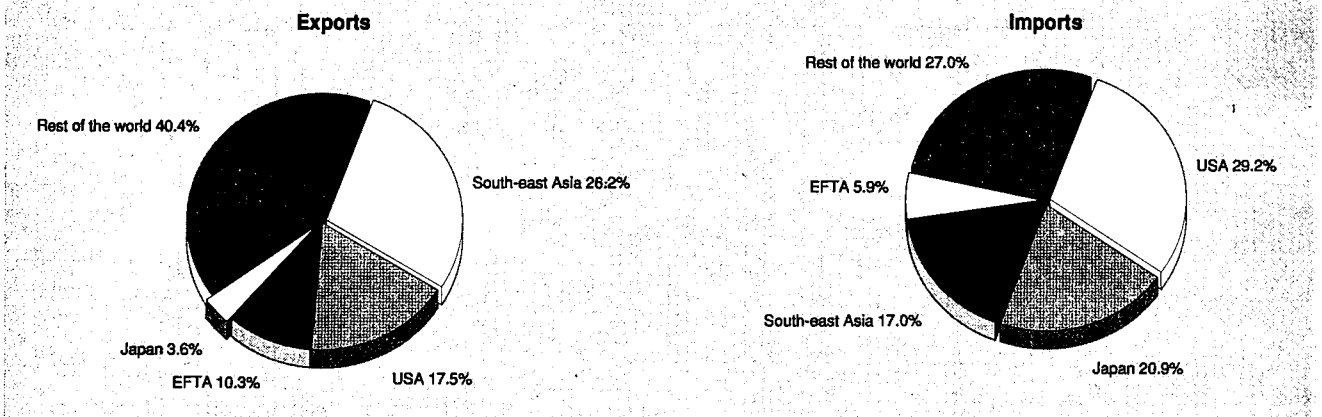
MARKET FORCES

Demand

The demand for electronic components comes from the OEMs, (Original Equipment Manufacturers) of electronic equipment in a wide range of industry sectors ranging from telecommunications to automotives. The passive and electromechanical components are relatively mature, whereas the active components, the integrated circuits above all, have great possibilities of further development and innovation. Particularly, the semiconductor sector displays high innovation rates boosting demand of many new final products. The spread out of the C-MOS technologies, the IGBT (Insulated Gate Bipolar Transistor), the Smart Power-IC and the ASIC (Application Specific Integrated Circuit) are some examples. In recent years fast innovation rates have been generating sophisticated components leading to the partial replacement of some categories of products, like passive devices in general.

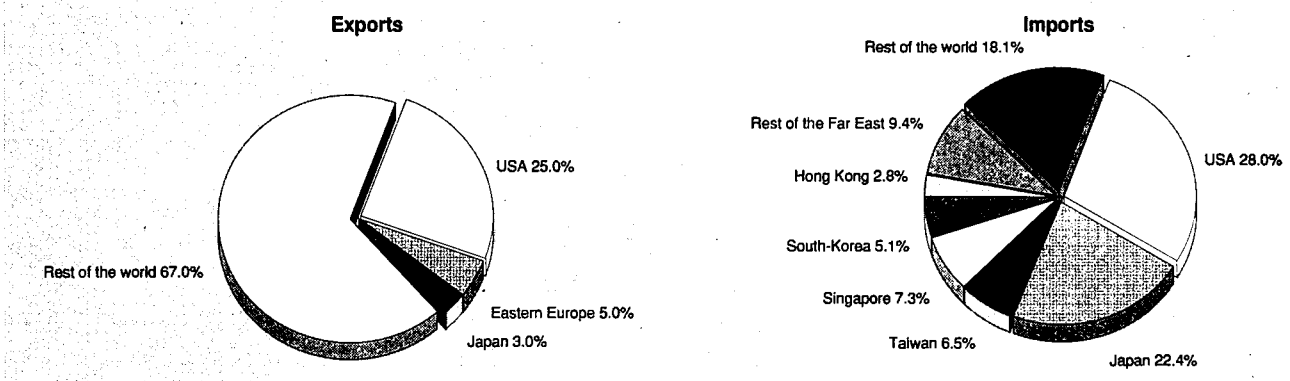
The computer sector is still the main market for electronic components, accounting for about 40% of total semiconductor demand and 30-35% of other components demand world-wide: the development of the individual and social applications of I.T. can be mentioned among the driving applications.

Figure 3: Semiconductors
Destination of EC exports and origin of EC imports, 1992



Source: Eurostat

Figure 4: Active components (1)
Destination of EC exports and origin of EC imports, 1992



(1) TV & monitor tubes, other tubes, integrated circuits and discrete semiconductors.
Source: EECA

The telecommunications sector is second in importance, requiring innovative components based on Digital Signal Processors. The development of the GSM (Group Special Mobile), of ISDN (Integrated Services Digital Network) and ATM (Asynchronous Transfer Mode) switching technologies are amongst the leading applications.

Consumer electronics requires sophisticated electronic components, as its range of products is widening and becoming increasingly high-tech intensive, but in general its share of total components consumption is decreasing. Innovative products concerning this area are HDTV (High Definition Television) and digital radio.

Automotives absorb a lot of electronic components for sophisticated devices, advanced diagnostics, engine management and - in the future - on-board computers. The present strong recession in automotive production, however, is seriously limiting the development of this important market.

Military and defence, which have traditionally been important user sectors for electronic components, are rapidly losing market share and they now represent less than 3% of total consumption, even though they are still important for some of the advanced and high value-added components.

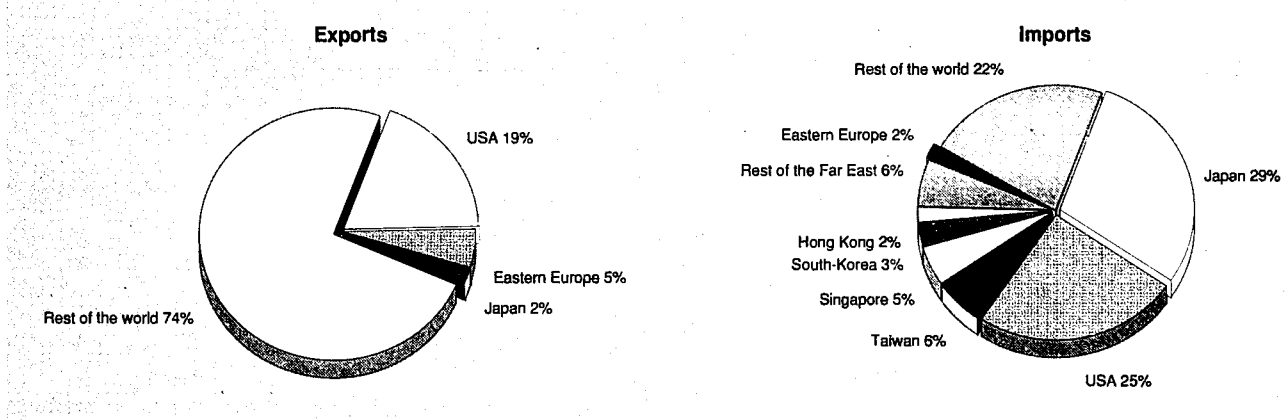
Industrial and medical equipment are losing in overall importance, but they continue to constitute a major area of application for electronic tubes, optoelectronics and electromechanical components.

Among geographic market segments, East European countries are likely to represent a very important outlet in the coming years, as they are embarking on industrial modernisation and are still very far from the market saturation level. Components distribution channels constitute an important part of the supply chain, particularly for the supply of passive and electro-mechanical products to industrial equipment sectors, which generally consist of a large number of small and medium manufacturers.

Supply and competition

The European microelectronics industry has three main categories of problems affecting its local and global competitiveness. Firstly, as far as some components like printed circuit boards are concerned, the size of the individual producers is too small to reach economies of scale and to generate margins to be invested in technological development and manufacturing investments, which are the necessary conditions to keep up with the speed of technological innovation. Secondly, although

Figure 5: Passive components (1)
Destination of EC exports and origin of EC imports, 1992



(1) Capacitors, resistors, inductors, soft ferrites and film circuits.
Source: EECA

Table 5: Electronic components
Breakdown of EC trade by component type, 1991-92

(million ECU)	1991	1992
Active components:		
Extra-EC exports	4 767	4 369
Extra-EC imports	7 362	7 161
Ratio exports/imports	0.65	0.61
Passive components:		
Extra-EC exports	1 170	1 157
Extra-EC imports	1 590	1 559
Ratio exports/imports	0.74	0.74
Electro-mechanical components:		
Extra-EC exports	5 534	5 532
Extra-EC imports	3 790	3 594
Ratio exports/imports	1.46	1.54

Source: Eurostat

Europe as a whole has strong capabilities in the different layers of the microelectronics industry it is weak in exploitation. The traditional strength of the European industry in machine tools and precision mechanics could be, for instance, a healthy basis for the semiconductor manufacturing equipment. In addition, the excellent capabilities in basic research could be adapted to the industrial world to become more effective.

The trend towards further concentration is likely to result in strong polarisation: on one side there will be the technological leaders, about ten large global companies; on the other side there will be a lot of small companies specialised in products/markets niches.

Passive and electromechanical components are more mature products, still evolving but at lower rates. In these segments, prices are the main competitive weapon. The supply is very fragmented, as many players are small local ones having their own market niches.

Production process

The components sector is typically science based, linked with the scientific research and discoveries, such as those in micro physic, material science, optics, mathematics, modelling, etc. combined with manufacturing innovations like micro-fabrication, photolithography and etching technology, packaging technology, etc. The processes are more and more capital intensive and the process know-how becomes a strategic factor of success in order to reduce costs and to guarantee the highest level of product quality and reliability.

Besides innovation and dependency on R&D, the production process is linked to upwards and downwards integration issues and location choices. Regarding the upwards integration, the proximity to special equipment manufacturers and to manufacturing/engineering services suppliers is a key factor of success that accounts for the manufacturing facilities concentrating in a few regions and "valleys". When components are produced by downwards integrated companies, the geographical proximity of the plants can provide logistic advantages. Finally, there is a need to achieve good communication between branches or affiliated companies, to be kept aware of changes in the final markets.

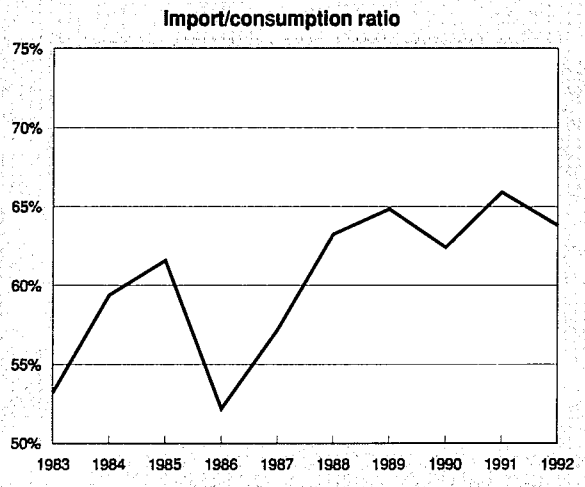
INDUSTRY STRUCTURE

Companies

Regarding semiconductors, there is a strong presence in Europe of USA and Japanese companies. Some European companies, such as Philips (NL), Siemens (D), SGS Thomson (F/I), are worldwide leaders, too. The passive and electro-mechanical components supply is more fragmented, with many small local operators having low market share. Here too the market is dominated by international companies, mainly USA and Japanese, as well as the above mentioned European ones. Some categories of products - i.e. most of the printed circuits - are delivered by small to medium sized enterprises or large companies active in captive markets.

Overall, for semiconductors Philips is the leader on the European market with a share of 9.3%, closely followed by Intel (USA), whose microprocessors are inset into about 80% of the personal computers produced worldwide. Another American company, Motorola, is in third place. Two European companies, Siemens and SGS-Thomson Microelectronics, and a long list of American, Japanese and South East Asian players follow.

Figure 6: Electronic components
Trade Intensities



Source: EECA

Table 6: Electronic components
EC trade balance in semiconductors, 1990-92

(million ECU)	1990	1991	1992
Discrete semiconductors	-237	-209	-109
Integrated circuits	-1 617	-2 049	-2 413
Opto-electronics	-59	-107	-113
Total	-1 913	-2 365	-2 635

Source: Eurostat

Strategies

The manufacturing of semiconductors is a capital intensive industry, where it is necessary to produce large volumes for the global market to achieve economies of scale. About 40% of the revenues are directed to feed R&D and production investments. The required amount of these investments will grow even more by the mid 1990s as the new generation of 0.3 micron chip components will be on development contributing towards further concentration on the supply side.

The strategy of European companies is dramatically changing as a consequence of both the recession and evidence of the unsatisfactory results of the 1980s policy that was based on strong competition with American and Japanese companies to gain independence and to protect the domestic market. Companies now look for joint ventures (for instance Siemens with IBM (US) and Toshiba (JPN) for a joint R&D effort in memories) and pay attention to small but high value added product/application niches. SGS-Thomson's strategy concerns a few specific components addressed to the faster growing applications in the EC market (cellular telephone, broad band communications, satellite communications, high definition television, automotive controls, etc.).

There is also an attempt to achieve economies of scale and synergism between European manufacturers: the agreement between SGS-Thomson and Philips for ASIC manufacturing is a clear example of this trend. As a consequence of the European competitive strategy turnaround, some important European R&D projects - like JESSI (Eureka) - have been reduced in size and importance, and some other R&D programmes, like OMI (Esprit) have been narrowed down to more specific and application oriented objectives.

Another established trend is towards vertical integration to supply functional devices, equipment and systems based on proprietary components. Japanese companies, NEC, Matsushita and Fujitsu for instance, are the most integrated. Among the American ones, Motorola and Texas Instruments have the highest vertical integration. The European companies are less integrated, with the exception of Siemens and Philips. SGS Thomson is now developing a downwards integration in specific niches with some of its customers, such as Thomson, Alcatel (F) and Bosch (D).

REGIONAL DISTRIBUTION

The main companies manufacturing both active and passive components, come from Japan and USA. Newcomers are companies from South East Asia (i.e. South Korea, Taiwan, Hong Kong and Singapore), having the competitive advantage of lower labour costs. Many USA and Japanese players have manufacturing facilities in Europe in order to strengthen their

Table 7: Electronic components
The top 20 firms in the Western European semiconductors market

Firm	Rank 1992	Rank 1991	Sales (million ECU)	European market share (%)
Philips	1	1	876.7	9.3
Intel	2	5	875.1	9.3
Motorola	3	4	751.1	8.0
Siemens	4	2	702.6	7.5
SGS-Thomson Microelectronics	5	3	689.5	7.3
Texas Instruments	6	6	567.8	6.0
NEC	7	8	376.7	4.0
Toshiba	8	7	358.2	3.8
National	9	9	325.9	3.5
AMD	10	10	268.9	2.9
Hitachi	11	11	256.5	2.7
Samsung	12	12	256.5	2.7
GEC Plessey semiconductors	13	15	149.5	1.6
Fujitsu	14	16	146.4	1.6
Telefunken	15	14	145.6	1.5
Mitsubishi	16	17	135.6	1.4
Analog Devices	17	19	110.2	1.2
Harris	18	18	110.2	1.2
ITT	19	13	107.9	1.1
LSI Logic	20	21	88.6	0.9

Source: Dataquest

Table 8: Electronic components
Share in the European market by company origin

(million ECU)	Sales 1991	Sales 1992	Annual growth (%)	Market share (%)
European firms	3 194	3 202	0.3	34.0
North American firms	3 682	4 260	15.7	45.3
Japanese firms	1 353	1 547	14.4	16.4
Rest of the world firms	256	403	57.5	4.3
Total market	8 485	9 412	10.9	100.0

Source: Dataquest

direct presence in local markets, to be closer to the end-users requirements, to spare distribution costs, to take advantage of their image and to accede to local governments by giving employment possibilities to the local labour forces.

ENVIRONMENT

The impact of the electronic components sector on the environment is linked with problems concerning the industrial end users sectors, particularly the electronic data processing sector. One of the main problems is the power consumption of the computers used in offices. For this reason, plans are being made to reduce the power waste of both computers and peripherals.

Electronic components producers are involved, Intel above all, within the 'Energy Star' program, proposed by the United States Environmental Protection Agency (EPA). The purpose of this plan, joined also by the European partners of Intel, is to solve the problem starting from the microprocessors, giving to the SL series the capability to stop the power consumption when the CPU is not actually used, even if the computer has not been switched off.

Other problems concern the use of polluting substances. According to the Montreal Protocol, the product processes have been modified in order to avoid CFC (chlorofluorocarbons) waste, the main cause of the reduction of the ozone layer. Waste recycling is another key point, hence components are being made more and more of recyclable substances.

OUTLOOK

In the coming years, the trend of the electronic components sector will depend on user industries development (capital investment trend and location), but also on factors like components technology innovation and industry competition (product pricing trends, import restrictions and taxation, mergers and acquisitions, etc.).

Table 9: Electronic components
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-5.9	1.4
Production	-7.5	1.2
Extra-EC exports	-5.0	0.9

Source: Databank

Some sectors, such as telecommunications and some consumer electronics segments (video games for instance), are expected to sustain their recent growth trends supporting the demand for specific components. As for other sectors, like computer, automotive and defence, the crisis is not yet over and may impact on the components production, too. Even if car sales may stagnate in the short term, sales of electronic components to the automotive sector will continue to grow because of the increasing share of electronic components in car manufacturing. The demand for more innovative and high price components is not guaranteed as it depends -case by case - on factors like software availability, market acceptance, public policies, and so on.

In conclusion, the European market will grow less than the world market average in the period 1992-1995, while in the long-term the development of new computer and communication systems for the European mass market will probably have a strong and positive impact.

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Computer and office equipment
NACE 33

The computer sector is going through a deep restructuring phase. Prices are falling dramatically, consumption and production are slowing and the market is getting fragmented into many niches. Downsizing and standardisation have intensified competition and squeezed margins. The major European manufacturers suffered losses during 1992, and are trying to shift their activities from manufacturing to software and services that still display high growth rates.
The major EC companies have been signing cooperative agreements with US and Japanese companies to acquire technology in exchange for links to the European distribution channels and customers; in some cases, though, the technology flow has been reversed (e.g. Bull with IBM). Top EC manufacturers are further pursuing strategic alliances on common European research programs. Despite hard times in recent years, Europe could still become one of the fastest growing markets in the world over the medium-term.

INDUSTRY PROFILE

Description of the sector

The products manufactured by the computer industry are :

- hardware: portables, notebooks, microcomputers, minicomputers, workstations, mainframes, network equipment;
- peripherals: printers, disks, monitors, keyboards, CD-ROM players;
- office equipment: electronic typewriters, electronic calculators, electronic cash registers, electronic accounting machines, dictation equipment.

The business is integrated with Information Technology (I.T.) software and services, as the largest global competitors are oriented to supply more complete solutions to the end users. The data provided by Eurostat in the figures and tables correspond to hardware only. Employment data also include software and related services.

Recent trends

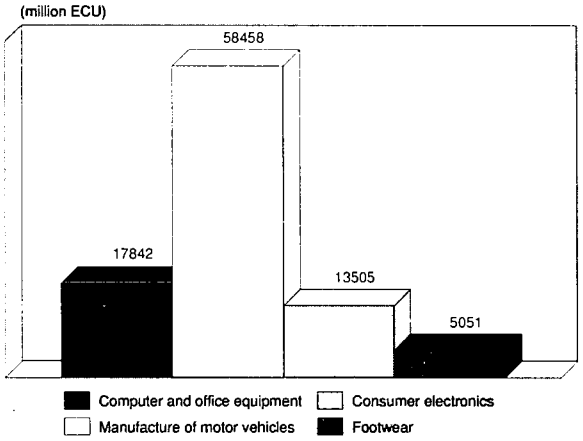
In 1992 all main indicators show a slight decrease in current prices, the only exception being extra-EC exports. However the trade balance deficit has been widening, from -13 920 ECU in 1991 to -14 500 ECU in 1992.

The general crisis of the main manufacturing sectors has a major impact on the computer sector, which is more sensitive to changes in the macro-economic trends because of the high level of investments already undertaken by the companies in I.T. systems and services, associated with their present attitude to rationalise I.T. architecture and usage. The trend of the market, associated with the fast technological innovations in basic components (which have incorporated most of the value added formerly due to computer equipment) and in manufacturing process (which are highly automated and/or decentralised to low labour cost countries) caused a decrease of more than 8 000 units in employment, that declined from 251 100 employees in 1992 to 242 300 in 1992.

International comparison

Production is rather concentrated in four Member States that are, in this ranking, Germany, France, Italy and the UK. In 1992 , Western Europe (including EFTA countries) accounted

Figure 1: Computer and office equipment Value added in comparison with other industries, 1992



Source: DEBA

for 36% (the EC 31%) of total I.T. consumption, compared with 35% for the US and 17% for Japan.

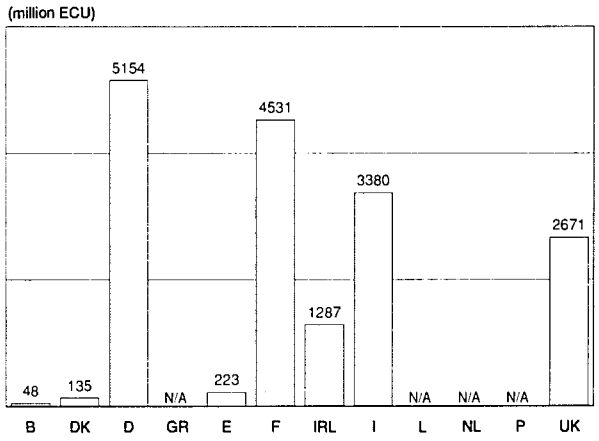
From a production point of view, Europe is less important than the USA and Japan, but European based production rose notably in the '80s, thanks to the localisation of new manufacturing facilities belonging to non European companies: in 1983 EC production in current prices was 50% of the correspondent USA production, compared with 80% in 1992.

The EC industry is weak in integrating research, technological development, innovation and standardisation into marketing practice. The strength of Europe lies in its continuing ability to identify new I.T. applications and to adapt I.T. technologies to support applications as well as in the relative flexibility of its industrial structure. Of the ten leading firms in the world, five are American, three Japanese and two European.

Foreign trade

Since 1983 extra EC exports have been growing strong, averaging at 9 984 million ECU in 1992, but they add up to less than half the extra EC imports. The trade balance has been worsening since 1988. From 1987 to 1992 EC computer and office equipment exports to the USA and Japan had a small increase, while EC exports to the EFTA countries de-

Figure 2: Computer and office equipment Value added by Member State, 1992



Source: DEBA

Table 1: Computer and office equipment
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	28 592	36 464	42 529	42 068	43 817	53 378	57 255	60 103	62 428	60 759	59 500
Production	24 091	30 115	36 396	36 158	36 340	42 623	45 138	47 597	48 508	46 259	44 100
Extra-EC exports	4 612	6 525	8 316	7 753	7 752	8 211	9 327	9 190	9 939	9 984	10 800
Trade balance	-4 501	-6 349	-6 133	-5 910	-7 477	-10 756	-12 117	-12 505	-13 920	-14 500	-15 000
Employment (thousands)	218.0	231.3	251.9	251.4	245.7	265.6	266.8	266.3	273.3	251.1	242.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Computer and office equipment
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	4 612	6 525	8 316	7 753	7 752	8 211	9 327	9 190	9 939	9 984
Extra-EC imports	9 113	12 875	14 448	13 663	15 229	18 966	21 444	21 695	23 859	24 484
Trade balance	-4 501	-6 349	-6 133	-5 910	-7 477	-10 756	-12 117	-12 505	-13 920	-14 500
Ratio exports/imports	0.51	0.51	0.58	0.57	0.51	0.43	0.43	0.42	0.42	0.41
Terms of trade index	110.7	102.5	100.0	101.5	104.8	106.4	98.2	103.5	100.5	94.4
Intra-EC trade	9 665	12 910	16 231	16 044	17 443	19 191	23 047	24 443	25 641	25 815
Share of total imports (%)	51.5	50.1	52.9	54.0	53.4	50.3	51.8	53.0	51.8	51.3

Source: DEBA

creased. Intra-EC trade has more than tripled over the last ten years experiencing higher growth than that of extra-EC exports and production

From 1987 to 1992, EC imports of computers from the USA decreased sharply, partly due to the emergence of US manufacturing facilities in Europe. Among new supplying countries, East Asia (South Korea, Taiwan, Hong Kong and Singapore) is the emerging player in personal computers, office equipment, printers and related devices manufacturing.

Traditional European manufacturing companies like Olivetti (I) and Bull (F) have been obliged to set up production in East Asia for PCs subsystems and peripherals: they found lower labour cost, associated with good technological standards and skilled work force. In fact nearly 40% of extra EC imports are peripherals, mainly coming from East Asia. Nevertheless, still 21% of EC exports are peripherals (very often re-exported), while 33% consists of data processing systems and parts. Only 18% of exports are finished products like office machines and data processing systems.

MARKET FORCES

Demand

The impact of economic recession on I.T. expenditure is only one of the factors affecting the recent trend of computer and office equipment demand. Other factors relate to downsizing (i.e. different mix of products sold) and the increasing importance of customer satisfaction. Additionally, the growth of open systems is making many hardware items increasingly "commodity" with a consequent reduction in unit price.

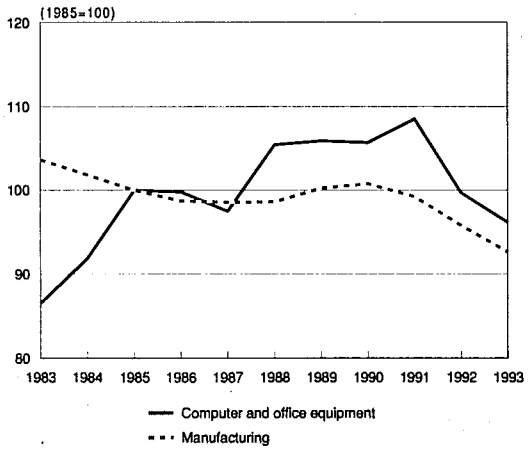
Investment in computers and - to some extent - in office equipment has to adapt to the growing requirement by customers for business solutions, rather than for technology tools only. As a consequence the economic trend of each market segment and, moreover, the business and organisational changes occurring in each industry (like, for instance, in banking, public administration, health, etc.) are demand-driving factors. The ability of vendors to really understand the user organisation and business needs and to provide customer oriented solutions - by integrating the right hardware, with the appropriate software and with the required quality of services - will be key factors of success. The lack of easy to use,

Table 3: Computer and office equipment
Breakdown by size of enterprise, 1990 (1)

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	6 800	88.8	7.5	5.3
20-99	609	8.0	7.5	4.7
100 or more	246	3.2	85.0	90.1

(1) Provisional estimates.
Source: Eurostat

Figure 3: Computer and office equipment Employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

vertical software and the lack of human resources skilled to analyse customer needs and to supply vertical solutions will be market braking forces in the short term.

Factors related to the above mentioned trend that will have an accelerating effect on the market, once the current recession is over, are the following:

- the first is the opening of new applications and new markets due to innovation in technologies and infrastructures, like on line multimedia, broad band communication (ISDN), electronic highways, very high performance computers, etc.;
- the second is the increasing penetration of low-end market segments by low cost computers - like PC in retail, tourism, etc., Personal Digital Assistants and personal electronic equipment for family and individual use.

"Downsizing" is a major factor: users are buying fewer large and intermediate systems and are adopting networks of PCs and workstations to develop most of the new applications, because of the best price/performance ratio. Continuous hardware innovations, increased performance, falling prices for Personal Computers together with the emerging importance and penetration of hardware and software standards have forced this trend.

In the medium term, although shrinking, the role of large and intermediate systems will remain significant, operating as platforms for specific applications (high performance computing, on line transaction processing, etc.) and as servers of company-wide client-servers architecture. Portable computers are expected to maintain high growth; in fact by 1995 one out of four PCs purchased could be portable.

Supply and competition

Technology and production are becoming globalized and the major companies operate with multinational strategies, looking for economies of scales. On the other hand, demand is becoming more and more segmented and companies are reorganising in smaller and independent business units, that are in principle more agile and capable to address changing business requirements.

It is gradually becoming harder to be a market leader in more than a segment. Producers tend to become less and less vertically integrated. Large hardware manufacturers in Europe, like the EC subsidiaries of IBM and DEC, Siemens Nixdorf, Olivetti and Bull suffered big losses during 1992. The winners, in this new scenario, are companies able to impose standards or to get large scale economies or, on the contrary, to gain market niches.

Production process

European production accounts for 76% of apparent consumption, but taking into account the amount of EC exports, less than 60% of the apparent consumption is satisfied with European products. Most systems incorporating high-tech devices and basic innovations are imported from the US and Japan. Personal computers, peripherals, monitors and other low value added products are increasingly imported from East Asia.

Large European groups are decentralising their production activities over many countries. While R&D and innovative systems are located in Europe (generally in the country of origin) and in USA (especially for R&D), products with low value added are produced in the NIC's countries where labour costs are lower than Europe.

In Europe vertical integration is fairly limited compared to the US and Japan. Some companies have attempted to integrate upstream activities by producing components for their own needs. However, the lack of a sufficiently large internal market did not allow them to reach the critical thresholds of production and sustained investment levels.

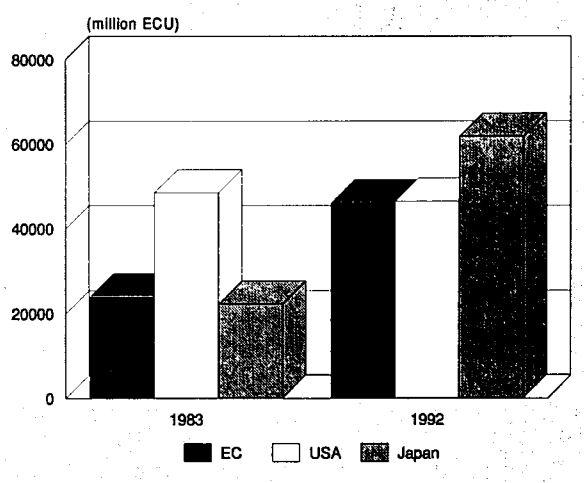
INDUSTRY STRUCTURE

Companies

The European computer industry, that had traditionally been an oligopoly, is becoming a very competitive market, fragmented in many niches. About 5 200 companies are active in the sector (while 50 000 firms operate in the Information Technologies sector as a whole). 87.4% of them have less than 20 employees while only 3.6% of companies accounts for 86.4% of the total labour force. Many new players have entered the PC segment(clone manufacturers, PC assemblers), as the entry barriers have been lowered due to the standardisation in production and the availability of basic technologies and skills on the market.

Despite increasing integration the EC is still divided into different national markets led by national manufacturers, like Siemens Nixdorf and Vobis in Germany, ICL in UK, Bull in France and Olivetti in Italy. Nevertheless, in all the largest EC markets USA vendors and namely IBM in the business sector and Commodore in the consumer market - are the better positioned firms.

Figure 4: Computer and office equipment International comparison of production in current prices



Source: DEBA, Census of Manufacturers, Nikkei

Table 4: Computer and office equipment
Market share by major product category in Europe, 1992

(%)

Personal computers (1)	
Commodore	12.0
IBM	11.9
Apple	7.2
Compaq	6.6
Market value (billion ECU)	17.4
Workstations (2)	
Sun	26.0
Hewlett Packard	22.0
IBM	17.0
Digital	13.0
Market value (billion ECU)	3.1
Computers (3)	
IBM	32.0
Siemens Nixdorf	9.0
PC Compatibles	8.0
Hewlett Packard	6.0
Market value (billion ECU)	19.2

(1) General-purpose single-user computer.
(2) Unix and integrated networking capability systems.
(3) Computers used in commercial environments only, from corporate resource computers down to small-scale work group computers.
Source: Dataquest

Strategies

In order to balance the dramatic erosion in profit margins, companies have been reducing expenses, particularly via redundancies. They are also trying to focus their activities on more profitable market segments and to change the organisational structure by decentralising activities to be closer to customers.

Hardware manufacturers are trying to shift their offering towards software and services. Software and professional services already account between 20% and 50% of the turnover of the largest world manufacturers. Many European companies also try to sign technological and commercial agreements with services firms, for gaining competence in the service sector and for getting closer to the customers.

European companies also try to develop new and cheaper sales channels compared with the traditional (and expensive) direct sales, still maintained for serving the largest customers. Software houses are vital channels for sale to small and medium user companies, while distributors are becoming more important to sell personal computers and other commodities products to the smallest business and to residential users.

European firms are trying to become stronger outside their national market, particularly in the rest of Europe via mergers & acquisitions but primarily through "growth by external networks", where cooperative agreements, both equity and non-equity, are taking place. Most of the agreements are between European and non-European companies; particularly Japanese and American. National and even local requirements are also emerging, as a further differentiating factor that encourages cooperative agreements between European, US and Japanese companies. Non-European manufacturers offer their technological and financial strength while European companies have commercial networks and knowledge of the customer's needs. The agreements signed in the last few years between Olivetti and Digital (USA), Bull, IBM and NEC (JPN), Fujitsu (JPN) and ICL are examples of this strategy. However American and Japanese companies, like IBM, Digital, Hewlett Packard (USA), Toshiba (JPN), Hitachi (JPN) are already well established in the European market, most of them with R&D and production facilities.

European companies decisions in technological and strategic alliances are neither coordinated nor convergent. Olivetti, for instance, has adopted DEC's RISC technology (Alpha), while Bull has preferred IBM's Power PC and ICL Sun for their future developments in the RISC/UNIX environment. Further strategic alliances are expected in the coming years, namely from Siemens Nixdorf and Olivetti. The most significant efforts to coordinate a European strategy for the computer industry are in Research and Development and the creation of a pan-European data communication network between Siemens Nixdorf, Olivetti and Bull.

REGIONAL DISTRIBUTION

Regional distribution of production is technology and price driven. As basic components, like microprocessors, require high investments in R&D and large scale production, most of the manufacturing is settled in the US and Japan. The Four dragons, headed by Taiwan, thanks to low labour costs and a sound technology level, are increasing production and becoming the emerging area for the production of peripherals and assembly of PCs.

Production of PCs and peripherals has became a low value added sector and large volumes associated with economies of scale (in marketing, logistics, etc.) are becoming a must. For all these reasons, manufacturing is shifting towards countries with a low cost work force. For instance, Taiwan has become the world's top manufacturer of colour monitors and of other components and systems. Component construction however is still strong in Ireland and Scotland as companies benefit from lower taxes and local government incentives.

Table 5: Computer and office equipment
Market share of all systems, 1992 (1)

(%)

BR Deutschland:	32.1
Vobis	15.0
Commodore	12.9
IBM	7.7
Aquarius	5.6
Compaq	5.3
United Kingdom:	30.5
Commodore	19.0
IBM	7.8
Compaq	6.6
Apple	5.2
Amstrad	4.9
France:	23.3
IBM	13.0
Apple	12.4
Compaq	8.9
Commodore	8.1
ZDS	5.8
Atari	4.7
Italia:	14.1
Olivetti	19.7
IBM	14.6
Commodore	13.9
Apple	6.5
Olidata	5.5

(1) Market share of each company in the national market.
For the countries the share is that of the country in the European total.
Source: Dataquest

Table 6: Computer and office equipment
Global leaders, 1992

(million ECU)

Personal computers	
IBM	5 897
Apple	4 169
Compaq	3 158
NEC	3 071
Fujitsu	2 017
Peripherals	
IBM	6 123
Hewlet-Packard	3 536
Canon	2 999
Hitachi	2 620
Fujitsu	2 405
Software	
IBM	8 756
Fujitsu	2 715
Microsoft	2 280
NEC	1 418
Computer Assoc.	1 364

Source: Datamation

ENVIRONMENT

The computer and office equipment industry does not impact the environment strongly. Nevertheless, there are some fundamental issues related to electrical power waste by computers. Global energy consumption is expected to grow 10% within the year 2 000. In order to reduce this amount, different agencies launched programs: Recommendations by DG XVII, the "Jeida" program of MITI, the "Energy Star" of EPA (Environment Protection Agency), all target to optimise the consumption of energy. Olivetti and Intel are part of "Energy Star". Energy saving protocols are incorporated in the i486 SI enhanced processor and in M26 Suprema Olivetti computer.

REGULATIONS

The standardisation of computer and office equipment at the European level is mainly represented by organisations such as the CEN (Committee of European Standardisation) and the Committee of European Electrotechnical Standardisation (CENELEC).

The influence of the official sources of "de jure" standards on the computer industry development has traditionally been weak with respect to the importance of proprietary technologies and "de facto" standards. This situation is changing as far as the market of Open Systems and the user orientation to standard technologies are increasing.

The attitude of hardware vendors to co-operate to identify and assess common standard at the different levels of computer and software architectures is now positive, but still posing some problems to the European computer industry:

- most of the standardisation committees are in the US; consequently, the influence of European manufacturers is weak (with the notable exception of Open Systems) and proportional to their world market share;
- on the same subject of standardisation (Operating Systems, User Interfaces, Communication Protocols, etc.) two or more standardisation committees have been set up, consisting of groups of vendors having common interests and striving to impose their technologies: the choice whether to co-operate within this framework becomes part of one's strategy on alliances and mergers, rather than a pure technological consideration;
- user companies participation in standardisation committees is traditionally very weak, particularly with reference to European users.

The EC is taking an active role to support and sometime directly represent the European computer industry and the European user community in the standardisation committees. Further, it is also actively promoting standardisation through R&D programmes which are actually conceived and focused on standard technologies. Apart from standardisation, problems like industrial concentration, price and protection policies and strategic technologies exports are under EC observation.

While limitations on strategic technologies exports and the protection of national/continental markets are loosing importance, the concentration process and national government supports to local manufacturers (Bull, Olivetti, etc.) are closely monitored and regulated at EC level.

OUTLOOK

The sector is going through deep restructuring : the general crisis of the computer industry and, on the other hand, the growth of lan/wan networks combined with the expected rise of the multimedia systems are among the most important developments. Computer, office equipment and telecommunications are merging with the TV networks and media sectors. Thanks to the convergence between these sectors, the consumer

Table 7: Computer and office equipment
The ten largest companies, 1992

(million ECU)	Country	Sales	Profit	Employment (thousands)
IBM	USA	50 147	-3 825	308
Toshiba	JPN	28 867	127	173
Fujitsu	JPN	21 501	-201	162
Hewlett-Packard	USA	12 655	423	93
Canon	JPN	11 824	218	67
Digital Equipment	USA	10 806	-2 154	114
Unisys	USA	6 488	278	54
Ricoh	JPN	6 370	31	48
Apple Computers	USA	5 460	408	15
Olivetti	I	5 013	-406	40

Source: Fortune 500

Table 8: Computer and office equipment
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-3.0	-4.0
Production	-4.0	-5.0
Extra-EC exports	-2.0	-1.0

Source: Databank

will play a growing role. Bottlenecks are in fact at user level: in order to sell new products incorporating technological innovations, it is necessary to conceive in advance appealing and user friendly applications for the new systems.

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Telecommunications equipment
NACE 344

In 1991 the EC European market for telecommunications equipment was the second largest in the world accounting for 28% of the total while the US market accounts for 35% and the Asian for 15%. Telecom equipment constitutes one of the few high technology sectors where the EC has a trade surplus. The EC public telecommunications markets - the biggest market segment for telecom equipment vendors - have developed as closed markets driven by public operators with strong links with domestic manufacturers. However, the global trend for deregulation is rapidly bringing down national barriers. Data and voice equipment for the business and consumers markets represent the fastest growing and most competitive segment.
European vendors of telecom equipment have a sound position in the world market: four European companies stand alongside four North American and two Japanese companies amongst the top ten. However, European suppliers are increasingly threatened by Japanese and South East Asian producers (for consumer products) and by US producers (with regard to private data networks).

INDUSTRY PROFILE

Description of the sector

The main product categories manufactured by this industry are: public and private switching, transmission systems, terminals, radio, data communications and mobile communications equipment. In addition to the manufacture of telecommunications equipment, NACE 344 includes the electrical and electronic measuring equipment, recording equipment and medical equipment. The data in this monograph refer only to telecommunications equipment.

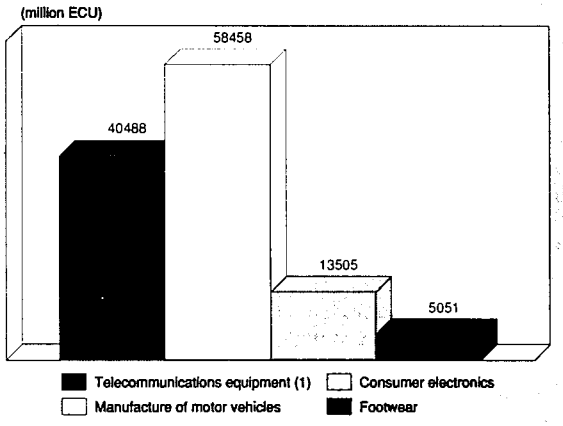
Telecom equipment manufacturing is a strategic industry as it is becoming more and more interconnected with other technologies and industries, like electronic components, computers, aerospace (satellites), software, consumer electronics and, more recently, with broadcasting both video and audio, media and publishing industries. Some years ago most of the equipment was sold to domestic public carriers and the offer of equipment and terminals for the private sector was very limited.

In the last few years, the great diversification of telecom services -both in the public and private sectors- and the digitalisation of the networks and terminals had a big impact on the industry. Actually, this has become a multi-product industry, with the scope of equipment ranging from the traditional wire telephone sets to mobile telephone hand sets, video conference equipment and multimedia workstations. Business and consumer markets are becoming more important and the market as a whole is getting global and very competitive. Moreover, because of the rapid changes of digital technologies, and because of the different services increasingly requested by customers, the life cycle of the products has shortened dramatically.

Recent trends

European production of telecom equipment has increased slightly from 1991 to 1992 and reached the value of 25,378 million ECU. Premise telecom and radio equipment account each for 25% of the total market; public switching for 40,6%, mobile communications equipment for 6,7% and broadcast and studio equipment for almost 3%. A slight increase is expected for 1993, with the market reaching the level of 25,500 million ECU. In 1992 extra-EC exports and trade balance also increased and reached the value of, respectively, 5 850 million ECU and 718 million ECU. From 1985 to 1992 the productivity index increased by one third.

Figure 1: Telecommunications equipment Value added in comparison with other industries, 1992



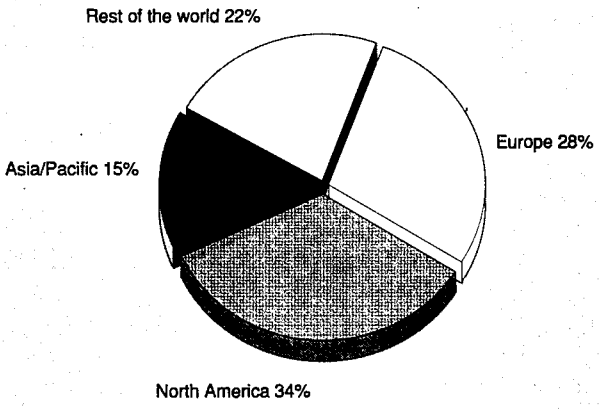
(1) Includes electronic measuring and recording equipment (NACE 3440).
Source: DEBA

International comparison

European vendors of telecommunications have a sound position in the world market: four European companies Alcatel (F), Ericsson (S), Siemens (D) and Bosch (D) stand alongside four North American (AT&T, Motorola, Northern Telecom and IBM) and two Japanese companies (NEC and Fujitsu) in the top ten positions in the world ranking.

Regarding technology, the European telecom industry has a strong position with respect to other competitors in the world market. This is reflected in major developments such as Integrated Services Digital Network (ISDN) to communicate both voice, data and images on just one digital network, GSM (Groupe Special Mobile) and Digital Europea Cordless Telecommunications (DECT) for wireless communications, which originated in Europe. The European telecom industry is therefore competitive in international terms and is holding its ground world-wide.

Figure 2: Telecommunications equipment Production share of the world market, 1991



Source: Dataquest 1993 - European Semiconductor Application Services

Table 1: Telecommunications equipment
Main indicators in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)
Production (2)	N/A	N/A	N/A	17 547	17 008	19 204	21 861	22 507	25 247	25 378	28 844
Extra-EC exports (3)	3 795	4 404	4 770	4 304	4 615	3 787	4 663	4 558	5 215	5 850	6 060
Trade balance (3)	1 850	1 745	1 570	1 241	1 029	91	110	297	383	718	1 000

(1) Rounded Dataquest and Eurostat estimates.
(2) European figures, not EC.
(3) A change in trade nomenclature in 1988 makes a comparison of pre-88 and post-88 figures hazardous.
Source: Eurostat, Dataquest 1993 - European Semiconductor Application Services

In 1991 the Western European telecom equipment market was the second largest in the world accounting for 28% of the total following the North America market with 35% and followed by the Asian/Pacific with 15%, while the rest of the world accounted for 22%.

Broadly speaking, the US leads in the deployment of new services and technologies, assisted by the long standing homogeneity and prosperous level of its market, compared with the hitherto fragmented European market. The US telecoms market claims to be very open to foreign competitors. In the consumer sector of the market, the Japanese have achieved a good level of penetration. In main network equipment, switching and transmission, however, the market is heavily dominated by two suppliers AT&T and Northern Telecom; the latter Canadian based firm like AT&T itself being well integrated as they both supply telecom services as well as equipment. Companies like Siemens, Ericsson and GPT do compete in this sector.

The Japanese market, where NEC and Fujitsu are the main suppliers, is closed to foreign competition although increasing trends towards liberalisation in the Japanese telecom services arena are resulting in growing imports from the USA and the EC. Currently the standing of the Japanese industry is problematic: out of the 15 top companies that in 1992 posted declines in their communications equipment revenues, 11 were Japanese (NEC, Hitachi, Sumitomo, Oki, Mitsubishi, Sony, Ricoh, Sharp, Sanyo, Canon).

Foreign trade

Even though in recent years European imports have been growing faster than exports, the trade balance in telecom equipment is positive, this being quite an exception among the high technology sectors. In 1992, the trade surplus was standing at 718 million ECU (+87% than the previous year). However trade surpluses were much higher in the early '80s: in 1983 the exports/imports ratio was 1.95 compared to 1.14 in 1992.

EFTA accounts for 19% of extra-EC exports and the USA (10%). Japan accounts just for 1% of the total EC exports and the rest of the world (mainly East Europe, Asia and developing countries) absorbs the rest of the EC exports. Japan (25%), USA (24%) and EFTA countries (23%) are the main exporters to the EC, together with South East Asia countries (10%). A weakness in EC external trade structure is that EC exports are mainly directed towards less developed countries while imports mainly come from the most advanced industrial countries (Japan and USA). EC countries mainly export network systems (that is switching, transmission and radio related equipment) and then terminals; while they import mostly facsimile machines and other terminals (62% of total EC imports).

Table 2: Telecommunications equipment
European production breakdown by sector, 1992

(million ECU)	
Premise telecoms equipment	6 312
Public switching	10 293
Mobile communications	1 709
Radio	6 325
Broadcast and studio	739

Source: Dataquest 1993 - European Semiconductor Application Services

MARKET FORCES

Demand

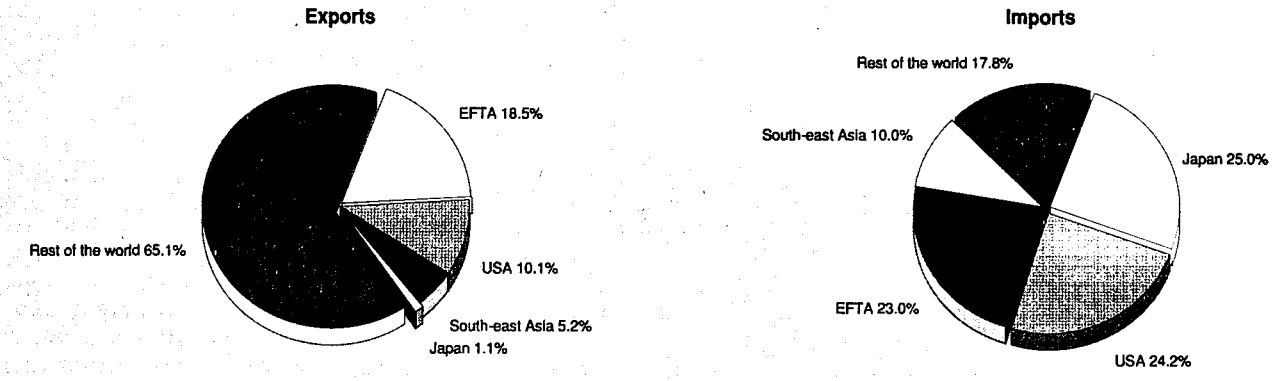
The telecommunications equipment market can be divided into three overlapping categories: the first -and by far the largest- is public switching and transmission systems for traditional telephone networks. The EC major telecommunications markets (but also USA and Japan) have historically developed as closed markets driven by public operators with strong links with the domestic manufacturers. Thanks to the world-wide deregulation trend, national markets are now opening up. In Europe this process is being mandated through EC directives and the process of products standardisation. This has turned out to be a very gradual and uneven process.

Demand for new high speed services provided by the public networks is evolving and becoming more sophisticated; therefore manufacturers have to provide software and data bases - integrated in the hardware systems (like in switching) and in the network - that are able to supply services like, for example, identification caller and personal number. New and more advanced equipment for high speed and mobile networks area also requested. The other subsectors, business and consumers markets, are quite competitive and faster growing. Demand is driven by two main categories of services: customer premises data and voice services directed towards the business sector and mobile communication targeting the consumer.

The field of private data and voice communication network is very dynamic, because of the increasing need by EC companies to integrate their activities and react rapidly to the changes in the market. While some segments of the communication equipment market have already or are in the process of becoming saturated, (modem, facsimile machines, electromechanical private exchanges) new markets are emerging, like terminal adapters for digital networks, digital PABX (Private Automatic Branch Exchange) for connecting both computers and telephones, multiplexer TDM (Time Division Multiplexing) and ATM (Asynchronous Transfer Mode) switching equipment for high speed and optical fibres networks.

Regarding the consumer market, the need for mobile, customised and cheap services has implied added attraction for products like cordless, cellular telephones and multifrequency telephoné sets that are able to give many added services, like repeat dialling and memory systems. Moreover, sophisticated residential customers increasingly demand communications

Figure 3: Telecommunications equipment
Destination of EC exports and origin of EC imports, 1992



Source: Eurostat

and information services for professional use: for this reason, the demand for equipment like facsimile, videotex, modem (connected with personal computer to get electronic mail or data bank services) is spreading also in the home segment.

Supply and competition

Conventional wisdom has it that there will be no more than five or six suppliers of public telecommunications systems by the year 2000. However, telecoms are expanding so quickly and in so many directions that this opinion is starting to be regarded as misleading, as it would be inconceivable for a handful of suppliers to control the whole market.

Broadly speaking, the domestic manufacturers traditionally have strong links with the national telephone carrier i.e. the main buyer of telecom systems and products. In the EC, like in the US and Japan, public operators supplying basic telecom services have long-standing relations with their suppliers, hence limiting opportunities for newcomers. Market accessibility is associated with the share of the national telecom market held by the largest domestic vendor. The share of the main domestic vendor varies from 80% in France and Sweden to 40% in Italy.

The fragmentation of the EC market acts as a major constraint for innovation and a hindrance in adapting to global competition. One of the negative side-effects is higher prices for the end user. New EC regulations and liberalisation of almost all telecom carriers imply that the link between domestic carriers and manufacturing companies will loosen. So protectionist (or quasi protectionist) national barriers shall fall in the next years and competition will spread to include also provisioning equipment to national carriers.

Competition has already got stronger, especially in the business and consumer arenas. In the dynamic field of data communications, the arrival of US networking companies is threatening to marginalise European leading equipment suppliers. Systems are increasingly based on sophisticated computer software and networking companies like Novell (USA), Cisco Systems (USA) and Synoptics (USA) are bringing products to the data equipment market faster than European companies.

In the consumer market, the competition of Japanese and South East Asian companies is very strong. Many low value added products, e.g. telephone hand sets, are being manufactured in East Asia at lower prices due to cheaper labour. With regard to the highest value added products, like cellular telephones, Ericsson and Motorola (USA) are the leading suppliers. Anyway, as consumer electronics companies (like Sony for example) diversify into mobile telephones, they will increasingly compete with telecommunications companies.

The prices of telecom equipment are falling very fast -resembling trends with computer products- because of the rapid innovation in basic fields like micro-electronics and optics; but the fall in prices is more pronounced in the consumer market than in the business one.

Table 3: Telecommunications equipment
External trade in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	3 795	4 404	4 770	4 304	4 615	3 787	4 663	4 558	5 215	5 850
Extra-EC imports	1 945	2 659	3 200	3 063	3 586	3 696	4 552	4 261	4 831	5 132
Trade balance	1 850	1 745	1 570	1 241	1 029	91	111	297	384	718
Ratio exports/imports	1.95	1.66	1.49	1.41	1.29	1.02	1.02	1.07	1.08	1.14
Terms of trade index (2)	113.9	105.5	100.0	107.5	112.4	108.6	106.2	110.8	110.1	112.6
Intra-EC trade	1 896	2 282	2 557	2 891	3 089	3 294	4 159	4 162	4 368	4 388
Share of total imports (%)	49.4	46.2	44.4	48.6	46.3	47.1	47.7	49.4	47.5	46.1

(1) A change in trade nomenclature in 1988 makes a comparison of pre-88 and post-88 figures hazardous.
(2) Includes electronic measuring and recording equipment (NACE 3440).
Source: Eurostat

Production process

Product costs are increasingly being dictated by high R&D costs for hardware and software. R&D costs -depending on production volume- already exceed value added generated by manufacturing. It is estimated that investment in R&D for the last digital generation of public switching was about 700 million ECU. R&D subsidies, such as development agreement or cost free technology transfers from government organisations or network operators represent a very important factor in competition.

The most innovative and sophisticated telecom technologies today are SDH and ATM. SDH (Synchronous Digital Hierarchy); a high speed transmission technology recently installed by public operators in order to replace or supplement existing transmission systems. Moreover, in the next few years, public carriers will adopt ATM (Asynchronous Transfer Mode); a switching technology for broad band multimedia communications. Companies are now starting to use ATM systems to increase the speed and widen the range of services of their private networks. A most promising product for the next years is the Personal Digital Assistant (PDA), a pocket personal computer that will also be able to communicate data and voice as a very intelligent mobile telephone.

INDUSTRY STRUCTURE

Companies

European companies are very well positioned in the global market of telecom equipment. Alcatel is the first company in the world ranking of telecom industries. However, the telecom business of Alcatel is hardly growing because of pricing pressures on the current generation of equipment and systems.

Siemens (the German group diversified in energy, industrial equipment, computers and semiconductors) contends with AT&T the second position in the world ranking. In 1992 it posted a 13% growth in communications equipment sales and a 17% growth at its public telecom unit. In fact Siemens is leveraging its position in East Germany to get the biggest share of orders for Deutsche Bundespost Telekom's massive public network upgrade in that region. Siemens also got important contracts in newly industrialised countries.

Ericsson, the sixth supplier of telecom equipment in the world, counts on Sweden for less than 20% of total revenue and has operations in 100 countries all over the world. In 1992 it increased its revenues by 3% and offset a drop in sales of public and private telecoms equipment and cables by substantial growth at the company's radio communications unit. Ericsson and Motorola (USA) are firmly established as the leading suppliers of world cellular telephone networks.

The Bosch Group (D) increased its revenue by 5% in 1992. The Italian company Italtel also increased its revenue (6%), thanks mainly to the big investment made by Stet-SIP for modernising Italian public fixed and mobile networks. The major EC companies show declining profits, while Philips (NL) even suffered a loss in 1992.

Regarding extra-EC companies, Nokia (SF) registered the most notable increase in its telecom revenue by 52% in 1992 and was the fastest growing public network manufacturer, thanks to its strength in the mobile segment.

In order to expand, EC companies will have to take advantage of opportunities in East Europe and Asia. Alcatel, Siemens and Ericsson are already well positioned in China and India, while Siemens and Alcatel are well positioned in Eastern Europe.

Strategies

The telecommunications equipment sector is evolving fast and alternative scenarios are emerging. The major trends are globalisation and concentration of the market through mergers and acquisitions, mainly directed to break into foreign markets, which have traditionally been dominated by domestic companies.

Broadly speaking, for winning orders in foreign markets a supplier has to form a joint venture or buy a stake in one of the established suppliers. Mainly for this reason, a lot of joint ventures, mergers and acquisitions have been concluded in the last few years. The examples of Siemens and GPT (UK), Northern Telecom and STC (UK), AT&T and Italtel (I), are the most recent but suppliers rationalisation is far from over. Another big push towards concentration arises from the need to find partners for lessening the burdens of high R&D expenses. Alcatel and Sprint for example made a joint venture to develop a new switching system. Some telecom companies try to share the expenses of R&D in new products and systems (like ATM) with computer companies. Moreover many medium sized companies (like the Italian Italtel) are looking for foreign partnerships to enter the international market and secure the most sophisticated and expensive technologies.

The major European companies have to balance the goals of expand in new markets, like mobile communications and data services, and securing existing customers. The speed of technology innovation and the creation of international commercial and production units are the most important challenges for telecoms companies.

REGULATIONS

The single European market helps promote economies of scale through standardisation of network systems and their terminal interfaces. However this is unlikely to be completely accomplished in less than 10 years. The European Telecommunications Standard Institute (ETSI) works intensively for fixing common European standards but full European standardisation will be possible only when new systems, such as narrow band ISDN, broadband ISDN, GSM and the like will be introduced and widely diffused in Member States.

Table 4: Telecommunications equipment Trade breakdown by sector, 1992

(million ECU)	Extra-EC exports	Extra-EC imports	Trade balance
Switching equipment	1 334.2	602.6	731.6
Transmission equipment	1 339.3	783.2	556.1
Radio-related equipment	321.0	208.1	112.9
Components for teiecom equipment	391.7	358.9	32.8
Telecom terminals	2 463.2	3 178.9	-715.7

Source: Eurostat

Table 5: Telecommunications equipment
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	32.0	33.6	34.5	34.7	36.6	39.2	40.0	41.4	44.1	46.0
Productivity index	93.0	97.6	100.0	100.6	106.1	113.7	116.1	120.2	127.8	133.4
Unit labour costs index (3)	89.8	94.0	100.0	104.0	113.1	120.4	127.2	133.7	145.4	156.5
Total unit costs index (4)	82.0	91.7	100.0	102.5	111.1	123.5	132.4	141.2	152.7	163.0

(1) Estimates are used if country data is not available, especially from 1990 onwards; includes electronic measuring and recording equipment (Nace 3440).
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

According to EC procurement guidelines for public contractors, all contracts exceeding 600 000 ECU should have been opened to international bids as of January 1993. This guideline leaves a lot of leeway with regard to the type of allocation, e.g. open or restricted invitation to bid, negotiation and prequalification procedures and so on. It's generally acknowledged that until now it has not been possible to create all the conditions for an effective open market within the EC. Generally speaking, the basic principle of mutual opening of markets under fair and not discriminatory conditions must apply not only within the EC, but also in other markets of the world.

Among its many other initiatives aimed at speeding the process of the introduction of harmonised advanced networks and services across Europe, the EC is continuing to support the RACE R&D programme into advanced communications and secure the early and wide diffusion of its results.

OUTLOOK

The telecommunications equipment industry will surely grow in the next few years: in fact advanced telecom services will become strategic for the economic development of the nations and will drive demand for telecom products and systems. Massive investment projects in new intelligent and high speed digital networks, in mobile communications by public and also private (in the case of GSM) carriers for modernising their services, will be essential to the development of the equipment sector.

For the rapid growth of the sector, the execution of pan European pilot projects will prove important. Two prime examples are the Trans European Network (TEN) and the European Pilot ATM network (EPAN). The former will connect integrated broad band communication islands; and the latter will be used to test innovative technologies, like ATM.

The importance of supporting common European standardisation is shown by the success of the GSM digital mobile system; in addition to 22 European countries, 40 non European countries are in the process or have already introduced the European standard (and European equipment).

In the next few years the major trends towards more globalisation, more competition, more concentration of the suppliers, and less employment in the sector, will increase. European public Telecom operators (that will be almost all privatised) will behave more and more like private sector customers vis-a-vis manufacturers. Finally, it is likely that US and Japanese companies will increase their share in some of the EC's fast growing market segments affecting negatively the EC trade balance with these two countries.

Table 6: Telecommunications equipment
The fifteen largest companies in the world, 1992 (1)

Company	Country	Communications equipment revenue (million ECU)	Change in communications equipment revenue 1991-92 (%)	Income before taxes (million ECU)	Change in income before taxes 1991-92 (%)	Employees
Alcatel	F	11 946	0	1 060	-7	125 782
Siemens	D	9 120	13	1 572	-7	413 000
At&t	USA	8 300	5	4 575	575	312 700
Motorola	USA	6 430	19	614	31	107 000
Northern Telecom	CAN	6 165	4	580	7	57 955
Ericsson	S	5 907	3	172	-23	66 000
NEC	JPN	5 829	-4	-229	N/A	128 320
IBM	USA	4 070	2	-6 930	N/A	301 542
Fujitsu	JPN	2 870	6	-98	N/A	155 779
Bosch Group	D	2 067	5	669	-29	169 804
GEC	UK	2 033	-13	1 170	4	93 228
Italtel	I	1 719	6	197	-2	16 517
Philips	NL	1 678	1	-217	N/A	252 200
GTE	USA	1 536	N/A	2 115	26	131 000
GM Hughes	USA	1 459	0	-98	N/A	90 000

Source: Sirius, in Communications Week International, September 1993.

Table 7: Telecommunications equipment
Share of European markets by company, 1991

(%)	Transmission equipment	Digital local lines	Premise switching equipment
Alcatel	29	30	23
Siemens/GPT	27	28	18
Others	10	3	23
Philips	7	0	6
Ericsson	6	19	7
AT&T	5	4	0
Bosch	5	0	8
Northern Telecom	4	2	6
Nokia	4	0	0
Italtel	3	14	0
Matra	0	0	4
Siemens Nixdorf	0	0	3
Ascom	0	0	3

Source: Dataquest 1993 - European Semiconductor Application Services

The compound annual growth rate of the world market is forecast to be 3.7% over 1992-97 with its Western European counterpart growing by 1.4%, the US by 3.5% and Japan by 3.8%. The market in the rest of the world is expected to grow by almost 8% per annum with China and the rest of Asia being the leaders. Prospects in East Europe are promising despite current financial difficulties.

Written by: Databank Group - Teknibank
The industry is represented at the EC level by: The European Telecommunications and Professional Electronics Industry (ECTEL). Address: c/o FEI, Russell Square House, 10-12 Russell Square, London WC1B 5AE, United Kingdom; tel: (44 71) 331 2020; fax: (44 71) 331 2042.

Consumer electronics
NACE 345.1, 345.2

Demand saturation, further price erosion, increasing concentration of the purchasing power in the distribution, congestion of locally manufactured and imported brands and economic recession in Europe have characterised developments in the industry over the last few years. Direct employment has exhibited a negative trend as automation has dominated the production processes. Japanese companies, also facing serious profitability losses, have the largest market share in the sector world-wide, especially for products like VCRs and camcorders. The two biggest EC companies Philips and Thomson rank well in the world top 10 with particular strength in the CTV segment. However, as have others in the last few years, both of them suffered serious profitability drawbacks in the consumer electronics sector. Nokia is the third largest European-owned EC manufacturer. Technology innovation, user friendliness, price, quality service and distribution are the key factors for success in the consumer market.
In the short term, the recovery of the EC consumer electronics industry hinges upon the successful completion of the vigorous restructuring programs undertaken by the leading companies for cutting costs and returning to structural profitability. In the long term, awaiting the new era of multimedia, success will depend more on the ability of EC companies to increase their global market share and produce both new standards and innovative products (like Digital Compact Cassette, Compact Disc Interactive, Improved Definition and Widescreen receivers, HDTV, Digital Audio Broadcasting and Digital Personal Electronics).

INDUSTRY PROFILE

Description of the sector

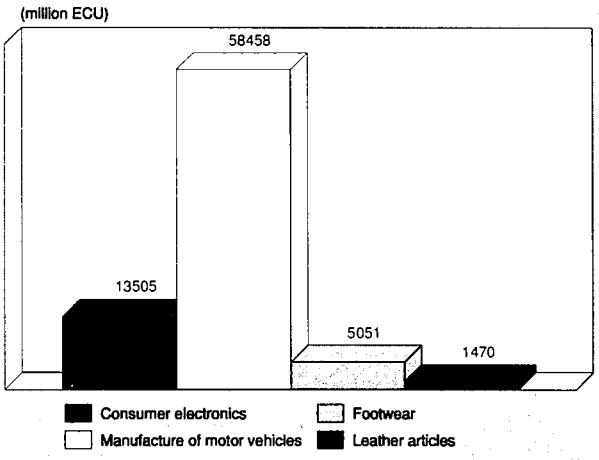
The consumer electronics sector includes all audio-visual products for domestic and portable use and their accessories, such as colour and monochrome televisions, video recorders, video cameras and camcorders, CD readers and audio equipment in general (NACE 345.1); other 'brown goods' are classified in this sector (NACE 345.2) including cable terminals and pay TV decoders. Other products are: antennas and satellite dishes, in-car entertainment and traffic guidance systems, mobile phones, home computing and telecom terminals. Video games, although no quantitative data are provided in the present chapter, are another category of increasing importance that can be included in the consumer electronics sector.

Among audio-products, Digital Compact Cassette (DCC) by Philips and MiniDisc by Sony, released in Europe in 1993, are very new and innovative: both of them are miniaturised products for digitally recording and playback of high fidelity sound and they are going to be the next generation of products (in substitution for traditional Compact Cassettes and, partially, for Compact Disc), but they are still far from achieving the market success of Compact Disc. CD-I (Compact Disc Interactive), a new interactive multimedia system, is in the initial stages of market penetration. Widescreen (16:9) and improved definition television receivers are starting on their market entry curve.

Recent trends

The consumer electronics sector generated a value added of 13 505 million ECU in 1992. Most of value added comes from France (5 336 million ECU in 1992), followed by Germany, Italy and UK, respectively contributing 2 214, 2 043 and 1 760 million ECU.

Figure 1: Consumer electronics
Value added in comparison with other industries, 1992



Source: DEBA

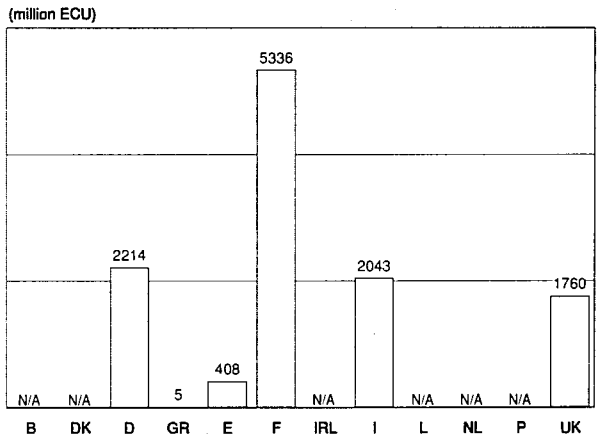
The EC consumption and production (in value terms), after years of strong growth over 1983-88 - with growth at a compound annual rate of 8.3% and 6.8% respectively - have been experiencing hard times since, as growth rates fell respectively to 0.9% and 1.1%. Finally, in 1992 both the EC consumption and production recorded a decline. Apparent EC consumption fell from 55.4 billion ECU in 1991 to 51.4 billion ECU in 1992, and the EC production from 42.2 billion ECU to 39.7 billion ECU.

EC employment was 356 000 in 1992, that is about 20 000 less than in the previous year. Since 1987 employment has been falling more dramatically than in the manufacturing industry as a whole and is expected to maintain its downward trend over the next few years. In the period 1985-92, the EC productivity index increased by nearly one third, while unit labour costs increased by 44%.

International comparison

Japanese companies are the main producers of consumer electronics good for the world market, with an estimated 43% of total production. Japanese manufacturers control over 99%

Figure 2: Consumer electronics
Value added by Member State, 1992



Source: DEBA

Table 1: Consumer electronics
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	29 898	32 873	34 562	38 504	41 604	47 097	51 855	54 309	55 366	51 453	47 200
Production	25 536	28 922	30 829	32 054	33 843	36 973	40 664	42 867	42 210	39 684	36 000
Extra-EC exports	2 963	3 705	4 460	5 623	5 936	6 577	7 399	7 959	8 409	8 888	9 770
Trade balance	-4 362	-3 951	-3 733	-6 450	-7 761	-10 125	-11 191	-11 442	-13 156	-11 769	-11 000
Employment (thousands)	416.4	405.6	402.6	393.9	398.4	389.8	387.4	384.6	375.6	356.9	338.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Consumer electronics (excluding music recording)
Total market (sales to distribution outlets)

(thousand units)	1990	1991	1992	1993 (1)
Colour televisions	20 558	20 462	20 782	19 868
Car radios (2)	16 147	16 708	15 785	13 985
CD players	10 661	14 066	15 761	16 661
Video tape recorders	11 581	11 069	11 199	10 080
Camcorders	2 475	3 320	3 319	2 974

(1) EACEM estimates.
(2) Excluding sales to the German automobile industry.
Source: EACEM

Table 3: Consumer electronics
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	8.3	0.9	4.9
Production	6.8	1.1	4.2
Extra-EC exports	13.8	10.2	12.2
Extra-EC imports	14.4	4.4	9.8

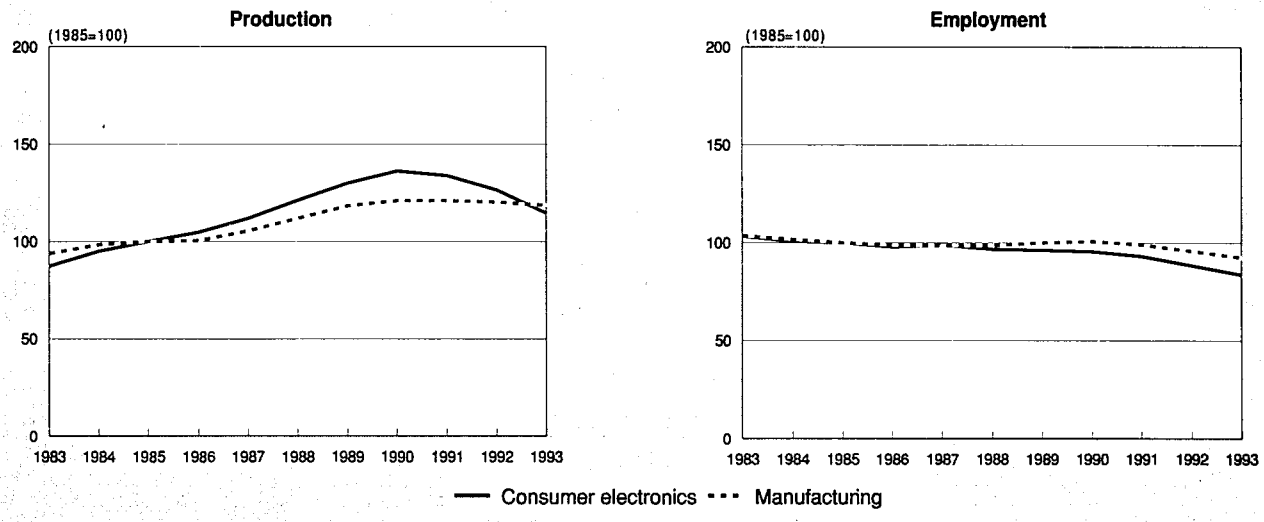
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Consumer electronics
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	2 963	3 705	4 460	5 623	5 936	6 577	7 399	7 959	8 409	8 888
Extra-EC imports	7 325	7 656	8 193	12 073	13 696	16 702	18 590	19 401	21 565	20 657
Trade balance	-4 362	-3 951	-3 733	-6 450	-7 761	-10 125	-11 191	-11 442	-13 156	-11 769
Ratio exports/imports	0.40	0.48	0.54	0.47	0.43	0.39	0.40	0.41	0.39	0.43
Terms of trade index	106.6	99.9	100.0	106.6	106.1	106.4	99.8	105.0	98.7	93.5
Intra-EC trade	5 135	5 905	6 863	10 864	11 797	14 222	16 191	17 936	18 923	18 850
Share of total imports (%)	41.2	43.5	45.6	47.4	46.3	46.0	46.6	48.0	46.7	47.7

Source: DEBA

Figure 3: Consumer electronics
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

of their domestic production and account for 50% of production in the USA and 27% of production in Europe. The EC manufactures produce 15% of consumer electronics goods in the world and the USA 13%. Europe is the second largest market for consumer electronics in the world, after the USA. Growth in Japanese consumption slowed in recent years as the market for audio and video products saturated, forcing manufacturers to place more emphasis on the USA and Europe for sales. Japan exports over 50% of its consumer electronics production. Both the USA and the EC are very significant net importers of consumer electronics, showing a strong negative trade balance in this field.

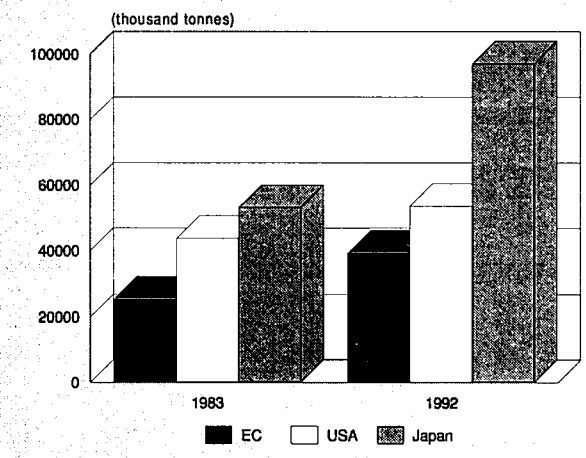
Foreign trade

In 1992 extra-EC exports increased in comparison with the previous year while extra-EC imports decreased. Thus the trade balance deficit declined from 13 155 million ECU in 1991 to 11 768 million ECU in 1992. Since 1988 exports, (10.2% of compound annual growth rate) have been growing faster than imports (4.4%).

Over 1987-1992, extra-EC exports have registered a shift in destination. The percentage directed to EFTA countries and the USA has declined in favour of exports towards the rest of the world, primarily less developed countries. The latter accounted for 58% of the total in 1992 compared to 50% in 1987. Very few EC products are exported to Japan which accounts for just 3% of total EC exports. Parts and accessories (54% of total exports), TV sets (17%) and blank tapes and discs (11%) are the main categories of exported products.

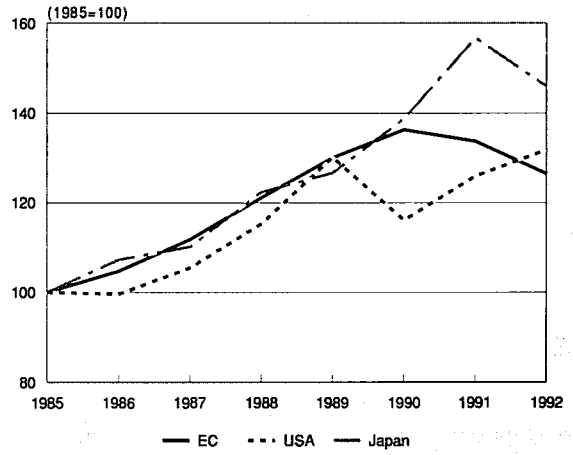
Most extra-EC imports comes from Japan (33%) and South East Asia countries, such as Korea, Taiwan, Hong Kong, Singapore, Malaysia and Thailand. The latter as a group have steadily increased their share in EC imports in the last few years. In 1992, 17% and 7% of EC imports came from the US and EFTA respectively. Parts & accessories (23% of total imports), home audio (16%), TV sets (14%), camcorders (13%) and blank tapes & discs (11%) are the main products imported.

Figure 4: Consumer electronics
International comparison of production in current prices



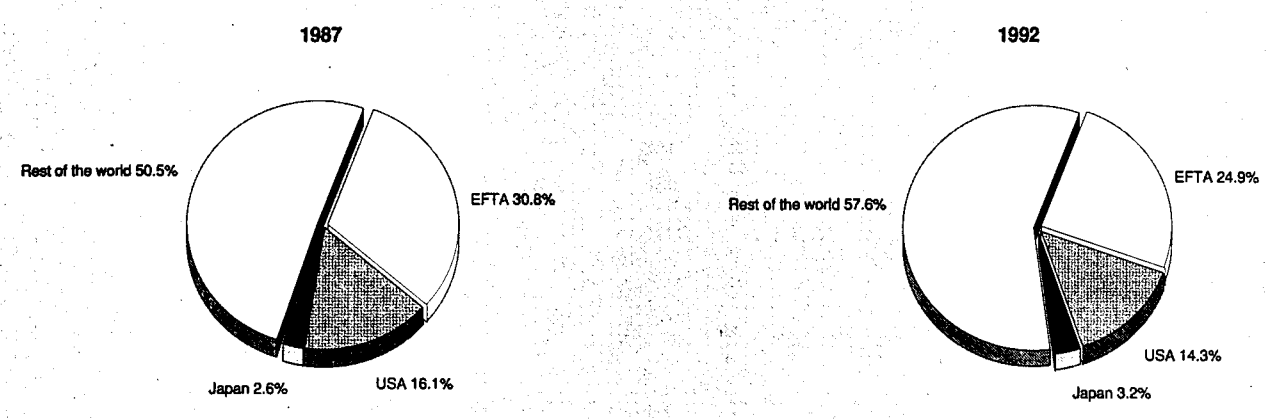
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Consumer electronics
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Consumer electronics
Destination of EC exports



Source: Eurostat

MARKET FORCES

Demand

Recession in the EC accounts for slow market growth, fierce competition and falling prices. However, falling prices have favoured a wider diffusion of consumer electronics and the range of products sold in the market has increased.

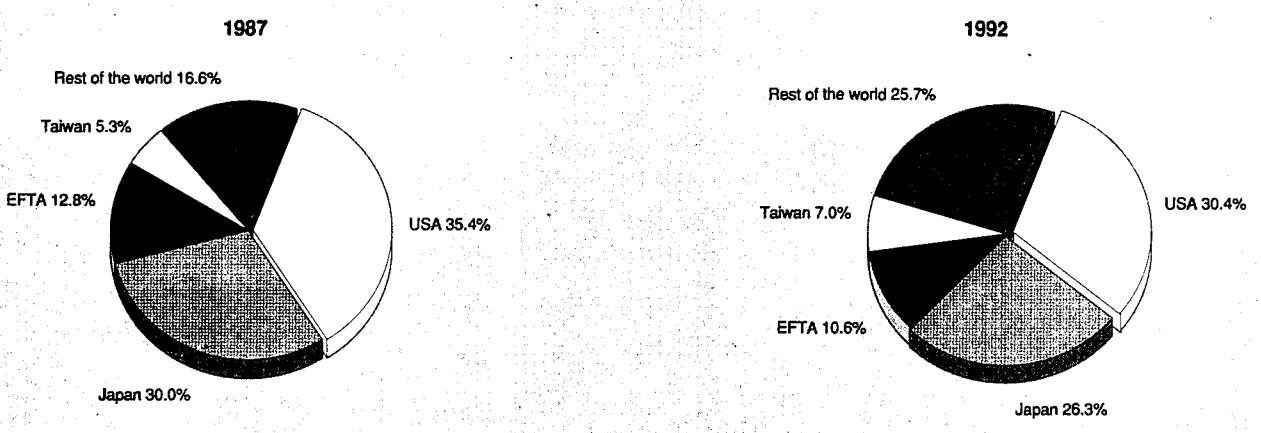
Broadly speaking, consumer demand can be divided into two main segments. High end users ask for better quality products and service (for example high specification and 16:9 format screen TV sets, VCRs, or premium audio products with state-of-the-art sound), while low end users ask for cheaper and easier to use products. It is also acknowledged that many functions of volume products (like VCRs and camcorders) are not actually used because of their complexity.

Product user friendliness, price and service and distribution quality are the main factors of success in the consumer electronics market, and the suppliers try to balance these features to get the right mix for the different segments of the market. Another key factor concerns brand image and the expansion of distribution channels, such as discount stores for the mass market, or specialised retail channels for high quality and sophisticated products.

Supply and competition

Japanese companies have the largest market share in the sector world-wide, especially for products like VCRs and camcorders. EC companies are strong above all in the CTV segment. Korean manufacturers are becoming better positioned in the world ranking of consumer electronics companies, favoured by their lower prices for high volume production. They are strong in the most mature and low end products, and improving in the VCR and camcorder markets. Hardly any US company can be found in the world ranking of consumer electronics companies, because of Japanese and EC companies dominance of the US market itself. The Japanese owe their strength in the sector to the benefit of large economies of scale, lower capital access costs and their traditional strength in manufacturing. Japanese companies are also favoured by better cash resources for R&D which were accumulated thanks to high profit margins in their domestic market. Japanese companies are generally able to take more profit from their vertical integration and diversification: in fact, many big Japanese producers are also big players in the electronic components market, and many of them are well diversified in other electronic fields, such as computing, professional equipment and telecommunications. Therefore they are able to cross-subsidise

Figure 7: Consumer electronics
Origin of EC imports



Source: Eurostat

Table 5: Consumer electronics (excluding music recording)
Structure of imports and exports, 1992

(million ECU)	Destination of EC exports	Origin of EC imports	Ratio exports/imports (%)
Japan	54	5 255	1.0
China	5	955	0.5
South Korea	12	800	1.5
Austria	317	761	41.7
Singapore	67	745	9.0
USA	282	735	38.4
Malaysia	14	727	1.9
Taiwan	32	354	9.0
Thailand	7	338	2.1
Hong Kong	50	227	22.0
Turkey	38	186	20.4
Indonesia	3	88	3.4
Brazil	15	72	20.8
Total extra-EC,	2 167	11 643	18.6
of which EFTA	960	941	102.0

Source: EACEM

the high investment in R&D required for electronics among the different divisions. Recently though, a strong movement towards delocalisation of production outside Japan has started taking place in order to maintain margins and cost competitiveness.

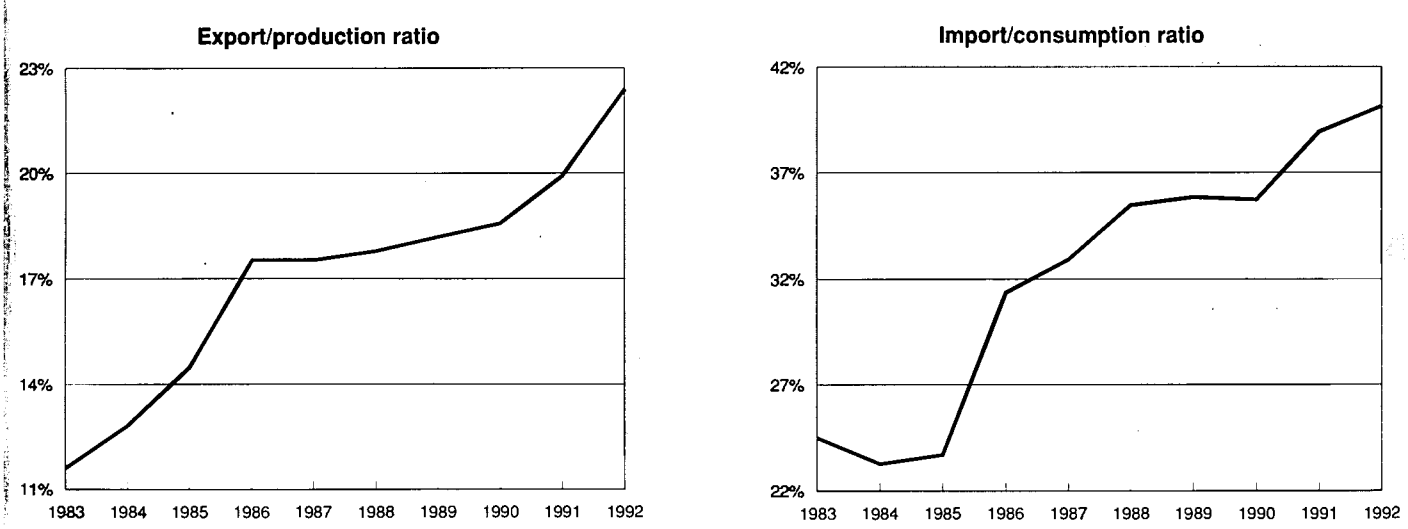
European-owned manufacturers, though to a lesser extent than the Japanese, are also vertically integrated and diversified: Philips is the main EC producer of electronic components and Thomson is one of the main shareholder of the semiconductor producer company SGS-Thomson.

Traditionally, Japanese companies gained global market share by selling high volumes at low price and modest profit in their export markets. The Yen revaluation, the current price war and the dramatic reduction of gross margins are deeply affecting Japanese companies, which are also hit, for the first time, by a reduction of their domestic consumer market which traditionally represented the platform for their strong profitability. Most of the Japanese consumer electronics companies are experiencing a dramatic reduction of profits and, in some cases, losses. Both Japanese and European companies are trying to rationalise their production facilities and to move low value added production to South-East Asian countries, where labour is cheaper.

Production process

The consumer electronic sector is characterised by the coexistence of relatively mature products, like CTVs and VCRs, alongside new products. In fact, suppliers try to revitalise the market by introducing new sophisticated products and by imposing enhanced standards and features. In the last months of 1992, Philips launched the Digital Compact Cassette (DCC) for recording digital sound. Sony launched the MiniDisc, another optical device for recording digital sound. Both are trying to emulate the success of compact disc, replacing traditional analogue cassettes. They are also trying to establish their standards with alliances with hardware suppliers (for example DCC of Philips is produced also by Matsushita, the largest Japanese

Figure 8: Consumer electronics
Trade intensities



Source: DEBA

Table 6: Consumer electronics (excluding music recording)
Principal producers of colour televisions and video tape recorders

(% of total market)	Colour televisions		Video tape recorders	
	1991	1992	1991	1992
EC production	76.0	58.0	59.0	45.0
Extra-EC imports, of which	45.0	47.0	51.0	60.0
Singapore	7.0	5.0	7.0	8.0
Thailand	5.3	8.3	0.0	0.0
South Korea	4.7	4.0	6.0	3.0
Turkey	4.7	4.5	0.0	0.0
Malaysia	4.6	6.7	0.0	0.0
China	3.0	3.7	0.0	0.0
Hong Kong	2.6	1.3	0.0	0.0
Japan	1.7	1.6	23.0	28.0
Taiwan	2.1	1.7	0.0	0.0
Austria	0.0	0.0	14.0	11.0
USA	0.0	0.0	0.2	9.0

Source: EACEM

consumer electronics company). For both contenders, the partnership with the "software" industry, i.e. the music recording industry, is vital for their new products' success.

Philips also introduced CD-I, an interactive multimedia optical device connected with traditional television sets and compatible with compact disc. Also in this case partnership with the "software" industry, that is movies industry, is the key to success.

The biggest attempt to revitalise the mature TV market has been made through enormous investment in R&D to supply High Definition TV, i.e. a new TV standard set providing high definition images (comparable to the level of image definition of the movie screen).

Over recent years, the EC supported a strong effort in R&D to promote a mixed analogue/digital standard of HDTV: HD-MAC. This would have been compatible with D2-MAC receivers, offering improved definition television pictures and downward compatibility between 16:9 and the existing 4:3 aspect ration pictures and standards.

Unfortunately, before these technologies could become established, the prospect of fully digital solutions became apparent, particularly in the USA, where electronic companies, including Philips and Thomson, promoted the principle of a new advanced digital TV standard. It is likely that fundamental features of this standard will be incorporated in the satellite and terrestrial digital TV standards, which will be adopted in Europe. Digital television standards can be used to promote either HDTV or a substantially increased number of standard definition channels, or a mixture of both. It is expected that these new developments will revitalise the US and EC consumer electronics industries.

For the new generation HDTV sets, large flat screens will be needed. Although the Japanese are more advanced than US and EC companies in R&D concerning such development, a significant and important amount of research work is going on in Europe on this and other technologies through the Eureka, Race and Esprit programmes.

An important development in Europe is likely to be the introduction of enhanced definition TV sets employing the D2-MAC standard and, in the immediate future, the PAL PLUS standard, both with a 16:9 format picture. This will be particularly important for terrestrial broadcasters as a measure to compete with satellite digital TV in 16:9.

The EC Commission has put in place an action plan to provide financial support to broadcasters to update to 16:9 studio equipment, and to foster providers and producers to convert to and make 16:9 programmes. There will be no direct funding to the consumer electronics industry in this plan.

In the long term, innovation is linked to the trend of convergence with telecommunications, computer and media technologies. Traditional industrial boundaries are disappearing and competition will stronger between companies originating from different sectors. Video telephone and personal communication electronics are examples of technological convergence that promises increasing competition and alliances between consumer electronic and telecommunications companies; multimedia PCs are a further example of technological convergence between TV and computer industries. Another sector of likely competition and/or partnership will be cable TV and pay-TV where media, telecommunications and consumer electronics companies will compete or set up new alliances.

Table 7: Consumer electronics (excluding music recording)
Equipment rates of EC households at the end of 1992 (1)

(%)	B	DK	D	GR	E	F	I	P	UK
Colour televisions	98.0	98.0	94.2	77.0	99.0	93.5	95.0	93.0	95.0
Video tape recorders	50.0	41.0	55.9	40.0	49.0	57.2	42.0	N/A	67.5
Camcorders	12.0	5.0	10.0	N/A	10.0	10.8	7.3	N/A	9.0
CD players	43.0	24.0	45.0	N/A	22.0	28.0	14.2	N/A	35.0

(1) At least one set.
Source: EACEM

Table 8: Consumer electronics
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	25.3	28.0	29.1	30.8	33.4	36.5	38.5	38.5	37.8	37.8
Productivity index	87.2	96.5	100.0	105.8	115.0	125.5	132.3	132.5	130.1	130.2
Unit labour costs index (3)	87.5	93.5	100.0	106.2	112.8	118.5	124.1	129.9	138.1	144.4
Total unit costs index (4)	83.2	92.6	100.0	106.4	110.1	121.9	134.2	144.4	153.4	156.5

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

INDUSTRY STRUCTURE

Companies

The only EC companies ranked in the top 10 of consumer electronics world-wide are Philips and Thomson. Nokia is the third largest European-owned manufacturer. 1992 and 1993 have been very tough years for the European industry. Many analysts claim that very few companies have been making profits in Europe in the last five years. Although consumer electronics is a mature market, - where usually established companies can consolidate good profits - fierce global competition and overcapacity seem to have forced the industry to give away all productivity gains to the customer.

Strategies

The strategies of the consumer electronics companies are directed towards controlling costs, rationalising production, improving the quality and user interface of existing products, expanding commercial networks and launching innovative products. On one hand, companies are likely to concentrate on their core competence and on the other to co-operate and set up new joint ventures with companies that might even originate from other sectors, like music records, computers and telecommunications.

Strong competition is generally forcing companies to seek networks of alliances and partnerships. After a wave of mergers and acquisitions over the 1980s, strategies have shifted towards agreements concerning a limited range of products or R&D on some technologies. Philips and Thomson for example were partners in developing HDTV and are jointly developing the flat TV screen and LCD (Liquid Crystal Display) technology. Digital Audio Broadcasting (DAB) is another area of R&D cooperation.

REGULATIONS

Regulations will be introduced by 1994 to limit interference when equipment is attached to the main supply. This will be mandatory for all suppliers of consumer equipment and may for example require the redesigning of the power supply stage.

Environment protection legislation is another key issue. Laws concerning waste disposal have already been introduced in Germany and France. EC and national laws will push the suppliers to adopt recyclable materials.

OUTLOOK

The future of the consumer electronic industry depends heavily on the developments of new technologies, such as in standard definition digital TV, improved definition TV, encryption systems and widescreen format TV, as well as on the successful marketing and adoption of new products, such as DCC, CD-I, DAB, in-car traffic guidance systems and personal electronics. However, hard times are likely to persist over the next few years, because of market saturation, fierce price competition, the concentration of purchasing power in distribution, congestion of locally manufactured and imported brands and economic recession in the EC.

Table 9: Consumer electronics
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-6.0	1.2
Production	-4.5	1.8
Extra-EC exports	6.5	6.2

Source: Databank

In the short term, the recovery of the electronics industry hinges upon the continuation of rationalisation programs being put forward by major companies in the sector. In the long term, the success of the EC consumer electronics industry depends also on its ability to increase its share in the global market and to create a wide range of technological and commercial alliances. The emergence of the new multi-media industry will present the major business opportunity, implying convergence of the consumer electronics, computer, telecommunications and software industries.

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Boeing 747

Overview
NACE 35, 36

The transport equipment industry ranks among the major industries in the EC, and has a significant influence over important supplying sectors (ferrous metals, rubber and plastics). Consequently, the deep depression the EC industry has experienced over the past two years has had a dramatic impact on its suppliers. This recession shows signs of having reached a bottom now. Following a deep slump in activity in 1993, attention is now turning to the timing and strength of recovery from 1994 on. The restructuring the industry is engaged in will continue and further lay-offs are to be expected, particularly in the motor vehicle and aerospace industries.

INDUSTRY PROFILE

Description of the sector

According to the NACE classification, the transport equipment industry covers the following sub-sectors:

- motor vehicles (NACE 351 and 352);
- motor vehicle parts and accessories (NACE 353);
- shipbuilding (NACE 361);
- railway rolling stock (NACE 362);
- mopeds and motorcycles (NACE 363);
- aerospace equipment (NACE 364).

The major category of the transport equipment industry is by far motor vehicles, which is the largest producer and employer of the sector. Aerospace ranks second in terms of production and employment.

Recent trends

With value added at above 47.7 billion ECU in 1992, Germany is by far the largest transport equipment producer. France, the United Kingdom and Italy rank as the three largest producers after Germany. These four leading producers together account for 85.6% of EC transport equipment output.

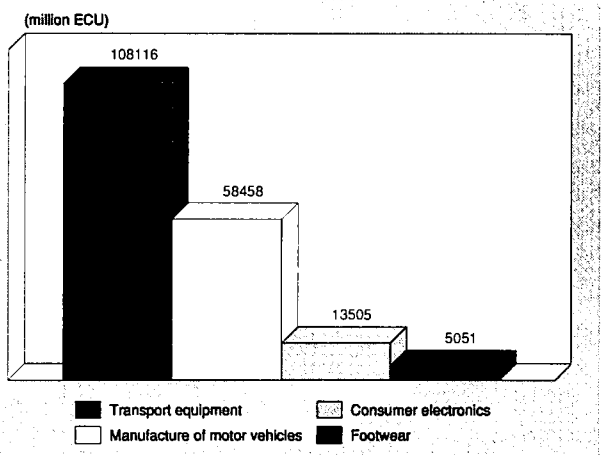
The transport equipment industry maintained sustained activity with an above 5% real annual growth rate between 1985 and 1989, thanks to the particular dynamism of the motor vehicle industry over the period. Motor vehicle parts and accessories was the fastest growing sector over the period, while shipbuilding and railway rolling stocks reported declining production.

After a slowdown reported in 1990, real production of transport equipment actually fell in 1991 and 1992. Since 1991, production of both motor vehicles and motor vehicle parts and accessories suffered declines, following a worldwide slump in both domestic and extra-EC demand. The downturn in extra-EC exports had a damaging effect on the sector's trade surplus which shrank by 43% in current terms in 1991. A strong increase of imports in the aerospace and motor vehicle industries contributed to dampen the sector's trade performance. 1992 proved to be a better year for the sector's trade balance. The trade surplus improved significantly thanks to stronger extra-EC exports, whose growth outstripped extra-EC import growth.

International comparison

Thanks to significant growth in the decade up to 1992, the EC has become the world's largest producer of transport equipment. The EC aerospace industry is largely responsible for this record, as it reported much stronger growth than the US, the unquestionable leader in the production of aerospace equipment.

Figure 1: Transport equipment
Value added in comparison with other industries, 1992



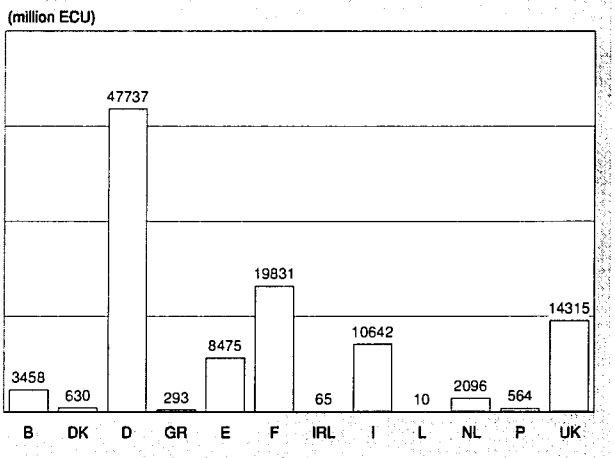
Source: DEBA

The US, which used to lead the market ten years ago, ranks second in the transport equipment industry, due to the poor growth rate reported throughout the decade. In contrast, Japanese production more than doubled between 1983 and 1992, reflecting Japan's ability to penetrate markets worldwide, particularly in the motor vehicle segment. Overall, Japan's transport equipment industry ranks among the top three producers in the world, with production value at 287.8 billion ECU in 1992 just 2% below that of the US.

Foreign trade

The EC transport equipment industry exports some 16% of its production outside the EC, while 13% of its consumption is produced outside the European Community. However, trade intensities differ significantly across subsectors. For example, the motor vehicle industry imports less than 10% of its do-

Figure 2: Transport equipment
Value added by Member State, 1992



Source: DEBA

Table 1: Transport equipment
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	170 571	174 396	192 412	212 992	234 988	265 166	305 589	322 369	336 630	338 214	313 000
Production	192 045	200 430	219 797	235 462	256 983	281 014	317 842	336 529	344 680	350 808	322 000
Extra-EC exports	37 511	44 235	46 303	43 837	44 178	44 765	49 531	51 555	52 890	56 214	54 800
Trade balance	21 473	26 034	27 385	22 471	21 995	15 848	14 253	14 159	8 050	12 594	9 300
Employment (thousands)	2 872	2 790	2 710	2 653	2 627	2 597	2 626	2 677	2 621	2 534	2 260

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Transport equipment
Breakdown by sector, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Motor vehicles	210 506	216 122	25 545
Motorcycles	7 109	4 664	584
Railway rolling stock	4 140	5 349	1 568
Aerospace	40 533	43 543	17 188

(1) Except for trade figures, estimates are used if country data is not available.
Source: DEBA

Table 3: Transport equipment
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	5.1	3.0	4.1
Production	3.9	2.2	3.1
Extra-EC exports	-1.6	0.0	-0.9
Extra-EC imports	4.2	6.6	5.3

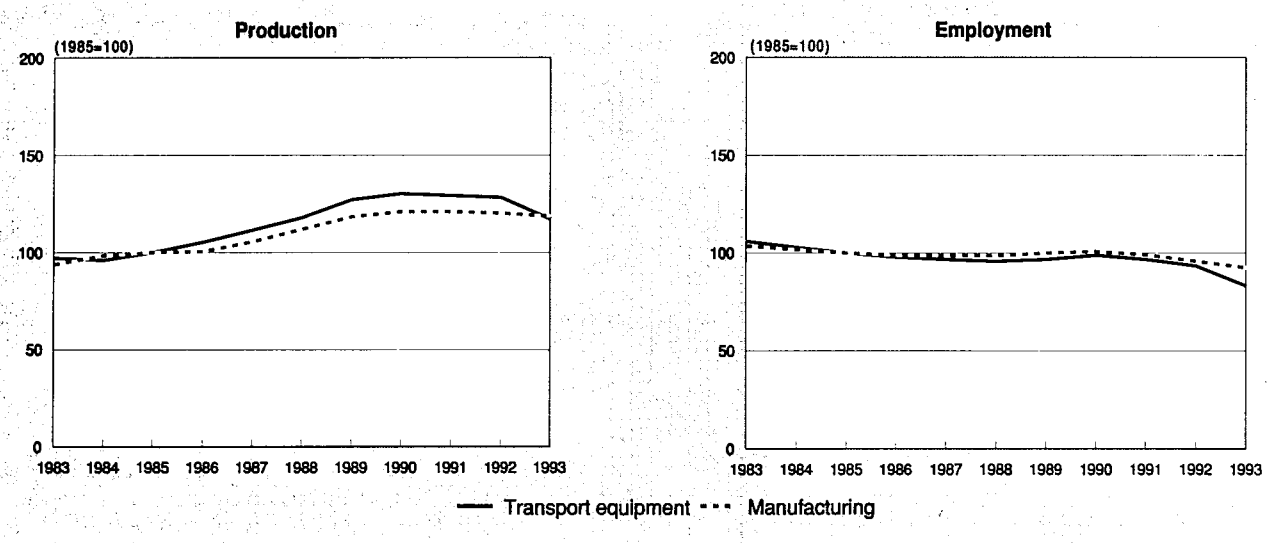
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Transport equipment
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	37 511	44 235	46 303	43 837	44 178	44 765	49 531	51 555	52 890	56 214
Extra-EC imports	16 038	18 201	18 918	21 367	22 184	28 917	35 278	37 396	44 840	43 620
Trade balance	21 473	26 034	27 385	22 471	21 995	15 848	14 253	14 159	8 050	12 594
Ratio exports/imports	2.34	2.43	2.45	2.05	1.99	1.55	1.40	1.38	1.18	1.29
Terms of trade index	107.9	100.8	100.0	101.9	101.9	96.5	96.4	102.7	101.9	103.4
Intra-EC trade	43 969	46 182	51 435	57 408	65 206	73 096	90 086	96 083	109 317	115 227
Share of total imports (%)	73.3	71.7	73.1	72.9	74.6	71.7	71.9	72.0	70.9	72.5

Source: DEBA

Figure 3: Transport equipment
Production in constant prices and employment compared to EC manufacturing



Source: DEBA

mestic apparent consumption, while only 12.5% of its production is exported. This peculiar aspect is the result of the strategy of internationalisation implemented by the major automotive producers, aimed at locating production plants near local consumer places, which leaves reduced space for extra-EC trade. In contrast, the aerospace industry ranks among the largest open to trade, with both export intensity and import penetration at about 35%.

Like for other industries largely open to trade, swings in currency values have made imported transport equipment cheaper than EC produced equipment. This was among the factors that tripled the value of extra-EC imports over the past decade and significantly reduced the EC's trade surplus.

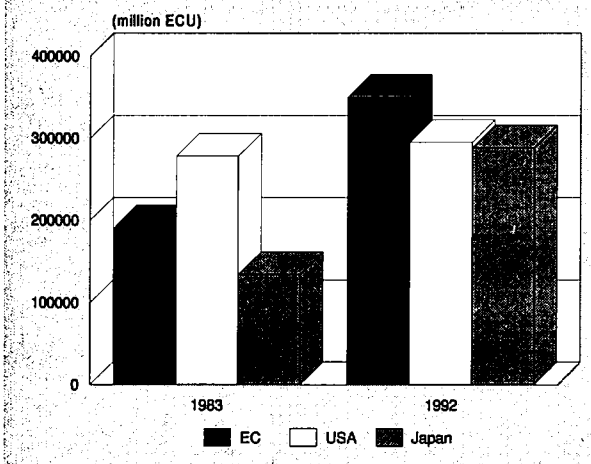
Since 1986, the EC transport equipment sector has experienced a number of major shifts in both the destination of extra-EC exports and the origin of intra-EC imports. Japan accounted for an increasing share of EC exports in 1992 compared to 1987, while export shares to the EFTA and OPEC countries remained stable. A notable decline in the export share to the USA can be mainly attributed to a substantial depreciation of the dollar during that period. For the same reason, the US increased its share of extra-EC imports by six points to 27.5% in the five year period to 1992, mainly to the detriment of import shares for the EFTA countries and Japan.

MARKET FORCES

Demand

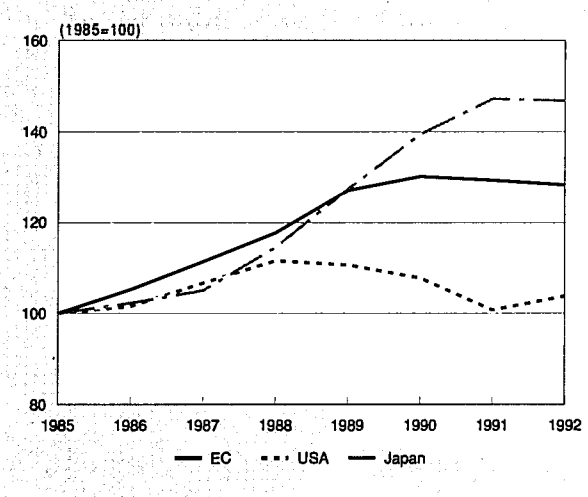
Demand for the different categories of transport equipment varies significantly. Consumers are the single most important component of demand for the mopeds and motorcycle industry, and for the motor vehicle industry (through demand for passenger cars). Consequently, overall economic activity, personal disposable income and demographic trends are overriding factors influencing demand for such equipment. It is no wonder, then, to observe that these sectors are characterised by a combination of short term cyclical fluctuations and long term

Figure 4: Transport equipment
International comparison of production in current prices



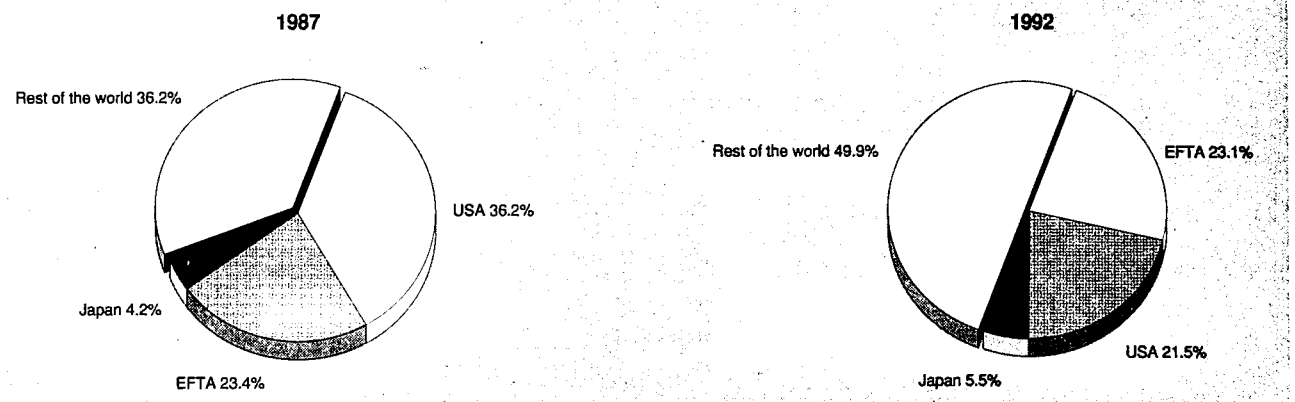
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Transport equipment
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Transport equipment
Destination of EC exports .



Source: Eurostat

growth. By contrast, the government sector is the aerospace industry's largest outlet through its military orders, followed by airline companies. Given the tough spending constraints its main clients are facing, along with changing defence policies and with increasing peace initiatives, the aerospace industry is currently experiencing its worst ever downturn in demand.

The shipbuilding and railway rolling stock industries have a relatively small number of customers, usually national or regional companies, which may be either private or public. These two industries are more sensitive to transportation and infrastructure policies, rather than to general income developments.

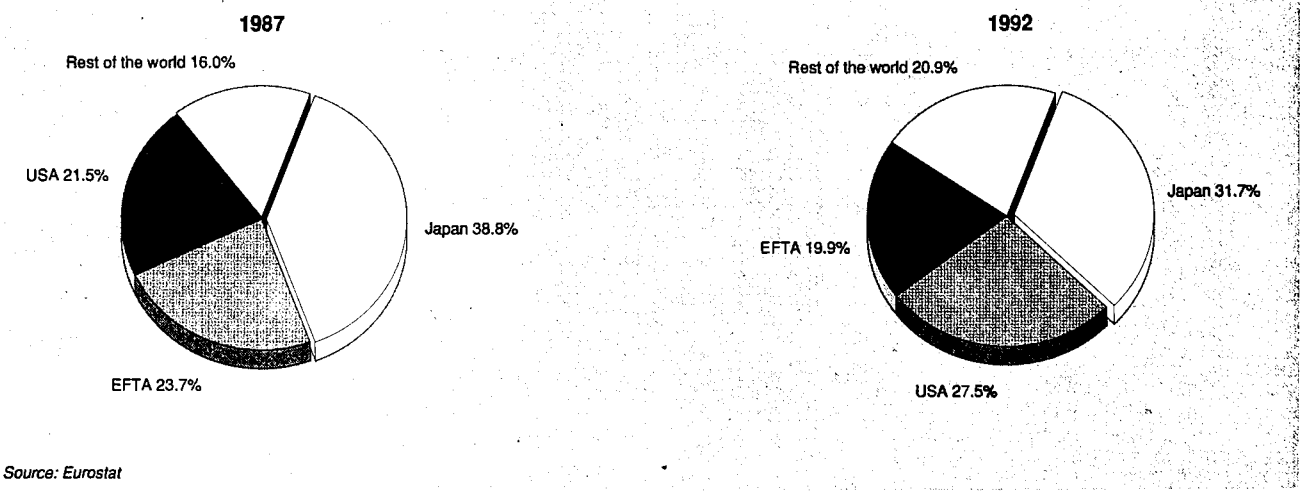
More generally, demand in the different subsectors can be attributed to a wide variety of factors as certain forms of transportation are close substitutes for each other (travelling by car versus rail or air travel, for example). Furthermore, an increased awareness of transportation's impact on the environment on the part of the general population may also affect demand as increased use of public transportation reduces emissions and traffic congestion.

Supply and competition

As a whole, the EC transport sector is fully capable of meeting the demand for transport among its Member States. In fact, the EC maintains a trade surplus, albeit declining, in transport equipment on an annual basis. In the motor vehicle industry, Japanese competition clearly constitutes the main challenge faced by European producers over the next two decades. In response to such competition, EC car manufacturers need to further implement the lean production techniques in order to at least maintain market shares. In the aerospace industry, the US remains the formidable competitor, but newcomers, such as Indonesia, might represent a serious threat over the next two decades.

The profits to turnover ratio shows the European transport industry improved its profitability between 1983 and 1992. The effects of the world-wide recession, however, have diminished a previously positive trend which peaked in 1989. The most notable rise and subsequent fall in this trend occurred in the aerospace subsector, which experienced a considerable drop in orders for both civil and military aircraft.

Figure 7: Transport equipment
Origin of EC imports



Source: Eurostat

Table 5: Transport equipment
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	33.7	33.6	35.5	37.5	40.1	41.6	43.6	42.5	41.9	42.7
Productivity index	95.0	94.8	100.0	105.6	112.9	117.3	122.7	119.7	118.0	120.2
Unit labour costs index (3)	87.5	92.8	100.0	105.8	112.4	118.3	126.1	133.2	143.2	155.5
Total unit costs index (4)	86.1	89.4	100.0	109.2	119.3	131.9	146.7	154.9	164.5	174.9

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Production process

Confronted by a highly competitive market, the transport equipment industry is bound to produce faster, better and cheaper. New forms of organisation and management of production have been implemented, along with new production methods. Innovations in the production process are particularly noticeable in the automotive industry, and to a lesser extent in the aerospace industry, where new techniques such as just-in-time production and increased emphasis on quality control are reducing significantly production times and allowing for greater cost effectiveness. The latter is of major concern for the transport equipment industry, which has experienced a strong deterioration of its cost structure, simultaneous to the inflation of unit labour costs.

As rationalisation and innovations in automated production techniques continue to be applied to the production process, employment in the sector continues to dwindle. In spite of a brief period of relief in 1989 and 1990, the trend in employment is dramatically downward oriented. Since 1991, the employment decline has actually accelerated, with a cut by 3.3% decline in 1992 and a further slump by 11% expected for 1993.

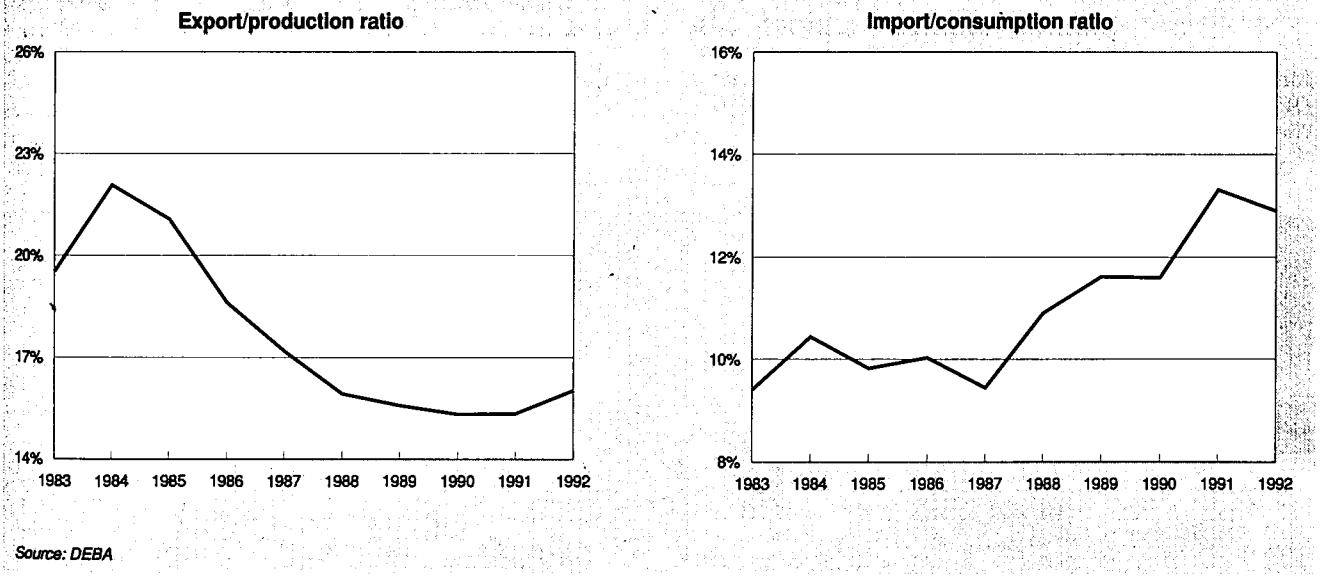
INDUSTRY STRUCTURE

Companies

The transport equipment sector is well represented among the leading European companies. Daimler-Benz (D) is the leader in terms of turnover, and the third largest industrial company in Europe, and the eleventh in the world. The sector is highly concentrated as the top 6% of the companies (i.e. companies with more than 99 employees in 1990) accounted for 94% of the transport equipment industry's turnover.

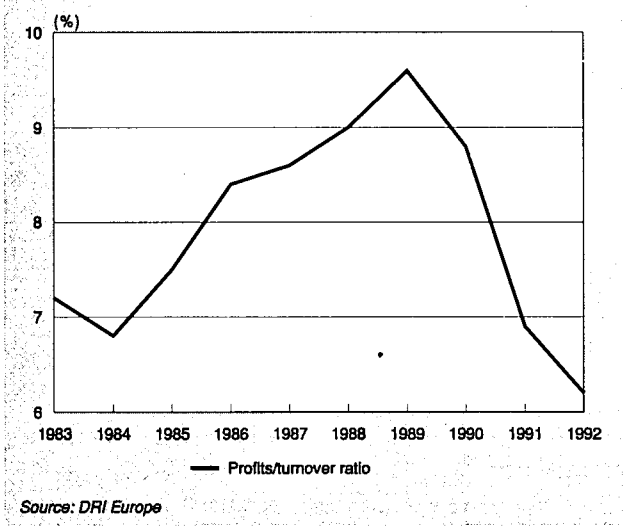
Some of the leading corporations in this sector have interests in various industries. Many of the large volume car manufacturers, such as Renault (F), Fiat (I) and Daimler-Benz, also have interests in the truck industry. Peugeot SA (F) produces mopeds, motorcycles and bicycles, whereas both Fiat and Daimler-Benz are involved in both the motor and aerospace sectors. In addition, British Aerospace (UK) now holds a majority stake in Rover Group (UK). At the time of the Rover Group take-over by British Aerospace, much was made of the opportunity for the two companies to enjoy industrial synergy. Although there does not seem much evidence of this synergy in general, companies with dual interests are at least able to allocate risks across their diversified branches.

Figure 8: Transport equipment
Trade intensities



Source: DEBA

Figure 9: Transport equipment
Pre-tax profits to turnover of the industry



Source: DRI Europe

Strategies

Although the EC can still lay claim to some of the largest transportation companies in the world, a strong movement towards international cooperation between EC manufacturers and American and Japanese companies is quite prevalent.

In the motor vehicles industry, a number of mergers have occurred, in particular between the large mass producers and smaller luxury car makers. Some examples include Fiat's takeover of Alfa Romeo (I), Ford's (USA) purchase of Jaguar (UK) and General Motors' (USA) 50 % stake in Saab's (S) car division. Apart from outright mergers, a cooperative agreement between Volvo (S) and Renault through complex cross-share holdings has made Volvo/Renault the world's largest truck producer.

Collaboration has not taken place solely between EC producers, however. In recent years, there have been a number of collaborative ventures or cooperative agreements between EC companies and Japanese or American organisations. The aim of such ventures is to develop new models together, in order to share development costs. Usually, the products of this cooperation are marketed separately to maintain a clear distinction between brands.

The Japanese motor industry's superior standing in certain areas of the production process has led to a steady stream of joint manufacturing agreements. Examples of such collaboration include General Motors' arrangement with Isuzu (JPN) to jointly produce vans in the UK, the much publicised Rover-Honda (JPN) alliance which has now been existence for over ten years, and Piaggio's (I) agreement with Daihatsu (JPN) which led to their common development of a new microvan called Hijet, whose marketing started in March 1993.

In terms of cooperation between US and EC companies, the aerospace sector is the unquestionable leader. This cooperation is essentially taking place between aerospace engine manufacturers (MTU (D) and Pratt & Whitney (USA) or General Electric (USA) and Snecma (F), for example). It is also worth mentioning the contribution of out-sourcing, particularly between US companies to the Airbus programme as well as European companies to some of the Boeing (USA) and McDonnell-Douglas (USA) programmes.

Although cooperation among companies has occurred, outright mergers and acquisitions activity is still somewhat limited in industries such as aerospace where governments of respective Member States still have a controlling interest (particularly in the production of military equipment). Given the advantages of scale economies and large R&D expenses, however, some very important mergers and acquisitions have occurred in the aerospace industry. Such a development is quite pronounced in Germany, where much of the aerospace industry is performed by divisions under the wings of Daimler-Benz which were acquired through mergers and acquisitions.

REGIONAL DISTRIBUTION

In 1992, more than 85% of EC production was concentrated in four Member States: Germany, France, the UK and Italy. For motor vehicles, these four countries accounted for 91% of all value added within the EC. In the aerospace sector, EC's Big four countries produced about 94% of value added in Europe.

The opening of frontiers with Eastern Europe promises to have a significant impact on the distribution of European production facilities, particularly for the motor vehicle industry. For example, many major West European manufacturers have already entered into agreements with East European producers, in anticipation of future rewards. Opel (a subsidiary of General Motors), Volkswagen (D), and Mercedes-Benz have all set up production units in former East Germany. Fiat took over FSM in Poland at the end of 1992, and acquired a 30% stake in VAZ, the Russian car producer. Among the other deals which have been successfully finalised, it is worth mentioning the purchase by Volkswagen in 1991 of a 31% stake in Skoda, the Czech manufacturer.

In the aerospace sector, principles of cooperation have also been agreed upon in the space industry between CIS and the EC.

ENVIRONMENT

Transport has been one of the main targets of environmental regulations for several years. Transport services account for one-quarter of total carbon dioxide emissions (carbon dioxide is the main gas responsible for the "greenhouse effect"). Given the strong "technological" link between carbon dioxide emissions and energy consumption, heavy energy users such as the aerospace and motor vehicle industries are likely to be under attack over the course of this decade. This could be

Table 6: Transport equipment
Breakdown by size of enterprise, 1990 (1)

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	25 060	81.9	4.1	2.7
20-99	3 737	12.2	6.1	3.7
100 or more	1 790	5.9	89.8	93.6

(1) Provisional estimates.
Source: Eurostat

Table 7: Transport equipment
The 15 largest European companies, 1992

(million ECU)	Country	Turnover	Net profit	Employees
Daimler Benz	D	48 828	703	376 467
Volkswagen	D	42 315	-43	281 649
Fiat	I	36 922	344	285 482
Renault	F	26 103	826	146 604
Peugeot	F	22 639	490	150 800
Bosch (Robert)	D	17 043	234	169 804
Bayerische Motoren Werke	D	15 479	357	73 562
British Aerospace	UK	13 556	-1 207	102 500
Volvo	S	11 065	-443	60 115
Ford Werke	D	10 901	-233	47 670
Man	D	9 368	181	63 256
Audi	D	8 292	43	37 738
Aerospatiale	F	7 601	-346	46 110
Rolls Royce	UK	4 840	-274	51 800
Fasa Renault	E	4 074	78	16 090

Source: DABLE

to the benefit of some of the smaller transport subsectors like rail. In the area of personal transport, increasing congestion in most towns and cities, coupled with growing environmental awareness should benefit the bicycle, moped and motorcycle industry, as well as the public transport equipment sector. In the long term, the kind of solution adopted to solve the global warming problem is of major importance, given that it could lead to a significant shift in production between certain branches of the sector.

REGULATIONS

Increasing penetration of Japanese motor vehicles will have a substantial effect on the sector as a whole. An agreement made in 1991 between the EC and Japan called for a complete opening of the European market to Japanese vehicles by the year 2000. During the agreement's interim period through 1999, the share of Japanese car makers will be progressively raised. Japanese producers have promised to refrain from a rapid adjustment of their penetration rates in what are presently the most protected markets, France and Italy.

OUTLOOK

The European auto industry has experienced a deep recession during the past two years. This recession shows signs of having reached a bottom and attention is turning to the timing and strength of recovery in 1994 and 1995. During the 1990's, European producers will face a series of important challenges ranging from Japanese competition to environmental pressures and the development of the East European market. The re-structuring of the industry will continue and sizeable lay-offs are expected.

Following the current downturn in the aerospace subsector, growth is expected to be encouraged in the medium term by both a rapid growth in air traffic and the need for airlines to replace their ageing fleets. Such a forecast also assumes that airlines will be in a better position than they currently have to make such investments.

Table 8: Transport equipment
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.5	3.3
Production	0.2	3.0
Extra-EC exports	-0.5	2.5

Source: DRI Europe

Prospects for the railway rolling stock industry are somewhat different, with problems stemming more from the demand than from the supply side as world demand remains sluggish. Sales in Europe will be somewhat spurred by investments in a European high speed rail network, the upgrading of the Italian and East German networks, and increased environmental concern which puts more emphasis on the development and expansion of efficient transport networks. In addition, an expected hike in oil prices will likely raise the cost of travelling (by car or by air, in particular), making rail travel a more affordable form of transportation.

Overall, production growth in the transport equipment sector is expected to average 2.5% per year up to 1997, slightly weaker than the above 3% annual rate of growth over the period 1983 to 1992.

Written by: DRI Europe

Motor vehicles
NACE 351

The European car and commercial vehicle markets are in midst of the worst decline since World War II. The industry is facing declines in sales greater than those which occurred after the first oil crisis in the early 1970s. Much of the industry is operating at a loss as car and commercial vehicle makers take drastic action to reduce production and cut jobs. 1993 has witnessed extensive short time working and new pressure on component suppliers to cut prices.
The current recession has highlighted the need for all vehicle manufacturers to accelerate restructuring programmes needed to achieve global levels of competitiveness. All vehicle manufacturers are meeting this challenge by restructuring their development and production processes, re-evaluating their sourcing policies and improving skill and productivity levels.

INDUSTRY PROFILE

Description of the sector

NACE 351 covers the manufacture and assembly of motor vehicles and manufacture of motor vehicle engines. Motor vehicles include passenger cars as well as commercial vehicles. All the volume car producers also operate in the commercial vehicle market, especially the light commercial vehicle market.

Vehicle manufacturers also produce motor vehicle components and accessories (NACE 353) and are engaged in the distribution and maintenance of vehicles.

Recent trends

World-wide sales of new cars increased only marginally from 33.9 million units in 1991 to 34.1 million in 1992. There was also hardly any growth in the EC market, with 1992 sales of 12.6m units being only marginally better than in 1991, when sales reached 12.55 million units.

Whilst the UK and the Italian markets were stable, growth in the French (up 4%) and Spanish (up 11%) markets in 1992 compensated for weakness in the German market which was down 6% from the 1991 post unification boom level.

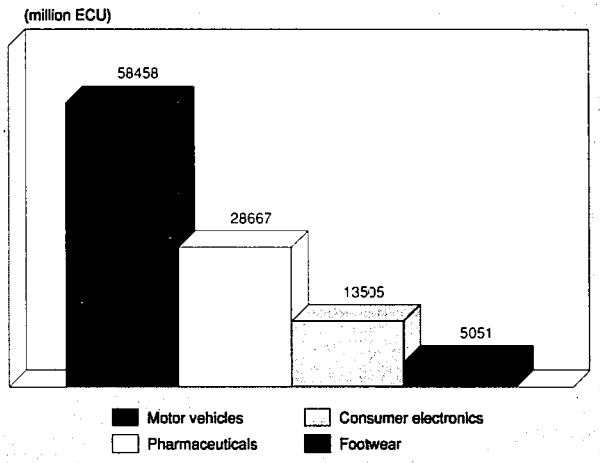
1993 has seen sales slump in almost all the EC markets and total 1993 sales were over 15% below the 1992 levels. Of the major European markets, Germany and France suffered declines in demand of over 18% and both Italy and Spain suffered declines of over 20%, with only the UK market showing growth (of over 10%) from the 1992 levels.

Sales of light commercial vehicles tonnes gvw rose by 7% from 1.24 million to 1.33 million between 1991 and 1992 but sales of trucks 6 tonnes gvw declined from 258 000 in 1991 to 233 000 in 1992 - a decline of over 10%. A sharp decline is being witnessed in 1993 with the light truck sales expected to be around 20% below 1992 levels and sales of trucks 6 tonnes gvw expected to be around 23% lower than in 1992.

Between 1991 and 1992, sales turnover of the EC motor vehicle industry rose by 4% to 210.5 billion ECU and production rose by 3% to 216 billion ECU.

According to Eurostat, the vehicle assembly industry employs 1.16 million people in the EC, representing some 3.7% of total EC manufacturing employment. Productivity improvements, restructuring, and rationalisation have all contributed to a steady decline in the level of employment in the industry. The current downturn is exacerbating this situation and 1993 has seen many of the vehicle manufacturers announce large reductions in their workforce.

Figure 1: Motor vehicles
Value added in comparison with other industries, 1992



Source: DEBA

Imports from outside the EC accounted for 9% of total consumption and exports to countries outside the EC accounted for 12% of production.

The industry is a net exporter and an important positive contributor to EC's trade balance; however the surplus has declined from 16.2 billion ECU in 1985 to 5.6 billion ECU in 1992. The main reason behind this decline is the loss by EC carmakers of third countries' market.

Vehicle manufacturers adopt Pan-European if not global strategies, while exploiting strengths of specific countries and expanding their presence in the major markets through new investments, joint ventures and alliances.

Germany retains its dominant influence on the EC industry, accounting for 38% of total EC consumption, 44% of production and 54% of value added (see Figure 2).

Between 1982 and 1993, production in nominal value terms doubled. In real terms it increased by 37% (see Figure 3) but changes in competitive dynamics have led to significant structural changes and implementation of new organisational and production processes and this has led to a reduction in employment levels.

Total employment in the EC vehicle assembly industry fell from over 1.3 million in 1983 to 1.05 million in 1993, a reduction of about 20%.

Employment or rather unemployment remains an important issue for the industry and the sharp downturn of vehicle production in 1993 is exacerbating this situation. Nearly 260 000 jobs have been lost between 1983 and 1993. 1993 has seen many of the vehicle manufacturers announce large reductions in their workforce. From vehicle manufacturers announcements which have already been made, indications are that the workforce will be reduced by a further 10% by 1995, equivalent to 110 000 jobs.

Figure 4 illustrates the employment trends in the five major EC countries. The German industry, which until 1991 witnessed increases in levels of employment, is expected to suffer the largest reduction in level of employment in 1993, as almost all manufacturers accelerate their rationalisation and productivity improvement programmes.

International comparison

In 1992, EC accounted for 37% of world-wide cars sales and 36% world-wide car production and Europe was both the

Table 1: Motor vehicles
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	98 505	102 853	112 788	127 157	145 285	163 047	183 115	191 039	202 462	210 506	196 000
Production	110 511	116 922	129 026	141 310	159 133	174 046	194 030	203 007	209 126	216 122	203 000
Extra-EC exports	19 393	22 494	25 664	25 697	26 220	25 173	26 525	27 915	25 131	25 545	26 600
Trade balance	12 007	14 069	16 238	14 154	13 848	10 999	10 915	11 967	6 664	5 616	6 600
Employment (thousands)	1 310	1 288	1 247	1 219	1 213	1 195	1 193	1 218	1 200	1 164	1 050

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Motor vehicles
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	6.1	2.9	4.7
Production	4.9	1.8	3.5
Extra-EC exports	-0.8	-3.8	-2.1
Extra-EC imports	7.4	5.6	6.6

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Motor vehicles
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	19 393	22 494	25 664	25 697	26 220	25 173	26 525	27 915	25 131	25 545
Extra-EC imports	7 387	8 425	9 426	11 544	12 372	14 174	15 610	15 948	18 467	19 929
Trade balance	12 007	14 069	16 238	14 154	13 848	10 999	10 915	11 967	6 664	5 616
Ratio exports/imports	2.63	2.67	2.72	2.23	2.12	1.78	1.70	1.75	1.36	1.28
Terms of trade index	101.6	99.7	100.0	103.2	107.9	102.2	106.4	111.9	109.9	107.0
Intra-EC trade	28 900	30 180	34 738	39 765	45 050	47 713	56 569	61 864	68 028	72 267
Share of total imports (%)	79.6	78.2	78.7	77.5	78.5	77.1	78.4	79.5	78.6	78.4

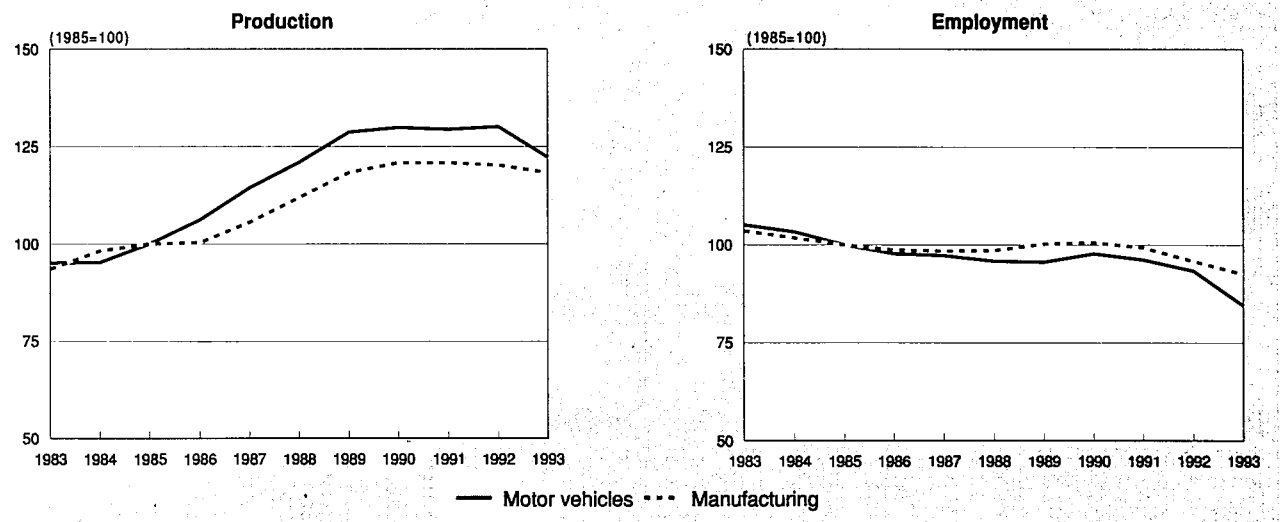
Source: DEBA

Table 4: Motor vehicles
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	39.0	38.1	41.0	44.2	48.1	49.6	52.5	49.7	48.7	50.2
Productivity index	95.1	92.9	100.0	107.7	117.1	120.8	128.0	121.1	118.7	122.4
Unit labour costs index (3)	88.0	93.0	100.0	106.7	114.2	119.7	128.0	134.3	144.0	157.0
Total unit costs index (4)	84.1	89.0	100.0	111.1	124.2	137.9	153.6	161.2	169.7	183.3

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 2: Motor vehicles
Production in constant prices and employment compared to EC manufacturing



Source: DEBA

largest consumer of vehicles and the largest producing region for automobiles.

In 1993, sales of cars in EC countries amounted to 10.68 million compared to 8.8 million in the USA and 4.14 million in Japan. Production of cars in EC in 1993 was 11.17 million compared to 6.23 million in USA and 8.68 million in Japan.

Between 1988 and 1992, in a static world market, sales of cars in EC countries grew by 6.5%. North American sales dropped by around 20% and sales in Japan rose by 20%. By 1992, car sales in EC countries had exceeded sales in the North American market by 3.4 million units. However, in 1993, this gap was narrowed to 1.17 million units as EC sales declined and North American sales enjoyed a revival.

Trends in motor vehicle production (cars and commercial vehicles) growth in value terms in EC, USA and Japan are compared in Figure 7. Production in real terms has grown by 30% between 1985 and 1992. This contrasts with a decline of 3.6 % in USA and a growth of 43% in Japan.

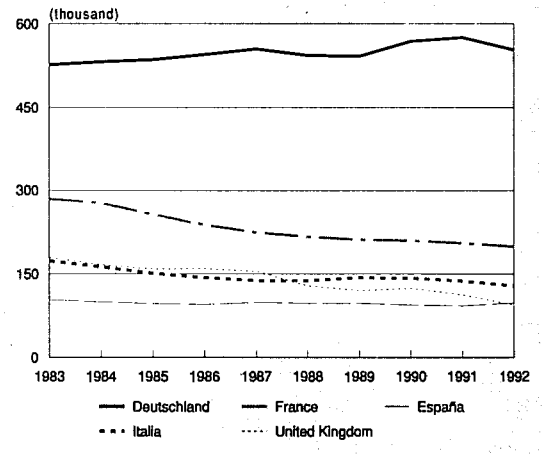
Foreign trade

In the mid- eighties, North America was the most important export market for EC car manufacturers and the major outlet for the European car segment above 3 000 cc (the so-called luxury cars) output (see Figure 8). Unfavourable currency movements, recession in North America, increased competition from domestic car manufacturers and encroachment into the luxury sector by Japanese manufacturers have all contributed to decline in exports of EC produced cars to North America.

In recent years, some EC car manufacturers operating in the luxury cars segment have responded by announcing plans to invest in North American production facilities. As this capacity comes on stream, EC's trade surplus with North America could be reduced further. US owned car manufacturers have been well established in Europe and absence of direct imports from USA have contributed to EC's trade surplus with USA.

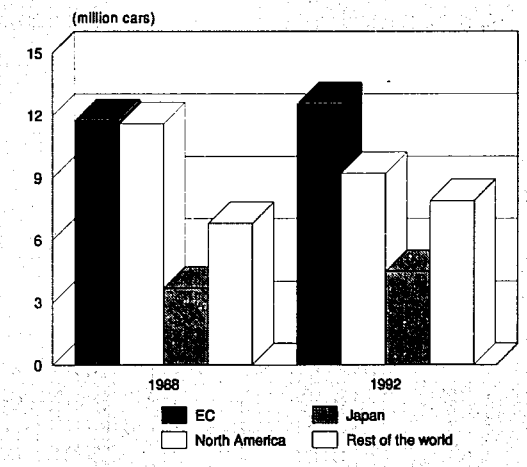
Figure 9 shows the trends in imports of passenger cars into the EC and Figure 10 illustrates the picture in value terms

Figure 3: Motor vehicle
Vehicle assembly employment in the 5 principal EC vehicle manufacturing countries



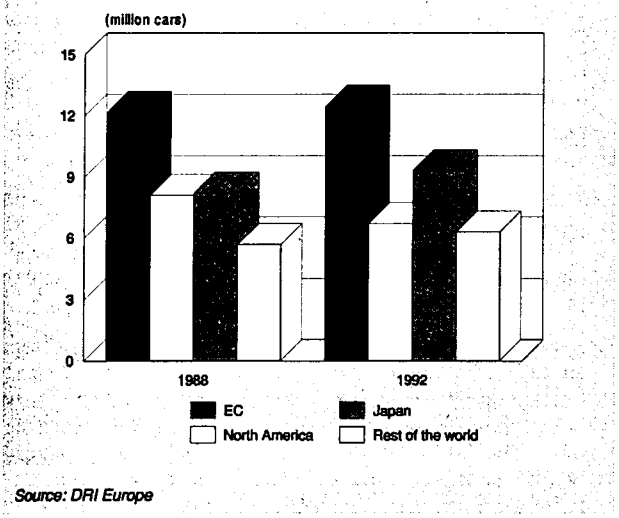
Source: Eurostat

Figure 4: Motor vehicles
International comparison of sales



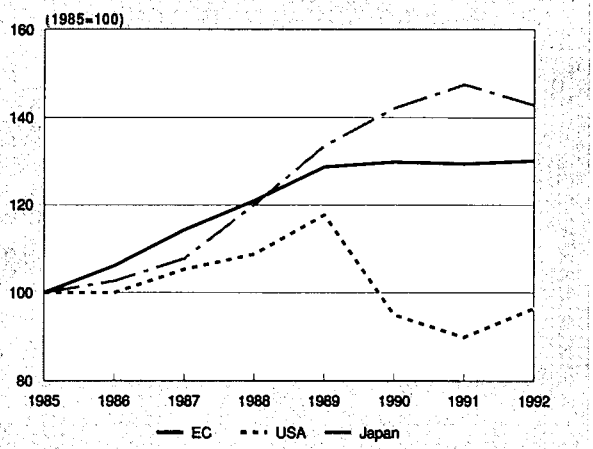
Source: DRI Europe

Figure 5: Motor vehicles
International comparison of production



Source: DRI Europe

Figure 6: Motor vehicles
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

for the whole industry including commercial vehicles. Japan continues to be the main source of imports, accounting for nearly 70% of all imported vehicles in unit terms and 54% in value terms. EFTA's share has declined in value terms, whilst imports from Korea increased sharply from 21 000 units in 1988 to 80 000 units in 1992. In 1992, Korea and USA accounted for 3% and 7% respectively of the total imports in value terms, compared to 1% and 2% respectively in 1987.

MARKET FORCES

Demand

Cars

Demand for cars is determined by a number of factors including trends in personal income and wealth and consumer confidence. These factors account for the cyclical nature of sales over the past two decades with economic downturns generally triggering slumps in new car registrations.

The Western European passenger car market has grown steadily over the last twenty years, punctuated by two periods of downturn. (see Figure 11) A further market weakness began to emerge in 1992 and 1993 has seen sharp downturns in most of the EC markets.

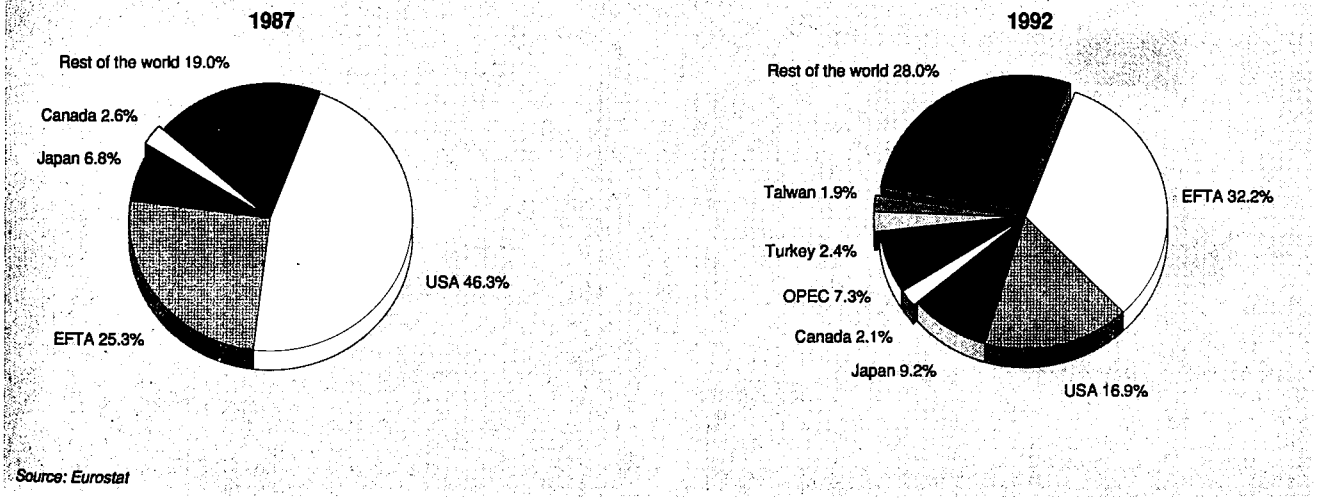
In the medium and long term, however, as motorisation rate continues to grow, demand for cars will continue to rise. Average car ownership figures vary widely across countries (as illustrated in Figure 12), it being nearly 600 units per 1 000 inhabitants in Western Germany, over 400 cars per 1 000 inhabitants in Italy, France and UK, but under 400 units per 1 000 inhabitants in Belgium, Netherlands and Spain. In countries such as Portugal, Greece and Ireland, penetration is considerably lower. There is further scope for increases in car ownership throughout the EC, especially in countries where car ownership per capita is currently low.

Trucks

Truck demand is highly correlated with trends in industrial output and in investment in plant and machinery.

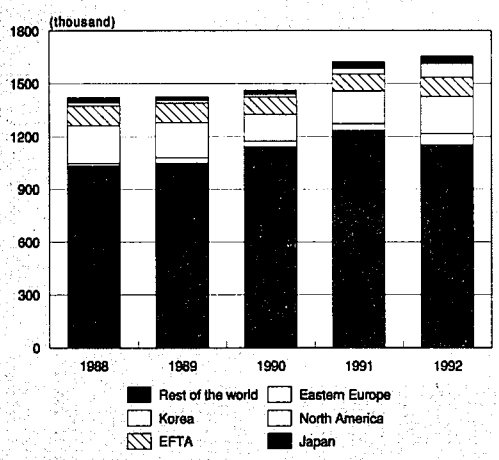
Long term truck demand is highly dependent on trends in the road haulage industry, which in turn is affected by the level of economic activity and by the competitiveness of road haulage with respect to other transport modes. Over the past two decades, the road haulage sector has consistently gained

Figure 7: Motor vehicles
Destination of EC exports



Source: Eurostat

Figure 8: Motor vehicles
Source of EC Imports (in unit terms)



Source: DRI Europe

market shares against rail and inland waterways; the trend is expected to continue.

Whilst demand for freight transport is expected to grow strongly in the future, harmonisation and deregulation of the road haulage industry is resulting in larger trucks being used much more efficiently. Whilst the EC truck fleet will continue to grow, it will be truck replacement patterns which will continue to be dominating factor in determining the overall levels of demand of new trucks.

The commercial vehicle market is highly cyclical. This market suffered dramatic downturns in the mid-1970s and the early 1980s but in the late 1980's, increased economic activity led to large growth in road freight transport demand, with a corresponding growth in the size of the EC fleet. This accompanied by high replacement demand (to replace the vehicles initially registered in the late 1970s) led to a boom in the truck market.

1990 saw the beginning of a cyclical downturn, and EC sales of trucks over 6 tonnes gvw declined by 6.7%. This trend continued in 1991 with EC sales declining by 2.3%. Post re-unification sales increase in Germany cushioned this decline but sales have dropped sharply in 1992 (down 11.3%) and in 1993 (down 25%), with only the UK showing signs of recovery.

Supply and competition

Cyclical under-utilisation of capacity is one of the key issues facing the European vehicle assembly industry at present. During the boom of the late 1980s, the industry was operating very close to full capacity. In this period the European assemblers enlarged total capacity, mostly through elimination of bottlenecks and new shift practices.

With the recent addition of new transplant capacity as well as capacity in Eastern Europe and a steep decline in sales, there are serious implications for vehicle manufacturers' profitability. Significant efforts are now being made to reduce break-even points with inevitable impact on employment.

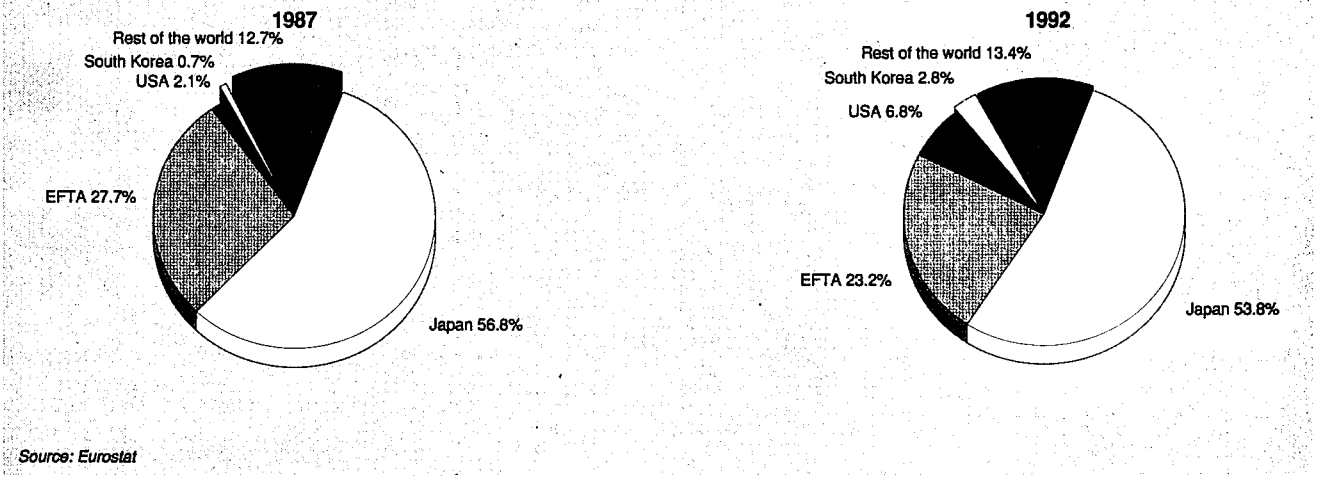
The new challenge for European manufacturers is also from Japanese production in Europe, where Nissan, Toyota and Honda are already claiming state-of-the-art levels of quality and efficiency. Whilst Japanese imports are liable to remain broadly stable in market share terms, due the framework agreed by EC and Japanese negotiators, significant growth in Japanese manufacturers' market share will come from the output from these transplants.

Newly industrialised countries, for example from East Asia, and the East European automotive industries, are adding to the competition in EC. Although the volume of imports into the EC from these countries is still at a relatively low level, the EC market continues to be attractive to importers. Imports from Korea represent one recent growth area. In 1990 16 000 cars were imported into Europe from Korea; in 1992 this had risen to 80 000 cars. Plans for new models and distribution capacity indicate an ambition from Korean companies to raise European sales substantially. This would have a direct impact on European produced passenger car sales. Japanese car manufacturers played a key role in the development of the Korean and Malaysian automotive industries with Mitsubishi having close ties with Hyundai of Korea and Proton of Malaysia and Mazda having ties with Kia of Korea.

Several studies have shown that Europeans have a relatively high cost to productivity ratio. Figure 13 shows an international comparison of wages and social costs for 1992. The data shown in Figure 13 should be interpreted with caution, the high labour costs of the German industry in particular.

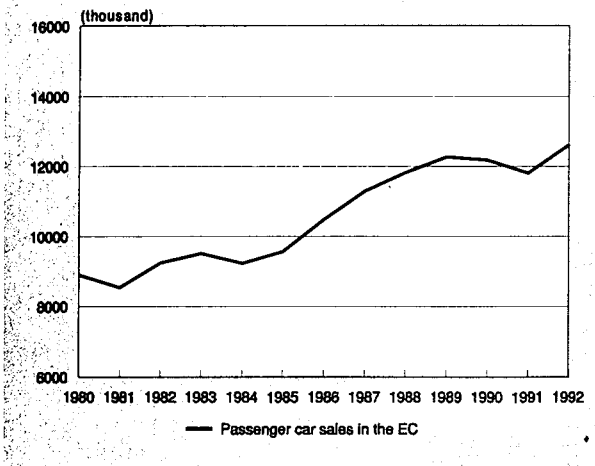
Employers in some countries of the EC have higher social costs and have less flexibility to make adjustments to the

Figure 9: Motor vehicles
Origin of EC Imports



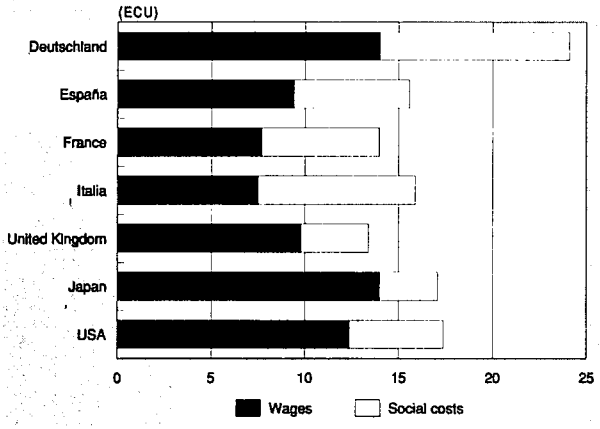
Source: Eurostat

Figure 10: Motor vehicles
Historic demand trends



Source: DRI Europe

Figure 12: Motor vehicles
International comparison of wages and social costs, 1992



Source: VDA 1992

labour force in response to changing commercial requirements than some of their global competitors.

Reduction in unit costs through productivity improvements in all parts of the supply chain, is the most important issue facing the industry.

1993 has seen vehicle manufacturers, workforce and unions in EC Member States responding to this challenge by taking steps to increase flexibility and improve competitiveness to internationally acceptable levels.

Production process

In recent years, changes in the production and operational philosophies in the motor vehicle industry have led to widespread adoption of the so called "lean production" techniques, resulting in lower levels of vertical integration and substantial changes in the nature of :

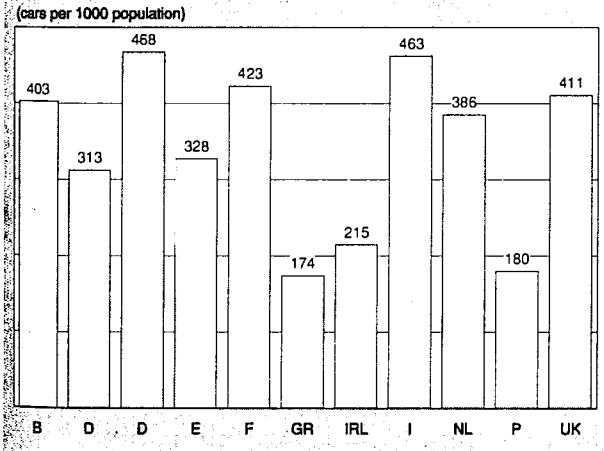
- relationship between vehicle manufacturers and its suppliers;
- co-ordination between product design and the production process;
- production and logistic operations;
- workforce responsibility, flexibility and skill levels.

Benefits have included reduction in the time from initial product concept to production, improvement in quality and productivity and increased flexibility and responsiveness.

Changes in the interaction between vehicle manufacturers and component suppliers are widely seen as instrumental to achieving global standards of competitiveness. These changes imply a restructuring of the automotive component supply chain with ramifications for the production and logistics processes (see section on Industry Structure). It is now common for the level of co-operation between vehicle manufacturers and suppliers to extend to joint development of complete subsystems and assemblies and their supply to the assembly plant on a Just-In-Time basis.

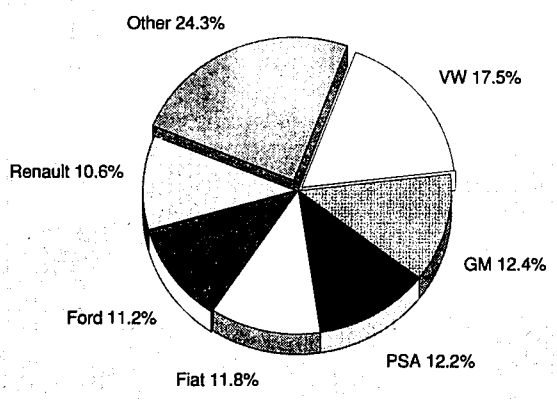
Shorter reporting lines, improved interfaces between management and workforce and better communication systems are all enabling concepts such as Total Quality Management, Quality Circles and Continuous Improvement programmes to be successfully implemented, with resulting improvements in productivity and quality. Flexible shift working is already leading to better utilisation of plant and equipment.

Figure 11: Motor vehicles
Comparison of car ownership levels in the EC, 1992



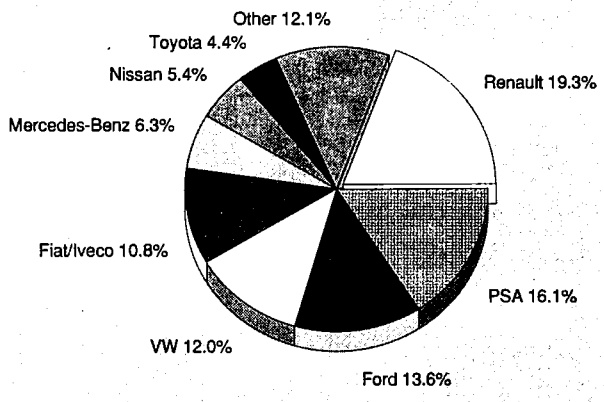
Source: DRI Europe

Figure 13: Motor vehicles
Major European vehicle manufacturers' EC market share, 1992



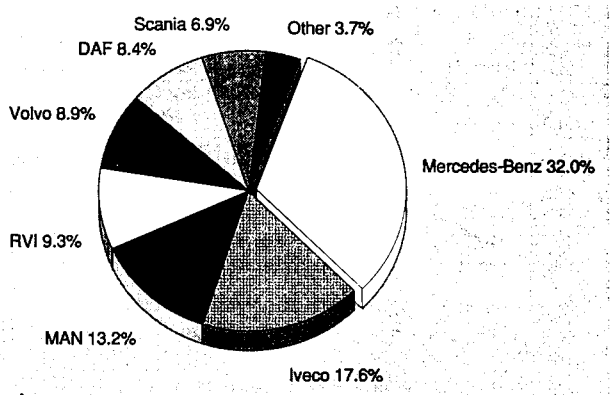
Source: DRI Europe

Figure 14: Motor vehicles
Major European vehicle manufacturers' EC market share for trucks 6 tonnes gvw, 1992



Source: DRI Europe

Figure 15: Motor vehicles
Major European vehicle manufacturers' EC market share for trucks > 6 tonnes gvw, 1992



Source: DRI Europe

Improvement in flexibility through reduction in machine set up time, optimisation of batch size and reduction in raw materials, work in progress and finished goods inventory are all part of common continuous improvement programmes; the current recession has placed additional emphasis on the need to reduce break-even volumes.

Simultaneous (or Concurrent) Engineering approach, involving the use of multi disciplinary teams to control a design project with the use of specific techniques such as QFD (Quality Function Deployment) and DFMA (Design for Manufacture and Assembly) and complemented by widespread use of tools such as Computer Aided Design (CAD) and Computer Aided Engineering (CAE) are widely implemented by car manufacturers.

New automated equipment has been introduced in those areas which represent the hardest and most repetitive working conditions. Widespread use of robotic painting and welding in the industry is improving quality, reducing labour costs as well as reducing the mundane and hazardous manual operations. Optimisation of capital to labour ratio is expected to continue to be a key instrument in improving competitiveness, and latest trends no longer feature ever-increasing robotisation of operations. Final assembly remains largely the domain of the manual employee, due to the variety and complexity of the operations. Whilst "state of art" work practices have been adopted in many of the newer vehicle assembly plants, EC manufacturers face the task of extending these practices to all their plants and all aspects of their activities.

Table 5: Motor vehicles
Summary of unit sales and production in 1992

(thousand units)	Sales	Production
Passenger cars	12 601	13 061
Light trucks 6 tonnes gvw	1 328	1 466
Trucks 6 tonnes gvw	233	229

Source: DRI Europe

INDUSTRY STRUCTURE

Companies

In the European passenger car market, five car manufacturers have market shares of between 10% and 12% and the top six manufacturers account for 75% of the market. The Volkswagen Group (including Audi and Seat) is the leader with market share of 17.5%. This is illustrated in Figure 14. The share of market accounted for by Japanese manufacturers has increased from 10.9% in 1989 to 12% in 1993.

Whilst several manufacturers have market shares of between 10% and 12% at European level, a different picture emerges at country level. The individual markets are still dominated by domestic manufacturers. Vehicle manufacturers tend to have larger distribution infrastructure in their respective domestic markets and nationalistic buying behaviour still plays a significant role in some markets.

In the market for trucks over 6 tonnes gvw, Mercedes-Benz is the clear leader; its market share rising from 23% in 1989 to 32% in 1992. Both Mercedes-Benz and MAN benefited from the reunification boom in Germany in 1992 and were

Table 6: Motor vehicles
Financial performance of the main EC manufacturers, 1991 and 1992

(million ECU)	Turnover 1991	1992
BMW	14 550	15 443
Fiat	25 510	23 571
Ford of Europe	19 433	17 546
GM Europe	20 498	22 186
PSA	22 969	22 693
Renault	23 801	26 199
Volkswagen	37 213	42 272
Volvo	10 325	11 019
Rover	5 341	4 989
Mercedes-Benz	31 850	32 099

Source: DRI Europe

Table 7: Motor vehicles
import quotas and Japanese market shares, 1992

Market	Status	Japanese share in 1992 (%)
Deutschland	No restriction	14.0
España	No imports allowed	3.7
France	Limited historically to 3%	4.1
Italia	3,000 cars as direct imports	2.7
Nederland	No restriction	27.0
United Kingdom	11% limit on imports	12.3
Sweden	No restriction	29.7
Switzerland	No restriction	30.0
USA	Imports limited to 1.7 million; no limit on transplants	31.4

Source: DRI Europe

the only manufacturer to record higher levels of sales in 1992 than in 1989.

Strategies

Vehicle manufacturers' strategies are driven by the need to respond to long term trends affecting the industry. The current slump in motor vehicles sales is accelerating the implementation of certain elements of long term strategy and resulting in a re-examination of the more ambitious expansion programmes. Key long term trends which will continue to shape vehicle manufacturers' strategies include:

- Globalisation: the need to reduce traditional dependencies on domestic market and improving ability to compete initially at European level and subsequently on a global level. Whilst non-EC manufacturers have been investing in transplant production facilities in EC, EC manufacturers have been active in investing outside their home country as well in non-EC countries, particularly in Eastern Europe and North America. Asian markets are enjoying high growth rates and this region has already attracted a lot of attention. EC manufacturers are expected to increase their presence in this region, especially through joint ventures.
- Product Development : the rate at which new vehicle models are introduced into the market place has become one of the key basis for competition in the automotive industry. Car manufacturers are speeding up their innovation processes, restructuring their product and process activities (Simultaneous Engineering) to reduce the time from initial concept to production. Continuous improvements in the flexibility of designs and processes are needed to ensure maximum degree of customisation to consumer requirements. Evolution in manufacturers' market shares reflect the competitiveness of the manufacturers' rates of new model introductions.
- Improved competitiveness through improvements in organisational processes: cost structure, productivity, quality and flexibility have all become crucial elements of competitiveness.

The current recession in the industry has highlighted the need for all vehicle manufacturers to accelerate the restructuring programmes needed to achieve global levels of competitiveness. Manufacturers are

- restructuring their design and production processes (see section Production Process);
- re-evaluating the degree of vertical integration, outsourcing policies and supplier relationships;
- improving workforce skill levels.

In the short term, each EC manufacturer is faced with different priorities and this is reflected in their strategies.

The late 1980s and the early 1990s saw reduction in the number of independent motor vehicles manufacturers, as niche producers were acquired by volume manufacturers. As product and business development costs escalate, partnerships and alliances are increasingly be regarded as providing the most cost effective method of developing a competitive product portfolio and reducing dependence on domestic markets.

Alliances between Ford and Iveco in the light commercial vehicle market, between PSA and Fiat and Ford and VW for development and production of a multi-purpose vehicle and between Ford and Nissan for development of a four wheel drive vehicle are examples of product development and joint production alliances.

Rover and Honda worked together on a number of collaborative projects before taking a cross share holding of 20% in each others UK businesses in 1990. Both companies now produce versions of a jointly developed car and further collaborative projects are anticipated.

ENVIRONMENT

The reduction of emissions achieved by the EC motor vehicles in the past few years industry has been impressive. However, further technical improvements are already becoming harder to achieve and progress in the areas of driver education, more frequent and stringent vehicle inspection and the use of road telematics to reduce traffic congestion are more likely to prove to be more effective strategies for reducing emissions.

Since the early 1970s, EC legislation has controlled the emission of both unburned hydrocarbons and carbon monoxide. In 1978, oxides of nitrogen also became subject to control. The "Luxembourg Agreement" of 1985 marked a significant step for future emissions standards and effectively initiated developments which were to lead to directive 88/76/EEC and the requirement for 3 way catalyst system.

The EC has moved rapidly in introducing a series of further light duty vehicle directives, 89/458/EEC and the present newly consolidated Directive, 91/441/EEC. This directive added a high speed element to the standard test cycle to provide better reflection of emissions in suburban driving situations. In December 1992, the Commission issued a new draft directive aimed at tightening the car limits still further. This directive incorporates a totally new annex for conformity of production (COP) testing. These limits are expected to come into force in 1995/1997.

Emissions of light commercial vehicles have been reduced to the level of passenger cars emissions with Directive 93/59/EEC of June 1992. Following the introduction of the most recent emissions standards at the end of 1992, passenger car CO emissions will have been reduced by over 90% com-

pared to 1970 levels and HC plus NO_x emissions by 80% from 1970 levels.

During the last decade, the European automotive industry has invested heavily in improving the environmental performance of vehicles. For the manufacturers, the technical changes required to meet these regulations were substantial, with the consequence of higher costs which couldn't always be passed on to consumers. For gasoline engine passenger cars, the need to have closed loop catalytic converter systems also meant that fuel injection and management systems were required.

During the next decade, whilst vehicle ownership levels and traffic levels will continue to increase, older models will be replaced by models equipped with 3 way catalyst systems and the European car parc is expected to produce substantially less emissions of CO, HC and NO_x than today.

Legislation for heavy duty diesel vehicles followed along a similar path. Regulation No. 49 was introduced in 1982 and established limits for CO, HC and NO_x. Directive 88/77/EEC lowered the emissions limits but it was not until the introduction of 91/542/EEC that fundamental changes to technology were signalled.

Euro 1 regulations came into force in 1992-93 and Euro 2 limits will come into force in 1995-96. Complying with Euro 2 limits without increasing fuel consumption and without using expensive after-treatment equipment presents a major technical challenge for the European industry. A further tightening of emissions limits (Euro 3) can be expected before the end of the decade but this is still under discussion.

With the introduction of new limits for cars and trucks, a complete set of stringent standards, acknowledged to be as severe as the US 1994 requirements will be in force by 1996. These will set the EC on course for substantial improvements by the end of the century

Road transport is estimated to account for around 20% of total European carbon dioxide emissions and reducing fuel consumption is the only method of reducing these emissions. Vehicle manufacturers have made substantial progress improving fuel efficiency, (for example through reducing drag factors and improving the combustion process and weight reduction) but in order to contribute to the goal of stabilising carbon dioxide emissions at 1990 levels by the year 2000, improvement in both traffic efficiency and fuel consumption will be needed.

Disposal/scrappage of vehicles at the end of their lives, is another issue receiving attention, by the vehicle industry, regulators and environmental groups. Some of the manufacturers have already set up recycling plants and EC manufacturers appear to be leaders in this field.

MONITORING

Until the end of 1992, various EC countries imposed quotas on vehicle imports. Table 7 summarises the restrictions in force in 1992 and the market share of Japanese manufacturers (transplants and imports).

One consequence of the further opening of the borders to trade is that national restrictions on Japanese motor vehicles imports have to disappear. A transitional period for this process has been agreed.

The EC and Japan signed an "Understanding" in July 1991, aimed at establishing the ground-rules for Japanese access to the European Community markets. 1993 represents the first year of the new transitional arrangement for Japanese manufacturers to reach a fully open EC markets and under the agreement Japanese manufacturers will link their exports volumes to developments in the European market during the seven year transition period.

The agreement assumes an EC market for cars and light commercial vehicles up to 5 tonnes to be 15.1 million in 1999. Total sales in EC by Japanese manufacturers are projected to be 2.43 million units of which imports into the EC will be 1.23 million units. This implies Japanese market share of 16.1% in 1999.

The 1991 EC-Japan understanding is based on the principle of fair sharing of market increases as well as downturns and an understanding that the EC market will be fully open at the end of 1999.

OUTLOOK

The EC car market remains in deep recession and is expected to show a decline of 15% in 1993 compared to 1992. Of the major EC markets, Germany, Italy and Spain are all expected to show reductions in sales of over 20% and while the declines in France are only marginally lower, the UK market is recovering and expected to show increases of over 10% over 1992.

The recession in the EC shows signs of having reached a bottom and attention is turning to the timing and strength of recovery in 1994 and 1995. According to DRI, total EC sales are expected to increase in 1994 by around 3.4% but sales in Germany and Italy are expected to be flat with the French, UK and the Spanish markets showing small rates of growth.

Table 8: Motor vehicles
Annual growth rates in number of vehicles 1993-1998 (1)

(%)	1993	1994	1993-98
Cars			
New registrations (2)	-15.1	3.4	5.1
Production	-15.8	1.9	4.7
Commercial vehicles (6 tonnes gvw)			
New registrations (2)	-20.1	8.0	6.6
Production	-23.0	10.3	7.0
Commercial vehicles (6 tonnes gvw)			
New registrations (2)	23.3	1.2	6.5
Production (2)	-32.0	7.7	8.2

(1) Not including Japanese manufacturers.
(2) EC countries only.
Source: DRI Europe

1995 should see higher rates of growth in all the major EC markets; total EC sales are expected to increase by 7.5% between 1994 and 1995. Sales are not expected to reach 1992 level of 12.6 million units until 1996.

1993 will be remembered for the sharpest downturn in European production since the 1974 oil price induced recession. Output is expected to fall by 15.8% or nearly 1.9 million units to 10.9 million units. Car production is expected to recover to 11.2 million units in 1994, with Japanese transplant production growth accounting for a significant part of this growth, increasing from 307 000 units in 1993 to 411 000 units in 1994.

After achieving a 5.1% growth in 1992 (re-unification boom), the light truck market is 20% decline in sales in 1993. An 8% recovery is expected in 1994 and sales will not reach 1992 levels until 1996.

EC's 4-year truck sales slowdown has taken a severe turn for the worse in 1993 and the market is set to decline by around 23%. Sales are down in markets with the exception of the UK. Germany, Spain and the Benelux countries, in particular, are now suffering major falls in demand. demand prospects for 1994 remain weak and the market is expected to remain flat. A slow revival of demand is not expected until 1995.

All EC vehicle manufacturers are expected to continue to streamline their operation to reduce costs and improve competitiveness. Introduction of Four wheel drive and Multi-purpose Vehicles dominate short term car product development programmes. Joint development and production, already used with success in such programmes is expected to continue as complexity increases, development costs escalate and manufacturers look for cost effective alternatives

Apart remaining financially viable in a difficult market, truck manufacturers resources will be focused on meeting 1995-96 emissions legislation (Euro 2).

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Motor vehicle parts and accessories
NACE 353

The motor vehicle parts and accessories industry employs nearly the same number of people (approximately 1 million) as in the motor vehicle industry it supplies. Unlike the motor vehicle industry, the parts and accessories sector presently includes a sizeable number of small firms; however, greater industry concentration is expected as trends in vehicle production techniques increasingly demand a tighter integration with the parts and accessories industry.
The business climate for parts and accessories is strongly tied to the cyclical performance of the motor vehicle sector. While the supply of parts for new cars closely reflects the fluctuations in new car demand, there are superimposed on this several trends with longer term influence. On the positive side, there has been a steady upgrade in car model mix to larger and better equipped models. At the same time the equipment levels on all vehicles is continuously improving, thereby increasing the value to the components suppliers. Acting contrary to this however is the demand for improved durability and life expectancy of all vehicle components which has a significant effect on replacement demand.
While the European car parc will continue to grow through the 1990's, much of the new car sales growth will be taken by the Japanese transplants, and the opportunity and challenge for the European parts industry is to supply this demand and in doing so, raise its performance to best world standards.

INDUSTRY PROFILE

Description of the sector

The parts and accessories market is traditionally broken down into two main segments. The first is the market for original equipment manufacturers (OEM), that is the parts that car manufacturers buy from specialised producers for assembly into new vehicles. The second is the replacement market which comprises parts destined for repairs and automotive accessories.

The precise coverage of the component industry in terms of products is difficult to assess. Data which corresponds to NACE 353 (parts and accessories for motor vehicles) is too narrow in its coverage as its excludes for instance heavy construction vehicles, tire manufacturers who supply vehicle manufacturers and most of the electrical and electronic components that are so important in vehicle manufacturing today. Furthermore, existing statistics which are based on the production of companies of more than 20 employees slightly understate the value of production of the fragmented parts and accessories industry.

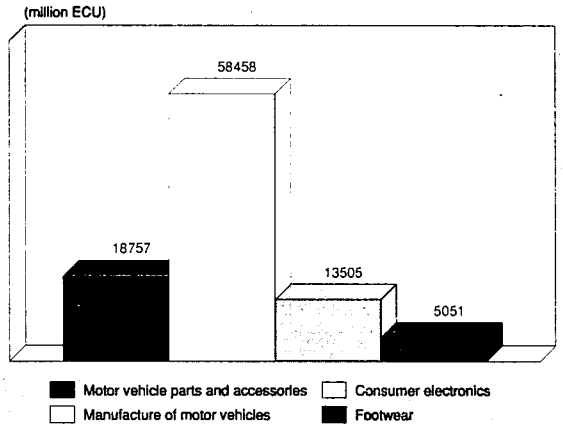
A study carried out for DGIII, also sourced in this monograph, covers a wider range of products than the strict NACE definition.

Recent trends

With a turnover estimated at almost 100 billion ECU, the EC parts industry represents about half of the size of the auto industry. In terms of employment, however, the parts and auto industries are much closer in size with each exceeding 1 million workers.

Within the parts and accessories sector, independent manufacturers account for nearly 90% of both production and employment, the remaining 10% stemming from subsidiaries of vehicle manufacturers.

Figure 1: Motor vehicle parts and accessories Value added in comparison with other industries, 1992



Source: DEBA

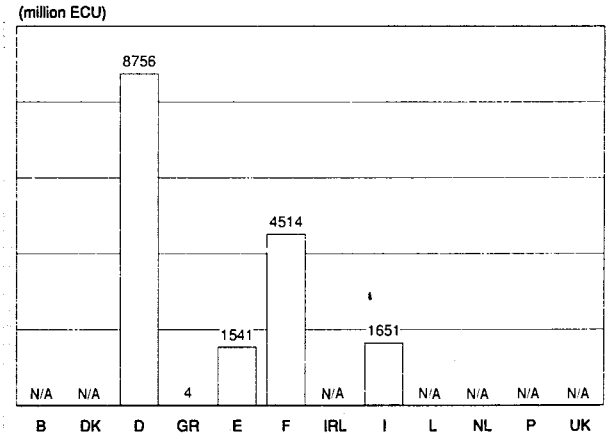
Turning to the breakdown of production by Member States, leading vehicle producing countries are also leading parts producers. Germany accounts for more than 45% of EC turnover. It is followed by France, Italy, the United Kingdom and Spain. Similar rankings can be observed in the auto and parts industries. This is explained by a frequent geographical clustering of parts manufacturers in proximity to vehicle production sites.

Over the 1980s, the industry has been expanding somewhat faster than its main industrial end-market, the auto industry. It has grown consistently between 1982 and 1990 but remained flat in 1991 and dipped during the second half of 1992, following the downturn in the car market.

Car makers are expecting new car demand to drop approximately 15% in 1993 from the previous year's 13.5 million vehicles sold. During the first five months of 1993, new car sales dropped by 20% in Germany alone and fell in 15 out of 17 car markets across Europe during the same period. This will directly affect demand of parts suppliers, although they have the replacement parts market to marginally help buffer the fall in original equipment demand.

Productivity improvements in the parts industry have been marginally faster than improvements for the vehicle manu-

Figure 2: Motor vehicle parts and accessories Value added by Member State, 1992



Source: DEBA

Table 1: Motor vehicle parts and accessories
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	19 992	20 880	23 778	26 958	29 978	36 864	41 790	44 293	45 343	47 340	44 200
Production	25 088	26 862	30 279	32 864	35 822	39 943	44 740	46 948	47 815	49 521	46 000
Extra-EC exports	6 383	7 547	8 186	7 770	7 923	5 487	5 686	5 441	5 684	5 587	4 940
Trade balance	5 096	5 982	6 501	5 907	5 844	3 080	2 950	2 655	2 473	2 181	1 800
Employment (thousands)	501.4	496.3	498.4	497.8	506.0	515.8	530.2	542.5	527.4	516.5	472.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

facturing industry, on average. They have been achieved thanks to rapidly expanding production rather than lay-offs, and as a result, employment was still higher in 1991 than in 1982. A substantial proportion of productivity gains have been transferred, by negotiation and sometimes by imposition, to the OEMs so that inflationary price adjustments of parts and accessories have lagged far behind vehicle price increases. OEMs have not realised all their differential pricing gains as net cost savings in cash, but have partially reinvested them in enriched vehicle equipment, thus keeping their suppliers' level of activity buoyant well into 1992.

The sharp downturn in vehicle demand and production did not become visible until 1993 on a year-on-year basis and has clearly affected suppliers directly. The industry is now only beginning to suffer from the type of painful restructuring endured by car manufacturers during the first half of the 1980s.

International comparison

Once relatively sheltered from foreign competitors, EC component suppliers are now facing increased domestic, European and worldwide competition. This trend, which is tracing a new international division of component production, is fostered by several factors:

- The creation of the single market is forcing European suppliers to intensify cross-penetration of each others' markets.
- The increased internationalisation of EC car producers implies geographically enlarged supply bases, with a tougher competition prompting a constant search for lower cost purchasing alternatives.
- Japanese investments for car assembly plants within the EC are also drawing the attention of Japanese component makers on the European market.

The Japanese component industry has several serious competitive advantages over its European counterpart. Although smaller than the EC industry (280 000 people in the first tier suppliers compared with 1 million people), the Japanese component industry is much less fragmented and already benefits from the tiered structural shape which the EC industry is presently constructing. Aside from the 40 000 sub-contractors who form the second and third tiers of the pyramidal structure of the Japanese industry, there are 310 first tier component suppliers, compared to 3 200 companies in Europe. The average size of the first tier enterprises is 900 people each compared with the European average of 270. Including the sub-contractors, the per company average of employees would be just 5.5. Of the Japanese firms, 45% employ more than 500 people, compared with only 10% in Europe.

Japanese companies have close organisational and financial links with vehicle manufacturers, and most of them are attached to groups around a major manufacturer. For instance, Nippondenso (the largest Japanese component producer) is partly owned by Toyota. Many component producers are owned by more than one vehicle producer. This system has resulted in an industry which is more specialised and concentrated than the European industry.

According to a study undertaken for the EC Commission, the EC industry remains competitive with Japan in terms of technology, but suffers (in its first-tier segment) from several disadvantages such as lower labour productivity, lower product quality, lower stock turns, slower design and development cycles.

When the Japanese car manufacturers started building cars in North America, their inclination was to put pressure on their traditional suppliers to come with them and set up new plants. While they needed high local content, they did not think that existing US component companies would be willing or able to provide them with components and systems of the quality and price they were used to from their close knit keiretsu family suppliers. As a result, Japanese component companies set up over 300 plants in the USA during the 1980's to support the growing transplant production.

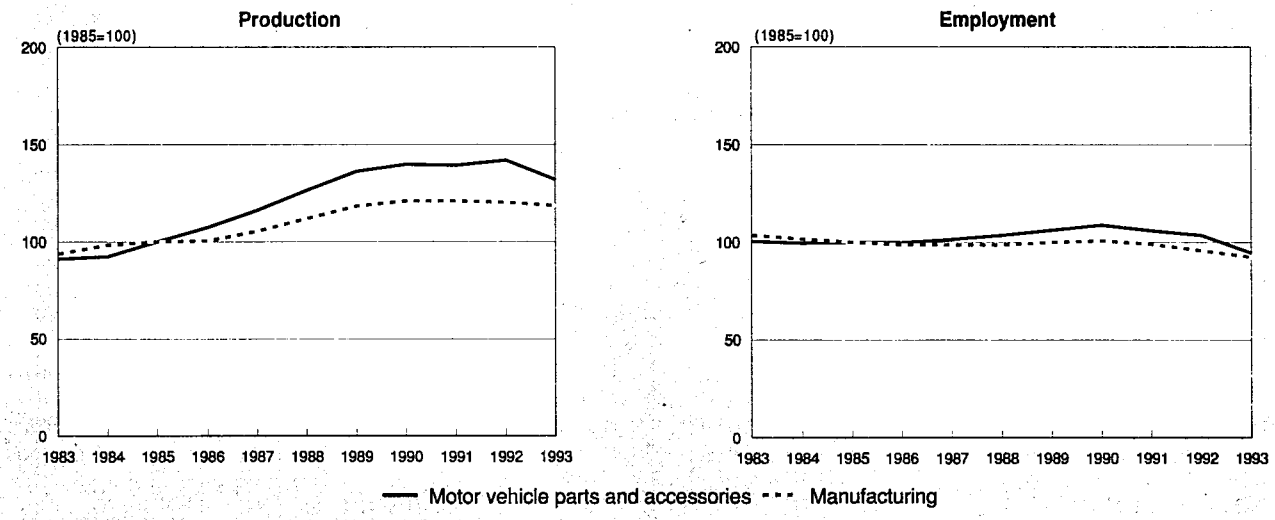
For several reasons this has not been repeated in Europe. One reason is that the projected volumes of car build in Europe are too small to justify setting up new plants solely for the transplants. The financial performance of the Japanese com-

Table 2: Motor vehicle parts and accessories
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	10.4	3.8	7.4
Production	6.8	2.9	5.1
Extra-EC exports	-8.0	-4.0	-6.2
Extra-EC imports	7.4	4.0	5.9

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Figure 3: Motor vehicle parts and accessories
Production in constant prices and employment compared to EC manufacturing



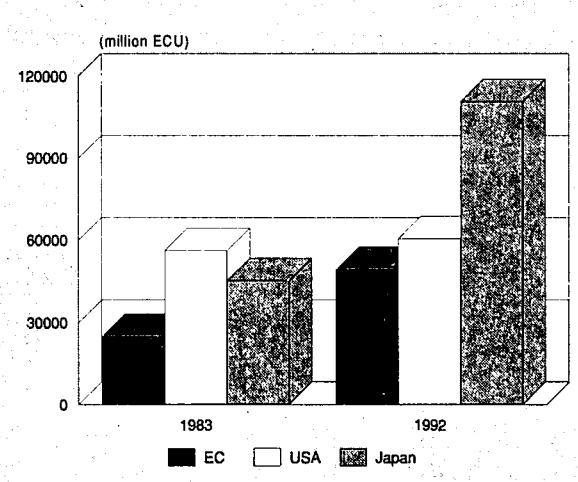
1993 are Eurostat estimates.
Source: DEBA

ponent companies in the US to date has been a growing cause for concern, and with falling margins throughout the Japanese car industry, they are not looking to repeat this mistake. Another reason was the intense political concern in Europe over the arrival of the Japanese transplants. The Japanese car companies have taken pains to reassure Governments that they will be good Europeans and one way of doing this has been to choose European component suppliers. While there have been some 50 new components plants set up by Japanese companies to date, and a few notable acquisitions or joint ventures (such as Calsonic and Nippondenso), for the most part the Japanese car producers have selected existing European companies to supply their components. What is more, the Japanese car companies, particularly Nissan and Toyota, have set out to where necessary, to bring these companies up to Japanese standards, and in so doing they are making a real contribution to the European component industry. In Europe there has traditionally been an adversarial relationship between the OEMs and their suppliers with the OEMs continuously demanding lower prices and threatening to use alternative suppliers. While this is now beginning to change, the Japanese, while equally tough, have been much more concerned about their suppliers' costs, and helping them to improve their quality and efficiency, and in doing so have developed more constructive and certainly more long-term partnerships. The long-term result of the arrival of the Japanese transplants in Europe will be to accelerate the restructuring of the components industry and to help raise its standards to world class. The benefits of this will be available, not only to the transplants but to all European OEMs.

Foreign trade

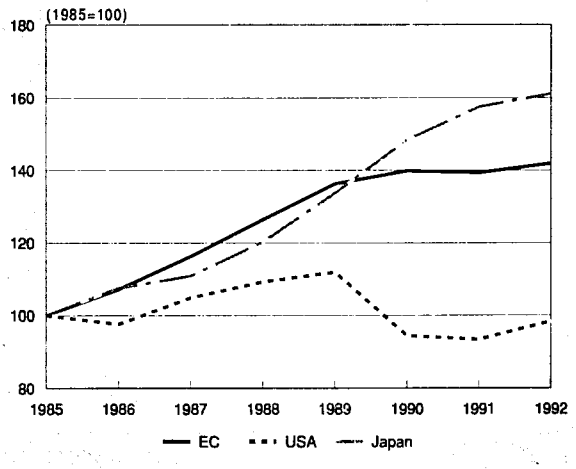
The internationalisation of the industry has been a determining factor in the substantial increase in foreign trade experienced since 1980. The expansion of intra-EC trade has been particularly rapid in recent years as intra-EC trade reached the 14 billion ECU level in 1991, a threefold increase compared to 1980. The industry remains essentially intra-EC oriented

Figure 4: Motor vehicle parts and accessories
International comparison of production in current prices



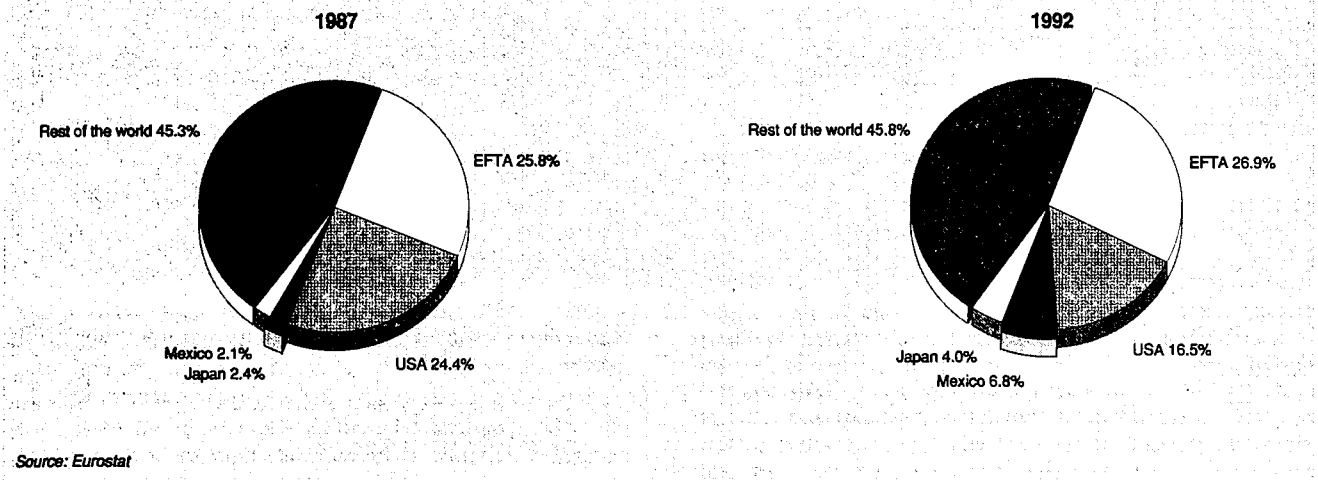
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Motor vehicle parts and accessories
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Motor vehicle parts and accessories
Destination of EC exports



Source: Eurostat

and intra-EC imports are more than 4.4 times higher than extra-EC imports, a ratio which is usually in the 2 to 2.5 region for most of the engineering and transport industries. Given the difficult nature of defining the industry, a word of caution regarding trade figures is in order. Statistics on trade are not necessarily related to the independent component industry's products but frequently include the movements of the OEM's own in-house products to and from assembly plants across national borders, thus causing significant distortions in the data.

The industry is a traditional balance of payment earner. After a peak in 1985 when it reached 6.5 billion ECU, the EC trade surplus decreased to almost 2.5 billion ECU in 1991. The second half of the 1980s were marked by a rapid increase in extra-EC imports and a relative stagnation in extra-EC exports. This situation is partly attributable to a change in the classification of trade statistics and, more importantly, to the rapid growth of car demand experienced in Europe between 1986 and 1990. During that period, European parts producers were predominantly busy trying to meet increased demand from the EC car manufacturers. As a result, their export effort remained limited, while imports were boosted by the buoyancy of the EC car market. Nevertheless, the trend was not really reversed in 1990 and 1991 when the European vehicle demand was somewhat weaker. The dwindling European trade surplus certainly signals some of the structural problems presently encountered by the European industry.

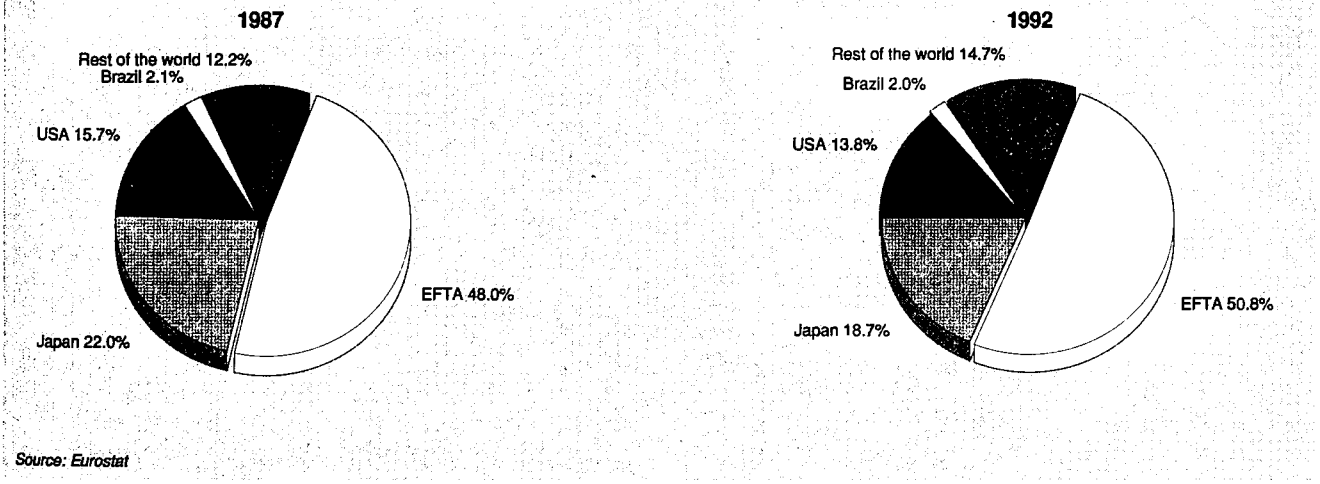
Extra-EC exports are relatively diversified in terms of destinations with the EFTA countries and North America respectively accounting for about 27% and 15% of total shipments as developing countries also remain an important end market with a share of more than 35%. In terms of extra-EC imports, flows are more concentrated with 50% of total non-EC supply originating from the EFTA countries, Sweden in particular. With a share of 20%, Japan is the second largest supplier to the EC. The share of trade with North America has dwindled considerably in recent years both in terms of imports and exports. With regard to the EC trade surplus, Germany continues to be the major contributor.

MARKET FORCES

Demand

Demand for OEM is, by definition, linked to the level of activity in the automotive production. Some segments of OEM, however, benefit from a faster growth than the auto market

Figure 7: Motor vehicle parts and accessories
Origin of EC imports



Source: Eurostat

Table 3: Motor vehicle parts and accessories
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	6 383	7 547	8 186	7 770	7 923	5 487	5 686	5 441	5 684	5 587
Extra-EC imports	1 286	1 565	1 685	1 863	2 079	2 408	2 736	2 785	3 211	3 406
Trade balance	5 096	5 982	6 501	5 907	5 844	3 080	2 950	2 655	2 473	2 181
Ratio exports/imports	4.96	4.82	4.86	4.17	3.81	2.28	2.08	1.95	1.77	1.64
Terms of trade index	98.4	95.7	100.0	102.3	102.2	97.9	100.0	91.9	88.6	97.3
Intra-EC trade	6 463	7 492	8 488	9 803	11 545	11 393	12 905	13 708	14 007	15 614
Share of total imports (%)	83.4	82.7	83.4	84.0	84.7	82.6	82.5	83.1	81.3	82.1

Source: DEBA

in general. This situation corresponds to components whose rate of penetration in vehicles is still on the rise. Such is the case, for instance, of equipment which a few years ago was optional (primarily in the upper car segment) and are now increasingly fitted as standard equipment on most models. Some examples include: electronic fuel injection, anti-lock brakes and air conditioning systems. In addition, original equipment manufacturers have largely benefited from a trend towards increasing outsourcing by vehicle makers.

On the other hand, demand for replacement parts depends on the usage of automobiles and other motor vehicles, as opposed to new sales. Demand is likely to be more stable in this market than in the original equipment market. The replacement parts market differs greatly from country to country. Market features in the various EC countries depend largely on the annual mileage per vehicle, the age of the car parc and the existence of specific legislation with regard to obligatory inspection of vehicles when they reach a certain age.

Supply and competition

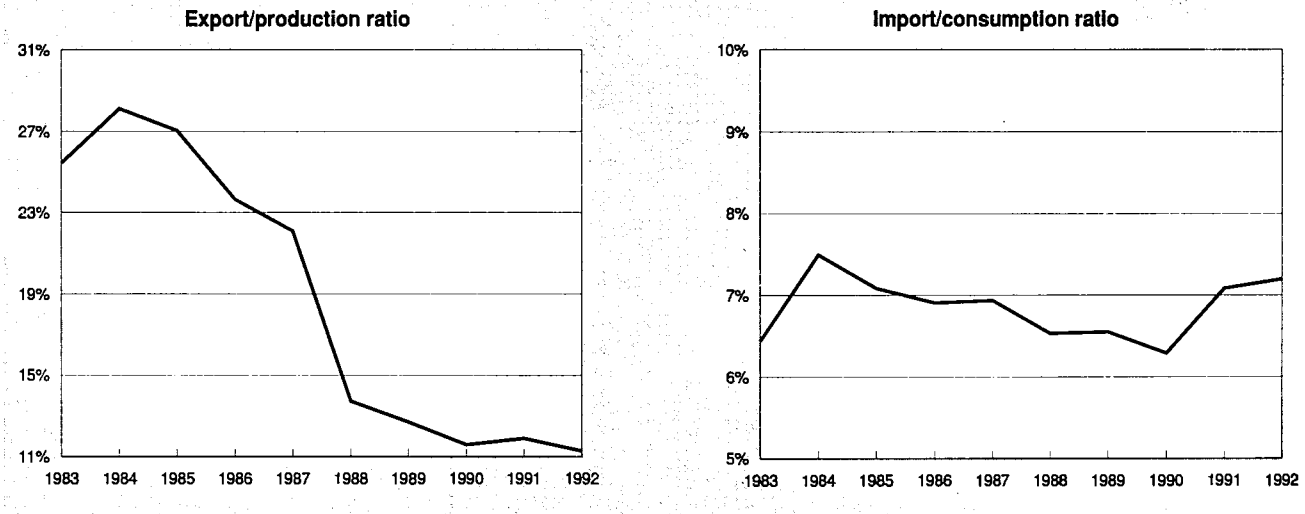
The supply of original equipment is undergoing fundamental structural change. Increasing internationalisation of vehicle manufacturers calls for the emergence of large international (sometimes worldwide) component manufacturers. In addition, the pattern of relationships between manufacturers and suppliers is being substantially modified and a rising share of the value added generated in the auto industry is transferred from vehicle to component manufacturers. To some extent, the balance of power is now shifting from the former to the latter.

A major reason behind such a change arises from the necessity for car manufacturers to limit investment and resources to essential activities which represent the core of their industry. One method is to increase outsourcing and to pass on the responsibility for product development, manufacturing and quality assurance functions to their suppliers (systems suppliers and/or specialised affiliated companies). Component producers contribute to the competitiveness of the industry, and the two sectors become increasingly interdependent.

Although conceiving, designing and producing in accordance with manufacturers' specifications, the component producer is increasingly technically autonomous. This is typically the case of systems suppliers who possess proprietary technology and product know-how. As a result of these transfers of value added, car manufacturers reduce the number of their suppliers to a smaller number of large producers which will in turn outsource part of their output to smaller companies, the whole supply chain thus posting a tiered structure.

The current pattern with regard to outsourcing practices within the EC automotive industry differs greatly from manufacturer to manufacturer. It is generally accepted, however, that the overall level of outside purchasing carried out by the European car manufacturers (60% to 70% of total component requirements) is more important than in the US industry (40% to 50%) but less than in Japan (around 80%).

Figure 8: Motor vehicle parts and accessories
Trade intensities



Source: DEBA

Table 4: Motor vehicle parts and accessories
Total component demand

	(billion ECU)	(%)
BR Deutschland	39.3	44
España	8.2	9
France	15.9	18
Italia	9.4	11
United Kingdom	11.2	13
Rest of EC	4.8	5

Source: Boston Consulting Group

Turning to the replacement equipment, it is generally estimated that about 70% of the market supplied by independent parts manufacturers, with the remaining 30% is controlled by the car manufacturers via their distribution and service networks. With regard to the industrial origin of such parts, however, car manufacturers comprise only a 10% share of the market.

Production process

The nature of the automotive products, together with shorter product life cycles, puts increased emphasis on the technological content of automotive parts. Increased use of electronics and new materials leads to increased collaboration with other leading high-tech industries and a sizeable investment in R&D organisations and equipment at all levels of the pyramidal structure of the sector. Once almost exclusively oriented towards applied engineering, the existing R&D resources of the sector are now taking greater initiative in terms of new technologies offering improved performance, fuel economy, emission control, safety and comfort. Black-box engineering is becoming an increasingly standard practice within the industry requiring enlarged R&D functions utilising up-to-date CAD (Computer-aided design) equipment and involvement at an early stage of the development process of new vehicles.

The competitive pressure on costs, prices, quality and delivery standards has led the industry to restructure in a parallel manner to the car manufacturers. Automotive parts suppliers compete on the basis of price as well as delivery and quality. Just-in-time, zero-defect, CAM (Computer-aided manufacturing), automation, and faster communication systems, are some of the features which have allowed substantial productivity gains while improving flexibility and allowing self quality assurance schemes to be put in place. This process (requiring sizeable investment and a recourse to skilled manpower) is far from being complete, especially among small to medium-sized producers.

INDUSTRY STRUCTURE

Companies

The industry is basically composed of three types of producers: the large diversified producer, whose output consists of many products in addition to auto parts (Bosch and Siemens in Germany); the larger producers specialising in auto parts (Valeo in France, Magneti-Marelli in Italy); and hundreds of SMEs producing auto parts on a smaller scale.

The trend towards more component outsourcing by car manufacturers combined with fundamental changes in the nature of the industry are having a dramatic result on the overall numbers of independent operators present in the industry. Vehicle manufacturers are cutting back on the number of suppliers and committing larger shares of their purchasing requirements to preferred systems suppliers. These systems suppliers outsource part of their work to second or third tier suppliers. Overall, during the past five years, it is estimated that the number of independent first tier companies supplying a single vehicle manufacturer has been reduced by less than 25%. A large part of this reduction has been achieved via mergers, takeovers and consolidations among previous competitors or companies having industrial synergies, such as Valeo/Neiman and Magneti-Marelli/Solex/Jaeger/Weber. However, the actual number of suppliers directly servicing the OEMs has decreased by approximately 50%. Supply relationships are, however, very difficult to estimate given the various numbers of models produced by the manufacturers and the underlying groups of parts suppliers supporting each model line. Various combinations of suppliers are possible leaving these figures on decreasing numbers of suppliers a rough estimate.

In spite of the increased presence of large international companies, the original equipment sector continues to be very fragmented. The average size for firms is about 270 people, but 64% of these enterprises employ less than 100 persons. Only 4% of the companies account for 50% of total employment (firms with more than 1 000 employees). This is essentially due to the nationally based nature of parts procurement. Although intra-EC trade has grown to extremely high levels during the past decade, most vehicle manufacturers continue to source largely from their domestic suppliers. For instance, Daimler-Benz procures approximately 90% of its needs from Germany, Renault, about 70% from France, and Fiat, about 85% from Italy.

The independent German industry dominates the European market with over 45% of the total European production (estimated at 79 billion ECU in 1988). This strength comes from the sheer size of the German motor vehicle industry, the importance of the upper market segment, and from strict legislation on car maintenance. The large German firms have played a major role in developing new products as illustrated by Bosch (the world's largest unaffiliated auto parts producer) which is a pioneer in the fields of fuel injection and anti-locking brake systems. Bosch alone is estimated to account for nearly

Table 5: Motor vehicle parts and accessories
EC automotive components industry consumption, 1992

(billion ECU)	OE market	Replacement market	Total
BR Deutschland	34.3	5.1	39.4
España	6.5	1.7	8.2
France	12.2	3.7	15.9
Italia	6.3	3.1	9.4
United Kingdom	6.9	4.3	11.2
Rest of EC	1.9	2.8	4.7

Source: Boston Consulting Group

a quarter of German production. The leader's vitality aided many smaller firms and contributed (together with other large firms such as ZF, Fichtel and Sachs, Teves, and VDO) to the unchallenged leadership of Germany within the European ASI.

The French industry is the second largest in Europe, with about 23% of the European total. Its structure is still characterised by a large number of nationally oriented small to medium-sized producers. Major restructuring has taken place in recent years, led by the three international scale emerging groups: Valeo, Bertrand-Faure and ECIA (PAS group).

The Italian industry (which accounts for about 14% of the European production) is dominated by the Fiat group. The leading producer is Magneti-Marelli (a subsidiary of Fiat) which now has an increased presence in all major European markets. Widely dispersed in the early 1970s, the sector is being tightly restructured under the influence of Fiat.

The United Kingdom components industry (10% of the total sector) has been badly hit by the decline of British vehicle production and its excessive dependence on domestic manufacturers. The major British component producers (such as Lucas, T&N and GKN) have taken advantage of the existence of an important replacement market, together with the increased rate of (Japanese) investment in automotive production in the United Kingdom, to expand overseas through investment and acquisition and have strengthened their position in a home market with considerable potential.

The Spanish industry has emerged since the late 1970s as another important producer of automotive components, having now reached a size comparable with the United Kingdom. Originally developed to comply with local content requirements, the industry has grown considerably since the early 1980s, thanks to the increased importance of Spain as a car manufacturing country. However, most of the components producers present in Spain are subsidiaries of foreign companies.

Strategies

As the Japanese car industry has shown, the necessity for the car manufacturer to rely increasingly on a smaller supply base implies fundamental changes in the structure of the sector. This means an increase in the sharing of high-value added products, faster growth in R&D expenditure and a need for organisations to adapt to new constraints (excellence in quality, delivery and price, not to mention production flexibility). Finally, there is a need to share productivity gains on a continuous basis with car manufacturers and to finance a growing share of productive investments (tooling and specific equipment) necessary for tailor-made products.

In return, car manufacturers are offering longer term purchasing commitments and closer cooperation, both of which contribute to improved stability in mutual relationships.

As a result of this process, the component industry will increasingly be reshaped into a pyramidal structure. First tier suppliers with a worldwide presence, proprietary technology and scale economies will design and supply full systems rather than single components. They will outsource part of their work from smaller second or third tier suppliers. The observed past trend toward increased concentration will continue during the decade but a further radical reduction in the number of independent producers is unlikely since many will survive as second or third tier suppliers.

Table 6: Motor vehicle parts and accessories
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-7.0	-2.8
Production	-8.3	-3.0
Extra-EC exports	-7.0	-2.0

Source: DRI Europe

OUTLOOK

Automobile sales in 1993 are expected to remain depressed. A sales increase of 1.7% is forecast for 1994 and a healthier increase of 7% per year during 1995 and 1996 is expected. This also places a cloudy outlook for automobile OEM suppliers for the near-term. The medium term outlook is brighter with expected increase in demand for new vehicles. The main source of overall market growth will come from the Asia-Pacific region (excluding Japan), particularly China, Malaysia, Thailand, Taiwan and South Korea.

With regard to the original equipment market, most of the growth will result from: vehicles increasingly fitted with such standard equipment as automotive electronics, anti-pollution devices and more efficient safety restraint systems; the general "up-market" move in car demand with customers demanding more equipment, comfort and power; and the increase in component outsourcing by car manufacturers with high added value.

With regard to the replacement market, it should be remembered that this segment is governed by the number and the state of vehicles on the road, as well as changes in consumer behaviour. These changes can either come about spontaneously, or be spurred by legislation on vehicle testing or compulsory maintenance. The constitution of the single market makes it likely that such measures will spread to countries where they have been absent until now. This, combined with the consumer's desire for safer and more comfortable driving, and the expected growth of the total car park in Europe, implies that there will be promising demand growth in the replacement parts market. Technological advances should, however, result in more durable parts and slow replacement cycles. Increased opportunities in East European markets will also have a positive influence on demand for automotive components.

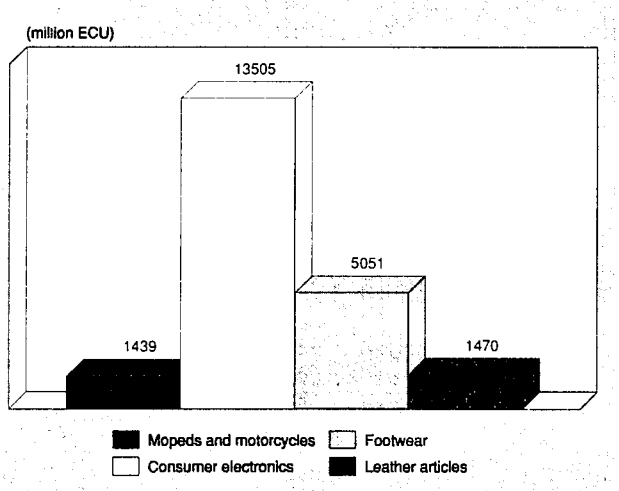
The overall outlook for growth in motor vehicle parts and accessories is good, but major adaptation and competitive efforts from the industry are still required.

Written by: DRI Europe
The industry is represented at the EC level by: Comité de Liaison de la Construction d'Equipments et de Pièces d'Automobiles (CLEPA). Address: 93 Rue de Stassart, B-1040 Brussels; tel: (32 2) 511 2919; fax: (32 2) 513 3802.

Mopeds and motorcycles
NACE 363

Apparent consumption of mopeds and motorcycles has steadily increased in the EC from 1986 to 1992, although from 1991 to 1992 the growth rate was less than 1%. Production of mopeds and motorcycles in the EC experienced two years of negative growth rates from 1990 to 1992. As a result, average real growth rates of extra-EC imports grew at a rate of nearly 18% from 1988 to 1992. External trade balance continues to pressure the EC moped and motorcycle industry to take measures to become more competitive (restructuring, mergers, licensing production to low-cost labour markets, investment in R&D, etc.) Intra-EC trade has steadily increased, aided partially by the presence of foreign manufacturer production and assembly plants in EC Member States. The outlook for this industry is not favourable in the short-term. A decrease in production and consumption rates from 1993 to 1994 is expected; there are prospects of a sluggish increase in demand for, and production, of EC produced mopeds and motorcycles beginning later in 1994

Figure 1: Mopeds and motorcycles
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

NACE 363 comprises the manufacture of mopeds, motorcycles, scooters, bicycles and their parts and accessories (bicycles are discussed in another monograph). The largest component of the industry is the production of mopeds and motorcycles where mopeds are defined as motor driven vehicles of two to three wheels with an engine displacement not exceeding 50 cc and a maximum design speed of 50 km/h. Motorcycles are motor driven vehicles with two to three wheels with an engine displacement greater than that of mopeds.

Recent trends

In volume terms, Italy, Spain and France were responsible for 90% of the EC production of mopeds and 86% of motorcycles: Italy, alone, was responsible for 43% and 68% of moped and motorcycle production, respectively. Italy exported 30% of its motorcycle production and 20% of its moped production to non-EC countries in 1992; their exports made up 83% and 51%, respectively, of the EC export totals for that year. Italy and Germany, together, were responsible for 97% of extra-EC exports of motorcycles and mopeds Although Belgium was responsible for only 2% of the 1992 EC total production of mopeds, it exported 85% of its production; this made up just over 10% of the extra-EC moped exports.

France regained second place with 25% of EC moped production and 6% of motorcycle production, while Spain decreased its share of EC motorcycle production from 23% to 12% and slightly increased its share of EC moped production from 18% to 20% from 1991 to 1992.

Production of mopeds and motorcycles stagnated during the first half of the 1980s, such that by 1987 EC output was approximately the same as that of 1982. Consumption began to increase in 1987 with production levels increasing the following year. Production in current prices increased 36% from 1987-1992 at an average rate of 4.6%, but has shown two consecutive years of decline from 1990-1992. All Member States listed as producers showed decreases in production volumes during the same period (with the exception of the United Kingdom whose figures remained the same).

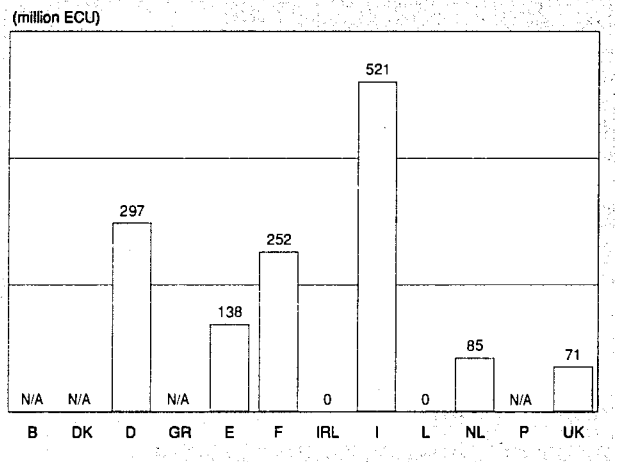
Through all this, employment levels have steadily declined by a total of -35% over the past decade; a 6% decrease in numbers occurred from 1991-1992 alone. Employment in 1992 was less than half of what it was in 1980. The increase in EC demand, the recent decrease in production and a three-fold increase in the trade deficit more than partially explains the steady decline in the number of this industry's workers.

During the fourth quarter of 1993, the Piaggio Group (I) announced the closure of its Gilera subsidiary's Arcore plant. Gilera will now only manufacture one line, the Typhoon 50 cc scooter. Production of this will be shifted to Piaggio's Pontedera plant. This cut back will result in a 40% decrease in Piaggio's 125 cc product, reducing total 1993 production of that product class to 77 000 units, down from 100 000 in 1992.

International comparison

From 1983 to 1992, EC production in current prices experienced a 40% increase; EC production in constant 1985 prices increased by 11.6% from 1985 to 1992. Production in current prices in the USA decreased 3% from 1983 to 1992. From

Figure 2: Mopeds and motorcycles
Value added by Member State, 1992



Source: DEBA

Table 1: Mopeds and motorcycles
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	3 708	3 753	3 537	3 824	3 988	4 588	5 782	6 625	7 072	7 109	6 680
Production	3 308	3 434	3 351	3 508	3 430	3 816	4 570	4 994	4 854	4 664	4 290
Extra-EC exports	471.2	554.0	609.4	570.2	521.1	541.8	568.1	628.6	627.0	584.1	541.0
Trade balance	-399.9	-319.1	-185.9	-316.3	-558.3	-771.9	-1 212.6	-1 630.8	-2 217.9	-2 444.6	-2 600.0
Employment (thousands)	68.9	62.5	56.9	52.5	48.7	47.5	49.6	49.7	47.9	44.9	43.8

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) DRI Europe estimates.
Source: DEBA

Table 2: Mopeds and motorcycles
Main indicators by country in volume, 1992

(thousands)	Sales		Production		Extra-EC exports	
	Mopeds	Motorcycles	Mopeds	Motorcycles	Mopeds	Motorcycles
Belgique/België	27	13	27	N/A	23	N/A
BR Deutschland (1)	99	17	631	41	1	13
España	219	100	272	40	3	1
France (2)	188	116	310	19	82	2
Italia (3)	500	124	522	223	113	78
Nederland	55	22	24	N/A	N/A	N/A
Portugal (4)	22	N/A	28	N/A	N/A	N/A
United Kingdom	8	44	0	3	0	N/A
EC total	1 118	595	1 214	327	222	94

(1) Including former East Germany
(2) Competition motorcycles and three wheelers excluded
"(3) Including CKD vehicles and three-wheelers for production; three-wheelers for sales;" and CKD vehicles for exports
(4) Imports excluded for sales
Source: COLIMO

Table 3: Mopeds and motorcycles
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	-.2	6.4	2.7
Production	-.3	1.1	.4
Extra-EC exports	-3.7	-4.2	-3.9
Extra-EC imports	-1.5	17.7	6.6

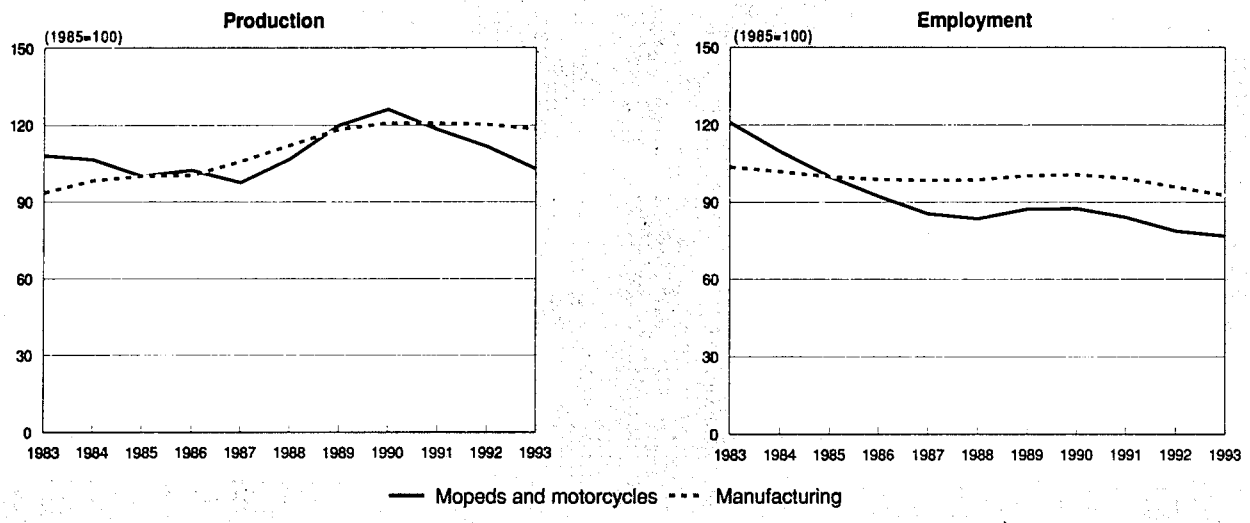
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Mopeds and motorcycles
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	471.2	554.0	609.4	570.2	521.1	541.8	568.1	628.6	627.0	584.1
Extra-EC imports	871	873	795	887	1 079	1 314	1 781	2 259	2 845	3 029
Trade balance	-399.9	-319.1	-185.9	-316.3	-558.3	-771.9	-1 212.6	-1 630.8	-2 217.9	-2 444.6
Ratio exports/imports	0.5	0.6	0.8	0.6	0.5	0.4	0.3	0.3	0.2	0.2
Terms of trade index	110.6	102.7	100.0	102.9	98.3	94.4	92.7	103.3	101.5	100.7
Intra-EC trade	680.0	714.0	725.4	782.6	862.6	1 003.5	1 258.6	1 606.3	1 680.7	1 923.6
Share of total imports (%)	43.8	45.0	47.7	46.9	44.4	43.3	41.4	41.6	37.1	38.8

Source: DEBA

Figure 3: Mopeds and motorcycles
Production in constant prices and employment compared to EC manufacturing



1993 are DRI and Eurostat estimates.
Source: DEBA

1985 to 1992, however, production in constant prices increased by 47% with the help of strong years in 1989 and 1991. Japan's production in current prices jumped 152% from 1983 to 1992 and in constant prices, it rose by 86%, surpassing both EC and USA growth rates even though total numbers produced in Japan fell during the 1980s. Average annual production rates in constant prices from 1985 to 1992 for the EC, the USA and Japan were 1.8%, 6.9% and 9.8%, respectively.

Foreign trade

Extra-EC exports in terms of value (1992 prices) was 12% of the total value of 1992 production. In volume, EC Member States exported 20% of units produced (18% of mopeds and 29% of motorcycles left the EC as export). Italy was the EC leader in exported units with 60% of the total exported (51% of total mopeds and 83% of total motorcycles that left the EC were built in Italy). France was second with 27% of the 1992 EC exports, followed by Belgium with 10%. Spain, the EC's third largest producer of mopeds and motorcycles, was responsible for only 1.3% of EC exports. Extra-EC exports recently displayed slight increases in value terms (up 16% from 1988 to 1991 in current prices) only to fall again in 1992 by 7%. The destination of EC exports has remained constant from 1987 to 1992. The EFTA countries receive nearly 38% of extra-EC exports. The USA purchased 13%, followed by Japan who took 7%.

During the period 1988-1992, extra-EC imports increased by 130%. The export/import ratio has decreased during the past decade from a high of 0.77 in 1985 to the low of 0.19 in 1992. The majority of imports to the EC (59%) comes from Japan. This has changed since 1987 with the recent transfer of Japanese production to the East Asian NICs who now are major importers to the EC of Japanese (and EC Member State) brands licensed to these countries to take advantage of their low labour costs.

Intra-EC trade has experienced strong growth during the 1980s and into the 1990s. Internal trade increased 92% in current prices from 1988-1992, and demonstrated a 14% increase from 1991-1992 alone.

MARKET FORCES

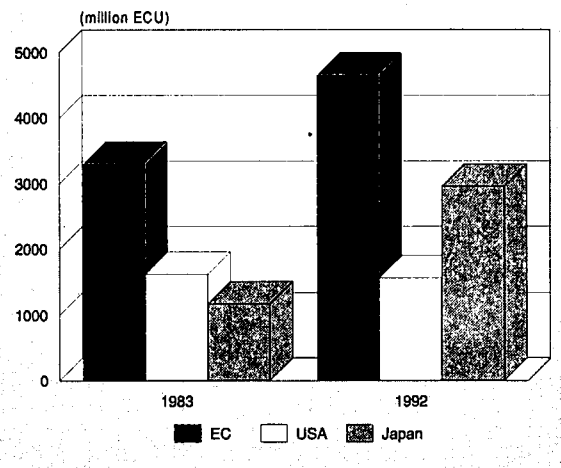
Demand

Overall economic conditions, personal disposable income and trends in demographics are the main drivers in consumer demand for mopeds and motorcycles. The recent recession has only served to slow the increase in EC demand for these products. One possible explanation is that mopeds and motorcycles become a more attractive means of transportation when considering purchase, operating, maintenance and insurance costs. Also, European cities are now considering passing laws, as has been done in Rome and Milan, to limit automobile access to sections of city centres to reduce pollution and traffic congestion.

Increased traffic volume can have a negative effect on demand as safety concerns surface regarding the operation of mopeds and motorcycles in dense traffic. Also, increasing safety requirements for drivers of these vehicles (helmet requirements, training, testing and licensing) serve to distract from the attractiveness of purchasing a moped or motorcycle.

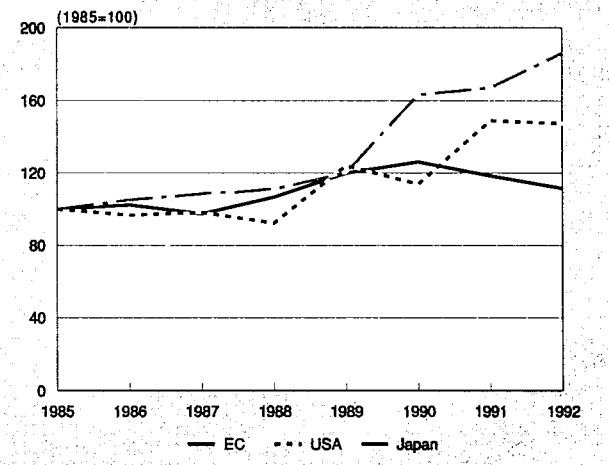
Of the approximately 7.2 million motorcycles in operation in the Member States during 1992, 78% were in the EC's major markets of Italy (34%), Germany (17%), the United Kingdom (14%) and France (13%). These countries experienced double digit growth rates in the numbers of motorcycles in use from 1987 to 1992 (Italy, 30%, Germany, 16% and France, 12%) with the exception of the United Kingdom which had just over a 2% growth for the same period. Italy has the highest density of motorcycles per capita in Europe with 43 in use per 1 000 inhabitants, followed by Switzerland with 40, Spain with 24 and Luxembourg with 21. Luxembourg experienced the highest European growth rate from 1987 to 1992 with an increase of 103% in the number of motorcycles in use. Similar statistics are not available for mopeds, alone. However, in 1990, the total number of motorised two-wheeled vehicles in use per 1 000 inhabitants was highest in the EC in Italy (142) followed by France (110), the Netherlands (64) and Belgium (52). Switzerland lead Europe with a density of 145 vehicles per 1 000 persons. Worldwide, Taiwan topped the list with 341 vehicles per 1 000 persons, followed by Japan with 180 per 1 000 persons. These figures must be treated with caution, however, since they include estimates of un-registered vehicles.

Figure 4: Mopeds and motorcycles
International comparison of production in current prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Mopeds and motorcycles
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Although the stronger economic climate of the late 1980s led to a resurgence in demand for both mopeds and motorcycles (in terms of number of units), sales have not reached 1980 levels.

East Europe demand remained high during the late 1980s. Economic conditions and the prohibitive price of automobiles, compared to average salaries, drive consumer demand there. This is expected to continue in the near future.

Supply and competition

Within the EC, Italy has maintained (if not consolidated) its dominance as the most important producer of mopeds and motorcycles over the 1980s. About one third of Italy's total production of mopeds and motorcycles is bound for countries outside the EC. Extra-EC exports of motorcycles from all Member States declined 28% from 1991-1992, while foreign sales of EC produced mopeds increased 40% from 159 000 to 222 000 units during the same period. Foreign demand is the most important for Italy, whose exports of mopeds increased by nearly 60% from 1991-1992. The export/production ratio remained stagnant from 1988-1992 but the import/consumption ratio steadily increased over the last decade to the point where nearly 43% of EC consumption is met by extra-EC imports.

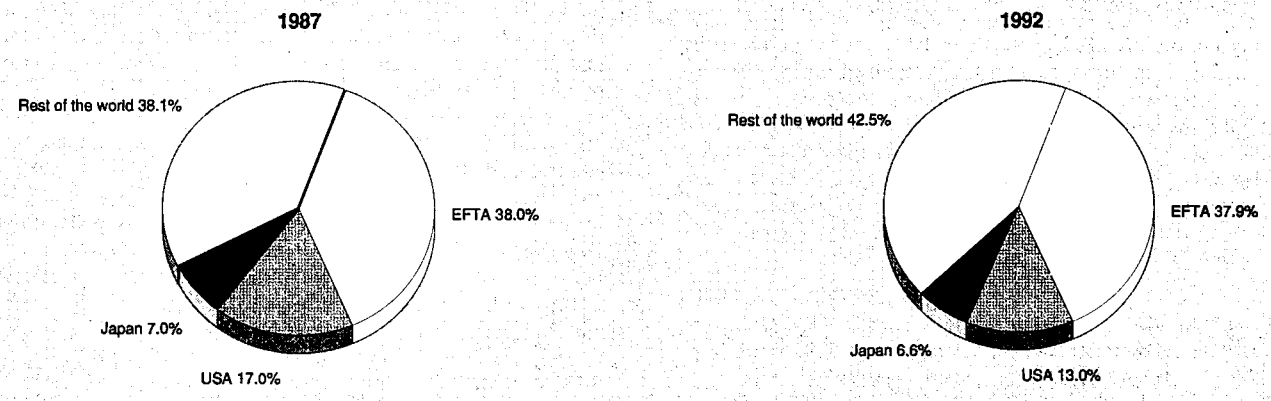
Although Japan's share of the EC market decreased from 77% in 1987 to 59% in 1992, the same has happened to the EC's share of the Japanese market, thus widening the trade deficit further.

With the fall in employment rates over the past decade and the increases in production experienced in the past several years, labour productivity has necessarily increased steadily since 1982 with a 33% gain in value added (in 1992 prices per person employed). Unit labour costs have increased 77% from 1983-1992; 40% occurring since 1987. This has helped spur the growth in production in the East Asian NICs as EC producers licence the manufacture of their products to the low labour cost countries there.

Production process

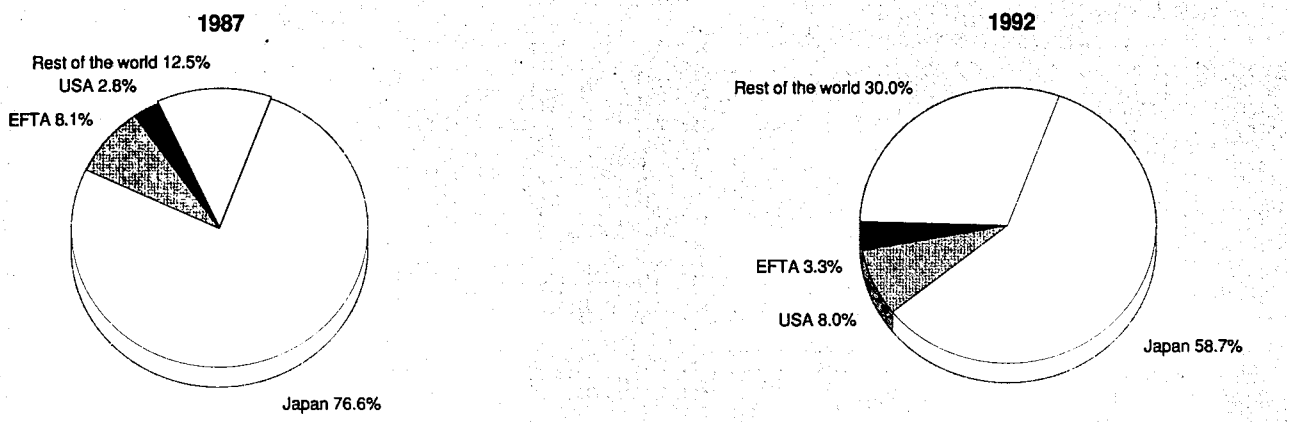
Falling levels of production as the 1980s progressed lead to plant closures and restructuring that resulted in lower employment levels in the industry. The associated improvements

Figure 6: Mopeds and motorcycles
Destination of EC exports



Source: Eurostat

Figure 7: Mopeds and motorcycles
Origin of EC imports



Source: Eurostat

in productivity have lead to an increase in the EC industry's competitiveness, however.

Impetus to improve competitiveness has also come from the single market as all major EC manufacturers are actively pursuing strategies to help them capitalise on opportunities offered by the new EC competitive environment. Common standards adopted by the Community will lead to further rationalisation and automation of the EC manufacturing process. Standards presently differ widely across the EC as illustrated by requirements on the gearing on mopeds. In Belgium, France and Portugal, automotive gears are required; in Denmark, the maximum number of gears is 2 and in Spain, 4. The opportunities arising from the single market will also depend on a common transport policy and the result of trade talks with Japan regarding the opening of its market and easier access to its distribution network.

The industry is developing new technologies both in terms of the design of the vehicles and their construction. The use of CAD/CAM has introduced the use of robotics, laser cutting machines, improved painting systems and more sophisticated quality control systems. These will help to increase productivity further as manufacturers begin to produce single models marketable across the entire EC.

Labour productivity varies, depending on the type of model produced by each company. Thus, in 1989, labour productivity ranged from 18 units per employee per year at BMW (D) to 102 at Honda (JPN), and 122 at Moto Vespa (E). On average, labour productivity is around 100 units per employee per year for the larger companies.

INDUSTRY STRUCTURE

Companies

Fifty-one manufacturers of mopeds and motorcycles in the EC account for about 85% of total EC production, with the remainder being produced by Japanese owned or controlled producers. More than half of the EC producers are located in Italy. Spain and Portugal are the next most important countries in terms of number of manufacturers, with seven and six, respectively.

The moped and motorcycle industry (excluding parts and accessories) is fairly concentrated with the ten largest producers accounting for about 68% of EC production. The size of the enterprises is larger than average in France, Spain, Italy and the Benelux region.

Japan controls 15% of EC production through licence agreements and financial holdings in local plants. Some Peugeot MTC (F) scooters are built under license from Honda (JPN) which owns a 25% share of Peugeot MTC. The second largest manufacturer in France, MBK Industrie, is fully controlled by Yamaha (JPN) and assembles Yamaha scooters and light motorcycles and manufactures mopeds under the Motobécane design. SIS (P) also assembles Yamaha trail bikes. Of Japan's direct investments in the EC, Yamaha, Suzuki and Honda are the three largest producers. These companies target the larger engine market (251 cc), of which they hold 82% share of the EC market.

Based on sales, the Italian Piaggio Group is the largest supplier of moped and motorcycles to the EC market, followed by Peugeot MTC, Moto Vespa (E) and Derbi (E). Piaggio is ranked third worldwide behind Honda and Yamaha of Japan.

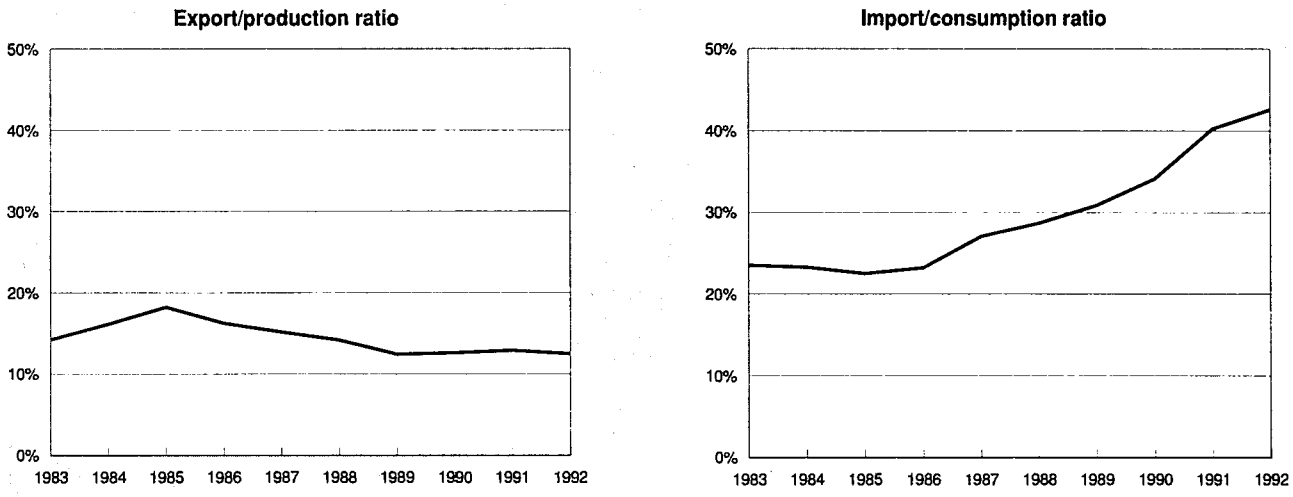
The Piaggio group includes Piaggio, Gilera, Puch (A) and Moto Vespa (Spain's largest producer). Other important Italian producers are the Cagiva Group (Cagiva, Ducati, Husqvarna and Moto Morini), Aprilia and the Moto Guzzi-Benelli Group. Italy has a large number of smaller producers, as well. France's largest is Peugeot MTC and is primarily engaged in the manufacture of mopeds and scooters (50-80 cc). Some Peugeot scooters and 50 cc engines are built under licence by Honda. In Spain, Moto Vespa and Derbi are the main manufacturers accounting for 59% of Spain's output of mopeds and motorcycles. The assembly operations of Honda, Yamaha and Suzuki account for one-third of local production in Spain.

Germany's largest producer is BMW; it strictly focuses on the manufacture of top of the line motorcycles with large capacity engines. In Portugal, SIS Vehiculos Motorizados LTDA is the largest manufacturer, producing mopeds equipped with engines either from Fichtel & Sachs (D) or Franco Morini (I). The second largest manufacturer in Portugal is Famel.

Honda Belgium is the largest producer in Belgium. Up to 75% of the parts used in its assemblies are of European origin. In the Netherlands, the most important manufacturer, Sparta BV, produces light mofas. The assembly of mofas and mopeds is also carried out by Tomos.

March 1991 saw the start of production by the new Triumph Motorcycle Company in the United Kingdom. In the subsequent 18 months to July 1993, this company produced some 9 000 motorcycles, and has successfully established distribution throughout the EC, Japan, Australia and New Zealand. Further sales have been made to a number of other markets including South America. It is anticipated that Triumph will

Figure 8: Mopeds and motorcycles
Trade intensities



Source: DEBA

enter the USA and Canadian markets in 1994. To supply these new markets, production is planned to increase substantially. In addition to Triumph, Norton Motors (UK) continue to manufacture rotary engine motorcycles, and BSA (UK) specialise in the supply of machines for the African market

Strategies

Since the early 1980s, many European manufacturers have carried out major investment projects to improve their competitiveness, yielding advances in the area of moped, scooter and low capacity motorcycle production. To capitalise on the improved demand outlook at the end of the 1980s, companies were undertaking further investment to improve production facilities and devoting resources to developing new models. Investment in R&D to develop new, more advanced, cleaner burning models is becoming increasingly important in the face of heightened competition. According to a sample of nine moped and sixteen motorcycle manufacturers, R&D spending was equivalent to 3.4% of turnover in 1989, while investment in new capacity reached almost 5% of turnover. BMW spent 8.1% of turnover on R&D in 1989.

In response to the poor economic situation of the early 1980s, a number of companies began to engage in merger and acquisition activities to buy market share and to take advantage of economies of scale in production. For example, the Italian Piaggio Group acquired Puch (A), and Cagiva-Ducati merged with Moto Morini and Husqvarna. However, merger and acquisition activity has been dominated by Japanese companies interested in acquiring a base in Europe. For example, Suzuki bought Avello-Puch of Spain in 1986, while the following year, Yamaha bought Babesto. The investments are now beginning to show positive returns. Although the Japanese have acquired about 15% of EC moped and motorcycle enterprises, they accounted for 36% of sales in 1989. Also, although the top 12 EC producers of mopeds and motorcycles accounted for 94% of total EC output in 1989, they accounted for only 64% of sales in the EC, reflecting the high degree of import penetration. Most of these Japanese producers, however, do perform assembly operations in Europe.

Consolidation within the larger industry groups will continue as companies fight to stay competitive during times of decreasing demand.

REGIONAL DISTRIBUTION

The distribution of production and consumption is clearly concentrated in the Southern EC region. Italy, Spain and France together contributed 67% of value added in 1992. This figure would be higher if data were available for Portugal. The same three Southern EC countries accounted for 82% and 57% of moped and motorcycle sales, respectively. Central Europe also had a significant share of EC motorcycle sales.

ENVIRONMENT

The main environmental considerations that may have an effect on the moped and motorcycle industry are the problems of urban traffic congestion and exhaust emissions. Should more governments introduce restrictions on traffic circulation in the larger cities, demand for mopeds and motorcycles may be stimulated. Manufacturers have also been concentrating on more fuel efficient, cleaner burning engines.

REGULATIONS

Legislation concerning the harmonisation of standards in the industry would allow manufacturers to standardise parts manufacture as mentioned previously. This could increase economies of scale by lengthening production runs and could instigate further rationalisation in the industry.

Increased use of mopeds and motorcycles has given birth to safety requirements that are sometimes unwanted by the consumer. There are suggestions that the Italian 1986 crash helmet requirement, speed limit introductions and the requirement for all mopeds to be registered in Germany have dampened demand for mopeds in these countries. These possible reactions are considered temporary and will diminish as consumers become more accustomed to the new regulations.

OUTLOOK

The length of the current worldwide recession resulted in a declining production growth rate from 1991 to 1992 in the EC. This was also exacerbated by the increase in demand for import models. Consumption growth rate slowed to a crawl (0.5%) from 1991-1992 further increasing market shares of imports. Short-term prospects for the EC moped and motor-

Table 5: Mopeds and motorcycles
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (2)	24.0	25.4	25.7	29.0	28.2	30.0	31.1	32.0	31.9	32.1
Productivity index	93.1	98.8	100.0	112.4	109.4	116.7	120.9	124.3	123.9	124.6
Unit labour costs index (3)	87.1	92.0	100.0	104.6	109.8	116.1	123.9	132.8	139.3	154.0
Total unit costs index (4)	82.2	93.7	100.0	111.5	119.5	137.0	156.0	165.9	166.7	176.4

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed (thousand ECU).
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

cycle industry do not look favourable as evidenced by the cutback announced by the Piaggio Group early in the fourth quarter of 1993 for their Gilera product line. The overall EC production growth rate from 1992-1993 will see its largest decrease of the decade and could be in the range of -8%. A further decrease from 1993 to 1994 is forecasted, however it should only be approximately 6%.

In the medium term, with world economies expected to grow at continued slow pace, particularly in Europe, internal demand in the EC is expected to grow only 1-2% faster than that of the 1991-1992 rate. Production could see a turnaround to positive growth if economies show moderate growth rates, particularly the economies of Italy, Germany, France and Spain. Future success will depend on the sector's ability to benefit from economies of scale in production and research and development. Standardised parts development could also help bring costs down and help encourage further restructuring of the sector. Continued environmental concerns may continue a push in many congested urban areas to limit automobile access, encouraging demand for mopeds and motorcycles. Growth in real consumption should continue its slow increase in the short-term. The medium-term prospects look slightly better as consumption should increase at a rate of approximately 1% to 2% per year from 1994 -1996 in line with expected consumer spending increases. The EC manufacturers short and medium-term prospects could actually be slightly better depending on how well they can tap into the expected higher growth rate markets in the East Asian NICs. The continued consolidation efforts will leave the remaining firms in a better growth position to take advantage of a future upturn in consumer spending.

Table 6: Mopeds and motorcycles
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-1.0	2.2
Production	-6.0	1.5
Extra-EC exports	-5.0	0.0

Source: DRI Europe

Written by: DRI Europe
The industry is represented at the EC level by: Association des Constructeurs Européens de Motocycle (ACEM). Address: Boulevard de la Woluwe 46, Bte 6, B-1200 Brussels; tel: (32 2) 771 0085; fax: (32 2) 762 8171.

Bicycles
NACE 363

Overall bicycle consumption in the EC has been increasing in the last decade. However, most of this increased consumption was accounted for by cheaper imports from non-EC countries, particularly from the Far East. Since 1992, the economic recession and changes in fashion have severely reduced consumption levels, and prospects for 1994 do not look very promising.
The importance of bicycles as an alternative and environmentally friendly means of transport has been recently recognised by the EC Commission in its White Paper on Transport Policy. It is widely recognised that action to promote the use of bicycles can make an useful contribution to the solution of traffic congestion problems in urban areas.

INDUSTRY PROFILE

Description of the sector

Bicycles are considered within the NACE 363 category, which also includes mopeds and motorcycles.

There are different types of bicycles, according to the end-user to whom they are destined: sports/touring bicycles (light weight), conventional adult bicycles, All Terrain Bicycles (ATB, or mountain bikes), hybrid bicycles (a cross between a mountain bike and a touring bicycle), small wheeled bicycles (for short distances, mainly aimed at the commuter) and children's bicycles.

Recent trends

In 1991, about 12.2 million bicycles were produced in the EC according to data published by the association EBMA. This figure was 10% lower than that of 1990, and about at the same level of production volume in 1989.

The strong growth in production which took place in 1990 is completely attributable to increased activity in the two main producers within the EC, namely Germany and Italy (see Table 1).

Consumption of bicycles in the EC has been constantly rising in the 1989-91 period. The strongest growth in consumption has taken place in Germany, where reunification has propped up bicycle sales from 4.6 million units in 1989 to 6.5 million units in 1991.

Preliminary figures for 1992 and 1993 indicate that consumption of bicycles in the EC has decreased: it is estimated that the drop in sales stands at around 8-10% per year.

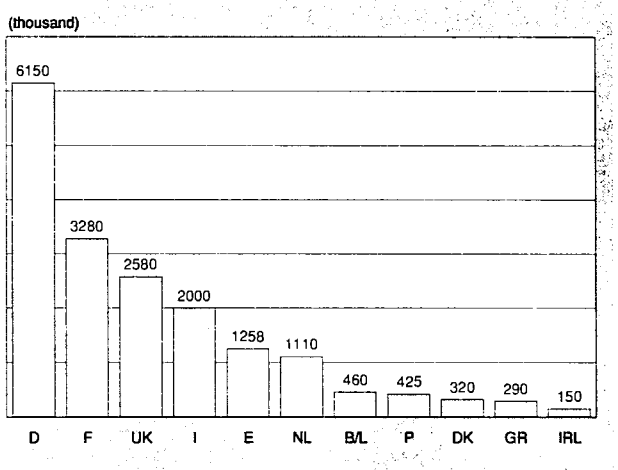
Foreign trade

In 1992, bicycle imports from non-EC countries stood at around 6.3 million units, down 5% from the level of 1991. Geographically speaking, most of EC imports come from the Far-East, and particularly from those countries which enjoy a preferential trade treatment under the Generalised System of Preferences (GSP) scheme.

Taiwan has the lion's share of bicycle imports to the EC (2.3 million units in 1992), followed by China (1.7 million units) Thailand (520 000 units), Indonesia (360 000 units) and Malaysia (345 000 units). These five countries account together for about 83% of total EC imports.

On the other hand, bicycle imports from Japan and the USA are quite low (46 000 and 128 000 units respectively in 1992). Among East European countries, the most important exporters to the EC are Poland (190 000 units) and the Czech and Slovak Republics (163 000 units altogether).

Figure 1: Bicycles
Breakdown of the EC bicycle consumption, 1991



Source: EBMA

As for intra-EC trade, in 1991 its volume reached about 3.4 million units. Italy is by far the largest intra-EC exporter with 1.8 million units, or 54% of the total. The main EC markets for Italian bicycles are France (875 000 units) and Germany (348 000 units).

MARKET FORCES

Demand

The surge in bicycles sales which has taken place in most recent years can be fully attributed to the success encountered by mountain bikes, particularly among youngsters of the 15-24 age group. At the same time, demand for traditional adult bicycles has been falling rapidly.

Since 1992, however, the boom in sales of mountain bikes seems to have levelled off. The main reason for this slowdown is doubtlessly the general economic recession that has rendered the price of ATBs quite prohibitive. Fashion considerations also play an important role in this respect.

Demand for bicycles is principally related to leisure and fun activities, and secondarily to the desire of consumers to keep fit. Other popular reasons to buy a bicycle are for recreational purposes, for local trips (i.e. shopping), or to commute to the workplace. Concerning this last reason, the use of bicycles as an alternative to private and/or public transport is increasing particularly in large cities, where traffic congestion is strong.

Supply and competition

Within the EC, the two largest bicycle producers are traditionally Italy and Germany. In terms of international competitors, Taiwan has become in the recent past the largest source of EC imports. Other competitors are also located in the Far East, namely China and Thailand.

These countries enjoy low labour costs, which allow them to undercut the prices offered by European producers. Moreover, Far East producers often make use of the so-called "screwdriver plants", i.e. they produce locally all the components which are later assembled in factories located in other countries. As a consequence of this unfair competition, several European manufacturers were thrown out of the market or nowadays design bicycles which are produced in the Far East and imported as finished products.

The component market has been practically taken over by two Japanese manufacturers, Shimano and Suntour. They specialise particularly in the gear and brake mechanisms, and

Table 1: Bicycles
EC production and consumption, 1989-91

(thousand)	Production 1989	1990	1991	Consumption 1989	1990	1991
Belgique/Belgie	102	88	93	356	462	511
Dannmark	176	170	160	359	360	320
BR Deutschland	4 350	4 800	4 500	4 600	6 000	6 500
Hellas	N/A	N/A	N/A	N/A	N/A	240
Espana	700	666	555	786	863	1 258
France	1 468	1 535	1 299	2 421	2 897	3 280
Ireland	N/A	N/A	N/A	N/A	N/A	150
Italia	3 000	3 500	3 100	1 626	2 100	2 000
Nederland	720	892	900	1 000	1 134	1 110
Portugal	346	380	420	350	385	425
United Kingdom	1 387	1 275	1 100	2 800	2 600	2 580

Source : EBMA

their entry in the market has seriously affected the level of activity of their European counterparts, which is now mostly confined to the most expensive models' segment (i.e. racing bikes). On the other hand, European manufacturers have increased their R&D efforts in order to obtain innovative product developments.

The bicycle sector in Europe has also witnessed a major change in distribution channels. Not a long time ago, bicycles were sold uniquely in specialised shops, while at present an increasing share of bikes is sold in large department stores, hypermarkets or by mail order.

INDUSTRY STRUCTURE

Companies

The industry is composed of a number of large, medium and small-sized companies, some specialising into some niche-markets such as children's bikes. At the same time, each European country has local producers which operate in all market segments and which take the biggest market share.

The following enterprises are the market leaders within their respective countries: Kynast, Derby Cycle Werke and Nurnberger Hercules (Germany); Bianchi, Rizzato and Carnielli (Italy); Peugeot, MBK and Gitane (France); Raleigh, Townsend and Dawes (UK); BH, Orbea and Rabasa (Spain); Gazelle and Batavus (Netherlands).

Strategies

In order to face the threat represented by import competition from Far East manufacturers, European companies have established alliances or cooperation agreements. The main aim of these alliances is to rationalise the production process and realise economies of scale in purchasing components.

In 1992, for example, the largest Spanish bicycle manufacturer BH announced the creation of a consortium with Peugeot and Gitane under the name of Cycleurope. Other major consortia are the Derby Group (formed by Raleigh, Gazelle and Derby) and the ATAG group (formed by Batavus and Dawes).

REGIONAL DISTRIBUTION

The largest market for bicycles in the EC is Germany. In 1991, one out of three bikes sold in the EC was sold in Germany (6.1 million). France comes second with 3.3 million bikes sold, and the United Kingdom third with 2.6 million units.

The Netherlands and Denmark are the two countries with the highest bike density in the EC. However, the highest growth rates in bicycle consumption in the last years come from Southern countries such as Spain (46% growth in 1991), France (13%) and Portugal (10%); on the other hand, consumption has been decreasing or stagnating in traditional bicycle markets such as the United Kingdom (-0.7% in 1991), the Netherlands (-2.1%) and particularly Denmark (-11.2%).

ENVIRONMENT

The bicycle is increasingly viewed as one of the most environmentally friendly means of transport. Its contribution to the solution of traffic congestion problems in large urban areas has been generally underestimated by local authorities within the EC.

In order to promote the use of bicycles in urban areas, it is necessary to provide facilities for cyclists such as bicycle lanes and specific parking areas. Unfortunately, this is more the exception than the rule in most large urban areas of the EC. In some European countries where the bicycle is traditionally a popular means of transport (i.e. the Netherlands, Germany and the Scandinavian countries), facilities are widespread. On the other hand, in the Southern European countries the absence of such infrastructures makes the use of bicycles in the city quite hazardous. Therefore in these countries the demand for traditional bicycles is mainly concentrated in the countryside.

REGULATIONS

The unfair competition and dumping practices which are commonly used by Far East producers have been recently sanctioned by the EC authorities.

Table 2: Bicycles
Significant bicycle imports to the EC, 1991-92

(thousand)	1991	1992
Taiwan	2 763	2 308
China	2 236	1 681
Thailand	269.0	521.8
Indonesia	190.0	359.6
Malaysia	118.0	344.1
Poland	277.8	189.9
Czech and Slovak Republic	87.7	162.7
USA	130.8	127.9
India	29.0	121.3

Source : EBMA

In August 1993, the EC Commission proposed a council regulation which imposes a definitive anti-dumping duty on imports into the EC of bicycles originating in China. The EC Council subsequently adopted the regulation: the rate of the duty has been set at 30.6%.

OUTLOOK

The general economic recession which is affecting Europe has badly influenced sales of bicycles in the last couple of years: in fact, during recessionary periods, consumers tend to postpone the purchase of new bikes. Moreover, the lessening of the consumers' excitement for mountain bikes will further reduce consumption, at least until a new cycling fashion appears.

On the other hand, the action of the EC authorities to prevent unfair competition practices by Far East manufacturers is expected to help reducing the price gap which hampered the activity of EC producers.

Table 3: Bicycles
Expected real annual groth rates

(%)	1993-94	1993-97
Apparent consumption	-3.0	1.0
Production	0.0	2.0
Extra-EC exports	-1.0	2.0

Source : DRI Europe

Written by: DRI Europe
The industry is represented at the EC level by: European Bicycle Manufacturers Association (EBMA). Address: 13 Avenue de la Grande Armée, F-75116 Paris; tel: (33 1) 45 01 91 86; fax: (33 1) 45 01 20 21.

Shipbuilding
NACE 361

Contrary to the widely-held belief that Japanese and South Korean shipbuilders dominate the shipbuilding industry, the EC continues to maintain its position as the world leader in the high value added segments of fully cellular container ships, refrigerated vessels, cruise ships and fishing vessels.
In sum, however, the EC shipbuilding industry continues to confront considerable challenges for the near future. Weaker than hoped for growth in sea-borne trade and the lingering overcapacity in the shipping industry in 1992 worked against the prospect for an immediate upturn in production volumes or employment. On top of that, exchange rate fluctuations (particularly vis-à-vis the US dollar) have helped weaken the competitiveness of EC shipbuilders.
The longer term outlook is potentially positive for the EC shipbuilding industry as the world fleet becomes increasingly aged, and legislative requirements for ship design favour some of the EC acquired expertise.

INDUSTRY PROFILE

Description of the sector

NACE 361 comprises the building and repair of seagoing vessels (NACE 361.1); building and repair of vessels for inland navigation (NACE 361.2); building and repair of boats and yachts (NACE 361.3); painting of ships (NACE 361.4); and ship breaking (NACE 361.5).

Most of the industry is accounted for by the construction of seagoing merchant vessels (i.e. NACE 361.1). Given the smaller economic significance of the other sub-sectors and the limited availability of data, this article refers predominately to trends in the manufacture and repair of seagoing merchant vessels.

Recent trends

In 1992 the growth of world trade accelerated in line with output growth; world sea-borne trade (measured in tonnes miles) followed the same pattern with growth of 2.3 % compared to 3.3% in 1991. Shipbuilding in the EC recorded strong growth in 1992 to exceed 2.8 million compensated gross tonnes (cgt), a 7.2% increase over 1991, that gave the EC a world production share of almost 24%. However, production had declined slightly in 1991 (compared to 1990) to 2.65 million cgt which was coupled with a marginal decline in its world production share (23%).

The principal product lines in 1992, and their corresponding share of aggregate EC production (including fishing and non cargo vessels, but excluding military vessels), are as follows: full container (19.1%); general cargo (15.2%); ferries and passenger ships (14.9%); fishing vessels (9.2%); oil and chemicals carriers (18%); LPG carriers (6.7%); and dedicated dry bulk vessels (3.6%).

After many years of decline, world ship production began to recover in 1989 and accelerated sharply in 1990. In the EC, production declined steadily from 1983 to 1988. For the first several years, EC production declined more rapidly than world production, so the EC share of total production that was 23.7% in 1980 had fallen to 19.7% in 1986 (former East Germany is included for both years). The EC's share improved significantly in 1987 and regained its 1980 comparable value in 1988, which it has maintained since then.

International freight rate performance, which is an important factor in scrapping and new-building decisions, varied according to ship-type in 1992, although total employment of the world fleet was very similar to 1990. The Gulf War in early 1991 partially prompted a surge in tanker oil movements and storage. Hence, rates during the first half of 1991 for various tanker sizes, notably VLCC's, Suezmax and Aframax tankers, were the best seen since the early 1970s. However, a significant amount of additional tanker tonnage came onto the market in 1991 approximately 11.5 million deadweight tons (dwt) was added. This addition of the largest increase in supply since 1977, coupled with high stocks, a reduction in tanker storage, minimal scrapping and a slowing of demand pushed rates down significantly in the second half of 1991. This depressed situation continued into of 1992, such that a significant number of tankers were withdrawn from the market (although not fully mothballed) and the number of tankers scrapped witnessed a dramatic rise. The two-tier rate structure that had emerged in 1991, where modern tonnage commanded a premium on some trades over older tonnage, died in 1992 and some of the owners of the more modern tonnage faced the greatest exposure to the weak rates due to their substantial capital costs.

Rates for product tankers followed a similar pattern as that for the crude carriers in 1991, albeit with a slight strengthening of rates at the end of the year, and 1992. The rates for bulk (and combination) carriers also declined further in 1992 following the deterioration in 1991, but managed to remain more stable than the declines in the tanker rates. This stability was due to the impact of rates on different sized ships, with smaller vessels commanding reasonable rates, whilst the larger ones were faced with declining rates.

Developments in other vessel type rates were rather muted. General cargo remained relatively flat, and gas carrier rates declined marginally as the increased supply of new-buildings exceeded demand.

Employment, after falling steadily throughout the eighties reached a trough in 1990, before growing strongly in 1991 and stabilising in 1992 (note that some eastern German employment is included from 1991).

In 1991 the tendency of rising prices for new ships, which started in 1985, reached its peak. In 1992, the weakening freight rates of 1991 and 1992 translated into weakening orders

Table 1: Shipbuilding in the EC
Main indicators for the shipbuilding industry, 1980-1992

(thousand CGT)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Production (1)	2 999	2 959	2 388	2 088	2 020	2 346	2 703	2 651	2 845
% of world production (1)	23.7	20.9	19.7	22.6	23.5	23.7	23.2	23.0	23.5
Employment (2)	124 229	109 242	96 145	79 904	72 460	69 738	68 875	78 424	77 152

(1) ships Completed and includes former East Germany
(2) Includes jobs in naval and para-naval building in France from 1986; Includes East Germany in 1991; includes naval dockyards in the Netherlands in 1980
Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Information Services

Table 2: Shipbuilding
Development of new merchant shipbuilding by region

Ships completed (thousand CGT)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC (1)	3 568	3 757	3 131	2 959	2 388	2 088	2 020	2 346	2 703	2 651	2 845
AWES (2)	4 709	4 832	3 906	3 591	2 927	2 537	2 510	2 781	3 285	3 158	3 399
Japan	5 811	4 908	6 951	6 498	5 085	3 795	2 953	3 664	4 456	4 417	4 379
South Korea	880	986	1 015	1 633	1 971	1 194	1 505	1 389	1 564	1 730	1 995
Rest of the world	3 188	2 826	3 127	2 447	2 156	1 719	1 630	2 047	2 351	2 222	2 348
Total	14 588	13 552	14 998	14 169	12 139	9 245	8 598	9 881	11 656	11 526	12 118

(1) Includes former East Germany
(2) Association of West European Shipbuilders: EC plus Finland, Norway and Sweden
Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Information Services

for news ships, and coupled with shipyards nearing completion of a delivery programme that had the yards working to full capacity over 1990/1991 meant that surplus capacity in the yards was appearing and hence prices (in nominal US dollars) for all vessel types were forced down significantly in 1992. However, prices in European currencies adjusted for exchange rates and inflation are close to the 1990 level, although significantly lower than in 1991.

This weakening in prices due to the widening gap between freight rates obtainable and the price of new ships and financing difficulties are considerably dampening the threat of rising prices in the short term.

International comparison

The EC's major competitors in shipbuilding are Japan, with a world share of 36%, and South Korea. However, the EC marginally gained share in 1992, whilst Japan's share had declined by 2%. Most of the share gain in world production has been due to the very active South Korean yards, which have increased share from 11.5% in 1985 to the current 16.5%.

The 1992 EC share of its principal product lines in world production, are: fully container (33%); general cargo (35%); ferries and passenger ships (49%); fishing vessels (47%); oil and chemicals carriers (12%); LPG carriers (37%); and dedicated dry bulk vessels (8%). The EC is the leading producer of containerised and general cargo vessels, dedicated reefer vessels and cruise vessels.

Foreign trade

Within the EC, the most important exporting countries by value and cgt in 1991 were Germany, Spain and France in order of rank. All of the EC Member States continued to post a trade surplus with the exception of Greece, which imports more than it exports due to the concentration of large bulk and tanker shipping companies in that country. EC exports in new shipbuilding reached 3 038 million ECU in 1991 compared to 2 988 million ECU in 1990.

MARKET FORCES

Demand

In the last years, demand for EC manufactured vessels has accelerated from the early to mid-1980's decline, which reached a trough in 1986. However, the volume of new orders, which rose by close to 30% in 1989 in terms of cgt to its peak, stagnated in 1990 and declined in 1991 and 1992. The 1992 result of new orders of 1.8 million cgt is a substantial decline from the 3.2 million 1989 peak. Also, world new orders have declined substantially and the EC has also lost share of this declining market due to stiff competition: the EC share was 23% in 1989 and is now just under 20%.

In 1992, the largest ship producing Member State was Germany (958 thousand cgt for a share of 34%), followed by Spain (15%), Denmark (14.6%) and Italy (10.2%). The outstanding order book for the EC producers at the end of 1992 maintains Germany in pole position with 29%, but puts Italy in second place with 20.5%, and Denmark third with 13.3%.

Supply and competition

Three-quarters of world shipbuilding is carried out by industrialised countries. The EC dominates the high added value market of fully cellular container ships, reefer and non-cargo

There are several hundred shipyards in the EC that manufacture and/or repair vessels of varying sizes. However, of these, only about seventy are capable of producing and/or repairing ships over 5 000 cgt. The repair industry has been faced with declining business as owners and operators have tried to strike a balance between keeping down costs and the absolute minimum level of maintenance required to match the demands of

Table 3: Shipbuilding
Development of contract prices for new vessels

(dwt)	shiptype	Nominal prices (million USD) 1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
80000	tanker	23.0	21.0	18.5	21.0	29.0	38.0	43.0	44.0	44.5	40.0
250000	tanker	48.5	44.0	37.0	42.5	54.0	73.0	82.0	86.0	90.0	85.0
400000	tanker	57.0	51.0	44.0	50.5	60.0	88.0	101.0	120.0	125.0	119.0
96000	oil/ore/bulk	28.0	26.0	22.5	25.5	32.0	44.0	54.0	62.0	64.5	56.0
120000	bulk carrier	25.0	24.0	20.5	23.0	30.0	39.0	44.0	46.0	50.0	44.0
125000	LNG carrier	150.0	130.0	130.0	120.0	145.0	175.0	220.0	260.0	290.0	260.0
75000	LPG carrier	50.0	45.0	42.5	47.5	55.0	61.0	71.0	80.0	85.0	75.0

Source: EC/Fearnleys

Table 4: Shipbuilding
Production by type, 1992 (1)

(thousand CGT)	World	EC	% of world total Japan	South Korea
Crude oil tankers	2 588	10.2	51.3	26.6
Chemical carriers	1 565	15.8	43.8	11.2
Bulk carriers	1 224	8.3	40.1	23.9
Combined carriers	379	17.9	0.0	82.1
General cargo ships	1 244	34.8	24.6	5.7
Reefers	432	34.9	30.6	0.0
Full containers	1 643	33.0	29.3	24.7
Roll on/off vessels	145	6.1	32.2	4.7
Car carriers	311	11.3	88.7	0.0
LPG carriers	517	36.6	54.7	6.8
LNG carriers	64	0.0	100.0	0.0
Ferries	416	16.3	32.8	0.0
Passenger ships	446	79.8	0.0	0.0
Fishing vessels	560	46.6	11.3	1.5
Other non-cargo vessels (2)	583	24.1	14.9	0.4
Total	12 117	23.5	36.1	16.5

(1) EC includes East Germany
(2) Note that this category does not include military vessels
Source: AWES

the various regulatory bodies. This is despite an ageing fleet, which should require more maintenance.

Scrapping

The scrapping of ships at the end of their usable life is decided not only by the age of the ship but by a combination several factors such as the vessel's operating profit margin, changes in environmental legislation and quality considerations and the existing market psychology (i.e. the expected return on a vessel). Given the aforementioned criteria, it is not surprising that many shipping firms have decided to scrap their vessels during the recent downturn in the shipping industry. The average age for vessels is presently around 12.5 years, which is higher than it was during the last period of intense scrapping activity during the mid-1980s; in addition, the share of the world fleet over 20 years old has increased substantially (now around some 35%). This is further indication that a considerable number of ships were retained during the favourable economic climate in the late 1980s and have served their useful service life. Scrapping in 1992, at 348 vessels of 18.5 million dwt more than doubled from the 1991 result of 5.3 million dwt in 1991. China currently dominates world scrapping followed by Pakistan and Bangladesh (and to a lesser degree India). Given the substantial increase in scrapping the prices paid for scrapping in 1992 declined for nearly all vessel types, the major exception being the vessel containing high quality stainless steel (such as chemical carriers).

Labour

Employment in the EC shipping industry has experienced a prolonged period of downsizing due to a number of factors. To begin, the world shipbuilding industry experienced an unprecedented period of expansion during the 1970s in which shipping tonnage was doubled within a ten-year period. The sudden influx of new tonnage resulted in an overcapacity of shipping tonnage which the shipping industry has yet to recover from, despite the fact that a number of ships were prematurely scrapped in the mid-1980s (some after less than 10 years of service). A secondary development was the shift in production centres away from Europe and the USA towards new shipyards in Japan and South Korea. For example, South Korea launched only 0.1% of new ships in 1972, by 1992 that share had blossomed to 16.5%.

Table 5: Shipbuilding
World development of merchant shipbuilding by type of ship

(thousand CGT)	1985	1986	1987	1988	1989	1990	1991	1992
Dry cargo ships	4 457	3 891	3 062	2 885	2 523	3 192	3 456	3 775
%	32	32	33	34	26	27	30	31
Bulk carriers	4 991	3 555	2 093	1 099	1 909	2 536	1 816	1 603
%	35	29	23	13	19	22	16	13
Oil tankers	486	830	646	787	1 138	1 163	1 624	2 588
%	3	7	7	9	12	10	14	21
Other tankers	1 934	1 557	1 193	1 530	1 795	1 906	2 291	2 146
%	14	13	13	18	18	16	20	18
Fishing vessels	669	791	890	1 150	1 117	1 027	734	560
%	5	7	10	13	11	9	6	5
Other	1 632	1 515	1 362	1 148	1 399	1 833	1 604	1 445
%	12	13	15	13	14	16	15	12
Total	14 169	12 139	9 245	8 598	9 881	11 656	11 526	12 118
%	100	100	100	100	100	100	100	100

Source: EC/Lloyd's Register of Shipping

Table 6: Shipbuilding
World shipbuilding production 1991-92

(million CGT)	1991	%	1992	%
AWES (1)	3.3	28.2	3.4	28.0
Japan	4.5	38.2	4.4	36.0
Other European countries	1.2	10.6	1.0	8.6
Other industrialised countries	0.1	1.1	0.2	1.3
Industrialised countries - total	9.1	78.1	9.0	74.0
South Korea	1.6	13.5	2.0	16.5
Other newly industrialised countries	0.5	4.5	0.7	5.4
People's Republic of China	0.3	2.6	0.3	2.3
Other developing countries	0.2	1.4	0.2	1.8
Developing countries - total	2.6	21.9	3.2	26.0
Total	11.7	100.0	12.1	100.0

(1) Association of West European Shipbuilders: EC plus Finland, Norway and Sweden. Includes East Germany
Source: AWES

The reduction in the EC shipbuilding workforce has continued and in 1992 stood at slightly more than only one-third of the 1975 total of employment for the present Member States. Employment is dominated by Germany, which employs 36.5% of the total, followed at a significant distance by Italy and Denmark with almost 11% each. The country that has seen the most substantial decrease in employment over the last two decade is the United Kingdom, with labour force one tenth of that in the mid seventies - which at that time was the largest individual workforce of the current Member States.

Production process

The industry has had to invest in automating the production process wherever possible, usually by introducing computerised sheet-cutter and automated welders. The changes in the production process have been similar to that in the automotive industry and is predominately a response to increasing competition from lower cost manufacture taking place outside the EC. Part of process of adjustment has included the adoption of Eastern style management techniques, multi-skilled work practises and purchases of complete systems and sub-systems from external suppliers.

INDUSTRY STRUCTURE

Strategies

The number of shipbuilding firms in the EC has been reduced by yards either going out of business or by mergers and acquisition activity, and many of the remaining shipyards have been forced to find niches in the shipbuilding market in order to survive. The EC shipbuilding industry in general seeks to differentiate itself from its main competitors in Asia by specialising in the construction of ships with relatively high value added rather than relatively simpler dry-bulk vessels or oil tankers. Examples of such ships include dedicated refrigerator vessels ("reefers"), dedicated container vessels, gas tankers, chemical tankers and cruise ships.

The major centre for mergers and acquisitions activity has been the privatisation of shipyards in former East Germany by the Treuhandanstalt, the German agency responsible for privatising former East German industries following unification. Most of the largest acquisitions have created Germany's largest shipbuilding group, Bremer Vulkan, however, other firms such as Norway's Kvaerner have also acquired facilities in the new Länder and other Member States.

ENVIRONMENT

Although oil spills are often considered as the greatest environmental threat posed by the shipping industry as a whole, as evidenced by the IMO regulations for new tankers to constructed with double hulls, prevention of oil spills is by no means the only major environmental issue confronting the shipbuilding industry. The shipbuilding industry is presently focused on the painting of ships where paint and coating substances and abrasive blasting done to prepare a painting surface are of particular concern.

A number of paint and coating (anti-fouling) substances have been brought under scrutiny. Paint components red lead (Pb3O4), zinc chromate (ZnCrO4) and tin compounds are

Table 7: Shipbuilding
New orders in world shipbuilding

(thousand CGT)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC (1)	2 927	2 568	2 209	2 583	2 550	2 310	2 485	3 220	3 143	2 170	1 758
AWES (2)	3 489	3 091	2 840	2 887	2 948	3 158	2 719	3 792	3 595	2 432	2 125
Japan	4 859	7 389	6 040	4 440	3 432	3 121	3 361	5 880	6 116	4 433	3 268
South Korea	1 002	2 147	1 181	807	1 352	1 943	1 203	1 671	2 169	2 278	1 085
Rest of the world	2 183	2 223	1 717	2 187	1 751	1 518	1 844	2 222	2 425	2 772	2 342
Total	11 533	14 850	11 778	10 321	9 482	9 740	9 126	13 564	14 304	11 915	8 820

(1) Includes former East Germany
(2) Association of West European Shipbuilders: EC plus Finland, Norway and Sweden
Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Information Services

Table 8: Shipbuilding
Ships completed by Member State

(thousand CGT)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Total	3 757	3 131	2 059	2 388	2 088	2 020	2 346	2 703	2 651	2 843
Belgique/Belgie	173	102	124	45	26	47	36	72	22	98
Danmark	339	355	440	351	194	277	287	306	351	414
BR Deutschland (1)	1 268	1 165	1 143	1 067	765	885	847	1 002	810	958
Hellas	36	40	44	25	7	12	13	46	6	0
Espagna	489	346	400	230	328	326	306	365	301	428
France	357	357	164	145	208	63	199	114	171	182
Ireland	19	0	0	0	0	0	0	0	0	0
Italia	217	182	124	61	225	120	285	328	424	289
Nederland	416	259	310	263	146	153	172	264	357	271
Portugal	125	17	40	61	26	23	46	65	39	64
United Kingdom	319	305	164	142	162	113	157	145	170	139

(1) Includes former East Germany
Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Informations services

expected to be banned along with previously discontinued substances such as cadmium and other heavy metals. Meanwhile, other substances used such as carbonates, silicates, coal tar, organic chloride compounds and polyurethanes are all suspected to cause specific health hazards. Abrasive blasting is another source of concern because of the vast amounts of hazardous dust which results from the preparation of metal or concrete surfaces before painting.

REGULATIONS

The global shipbuilding industry is subject to competitive distortions due primarily to differing levels of subsidies by geographic region. EC level of subsidies to shipbuilding come under the auspices of the 7th directive on aid to shipbuilding (approved in November 1990) and must be reviewed each year. In December 1992, the Commission determined that the common ceiling for state aid, which is based on the difference in costs between the most efficient EC yards and their major competitors (typically form the Far East), should be the same for 1993 as for 1992. This means that ships contracted in 1993 for delivery in or before 1996 should have a subsidy ceiling of 9% of the contract value. The ceiling for ships with a contract value less than 10 million ECU was 4.5% of that value.

With regard to environmental regulations, the EC and the USA are leading the industry with the preparation of legislation designed to reduce solvent emissions resulting from particular paint substances. Such legislation is expected to be similar to the German TA Luft legislation. Member States such as Denmark and the Netherlands have already initiated programmes designed to reduce solvent emissions.

Increasing pressure on the shipping industry on maritime safety may act as a boon to the shipbuilding industry depending on the level and degree of legislation that is applied. This will be due to the potential for shipbuilder to incorporate additional,

Table 9: Shipbuilding
Total order book by country at year's end

(thousand CGT)	1985	1986	1987	1988	1989	1990	1991	1992
EC (1)	3 710	3 827	4 451	5 006	6 176	6 850	6 152	5 058
Belgique/Belgie	62	60	75	82	148	154	213	117
Danmark	442	430	474	460	590	928	877	674
BR Deutschland (1)	1 119	1 282	1 426	1 429	1 974	1 955	1 530	1 471
Hellas	120	103	122	117	114	69	73	42
Espana	492	528	636	838	854	1 004	757	476
France	383	371	235	380	362	397	557	411
Italia	346	466	865	904	1 189	1 298	1 191	1 036
Nederland	300	196	142	365	415	443	388	322
Portugal	94	67	108	114	156	182	153	97
United Kingdom	353	325	370	317	377	419	414	412
Finland	544	484	991	963	652	589	494	467
Norway	148	147	137	114	423	464	382	284
Sweden	182	138	94	39	115	64	24	24
AWES (2)	4 584	4 595	5 673	6 122	7 366	7 967	7 052	5 833
Japan	5 915	3 916	2 919	3 474	5 697	7 495	7 622	6 483
South Korea	2 579	1 909	2 639	2 343	2 813	3 501	3 924	3 012
Rest of the world	5 486	5 226	5 325	5 735	6 092	6 683	7 341	7 321
Total	18 564	15 646	16 556	17 673	21 968	25 646	15 938	22 649

(1) Includes former East Germany
(2) Association of West European Shipbuilders: EC plus Finland, Norway and Sweden
Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Information Services

Table 10: Shipbuilding
Employment in new shipbuilding

	1975	1980	1985	1986	1987	1988	1989	1990	1991	1992
Total	208 833	124 229	109 242	96 145	79 904	72 460	69 738	68 875	78 424	77 152
Belgique/Belgie	7 467	6 523	3 923	2 995	2 548	2 270	2 307	2 377	2 418	2 391
Danmark	16 630	11 400	10 200	7 000	7 000	7 300	7 900	8 400	8 600	8 300
BR Deutschland	46 839	24 784	22 260	18 184	12 875	14 845	14 732	15 297 (3)	27 763 (4)	28 146 (5)
Hellas	2 316	2 672	2 000	1 709	1 621	1 855	1 535	550	0	0
Espana	N/A	N/A	18 000	18 000	17 300	14 000	12 550	11 940	11 440	10 735
France (1)	32 500	22 200	15 053	13 700	8 940	6 850	6 800	6 600	6 100	6 040
Ireland	869	750	0	0	0	0	0	0	0	0
Italia	25 000	18 000	12 000	11 570	9 500	8 428	9 675	9 840	8 299	8 200 (6)
Nederland (2)	22 662	13 100	6 236	5 400	3 600	3 500	3 500	3 900	4 000	4 000
Portugal	N/A	N/A	5 370	5 087	5 020	4 412	4 245	3 845	3 820	3 520
United Kingdom	54 550	24 800	14 200	12 500	11 500	9 000	6 494	6 126	5 984	5 820

(1) From 1986 on, the figure covers jobs in new shipbuilding, naval and para-naval building
(2) From 1975 to 1984 including naval dockyards
(3) Excluding jobs in ex-GDR's yards
(4) Including 1170 jobs in ex-GDR's yards
(5) Including 1241 jobs in ex-GDR's yards
(6) 700 unemployed should be added to this figure, representing the structure overcapacity.
Source: EC Commission

high value added safety features in new vessels, as well as ship repairers having to outfit existing shipping with add-on equipment. Recent research on claims arising from major casualty reports indicates that equipment and mechanical failure account for 20% of these casualties, whilst structural failure accounts for 13%.

OUTLOOK

For the immediate future, the outlook for EC shipbuilding industry does not appear to offer obvious change from the persistent contraction of production and employment. The existing overcapacity in the shipping industry combined with a lingering global recession prevents the likelihood of any immediate boom in demand for new shipbuilding. However, as sub-standard tonnage becomes increasingly under pressure to improve and as the relevant authorities apply more stringent ship surveys, there should be a substantial pick-up in repair demand in the short-term in advance of the large influx of new orders.

On a more encouraging note, in the long-term over half of the current fleet will be over 25 years old by the year 2000, up to one-third will need to be replaced during the interim period; world trade will accelerate to use up much of the current excess capacity and with current trend for lower prices there should be an acceleration of orders.

From a long-term perspective, the EC shipbuilding industry will be keenly focused on the development of the next generation of shipping vessels which are predominantly being developed in Japan by Mitsubishi Heavy Industries. Although Mitsubishi is the primary developer of the super conductive electromagnetic propulsion (SEMP) vessels, certain EC firms are performing crucial roles in the development of the SEMP project. The most significant contributor is Germany's Motoren und Turbinen Union division of Daimler-Benz, which won a prestigious contract to develop two high-speed engines used to power the SEMP's innovative magnetohydrodynamic (MHD) propulsion system.

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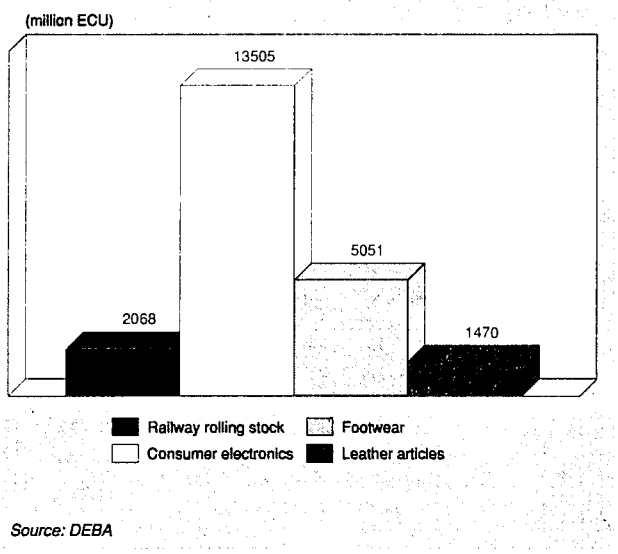
Railway rolling stock
NACE 362

In 1992, the EC railway rolling stock industry continued its growth. Production increased and trade balance went on its recovery started in 1991. Employment, however, remained low. The industry has few clients and is completely dependent on them. Products are tailored to these clients and continuous innovation is necessary to satisfy them and to ensure that EC firms stay competitive. Therefore, the EC railway rolling stock industry tends to be more concentrated. East European countries have become dangerous competitors on the basis of prices, although their technology needs very often to be updated.
Although the railway rolling stock industry is less polluting than the air or road transportation means, efforts are made to protect the environment. In addition, European integration will lead to a more competitive EC market as national governments open bidding procedures to all EC manufacturers to compete. The reorganisation of the railway operators can delay investments in several EC countries

Figure 1: Railway rolling stock
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

The railway rolling stock industry includes the manufacture of standard large and narrow gauge railway and urban transport railway equipment. This includes:

- locomotives;
- heads of motor coaches and motor-coach trains;
- mainline passenger coaches, metro cars and tramways;
- goods wagons;
- rolling stock equipment;
- fixed track equipment;
- electric signalling, safety and control devices for railways..

Production of passenger coaches also includes material for regional traffic and medium distance e.g. coaches for the "interregional" service, and for additional services like: mail vans, restaurant cars, sleeping cars; even if these specific cases concern a restricted manufacture.

The performance of the industry is dependent on the transportation needs and on public policies regarding the development of the railroad lines and purchase of rolling stock.

At the EC level, results also depend on well running enterprises that use railway networks for their inter-subsidiaries transports, and on the innovation capacity linked to R&D works.

In 1992, according to the Verband der Deutschen Bahnindustrie, Germany exported a value of 435 million DM, towards France (414), Canada (314), USA (290) and the United Kingdom (37).

Recent trends

After the fall during the 1985-87 period, production began to recover and reached some 5 billion ECU in 1992. In constant prices, production fell continuously throughout the 1983-88 period. Apparent consumption was more variable throughout the 1980s because of the variability in extra-EC imports and exports. Employment continued to fall in 1992 despite an increase in production reflecting increasing productivity. Trade balance remained positive throughout the eighties but with a strong fall from the second half due to the decrease of the exports/imports ratio. Since 1991, trade balance recovered and surpassed, in 1992, its level of the beginning of the 1980s.

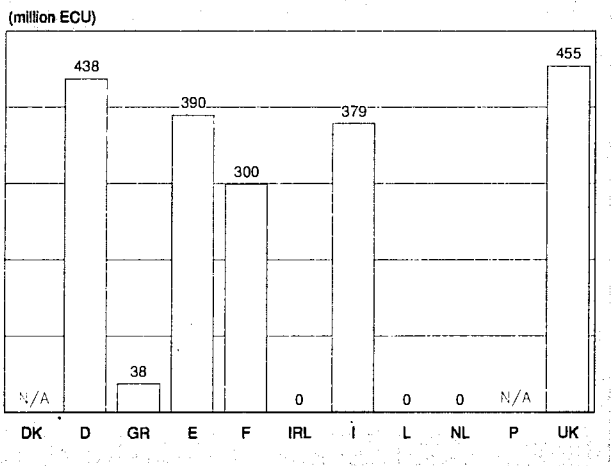
International comparison

In 1992, EC was the leader in the production of railway rolling stock, outpacing US production by 57% and being more than the double of the Japanese one. Nevertheless, measured at constant prices, Japanese production grew at the fastest average annual rate during the 1985-1992 period.

As a competitor on world markets, Japan railway industry has suffered in recent years from the high exchange rate of the yen and in high speed its technology appears less advanced than the ones of European leaders. As far as urban transport systems are concerned the existing Japanese production is not competitive and Japanese industries do not envisage any significant penetration of the market in the near future.

Threat for the European rail industry comes rather from South Korea: the technological transfers required for participating to projects in South Korea could be dangerous for Europe's suppliers in the long term. On extra EC markets, Japan may offer more attractive financial packages.

Figure 2: Railway rolling stock
Value added by Member State, 1992



Source: DEBA

Table 1: Railway rolling stock
Breakdown by product line, 1991 and 1992

(million ECU)		Locomotive	Passenger coaches	Goods wagons
EC(1)	1991	690.8	1 275.5	639.1
Belgique/België	1991	4.7	0.0	0.0
	1992	4.1	91.1	0.0
Danmark	1991	0.0	12.6	0.0
	1992	8.1	0.0	0.0
BR Deutschland	1991	346.2	880.1	514.9
	1992	323.3	840.6	375.2
España	1991	53.8	115.7	19.5
	1992	126.3	101.1	0.0
France	1991	286.0	263.3	97.5
Italia	1991	0.1	0.3	0.0
	1992	0.2	0.1	0.1
Portugal (2)	1991	0.0	3.5	8.3
	1992	0.0	0.0	7.4

(1) Excluding Greece, Luxembourg, the Netherlands, Ireland and the United Kingdom
(2) Data for passenger coaches include bodies
Source: UNIFE

Table 2: Railway rolling stock
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	3 306	3 069	3 467	3 452	3 224	3 447	3 752	4 704	4 271	4 140	4 200
Production	4 093	4 129	4 297	4 195	3 896	4 014	4 026	4 958	5 233	5 349	5 300
Extra-EC exports	904.6	1 186.7	964.5	856.0	840.3	722.7	409.9	444.8	1 341.2	1 567.8	1 400.0
Trade balance	786.2	1 060.2	830.0	743.8	671.8	567.1	274.2	254.2	961.8	1 209.3	1 100.0
Employment (thousands)	99.1	92.8	87.5	83.2	71.5	68.4	64.8	68.4	66.1	62.3	56.1

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 3: Railway rolling stock
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	-2.3	1.3	-0.7
Production	-3.5	3.9	-0.3
Extra-EC exports	-8.8	17.1	1.9
Extra-EC imports	-2.7	14.4	4.6

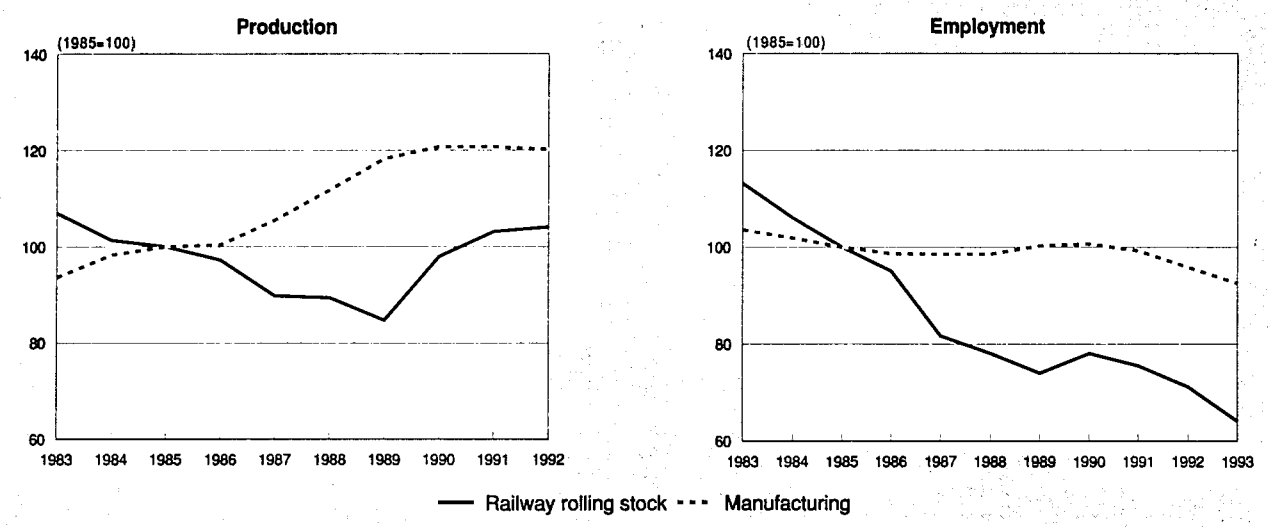
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Railway rolling stock
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	904.6	1 186.7	964.5	856.0	840.3	722.7	409.9	444.8	1 341.2	1 567.8
Extra-EC imports	118.4	126.5	134.5	112.2	168.5	155.6	135.7	190.6	379.4	358.4
Trade balance	786.2	1 060.2	830.0	743.8	671.8	567.1	274.2	254.2	961.8	1 209.3
Ratio exports/imports	7.64	9.38	7.17	7.63	4.99	4.64	3.02	2.33	3.53	4.37
Terms of trade index	111.7	97.3	100.0	95.5	88.3	94.2	84.2	83.5	77.4	80.8
Intra-EC trade	327.7	353.5	244.7	269.2	259.1	298.7	350.0	407.8	679.4	958.3
Share of total imports (%)	73.5	73.6	64.5	70.6	60.6	65.7	72.1	68.1	64.2	72.8

Source: DEBA

Figure 3: Railway rolling stock
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

Foreign trade

In general, both extra-EC exports and imports exhibit large variations from year to year, due to the high value nature and irregular delivery of long term contracts. In 1991 and 1992, large exports to the former Soviet Union from Germany, and to some extent from France caused extra-EC exports to increase. Extra-EC exports consisted mainly of passenger coaches. Destination of extra-EC exports changed significantly as EC exports towards developing countries increased by 20%, while those towards USA decreased by 15.2% during the 1987-92 period.

EC suppliers changed also from 1987 to 1992 as the share of EC imports coming from the developing countries doubled when USA share in EC imports decreased from 10.6%. EFTA countries remained the largest exporters to EC though the opening of East Europe could provide the EC with important new sources such as Czechoslovakia.

Goods wagons represented the largest part of extra-EC imports while imports of passenger coaches and locomotives came from other EC Member States.

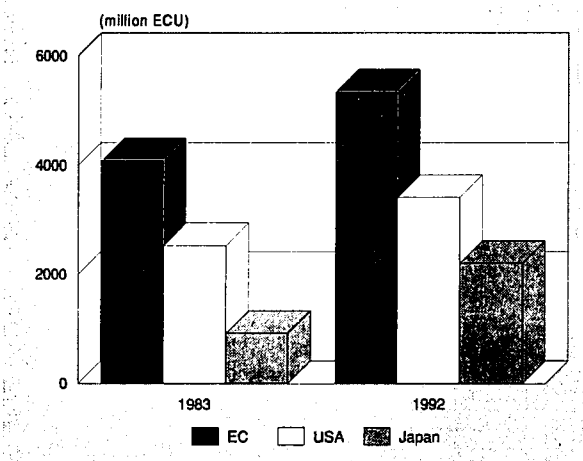
Intra-EC sales showed a steady increase since 1988, although its share of total sales varied between 60% and 70% throughout the eighties.

MARKET FORCES

Demand

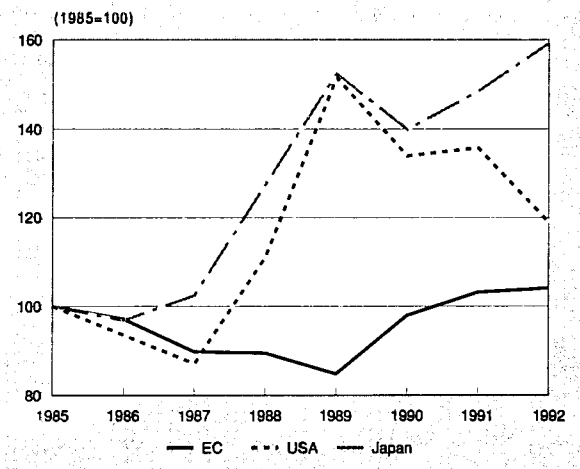
The industry has a relatively small number of customers, in national and regional railroad companies, urban transport companies, private rental and lease companies and industries with their own railway rolling stock. Enterprises of UNIFE also produce for private clients exploiting their internal network and with their own material e.g. big petroleum industries or automobile industries.

Figure 4: Railway rolling stock
International comparison of production in current prices



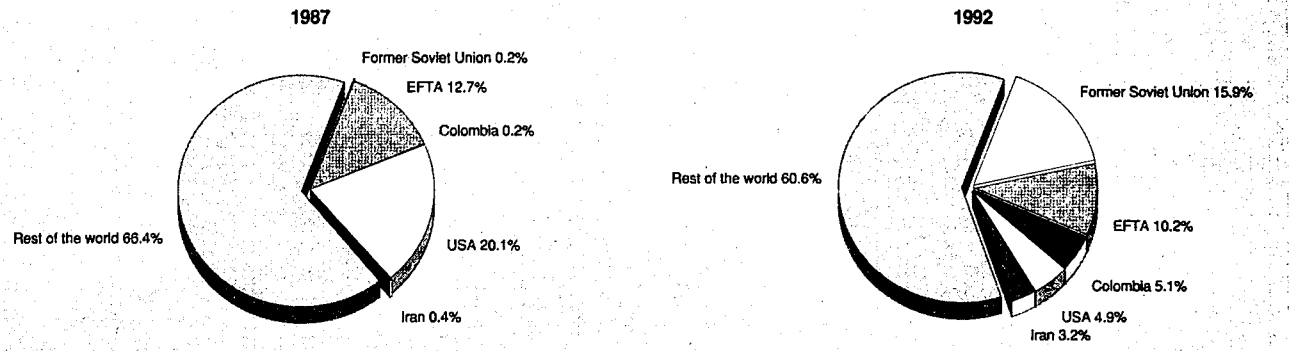
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Railway rolling stock
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Railway rolling stock
Destination of EC exports



Source: Eurostat

The industry is less affected by general income developments than by transportation and infrastructure policies. Planning of new networks and increases in infrastructure tend to be long-term plans. Short-terms variations arise however from budgetary bottle-necks. Railway rolling stock has a long economic life. Product innovation does however involve the purchase of replacement of certain parts of rolling stock.

Product innovation has a significant effect on demand. Increased demand for fast transportation led to the development of the high-speed rail technology and resulted in plans by many countries for new high-speed networks. France is increasing the network of its TGV, and it is expected that by the end of the century, all west European countries will have high-speed rail connections. Beyond, France, Germany, Italy and Spain in particular are well started on their high-speed networks.

Supply and competition

For many years EC has been the world market leader. Since Spain has become an EC member, the European leadership has been reinforced towards competition from Japan, USA and Canada. East European countries might eventually become competitors for the EC, due to the lower labour costs and transfer of technologies from EC manufacturers. Competition thus is mainly on the technological side. Japanese manufacturers are looking for new international markets to boost flagging exports, including Europe and USA.

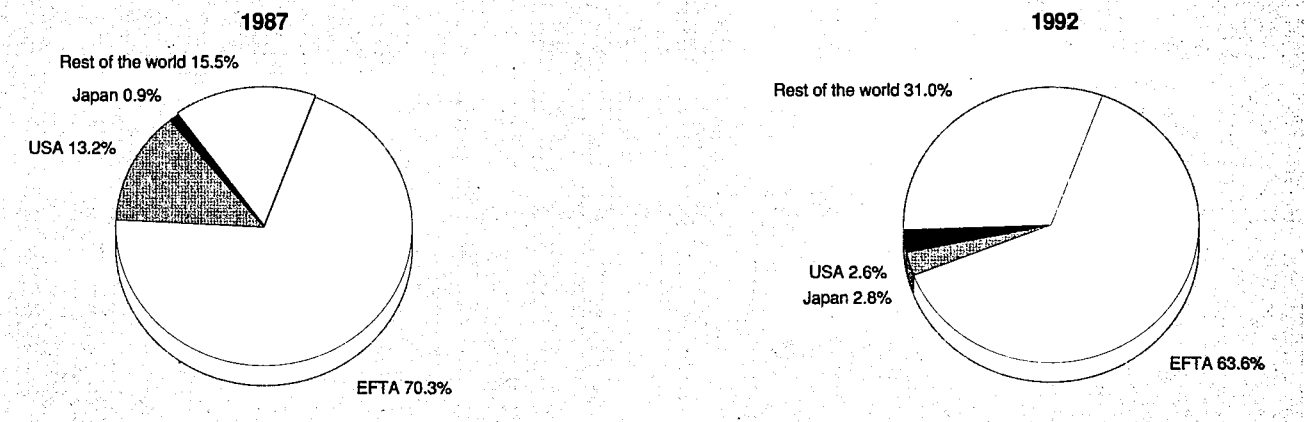
During the 1987-90 period, while US production continued its growth, EC production at constant prices fell as well as the other EC manufacturing industries did. This decrease led to a downsizing of the employment in the railway rolling stock while it was more variable in the other EC manufacturing sectors. Even after the recovering of the production in all EC manufactures, employment remained low in the 1990-92 period due to high unit and total labour costs index.

The result of this downsizing was growing productivity that should help the EC to maintain its competitiveness compared to producers with lower labour costs.

Production process

Since the industry has only a few clients, it works very closely with its customers. Producers can only develop new equipment in close collaboration with their clients. The Single European Market should make cooperation easier, as requirements will be harmonised through European standardisation.

Figure 7: Railway rolling stock
Origin of EC imports



Source: Eurostat

Innovations have been numerous in the industry. For example, high-speed and tilting car body technology allow higher medium speeds on curved tracks.

Multi-micro processor control equipment and three phase drives have become standard in various countries. The use of new materials like light alloys, composites, carbon fibres and the use of new propulsion systems with low weight transformer will decrease vehicle weight significantly and increase power efficiency.

Technological developments will also address information and telecommunication technologies regarding signalling and safety systems allowing trains to cross national borders; advanced telematics that will allow for example identification and localisation of vehicles; software applications, e.g. experts systems aiming at total predictive maintenance.

Additional technological innovations worth to mention are: bogies for locomotives and coaches with radial steering wheel sets to minimise lateral forces on track and wear of rail and wheel flange; satellite oriented control and communication systems; integrated transport systems for passengers and freight; innovative aerodynamic and silent proved trains and automotive train control systems for mass transit transport. Urban vehicles with low-floor and advanced propulsion systems are more and more used.

INDUSTRY STRUCTURE

Companies

The industry comprises about 100 locomotive, coach, and wagon builders, and about the same number of railway equipment manufacturers. Locomotives are mainly produced by divisions within large firms engaged above all in other industrial sectors, while passenger coaches and goods wagons are usually the primary product of the producing firm. The size of companies varies widely, from less than 100 employees to several thousand workers. The largest companies include GEC-Alsthom (UK-France), Asea Brown Boveri (Sweden-Switzerland and Germany), Siemens and AEG (Germany) and Ansaldo (Italy). All these companies produce in many fields other than transportation. Several of them are the result of mergers. There is a need for a concentrated industry structure to deal with the continuous expense of R&D and innovation, and with foreign competition.

Strategies

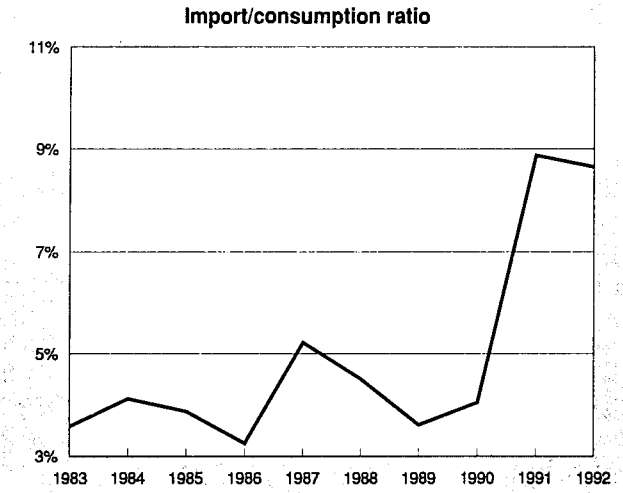
Major railway suppliers generally have significant presence in their main markets in the EC with production capacities in the main countries they serve. Today they are forced to rationalise their capacities and facilities across border to survive fierce competition. Indeed, East European railway industry can be seen as direct threat for EC industry as they benefit from low-wages conditions and generate a delocalization process adding pressure on existing overcapacity in Europe.

The primary strategies for the leading firms of the industry are increased innovation and technology and increased concentration. European firms must stay competitive on the basis of quality and modernisation.

Companies must also be large enough to withstand foreign firms. The specialised nature of products does not allow a large amount of economies of scale, but knowledge of different standards and requirements by different EC customers does give European firms an advantage over non-European firms on the world market. This advantage might well disappear after the introduction of European norms. Firms must therefore be prepared to face more direct foreign competition, as well as more intra-EC competition. However, the drawback of the creation of these European norms will only concern the diversity of the industrial supply. A technical harmonisation at the European level allows manufacturers to turn themselves to standardised rules and give them, as a result, the possibility to profit from economies of scale. Yet this allows also the railway industry to increase its competitiveness through more effective and more economic production methods so that the drawback of too much diversified production, i.e. in a very small scale, can be more than compensated. It is that objective that has led to the proposal of a directive for the high-speed trans-European network.

The railway industry is looking in three primary directions. Much of current investment is going into the high-speed railways, which are seen as one of the most important of near future developments. These high-speed systems will require some transformation of existing networks and infrastructure, as well as new infrastructure, and therefore provide the railway industry with new opportunities. Technical specifications on interoperability need to be prepared by industry and operators which would later on be transformed into mandatory standards.

Figure 8: Railway rolling stock
Trade intensities



Source: DEBA

Table 5: Railway rolling stock
EC trade by product in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports:										
Locomotives	130	232	153	94	212	266	32	50	54	145
Passenger coaches	275	281	309	254	189	83	41	26	611	845
Goods wagons	101	166	61	141	76	75	63	100	357	221
Parts	471	598	527	422	423	348	343	358	412	453
Extra-EC imports:										
Locomotives	7	8	4	13	11	14	19	25	36	3
Passenger coaches	23	23	24	18	38	2	0	10	30	6
Goods wagons	23	25	30	27	45	68	50	80	153	162
Parts	63	76	81	61	80	78	77	86	193	222
Intra-EC imports:										
Locomotives	40	12	21	16	12	21	49	54	68	191
Passenger coaches	129	180	80	73	68	60	67	122	230	239
Goods wagons	25	28	22	42	36	49	53	45	93	99
Parts	125	150	138	162	162	193	211	231	354	492

(1) 1983 EC10; double counting may exist, hence explaining the differences in total figures compared to Table 4
Source: Eurostat

High-speed systems are limited in scope. However, another area which is receiving a lot of attention is the urban transit sector to which should be added the regional transport. Expanding cities and suburbs are making efforts for fast and easy public transportation, especially into the heart of cities. As urban transit systems cut down on both pollution and traffic, this is of primary importance to city planners. With the growth of cities, the transit systems will continue to grow to accommodate the increasing number of people and increased area. This sector is therefore considered by the industry to be at least of equal importance and some industrialists are even believing that it should be larger to the high-speed rail development, because of the almost unlimited room for expansion and demand. High speed, regional and urban transport systems need to be interconnected to create the "citizen networks" proposed by EC in its White Paper on Future Transport Policy.

Combined transport is another important field for the future activity of the industry. As it is not possible for railways to deliver goods to every location trucks can reach, the combined rail/road haulage offers a good solution, especially as it offers environment, energy saving, security and anticongestion advantages. Goods can be transported by rail for long distances and dispatched to their final destinations by trucks. Quick loading and unloading systems are essential for the success of combined rail/road traffic.

ENVIRONMENT

Rail transport is a less polluting mode of transportation than air or road. Nevertheless, efforts are made to protect the environment. A coordinated transport system for Europe has been identified as a prime objective of the EC policy in order to ensure sustainable mobility of freight and passenger under the best environmental and energy efficient conditions.

As environmental concerns are considered as a main issue in Europe, railway has to adapt to more and more strict environmental measures. In this way, weight-savings; more economical use of energy; cooling system increasingly designed with recyclable components and research for technologies to reduce environmental damages such as noise and air pollution are good examples.

REGULATIONS

The Single European Market will have a significant effect on intra-EC trade, especially due to the European standardisation efforts, and the enforced opening up of public procurement competition to all qualified EC companies regardless of nationality. The so-called "Utilities Directive" (Directive 90/531, in force since 1/1/93 excepted for Spain, Greece and Portugal) imposes four requirements to the public contracting entities: information, non discriminative specifications, transparency and fairness. It should lead to major changes in the old national practices and supremacy for the operators' requirements.

Table 6: Railway rolling stock
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	24.6	25.2	26.7	25.5	26.1	28.0	28.4	28.1	31.1	33.2
Productivity index	92.1	94.3	100.0	95.2	97.5	104.7	106.1	105.1	116.2	124.1
Unit labour costs index (3)	86.0	92.4	100.0	105.6	116.2	119.4	129.5	141.3	152.6	165.7
Total unit costs index (4)	88.7	91.4	100.0	107.6	116.3	124.3	133.3	151.3	164.4	180.1

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Table 7: Railway rolling stock
Expected real annual growth rates

(%)	1993-97
Apparent consumption	0.5-1.0
Production	2.0

Source: DRI [redacted]

The "Remedies Directive" (Directive 92/13, in force since 1/1/93 excepted for Spain which will be in force on the 30th of June 1995 of, Greece and Portugal both in force on the 30th of June 1997) completes the system set by the above-mentioned Directive by giving the rights to suppliers to be assured that the obligations of the purchasers are fulfilled.

The "Service Directive" (Directive 93/38, in force on 1/7/94 excepted for Spain, Greece and Portugal) completes Directive 90/53 of which it contains a consolidated version in order to take into account the characteristics of service contracts. It will namely be applied to certain R&D services if they lead to contractual commitments. R&D contract which affects the competitive award of subsequent contracts has to be opened.

OUTLOOK

It is not easy to forecast economic indicators for the railway industry, because the industry is extremely dependent on factors beyond its control, and which are not always foreseeable. Changes in the political climate or the budgetary situation of a country can lead it to cancel long-standing contracts, for instance. However, by examining medium and long-term trends general forecasts can be made by industry.

Despite negative growth trends for railroad rolling stock in the 1980s, the outlook for the early to mid 1990s looks promising. Increased interest in high-speed lines as alternatives to air travel and road travel look good in the face of continuing worries about pollution from cars and overcrowded roadways, as well as the proximity of railroad stations to town centre compared to airports. Looking at the figures, consumption is expected to grow at about 0.5 to 1% and production at 2% during the period 1993-97.

Positive effects of European integration include increased freight and passenger traffic among Member States. The former Soviet Union countries can also offer EC manufacturers large new markets, as the need for technology in those countries creates business opportunities for western firms, provided that financing is available. Although the Single European Market may also involve risks for firms as well. The primary risk is that deregulation of airlines and road haulage firms will make them more competitive with rail. There is thus no guarantee that the Single European Market will increase the demand for railway equipment's.

An important factor affecting the market development will be the reorganisation and restructuring of European railway operators. Financing of transport infrastructures should also be promoted by EC and Member States in order to improve European global competitiveness and keep European railway industry technology ahead of international competition.

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Aerospace equipment
NACE 364

Activity in the aerospace equipment industry is traditionally characterised by its cyclical nature. Since the beginning of the nineties however, the European aerospace manufacturers are experiencing their worst crisis, resulting this time from worrying structural problems. The slump in civilian demand for aircraft could have merely generated a cyclical downturn in the aerospace industry, but in fact, it translated into the largest depression ever through its coincidence with the dramatic reduction of military orders. Now, the European aerospace industry is facing problems of structural adjustment. The EC aerospace industry is increasingly operating in a global market, and its future will depend on its ability to surmount the current problems, in particular by increasing its export market share in spite of the emergence of newcomers and increasingly determined US competition.

INDUSTRY PROFILE

Description of the sector

Data available for the aerospace industry divides total turnover into four subsectors: complete systems (aircraft, missiles, etc.) engines, equipment, and space. Complete systems represent about 50% of the sector's turnover. Equipment represents some 26% of the turnover of EC aerospace industry, followed by engines with 18% and space with 6%. These products have both civilian and military applications. Civilian businesses cover several products: large commercial jets, regional aircraft (turboprops and small commercial jets), helicopters, space hardware (satellites and launchers).

Military operations comprise the manufacture of aircraft, missiles, helicopters and space hardware. The share of military activities in total aerospace manufacturing has been constantly decreasing since the early 1980s, as a result of political détente. However, the relative share of production for military purposes still represents more than half of the sector's activity in the EC.

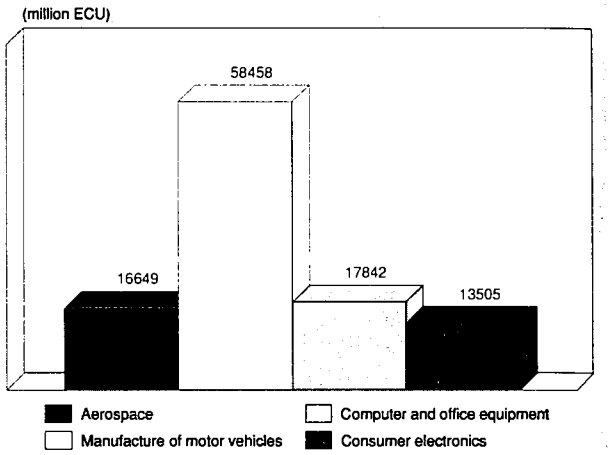
Recent trends

Total EC production value amounted to 42 billion ECU in 1992, increasing by more than 5% per year (in real terms) over the eight year period to 1992. The four largest producing countries, France, the United Kingdom, Germany and Italy, together accounted for 94% of EC aerospace consolidated turnover in 1992.

The European aerospace industry achieved spectacular growth in productivity over the eighties, at above 5% on a yearly average between 1985 and 1990. Such performance accompanied an important increase in apparent consumption. Demand for large commercial aircraft and for space equipment had indeed expanded at a strong pace, which somewhat counterbalanced the cutback in the production of military aircraft. Consequently, the aerospace industry produced at a substantial rate throughout the eighties, a rate which actually jumped in 1989 and 1990.

1990 turned out to be a dramatic turning point. Hit by a sharp recession in both military and civil activities, EC's apparent consumption of aerospace equipment fell by as much as 14% (in current ECU) between 1990 and 1992. Meanwhile, production was cut by only 4.6% due to a strong EC performance on export markets. Employment, which had been regularly increasing over the second half the 1980s, fell by above 7% between 1990 and 1992.

Figure 1: Aerospace
Value added in comparison with other industries, 1992



Source: DEBA

International comparison

The EC emerged as a powerful competitor in the world's aerospace industry in the last decade. The founding of the Airbus Industrie consortium, composed with four companies: Aérospatiale (F), British Aerospace (UK), Deutsche Aerospace, also known as DASA, (D) and CASA (E) marked the return of Europe to the large civil aircraft market.

Competitive pressure to EC manufacturers still essentially stems from the US. The world aircraft industry has always been dominated by the United States, which posted 78.8 billion ECU of production value in 1992. Japan is also a sizeable aerospace manufacturer, with production value averaging 4.5 million ECU in 1992 (as such, Japanese turnover is more than five times smaller than EC's).

New players are emerging in other places. Far East Asian countries are endeavouring to build up an aerospace industry, often from scratch. To reach this objective, manufacturers in these countries are engaged in negotiations aimed at setting up joint ventures or alliances with western companies. The Indonesian industry has actually emerged as a respectable aerospace manufacturer, as this country managed to build up an industry in about one decade, which is now about to manufacture its own turboprop.

The former USSR is another potential entrant. The CIS, in particular, has one of the world's largest aerospace industries and holds an impressive technological know-how in aerospace manufacturing. This industry is nevertheless suffering from serious handicaps in terms of efficiency, organisation and overmanning. There is thus a long way before the east European aerospace industry becomes competitive and up-to-date. Meanwhile, principles of cooperation (in the space sector particularly) have already been agreed upon between CIS and the EC.

Foreign trade

It is no wonder, given the global nature of the aerospace industry, to find that exports are the sector's largest outlet. More than 39% of EC's production is exported, a share which exceeds 60% in France. Most of these exports are directed to extra-EC markets, North American being one of the major EC trading partners, with 35.6% of EC's exports and 67.5% of total imports to the EC.

Table 1: Aerospace
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	25 791	25 507	28 744	31 774	32 514	35 473	42 698	47 018	46 902	40 533	43 700
Production	26 818	27 561	30 825	32 357	33 023	35 762	42 322	45 638	45 114	43 543	41 600
Extra-EC exports	5 756	7 658	7 401	5 884	5 686	9 366	12 572	12 480	15 133	17 188	12 000
Trade balance	1 027	2 053	2 081	583	510	289	-376	-1 381	-1 788	3 010	-2 100
Employment (thousands)	404.3	395.8	395.8	401.6	408.8	404.9	412.7	421.8	413.8	389.9	368.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards ; consolidation at National Level.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Aerospace
Breakdown of aerospace turnover, 1991 (1)

(million ECU)	F	D	I	UK	E	NL	EUR6	%
Aircraft+missiles	7 905	5 848	2 928	7 071	693	1 238	25 683	48
Engines	3 844	1 248	742	3 521	109	0	9 464	17
Equipment	4 268	4 508	899	4 929	29	365	14 998	28
Space	1 350	1 448	520	155	75	48	3 595	7
Total	17 367	13 052	5 089	15 676	906	1 651	53 740	100

(1) For further figures, see the Commission publication ""The European aerospace industry, Trading position and figures 1993
Source : DGIII, national associations

Table 3: Aerospace
Average real annual growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption	0.6	4.2	2.2
Production	2.5	1.5	2.1
Extra-EC exports	12.9	-1.1	6.5
Extra-EC imports	6.1	6.9	6.5

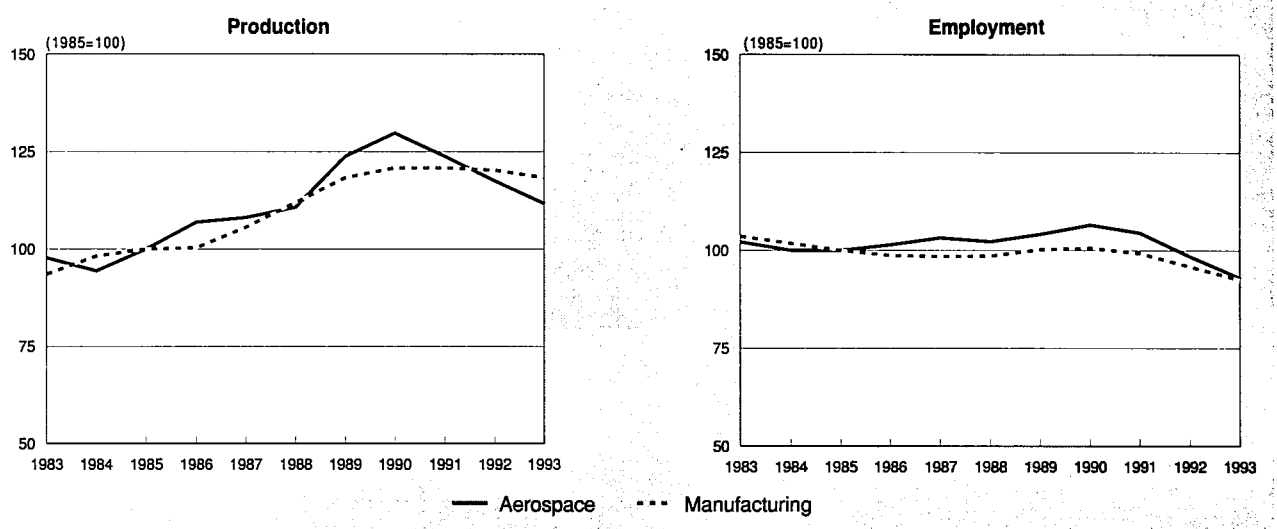
Source: DEBA

Table 4: Aerospace
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	5 756	7 658	7 401	5 884	5 686	9 366	12 572	12 480	15 133	17 188
Extra-EC imports	4 730	5 605	5 320	5 301	5 177	9 076	12 948	13 860	16 921	14 178
Trade balance	1 027	2 053	2 081	583	510	289	-376	-1 381	-1 788	3 010
Ratio exports/imports	1.22	1.37	1.39	1.11	1.10	1.03	0.97	0.90	0.89	1.21
Terms of trade index	130.6	114.2	100.0	87.7	79.6	81.2	82.4	90.3	114.0	130.3
Intra-EC trade	6 294	6 145	5 795	5 237	5 536	10 243	15 496	14 547	20 129	19 960
Share of total imports (%)	57.1	52.3	52.1	49.7	51.7	53.0	54.5	51.2	54.3	58.5

Source: DEBA

Figure 2: Aerospace
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

Exports and imports to/from the EC broadly balance in terms of size. The very large fluctuations of the American dollar compared to European currencies have largely influenced EC's trade balance during the 1980s. In particular, the weakness of the dollar since 1986 has dampened EC's export competitiveness, which coupled with increased purchases of American aircraft by EC airlines, led to a deterioration of Europe's trade balance. In 1991, EC's trade deficit amounted to 1.8 billion ECU. In 1992, slackening apparent consumption in the EC translated into decreasing extra-EC imports. Consequently, EC's trade balance was positive by about 3 billion ECU. In 1993, EC's trade balance is expected to have deteriorated again, with extra-EC exports falling by 30% in value.

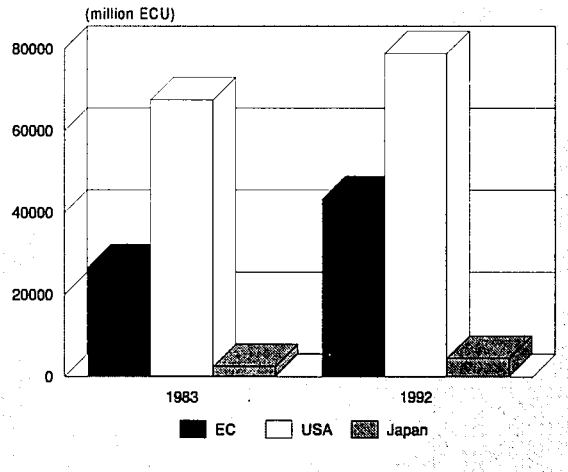
MARKET FORCES

Demand

Apart from export markets, the largest outlet for aerospace equipment is the government sector, through its military orders. The government sector actually represents more than half of the sector's domestic sales. It is then easy to understand how severely governments' drastic cuts in defence budgets have affected the aerospace industry as a whole. Under strong budgetary constraints, governments started cutting defence budgets in the middle of the eighties, that is far before the fall of the Berlin Wall. This trend has nevertheless accelerated over the recent past, in line with the end of the Cold War. The shrink in the defence market translated into cancellations or postponements of new or existing programmes.

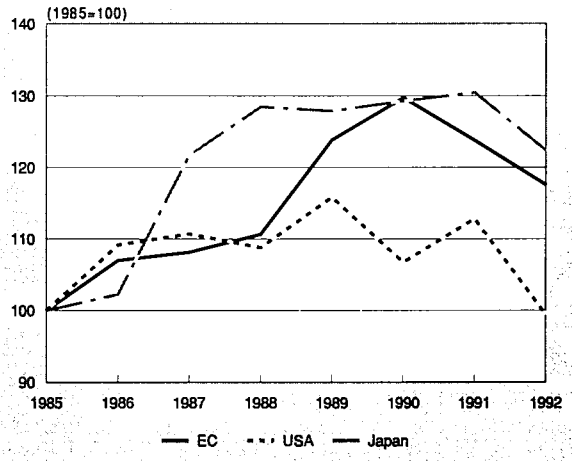
Airline companies are the other major outlet for the aerospace industry, through their demand for new aircraft, replacement parts and maintenance services. Since 1990, airline companies have faced sluggish or negative traffic growth, fierce competition and rising costs, an occurrence of factors which translate into deep financial losses. Also enduring large over capacity due to the investment boom of the late eighties, most airline companies have severely revised their investment plans, often postponing or even cancelling orders for new aircraft.

Figure 3: Aerospace
International comparison of production in current prices



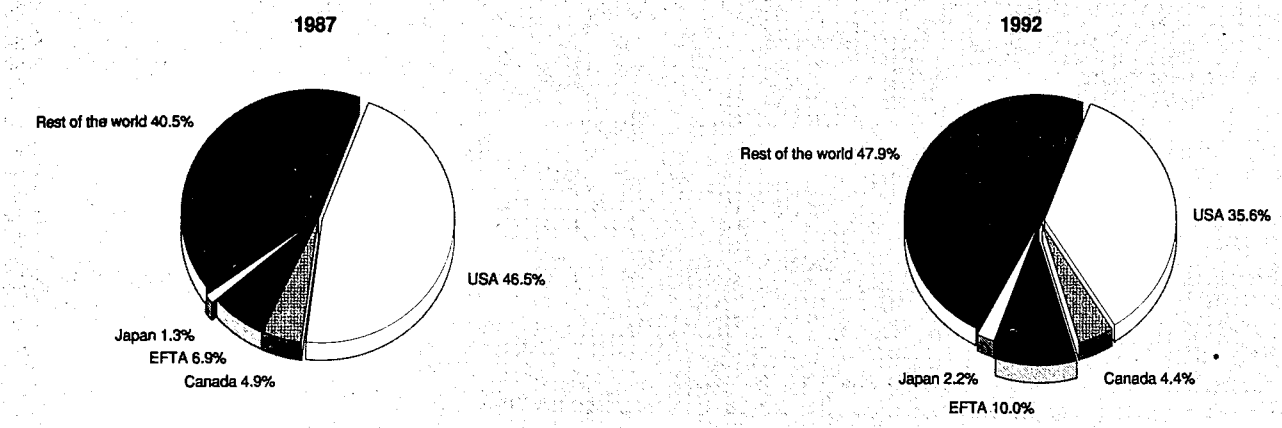
Source: DEBA, Census of Manufacturers, Nikkei

Figure 4: Aerospace
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Aerospace
Destination of EC exports



Source: Eurostat

Regional airlines are suffering more from the recession than their larger counterparts, due to their difficult financial position, and their smaller market share. They have drastically cut orders. For example, new orders of EC produced turboprop aircraft dropped from 451 units in 1990 to 222 in 1992.

Civilian and military activities have traditionally posted asynchronous cycles. Since 1991, the deep recession in civil aviation, linked to the airline sector's difficulties, has coincided with sharp cuts in defence spending. Civil operations are therefore hardly not able to offset the dramatic decline of defence businesses for the aerospace industry.

Supply and competition

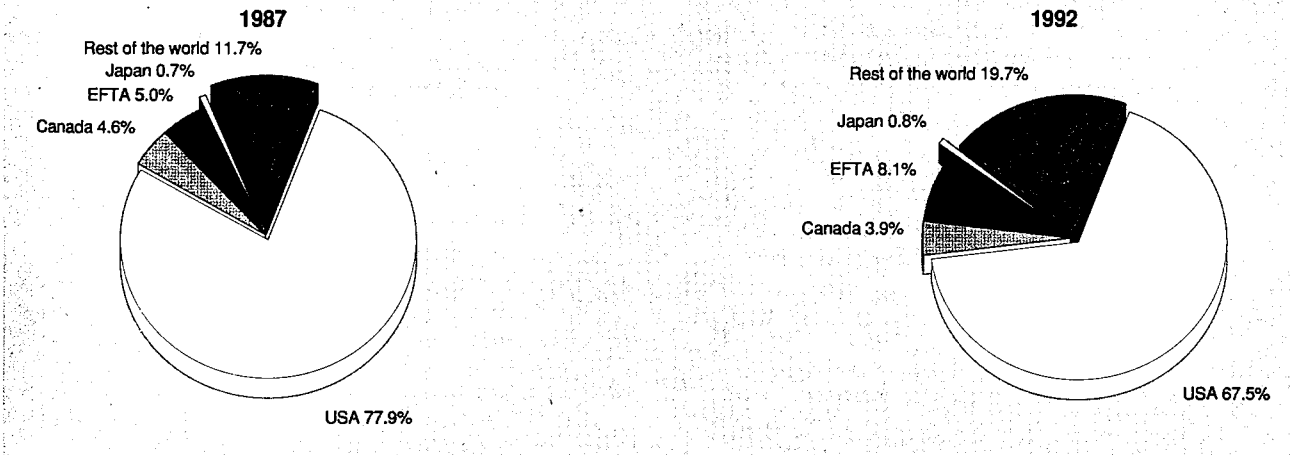
As indicated earlier, the world's aerospace industry is clearly dominated by US firms, which enjoy the advantage of a large domestic market, and lead in production volume, range of models and rate of production. In addition to these competitive advantages, the under valuation of the US dollar with respect to European currencies further handicaps the EC industry.

The relationship between the EC and the US is an outstanding mix of cooperation and competition. Collaboration exists, particularly in the case of engine manufacturers where strong links have been built up between EC and American manufacturers. Competition is, nevertheless, harsh between the major producers, and takes place both in civilian and military businesses.

Such intense competition led the EC aerospace industry to implement changes in the production process, which brought about significant changes in the organisation of work. Forced to shorten production cycles and to cut costs to remain competitive, the industry shifted towards increased automation. Simultaneously, new forms of organisation and management are being introduced, which aim at producing faster, cheaper and more efficiently. In particular, the aerospace industry is introducing just-in-time management. Airbus is also implementing simultaneous engineering, in order to efficiently manage the wide range of activities the group traditionally coordinates.

The development of such new forms of production (inherited from the Japanese automotive industry), is pushing the industry to a substantial reduction in the number of component suppliers, and contributing to the restructuring and consolidation of the aerospace supply sectors.

Figure 6: Aerospace
Origin of EC imports



Source: Eurostat

Table 5: Aerospace
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	39.0	39.9	39.8	42.7	41.9	44.0	46.2	46.4	42.5	42.7
Productivity index	97.8	100.1	100.0	107.1	105.2	110.6	116.0	116.6	106.8	107.2
Unit labour costs index (3)	86.1	91.7	100.0	102.3	106.8	113.9	120.6	128.4	139.0	149.3
Total unit costs index (4)	97.1	87.7	100.0	101.9	104.0	112.3	128.8	137.3	143.3	149.3

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Production process

The aerospace industry is characterised by important synergies between the military and civilian segments of the market. Most of the synergies take place at the research and development stage. Generally, new technologies are first developed for military applications, and are in a second stage adapted for civil purposes, mainly in engines and avionics.

Another important feature of the aerospace industry is the importance of economies of scale in the production process. Research and development costs are the most important sources of economies of scale, although some scale economies may also be achieved at the production stage. The initial cost in R&D that is necessary to develop a new model is one of the largest of all industries. For example, the development of a large commercial aircraft requires up to 10 billion US dollars spread over four or five years, and the length of the product cycle is characterised by very long periods of time before reaching break-even. Economies of scale can also be achieved on the demand side, by enabling the costs of maintenance and training to be held in check.

Along with these economies of scale, the aerospace manufacturers can also benefit from "family economies". The existence of a learning curve and production overheads indeed provide manufacturers with a cost advantage when developing and producing new models. This actually gives manufacturers a strong incentive to produce a full range of models.

INDUSTRY STRUCTURE

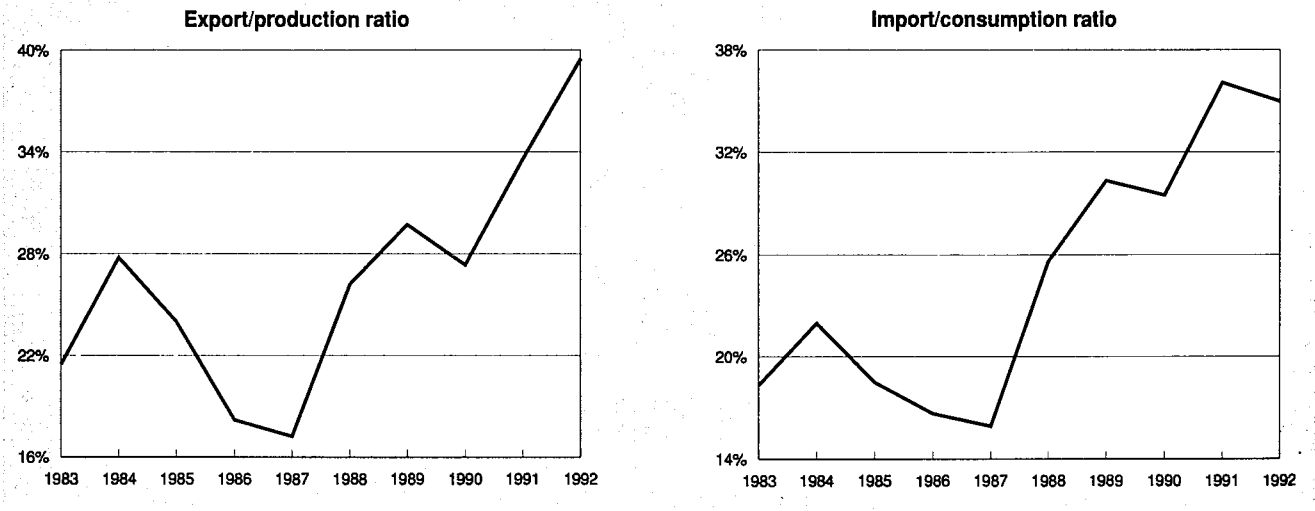
Companies

Contrary to its American competitor, the European aerospace industry is largely segmented. Moreover, the main European aerospace manufacturers are smaller than their American competitors. Of the world's leading aerospace manufacturers in 1991, only four were European: British Aerospace, DASA, Rolls Royce (UK) and Aérospatiale.

The aeroengine industry is dominated by three players: Rolls Royce, General Electric (USA) and Pratt & Whitney (USA). The large jet aircraft industry is controlled by an oligopoly of similar size: Boeing (USA), Airbus and McDonnell Douglas (USA). The regional aircraft industry is dominated in the EC by few manufacturers including ATR (a joint venture between France's Aérospatiale and Italy's Alenia), British Aerospace, CASA, DASA, and Fokker (NL).

Apart from the leading European producers, a substantial amount of small and medium sized firms account for a significant share of the production. The production of an aircraft, which can be represented by a complex system of equipment, is indeed divided into parts which can be sub-contracted. Subcontracting activities are organised, like in the automotive assembly industry, in a hierarchical structure. The prime contractor, i.e. the aircraft manufacturer itself, delegates the production and sometimes even the conception, of complete systems to large suppliers which in turn out-source parts of

Figure 7: Aerospace
Trade intensities



Source: DEBA

Table 6: Aerospace
The 10 leading European companies, 1992

(million ECU)	Country	Aerospace turnover	Turnover	Net profit	Aerospace employees	Employees
British Aerospace	UK	7 419	13 487	-1 461	63 600	108 500
Aérospatiale	F	7 279	7 607	-351	N/A	46 110
Deutsche Aerospace	D	6 973	8 523	-951	N/A	81 872
Thomson CSF	F	4 169	4 978	301	30 200	42 357
GEC	UK	3 761	12 754	949	N/A	104 995
Snecma	F	3 324	3 324	17	26 374	26 374
Rolls-Royce	UK	2 897	4 815	129	30 700	55 000
Alenia	I	2 868	N/A	N/A	N/A	29 471
Dassault Aviation	F	2 387	2 387	168	13 592	13 592
Fokker	NL	1 696	1 790	58	N/A	12 363

Source: OC&C Flight International, August 1993

the operation to a third level of sub-contractors. Overall, France's Aérospatiale estimates that sub-contracting represents over 25% of the production of an aircraft.

In Germany and in the United Kingdom, the production is very concentrated under the wing of a single national company, respectively DASA and British Aerospace. This is not the case in France and in Italy where the industry remains particularly fragmented.

Strategies

The contraction of the defence industry led manufacturers to diversify increasingly into commercial activities. This has put greater pressure in the commercial business already suffering from over capacity caused by falling orders and deliveries.

To answer these challenges and difficulties in funding the development of new aircraft, the major aircraft manufacturers have been engaged in a deep restructuring. Besides the trend towards concentration, they have entered in a process of international cooperation which takes the form of mergers, acquisitions and strategic alliances. For example, Deutsche Aerospace received in May 1993 a go ahead from the European Commission to acquire 51% of Fokker of the Netherlands. This approval paved the way for the building of further links in the regional aircraft industry. DASA has actually proposed to Aérospatiale and Alenia to take a minority stake in Fokker. The French and Italian manufacturers already team up in the ATR regional aircraft venture.

International cooperation finds an interesting illustration with the negotiations held between Boeing of the US and Europe's four Airbus partners. Boeing and the partners of Airbus indeed forgot their recurrent disputes to reach an agreement upon a joint marketing study to develop the so called Super Jumbo, a civilian aircraft that should carry between 550 and 800 passengers. The size of the necessary initial outlay for the development of such a large project calls for a need to spread risks, a constraint largely understood by the potential partners in this operation.

REGIONAL DISTRIBUTION

In spite of efforts from both national and EC levels, the manufacture of aerospace equipment remains divided between numerous highly specialised production sites situated in different Member States, and France, the United Kingdom, Italy and Germany account for the bulk of aerospace production in the EC. With more than 30% of EC turnover each, France and the United Kingdom are the largest aerospace manufacturers in the EC. Recent trends in production and employment by country confirm the growing importance of Germany and Italy in aerospace manufacturing. The latter countries represent respectively 22% and 8% of EC manufacture of aerospace equipment. The Netherlands, Belgium and Spain provide the remainder of EC aerospace production.

ENVIRONMENT

Aircraft and engine manufacturers have long integrated environmental concerns in their production processes. Environmental performance has actually become an important criterion in an airline's aircraft and engine selection process. The oldest and least efficient aircraft have already been withdrawn pursuant to a number of international agreements, with major financial impact on the airline companies.

The aerospace industry is concerned with three different types of pollution. Noise created both on take-off and landing is one such problem. The aerospace industry has been dealing with this issue for a long time. However, the actual growth of air traffic, combined with the increased size of the aircraft, threatens substantially to reduce the benefit derived from the regulations that have come into force during the last decade. Unless aircraft noise is reduced still further, current international standards may face increasing challenges as individual airports seek to impose tougher controls.

Pollutant emissions, and in particular gaseous emissions in the high atmosphere, are another crucial environmental concern, often associated with the growing awareness of problems connected with the greenhouse effect. The industry has been handling this issue through several technical programmes, particularly through developments in advanced jet propulsion. The current environmental standards regarding gaseous emissions nevertheless appear to be inadequate in so far as they do not take into account the whole flight envelope: during a long distance flight more than 90% of the gaseous emissions are not covered by current standards.

Lastly, aerospace manufacturers are particularly concerned with the problem of energy conservation. This issue is all the more crucial as the industry is bound to produce increasingly powerful civil engines to match the growing size of aircraft. The engines of the future will have to be increasingly efficient in order to meet such requirements as energy conservation, thus requiring further research.

REGULATIONS

Owing to the intensification of international competition, all firms are operating under the same competitive conditions. In the context of progressive globalisation of the aerospace market, this principle applies just as much to competition within the EC as it does to external competitors. All the factors

that could affect competition must be taken into account, and this includes both direct and indirect public subsidies.

When the rules on competition, particularly Articles 85 and 86, are applied to the aerospace industry, the specific conditions of its viability such as the high level of investment needed, the necessary degree of cooperation and the comparatively small number of producers, are taken into account. Some sectors are confronted by difficult challenges of size and depth inherent in the industry: the worldwide dimension of the market, often national markets are too restricted to nourish the development of enterprises strong enough to be internationally competitive; industrial operations of such a size that no existing European enterprise can master all the technologies and acquire the production equipment needed to manage a complex programme in industrial and economic terms; financial requirements that have reached a level beyond the ability of any individual operator to accumulate; and the high degree of integration of the main competitors of the European aerospace industry.

Mergers are subject to Council Regulation (EEC) No. 4064/89 dated 21 December 1989. Their impact is generally evaluated on the world market. Consequently a merger bringing together most of the supply capacity of the EC in certain sectors of the aerospace industry does not necessarily amount to the creation of a dominant position incompatible with the Single Market.

Government subsidies for the aerospace industry are subject to articles 92-94 of the EEC Treaty. At the present time there is no sectoral aid framework laying down special directives for Member States in granting assistance to the aerospace industry. The distorting effects of subsidies on other competitors are also taken into account.

There are general regulations governing state assistance for R&D, but the special features of the sector are taken into account: the advanced technology content of the products, the fierce international competition and lastly the cooperative nature of research.

The sectoral agreement of GATT [General Agreement on Tariffs and Trade] on international trade in civil aircraft, which came into effect on 1 January 1980, lifted most of the tariff and non-tariff barriers to trade in commercial aircraft. In particular, it regulates the various forms of government subsidy to the aerospace industry. Because the situation of the US is fundamentally different from that of Europe and governed by different considerations, the signatories to the agreement do not agree on how it should be interpreted.

On 1 April 1992 the negotiators of the EC and of the USA concluded an agreement resolving their dispute about large commercial transport aircraft. In July 1992, a multilateral negotiation was opened within the GATT framework in order to reach an agreement covering all types of aircraft and all aircraft producer countries so as to arrive at multilateral rulings for this sector.

OUTLOOK

Given the reduction in the share of military work, which is not going to stop given the peace initiatives. the outlook of the EC aerospace equipment sector appears closely linked to the prospects for the airline industry.

Table 7: Aerospace
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.0	1.0
Production	-0.5	2.0
Extra-EC exports	-0.5	1.5

Source: DRI Europe

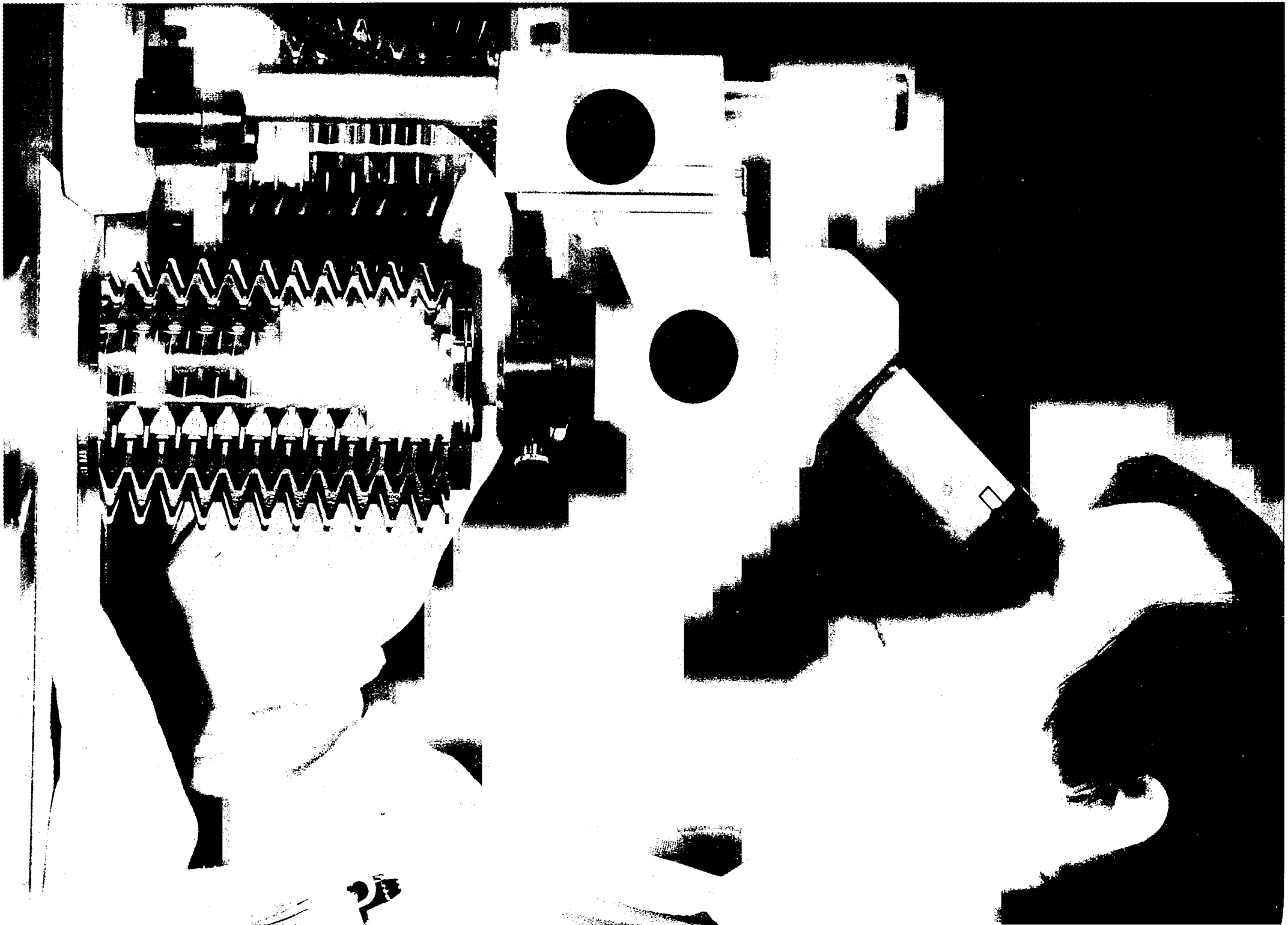
The combination of sluggish traffic and the large amount of new aircraft orders which peaked between 1990 and 1992 has resulted in a serious over capacity. Consequently, short term prospects call for a slackening of commercial aircraft deliveries, in spite of the improvement in air traffic. The markets for engines and equipment will grow in line with aircraft. The only way for the European aerospace manufacturers to secure growth will be through increased market shares. Airbus seems rather well positioned from this point of view, and the EC industry will continue to grow faster than its American counterpart.

After 1995, the growth in air traffic will be fully reflected in the world commercial aviation industry, translating into increased delivery rates. Economic recovery in the world and the need to replace old aircraft will keep activity going in business aircraft and helicopters, while the market for regional aircraft will grow more slowly. The space market will continue to grow apace, particularly in the commercial segment. Sales of military aircraft will continue to fall as programmes are either cancelled or postponed, and defence budgets are cut. Modernisation of aircraft might nevertheless partially check this decline.

Further rationalisation, increased concentration and an enhanced and more coordinated R&D effort appear necessary to enable the European aerospace manufacturers to remain competitive against the formidable US industry. Employment levels are in particular most likely to go on shrinking in the coming years.

The growth in air transport in the medium and long term will necessitate the development of higher capacity, more efficient aircraft, and the improvement of airport infrastructure. Research into environmental technologies to meet increasingly stringent standards will be essential to ensure that this predicted growth is sustainable.

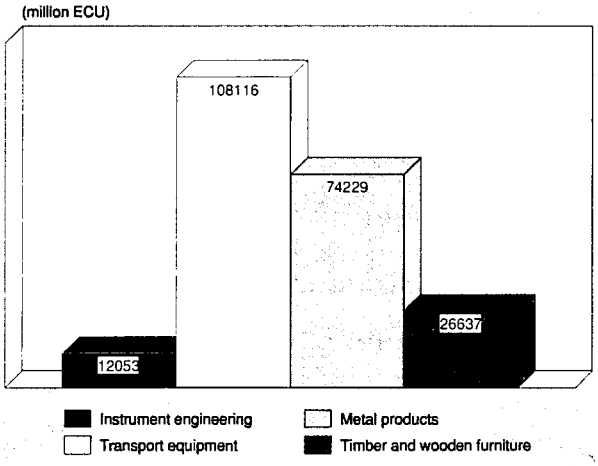
Written by: DRI Europe
The industry is represented at the EC level by: Association Européenne des Constructeurs de Matériel Aérospatial (AECMA). Address: c/o Technopolis, 175 rue Jean-Jacques Rousseau, F-92138, Issy-les-Moulineaux Cedex; tel: (33 1) 47 36 98 76; fax: (33 1) 47 36 83 04.



Overview
NACE 37

The instrument engineering industry covers a wide range of diverse products. Demand for the industry's products stems from investment activities, mainly in the manufacturing sector, and from consumer expenditure on durables.
Thanks to the healthy economic climate of the last decade, EC production increased considerably. Product innovation was an important driving force as well, giving birth to new generations of devices. The increased use of electronic components and the integration with data processing systems brought about significant changes in the industry's relations with up-stream industries.
Competition from producers outside the EC increased rapidly over the last few years, causing a deteriorating trade balance throughout the eighties and into the beginning of the nineties. The outlook in the short term is somewhat pessimistic as the slowdown in the EC's economy dampens demand for investment goods and consumer durables.
In the medium term, however, the outlook for the instrument engineering industry is quite good, as the expected economic recovery will boost demand. Increased automation efforts in production processes, the development and use of new generations of devices, growing environmental concerns and the effects of the ageing of the population are all expected to stimulate demand for the industry's products.

Figure 1: Instrument engineering
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

The instrument engineering industry comprises the following sectors:

- measuring, checking and precision instruments and apparatus (NACE 371);
- medical and surgical equipment and orthopaedic appliances (NACE 372);
- optical instruments and photographic equipment (NACE 373); and
- clocks, watches and parts thereof (NACE 374).

The most important sub-sector is that of measuring, precision and control instruments, with about 38% of total 1992 industry output; the sub-sector of medical devices follows with about 32% of total output, optical instruments and photographic equipment represent approximately 25% and clocks and watches, around 5%. Within the EC, the most important producing countries are Germany with about 46% of the total, the United Kingdom (19%), France (14%) and Italy with some 9%. The smaller countries within the EC produce about 12% of the total. Compared to other sectors of the EC manufacturing industry, the instrument engineering industry is of minor economic weight, with output equivalent to only about 11% of that of the transport equipment industry, for example.

Recent trends

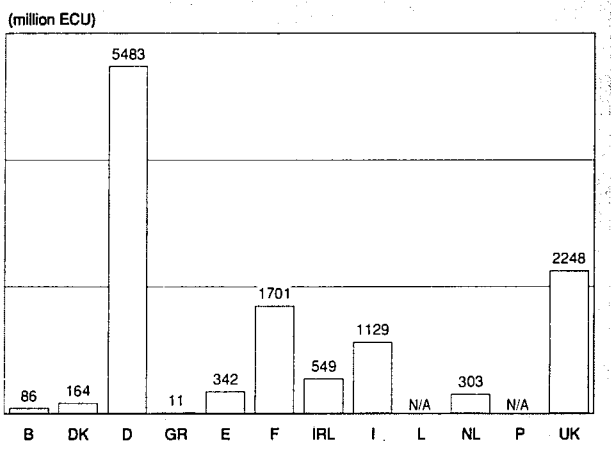
In the recent past, the EC's instrument engineering industry experienced a quite favourable development. Production increased by some 4% per year in volume from 1983 to 1992, well above production growth of the manufacturing sector as a whole, which grew by about 3% in real terms during the same period. Employment figures remained more or less stable with approximately 323 000 employees on the industry's payroll in 1992.

Demand for the industry's products, as measured by apparent consumption, increased at a faster pace than production during these last few years, about 5% per year, in real terms. The difference was made up by sharp increases in imports (7.5% per year in volume). Exports to countries outside the EC increased considerably as well, though at a slower pace than imports (4.6% per year). The result is a deteriorating EC trade balance over the last several years, with a deficit of nearly 3 billion ECU in 1992.

International comparison

The most important producing country in the field of instrument engineering in the Triad is the USA, with more than 50% out of the Triad's total in 1992. The performance of the three main producing areas within the Triad was similar over the last few years. Production growth in the USA and the EC was about 7% per year in value from 1983 to 1992. The most dynamic development for the industry was in Japan, with an average annual growth rate of more than 9% over

Figure 2: Instrument engineering
Value added by Member State, 1992



Source: DEBA

Table 1: Instrument engineering
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	13 956	14 838	16 847	18 165	19 231	21 739	23 954	25 042	27 110	27 673	26 900
Production	13 604	14 583	16 898	17 737	18 351	20 208	21 915	22 880	24 064	24 725	23 900
Extra-EC exports	5 070	5 998	6 942	6 616	6 355	6 961	7 818	7 909	8 223	8 582	8 380
Trade balance	-352.3	-254.5	51.0	-427.8	-880.6	-1 530.6	-2 038.5	-2 161.8	-3 046.1	-2 948.5	-3 000.0
Employment (thousands)	315.5	306.7	322.3	325.4	320.8	325.8	333.2	333.5	330.8	322.8	316.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded BAK estimates.
Source: DEBA

Table 2: Instrument engineering
Breakdown by sector, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Measuring, precision and control instruments	9 015	9 483	1 970
Medical and surgical equipment	8 052	7 796	2 460
Optical and photographic instruments	7 653	6 090	3 061
Clocks and watches	3 049	1 356	996

(1) Except for trade figures, estimates are used if country data is not available.
Source: DEBA

Table3: Instrument engineering
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	7.1	3.0	5.2
Production	5.7	1.6	3.9
Extra-EC exports	4.9	4.3	4.6
Extra-EC imports	8.2	6.7	7.5

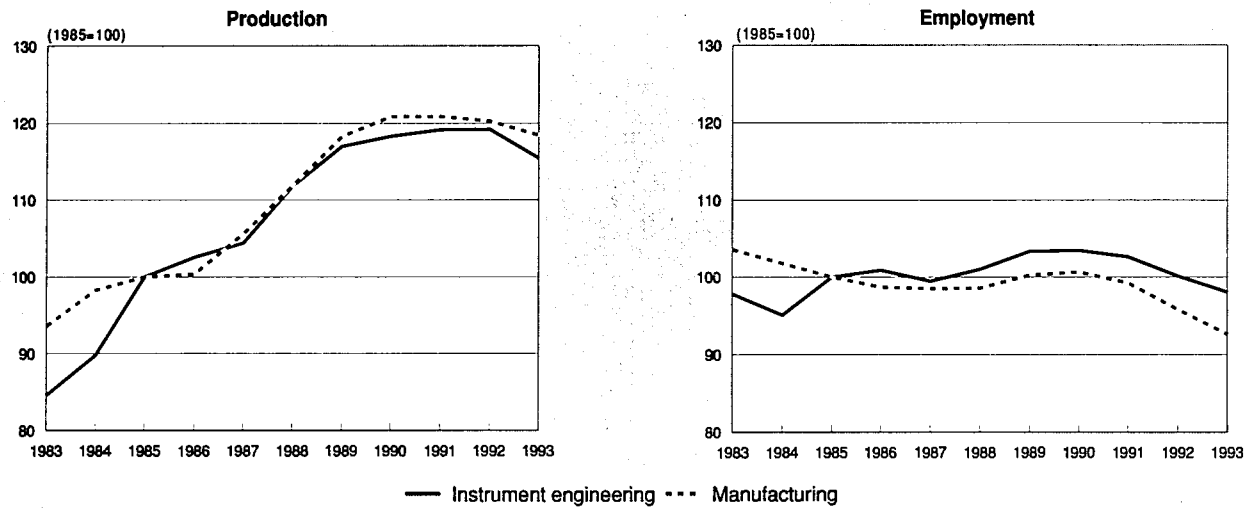
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Instrument engineering
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	5 070	5 998	6 942	6 616	6 355	6 961	7 818	7 909	8 223	8 582
Extra-EC imports	5 422	6 253	6 891	7 044	7 236	8 491	9 857	10 071	11 269	11 530
Trade balance	-352.3	-254.5	51.0	-427.8	-880.6	-1 530.6	-2 038.5	-2 161.8	-3 046.1	-2 948.5
Ratio exports/imports	0.9	1.0	1.0	0.9	0.9	0.8	0.8	0.8	0.7	0.7
Terms of trade index	105.8	100.2	100.0	102.3	109.4	108.5	101.2	106.3	106.3	107.9
Intra-EC trade	4 358	5 019	5 515	6 247	6 910	7 732	8 842	9 616	10 507	11 023
Share of total imports (%)	44.6	44.5	44.5	47.0	48.8	47.7	47.3	48.8	48.3	48.9

Source: DEBA

Figure 3: Instrument engineering
Production in constant prices and employment compared to EC manufacturing



1993 are BAK and Eurostat estimates.
Source: DEBA

the same period. Consequently, the share of USA and EC production of the Triad's total declined slightly by two percentage points, each, from 1983 to 1992, benefiting mainly Japanese production, which increased its share in the Triad's total from about 27% in 1983 to 31% in 1992. This performance was mainly the result of fast growth in the sub-sectors of measuring, precision and control instruments and of clocks and watches, where Japanese firms tripled their production during the period.

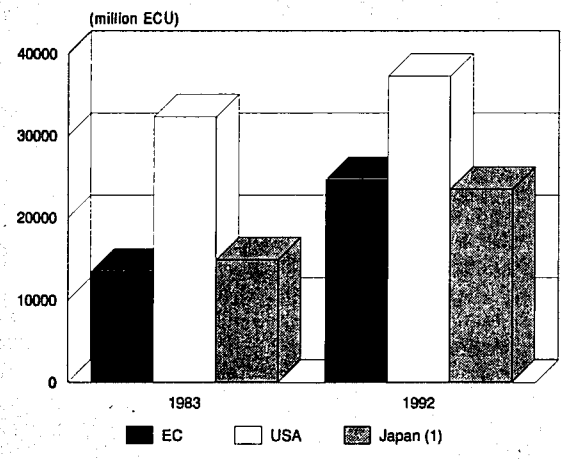
Foreign trade

Trade in instrument engineering products grew at a highly dynamic pace over the last few years. Extra-EC exports grew by 6.0% per year in value from 1983 to 1992. The most important markets for EC producers are the developing countries (including the East Asian newly industrialised countries [NICs]), with some 32% of total extra-EC exports. The EFTA countries and the USA receive about 23% each of extra-EC exports. Developing countries' markets - mainly the East Asian NICs, but also China - have been gaining more importance over the last years. This has caused the share of the USA and the EFTA countries to decline significantly from 1987 to 1992, while that of the East Asian NICs increased considerably.

Imports from outside the EC increased even more dynamically, at roughly 9% per year in value from 1983 to 1992. Consequently, the EC trade balance has been deteriorating and its deficit suffered an eight-fold increase between 1983 and 1992. On the import side, the most important competitors for EC producers are Japan, the USA and the EFTA countries, representing together about 80% of total EC imports in 1992. Imports from developing countries (including the East Asian NICs), however, are likely to gain importance in the future, mainly to the detriment of Japan, which has lost 8.7 percentage points of market share over the last five years.

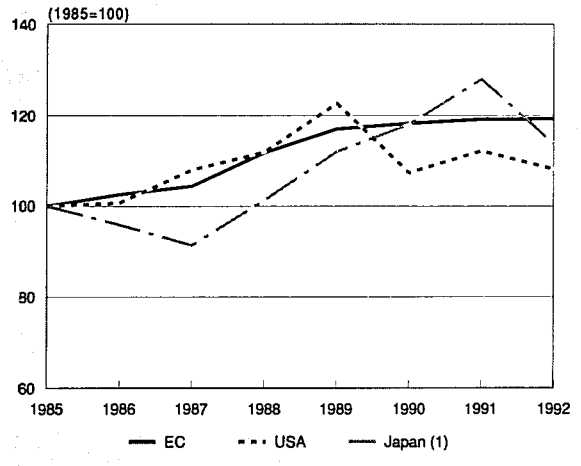
Most dynamic, however, was the development of trade among EC member countries. Intra-EC trade grew by some 11% per

Figure 4: Instrument engineering
International comparison of production in current prices



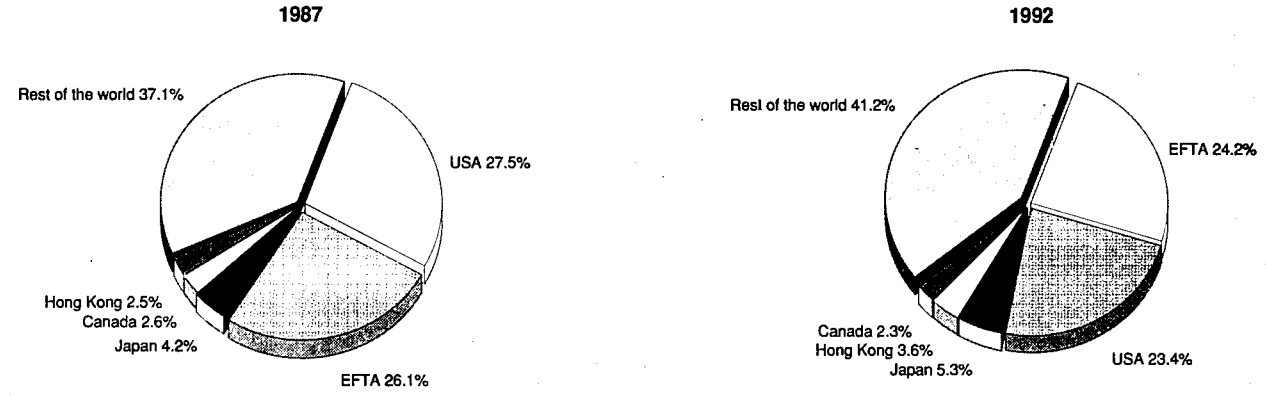
(1) Excluding Japanese Sic 3233, 3235.
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Instrument engineering
International comparison of production in constant prices



(1) Excluding Japanese Sic 3233, 3235.
Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Instrument engineering
Destination of EC exports



Source: Eurostat

year in value during the last few years. As a result, the share of intra-EC trade out of total EC imports increased from 45% in 1983 to 49% in 1992.

MARKET FORCES

Demand

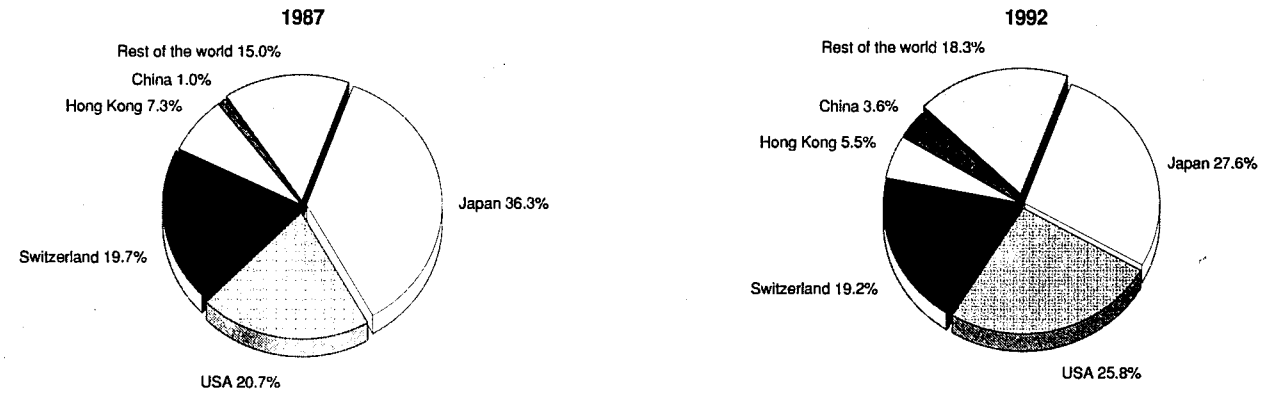
Demand for products of the instrument engineering industry, as measured by apparent consumption, increased considerably over the last few years, at a rate of 5% in volume from 1983 to 1992. Goods of the industry are used in nearly all production processes, largely to monitor and regulate production. However, like the diversity of the industry's products, demand pattern for its goods varies as well. On the whole, the industry benefited from the strength of investment activity during the last few years, induced by high capacity utilisation levels in a healthy economic climate. Investment activity was also inspired by preparations for the establishment of the EC single market in 1993 and by the need to compete in global markets. In addition, tighter environmental regulations in some EC countries increased demand for products of the industry.

Product innovation was also an important driving force behind the development of demand. The use of electronic components and their integration with data processing systems is now a common feature of nearly all the sub-sectors of the industry. Efforts of the manufacturing sector to automate production processes to increase efficiency have required the ever wider use of precision instruments.

The sub-sector of measuring, precision and control instruments benefited most from these developments. Another beneficiary was the sub-sector of optical precision instruments, a subgroup within optical instruments and photographic equipment that is also increasingly used in manufacturing processes. In particular, the tendency to substitute optical methods for mechanical measuring methods has given fresh impetus to this sector since it permits measurements to be taken without having physical contact with the measured object, thus increasing speed and accuracy.

In the field of spectacles, lenses, frames and mountings, demand stems mainly from private households. Demand growth was supported by increases in the number of people wearing corrective glasses, as well as by dictates of fashion that induced the use of new products, or even the use of more than one pair of glasses.

Figure 7: Instrument engineering
Origin of EC imports



Source: Eurostat

Table 5: Instrument engineering
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	28.1	30.4	31.7	31.7	33.0	35.1	34.1	35.0	37.0	37.3
Productivity index	88.8	96.0	100.0	100.0	104.3	110.9	107.8	110.6	116.8	117.9
Unit labour costs index (3)	88.2	93.6	100.0	106.1	112.0	116.9	122.7	130.2	139.4	147.9
Total unit costs index (4)	83.7	91.2	100.0	105.0	109.7	117.1	126.9	131.9	140.8	149.7

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Demand for products of photographic and cinematographic equipment has been stimulated by the development of new products through the introduction of electronic processes. This has overcome market saturation by simplifying camera usage thus broadening the market to consumers previously unwilling to use less automated models. Demand for the industry's products also benefited from monitoring needs in manufacturing processes.

In the field of medical and surgical equipment, the driving forces behind demand were the general ageing of the population, as well as increased health consciousness on the part of the population in general. In addition, the development of new materials (bio-compatibility) and the increased use of disposable and sterilised instruments strengthened demand for these kind of products.

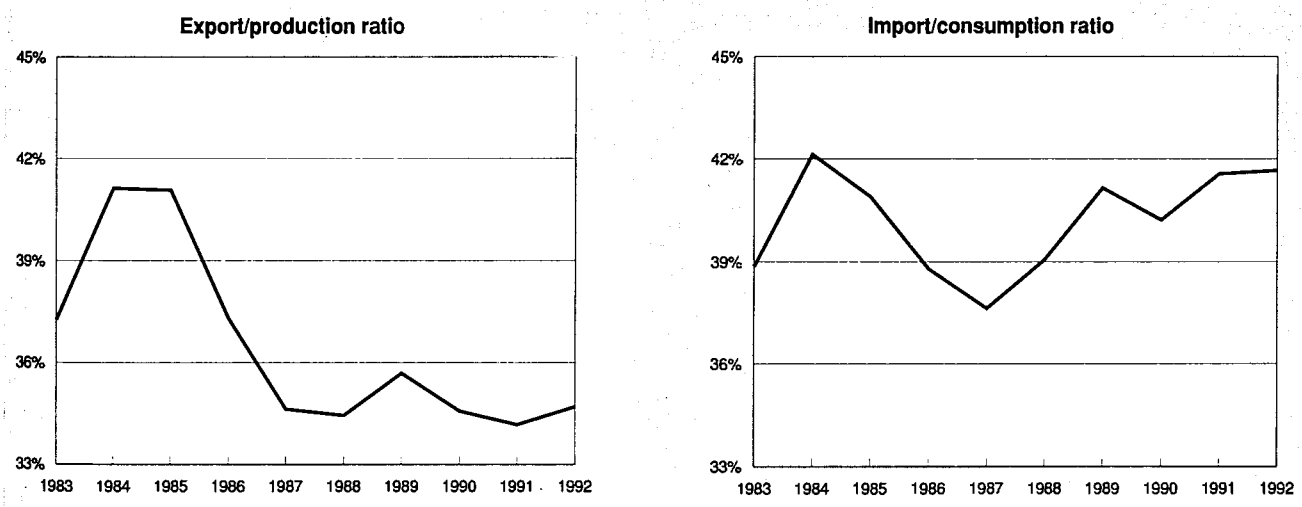
In the sector of clocks, watches and components, demand depends mainly on consumer expenditure. Demand is driven mainly by fashion trends, and only to a lesser extent by technological innovations since the most important developments took place more than a decade ago. Increasing affluence among consumers resulted in a gradual shift from cheaper watches to the higher-end range.

Supply and competition

Increasing competition from producers outside the EC is one of the main features of the EC instrument engineering industry in the last few years. Extra-EC imports grew by about 7.5% per year in volume from 1983 to 1992, well above the growth of extra-EC exports (4.6% per year) during the same period. Considering instrument engineering as a whole, the market shares of the USA and EFTA countries increased slightly over the last few years. In 1987, about 47% of extra-EC imports stemmed from these two areas, but this increased to roughly 51% by 1992. The USA increased its market share considerably with assistance from the depreciation of the USD against European currencies. Japan's EC market share dropped from about 36% in 1987 to 28% in 1992; it still retains the highest single-country EC market share, however. In recent years, competition from developing countries, mainly from the East Asian NICs, increased as well. The success of these countries in the EC is mainly based on low-end products mass produced at highly competitive prices. In the last few years, however, these countries have also become active in technologically advanced products; competition from the East Asian NICs in advanced products can be expected to stiffen in the course of the nineties.

The position of EC producers varies considerably in the various sub-sectors. In measuring, precision and control instruments, EC producers have a relatively strong position in the production of technologically advanced products, resulting in a trade balance that is still positive. In the other instrument engineering sub-sectors, however, the EC trade balance has been negative over the whole period or has become negative during recent years. In medical and surgical equipment and orthopaedic appliances, EC producers are confronted with

Figure 8: Instrument engineering
Trade intensities



Source: DEBA

Table 6: Instrument engineering
Breakdown by size of enterprise, 1990 (1)

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	31 874	90.1	26.1	17.9
20-99	2 797	7.9	20.8	21.9
100 or more	703	2.0	53.1	60.1

(1) Provisional estimates.
Source: Eurostat

strong competition from the USA. EC production in the field of photographic equipment shrunk over the last few years to only a few niche manufacturers. For clocks and watches, the situation is characterised by the strong penetration of Japanese and the South East Asian NIC products in the lower price range, and of Swiss products in top-of-the-line and fashion watches. Switzerland is the major EFTA exporter to the EC with about 70% of imports coming from this trading block.

Production process

The introduction of electronic components has caused important changes within the instrument engineering industry. While manufacturers produced much of their products' components themselves in the past, the increased use of electronic components has forced them to hand over portions of their component production to subcontractors causing a shift in know-how to sub-contractors. As a result, some producers restrict themselves to the design and assembly of their products. This development has caused some professions to literally die out. One such example is in the field of watch movements where electronically regulated movements have largely displaced mechanically regulated ones in the low and middle quality watches. Another change in production processes has been increased automation efforts to reduce labour costs, or the displacement of labour intensive production processes to low cost countries. Increases in the value of production were not accompanied by similar increases in employment figures, the end result being productivity increases of 3.1% per year from 1983 to 1992. The strength of competition from the South East Asian NICs, Japan, and the USA guarantees that the trend for lower labour inputs will continue, whereas the importance of capital inputs will continue to increase in the next few years.

INDUSTRY STRUCTURE

Companies

The instrument engineering industry is largely organised in small and medium sized firms with about 32 000 firms in the EC. About 89% of the firms operating in the industry employ less than 20 workers; 9% have a size of 20 to 100 workers. Larger firms with more than 100 employees represent only 2% of the active firms in the industry; however they are responsible for about 63% of the industry's turnover.

Most of the firms are highly specialised in a particular area of activity and have a small number of competitors within the EC. The more important competition stems usually from firms outside the EC. Given the small size of demand for their specialised products, most of the firms operate at least on the national level, with some operating on the global market.

The larger firms, in general, offer a broad range of products usually in a single sub-sector. A few of the large firms do operate in several sectors of instrument manufacturing. For example, the company Zeiss (D) is active in measuring, checking and control machines as well as in the optical instruments field. For some of the larger companies, instrument engineering is only one of a number of branches. Siemens (D), for example, deals in optics, medical and surgical equipment and metrology along with its involvement in a large number of fields such as computers, household appliances, consumer electronics, electrical industrial equipment and many others.

Table 7: Instrument engineering
The 15 largest European companies , 1992

(million ECU)	Country	Turnover	Net profit	Employees
Thomson CSF (1)	F	5 042	337	44 514
Siebe (1)	UK	2 313	131	31 939
Magneti Marelli (1)	I	2 137	-94	25 997
Oerlikon-Buhrle Holding	CH	1 857	18	16 359
Fisons	UK	1 745	130	14 477
Cardo Investment	S	1 686	28	15 451
SMH-Schweiz.Ges.fur Mikro. & Uhren.	CH	1 520	227	14 304
VDO Adolf Schindling	D	1 179	-32	14 669
OCE-Van Der Grinten	NL	1 168	38	11 262
Smith & Nephew	UK	1 165	140	13 857
Smiths Industries	UK	898	97	11 200
Gambro	S	841	61	8 320
Essilor International	F	823	19	12 718
Sextant Avionique (1)	F	797	-78	8 441
Fresenius	D	769	11	7 001

(1) 1991.
Source: DABLE

Strategies

Competition from outside the EC can be divided into two categories: competition in technologically advanced products, mainly from EFTA countries, USA and Japan; and competition in the field of less technologically advanced, standard, instruments, mainly from the East Asian NICs.

In the field of technologically advanced products, EC producers have a relatively strong position. To remain competitive, however, they will have to increase R&D expenditure. In looking at the structure of the industry it is apparent that firms are often too small to finance the necessary R&D efforts: an industry restructure towards larger firms could bring advantages in this context. Cooperation in the field of research and development, as well as in production, could also help the industry to survive the challenges of competition from abroad.

To compete in the field of standard instruments, efforts have to concentrate on cost reduction and increased production efficiency. Another strategy is the relocation of labour intensive production processes to low cost countries: a trend already apparent in the production of clocks and watches.

REGIONAL DISTRIBUTION

The most important producer in the EC's instrument engineering industry as a whole is Germany, with some 46% out of the EC total. The picture is similar in nearly all the subsectors of the industry: in measuring, precision and control instruments, in medical and surgical equipment and orthopaedic appliances and in optical instruments and photographic equipment, Germany is by far the largest producer with more than 50% of the EC total. Within the latter sub-sector, Germany produces mainly optical, precision and photo instruments, while France and Italy are major producers in ocular optics and spectacles frames. In the field of clocks and watches, the dominant producer countries remain Germany and France. Over the last few years the relative position of German producers declined to the benefit of French producers. In 1983, some 58% of the EC production stemmed from Germany and only 31% from France. While production in Germany declined sharply by some 8% per year in volume from 1983 to 1992, the decrease in France was less dramatic (-1%). Consequently, French producers increased their production share to 40% in 1992, while that of Germany declined to the same figure.

ENVIRONMENT

The production process of instrument engineering goods does not harm the environment to any large extent, as it involves little use of polluting materials and energy. In the field of photographic equipment, there is one source of pollution in the form of chemicals used in the production and development of films. In the clock and watch industry, environmental concerns are related to the use of small batteries containing nickel-cadmium that is liable to pollute the ground water and endanger the population if disposed of improperly. In the medical device field, the main burden on the environment is solid waste disposal problems stemming from the extensive use of disposable, sterilised instruments and their associated packaging materials. To restrict environmental damage, there is an EC directive, requiring that all packaging materials be recyclable and recovered by the year 2000.

More important in this context, however, are the opportunities from which the industry may benefit. Increased concerns regarding environmental issues will generate additional demand in the course of the nineties as monitoring and analysing environmental damage becomes ever more important. This will benefit mainly measuring, precision and control instruments, but also optical precision instruments because the use of optical methods to measure environmental damage creates additional demand for this industry's products.

REGULATIONS

The instrument engineering industry as a whole will be influenced by the technical standardisation of machinery within the EC. The removal of non-tariff trade barriers within the EC will be further supported by the standardisation of metric regulations a particularly important element for the measuring, precision and control instruments industry.

In the field of medical equipment exports, the most important non-tariff trade barrier for European producers is the lengthy and, therefore, costly process of certifying the products in the USA.

Beside the EC directive requiring by the year 2000 the ability of all packaging materials to be recyclable and recovered, another EC directive requires that any medical device or product sold in the EC feature the EC stamp of approval, attesting to its conformity to EC law.

OUTLOOK

Prospects for the instrument engineering industry are somewhat pessimistic in the short term. The sharp downturn in investment activity in the industrialised world will negatively affect demand for the industry's products, particularly for products of measuring, precision and control instruments, and precision optical instruments; both suppliers of mostly investment goods. The weakness in consumer expenditures will also affect demand for clocks and watches and photographic equipment.

Table 8: Instrument engineering
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.2	3.6
Production	1.3	2.7
Extra-EC exports	2.2	3.4

Source: BAK

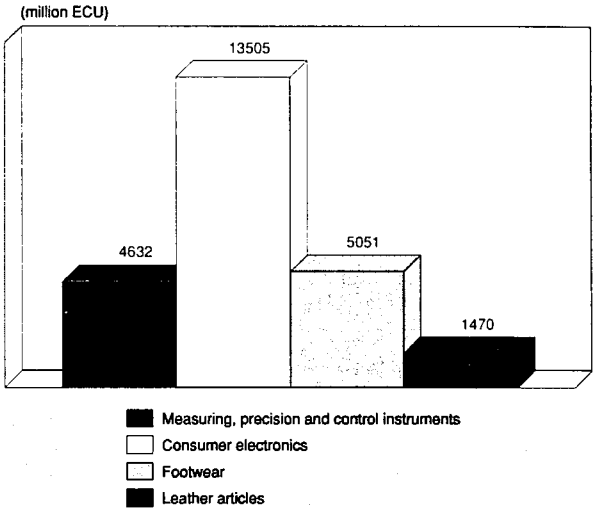
In the medium term, however, prospects for nearly all subsectors of instrument engineering are quite good. In the field of measuring, precision and control instruments and precision optical instruments, prospects are favourable because the increasing automation of industrial processes will boost demand for testing, measuring and analysing instruments. In addition, environmental concerns are also likely to boost demand for these kinds of products. For photographic equipment, the outlook is somewhat more pessimistic since competition from the NICs and Japan is very strong. Demand for spectacles, lenses and frames is expected to remain strong in coming years: planned cutbacks in health expenditure in the industrialised countries are likely to have a negative effect on demand, however. Cuts in health expenditure will affect demand for medical devices as well. In the field of clocks and watches, the medium term outlook is somewhat pessimistic, as competition from outside the EC will further dampen EC production.

Written by: BAK

Measuring, precision and control instruments
NACE 371

Increased investment activities and the growing spread of electronic components in their products provided the industry with a favourable climate for production growth during the last decade.
Competition for EC producers increased from both intra-EC trade and increased imports from outside the community. As a result, the trade balance declined during the eighties and the beginning of the nineties, while still remaining positive.
In the recent past, the picture has changed as demand for products of the industry declined. This was due to the recession in the western industrialised world as well as to the loss of markets in Eastern Europe.
Prospects in the short term remain unfavourable, but in the medium term the industry should return to a stable growth path with the expected upturn in general economic activity. The industry should also benefit in the nineties from the tighter controls required to meet growing environmental concerns.

Figure 1: Measuring, precision and control instruments Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

The industry of measuring, precision and control instruments covers the fabrication of:

- gas meters, water meters and other liquid supply meters (including petrol pump meters);
- measuring, checking or automatic control instruments and apparatus;
- equipment for navigation, hydrology, geophysics and metrology;
- drawing and mathematical calculating instruments;
- precision measuring instruments;
- precision balances, laboratory equipment and teaching equipment; and
- other precision equipment and apparatus.

The sector does not include electrical counters, or measuring, testing, regulating and control instruments, all of which are classified under NACE 344.

Compared to other branches of the manufacturing sector this industry carries a relatively small economic weight. Its output represents about 34% of that of the consumer electronics industry measured in value added terms for 1992.

Within the field of instrument engineering, the sub-sector of measuring, precision and control instruments is the most important, with nearly 40% of the output of the entire industry.

The largest producing country, by far, is Germany, with about 50% of total value added in the EC, followed by the United Kingdom (31%), Italy (10%) and France (4%).

Recent trends

During the last decade, producers of measuring, precision and control instruments experienced quite favourable demand conditions, driven by strong investment activity in the manufacturing sector. Average production growth was roughly 3.4% per year for 1983 to 1992, which was in line with the growth of manufacturing as a whole (2.8% per year).

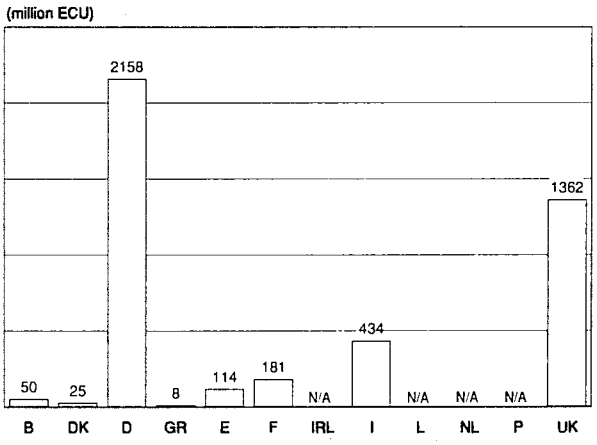
During the same period, demand for the industry's products, as measured by apparent consumption, increased by 7.5% per year in value. The difference came from a 9.6% per year nominal increase in imports from outside the EC. Extra-EC exports had an annual growth rate of 4.9% for 1983 to 1992. As a result, the trade balance has been deteriorating over the last decade while still remaining positive. In 1992, exports to non-EC countries represented only about 21% of production compared to 24% in 1983.

The performance of the industry was strongest up to 1989. After 1990, production growth slowed down remarkably as investment activity in EC-manufacturing as well as demand from major export markets declined. During the same period the workforce was reduced from 130 000 employees in 1989 to 121 000 in 1992.

International comparison

The world's largest producing country in measuring, precision and control instruments is the United States with about 42% of the Triad's total (EC, USA and Japan). Japan represents about 32% and the EC 26%. Fastest growing, however, was Japanese production, whose share of Triad production in-

Figure 2: Measuring, precision and control instruments Value added by Member State, 1992



Soruce: DEBA

Table 1: Measuring, precision and control instruments
Main indicators at current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	4 688	5 287	6 275	6 643	6 700	7 245	8 347	8 301	8 746	9 015	8 830
Production	5 306	5 917	7 013	7 359	7 405	7 839	8 835	8 894	9 346	9 483	9 250
Extra-EC exports	1 278	1 393	1 595	1 568	1 516	1 700	1 813	1 927	2 039	1 970	1 870
Trade balance	618.1	629.5	738.2	716.2	705.4	593.9	487.9	592.4	599.8	468.2	420.0
Employment (thousand)	122.2	118.4	127.8	129.8	127.8	128.1	130.2	128.8	126.9	121.9	118.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) BAK estimates.
Source: DEBA

Table 2: Measuring, precision and control instruments
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	6.3	1.9	4.3
Production	5.5	1.0	3.5
Extra-EC exports	5.3	2.5	4.0
Extra-EC imports	10.1	7.4	8.9

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Measuring, precision and control instruments
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 278	1 393	1 595	1 568	1 516	1 700	1 813	1 927	2 039	1 970
Extra-EC imports	659.4	763.3	856.6	852.0	810.9	1 106.4	1 325.2	1 335.0	1 438.9	1 501.3
Trade balance	618.1	629.5	738.2	716.2	705.4	593.9	487.9	592.4	599.8	468.2
Ratio exports/imports	1.9	1.8	1.9	1.8	1.9	1.5	1.4	1.4	1.4	1.3
Terms of trade index	109.5	104.0	100.0	107.7	113.9	108.8	112.7	116.7	112.6	112.3
Intra-EC trade	1 079.1	1 219.4	1 421.4	1 524.6	1 614.5	1 817.4	2 002.6	2 080.4	2 210.2	2 294.5
Share of total imports (%)	62.1	61.5	62.4	64.2	66.6	62.2	60.2	60.9	60.6	60.4

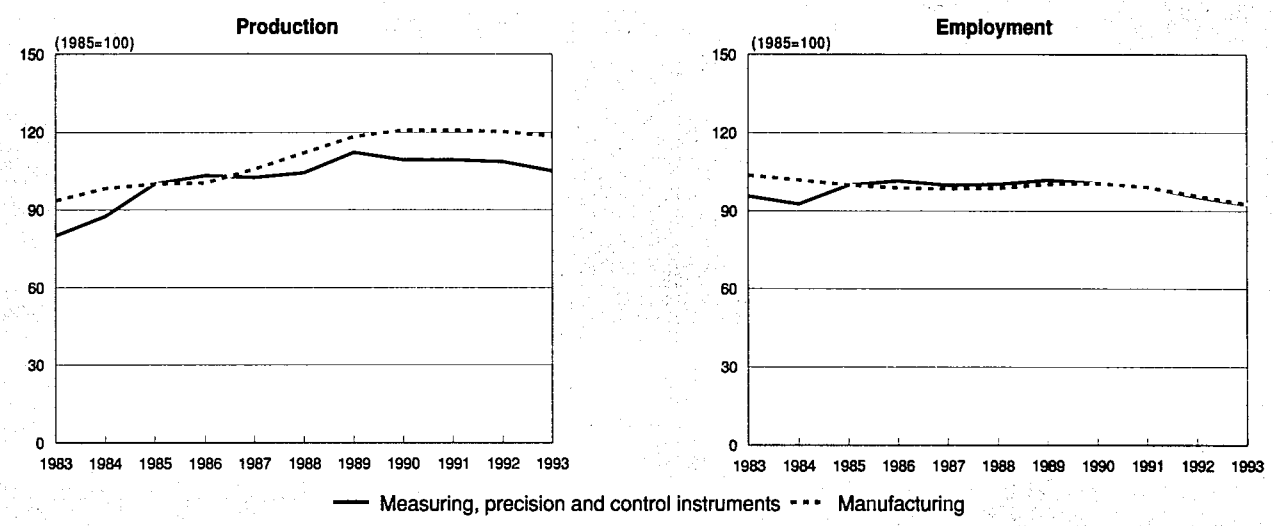
Source: DEBA

Table 4: Measuring, precision and control instruments
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (2)	29.2	32.4	33.5	33.7	34.8	35.5	35.5	36.3	37.4	38.0
Productivity index	87.2	96.7	100.0	100.7	103.9	106.2	105.9	108.6	111.6	113.5
Unit labour costs index (3)	87.4	94.4	100.0	106.1	110.4	115.7	123.5	132.2	142.3	149.8
Total unit costs index (4)	80.2	91.5	100.0	103.7	105.6	111.2	125.3	128.2	138.8	147.0

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed (thousand ECU).
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Measuring, precision and control instruments
Production at constant prices and employment compared to EC manufacturing



1993 are BAK and Eurostat estimates
Source: DEBA

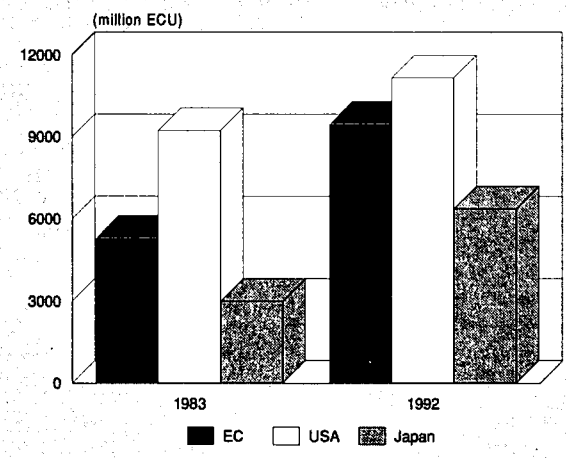
creased from 20% in 1983 to 32% in 1992; the United States' share declined during the same period from 51% to 42% in 1992 and the EC's, from 29% to 26% during the same period.

Foreign trade

International trade in measuring, precision and control instruments increased considerably during the last decade. Competition for EC producers sharpened, with imports from extra-EC countries rising by 9.6% per year in value from 1983 to 1992. Extra-EC exports, which were roughly twice as large as imports in 1983, increased by only 4.9% during the same period. Consequently, the trade balance deteriorated somewhat, though still remaining positive. In 1992, about 17% of EC demand was satisfied by imports, compared to 14% in 1983.

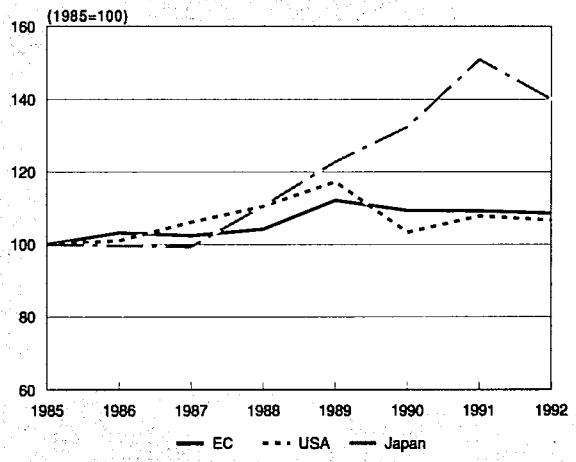
The United States, as the major player in the industry, is also the main competitor for EC producers with a share of about 40% of the total EC-imports. Another important supplier on the EC market are the EFTA countries, with a share of roughly 30% of total extra-EC imports. Competition from the USA has continued to increase during the last years, resulting in further gains in market share. The EFTA countries, on the other hand, lost market shares. One explanation could be the increased price competitiveness of United States products during the last years, thanks to the depreciation of the USD against European currencies. Japan, a minor player in terms of competition, lost market share as well. On the other hand, the developing countries, including the East Asian newly industrialised countries (NICs), managed to increase their market share. The United States is also an important market for EC manufacturers, while Japan is of secondary importance. Intra-EC trade increased as well, spurred by the advent of the common market. It more than doubled during the eighties, growing by about 8.7% per year in value from 1983 to 1992. Germany is the most important exporter within the EC, with about 34% of total intra-EC exports.

Figure 4: Measuring, precision and control instruments
International comparison of production at current prices



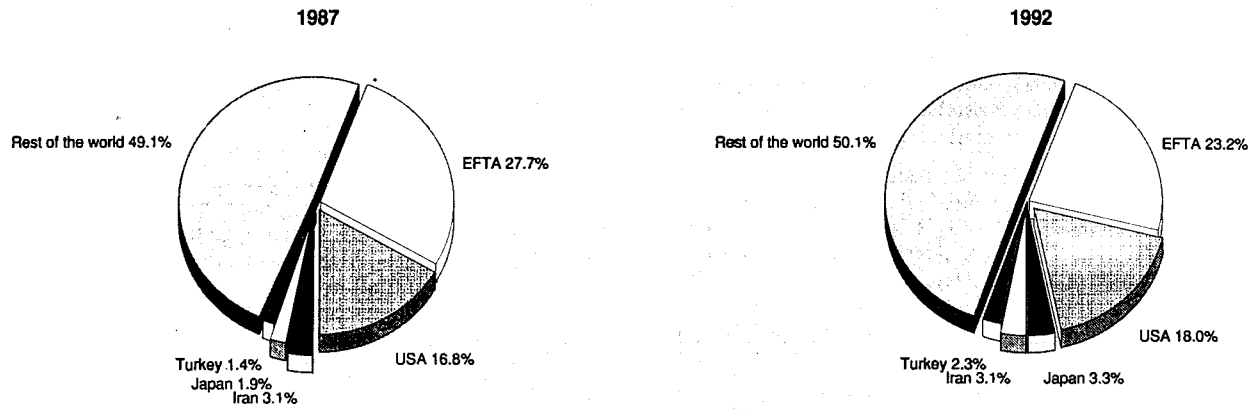
Source: DEBA

Figure 5: Measuring, precision and control instruments
International comparison of production at constant prices



Source: DEBA

Figure 6: Measuring, precision and control instruments
Destination of EC exports



Source: Eurostat

The share of intra-EC trade within total EC imports decreased from 62.1% in 1983 to 60.4% in 1992 since extra-EC imports have been growing at an even faster rate.

MARKET FORCES

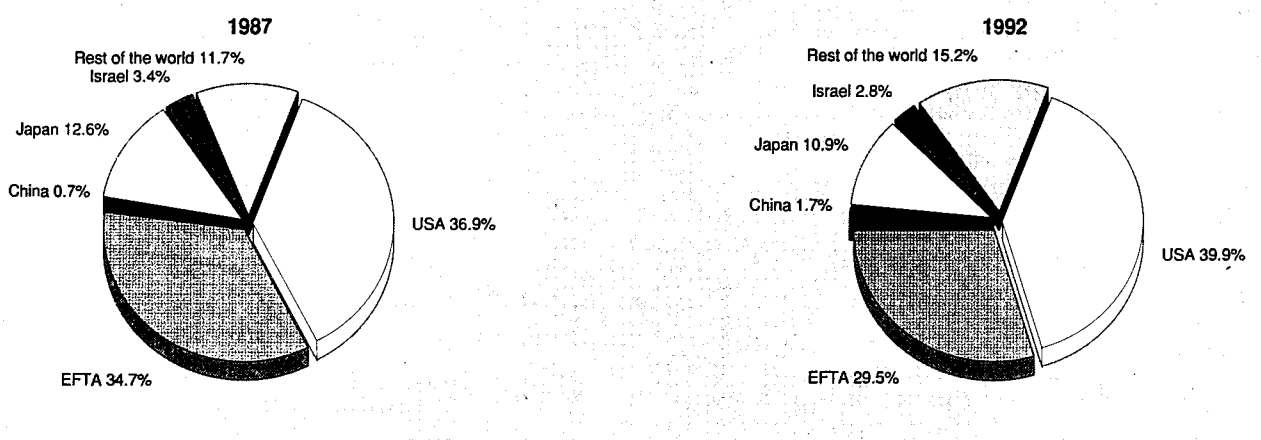
Demand

Strong economic activity in the industrialised world automatically spurs demand for measuring, precision and control instruments due to the fact that clients of the industry are found in every sector of the manufacturing industries, the service sectors, and even certain consumption products. In the field of measuring, checking and controlling instruments, which are used to automate, control and regulate production processes, the most important areas of application are not only in the fields of vehicle production, machinery construction, and environmental protection, but also in the chemical, pharmaceutical and food industries. In the field of instruments for navigation, hydrology, geophysics and metrology, the main clients are the aircraft and shipbuilding industries. The weighing instrument industry , which produces analytical, chemical and precision balances, is involved in industrial uses as well as in wholesale and retail trade. The necessity to modernise to stay competitive in an increasingly open economy, combined with high levels of capacity utilisation in a healthy economic climate, stimulate companies to invest in highly sophisticated equipment.

In addition, demand for the products of the measuring, precision and control instruments industry is stimulated by technological change, (the increasing rate of replacement of mechanical devices by electronic components), by system integration, (which requires integration with data processing systems), and by the growing use of sensors. In particular, the automation of industrial processes using data processing systems to allow the automatic readjustment of filling, dosing and conditioning processes, has given fresh impetus to the industry and stimulated the production of new generations of instruments.

The introduction of new technologies has also led to a shift in demand from mechanically regulated instruments to electronically regulated products. The share of electronically controlled products in the weighing industry, for example, is now above 90%.

Figure 7: Measuring, precision and control instruments
Origin of EC imports



Source: Eurostat

Supply and competition

During the second half of the last decade the United States has seen its production increase by around 3% per year, while EC-production increased by about 1.8% per year in real terms during the same period. The development of the industry in the United States has benefited from the increase in price competitiveness brought about by both the devaluation of the USD during the last years, and from a technological edge. Consequently, United States producers increased both their exports to the EC and their market share.

The lesser share of imports from Japan tends to hide the fact that EC producers are confronted with strong competition from Japan in a number of specific sub-sectors. In the weighing industry, for example, Japan producers are making efforts to penetrate the retail trade market by slashing prices. This development was also helped in the past by a decline of the Yen against EC currencies. Another possible factor in favour of Japanese competitors is the fact that EC enterprises in this sector are usually small or medium-sized, while Japanese enterprises are often larger. This permits them to benefit from a better availability of capital for research and development and, possibly, from synergies and from economies of scale. In addition, the advent of the EC common market in 1993 has spurred efforts by the Japanese firms to gain a foothold there. In the weighing industry for example, TEC and Ishida already have operations in EC countries, the majority being located in the United Kingdom.

Another important development has been the increase in competition from the East Asian NICs. This can be expected to continue in the future, particularly in the field of standard, less technically advanced devices, due to their lower labour and capital costs.

Intra-EC competition has strengthened during the last decade with intra-EC trade increasing by roughly 9% per year from 1983 to 1992. The advent of the common EC market has developed important driving forces behind the increase in trade between EC Member States. Two of these forces are the technical standardisation of machinery within the EC and the growing number of cross-border corporate partnerships between EC companies. This trend is expected to be reinforced during the next few years because of EC directives removing non-tariff trade barriers, such as differing metrological regulations in each country.

The most important exporters within the EC are Germany with about 34% of intra-EC exports, followed by France with 17% and the United Kingdom with 14%. The largest importers within the EC is France with about 21%, Germany with 20%, Italy with about 14% and the United Kingdom and the Netherlands with about 11% each.

Production process

Technological developments, such as the increased use of electronic components in products, have considerably changed relationships with up-stream industries. In the past, the production of mechanically regulated measuring, precision and control instruments mainly required the input of raw or partially processed materials which were then converted to high value added products. Manufacturers are increasingly unable to produce in-house all or a majority of the components for their products due to the rapid increase in the use of electronic components. The consequence has been an increase in subcontracting, particularly with electronic companies. In some cases, producers of instruments have reduced their contribution to the tasks of assembly and design of their products. Thus, know-how was shifted from the manufacturers to subcontractors. The trend for increased integration with data processing systems continues. In the sector of precision mechanics, for example, the integration of new data processing achievements has opened up new possibilities in drawing and design technology. Similar developments are also taking place in the fields of analytical equipment, process control systems, transducers, measuring devices and other measurement systems and sensors.

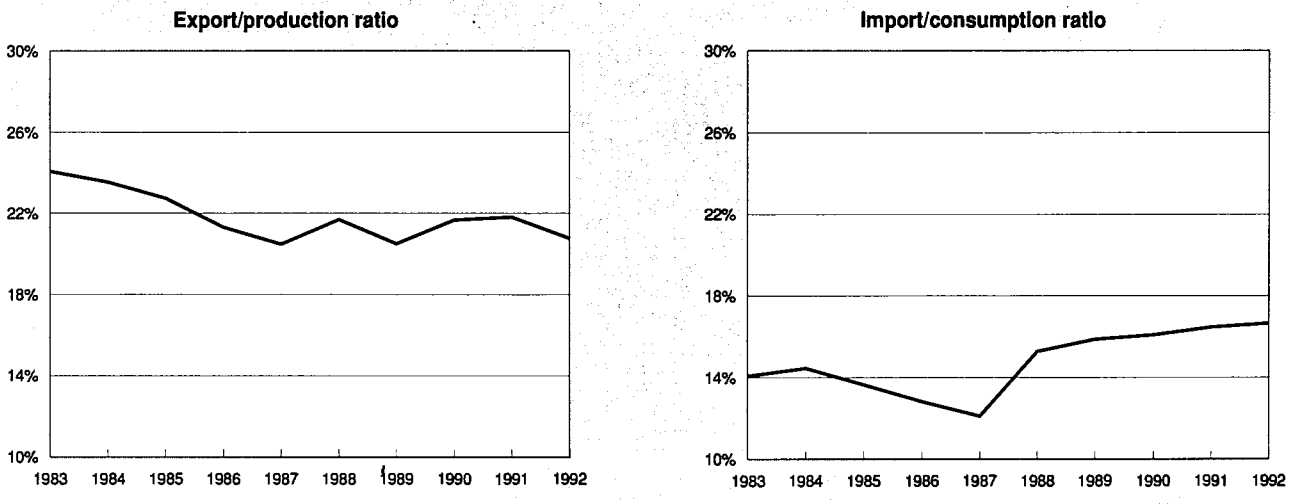
INDUSTRY STRUCTURE

Companies

In general, the industry consists of small and medium-sized companies concentrating their activities on one or two product lines. A few large companies produce a broad range of products in various fields of instrument engineering. Some are engaged in other fields of manufacturing as well, such as consumer electronics, computers and motor vehicles.

Depending on the product line, the structure of the industry varies. In the weighing industry there are about 350 firms employing some 20 000 people. The size of the enterprises range from firms employing only a few people to firms em-

Figure 8: Measuring, precision and control instruments Trade intensities



Source: DEBA

ploying a few thousand. Important companies in the weighing industry are Sartorius (D) and GEC Avery (UK). Enterprises in this industry are usually active only in their national market, at least as far as small and medium-sized companies are concerned. Other sub-sectors, such as the counting instruments industry consist mainly of medium to large manufacturing firms. A similar picture is found in the sub-sector of checking and controlling machines, which is fairly concentrated with about 80 producers worldwide. The main EC producers are Zeiss (D), Renault Automation (F) and Dea (I). In measurement and automation technology, the majority of the firms are small to medium-sized, with up to 200 employees, but a few large firms employ more than 1 000 employees. Important firms in this sector are Hartmann & Braun (D), Hottinger Baldwin (D), Krohne (D), Endress & Hauser (D) and Foxborro (UK), which was recently taken over by Siebe (UK).

In the field of automation technology, there are a few multinational companies active in various fields of manufacturing, such as Siemens AG (D), ASEA Brown Bovery (D) and Philips (NL).

Strategies

As previously mentioned, increasing international competition is expected to continue the foreseeable future. In the fields of highly sophisticated products, EC producers will face fast paced technological innovation, imposed mainly by Japan and the United States. In the field of the less technologically advanced products, standard instruments in particular, increased competition can be expected from the East Asian NICs who are very price competitive. Lastly, cross-border competition within the EC is expected to increase as well. In the fields of standard instruments, EC firms will need to invest in modernisation and automation of the production process to improve production efficiency and reduce costs. This will counteract the effect of their higher labour costs as compared to that of the East Asian NICs. Another possible strategy could be to relocate production facilities to countries with lower production costs. Spain, Portugal, Hungary and the Czech Republic are likely alternative locations.

In order to remain competitive in the field of highly sophisticated products, EC firms will have to increase their R&D expenditures considerably. The problem is that this high-cost strategy can hardly be financed by small or medium sized companies. A higher degree of concentration is thus becoming imperative if the industry is to survive and to prosper. Changes in that direction have already been happening. In the weighing industry for example, Toledo (F) was taken over by Mettler (D), GEC Avery (UK) took over Berkel and Testut (F) has bought Trayvou (F) and Lutrana (F). Similarly, the Precia (F) company took over Pesage Volumetrie (F) in 1990. In industrial process control, changes have occurred with the take-over of Foxboro by the British firm Siebe, which has thus become the world's second largest producer of these types of instruments, behind Honeywell. At the beginning of 1990, the Italian company Elsag, after selling Bailey Controls to the American Babcock Wilcox Group, bought the Sereg division of Schlumberger (D). In 1989, CGE-Alsthom (F) took over the industrial control operations of the British GEC.

Another possible strategy, particularly for specialised niche products, is for the smaller firms to increasingly limit their activities to design and assembly and subcontract upstream and downstream activities such as components production and marketing and service functions to other firms.

The marketing philosophy of the industry has evolved during the last few years. Most companies are now forced to operate at least on a pan-European level. Larger firms often operate on a global level. This tendency towards globalisation is likely to increase in the future as the EC common market becomes fully operative and as overseas markets become more open. The problem in gaining market shares in dynamic markets such as the East Asian NICs is that marketing functions and post-sale service functions cannot be satisfactorily provided by small or even medium sized firms. Cooperation agreements with local producers or co-ordinated efforts of EC producers to form joint service centres and marketing groups in these countries are possible answers to this problem.

ENVIRONMENT

The manufacture of measuring, precision and control instruments has little impact on the environment. More important in this context are the new opportunities that will benefit the industry that are emerging from the growth of environmental concerns within the manufacturing processes of other industries and utilities. Developing needs for measuring and analytical equipment for gas, vapour, dust and noxious substances in air and water, and for apparatus to investigate harmful effects on humans, animals, plants, soil and food will provide the industry with a growth in demand for its products. Beyond this initial source of demand for identification and monitoring apparatus, demand for instruments to regulate and reduce environmental damage (such as gas desulphurisation systems), will also develop.

REGULATIONS

In general, the industry should benefit from the technical standardisation of machinery within the EC, which should ease the development of trade between EC members' firms. EC Directives will remove non-tariff trade barriers, such as those caused by different meteorological regulations in each country.

In the field of electronic weighing machines, the Commission has applied anti-dumping duties on imports from a number of Japanese firms. Similar measures are being considered regarding electronic weighing machines produced in South Korea and Singapore.

OUTLOOK

Short term prospects for the industry of measuring, precision and control instruments are rather unfavourable. Production in the EC is expected to decline in 1993 and to remain flat in 1994, as the sharp cut backs in investment plans in nearly all EC countries further dampens demand for the products of the industry. The only country where demand can be expected to increase is the United Kingdom; demand from the United States will increase, but this will not compensate for losses on other export markets.

In the medium-term, demand as well as production will return to a stable growth path. The increasing rate of technological change, the dynamics of the common market, the development of new markets in South East Asia and in other NICs and the growing weight of environmental requirements in manufacturing and service industries will combine to offer a wide market base for increasing demand for the industry's products. A revival of demand from Eastern Europe, as well as increased demand from South America and possibly China, may provide

Table 5: Measuring, precision and control instruments
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.3	2.9
Production	0.8	2.7
Extra-EC exports	1.0	3.1

Source: BAK

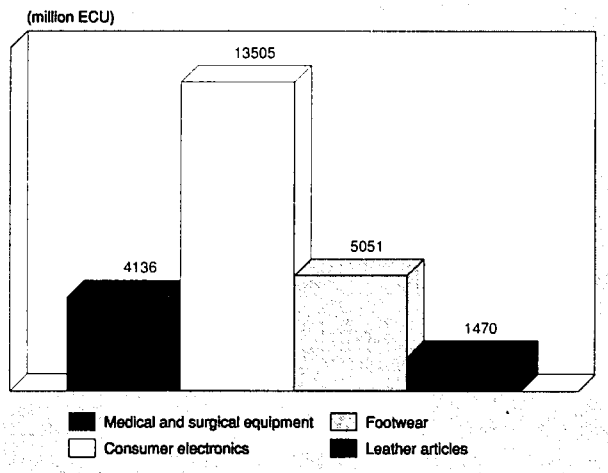
the necessary impetus for increased production in the second half of the nineties. To capture a large share of this additional demand, EC firms will have to increase their efforts to overcome competition from abroad, increase production efficiency to reduce costs, invest more heavily in R&D and expand their globalisation efforts.

Written by: BAK
The industry is represented at EC level by: European Federetion of Precision Mechanical and Optical Industries, Precision Mechanics (EUROM IV) and Measurement and Automation Technology (EUROM V); Address: Pipinstrasse 16, D-5000 Köln 1; tel: (49 221) 921212-0; fax: (49 221) 245013.

Medical and surgical equipment and orthopaedic appliances
NACE 372

Increasing health expenditures resulted in a period of strong growth in the industry of medical and surgical and orthopaedic appliances during the recent past.
The ageing of the population, increasing health consciousness and product innovation were the most important driving forces for this development.
The industry is dominated by the United States, with roughly 70% of the world market. Thus, the main competitors of EC producers stem from there.
Medium term prospects for the industry are quite good, as demand for the products will keep increasing through the nineties. Increasing efforts to control health expenditure in most industrialised countries are expected to slow down the growth of demand for the products and to foster competition between manufacturers in the longer term. Increasing competition can be expected as well from harmonisation efforts within the EC.

Figure 1: Medical and surgical equipment and orthopaedic appliances
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

The sector of medical and surgical equipment and orthopaedic appliances includes the following activities:

- manufacture of medical apparatus for diagnostic work;
- manufacture of medical, surgical and veterinary equipment and instruments;
- manufacture of dental instruments and apparatus; and
- manufacture of orthopaedic appliances, artificial limbs, eyes, teeth, etc.

The sector does not include orthopaedic footwear, which is found in NACE 452. X-ray apparatus and electro-medical instruments, including electro-medical diagnostic equipment, electro-medical treatment, electro-dental instruments, electrical hearing aids and pacemakers are also excluded; they are classified under NACE 344.

Within the larger sector of instrument engineering, the subsector of medical and surgical equipment and orthopaedic appliances represents about 30% of total production. The most important producer countries among EC members is Germany with more than 50% of the EC total; France follows, with 17%, the United Kingdom with 15% and Italy with 9%.

Compared to other sectors of manufacturing, this industry is of minor importance. Measured in terms of value added, its output represents about one third of that of consumer electronics.

Recent trends

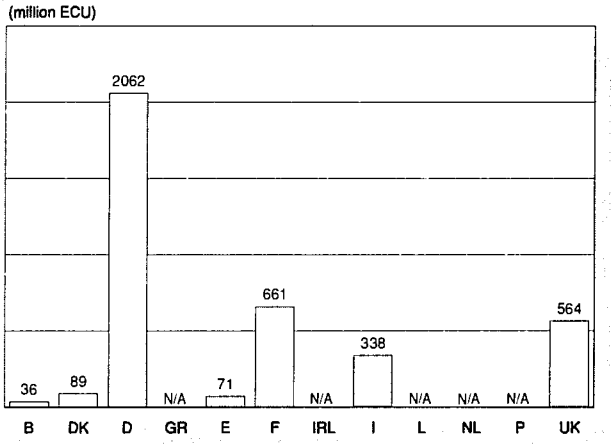
During the recent past, the industry experienced a highly favourable development in the EC. Production increased by more than 6% per year in volume from 1983 to 1992, well above the growth rate of manufacturing as whole (2.8% per year). This rapid increase in production gave rise to considerable increases in employment figures (2.1% per year), to reach about 104 000 employees on the industry's payroll in 1992.

Production growth in the EC, however, was slower than the rise in consumption, as imports grew by about 9% per year in real terms, well above the rate of growth of exports. In 1983, imports represented only 82% of the value of exports. By 1992 however, the value of exports was only 91% of the value of imports. The EC trade balance became negative from 1991 on.

International comparison

The world's largest producing country of medical and surgical equipment and orthopaedic appliances is the United States, representing about two third of the Triad's total. Manufacturers in the EC and Japan are far behind, producing some 19% and 11% of the Triad's total, respectively. The United States also exhibited the most vigorous development during the last few years. Production there increased by more than 12% per year in value from 1983 to 1992. In the EC and Japan, production increased at a somewhat slower rate during the same period (9% and 8.4% per year, respectively). As a result, the United States production continuously increased its market share in the Triad, from 64% in 1983 to some 70% in 1992.

Figure 2: Medical and surgical equipment and orthopaedic appliances
Value added by Member State, 1992



Source: DEBA

Table 1: Medical and surgical equipment and orthopaedic appliances
Main indicators at current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	3 315	3 630	3 951	4 075	4 475	5 453	5 887	6 560	7 487	8 052	7 830
Production	3 501	3 831	4 409	4 620	4 828	5 628	5 898	6 645	7 278	7 796	7 560
Extra-EC exports	1 059	1 236	1 657	1 775	1 686	1 781	1 954	2 151	2 335	2 460	2 510
Trade balance	185.9	200.4	458.2	544.7	353.2	174.9	10.5	85.3	-209.1	-255.7	-270.0
Employment (thousands)	86.5	88.0	92.6	93.2	92.8	95.5	98.5	101.5	103.2	104.4	104.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) BAK estimates.
Source: DEBA

Table 2: Medical and surgical equipment and orthopaedic appliances
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	8.4	6.3	7.5
Production	7.4	5.2	6.4
Extra-EC exports	5.9	5.7	5.8
Extra-EC imports	9.1	9.2	9.1

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Medical and surgical equipment and orthopaedic appliances
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 059	1 236	1 657	1 775	1 686	1 781	1 954	2 151	2 335	2 460
Extra-EC imports	873	1 036	1 199	1 230	1 332	1 606	1 943	2 065	2 544	2 715
Trade balance	185.9	200.4	458.2	544.7	353.2	174.9	10.5	85.3	-209.1	-255.7
Ratio exports/imports	1.2	1.2	1.4	1.4	1.3	1.1	1.0	1.0	0.9	0.9
Terms of trade index	109.2	102.8	100.0	103.0	108.5	115.9	105.4	105.9	107.3	107.8
Intra-EC trade	777.1	936.0	1 137.3	1 289.2	1 428.6	1 616.3	1 834.6	2 131.8	2 513.3	2 859.0
Share of total imports (%)	47.1	47.5	48.7	51.2	51.7	50.2	48.6	50.8	49.7	51.3

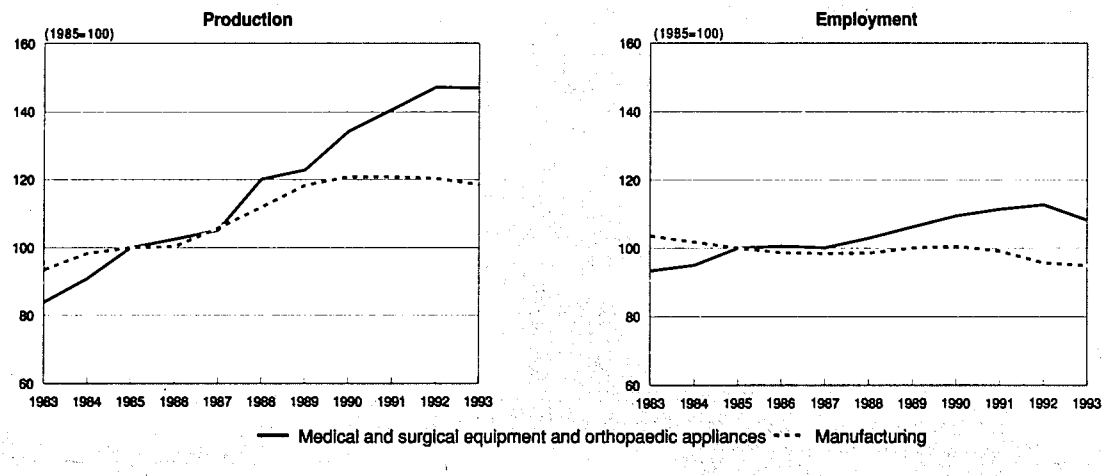
Source: DEBA

Table 4: Medical and surgical equipment and orthopaedic appliances
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	28.7	29.6	30.8	31.0	31.5	35.5	34.2	36.4	38.4	39.6
Productivity index	93.1	96.1	100.0	100.7	102.3	115.2	111.0	118.1	124.6	128.6
Unit labour costs index (3)	87.6	92.7	100.0	106.1	111.9	118.2	121.0	128.0	137.8	147.1
Total unit costs index (4)	84.3	92.3	100.0	106.1	112.8	122.3	127.1	136.6	146.1	156.4

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Medical and surgical equipment and orthopaedic appliances
Production in constant prices and employment compared to EC manufacturing



1993 are BAK and Eurostat estimates
Source: DEBA

Foreign trade

The EC trade balance has deteriorated rapidly during recent years and has been negative since 1991. While exports increased by about 10% per year in value from 1983 to 1992, imports grew by approximately 13% per year during the same period. The most important competitors on EC markets are the United States and the EFTA countries, which represent between them nearly 80% of total extra-EC imports. While EFTA countries lost EC market share during the last several years, USA manufacturers increased their share of extra-EC imports from 46% in 1987 to 52% in 1992. This is mainly due to improved price competitiveness and technological advantages there. Japan, with about 13% of total extra-EC imports, lost EC market share as well.

On the export side, the EFTA countries and the United States are important markets for EC producers, with about 44% of total extra-EC exports. The United States, with consumption about three and a half times that of the EC, was the biggest outlet in 1987: by 1992, however, its share has declined to some 22%.

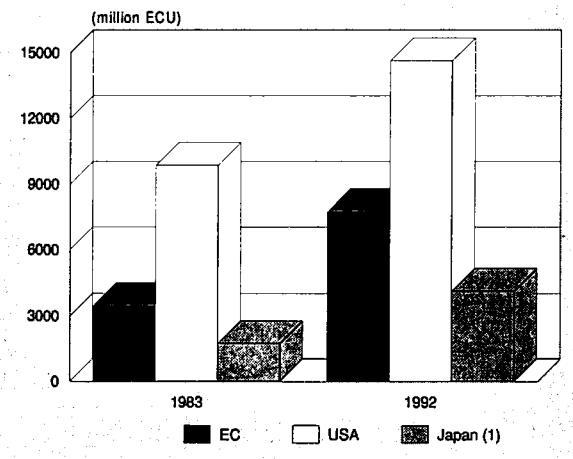
Trade among EC member countries grew at an even faster rate (about 16% per year in value) than extra-EC imports. As a result, the share of intra-EC trade out of total EC imports increased from 47% in 1983 to 51% in 1992. The most important intra-EC exporter is Germany, with about 27% of the total. Far behind are France (15%) and the United Kingdom (13%).

MARKET FORCES

Demand

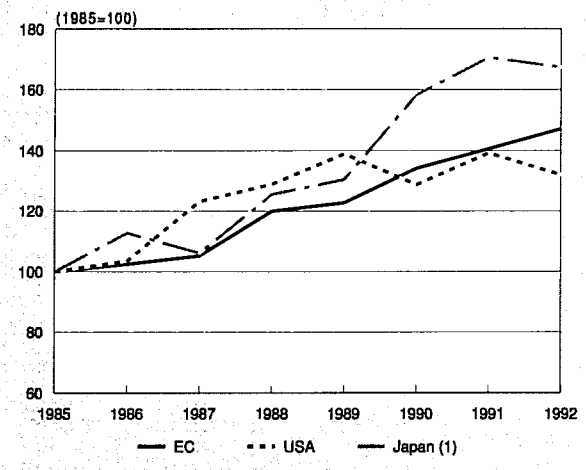
The industry's rapid growth in demand during the last few years reflects not only the ageing of the population in industrialised countries but also the increasing health consciousness on the part of the population in general. Another important

Figure 4: Medical and surgical equipment and orthopaedic appliances
International comparison of production at current prices



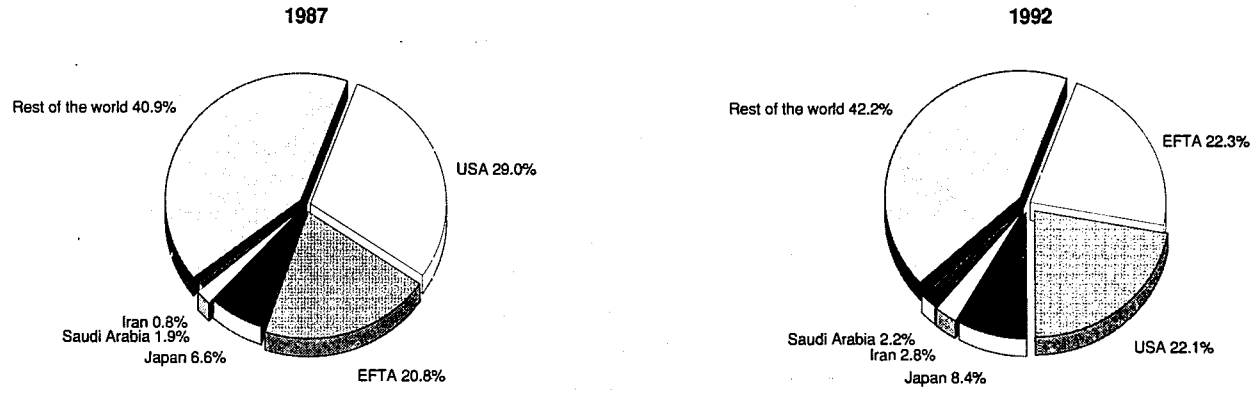
(1) Excluding Japanese Sic 3233, 3235.
Source: DEBA

Figure 5: Medical and surgical equipment and orthopaedic appliances
International comparison of production at constant prices



(1) Excluding Japanese Sic 3233, 3235.
Source: DEBA

Figure 6: Medical and surgical equipment and orthopaedic appliances
Destination of EC exports



Source: Eurostat

factor was the role of product innovation, as new discoveries in medical science and the increasing use of advanced technology strengthened demand for the products of the industry. In the field of diagnostic apparatus, improvements took place in the analysis of results through the use of data processing systems. In this area, an important innovation occurred with the development of a new method of endoscopic treatment, a type of minimally invasive surgery. Under endoscopic view, treatments are conducted by ultrasound or by laser without causing the usual damage normally resulting from conventional surgery. New developments in this field are multi-functional endoscopes, which allow complete treatment without the need for changing instruments during surgery. Further developments are in the pipeline such as the combination of endoscopes and new optical systems (laparoscopes).

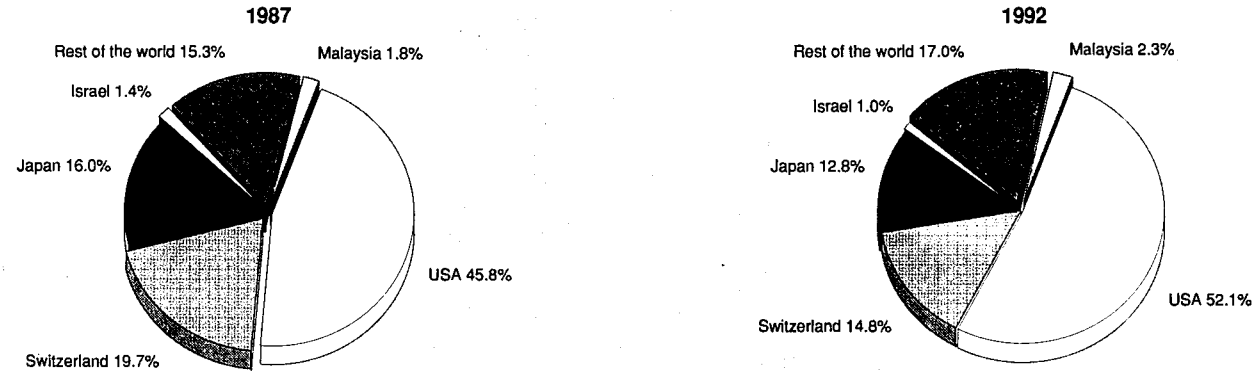
Picture quality from video cameras that are used to control laparoscopic treatment has now been improved by the use of electronic chips. In addition, data processing systems permit picture storage with virtually no loss in quality. All these developments contribute to improvements in diagnostic methods in general, as documentation of different phases of an illness is made possible. Anaesthetic devices also benefit from new technological developments since the identification, measurement and monitoring of anaesthetic gas is now supported by data processing systems. In the field of prosthetic and orthopaedic devices, bio-compatibility has become a major priority, leading to the development of new materials. In orthopaedic technology, the myo-electronic regulation of artificial legs and arms represents another important development. Also, demand for medical devices for operative and postoperative treatment is greatly increased by a growing tendency to use disposable and pre-sterilised instruments.

The availability of disposable instruments and easier to use modern medical equipment permit substantial savings in costs of hospitalisation by allowing many treatments to be performed at home. On the other hand, the spiralling growth of health costs in all developed countries is triggering revisions in national health policies. These take the form of putting caps on public costs by transferring an increasing share of costs to the patients. These developments will inevitably have a dampening effect on demand for the industry's products.

Supply and competition

The United States is the world's largest producer of medical and surgical equipment and orthopaedic appliances, as well as the largest consumer of these products (with consumption

Figure 7: Medical and surgical equipment and orthopaedic appliances
Origin of EC imports



Source: Eurostat

of about 60% of the world total). Thus, it is not surprising that the United States is also in a leading position as far as research and development are concerned. Exports of EC producers to the United States have been recently declining. The loss of price competitiveness, following the depreciation of the USD against European currencies and a growing technology gap are only part of the explanation. An additional factor resides in the lengthy and costly process of sanctioning a health product in the USA. This represents a huge barrier for the small or medium-sized firms, with little financial power, who make up the majority of the industry.

Japan plays a relatively minor role in EC trade of the industry's products, absorbing about 8% of total EC exports and providing about 13% of extra-EC imports. In some fields, however, Japanese companies are serious competitors, or in some fields, market dominators. In the field of flexible endoscopic instruments, the Japanese company, Olympus, dominates the world market with a share of roughly 85% of total world production. Japanese competition is also strong in the field of blood pressure instruments.

Imports from East Asian newly industrialised countries (NICs) have been increasing during recent years, mainly in low-end instruments. In the field of standard instruments for example, competition arises from countries like Pakistan as well.

The strong rise in intra-EC trade (16% per year in value) was mainly a result of increased efforts of companies to gain market share in the EC, helped by technical standardisation within the EC and by a more rapid approval of products. The continuation of this trend can be expected in the future, with the expected adoption of an EC directive requiring specific product characteristics before free movement in the EC would be allowed.

Production process

The industry is characterised by an increasing share of sub-contracting, as the very specialised character of the main components of their products, optical systems for instance, require input from other producers. This trend is expected to reinforce itself in the future. In particular, the trend for increased integration with data processing systems will require even more sub-contracting.

INDUSTRY STRUCTURE

Companies

The industry in the EC is characterised by a large number of small enterprises (less than 250 employees), usually specialised in narrowly defined niche markets, often producing a small number of closely related products. The few medium-sized and large firms in the industry produce a broad range of devices in the field of medical equipment and in other fields as well.

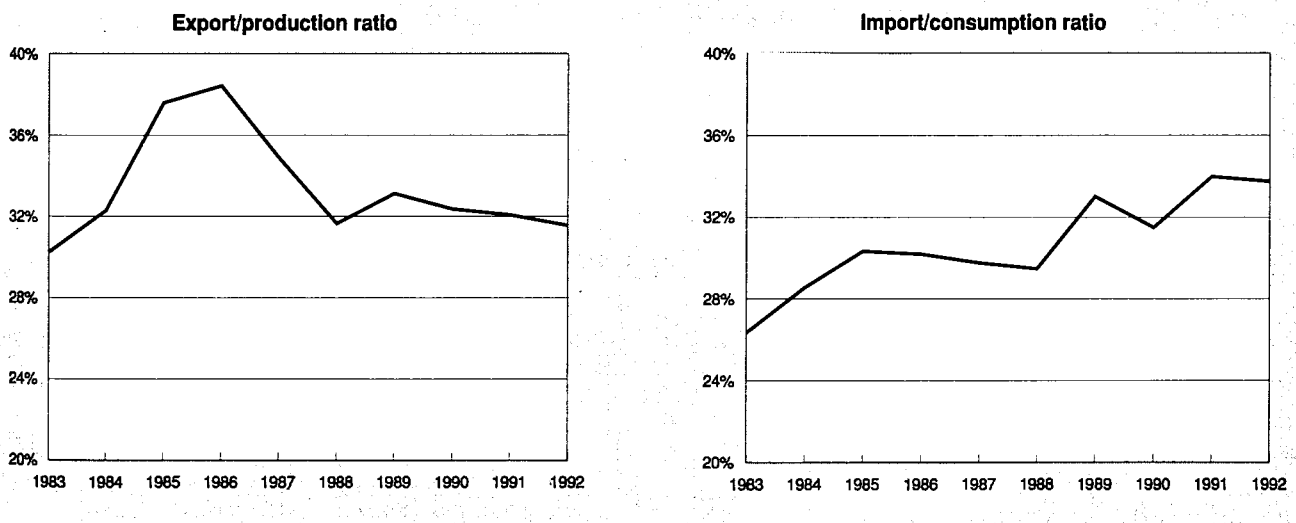
Along with the aforementioned company, Olympus, other important producers in fixed endoscopic devices are the medium-sized companies Karl Storz (D) and Richard Wolf (D), each holding about 35% of the world market. In the field of anaesthetic apparatus and equipment, the most important firms are Draeger Werke (D), l'Air Liquide (F), Ohmeda (UK) and British Oxygen (UK), all of which are producing on a global level. In the field of small instrumentation, Germany is home for a high number of small firms with about 100 employees each, that, in total, produce about 50% of total world production. Aesculab (D) is one of the few large companies in this area. In the other important countries of the EC, the structure of the small instrumentation industry is similar. In operative and postoperative treatment, important firms are the companies Beiersdorf (D) and Braun (D). In orthopaedic appliances, there are some 70 firms in the EC with a total of about 2 500 employees. The most important are Smith & Nephew (UK), Dow Corning (F), Otto Bock (D), Aesculab (D), Waldemar Link (D) and the Gebr. Martin (D).

The US firm Baxter is the world's largest producer of health care products, producing in nearly all sectors of medical equipment, e.g. blood bags, apparatus for diagnostic work, medical dressings, infusion sets, surgical gloves and more. Other important USA firms are 3M, Johnson and Johnson and Abbott. They mainly produce infusion sets and catheters, medical dressings, implants, dental materials and diagnostic devices.

Strategies

Competition among EC producers and from those in non-EC countries is likely to increase over the next few years. The technical standardisation within the EC is expected to strengthen competition from abroad, since USA and Japanese competitors will no longer be forced to adapt their products

Figure 8: Medical and surgical equipment and orthopaedic appliances
Trade intensities



Source: DEBA

to differing requirements in the various EC countries. On the other, hand this will also enhance the capability of EC producers to increase their share of the EC market. Due to its technological edge, the United States will remain the most important competitor, while in the field of standard instrumentation, competition stems mainly from Japan and the East Asian NICs.

The strategies of EC firms will continue to be oriented towards cost reduction in the field of standard instruments through the modernisation and automation of production processes, as well as by moving production facilities to low cost countries. In order to gain market share in growth markets, however, it will not be sufficient to simply improve the distribution chain there. Cooperation with producers in South East Asia and China and the formation of subsidiaries there will become a condition for success in these markets. For instance, the German company, Draegerwerke, plans a joint venture in China to produce low-end instruments.

In the field of highly sophisticated products, the position of EC producers is better thanks to better access to technological innovations: to maintain this edge will require increased investments in research and development. In German firms, this currently represents about 6-12% of turnover.

High levels of R&D expenditure, however, can hardly be expected from small or medium sized firms. The strategy for these firms will have to be the production of very client-specific products, designed for small niche markets. Another possibility is consolidating into larger firms, or at least cooperation in research and development. Weak cooperation between the EC's scientific research and industry communities is another problem that should be addressed. At present, the time lag between scientific discoveries and their actual application in a new product may be very long, much longer than is common in the USA.

ENVIRONMENT

The increased application of single-use disposable devices and sterilised instruments, and the disposal of their packaging materials are the main ecological issues. According to an EC Directive, all packaging materials will have to be recycled or recovered by the year 2000.

REGULATIONS

Besides the above mentioned EC regulation, there are a number of EC directives concerning the movement of medical devices in the EC. A directive concerning the health and safety of patients will become effective in July 1994. It will require any medical device or product, intended for use in the EC, to feature the EC stamp of approval attesting to its conformity with EC law. Free movement within the EC will be allowed once the product is in compliance with the provisions of this directive. Another EC directive which came into force in January 1993 is related to active implantable devices; it also requires the EC stamp to move around freely within the EC.

Another regulation concern for all health products bound for export to the United States is the product approval process there, which is considered by some to be a non-tariff trade barrier.

OUTLOOK

The demand and production of medical and surgical equipment and orthopaedic appliances is expected to develop quite favourably in the coming years. The increasing average age of the population in industrialised countries should provide the industry with a stable source of growth during the nineties. Fledgling demand from Eastern Europe, China and other South East Asian countries offers a huge growth potential as well.

However, demand growth is expected to be dampened by recent national health policy restructuring efforts, being taken in nearly all industrialised countries, to cap growth in health care expenditure. In addition, EC suppliers will face increased competition in their home markets from abroad, particularly from the United States, as well as from other EC producers.

Table 5: Medical and surgical equipment and orthopaedic appliances
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	2.7	3.6
Production	2.6	3.1
Extra-EC exports	2.9	3.0

Source: BAK

Written by: BAK
The sector is represented on EC level by: European Federation of Precision Mechanical and Optical Industries, Medical Technology (EUROM VI); Address: Pipinstrasse 16, D-5000 Köln 1; tel: (49 221) 921 212 0; fax: (49) 245 013.

Optical instruments and photographic equipment
NACE 373

The industry of optical instruments and photographic equipment enjoyed brisk growth over the last decade. It benefited from a favourable investment climate, as well from technological innovations resulting from optronics, the combination of optical devices with electronic components, and by the introduction of laser technology.
In the recent past, however, demand for the industry's products declined due to the current recession. Because of this, the short term outlook remains rather pessimistic.
In the medium term, the industry should enjoy a strong recovery thanks to increased investment activities in machinery and equipment and to growing environmental concerns.

INDUSTRY PROFILE

Description of the sector

The industry of optical and photographic equipment includes the following sub-sectors:

- spectacles, lenses, frames and mountings and equipment for use by opticians;
- optical precision instruments (other than optician items); and
- photographic and cinematography equipment.

Compared to other sectors of the manufacturing industry, the optical and photographic equipment industry is of minor importance, with value added being about 20% of that of consumer electronics.

In the EC, the sub-sector represents about 25% of the instrument engineering sector, with Germany being the most important producing country (45% of the EC total in terms of value added, in 1992), followed by France (28%), Italy (14%) and the United Kingdom (11%).

Among EC producers, there is a large degree of specialisation. Germany produces mainly optical, precision and photo instruments, while France and Italy are major producers in ocular optics, mainly spectacle frames.

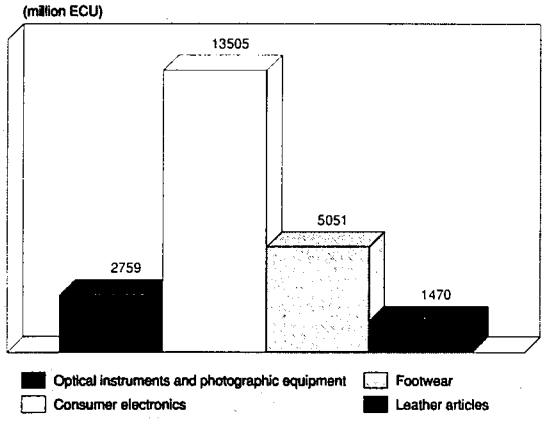
Recent trends

From 1983 to 1988, the industry's performance was quite favourable, with an average production growth of 8% per year in real terms. Production growth was slightly above consumption growth, thanks to strong export growth. In 1988, about 50% of EC production was exported to non-EC countries.

From 1988 to 1992, however, the picture changed. The production rate fell 1.2% per year from 1990 to 1992 as a result of a stagnation in consumption. During the entire period from 1983 to 1992, extra-EC exports grew at faster rates than imports. Since extra-EC imports are about 50% percent higher than extra-EC exports, the EC trade balance deteriorated dramatically from a deficit of approximately 630 million ECU in 1983 to about 1 560 million ECU in 1992.

Until 1990, production of optical and photographic equipment in the EC grew more or less at the same rate as manufacturing production as a whole. In the last two years, however, real production in the industry declined sharply, even while manufacturing production as a whole was stagnant. From 1983 to 1992, employment in the industry increased by about 1% per year, while employment figures in manufacturing as a whole declined by roughly 1% per annum.

Figure 1: Optical instruments and photographic equipment Value added in comparison with other industries, 1992



Source: DEBA

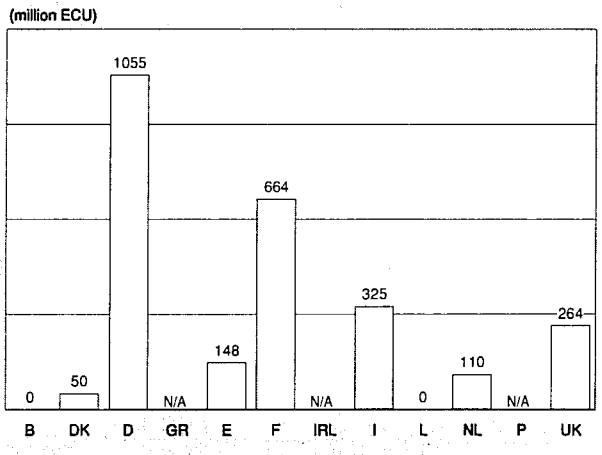
International comparison

The most important producer of optical instruments and photographic equipment is the United States, with more than half the Triad's total output in 1992. Japanese production represents about 31% of the Triad's output, while EC production stands at 22%. Regarding the development of production over time, however, the picture is different. While United States' production stagnated from 1985 to 1990, both Japan's and the EC's increased considerably during the last decade. As a result, the share of the US of total Triad production declined while the EC's percentage increased from 14% to 22% from 1983 to 1992.

Foreign trade

Producers of optical and photographic equipment in the EC have had to face strong competition from abroad which has caused the trade balance to deteriorate over the last decade. In 1992, about 60% of EC demand was satisfied by non-EC producers.

Figure 2: Optical instruments and photographic equipment Value added by Member State, 1992



Source: DEBA

Table 1: Optical instruments and photographic equipment
Main indicators at current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	3 803	4 118	4 774	5 077	5 673	6 456	6 994	7 235	7 814	7 653	7 330
Production	3 170	3 581	4 156	4 336	4 706	5 288	5 683	5 794	6 004	6 090	5 910
Extra-EC exports	1 894	2 399	2 610	2 509	2 406	2 548	2 989	2 801	2 852	3 061	2 970
Trade balance	-632.8	-536.6	-618.3	-740.7	-967.1	-1 167.7	-1 310.3	-1 440.4	-1 809.3	-1 563.1	-1 400.0
Employment (000)	72.5	74.6	77.2	77.7	77.1	79.8	82.4	82.5	81.1	78.3	76.2

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) BAK estimates.
Source: DEBA

Table 2: Optical instruments and photographic equipment
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	6.8	0.5	4.0
Production	8.0	-0.1	4.4
Extra-EC exports	6.0	5.2	5.6
Extra-EC imports	4.8	4.5	4.7

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Optical instruments and photographic equipment
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 894	2 399	2 610	2 509	2 406	2 548	2 989	2 801	2 852	3 061
Extra-EC imports	2 527	2 935	3 229	3 249	3 374	3 716	4 300	4 241	4 661	4 624
Trade balance	-632.8	-536.6	-618.3	-740.7	-967.1	-1 167.7	-1 310.3	-1 440.4	-1 809.3	-1 563.1
Ratio exports/imports	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.6	0.7
Terms of trade index	111.0	101.4	100.0	100.1	100.7	96.0	90.5	98.8	95.2	90.6
Intra-EC trade	2 146.5	2 505.9	2 595.6	2 919.4	3 340.3	3 714.7	4 376.3	4 768.9	5 167.3	5 261.9
Share of total imports (%)	45.9	46.1	44.6	47.3	49.8	50.0	50.4	52.9	52.6	53.2

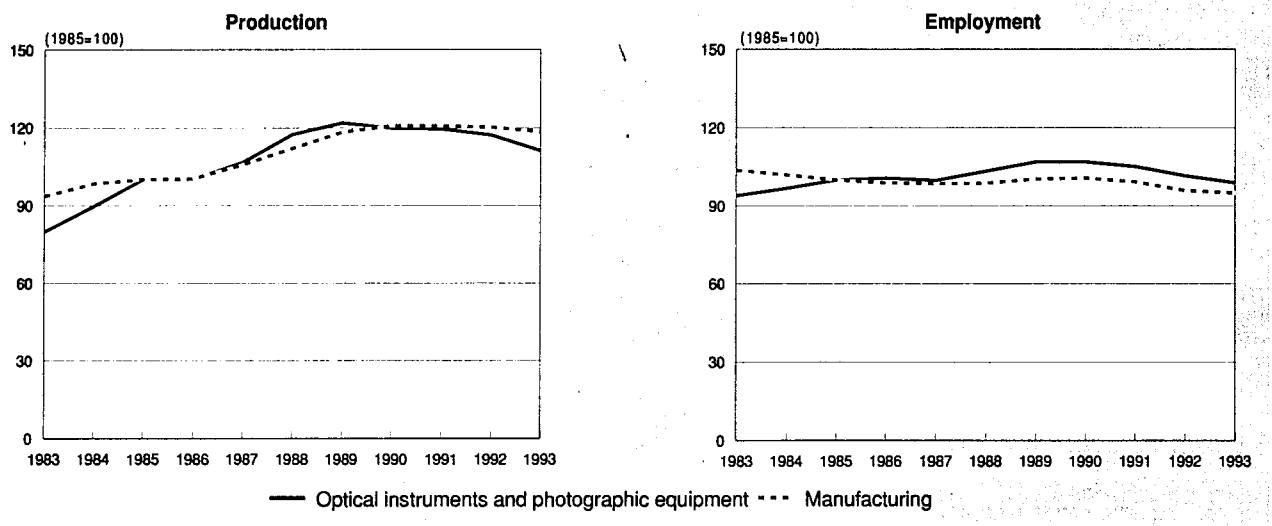
Source: DEBA

Table 4: Optical instruments and photographic equipment
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (2)	27.7	30.4	32.1	30.9	33.7	35.7	33.6	32.7	36.3	35.2
Productivity index	86.4	94.8	100.0	96.5	105.1	111.3	104.7	101.8	113.0	109.8
Unit labour costs index (3)	88.8	93.6	100.0	105.6	112.3	116.7	122.7	129.1	135.9	144.4
Total unit costs index (4)	84.7	89.6	100.0	104.8	111.8	120.7	130.1	132.2	140.9	150.9

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed (thousand ECU).
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Optical instruments and photographic equipment
Production at constant prices and employment compared to EC manufacturing



1993 are BAK and Eurostat estimates.
Source: DEBA

By far the most important competitor for EC producers is Japan. During recent years, however, the EC market share of Japanese producers has declined from 60% in 1987 to 50% in 1992. East Asian NICs and the United States have acquired this market share lost by the Japanese firms.

Important export markets for EC producers are the United States (32% of total extra-EC exports), developing countries, including the East Asian NICs (25%) and the EFTA countries (22%).

The most dramatic increase in competition, however, was seen among EC Member States. From 1983 to 1992, trade between EC countries increased by about 10% per year in value, while extra-EC imports rose by a only 7% per year. As a result, the share of imports within the EC out of total imports increased from 46% in 1983 to 53% in 1992. The most important intra-EC exporter was Germany with roughly 30% of the total, followed by the Netherlands (27%). The most dynamic increases during that period were French intra-EC exports (+16.8% per year in value), followed by that of Italy's (+13.5%) and the Netherlands' (+12%).

Due to the rapid rise of intra-EC trade, the import/consumption ratio has been decreasing. In 1983, about 67% of demand was satisfied by non-EC producers. By the end of 1992 this figure declined to 60%.

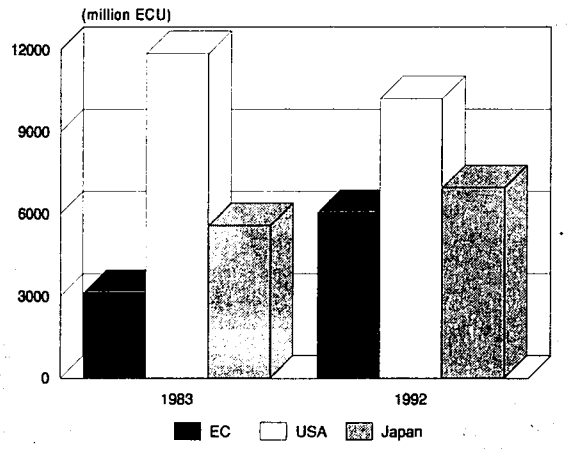
MARKET FORCES

Demand

Demand for optical instruments and photographic equipment as a whole has increased considerably over the last decade. From 1983 to 1992, EC consumption grew at an average rate of 4.0% per year in volume. Since the industry's sub-sectors follow unequal demand patterns, the analysis of the different sub-sectors should be done separately.

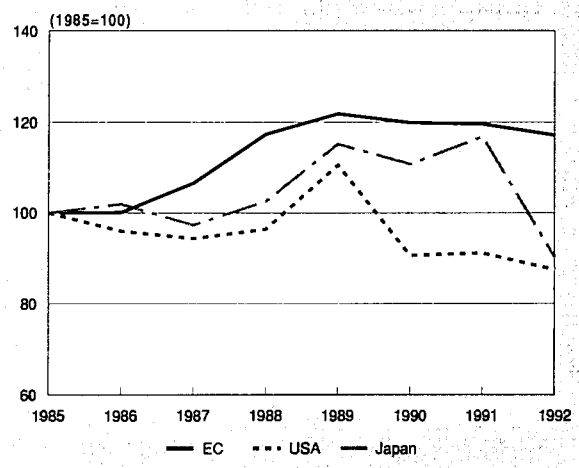
In the field of spectacles, lenses, frames and mountings, the growth in demand stems from both an increase in the number

Figure 4: Optical instruments and photographic equipment
International comparison of production at current prices



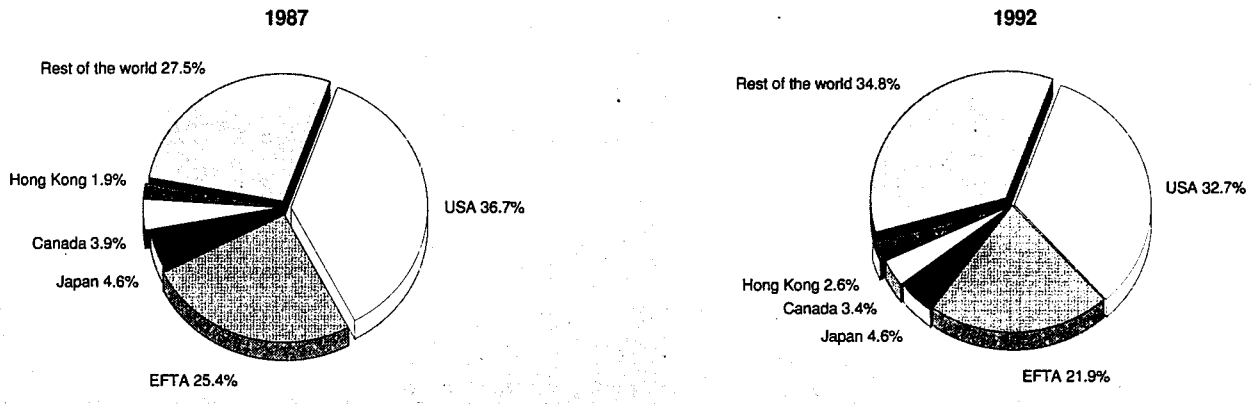
Source: DEBA

Figure 5: Optical instruments and photographic equipment
International comparison of production at constant prices



Source: DEBA

Figure 6: Optical instruments and photographic equipment
Destination of EC exports



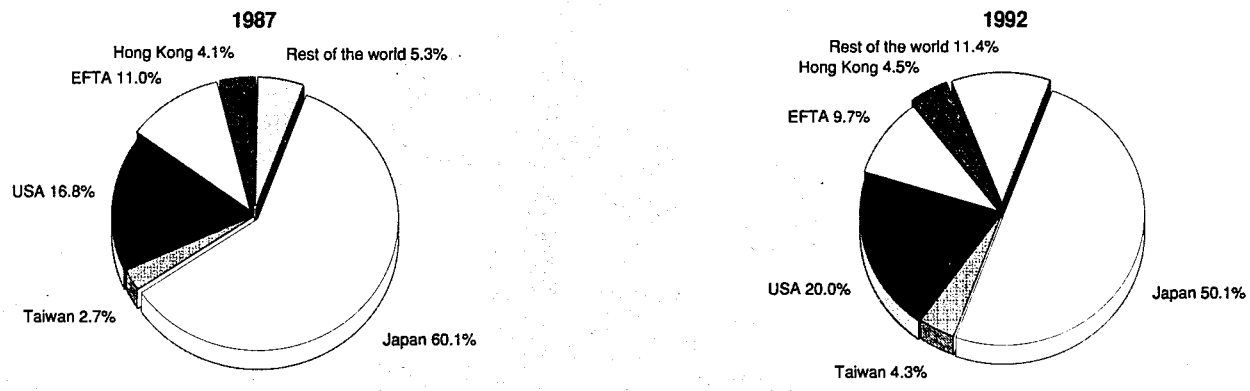
Source: Eurostat

of people wearing corrective glasses and from fashion considerations. In line with the increasing average age of the population, the number of spectacle wearers has been increasing steadily over the years. In Germany for example, about 50% of the population now wear spectacles or lenses.

Since spectacles are becoming more fashionable, demand has been shifting continually towards high quality products. Consumers now often own several pair of spectacles or lenses to satisfy various purposes. Demand for ophthalmic industry products has also been driven by technological innovation. This has resulted in improvements in the glasses as well as the development of new, higher priced products (continuously variable glasses, gas permeable contact lenses and special glasses for people working in front of monitors). From 1989 on, however, demand for products of the ophthalmic industry in the EC has been declining due to more restrictive refund policies introduced by social security systems. This development mainly effected the demand for prescription glasses. In addition, the recent recession has strengthened the downward trend in the low price segment of the market as customers there tend to only change their lenses instead of buying new frames as well. The high price segment, in contrast, performed quite well, since this type of product is relatively insensitive to cyclical fluctuations.

The precision optical instrument market is mainly found in industrial processes. These instruments are used to improve testing and measuring methods. A particularly important sector is the measuring, precision and control instruments industry. Increasingly in this industry, mechanical measuring processes have been eliminated by the introduction of optical methods. In some cases, advanced optical technology in industrial processes allows precise measurements to be obtained, without making contact with the object. This is the case for opto-electronic process control and sensor technology, microanalytical equipment, multiple co-ordinate measuring machines and high power telescopes. Technological innovations and increased investment activity in manufacturing industries have been the driving force behind the increase in demand for precision optical instrument industry products. Of particular importance has been the development of laser technology which is used in fields as varied as: soldering and automatic sheet cutting in the automobile and aerospace industries, the treatment of materials in medical technology and in performing endoscopic surgery. Another area of increasing importance is

Figure 7: Optical instruments and photographic equipment
Origin of EC imports



Source: Eurostat

the use of laser technology for the measurement of environmental pollution. The development and use of LIDAR (light detection and ranging) is replacing the traditional chemical analysis for measuring the concentration of pollutants in air and water.

Over the last few years, however, demand for precision optical industry products has declined as investment expenditure was cut back due to the current recession. In addition, the decrease in demand from the military sector has hastened the downturn. In Germany, for example, production of precision optical instruments declined by 10% in 1990 and by 3% in 1991. The downturn continued in 1992 as well, with a fall of about 4% in real terms.

In the field of photographic and cinematographic equipment, demand stems mainly from private households, but it also comes from specific manufacturing activities. In the photographic apparatus sector, product innovation has been the driving force for the increase in demand. The introduction of electronics was responsible for a move towards electronically controlled cameras, decreasing the amount of mechanical parts necessary. Technological improvements that make sophisticated cameras more user-friendly and improve picture quality have allowed cameras to be offered with features such as auto focus, auto rewind and auto flash. Recently, however, there appears to be a trend among customers to shy away from highly sophisticated cameras and move towards simpler, handier models or even towards throw-away cameras. At present, demand exhibits a downward trend that results from high equipment prices and "innovation fatigue" among consumers. The loss of markets in Eastern Europe has also reduced world demand. This development has been strengthened by the current recession, bringing about a decline in investments as well as in consumer expenditure on durables.

Another field of demand is the use of state-of-the-art special cameras and lenses in fields such as aerial and space photography, traffic and building access monitoring, medicine and science as well as studio and press photography. Demand for photographic and cinematographic equipment is also supported by the growth in importance of communication systems. Transmitted electronic images, videos and communications all require photographic or related optical equipment.

Supply and competition

In the field of photographic equipment, production growth in the United States and Japan has been declining since 1985 following the gradual maturation of their markets. In Japan in particular, demand for photographic equipment has decreased considerably in the recent past, giving rise to price wars among suppliers there. In addition, the consumer trend away from SLR cameras towards low cost compact cameras or even disposable cameras has caused sharp decreases in profits. There has been a rapid increase of imports into the EC over the past few years due to the sharp competition between Japan, the United States and, more recently, the East Asian NICs for EC market share.

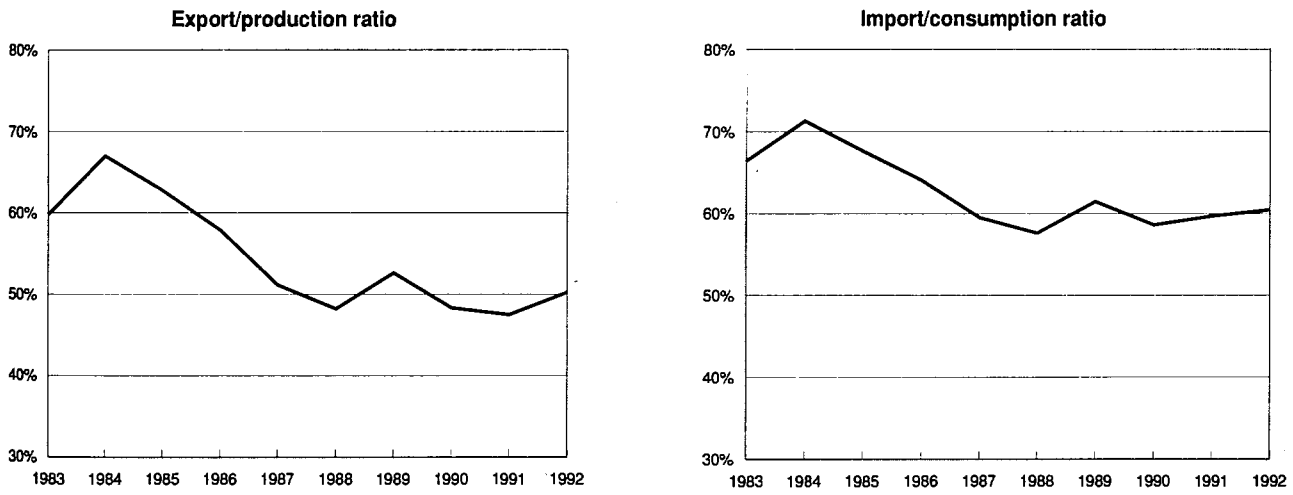
The few EC survivors in the field of photographic equipment face a tough struggle to retain their market share against Japanese and the US producers who are highly price competitive due to their large scale production. In particular, Japanese producers such as Canon, Olympus or Nikon are extremely efficient in both production and marketing and their size allows them to invest heavily in research and development.

In the field of optical precision instruments, the situation is characterised by the strong position of EC firms in producing state-of-the-art technology for the export market. The most important export market for these products is the United States where competition mainly takes place between EC producers.

In the field of spectacles, EC firms are world leaders. France and Italy, in particular, are strong exporters of fashion frames due to their excellent image abroad. In the production of spectacles, Germany is very successful in foreign markets. Competition from Japan and the East Asian NICs is on the rise. Imports into the EC of frames from the latter have been increasing, thanks to their price competitiveness, supported by lower production costs there. Japan has lately become a more serious competitor in the field of spectacles since the MITI is encouraging research and development activity in this sub-sector to help supply the rapidly increasing demand from the ageing population.

As a result of enhanced intra-EC trade, competition between EC member countries is on the rise. In the field of precision optical instruments, the high degree of specialisation of each firm forces producers to search for additional markets abroad since national markets are too small to permit them to reach economies of scale in production facilities. Intra-EC compe-

Figure 8: Optical instruments and photographic equipment Trade intensities



Source: DEBA

tition is likely to keep increasing, over the next few years, particularly after the remaining impediments to trade are fully eliminated in the common EC market.

Production process

Employment in the industry has changed very little from 1982 to 1993, increasing, on average, by about 1% per year. As production in volume rose by about 4.0% during that same period, it follows that productivity gains reached approximately 2.1% per year.

In most of the industry, the production process involves the assembly of large numbers of components with highly complex characteristics. Normally, at least some of these components are outsourced to highly specialised firms that produce to custom specification for a number of firms. In some cases, producers of optical instruments and photographic equipment concentrate mainly on design, research and development, while both production and assembly are subcontracted out.

INDUSTRY STRUCTURE

Companies

Precision optical instruments in the EC are frequently produced by firms that are active in the broader sector of instrument engineering. These companies are concentrated mainly in the field of measurement technology since it plays an increasingly important role in optical technology.

In the sub-sector of spectacles, lenses, frames and mountings, the industry is comprised of predominantly small and medium-sized firms, employing a maximum of 500 employees. Frame production is usually done by even smaller firms that employ less than 100 employees. Despite their small size, however, these firms are usually internationally active, with EFTA countries and the United States being their most important extra-EC outlets. The few larger companies in the sub-sector are Rodenstock (D), Bausch & Lomb (D), Carl Zeiss (D), Essilor (F), Luxottica (I), Safilo (I), De Rigo(I), Indo (E) and Pilkington (UK). Important Japanese companies are Seiko, Hoya and Nikon.

In the precision optical instrument sub-sector, Carl Zeiss (D), Schott (D) and Philips (NL) are among the most important suppliers. World wide there are about 12 producers in this area. Leica (CH/UK), specialised in optical instruments, has become a world leader in the sector behind the Japanese company Nikon (JPN).

In the field of photographic equipment, there are a few large, often highly specialised, manufacturers in the EC, such as Angénieux, a French manufacturer of camera lenses. Other important producers in this area are Agfa Gevaert AG (D), Carl Zeiss (D), Rollei (D), Minox (D), Linhof (D), Durst (I) and Bosch (D).

Strategies

EC photographic equipment enterprises face strong competition from outside the European Community, especially from the United States and Japan. As Japan is the most important producer of cameras, a closer look should be taken at this industry's strategy there. In the wake of the decrease in turnover and profits Japanese firms have suffered, companies there have had to rethink their strategies. One such change in strategy has been product diversification. This should cause the share of cameras in total turnover to keep declining. Canon, for example, has been very successful in this context, since about 80% of its turnover currently results from other products such as printers and copiers. In addition, Japanese manufacturers have also increased their marketing efforts in foreign markets, further exacerbating price competition in the EC. The creation of subsidiaries in low wage countries could help EC firms improve their price-competitiveness by shifting portions of production to these countries while restricting themselves mainly to research and development, design and, possibly, product assembly.

To maintain their advantage in the state-of-the-art precision optical instrument field, EC producers will have to increase their R&D expenditure, as well as to strengthen their presence in the fast growing South East Asian markets.

Increasing intra-EC competition in the field of optical precision instruments is likely to give a boost to mergers and acquisitions. Important regrouping has already taken place. The British firm Cambridge Instruments and the Swiss firm Wild Leitz merged to form a new group, specialised in optical instruments, under the name of Leica. In 1988, Wild Leitz took over one of its main competitors, Kern. And, in 1993, Angénieux (F) was acquired by SGS-Thomson (UK) and AML, a subsidiary of l'Air Liquide (F).

ENVIRONMENT

The production process of optical instruments and photographic equipment has a negligible effect on the environment. One area of environmental concern for the industry is related to the photographic equipment sector where chemicals used in the production and development of photographic films find their way into the soil and possibly into water supplies. Another problem in this context is the growing use of disposable cameras that add to the waste stream. Increased efforts at recycling would be beneficial for the industry in limiting environmental damage.

The industry may benefit from new opportunities emerging in the area of solutions to ecological problems. The precision optical instrument sub-sector, for example, depends to a considerable extent on demand for measurement and control instruments. Enhanced environmental monitoring and measuring requirements will likely boost demand for such instruments. Similarly, there will be an increase in demand for analytical instruments such as microscopes and optical instruments for physical and chemical analysis such as spectrographs, colorimeters and photometers. Demand for photographic equipment may also benefit from ecological concerns. The aerial and space photography fields increasingly use sophisticated cameras to monitor environmental damage.

OUTLOOK

The EC industry of optical instruments and photographic equipment is being hit by the current recession. The situation is not expected to improve until the end of 1994. Low investment activity in the manufacturing sector will particularly effect suppliers of optical precision instruments.

In the optical sub-sector, stagnant consumer demand and the failure of markets in Eastern Europe to recover will continue to weigh down production. Even the German optical industry, which had profited from the boost in demand brought about by the German reunification, faces a decrease in demand as well. In the medium-term, the outlook for EC producers is rather positive. The optical sub-sector will continue to benefit from the increasing of the population ageing population and

Table 5: Optical instruments and photographic equipment Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.2	2.6
Production	0.5	2.8
Extra-EC exports	0.8	4.5

Source: BAK

may also benefit from developing markets in Eastern Europe. Once the expected upswing in overall economic activity takes place, a recovery in demand for this sub-sector's products as a whole is expected.

The sub-sector of precision optical instruments will benefit from increased investment activity in machinery and equipment, as well as from ecological issues that are continually gaining importance in industrial production processes. For EC suppliers to survive in globalised markets, it is imperative that they increase their R&D expenditure and redouble their efforts to gain a foothold in the dynamic, growing markets of South East Asia. Other potentially important markets in the medium-term may be found in South America where demand is expected to surge once their economies finally take off.

Written by: BAK
The sector is represented on EC level by: European Federation of Precision Mechanical and Optical Industries, Ophthalmic Optics (EUROM I), Optics, Laser and Laboratory Instrumentation (EUROM II) and Photographic and Video Technology (EUROM III); Address: Pipinstrasse 16, D-5000 Köln 1; tel: (49 221) 921 212 0; fax: (49 221) 245 013.

Clocks and watches
NACE 374

The clock and watch industry in the EC is confronted with strong competition from abroad. While production in the EC declined by about 4% per year in volume from 1983 to 1992, consumption increased by about 3% during the same period. The most important competitors are China, Hong Kong, Switzerland and Japan. Nearly 50% of extra-EC imports stem from Swiss producers, mainly active in the field of top-of-the range watches. In line with the unfavourable development during the last years, employment fell by half from 1983 to 1992 The outlook for the industry in the medium term is somewhat more optimistic, thanks to the eventual economic recovery in industrialised countries and to the potential for increased demand from developing countries such as China and India.

INDUSTRY PROFILE

Description of the sector

The industry defined as clocks, watches and parts thereof includes watches, instrument panel clocks, clocks, control apparatus and timing devices using clock-work or synchronous motors and time switches, as well as clock and watch movements. The sector comprises mechanical, electrical and electronic watches.

The sub-sector of clocks and watches is the smallest among the larger sector of instrument engineering in the EC. In 1992, its output represented only about 5% of the total.

Germany and France are the most important producer countries within the EC. Their output accounts for more than 80% of the EC total. Far behind is the United Kingdom (12%) and Italy (7%). Germany is the main producer of clocks in the EC industry, France produces mainly watches and Italy is specialised in the production of cases, in particular gold cases.

The production structure in the EC underwent considerable changes during the eighties. West Germany was the dominant producer at the beginning of the eighties with nearly 50% of the EC total, but its relative position receded in the following years to the benefit of France, whose share of EC production surpassed that of Germany by 1987. In 1989, Germany managed to remarkably increase its production from the stimulation of demand it received from the reunification. In 1992, the share of Germany in total EC production was 42%. followed by France (40%), the United Kingdom (12%) and Italy (7%).

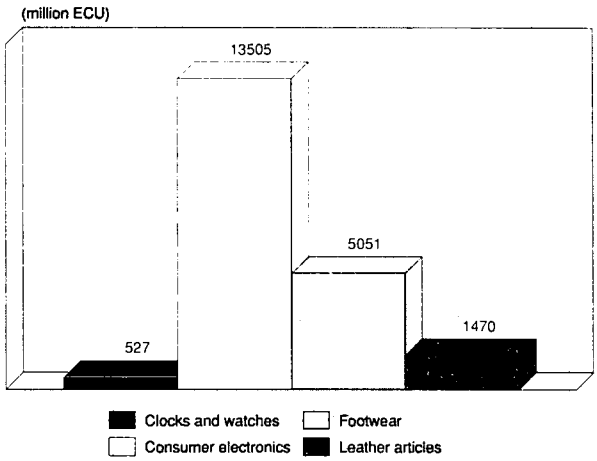
Intra-EC exports are similarly dominated by these countries who make up about 80% of the total. The most important intra-EC exporter is Germany with 45% of the total, followed by France with 20%.

Recent trends

The development of the clock and watch industry was characterised by sharp declines in production during the eighties and the beginning of the nineties. While EC production in manufacturing as a whole increased by roughly 3% per year in volume, the output of clocks and watches decreased by 4% per year during the same period. This decline was reflected in employment as well; while employment in the manufacturing sector declined by about 1% per year, the workforce in the clocks and watches industry fell by roughly 7% per year, shrinking to 18 000 employees in 1992, compared to 34 000 in 1983.

Consumption increased steadily from 1983 to 1992 (3.1% per year), reached 3 billion ECU at the end of the period and was mainly satisfied by fast increasing extra-EC imports.

Figure 1: Clocks and watches
Value added in comparison with other industries, 1992



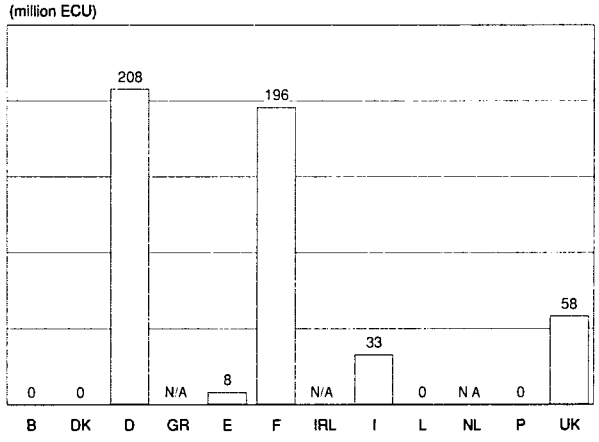
Source: DEBA

Extra-EC exports increased at a similar pace but, given that imports are about three times as high as exports, the EC trade balance kept deteriorating with a deficit of about 56% of EC consumption in 1992.

International comparison

By far the most important producer of clocks and watches in the world is Japan, with a production value of about ten times that of the EC. Unlike the United States and Japan, however, production in the EC declined constantly to reach about 1.4 billion ECU in 1992. Production in the USA increased by roughly 5% per year in volume through the second half of the eighties. Japanese production increased by 11% per year in value, to reach about 14 billion ECU in 1992. Consequently, EC and USA producers saw their shares of world production drop dramatically. In 1983, Japan produced about 61% of the Triad's output, the EC roughly 21% and the United States about 18%. In 1992, the share of EC - and USA production dropped about 8%, while Japan's rose to more than 80% of the Triad's output.

Figure 2: Clocks and watches
Value added by Member State, 1992



Source: DEBA

Table 1: Clocks and watches
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	2 399	2 029	2 072	2 384	2 399	2 640	2 843	3 003	3 119	3 049	2 920
Production	1 628	1 265	1 323	1 425	1 414	1 454	1 512	1 546	1 435	1 356	1 230
Extra-EC exports	527.6	669.6	753.6	754.1	733.1	875.8	957.6	972.0	940.9	996.1	1 030.0
Trade balance	-771.3	-763.6	-748.8	-958.2	-985.7	-1 186.5	-1 330.9	-1 457.3	-1 683.5	-1 693.6	-1 700.0
Employment (thousands)	34.3	25.7	24.8	24.7	23.1	22.4	22.0	20.7	19.6	18.2	17.6

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) BAK estimates.
Source: DEBA

Table 2: Clocks and watches
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	3.8	2.3	3.1
Production	-3.4	-4.5	-3.9
Extra-EC exports	16.4	8.0	12.6
Extra-EC imports	16.0	7.8	12.3

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Clocks and watches
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	527.6	669.6	753.6	754.1	733.1	875.8	957.6	972.0	940.9	996.1
Extra-EC imports	1 299	1 433	1 502	1 712	1 719	2 062	2 289	2 429	2 624	2 690
Trade balance	-771.3	-763.6	-748.8	-958.2	-985.7	-1 186.5	-1 330.9	-1 457.3	-1 683.5	-1 693.6
Ratio exports/imports	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Terms of trade index	97.2	95.5	100.0	98.5	110.0	99.6	78.7	75.7	79.3	86.5
Intra-EC trade	419.0	442.7	465.1	513.2	525.9	583.1	628.5	634.4	616.1	607.2
Share of total imports (%)	24.4	23.6	23.6	23.1	23.4	22.0	21.5	20.7	19.0	18.4

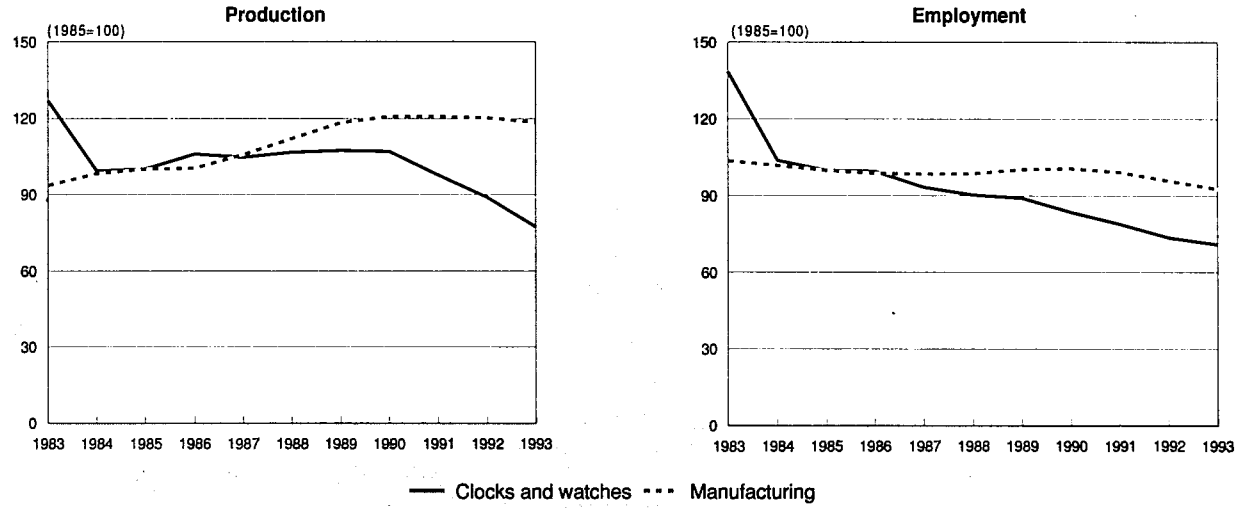
Source: DEBA

Table 4: Clocks and watches
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (2)	23.3	24.4	24.6	25.5	27.4	29.5	28.6	29.4	30.2	28.9
Productivity index	94.7	99.4	100.0	103.8	111.7	120.0	116.3	119.7	122.9	117.6
Unit labour costs index (3)	95.2	94.5	100.0	108.0	121.4	118.9	123.4	131.4	139.9	150.7
Total unit costs index (4)	90.6	90.8	100.0	108.7	115.8	120.8	127.2	138.9	139.6	147.1

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed (thousand ECU).
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Clocks and watches
Production in constant prices and employment compared to EC manufacturing



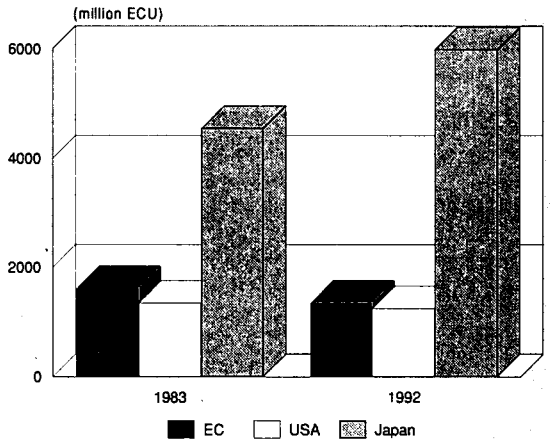
1993 are BAK and Eurostat estimates.
Source: DEBA

Foreign trade

The EC clock and watch industry is faced with strong competition from abroad. Imports from outside the EC increased by 8.4% in value from 1983 to 1992. The most important competitors are Swiss producers with more than 50% of total imports into the EC, as Swiss companies are world leaders in high quality mechanical watches. Imports from the developing countries group (including the East Asian newly industrialised countries [NICs] originate mainly from Hong Kong (about 17% of total imports). This group is an important producer of electronic watches in the low price segment. About 14 % of imports are from Japan. All in all, 88% of demand in the EC is currently satisfied by products from without the EC.

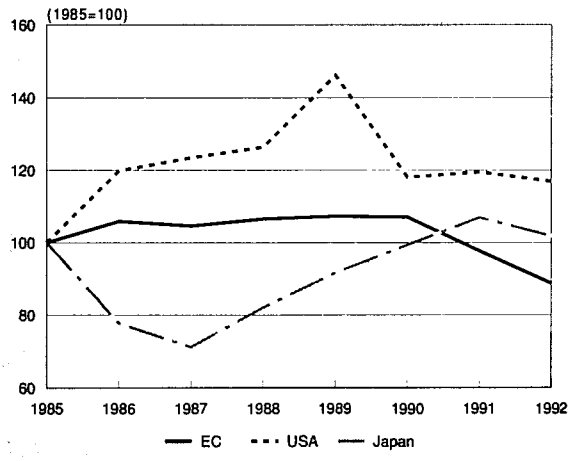
EC producers of clocks and watches are highly export-oriented with about 73% of production being sold outside the EC. Exports from EC companies to extra-EC markets increased by 7.3% per year in value from 1983 to 1992. The most important markets for the EC are the developing countries with a share of about 40% of total exports and Switzerland with more than 30%. Despite the favourable development of extra-EC exports, the EC trade balance has been deteriorating during the same period; imports are presently almost three times as large as exports. Trade between members of the EC increased as well during the same period, but at a slower pace than trade with extra-EC countries. It grew at an annual average rate of 4.2% in value, compared to the above mentioned 8.4% annual growth rate of extra-imports. Consequently, the share of intra-EC imports out of total imports declined from 24.4% in 1983 to 18.4% in 1992. The most important exporter in the EC is Germany with about 45% of total intra-EC exports at present, followed by France with roughly 21%.

Figure 4: Clocks and watches
International comparison of production in current prices



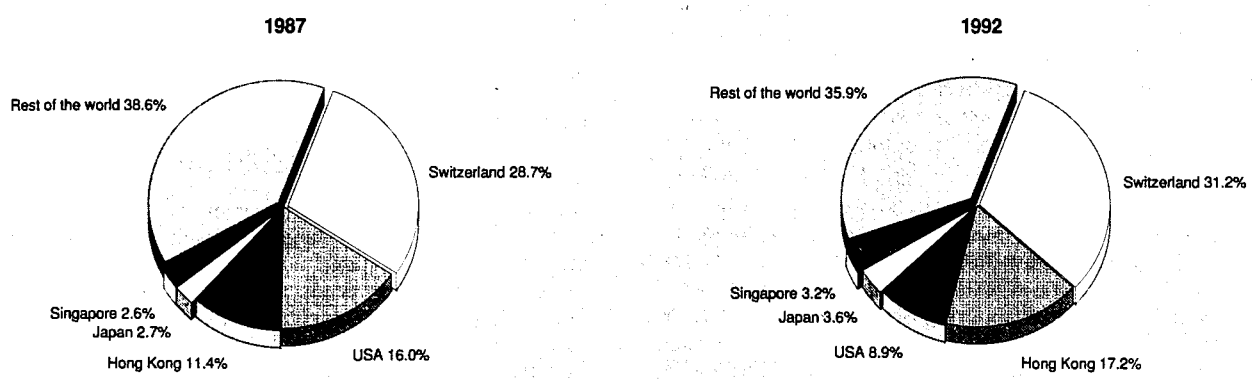
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Clocks and watches
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Clocks and watches
Destination of EC exports



Source: Eurostat

MARKET FORCES

Demand

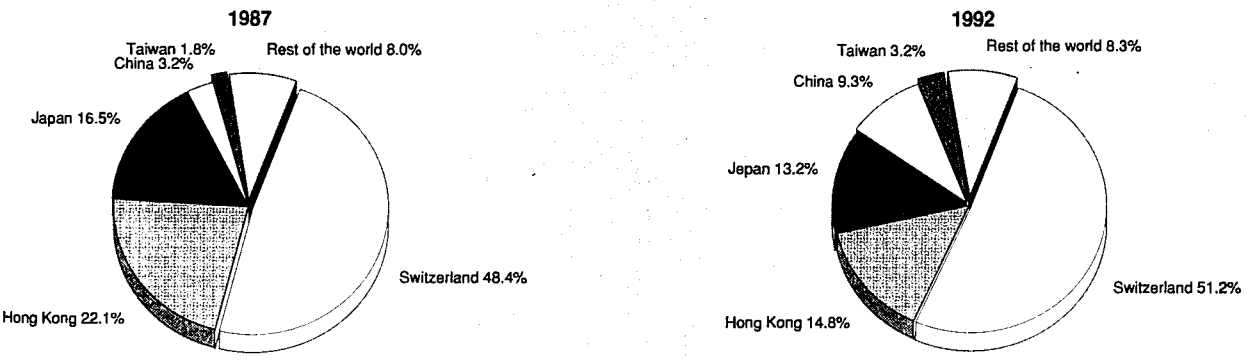
Demand for clocks, watches and components, depending mainly on consumer expenditure, increased steadily during the last years. Given the fact that the introduction of electronic components in this sector's products dates from the early 1960s, consumption was stimulated by fashion trends rather than by technological developments. Innovations, therefore, took place mainly in the form of design changes. Increasing affluence among consumers, in line with the healthy economic climate, resulted in a gradual shift away from cheap electronic watches produced in Japan and Hong Kong, to top-of-the-range watches. As a result, producers from Switzerland, the main suppliers of luxury watches, increased their market share in the EC considerably. In the last few years, technological innovation has been gaining in importance again. The recent decline in consumer demand hit nearly all EC producers of clocks and watches. Manufacturers who introduced new products managed to increase their sales. One such example is the German watch producer, Junghans, that introduced the first solar radio watch at the beginning of 1993.

Supply and competition

The EC clock and watch industry is faced with strong competition from abroad that has caused a rapid decline of its trade balance: the deficit tripled during the last few years and reached 1.7 billion ECU in value in 1992.

The most important competitors for EC producers are manufacturers from China, Hong Kong, Switzerland and Japan. Japan and Hong Kong mainly produce low-end electronic watches and dominate the world market with some 65% of total world production. Japanese producers, however, lost market share in the EC as imports from there declined from 16.5% of total extra-EC imports in 1987 to 13.1% in 1992. This development was mainly the result of the appreciation of the Yen against the European currencies. In particular, manufacturers of high quality watches lost market share in the EC, mainly to the benefit of Swiss producers, the largest exporter to the EC. Manufacturers from Switzerland (highly specialised in the production of top-of-the line mechanical watches) remarkably increased their EC market share during the last few years, largely a result of the success of the Swatch watch. Even in the segment of mid-range watches, the traditional field of EC producers, Swiss manufacturers enjoyed mounting success in the EC. This development is partly the result of

Figure 7: Clocks and watches
Origin of EC imports



Source: Eurostat

the different industrial structure of the Swiss industry. Swiss manufacturers are of international size, which enables them to not only be at the cutting edge concerning marketing and sales strategies, but also to benefit from economies of scale. EC manufacturers, in contrast, are usually small to medium sized. As a result, SMH, the Societe de Microtechnique et dHorlogerie (the manufacturers of Rado, Omega, Longines, Tissot, Certina, Blancpain and Swatch) enjoyed a surge in earnings despite weak and cyclical demand conditions in general. This is due not only to the success of the Swatch watch in the low price segment, but also to the popularity of high quality mechanical watches in the face of difficult demand conditions.

As already mentioned, EC manufacturers are mainly active in the field of mid-range watches. They are not able to compete in prices with electronic watches from the East Asian NICs, which benefit from lower labour costs as well as from a better availability of components for the production of electronic movements. In addition, the EC industry is confronted with a flood of imitation watches, largely from Hong Kong and China.

Taking into account that overall demand for watches is likely to decrease in the near future, in line with the economic slowdown in Europe and Japan, competition on EC markets can be expected to become even harsher. Prices will decline and the profit situation of EC firms will worsen. Efforts of EC producers to move up to the top-of-the-range segment can also lead to price decreases as market saturation in that segment is also reached. This has been happening already for French and German watch producers.

Production process

The sharp decline of EC production over the last decade, along with strong price competition from Japan and Hong Kong, have forced watch and clocks producers in the EC to modernise their equipment in order to reduce their costs. As a result, a substitution process of capital equipment for labour has been taking place. After reaching about 34 000 people at the beginning of the eighties, EC employment declined during the eighties at an average rate of more than 7% to 17 000 people in 1992. The strongest fall in employment could be observed in Germany (-10% per year from 1983 to 1992) and the United Kingdom (-6%).

In addition, EC producers tried to reduce their production costs by outsourcing parts of the production process to concentrate on the tasks of design, assembly and distribution. In particular, the production of movements was shifted to countries with lower labour costs and better availability of electronic components.

INDUSTRY STRUCTURE

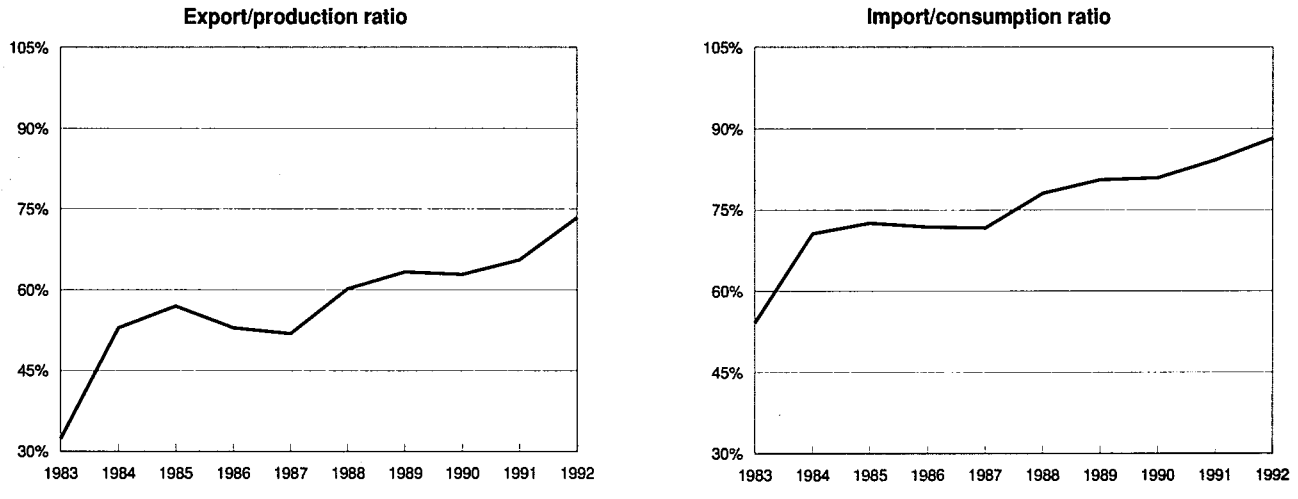
Companies

The industry's enterprises are highly specialised, each in narrowly defined areas. In the EC, the clock and watch industry consists mainly of a large number of small firms producing components, with a few larger companies employing more than 700 people. The larger companies are mainly in the field of case and movement production. The most important manufacturers in the EC are Junghans (D, 1 400 employees), Dufa-Kienzle (D, 800 employees) and Kundo Staiger (D). Other important firms are France Ebauches(F), one of the most important producers of movements in the world, and Vedette (F), operating in the field of clocks. Other companies are Herbelim (F) and Pequignet (F), producing in the high price segment. Most EC companies are active in extra-EC markets as well, with the United States, the EFTA countries and the East Asian NICs as their main export markets. The world's largest producers of clocks and watches, however, are the Japanese companies Citizen, Seiko and Casio. In Switzerland, the home country to the most important competitors for EC producers, SMH is the main producer of watches.

Strategies

The horological industry in the EC faces strong competition from Switzerland in the high-price segment, and from Japan and Hong Kong in electronic low-cost watches. The smaller firms producing in the low-price range have been particularly hit by competition, since they could not produce on a scale sufficient to permit low-cost production. The mid-range sector, however, is dominated by EC manufacturers, but even these are now faced with increasing efforts on the part of Swiss manufacturers to strengthen their presence in EC markets by supplying some of their products at very competitive prices. In anticipation for the onset of the common market in 1993, companies from outside the Community, mainly the Swiss and the Japanese, have been increasing their investments in the EC. Thus, the Compagnie Generale Horlogère, a subsidiary

Figure 8: Clocks and watches
Trade intensities



Source: DEBA

of the Hattori-Seiko group, has expanded its presence in France by making large investments there, while the Swiss SMH has taken over the rough-hewing manufacturing part of the German Porta.

In order to face up to these challenges in their domestic market, EC companies have increased their investments during the last few years. This has permitted firms in the mid-range sector to retain their place in the market by frequently renewing their product lines and by improving the quality of their watches.

To better meet with the intensification of competition, firms in the mid-range segment are being forced to regroup. In Germany, for example, clock producing Dufa-Kienzle took over the watch firms Haller and Buerk and the clock firms Peter-Uhren, Schmid-Schlenker and Patz. Kundo and Staiger, after working together in both R&D and the production of watches, merged in 1991. To strengthen their market position in Western Europe, Dugena from Germany incorporated into the Egona International Holding Ltd. Increased efforts in research and development are very important, as the success of the German Junghans illustrates. They managed to increase their turnover by 20% in 1992, mainly by introducing first the solar watch, then the radio set watch and most recently the first combined solar radio watch.

To streamline production costs, some EC firms increasingly subcontract the production of parts to other countries, mainly in South East Asia and in China; others established subsidiaries there. Thus, Ebauches (F) already has subsidiaries in Mauritius, Tunisia, Hong Kong and China.

ENVIRONMENT

Ecological concerns are of minor importance for the industry of clocks and watches. One ecological issue regarding the clocks industry is the disposal of the small nickel-cadmium batteries used to power electrical and electronic time pieces. The cadmium contained in these batteries may progressively seep into ground water. In the field of watches, another ecological issue is the use of nickel in cases.

REGULATIONS

Trade restrictions are relatively absent in this sector, although some restrictions still exist in France, the United Kingdom, the Netherlands, Ireland and Spain. The forthcoming directive on gold watches should facilitate trade in these products.

OUTLOOK

The recent decrease in world demand due to the recession will hit EC manufacturers in particular. The decline in demand for mid-range watches will cause serious declines in production in the short term. In the field of clocks, demand is hampered by low investment activity in the manufacturing sector as well. Production of top-of-the range watches is expected to show slightly better development since demand for this type of product is less sensitive to cyclical fluctuations.

In the medium term, the outlook for manufacturers in the EC is somewhat more optimistic, mainly a result of both the expected recovery in Western Europe, and of the huge demand potential offered by some developing countries such as China and India; the Eastern European markets are not expected to recover significantly in the nineties, however. EC producers will be faced with increasing competition from outside the community as well as from EC members itself. To survive in this highly competitive environment, EC producers will need to continually reduce their production costs and increase their efforts at product innovation.

The advent of the common market in 1993 did not drastically change the landscape for the industry in the EC since most of the firms were already operating internationally.

Table 5: Clocks and watches
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	3.0	3.5
Production	0.2	0.4
Extra-EC exports	5.1	6.0

Source: BAK

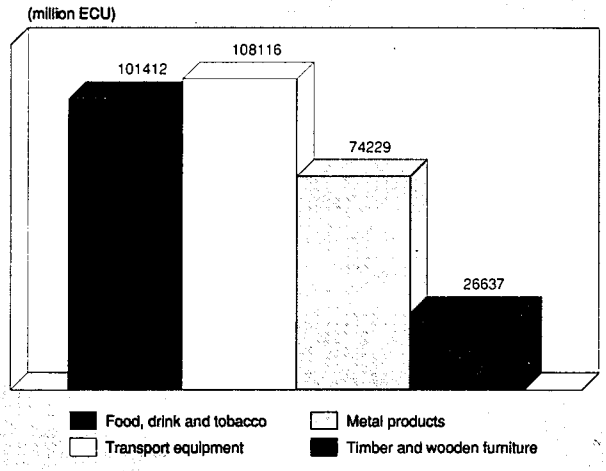
Written by: BAK
The sector is represented at EC level by: Permanent Committee of European Watch and Clock Makers Secretariat (CPHE): French Chamber of Watch and Clock Makers and Micro-technology. Address: Avenue de Messine 34, F - 75008 Paris; tel: (33 1) 456 19522; fax: (33 1) 435 90386; and
International Confederation of Jewellery, Silverware, Diamonds, Pearls and Stones (CIBJO). Address: 78A Luke Street, London EC2A 4PY United Kingdom; tel: (44 71) 613 4243; fax: (44 71) 613 4450.

Schloß-
Bräu

Overview
NACE 41-42

The European food industry, like other sectors, is affected by the world recession. However, comparison at Community level, between the recent trend of manufacturing output as a whole and that of the food industry reveals the typical counter-cyclical behaviour of the food industry. The European market is still characterised by the different consumption habits of the various regional areas, albeit with some common trends. Worthy of particular emphasis is the shift in consumers' preferences towards processed products, convenience foods and snack foods and their ever-increasing concern with nutritional, health and environmental problems.
The competitive environment is determined more and more by a small number of multinational companies. In many market segments, however, production and distribution are still on a national scale only while the degree of concentration of the industry and of distribution varies from country to country. Mergers and take-overs during the 1980s radically changed the company profile and the structure of the sector. During the last two years these activities, although not as intensive at world level as in the recent past, did include some major operations.

Figure 1: Food, drink and tobacco
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

This industry comprises all processed food products, beverages and tobacco classified in NACE groups 411 to 429. In Europe the food and drinks industry is the most important branch of activity in the whole of manufacturing industry in terms of the value of production and one of the most important in terms of added value.

Recent trends

The food industry as a whole displays growth rates which are typical of sectors whose expansion has ceased. The outstanding feature is the steady growth of both apparent consumption and production. At constant prices the average annual growth rate is 2.5% over the period 1983-92 for both production and apparent consumption, with a speeding-up of the growth rate in the second part of the decade (3% in the period 1988-92).

The attractiveness of this industry to the major financial and manufacturing groups is due to this steady growth, and it is particularly during recessions like the present one, that the counter-cyclical nature of most agri-foodstuffs sectors becomes most advantageous. In 1992, the food industry's production index showed a cumulative rise of 20% since 1980 with average annual growth of 2% during the last two years. For the manufacturing industry as a whole the production index declined by 0.4% over 1990-92.

The interest displayed in the food industry is also attributable to its profitability. In 1989, for the hundred leading industrial groups in the EC, agri-foodstuffs companies showed the highest net profit/turnover ratio (7.7%), compared with 5.3% for the chemical industry and 4.7% for the automotive industry. This tendency is due, despite the fact that most of the agri-foodstuffs sectors are no longer growing, to the vigorous spread over the last decade of new convenience products with a higher added value than the traditional products. These characteristics have kept employment levels fairly steady throughout the last decade, despite the sharp drop in the number of persons employed in 1992 (down 2.4% on 1991).

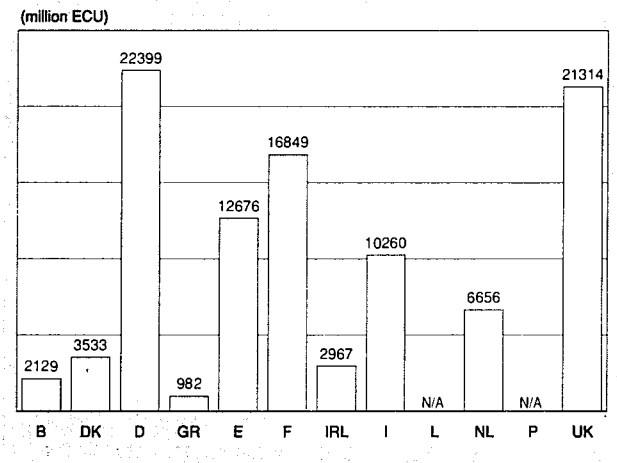
Extra-EC exports have increased slightly since 1989, when their value rose by about 17%. Despite a small increase in imports the Community balance of trade has improved steadily, showing a surplus of ECU 6601 million in 1992, 22% higher than 1991. The meat processing sector, together with the processed fruit and vegetables and oils and fats sector, are the only food categories showing a trade deficit.

International comparison

The market for (fresh and processed) foods and beverages in the OECD in 1990 amounted to over 1 600 billion dollars on the basis of purchasing power parity, representing a volume of expenditure greater than that of transport (1 422 billion), clothing and footwear (731 billion) and furniture and electric domestic appliances (688 billion).

The EC, with over 550 billion dollars, is the largest market, followed by the United States (471 billion) and Japan (197 billion). In the United States the food industry is the second-

Figure 2: Food, drink and tobacco
Value added by Member State, 1992



Source: DEBA

Table 1: Food, drink and tobacco
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	296 525	324 781	334 091	334 986	340 186	361 178	391 844	410 552	434 188	447 165	452 000
Production	298 079	327 105	337 583	337 807	343 226	363 601	396 806	415 495	439 595	453 766	456 000
Extra-EC exports	20 283	23 745	24 672	20 701	20 305	21 477	25 068	24 860	26 099	27 908	25 000
Trade balance	1 554	2 324	3 492	2 821	3 039	2 423	4 962	4 943	5 408	6 601	4 500
Employment (thousands)	2 496	2 472	2 419	2 376	2 393	2 382	2 409	2 429	2 436	2 378	2 310

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 2: Food, drink and tobacco
Breakdown by major product line, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Meat	79 659	79 382	3 770
Dairy products	64 594	67 815	3 980
Compound feed	28 880	29 202	1 048
Brewing and malting	25 038	26 099	1 168
Tobacco	38 051	38 992	1 424

(1) Except for trade figures, estimates are used if country data is not available
Source: DEBA

Table 3: Food, drink and tobacco
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	2.1	3.0	2.5
Production	2.2	3.0	2.5
Extra-EC exports	2.3	4.2	3.2
Extra-EC imports	1.5	4.8	2.9

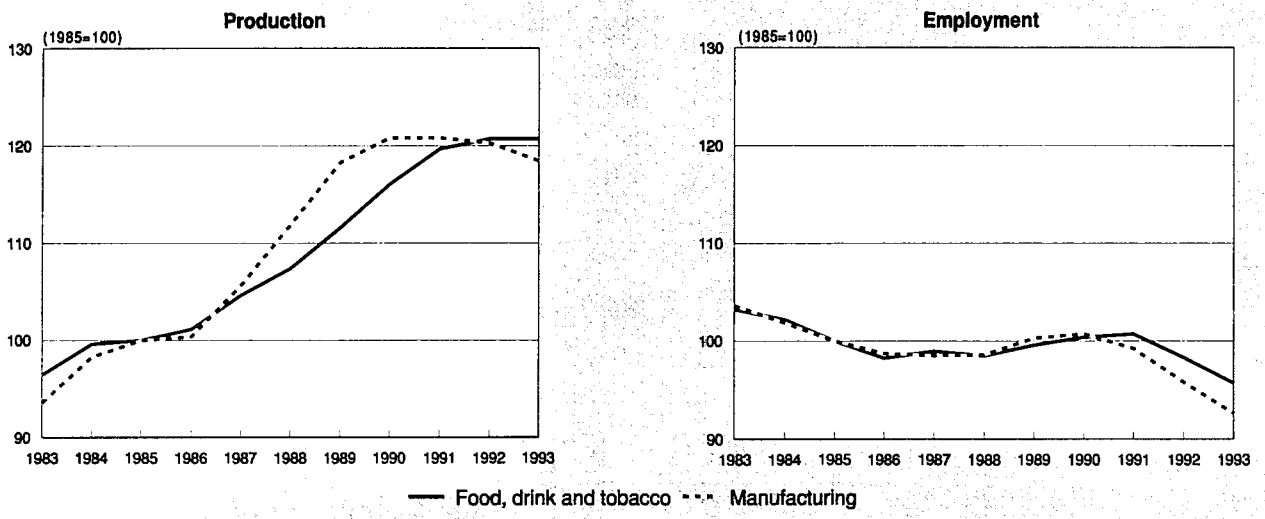
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Food, drink and tobacco
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	20 283	23 745	24 672	20 701	20 305	21 477	25 068	24 860	26 099	27 908
Extra-EC imports	18 729	21 421	21 180	17 880	17 266	19 054	20 106	19 917	20 691	21 308
Trade balance	1 554	2 324	3 492	2 821	3 039	2 423	4 962	4 943	5 408	6 601
Ratio exports/imports	1.08	1.11	1.16	1.16	1.18	1.13	1.25	1.25	1.26	1.31
Terms of trade index	99.3	93.3	100.0	106.5	102.9	99.0	111.0	119.3	114.2	117.7
Intra-EC trade	33 072	36 765	40 872	42 150	43 256	47 878	52 347	53 949	59 271	64 026
Share of total imports (%)	63.8	63.2	65.9	70.2	71.5	71.5	72.2	73.0	74.1	75.0

Source: DEBA

Figure 3: Food, drink and tobacco
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

largest manufacturing sector after transport. US production in 1992 is estimated at about ECU 321 billion, representing a real growth of 1.5% compared with 1991. The average annual real growth in production of 1.3% during the period 1985-92 was appreciably lower than that recorded in the Community. In contrast to stable growth and the characteristics of maximum expansion, the food industry in the United States is going through a period of pronounced change. During the last ten years there have been about seven thousand mergers and/or take-overs. At present, the 50 leading producing companies account for 50% of the market, which is twice the share they had ten years ago.

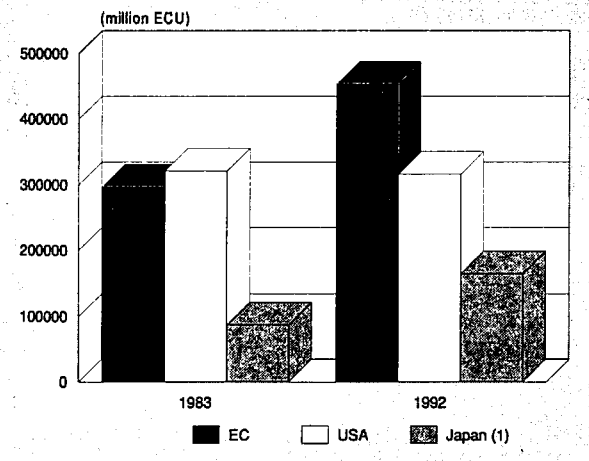
Foreign trade

Although growing at a moderate rate, extra-EC exports during the last four years still represent only a small share of production (6.15% in 1992) and have not yet recovered to the figure of the early 80s. On the other hand, intra-Community trade has grown steadily, and twice as fast as extra-EC exports.

Extra-EC imports have increased significantly in real terms during the last four years, with an average rise of 4.8% over the period 1988-92. Even so, during the same period both the growth in exports in real terms and the marked improvement in the terms of trade have led to a significant improvement in the trade surplus, which doubled between 1987 and 1992.

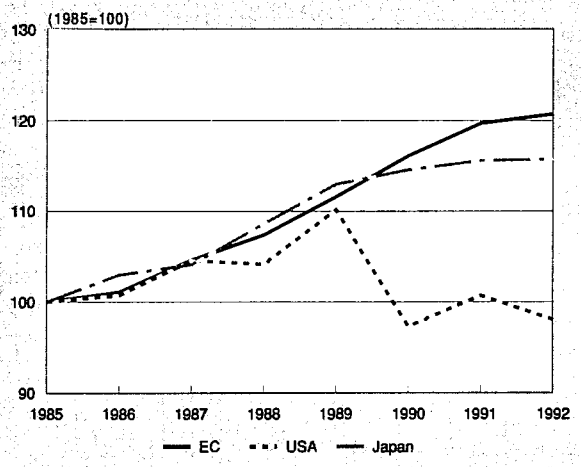
The share of exports to the EFTA countries, the United States and Japan has decreased steadily over the last five years, chiefly to the advantage of Eastern Europe. The changes in flows in terms of geographical areas have, however, mainly hit the United States, which has lost some of its relative importance both as a destination area for Community exports and as an area of origin of EC imports.

Figure 4: Food, drink and tobacco
International comparison of production in current prices



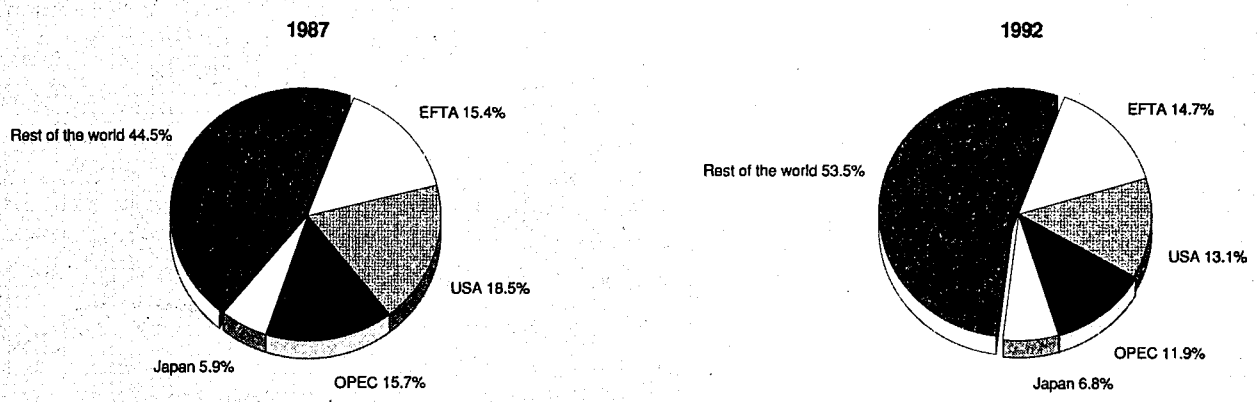
(1) Excluding NACE 421, 427 and 429.
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Food, drink and tobacco
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Food, drink and tobacco
Destination of EC exports



Source: Eurostat

MARKET FORCES

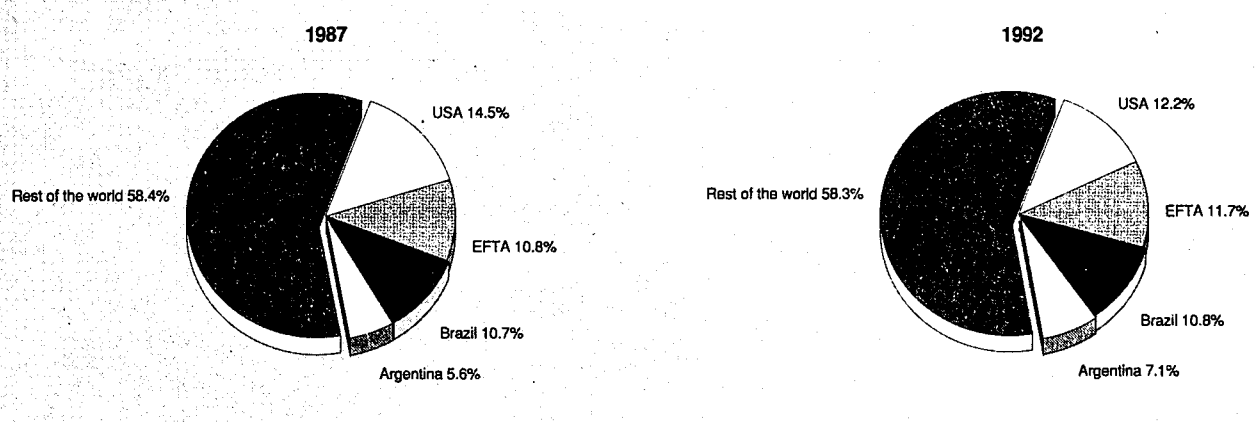
Demand

Demand for food products in Europe is continuing to grow, overall, very slowly indeed, at a rate close to zero. The stable rate of population growth and the increase in purchasing power explain, in the first case, the extremely small rise in consumption in real terms and, in the second, the steady decrease in the proportion of expenditure devoted to food, which is now down to well below 20% in some countries.

However, both the level of expenditure on food and the basket of goods purchased are determined not only by economic or demographic factors but also by different regional habits. With regard to the different patterns of food consumption, four main regional areas can be distinguished: area 1, comprising Germany, Benelux and Denmark, where the diet includes a large traditional component (a substantial proportion of meat, butter, chocolate, biscuits, etc.); area 2, comprising the United Kingdom and Ireland, where there is a large proportion of traditional beverages, especially beer; area 3, comprising Greece and Portugal, where there is a typically Mediterranean situation, with a consumption pattern which we could call first generation: extremely high consumption of fresh products and few prepared, innovative and convenience products; area 4, comprising Italy, Spain and France, again with a Mediterranean pattern, but a second-generation one: products - both fresh and processed - with a high health value, side by side with convenience products. The latter area is a market of primary importance, as the three countries in question account for over 50% of total food expenditure in the EC.

Despite regional differences, however, some common features have emerged during the last few years. Traditional foods, which are still the most important component of food expenditure, are tending to account for a smaller proportion, at the expense, in particular, of products such as bread, butter, sugar, jams and unprocessed meat, excluding poultry meat. Prepared products, on the other hand, continue to consolidate the growth they recorded throughout the 1980s: the main reasons appear to have been their greater tastiness together with retention of their full nutritional value. On the other hand, consumption of alcoholic beverages - spirits and ordinary table wine - is declining appreciably and this trend is hardly counterbalanced by the more widespread consumption of mineral waters and other health drinks. The entire drinks sector is characterised by the appearance of many new products tending to take the

Figure 7: Food, drink and tobacco
Origin of EC imports



Source: Eurostat

Table 5: Food, drink and tobacco
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	31.9	30.8	32.2	34.4	36.7	37.6	37.7	39.9	41.4	42.6
Productivity index	99.0	95.7	100.0	106.7	114.1	116.7	117.2	123.9	128.5	132.4
Unit labour costs index (3)	87.9	94.2	100.0	103.5	107.2	112.3	118.4	125.3	133.2	142.6
Total unit costs index (4)	85.1	95.2	100.0	100.8	101.6	108.3	117.2	121.7	127.2	135.2

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

place of established beverages, thanks to a new image created by publicity campaigns centred around health consciousness.

Supply and competition

The countries with the highest degree of vertical integration and concentration in many primary and secondary agri-foodstuffs-processing sectors are Germany and the United Kingdom, accounting for 22.1% and 21% respectively of Community added value in 1992. Germany, the United Kingdom, France, Spain and Italy combined contribute over 80% of added value generated at Community level.

Owing to the persistence of deep-rooted regional consumption patterns, even the largest multinationals operating in the sector tend to locate their production unit in the main markets in order to keep more closely in touch with consumers' preferences and tastes. Production and distribution also vary widely from country to country as regards the degree of concentration. In Northern Europe it is very high, whereas in the countries of Southern Europe production is very fragmented, with an overwhelming predominance of small and medium-sized local firms. In the United Kingdom, for instance, many public companies are operating, and 18 of these are among the 50 leading European companies (in terms of turnover). In Italy, by contrast, only three companies are among Europe's leading 50. In the 1980s, however, a number of structural changes speeded up the process of convergence towards more homogeneous development. The main forces behind the change are both external to the industry, namely the advent of the single European market, and internal, namely technical innovations with regard to both production processes and products. These structural changes now taking place have created and will promote further concentration and competitive forces driven by multinational companies.

Production process

Companies have reacted to change by investing heavily in increasing their own production capacity, in new technology and in the modernisation of machinery and production services. The expansion of the market and the increase in competition at European level has in some sectors (especially primary processing) heightened the importance of economies of scale, but there have also been many product innovations, all aimed at creating both horizontal and vertical product differentiation.

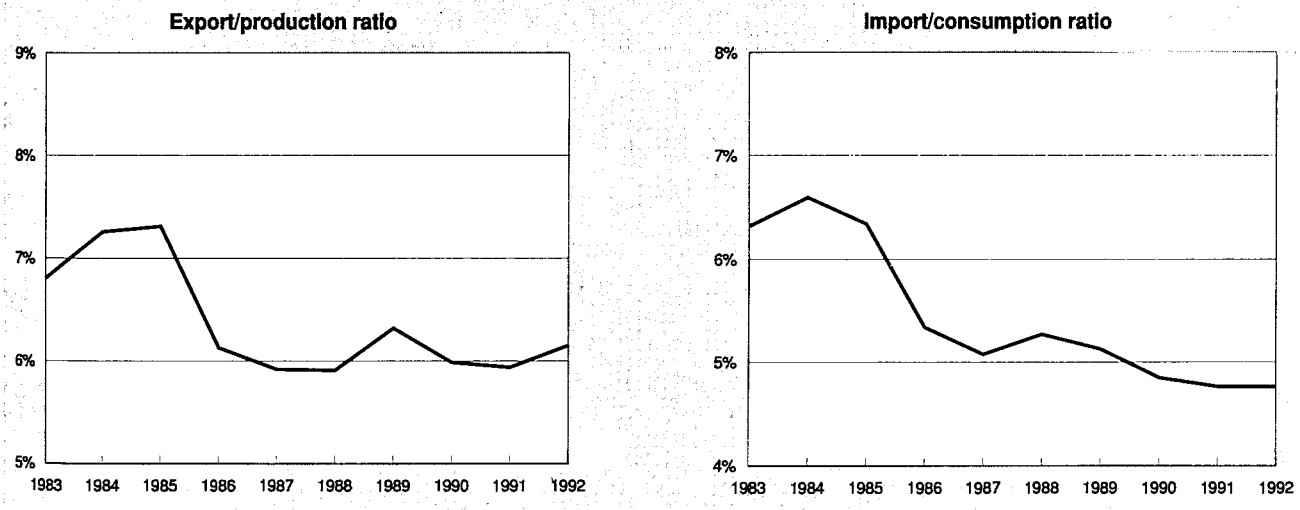
The introduction and recent spread of scanners at points of sale in modern distribution networks will certainly also lead to considerable changes in the product logistics and marketing data-processing systems of companies engaged in production and distribution.

INDUSTRY STRUCTURE

Companies

The change during the 1980s radically altered the international competitive scene. According to the "Fortune" ranking of the main food companies, only four groups appeared constantly

Figure 8: Food, drink and tobacco
Trade intensities



Source: DEBA

Table 6: Food, drink and tobacco
Production and employment by country, 1992 (1)

	Production (million ECU)	Employment (thousands)
EC	453 766	2 378.2
Belgique/België	15 298	71.2
Danmark	13 960	64.4
BR Deutschland	100 434	520.0
Hellas	5 906	55.7
España	45 550	339.2
France	89 032	360.3
Ireland	12 026	44.2
Italia	53 442	212.2
Luxembourg	402	2.4
Nederland	32 995	130.3
Portugal	6 093	65.2
United Kingdom	78 629	513.2

(1) Estimates.
Source: DEBA

among the first ten between 1985 and 1990: Unilever (UK/NL), Nestlé (CH), ConAgra (USA) and Sara Lee (USA).

Recent events involving the Ferruzzi Group (I) will very probably have a serious impact on the international competitive situation. This will depend on the fate of Eridania Beghin-Say, the leading company in the agri-foodstuffs activities of the Ferruzzi Group, which in 1991, was sixth in the world and fourth in Europe among the leading food companies.

However, still as regards world ranking, it should be emphasised that with few exceptions, European food companies handle a much smaller volume of business than the world giants, especially the American firms, and that among the main European companies/ groups, the British are far ahead of the rest at least in terms of size.

The number of companies operating in the European food industry as a whole is rather high. However, the marked concentration of food turnover among the leading ten concerns whose respective parent companies are situated within the EC secures for them a substantial and growing share of the overall market (about 20% in 1991). The biggest company in Europe, by turnover alone, is Nestlé, followed by Unilever and BSN.

Strategies

The need to rationalise and consolidate the acquisitions of the past years and the gradual worsening of the general economic and financial situation of companies has slowed down merger and take-over activity at world level. It should be stressed, however, that the European market has been affected only partly by this situation. Despite the recession, there has in fact been an increase in the number of take-overs and mergers in Europe during the last two years. A significant proportion of this growth is attributable to the opening up of the markets of Eastern Europe and especially the reunification of Germany. Another reason is that small and medium-sized companies in Southern Europe are attractive to those in the North. The reason for this flow lies in the considerable growth potentials, which many countries of Southern Europe offer for some segments of the market.

The increase in take-overs, both within and outside the individual countries, is mainly accounted for by leading European multinationals: Unilever, Nestlé, BSN and Ferruzzi. It should be noted, however, that in 1992, although the number of operations increased, the average sum involved was considerably smaller than in the recent past. This is due to the fact that there are fewer potential targets and that the price of possible further take-overs is too high. In addition, there has also been a change in take-over and merger strategies. Companies which intend to embark on a new line of business or to expand their activity at Community level are tending more and more to create a pan-European network of small and medium-sized firms rather than take over a single large company. In an increasingly competitive market it is becoming necessary, in order to survive and grow, to develop the ability to react quickly to changes. The flexibility with which small firms operate, producing niche products or products aimed at a particular geographical area, gives them an undoubted strategic advantage over larger companies, who in turn respond by taking over small specialised production units.

REGIONAL DISTRIBUTION

Analysing the internationalisation strategies of the major European groups in the EC, recent studies have revealed the existence of different "geographical leadership areas" within which these companies propose to expand and extend the

Table 7: Food, drink and tobacco
The 15 largest european companies, 1992

(millon ECU)	Country	Turnover	Net profit	Employees
Unilever	UK/NL	33 692	1 761	287 000
Nestlé	CH	29 997	1 485	218 005
B.A.T. Industries	UK	16 294	1 181	92 829
Ferruzzi Finanziaria	I	12 431	-949	51 769
Grand Metropolitan	UK	11 104	877	102 405
BSN	F	10 305	529	58 063
Allied-Lyons	UK	6 049	346	71 713
Hillsdown Holdings	UK	5 942	128	44 196
Associated British Foods	UK	5 576	276	51 724
Saint Louis	F	5 153	113	28 016
Tate & Lyle	UK	4 622	163	17 004
Cadbury Schweppes	UK	4 582	276	36 579
Guinness	UK	4 319	713	24 032
United Biscuits	UK	3 805	150	38 698
Rothmans International	UK	3 567	400	20 370

Source: DABLE

Table 8: Food, drink and tobacco
Major acquisitions in the European food and drink industry in 1992

Purchaser	Country	Purchase	Country	Price (in million ECU equivalent)
Nestlé	Switzerland	Perrier	France	1 871
Royal Food Limited	South Africa	Del Monte Foods International	UK	496
Caldbury Schweppes	UK	Aguas Minerales	Mexico	250
Goodman Fielder Wattie (4 establishments)	Austria	Koninklijke Wessanen	Nederland	125
Grand Metropolitan	UK	Cinzano	Italia	126
Besnier	France	Roquefort	France	121
BSN	France	San Miguel Fabricas de Cerveza y Malta	España	99
BSN	France	Cokoladouny	Czechoslovakia	97
Arrisons & Crosfield	UK	BOCM-Silcock	UK	92
Dalgety	UK	Sooner Snacks	UK	61
Grolsch	Nederland	Ruddles Brewery	UK	55

Source: Prometeia

marketing of their products. Very basically, the following main areas can be distinguished: the Italy-France-Spain triangle, in which BSN, Ferruzzi and Unilever are operating on a substantial scale; the Germany, France, UK triangle, in which Nestlé and Unilever are operating, and, lastly, the German-British-Dutch triangle, in which Unilever is the main operator.

ENVIRONMENT

The food industry - confined as it is to processing operations, as distinct from farming - cannot be regarded as one of the more polluting sectors. The problems are due to the recent development of modern distribution methods requires the massive use of packaging.

For certain materials recycling is not necessarily the best option from an environmental and from a cost point of view. Secondly, packaging is regarded as a necessary part of market strategy and in many cases is actually a vehicle for expansion thus any standstill provision could pose serious problems. Furthermore, European legislation foresees the standardisation of food packaging, especially in the case of fresh fruit and vegetables. In some cases there is a trade-off between the need for harmonisation of the legislation concerning food products, the perceived need to establish product and packaging standards and environmental requirements. On the other hand, a new possibility is offered by biodegradable products used for packaging, although their high cost could jeopardise the competitiveness of the companies which use them. For these reasons, environmental problems must be viewed within the broader context of the harmonisation of Community legislation.

REGULATIONS

The legislation produced at Community level deals particularly with the following groups of subjects:

- elimination of the obstacles to the free movement of goods, from the technical and tax points of view;
- protection of public health and the final consumer;
- economic and technological aims.

There is a horizontal legislation dealing with general aspects such as packaging materials, labelling, the use of additives, the characteristics of the production process, etc. Vertical legislation, on the other hand, deals with individual sectors, such as jams, honey, chocolate products, etc.

The most recent directives have dealt chiefly with the hygiene and health aspects of food production. Directive 95/3 of March 1993 concerns co-operation between the EC and the Member States in tackling the scientific problems relating to food processing and its effect on human health. Furthermore, in June 1993 the Council finally approved a directive imposing further hygiene requirements for food products, with special attention to the premises where firms produce.

OUTLOOK

The growing importance of processed products in the diet of European consumers reflects the vitality of this industry. Nevertheless, production activity is expected to slow down in this sector, too, during the next few years. This will apply to most sections of the industry, and, in particular, there is expected to be a big drop in the production of the alcoholic

Table 9: Food, drink and tobacco
Breakdown by size of enterprise, 1990 (1)

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	233 280	92.2	29.5	12.2
20-99	15 458	6.1	19.2	20.2
100 or more	4 214	1.7	51.3	67.6

(1) Provisional estimates.
Source: Eurostat

beverages sector, while that of the slaughtering and meat processing industry will cease to grow.

Food trade within and outside the EC, although growing, is not a significant indicator of geographical specialisation, because there are still wide differences in eating habits and tastes at regional level. Nevertheless, the proportion of exports to production is tending to increase, particularly in some subsectors characteristic of Mediterranean diet (pasta and preserved tomato products).

The growing bargaining power of the major distributors will be the major characteristic of the competitive environment that companies will face. Small and medium-sized firms will find themselves increasingly squeezed between the commercial power of organised distribution and competition from the big companies. The strategic choices open to small firms are thus reduced to a dual option: either to pursue a niche strategy or to become suppliers of unbranded products for the distribution channels.

Finally, the future of many European agri-foodstuffs companies will be determined by the outcome of the GATT negotiations and by the effects of the reform of the CAP (common agricultural policy) on the prices and on the availability of agricultural raw materials.

Table 10: Food, drink and tobacco
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.0	1.5
Production	1.0	1.5
Extra-EC exports	3.0	3.5

Source: Prometeia

Written by: Prometeia Calcolo Srl
The industry is represented at the EC level by: Confédération des Industries Agro-Alimentaires de la CE (CIAA). Address: Rue de la Loi 74, bte 9, B-1040 Brussels; tel: (32 2) 230 8145; fax: (32 2) 230 8569.

Oils and fats
NACE 411

Consumption of oils and animal fats remained stable over the last 12 years. The major development has been substitution of animal fats by vegetable fats and growing preference for low-fat content products as well as more geographically spread consumption of olive oil. With the sole exception of olive oil, self-sufficiency is well on the low side in the oils and fats sector. On the contrary, EC production of margarine takes place in line with demand, so there is full self-sufficiency in the sector.
Growing industrial concentration has improved productivity primarily by rationalising the production process through technological change. Increasing international competition and the introduction of innovative products are major expected developments.

INDUSTRY PROFILE

Description of the sector

The sector's main products are:

- Products of processing of oilseeds intended for final human and animal consumption including vegetable oils, oilcake, flours etc. and raw materials for pastry making, sugar confectionery and preserves industries; products for the production of celluloid, electrical insulating materials, candles, paints, fuels, glycerine, linoleum, lubricants, varnishes, soaps, etc.;
- Products of the processing of olives, from which olive oil is obtained, with different names depending on the production method employed and the quality of the product;
- Margarine, reduced-fat and low fat spreads and blended spreads (mixtures of butter fat and vegetable fat in various percentages), which represent a further stage of processing of vegetable and dairy fats;
- Oils and fats from land and marine animals.

The extensive range of products, particularly for human consumption, may lead to the EC adopting a classification based on the definition of three broad groupings: butter, margarine and mixed fats. These groupings are further subdivided according to fat variations.

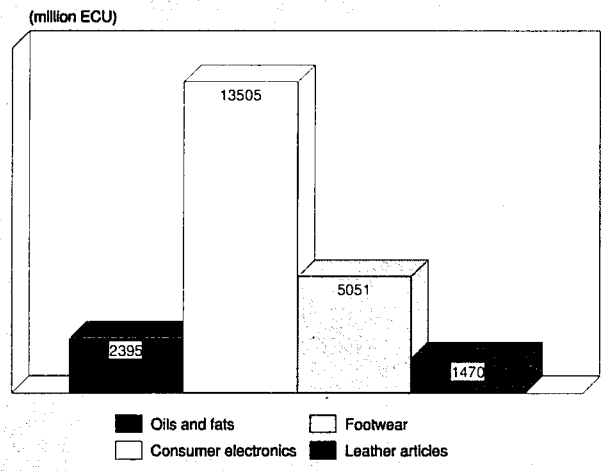
Recent trends

In 1992 the sector's total added value amounted to ECU 2 395 million, having declined by 6.5% in nominal terms compared with the previous year. The countries most responsible for this adverse trend were Spain, Italy and Denmark, while Belgium, France, the Netherlands, the United Kingdom and Germany recorded increases. Denmark, Spain, France, the Netherlands and the United Kingdom account for about 80% of EC value added. In the period 1988-92, consumption and production rose by 2.6 and 2.8% respectively, representing a slight slackening of growth compared with the period 1983-88.

In 1992 per capita consumption in the Community amounted to 15.9 kg of oils and fats, made up of 5.1 kg of margarine and 10.8 kg of other oils and fats for human consumption. On the other hand, per capita consumption of butter in 1992 was 3 kg.

The balance of trade continues to show a deficit. Despite the fact that 80% of world production of olive oil is accounted for by the EC, the overall balance of trade of the oils and fats industry is structurally negative because the industry is heavily dependent on foreign countries for supplies of oilseeds, other vegetable oils and oilcake. The recent recession in Europe caused a drop in sectoral employment of 2.8% in 1992.

Figure 1: Oils and fats
Value added in comparison with other industries, 1992



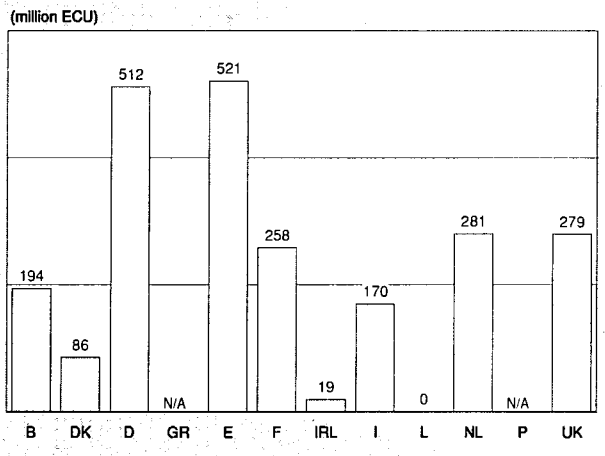
Source: DEBA

Foreign trade

The Community imports oilseeds, vegetable oils, oilcake and flours (notably from the United States, Brazil, Argentina and Malaysia), while it exports olive oil and modest quantities of margarine. Over the period 1987-92 the combined share of the US and EFTA in extra-EC imports declined from 25.4% to 8.3% of the total. Extra-EC exports of oils and fats are being absorbed at an increasing rate by the US market which has come to account for 11.3% of the total compared to 6.5% in 1987. Around 13.4% is absorbed by EFTA countries.

In the olive oil subsector 90% of production is consumed by the producing countries although growing demand from countries that are not traditional consumers is increasing trade flows. The main exporting area is the Mediterranean basin, which normally accounts for 97% of world exports, 60% of which come from the Community. Spain, Italy, Greece, Tunisia and Turkey are traditionally the main exporting countries.

Figure 2: Oils and fats
Value added by Member State, 1992



Source: DEBA

Table 1: Oils and fats
Main Indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	18 840	22 013	21 526	16 886	15 981	19 015	19 965	20 492	20 501	20 153	21 200
Production	15 216	18 287	18 146	13 860	13 543	15 925	16 950	18 109	18 075	17 833	18 500
Extra-EC exports	1 719	2 264	2 157	1 319	1 289	1 297	1 535	1 479	1 394	1 572	1 480
Trade balance	-3 625	-3 726	-3 380	-3 026	-2 438	-3 090	-3 015	-2 382	-2 426	-2 320	-2 700
Employment (thousands)	62.1	55.5	56.4	49.7	51.6	54.3	49.1	50.7	50.8	49.4	48.4

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Oils and fats
Breakdown by major product line, 1992

(thousand tonnes)	Production	Extra-EC imports	Extra-EC exports	Apparent consumption
Vegetable products: (1)				
Liquid	6 770	429	1 580	5 619
Laurics	36	804	11	829
Linseed	105	9	21	93
Castor	15	69	1	83
Palm	0	1 462	30	1 432
Total	6 926	2 773	1 643	8 056
Protein meal:				
Soya	10 334	10 976	1 095	20 215
Rape	3 524	922	14	4 432
Sunflower	2 414	1 537	7	3 944
Cotton	374	761	8	1 127
Copra	18	879	4	893
Palmkernel	4	1 489	0	1 493
Lin	201	411	73	539
Maize	215	956	1	1 170
Others	51	836	7	880
Total	17 135	18 767	1 209	34 693
Marine products:				
Fish oil	145	265	36	374
Fish meal	548	780	306	1 024

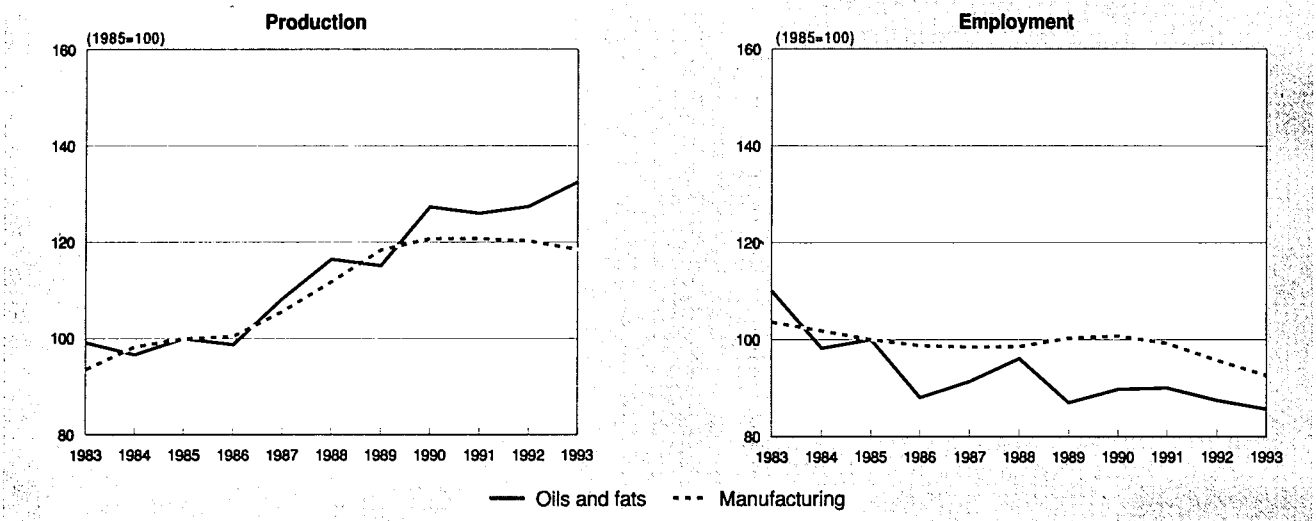
(1) Excluding olives.
Source: Fediol

Table 3: Oils and fats
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	2.9	2.1	2.6
Production	3.3	2.3	2.8
Extra-EC exports	-0.8	3.2	0.9
Extra-EC imports	0.3	1.9	1.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Figure 3: Oils and fats
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

MARKET FORCES

Demand

Oilcake and flours for animal feed, and also vegetable oils, are obtained from oilseeds. The sector's economy is therefore dependent on the movement of prices for oilseeds, oils and oilcake. Seed oils can be consumed in the pure state or in the form of prepared oils or fats, such as margarine.

Animal feed

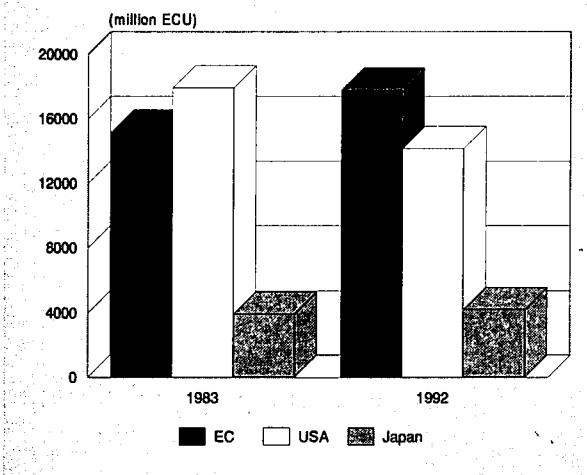
Demand for oilcake and animal feed derived from oilseeds fluctuates due to the composition of the animal feed and the fact that they can be substituted by cereals, corn gluten feed and green fodder. The basic factors influencing the demand for and composition of feed are the production trends in the EC and world stock farming and hence the demand for the various types of meat.

Human consumption

There are significant differences in consumption patterns between Member States. In the Mediterranean countries olive oil and seed oils are much more used than in Northern Europe where consumption of margarine is more widespread. For instance, per capita consumption of margarine in 1992 was over 8 kilograms in Germany, Benelux and Denmark, but less than 2 kg in Italy, Spain and Greece (Source: Consumer Europe). On the other hand, consumption of other oils and fats (mainly olive oil and seed oils) amounted to 32.3 kg in Greece, 27.2 kg in Spain and 11.4 kg in Italy, but was less than 7 kg in France and Benelux and only 0.6 kg in Denmark.

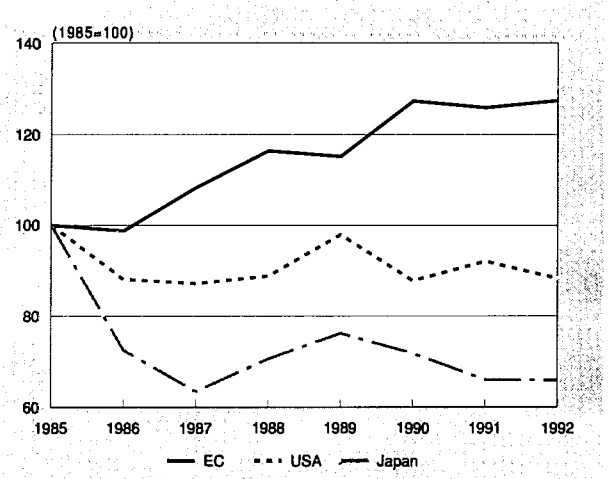
The principal variables influencing consumption, apart from eating habits, is relative prices, consumer concern about health, introduction of new products and legislative factors, such as the restrictions imposed by some Member States on the marketing of products based on vegetable fats. Substitution between olive oil and seed oil can take place due to price

Figure 4: Oils and fats
International comparison of production in current prices



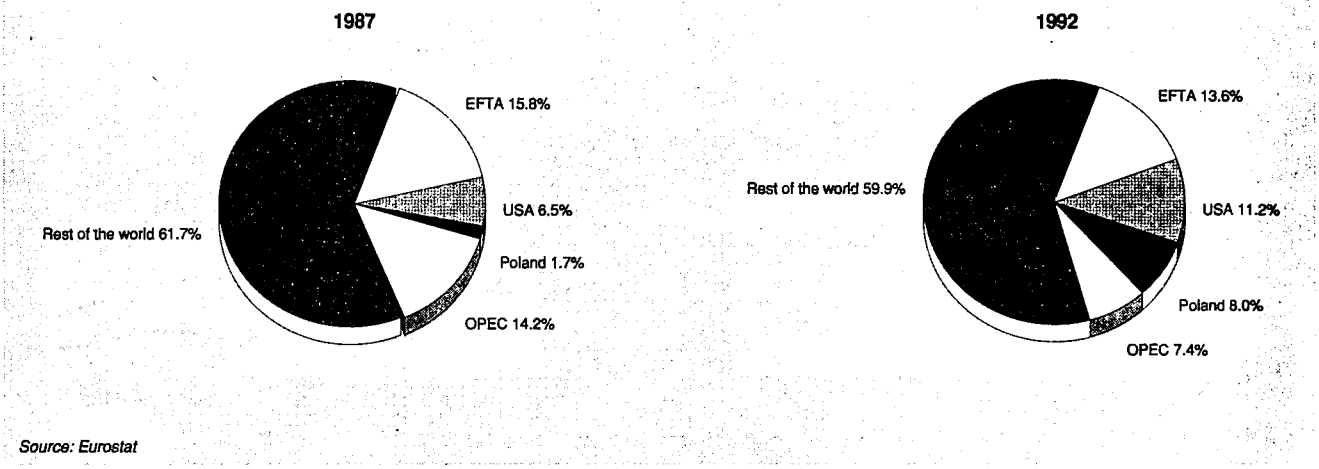
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Oils and fats
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Oils and fats
Destination of EC exports



Source: Eurostat

differentials and consumer perceptions. On the other hand, substitutions between saturated and polyunsaturated fats and between fats of animal origin and vegetable fats are chiefly attributable to the greater attention paid to health issues.

The changes which are taking place in consumer patterns are leading to an increase in consumption of vegetable oils and fats at the expense of animal fats and butter. Furthermore sales of mixtures of fats and new products with a low fat content are expected to rise. These developments will undoubtedly be assisted by the removal of the remaining legislative restrictions on the introduction of such products into some national markets.

Supply and competition

Oilseeds are processed in two stages, not always integrated in the same company:

- the processing of oilseeds into crude oil and protein meal;
- the refining, hydrogenation and fractionation of crude oils and fats.

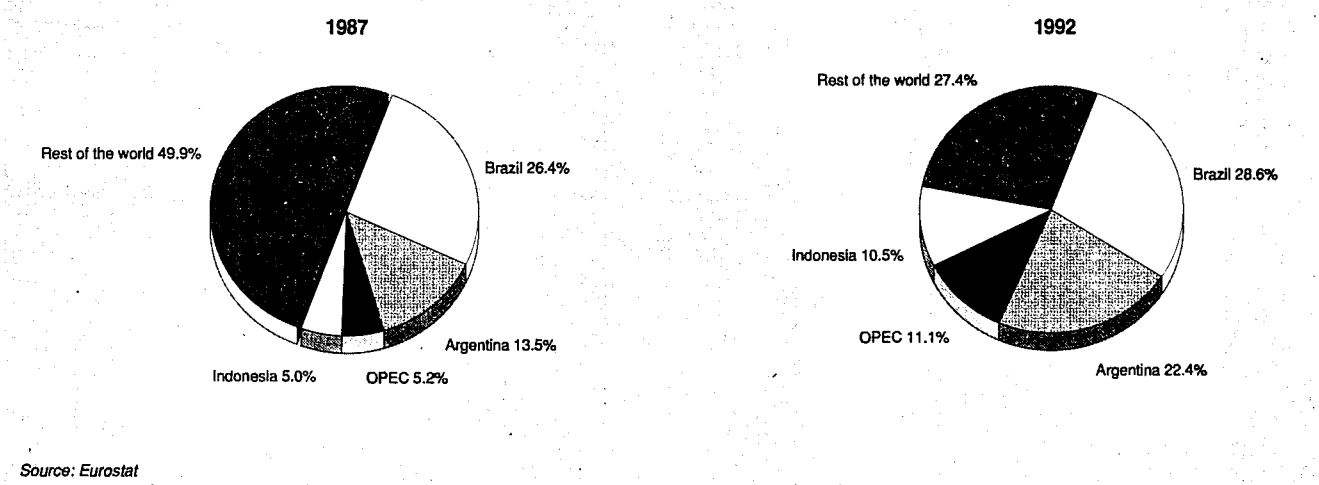
The olive oil subsector is characterised, in the case of Italy and Greece, by the presence of many small firms operating on a local scale, together with a few medium-sized and large companies. Spain, on the other hand, has a production structure with high-capacity factories. This gives the Spanish industry unquestionable competitive advantages. EC companies are encountering competition from countries such as Argentina, Brazil and Malaysia which are developing and expanding their production capacities. Regarding the margarine industry, it is highly concentrated and production location corresponds to the size of consumer markets.

Production process

The processing of oilseeds is capital-intensive and involves a high degree of mechanisation which has enabled the introduction of significant technological innovation. However, the productivity gains have been significantly counteracted by rising labour costs.

The bulk of margarine output comes from large and highly mechanised plants whereas, in the case of olive oil, production structures in the Community are still somewhat varied making it difficult to introduce process innovations.

Figure 7: Oils and fats
Origin of EC imports



Source: Eurostat

Table 4: Oils and fats
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 719	2 264	2 157	1 319	1 289	1 297	1 535	1 479	1 394	1 572
Extra-EC imports	5 343	5 989	5 537	4 344	3 727	4 387	4 550	3 861	3 820	3 891
Trade balance	-3 625	-3 726	-3 380	-3 026	-2 438	-3 090	-3 015	-2 382	-2 426	-2 320
Ratio exports/imports	0.32	0.38	0.39	0.30	0.35	0.30	0.34	0.38	0.36	0.40
Terms of trade index	89.0	88.8	100.0	100.5	95.4	86.4	93.1	113.6	116.1	112.1
Intra-EC trade	2 367	3 466	3 334	2 294	1 983	2 246	2 527	2 319	2 411	2 388
Share of total imports (%)	30.7	36.7	37.6	34.6	34.7	33.9	35.7	37.5	38.7	38.0

Source: DEBA

Table 5: Oils and fats
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	30.6	26.9	27.6	36.6	45.7	43.0	41.4	48.1	46.2	48.5
Productivity index	110.7	97.2	100.0	132.3	165.5	155.6	149.9	174.0	167.1	175.5
Unit labour costs index (3)	89.6	100.7	100.0	109.0	109.8	109.7	122.4	129.9	136.5	147.4
Total unit costs index (4)	79.9	107.4	100.0	90.3	86.1	98.0	113.0	116.5	116.8	119.3

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

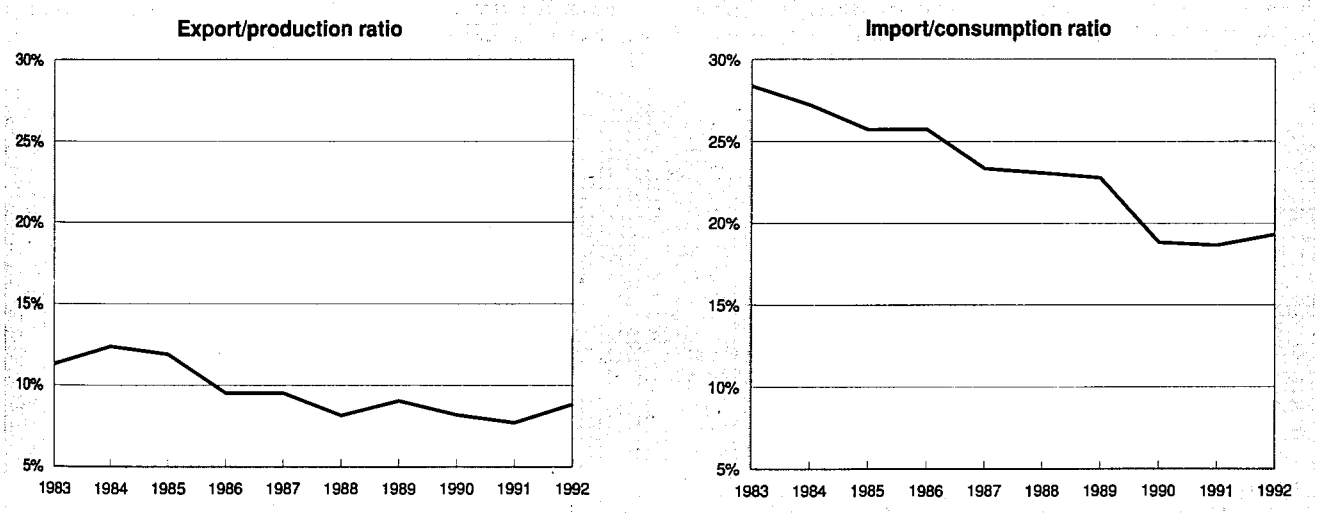
INDUSTRY STRUCTURE

Companies

After significant merger activity the European leadership of the oilseed-crushing and refining sector was held up till 1992 by the Ferruzzi group via Cereol, with an 18-20% share of the market. The Unilever group (UK-NL) holds an important positions in many European markets as regards margarine. ADM and Cargill (USA) operate as major crushers in Europe.

In the olive oil sector, co-operative enterprises play a rather prominent part, especially in Spain. In the edible oil sector, the first three groups, Ferruzzi, Unilever and Elosua (Spain) hold a combined market share of 45-50%. In the margarine sector the three leading companies, Unilever, Vandemoortele

Figure 8: Oils and fats
Trade intensities



Source: DEBA

Table 6: Olive oil
Main Indicators

(thousand tonnes)	1990/91 EC	1990/91 Extra-EC	1990/91 World	1991/92 (1) EC	1991/92 (1) Extra-EC	1991/92 (1) World	1992/93 (1) EC	1992/93 (1) Extra-EC	1992/93 (1) World
Production:									
Olive oil	994	457	1 451	1 672	488	2 160	1 435	407	1 842
Edible olive pomace oil	84	7	91	139	11	150	120	8	128
Total	1 078	464	1 542	1 811	499	2 310	1 555	415	1 970
Consumption:									
Olive oil	1 211	472	1 683	1 300	512	1 812	1 300	523	1 823
Edible olive pomace oil	15	34	49	117	21	138	112	26	138
Total	1 226	506	1 732	1 417	533	1 950	1 412	549	1 961

(1) Provisional figures.
Source: Fedolive

Table 7: Oils and fats
Production of oilseed by country, 1992

(thousand tonnes)	Oilseeds processed (1)	share (%)	Crude oil & fats produced (1)	share (%)	Meals & cakes produced (2)	share (%)
EC	24 602	100.0	6 926	100.0	17 135	100.0
Belgique/België	2 170	8.8	618	8.9	1 538	9.0
Danmark	365	1.5	125	1.8	236	1.4
BR Deutschland	6 325	25.7	1 884	27.2	4 404	25.7
Hellas	745	3.0	129	1.9	570	3.3
España	3 214	13.1	829	12.0	2 193	12.8
France	2 538	10.3	1 008	14.6	1 534	9.0
Italia	2 223	9.0	511	7.4	1 702	9.9
Nederland	4 413	17.9	987	14.3	3 291	19.2
Portugal	833	3.4	211	3.0	551	3.2
United Kingdom	1 776	7.2	624	9.0	1 116	6.5

(1) Excl. olives, maize germs, grape and tomato pips.
(2) Excluding olives.
Source: Fediol

(Belgium) and Rau (Germany) account for 60-65% of the market share.

Strategies

The sector's strategic response to changing market conditions consists of concentration and rationalisation of the production structure, aiming primarily towards cost reduction. There have been a series of take-overs of national companies by multi-nationals, which have reduced the role of small and medium-sized firms to operating in niche markets or becoming suppliers of the modern distribution chains for branded products.

The competitive strength of the large companies lies in product diversification given that product typology is experiencing significant growth that provides great opportunities for those introducing new innovative market segments.

From the strategic point of view, increasing importance is attached to brands and advertising and policies widening the

Table 8: Oils and fats
Production of olive oil by country

(thousand tonnes)

	1990/91 Olive oil	1990/91 Edible olive pomace oil	1990/91 Total	1991/92 (1) Olive oil	1991/92 (1) Edible olive pomace oil	1991/92 (1) Total	1992/93 (1) Olive oil	1992/93 (1) Edible olive pomace oil	1992/93 (1) Total
EC	993.7	83.3	1 077.0	1 672.2	139.0	1 811.2	1 435.0	119.8	1 554.8
Hellas	170.0	17.0	187.0	385.0	34.0	419.0	330.0	30.0	360.0
España	639.4	51.2	690.6	593.0	47.4	640.4	563.0	45.0	608.0
France	1.0	0.0	1.0	4.2	0.0	4.2	2.0	0.0	2.0
Italia	163.3	13.1	176.4	630.0	50.4	680.4	500.0	40.0	540.0
Portugal	20.0	2.0	22.0	60.0	7.2	67.2	40.0	4.8	44.8

(1) Provisional figures.
Source: Fedolive

Table 9: Margarine
Production by country

(thousand tonnes)	1988	1989	1990	1991	1992
Belgique/België, Luxembourg	183	186	189	196	209
Danmark	103	105	108	103	95
BR Deutschland	472	479	602	616	787
Hellas	27	27	31	N/A	N/A
España	68	69	82	84	80
France	160	162	158	154	154
Ireland	19	23	22	24	18
Italia	72	73	79	82	82
Nederland	226	255	256	271	280
Portugal	59	60	60	63	61
United Kingdom	470	489	475	464	482

Source: IMACE

product range. The EC has financially supported generic advertising for olive oil.

The most important operations leading to external growth in recent years have been: the take-over of Novenyolajipari es Mososzergyarto Vaallalat (Hungary) by Ferruzzi (I); Unilever's (UK/NL) traditional share in Unilever-Is (Turkey) was increased to a full share holding; the take-over of Aceites Españoles SA (E) by Elosua SA (E).

REGIONAL DISTRIBUTION

The production of olive oil is concentrated in Spain, southern and central Italy, Greece and Portugal while the oilseed processing industry is located mainly in Germany, Holland, Spain, France and Belgium. The production of margarine is concentrated in Germany, the United Kingdom, Holland, Belgium, France and Denmark.

ENVIRONMENT

The main ecological problem affecting the industry is connected with the disposal and processing of solid urban waste. National and Community legislation is increasingly tending to regulate the characteristics of product packaging, including their chemical composition. The volume and chemical content of the packaging is subject to legislation. Consumers, becoming increasingly concerned about ecological problems, are likely to show greater preference for products packaged in the most environmentally friendly manner.

REGULATIONS

For olive oil EC regulations operating through subsidies and price intervention are aiming to:

- Provide producers with a guaranteed income (production subsidies);
- Facilitate marketing within the Community (consumer aid);
- Assist exports (export compensation);
- Support the EC market (price intervention).

The use of price intervention has been limited. Vegetable oils however are exempted from export compensation, consumer aid and price intervention. Finally, regulation 2568/91 and subsequent amendments thereto (Regulations 356/92, 1429/92, 1683/92) aim to provide quality control of the oils, as a safeguard for the consumer. As concerns oilseeds, the support regime has been completely reformed. Farmers now sell oilseeds at world market prices and receive compensatory support in form of per hectare payments.

OUTLOOK

The process of substitution between animal fats and vegetable fats might continue during the coming years. Innovative low fat products may well have possibilities of expansion at the expense of traditional products. During the coming years we may witness an increase in competition at international level (and therefore the process of concentration already in progress will probably speed up) and the removal of the legislative restrictions limiting the entry of mixtures of fats into certain national markets. The United States market will continue to be characterised in the coming years by an advantageous trend of consumption of olive oil. Finally, there are clear possibilities of expansion at international level, especially for large companies which are active in diversification.

Table 10: Oils and fats
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	2.1	2.5
Production	2.3	2.8
Extra-EC exports	3.1	3.5

Source: Prometeia

Written by: Prometeia Calcolo Srl
The industry is represented at EC level by: Federation of Seed Crushers and Oil Processors in the EEC (FEDIOL). Address: Rue de la Loi 74, Bte 4, B-1040 Brussels; tel: (32 2) 230 3125; fax: (32 2) 230 0946; and,
Fédération de l'industrie de l'huile d'olive de la CEE (FEDOLIVE). Address: Bd. Baudouin 21, Bte 7, B-1210 Brussels; tel: (32 2) 223 0141; fax: (32 2) 223 1244; and,
Association of the Margarine Industry of the EEC countries (IMACE). Address: Rue de la Loi 74, Bte. 3, B-1040 Brussels; tel: (32 2) 230 4810; fax: (32 2) 230 2274.

Meat
NACE 412

The introduction of free market policies in Eastern Europe coupled with economic recession have resulted in a dramatic decline in fresh meat production. In fact, long-term stability of world trade is jeopardised by the changing conditions in East European countries, given their role as major meat producers. The GATT Uruguay round, which should be completed in the near future, will establish the new trading rules for the meat market with repercussions on the retail side. The propensity towards consumption of meat with a low fat content is continuing to grow. For some years, beef has been replaced by other types of meat which, with the same protein content, contain less fat. There has also been a substantial increase in output of processed meat-based products.

INDUSTRY PROFILE

Description of the sector

The main products of the sector can be classified according to:

- the type of meat: beef, pork, mutton, poultry, horse meat, etc.;
- the degree of processing of the product: fresh meat (sold in portions, packaged or combined with other food-preparation ingredients), or preserved pork- and beef-based products, including sausages, dressed pork products (charcuterie), ham and bacon.

The degree of diversification of enterprises is generally on the low side, especially as regards the very large number of small and medium-sized enterprises. Only the big groups strategically diversify their activity into other food sectors and/or undertake downstream integration: the main enterprises in the dressed pork sector seek to achieve economies of scale by marketing various types of fresh products (for instance dairy and cheese products), while the main enterprises in the poultry sector generally tend to operate in the animal feeding stuffs sector.

Recent trends

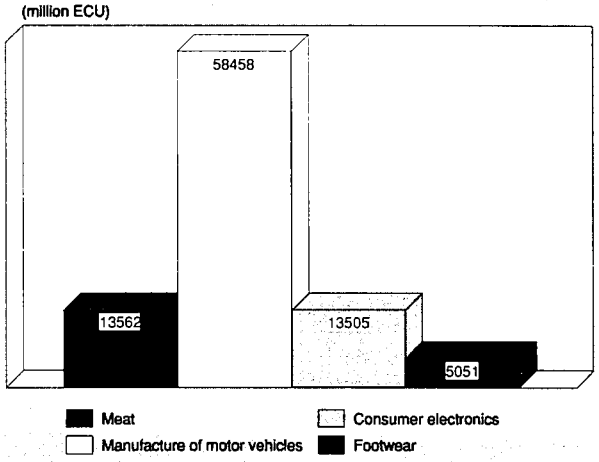
In 1992 the meat sector achieved an added value of ECU 13 500 million. The economic importance of the slaughtering and meat processing industry is quite high and comparable to that of the consumer electronics industry. Over 83% of the added value was generated in France, United Kingdom, Germany, Spain and Italy.

The largest increases in added value were recorded in Greece and the United Kingdom. In the former, value added almost doubled compared to 1991. On the other hand, negative trends have been recorded in France and Spain.

Real growth rates for production, consumption and trade during the period 1988-92 averaged at a lower level compared to the 1983-88 period with production and consumption retreating the most, while the growth rate for exports maintained recent trends. In 1992 total production of meat at current prices was 4.9% higher than the previous year, whereas the growth rate of apparent consumption increased slightly by 5.3%.

In terms of physical quantities, consumption in 1992 amounted to about 81 kg of meat per head per year, including 2.5 kg of canned meat and about 2 kg of frozen meat. These averages, however, conceal substantial differences between the individual countries, as consumption of fresh meat ranges from 67 kg

Figure 1: Meat
Value added in comparison with other industries, 1992



Source: DEBA

in the United Kingdom to 100 kg in Denmark (Source: Consumer Europe 1993).

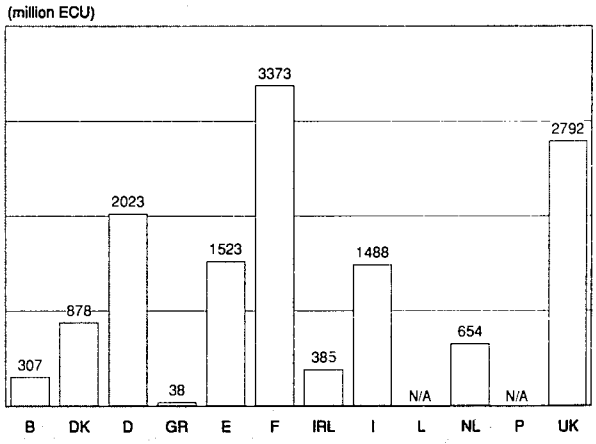
Overall, 1992 saw a shift in demand towards the various types of white meat (especially poultry) at the expense of red meats. There was a substantial increase in total demand for meat in Spain and Portugal where the development of consumption patterns had been lagging behind.

The swine population had been decimated by disease in 1991 and was down to around 100 million heads in 1992. During the same period Community production of beef fell sharply (by 5%) to a total of 8.2 million tonnes. Most affected were the territories of Germany, where a fall of about 20% in output was coupled with a decrease in the number of animals slaughtered (-5%). For the first time in the last ten years, employment in the sector declined by 1% in 1992.

International comparison

In the world context, the Community is the leading producer of beef, mutton and goat meat and the second-largest producer of pig meat, after China.

Figure 2: Meat
Value added by Member State, 1992



Source: DEBA

Table 1: Meat
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	45 644	53 276	55 922	56 461	56 981	61 587	68 842	72 481	75 649	79 659	79 700
Production	44 528	52 297	54 619	55 838	56 293	60 756	68 133	71 796	75 676	79 382	79 700
Extra-EC exports	2 505	3 134	3 200	3 125	3 077	3 173	3 648	3 373	3 796	3 770	3 400
Trade balance	-1 116.0	-978.6	-1 303.7	-622.8	-688.1	-831.1	-708.4	-685.4	27.3	-277.6	-36.0
Employment (thousands)	375.2	394.7	391.6	400.3	410.6	426.3	432.0	433.3	441.2	436.7	432.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Meat
Breakdown by major product line, 1991 (1)

(thousand tonnes carcass weight)	Total domestic use	Usable production	Total exports
Cattle and calves	7 579	8 731	1 321
Pork	13 833	14 365	608
Sheep and goats	1 438	1 222	16
Equidae	187	91	8
Poultry	6 395	6 757	501
Oxher meat	828	770	10
Offal	2 006	2 039	106
Total meat	32 265	33 974	2 571

(1) Including former East Germany.
Source: Eurostat

Table 3: Meat
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	5.4	3.6	4.6
Production	5.7	3.9	4.9
Extra-EC exports	5.4	5.2	5.3
Extra-EC imports	1.7	0.9	1.4

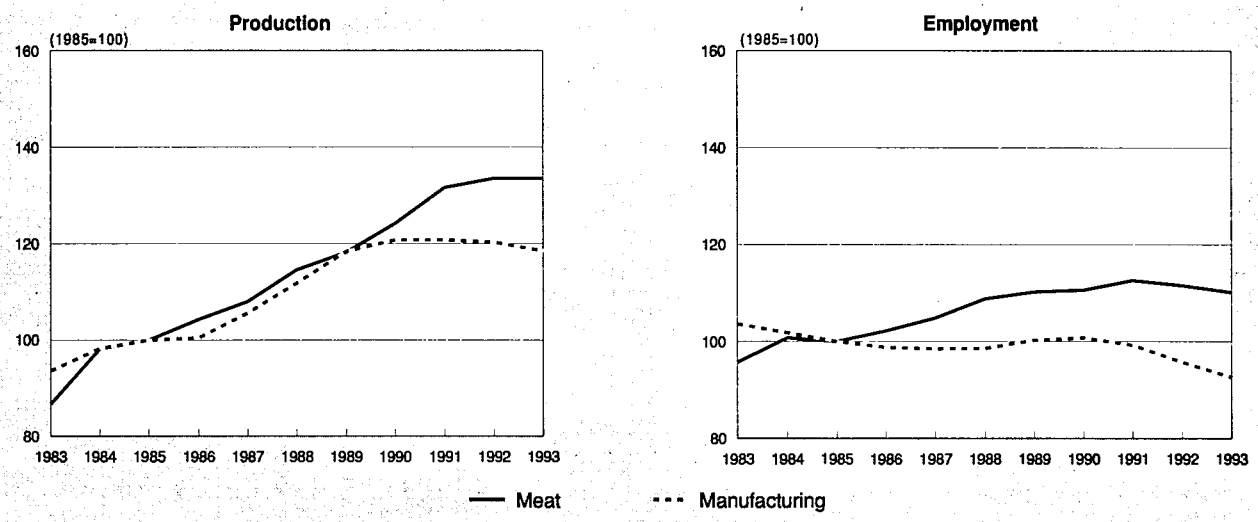
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Meat
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	2 505	3 134	3 200	3 125	3 077	3 173	3 648	3 373	3 796	3 770
Extra-EC imports	3 621	4 112	4 503	3 748	3 765	4 004	4 356	4 059	3 769	4 048
Trade balance	-1 116.0	-978.6	-1 303.7	-622.8	-688.1	-831.1	-708.4	-685.4	27.3	-277.6
Ratio exports/imports	0.69	0.76	0.71	0.83	0.82	0.79	0.84	0.83	1.01	0.93
Terms of trade index	102.6	100.2	100.0	106.8	101.9	98.4	96.8	99.8	96.6	98.2
Intra-EC trade	9 772	10 280	11 319	11 393	11 445	11 958	13 549	13 616	14 461	15 720
Share of total imports (%)	73.0	71.4	71.5	75.2	75.2	74.9	75.7	77.0	79.3	79.5

Source: DEBA

Figure 3: Meat
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

The livestock population of the United States is being slowly built up again, and this is reflected in a steady increase in domestic production and higher exports, especially to Japan. At the same time the United States has signed voluntary agreements which actually limit exports to its main suppliers, especially in Oceania.

Foreign trade

The balance of trade, which had shown a surprising surplus in 1991, swung back into deficit in 1992. A trade surplus had been achieved in 1991 for the first time in the last ten years, but the balance became negative again in 1992. This was due to a fall in exports (-0.7% in nominal terms) and an increase in imports (7.4%, again in nominal terms).

Approximately 20% of EC output constitutes intra-EC trade. The trade flows of beef and pig meat move mainly from the producing countries in Northern Europe towards the Mediterranean countries (especially Italy and Spain). Some 5% of Community output is accounted for by extra-EC trade. Compared with 1987, the figures for 1992 show a drastic drop in exports to the United States. There was also a further decrease in exports to EFTA countries. EC exports of mutton, lamb and goat meat are negligible.

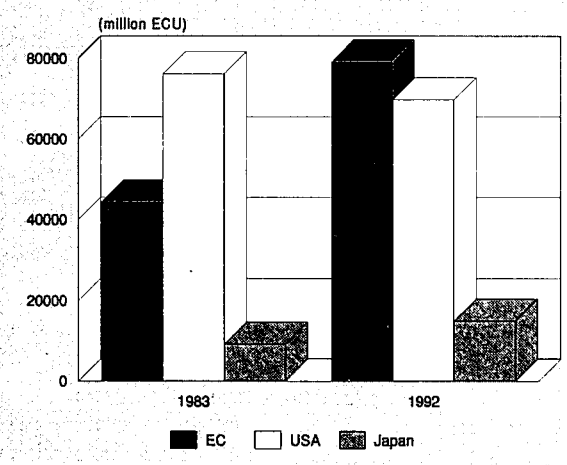
Extra-EC imports account for 20% of the total, the main suppliers being Argentina, New Zealand, Brazil and some East European countries.

MARKET FORCES

Demand

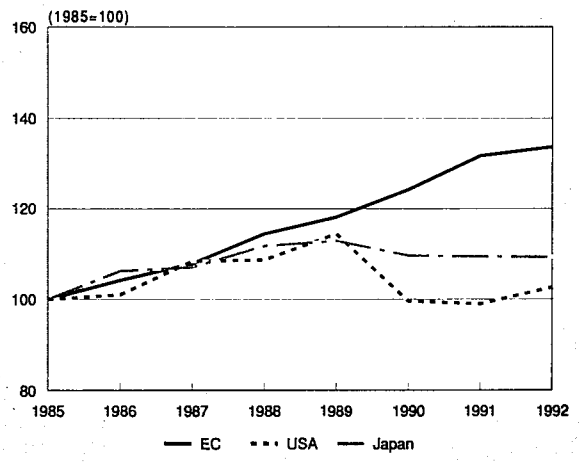
The proportion of consumption of fresh meat in total consumption remains unchanged and is estimated at around 70-75% in terms of volume and 65-70% in terms of value. The propensity towards fresh meat is greater in the Mediterranean countries. The dressed pork and canned meat products sector is substantial in France, Italy and Germany.

Figure 4: Meat
International comparison of production in current prices



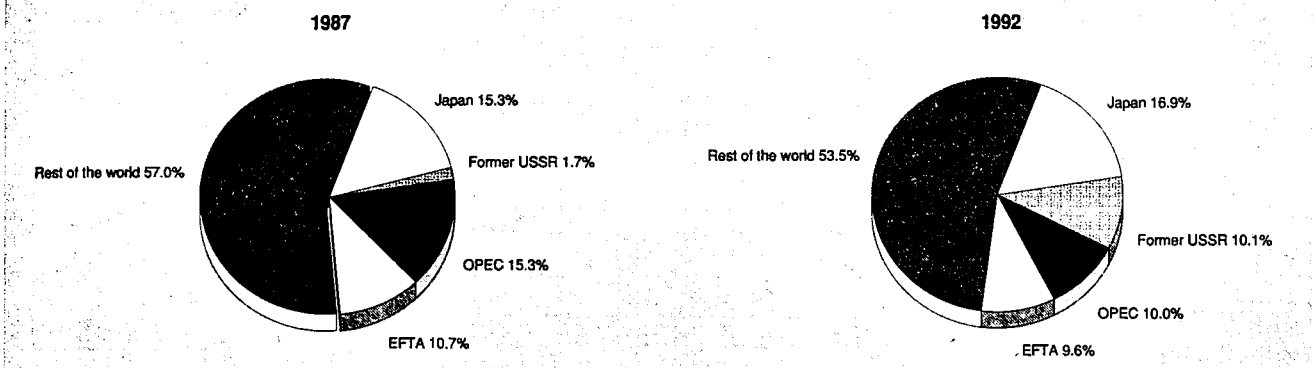
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Meat
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Meat
Destination of EC exports



Source: Eurostat

For some time now preferences in meat consumption have been shifting towards "white" and lean meats at the expense of beef. This is attributable to the greater attention paid to health problems, especially by consumers in the more industrialised countries. In addition, the price differential in favour of poultry meat has definitely stimulated demand in the face of declining disposable incomes during the current recession. Other kinds of meat which are proving successful, are dressed pork products and fresh products sold ready-prepared in portions with a high added value.

It is worth mentioning the high consumption of lamb in the United Kingdom, where 30% of the Community's sheep are concentrated. Production of this type of meat is likely to increase, thanks to support provided by the Common Agricultural Policy.

Supply and competition

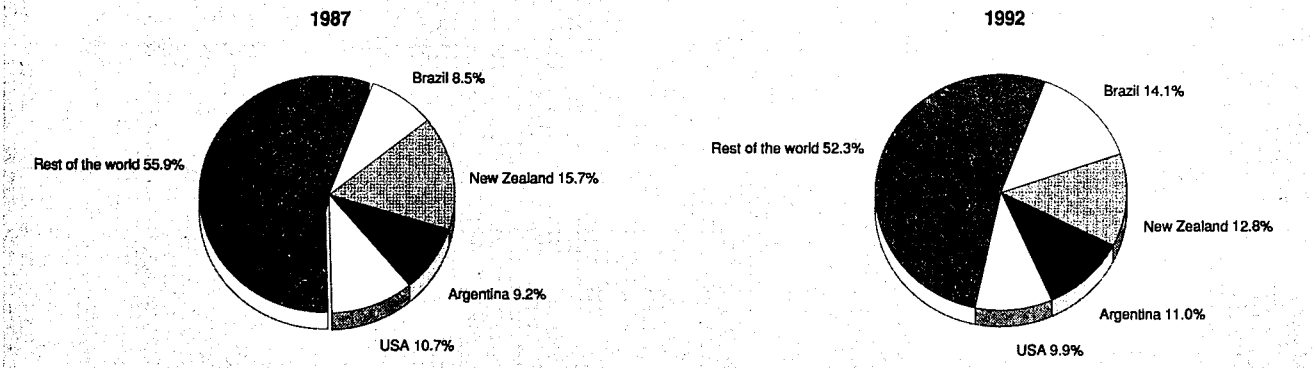
The meat sector is particularly fragmented, with the actual position varying greatly from country to country. In Italy there are many processing firms, but they are definitely declining in number. The trend is the same in Ireland, Greece and Portugal. There is a higher degree of concentration in Germany, the Netherlands and Denmark. The growth in the size of firms is now proving to be a strategic factor not only for the reduction of costs and operating charges, which, among other expenses, are rising continuously, but also for winning larger market shares. The greatest concentration of production has taken place in the preserved animal products and canned meat sector.

The loss of traditional sales points for food as against the rapid growth in the number of sales points in the modern distribution network has enhanced the bargaining power of distribution enterprises.

Production process

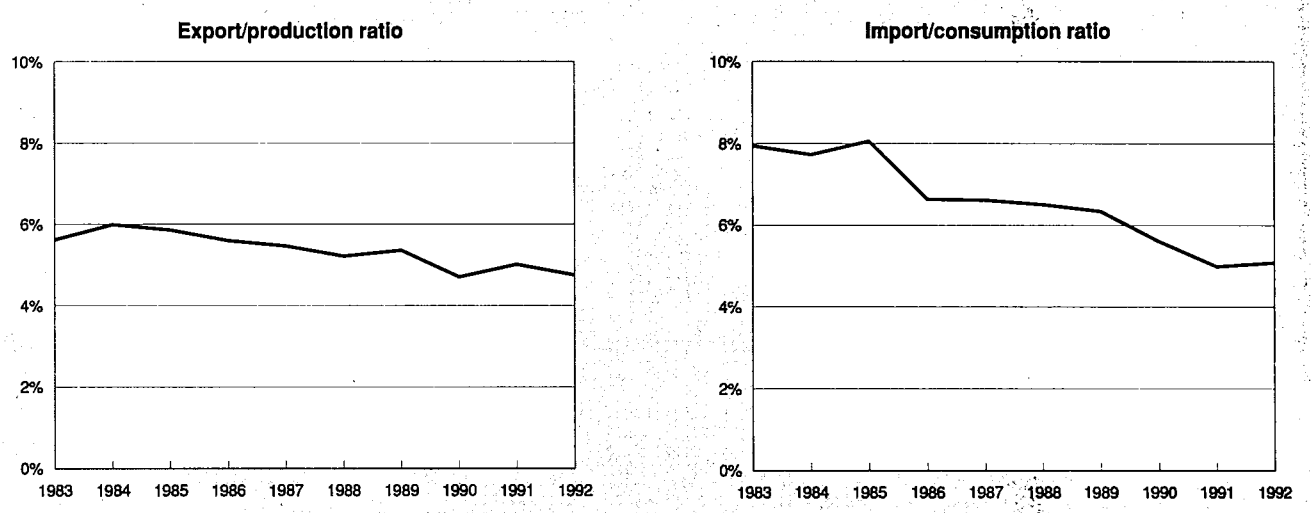
The added value per employee in this sector is rising steadily. Unit labour costs show no sign of decreasing and meat as a product does not lend itself to the introduction of technological innovations capable of generating major economies of scale. In recent years, however, there had been an increase in investment projects aimed at rationalising the production process, by the introduction of automation in the phases which require less manual skill. The present acute recession and the need to reorganise the production process by making it more capital-intensive are the factors responsible for the fall in employment.

Figure 7: Meat
Origin of EC imports



Source: Eurostat

Figure 8: Meat
Trade intensities



Source: DEBA

INDUSTRY STRUCTURE

Companies

The meat and meat-based-product industry embraces some 8 000 firms whose production in 1992 is estimated at around ECU 79 billion at current prices.

Co-operatives, which account for a significant share in total supply, are widespread in the Community. Recently these types of enterprise have increasingly assumed an entrepreneurial structure in order to meet the "threatening" globalisation of markets, sometimes by joint ventures with private enterprises.

In Italy, Germany and France, public slaughterhouses are found in many places, but the share of butchered meat provided by private establishments is rising everywhere. 76% of pig slaughtering activity in the Community is distributed among an immense number of firms, while the remaining 24% is accounted for by the twelve largest enterprises in the sector. Denmark has the highest concentration of pork slaughtering firms with the three leaders accounting for 89% of the market. It is followed by the Netherlands where the three leading enterprises control 38% of the market.

With regard to cattle slaughtering, 80% of the market is shared among the very large number of small and medium-sized enterprises located in the Community countries, while the remaining 20% is held by the twelve largest enterprises. Here again, Denmark has a high degree of concentration, with 67% of the market shared among the country's three largest enterprises. Germany comes next, with its three leading enterprises having 29% of the market.

In the fresh beef sector special mention should be made of Socopa (F), Inalca-Gruppo Cremonini (I) and Sogé viande (F), which together hold 4-6% of the EC market but operate exclusively in their own countries. In the fresh pork sector, Annuss Fleisch (D), West-Fleisch (D) and Süd-Fleisch (D) together have a market share of 4 to 4.5%. In the mutton and lamb sector, HL Foods (UK) and Socopa (F) account for 15-16% of sales. In the poultry sector, Paribas (F), Sipa (I) and AIA-Gruppo Veronesi (I) cover 15-18% of the total market. Lastly, Nestlé (CH), Unilever (NL) and BP Nutrition cover 9-11% of the processed meat market.

Strategies

The successful strategies adopted by the principal European meat-producing enterprises can be summarised as follows: to improve efficiency of production in order to increase market shares; to penetrate other foreign sales markets by means of international agreements and merger and acquisition operations; to develop and consolidate commercial relations with the major organised distribution networks; to recruit professionals and specialists in an effort to boost marketing strategies; and to control the entire trading chain.

Furthermore, the individual EC Member States are making efforts to obtain acceptance at Community level in order to

Table 5: Meat
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	23.5	23.9	24.5	26.9	28.7	27.9	26.9	29.4	30.5	31.1
Productivity index	96.0	97.2	100.0	109.5	117.2	113.7	109.6	119.7	124.4	126.6
Unit labour costs index (3)	88.5	94.0	100.0	103.1	105.9	111.8	116.5	122.3	131.4	140.1
Total unit costs index (4)	85.7	95.7	100.0	100.3	97.9	102.9	113.7	118.7	122.6	130.5

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Table 6: Meat
Gross per capita consumption, 1991

(kg per head)	Total meat	Cattle and calves	Pork	Sheep and goats	Poultry
EC (1)	93.4	21.9	40.0	4.2	18.5
Belgique/België, Luxembourg	102.0	21.6	47.8	2.1	17.1
Danmark	105.8	19.5	65.2	1.0	11.9
BR Deutschland (1)	97.2	21.2	56.0	0.9	12.2
Hellas	77.1	19.5	20.6	14.2	16.6
España	102.1	13.1	49.4	6.5	23.7
France	110.5	30.0	37.0	5.6	21.8
Ireland	100.5	17.0	38.0	7.9	23.3
Italia	88.0	25.7	31.7	1.8	19.7
Nederland	89.4	21.8	44.0	1.0	19.1
Portugal	75.5	16.5	27.4	4.1	18.9
United Kingdom	74.4	19.2	23.9	7.4	19.9

(1) Including former East Germany.
Source: Eurostat

protect their own typical products, especially in the delicatessen subsector.

The most significant acquisitions which have taken place in the EC, particularly in Italy: Kraft has acquired Fini, Invernizzi and Negroni; Nestlé has acquired Vismara, Locatelli, Kings and Herta. BSN has acquired Galbani.

Other recent operations include the following: Cavaghan & Gray Ltd (UK) has acquired Emile Tissot Foods Ltd (UK); Tyson Foods Inc (USA) has acquired Purina Mills Inc (USA); Gouessant (F) has acquired Pic'Grin (F) and Sodelor (F); Campofrio SA (E) has acquired Campocarne SA (E); MBO has acquired Wirral Foods Ltd (UK).

REGIONAL DISTRIBUTION

The map of stock farming in the EC has been redrawn since the five East German Länder became part of Germany. In the case of beef production, 85% of output comes from France (Normandy and Brittany), the United Kingdom (Cornwall), the Netherlands, Northern Italy and, obviously, the new German Länder. About 80% of pork is farmed and slaughtered in Denmark, the Netherlands, Northern Italy, France (Normandy and Brittany), the German Länder and Eastern Europe. Nearly 90% of poultry meat is produced and processed in Germany, Spain, France, Italy (particularly in Emilia-Romagna and Veneto), the Netherlands and Eastern Europe. About 86% of sheep and goat farming for slaughter purposes is concentrated in Ireland, Scotland, England and Wales, the southern regions of Italy, France and Spain and the German Länder.

ENVIRONMENT

When looking at the ecological problems connected with the slaughtering and meat processing industry, one must start with stock farming. Territorial concentration, especially in pig farming, creates problems of soil pollution and, above all, the underlying strata. This calls for the introduction of policies to control the disposal of manure and in some extreme cases for restriction of livestock numbers and density.

Slaughtering inevitably results in certain by-products which are not as such suitable for human consumption. These are organic substances and therefore perishable. Fortunately, there is a large and well developed industry which processes these substances for other purposes, e.g. animal feed and fertilizers.

REGULATIONS

As part of a set of measures for reforming the common agricultural policy, Regulation EEC 2078/92 for the protection of the rural environment has been issued. This regulation lays

Table 7: Meat
Usable production (slaughtering) by country, 1991

(thousand tonnes carcass weight)	Cattle and calves	Pork	Sheep and goats	Equidae	Poultry
EC (1)	8 731	14 365	1 222	91	6 757
Belgique/België, Luxembourg	381	914	8	3	200
Danmark	213	1 265	2	1	139
BR Deutschland (1)	2 182	3 910	50	5	563
Hellas	81	153	128 160		
España	509	1 877	244	8	882
France	1 860	1 918	185	14	1 770
Ireland	553	181	8 993		
Italia	1 180	1 332	85	58	1 118
Nederland	623	1 591	16	1	547
Portugal	129	245	30	1	189
United Kingdom	1 019	978	386	1	1 095

(1) Including former East Germany.
Source: Eurostat

Table 8: Meat
Production in current value by country, 1992 (1)

(million ECU)

EC	79 382
Belgique/België, Luxembourg	1 868
Danmark	4 316
BR Deutschland (1)	11 441
Hellas	309
España	7 516
France	23 807
Ireland	3 180
Italia	9 238
Luxembourg	49
Nederland	5 742
Portugal	674
United Kingdom	11 240

(1) Estimates.
Source: DEBA

down guidelines for farmers who employ production methods and engage in other activities which are useful for the protection of the rural environment.

The events of 1991 which seriously threatened the health of animals in the Community made it necessary to draw up Directive 92/102 on the identification and registration of stock farms and livestock. Health Regulation 91/497 (29/6/91) subsequent amendments were designed to regulate production activity in abattoirs, cutting shops and cold stores. However, Directive 92/120 (17/12/92) authorises Member States to grant temporary derogations until the 31st of December 1995 to factories which manufacture products of animal origin for human consumption.

Italy, which has many abattoirs which do not comply with the Community rules, has not stepped up investment in fixed capital to the extent expected from implementation of the directive. Consequently there is now massive resort to the postponements and derogations provided for by the directive. Following the publication of Regulation 675/92 it is possible to identify the maximum limits for residues of veterinary medicines whose presence is tolerated in foodstuffs of animal origin and especially in meat.

Lastly, there are two further EEC directives: one, issued on 29 July 1991, amends and codifies Directive 64/433/EEC concerning health problems connected with intra-Community trade in fresh meat and can be extended to the production and marketing of fresh meat; the other, issued on 10 February 1992, amends and updates Directive 77/99/EEC concerning health problems connected with intra-Community trade in meat-based products and amends Directive 64/433/EEC.

OUTLOOK

Developments in the medium term will depend chiefly on changeable international agreements and on the course of EC legislation. Pig farming is tending towards overproduction. Potential economic recovery in Germany is likely to lead to a situation favourable to the industry, but somewhat of a burden for the stock farming sector.

Over the next few years industrial production of meat will continue its present trend towards concentration both owing to the entry into force of Directive EEC 497/91 and because of the ever-keener international competition within the Community. Many marginal enterprises will therefore be squeezed out of the market.

Internal consumption will continue to grow slowly but steadily and will shift more and more towards high quality products with a high added value. The chief problem is set consumption patterns, whose disadvantages can be overcome by operators directing attempting to decisively challenge consumer habits.

Modern distribution will make it necessary to maintain a relationship of competitive co-operation in order to avoid triggering a spiral of beggar-thy-neighbour low-price policies that jeopardise the quality of meat produced.

Exporting to the markets of the former USSR and Eastern Europe is a source of opportunities and risks. Political reform has brought about a decline in agricultural production, creating potential markets for processed products and there is also the possibility of joint ventures with local enterprises for financing modernisation of the local production structure. There is still, however, the risk connected with the increase in imports of livestock from those countries - a problem which the Community has recently had to face.

The risks for the industry can be summed up as follows: the difficulty of countering the replacement of beef by white meats; the inadequate degree of support offered to the market by the common agricultural policy (CAP); the increasing bargaining power of distributors; the unlikelihood of survival in the market of small enterprises because of the intensification of competition.

Arising opportunities are considered to reside in: the potential for greater market segmentation and the spread of new products; the possibility of product differentiation through the introduction of quality brands; investment, acquisitions, joint ventures and trade agreements with Eastern European countries.

Table 9: Meat
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	2.7	3.2
Production	3.0	3.5
Extra-EC exports	4.5	5.0

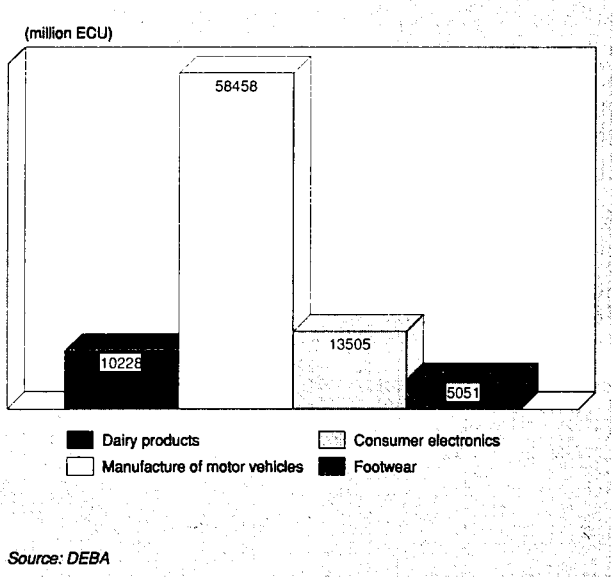
Source: Prometeia

Written by: Prometeia Calcolo Srl
The industry is represented at the EC level by: Union Européenne des Exploitants d'Abattoirs (UEEA), (NACE 412.1). Address: 197 Rue Belliard, Bte 6, B-1040 Brussels; tel: (322) 230 6170; fax: (322) 230 3063; and Association des Entreprises d'Abattage et du Commerce d'Importation et d'Exportation de Volailles (AVEC). Address: V. Farimagsgade 1, DK-1606 Copenhagen V; tel: (45 133) 115670; fax: (45 133) 935670; and, Liaison Centre of the Meat Processing Industry in the EC / Centre de Liaison des Industries Transformatrices de Viandes de la CE (CLITRAVI), (NACE 412.2). Address: Bld. Baudouin 21, 7th floor, B-1210 Brussels; tel: (32 2) 233 0141; fax: (32 2) 223 1244.

Dairy products
NACE 413

The EC is the largest milk producer in the world. In 1992 its share of milk deliveries in the OECD stood at 45%. In 1989 milk production accounted for 18.1% of total agricultural production with half of it produced by Germany (the leading producer) and France. After the downward trend of the market for dairy and cheese products in 1990, prices recovered slightly in 1991 thanks to the stabilisation of world markets following the radical changes which took place in Eastern Europe. In recent years there have been signs of a stabilisation in milk consumption and a decline in butter consumption. The most vigorous sectors are still those of yoghurt, desserts, light and new cheeses and partly skimmed milk. Community production of milk and cheese products is showing a surplus. The problem of stocks of powdered skimmed milk has become acute again, while butter stocks have declined. Take-overs and mergers in recent years have considerably changed the scene altering competition patterns.

Figure 1: Dairy products
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

The main products of the sector can be subdivided into:

- products for final consumption: fresh and long-life milk, butter, cheese, fresh products (cream, fermented milk, desserts, fresh cheese), powdered milk;
- products which are ingredients for the secondary processing industry and are in the nature of commodities: powdered milk, butter, butterfat, casein, powdered whey.

These products are used both in the food industry and in the animal feed industry, where proteins and fats are particularly suited. In confectionery, the use of egg albumen has been replaced by the use of concentrated whey protein.

Dairy-product and cheese enterprises usually diversify into related sectors, achieving economies of scale with regard to: transport (other fresh products), marketing (delicatessen products); and packaging (canned vegetables). Dairy firms are rarely diversified into non-food sectors.

Recent trends

The added value of the sector in 1992 was ECU 10.2 billion with 80% accounted for by France, Germany, the United Kingdom, Italy and the Netherlands. During the five-year period 1987-1992 employment fell by 10.7%, including a 2.5% drop in 1992.

Over 1983-1990 production in real terms rose at an average annual rate of 1.7%. Since then there has been some levelling off. In 1992 falling imports and rising exports allowed for a moderate trade surplus.

From 1993 onwards Italy accepted the new production level. For the 1993-94 season the Community has provisionally increased the quota to 900 000 tonnes for Italy, 100 000 tonnes for Greece and 500 000 tonnes for Spain.

International comparison

Contrary to what occurred in the EC, output in the US for dairy and cheese products increased by 3% in real terms in 1992 (although it should be borne in mind that this figure includes the rapidly-growing segment of ice creams and desserts).

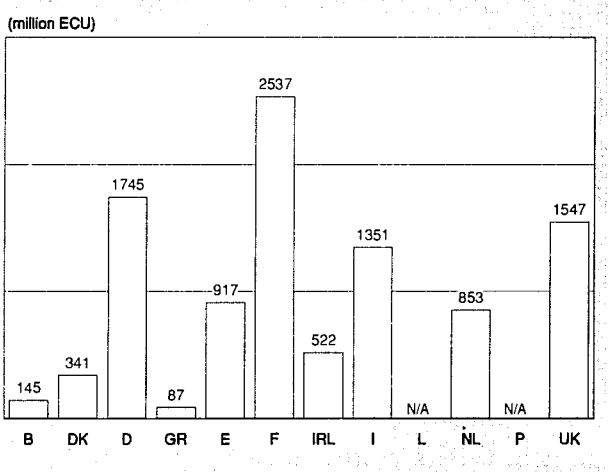
Consumption trends, if broken down by family product, reflect changes in consumption patterns similar to those in Europe, the most dynamic products being those with a low fat and calorie content, at the expense of products containing more fats. Consumption of yoghurt has fallen due to market saturation. US exports increased in value by 67%, leading to the first surplus since 1972. The US dairy and cheese product industry is now exporting 2% of its output, compared with 1.1% in 1989.

The EC is the major world exporter of dairy products (in 1991 it retained its overall 49.5% share of exports on the world market) followed by New Zealand and Australia with world-market export shares of 19% and 8% respectively.

Foreign trade

Sales of dairy and cheese products in non-EC countries contracted in 1986 and again in 1990, in the latter case owing to the Gulf war. Over the last two years there has been an improvement in the balance of trade, which became more marked in 1992. In many countries the dairy and cheese product industry is highly fragmented and most enterprises do not succeed even in attaining national stature. This type of struc-

Figure 2: Dairy products
Value added by Member State, 1992



Source: DEBA

Table 1: Dairy products
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	47 638	49 628	51 014	53 554	53 413	55 533	61 433	62 908	62 575	64 594	64 200
Production	50 356	52 797	54 075	55 832	55 784	58 369	64 848	65 685	65 546	67 815	67 700
Extra-EC exports	3 426	3 846	3 765	3 013	3 081	3 598	4 295	3 595	3 732	3 980	4 280
Trade balance	2 718	3 168	3 062	2 278	2 372	2 837	3 415	2 777	2 971	3 221	3 500
Employment (thousands)	285.0	281.3	272.1	264.6	271.0	254.5	252.3	252.0	248.1	242.0	232.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Dairy products
Breakdown by major product line, 1991 (1)

(thousand tonnes)	Usable production	Total domestic use	Total exports
Fresh milk products except cream	34 211	34 077	286
Drinking milk	29 128	28 741	220
Cream	1 146	1 114	31
Concentrated milk	1 213	845	282
Whole milk powder	1 042	401	636
Skimmed milk powder	1 509	1 193	354
Butter	1 826	1 645	418
Cheese	5 335	5 065	407

(1) Including former East Germany.
Source: Eurostat

Table 3: Dairy products
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	0.7	2.4	1.5
Production	0.8	2.1	1.4
Extra-EC exports	2.1	-2.8	-0.1
Extra-EC imports	-0.8	-1.0	-0.9

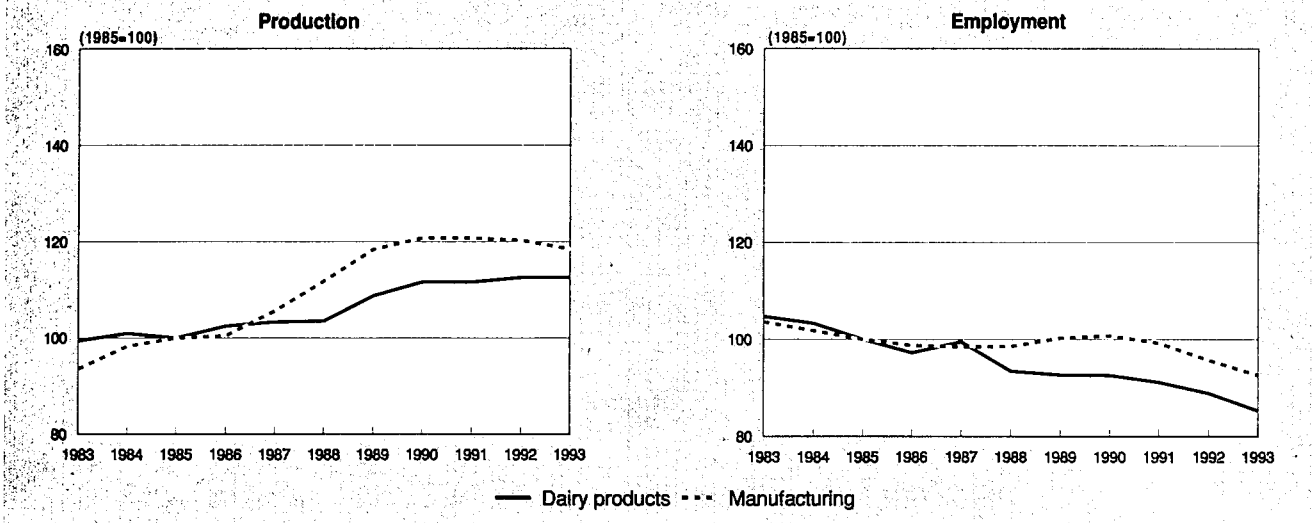
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Dairy products
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	3 426	3 846	3 765	3 013	3 081	3 598	4 295	3 595	3 732	3 980
Extra-EC imports	708.2	677.4	702.9	735.5	709.8	761.9	879.4	818.3	761.1	758.6
Trade balance	2 718	3 168	3 062	2 278	2 372	2 837	3 415	2 777	2 971	3 221
Ratio exports/imports	4.84	5.68	5.36	4.10	4.34	4.72	4.88	4.39	4.90	5.25
Terms of trade index	96.7	98.3	100.0	87.4	76.5	81.7	102.4	103.3	97.4	97.8
Intra-EC trade	6 496	6 570	7 406	7 875	8 168	9 718	9 900	9 137	9 918	11 338
Share of total imports (%)	90.2	90.7	91.3	91.5	92.0	92.7	91.8	91.8	92.9	93.7

Source: DEBA

Figure 3: Dairy products
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

ture, together with the high incidence of transport costs, induces operators in the sector to turn mainly to the domestic market, neglecting intra-Community trade (intra-EC trade is 17%) and neglecting extra-EC even more (extra-EC trade is 6%). The main recipients of extra-EC exports are the OPEC countries, followed by the United States. The proportion of extra-EC imports in total consumption is marginal.

MARKET FORCES

Demand

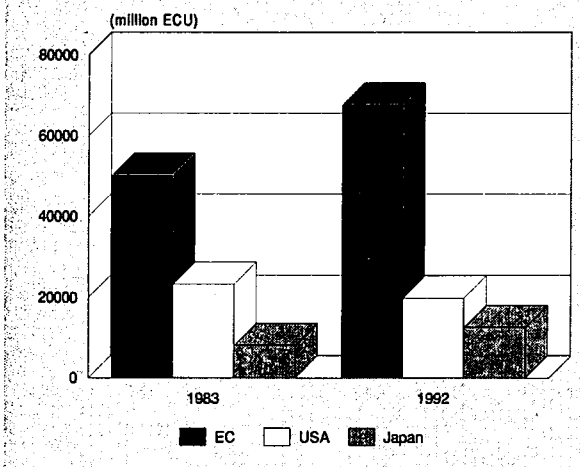
Of the milk produced in the Community, 20% is consumed in the liquid state, while the remaining 80% is used for producing cream and fresh products (8-9%), butter and cheese (50-60%), powders (15-16%), feed for livestock (4-5%) and other minor products.

The change which is taking place in the pattern of consumption of food products is also affecting consumption of dairy and cheese products.

With the exception of Germany the early 1980s saw the start of the decrease in consumption of butter due to competition from margarine. In recent years, on the other hand, sales of butter are being threatened by a new generation of yellow fats, called spreads - products containing a mixture of butterfat and vegetable oil. On some markets they account for a significant proportion of trade in fats. In 1992, per capita consumption of butter was about 3 kg for the Community as a whole.

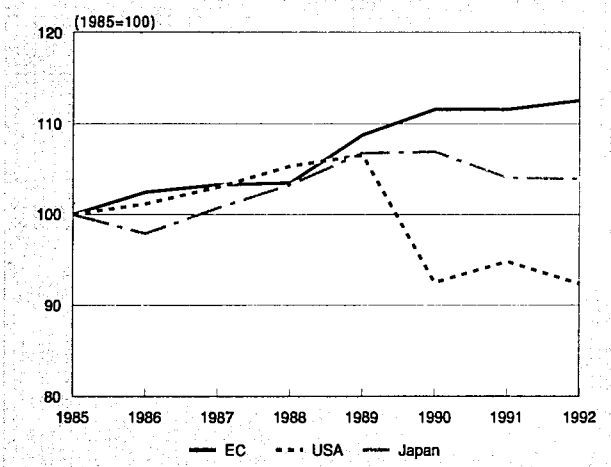
Consumption of liquid milk is declining, except for Germany and Portugal. The preference for semi-skimmed milk reflects preference for light products. Milk is encountering competition chiefly from soft drinks and fruit juices. Producers have tried to counter this phenomenon by producing milk with added

Figure 4: Dairy products
International comparison of production in current prices



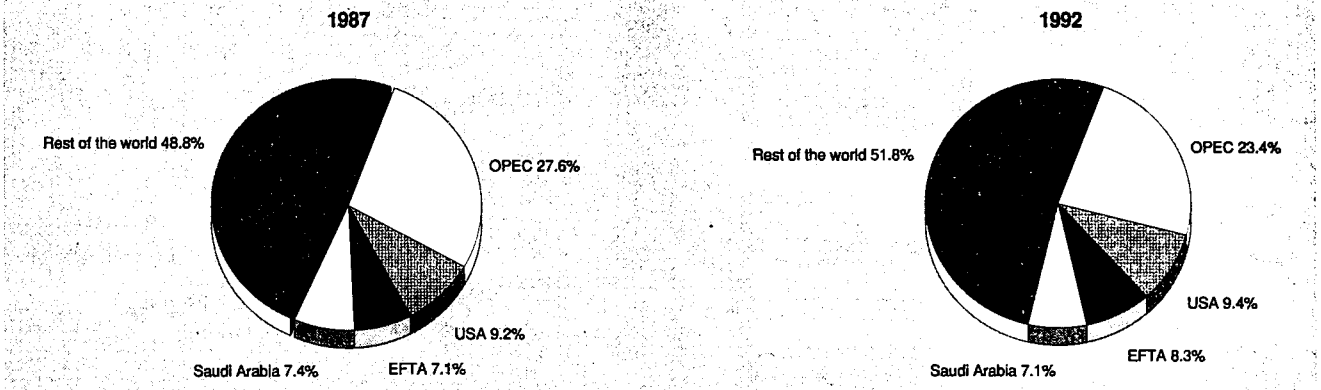
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Dairy products
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Dairy products
Destination of EC exports



Source: Eurostat

vitamins or flavourings. Per capita consumption of milk in 1992 was around 73 litres. The preference for fresh low-fat "health" products has led to a substantial increase in consumption of the great variety of yoghurts and fresh white and light cheeses, which are markedly invading the markets. In 1992, per capita consumption of cheese in the EC was 13 kg and that of yoghurt 9 kg.

The quantities of butter, powdered milk and cheeses which are not in demand within the EC find an outlet in the international markets. World demand is, however, declining owing to saturation of consumption in developed countries and an increase in production in some importing countries. Furthermore, some of the latter are diversifying their sources of supply away from the EC.

Supply and competition

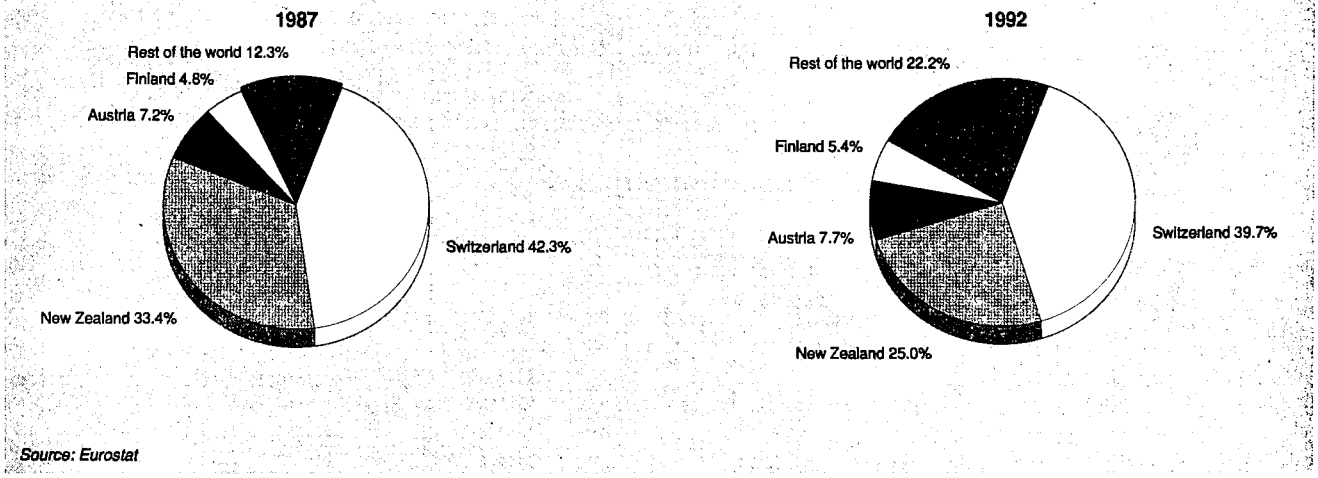
The recent introduction of the milk quota system in the Community has triggered a restructuring process which is changing the pattern of the European industry. Despite the fact that various mergers between leading co-operatives have taken place in some North European countries, the dairy and cheese product industry in the Community as a whole displays a low degree of concentration. The value added per employee contracted by 2.5% in 1992, while unit costs increased sharply (by about 8%).

A drastic change in the organisation of the new German Länder, connected with the need to reach EC standards, has led to a reduction in milk deliveries, reflected in a significant decline in production not only of butter but also of cheese and condensed milk.

Production process

In recent years technology has succeeded in diversifying the range of dairy and cheese products. Innovation is constantly taking place with the object of addressing precise consumer preferences and needs. At the same time the industries are introducing new technology to achieve economies of scale. The process of ultra filtration is making it possible to rationalise the components of raw materials and to introduce milk derivatives which are novel from the point of view of composition. It is only the traditional product lines that are less suited for technological improvements, with the result that production costs remain high.

Figure 7: Dairy products
Origin of EC imports



Source: Eurostat

Table 5: Dairy products
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	32.1	33.5	35.2	37.1	37.8	39.0	39.8	41.3	43.4	42.3
Productivity index	91.1	95.0	100.0	105.1	107.3	110.6	112.9	117.2	123.0	119.9
Unit labour costs index (3)	88.8	94.0	100.0	103.9	107.0	112.3	118.8	126.6	132.7	142.7
Total unit costs index (4)	89.6	94.6	100.0	106.6	104.3	115.7	128.5	130.4	131.8	141.9

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

INDUSTRY STRUCTURE

Companies

Despite the many changes which are still in progress, production in many Community countries is extremely fragmented. It should be remembered that producers' organisations (especially co-operatives) play an important role as regards liquid milk and butter in the markets of Ireland, Belgium, the Netherlands, Germany and Denmark. In Spain, on the other hand, an important role is played by partly state-owned enterprises.

The total number of firms in the sector is around 6 500 and the countries with the highest average intake per enterprise are the Netherlands and Denmark, while the lowest rate is recorded in Italy. In some countries the industrial structure is made up of sector leaders which operate surrounded by a large number of smaller enterprises operating in local areas and specialising in production of typical products.

About 15-20% of the market for milk for use as food is held by Parmalat (I), Sodiaal (F), MMB (UK). 35-40% of the market for yoghurt is held by BSN (F), Nestlé (CH) and Sodiaal (F). 25-30% of the market for fresh cheese is held by BSN, Unilever (NL) and Philip Morris/Kraft (USA). 60-65% of the market for powdered milk is held by Nestlé (CH), France Lait (F) and HL Foods (UK).

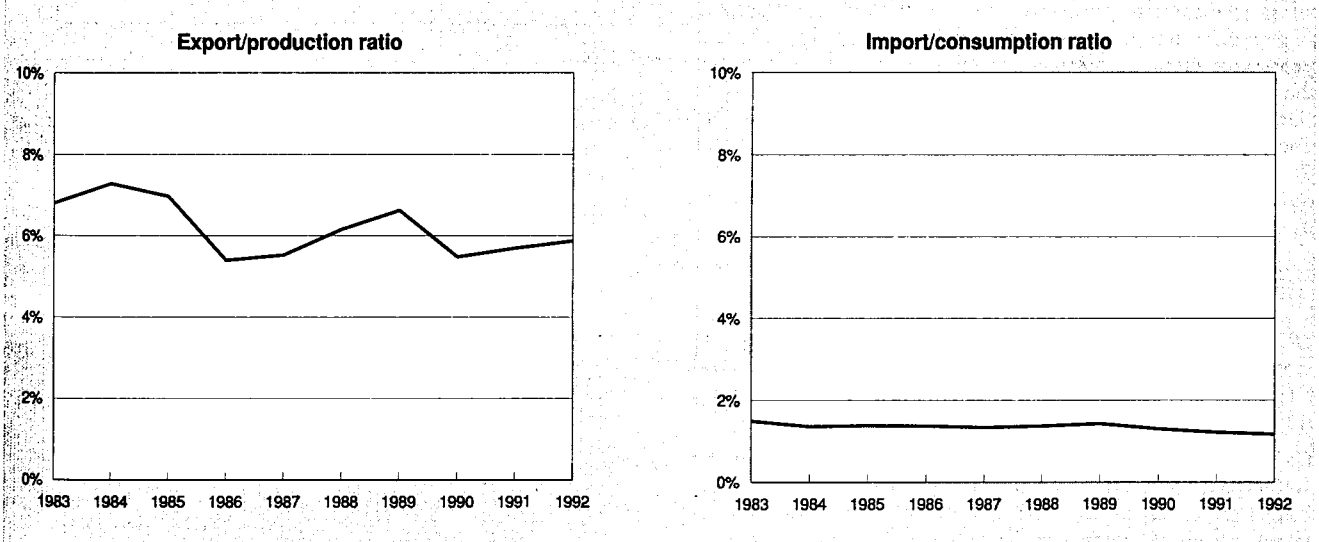
Strategies

Dairy products face competition from related food sectors which have a better profile from a health view point. That has revived efforts to increase the number of milk-based products made available to the public.

For historical reasons a significant proportion of the production and distribution of liquid milk is in the hands of co-operatives. Although the latter have adopted an industrial-type decision-making structure, they still have difficulties in pursuing a market-oriented diversification policy owing to the close link with the contributing members. Consumers tend to associate milk, cream and some types of cheese not so much with a particular producer or brand but with the geographical area of origin. Butter, on the other hand, tends to have a stronger brand association.

The constraints imposed by the Common Agricultural Policy and the degree of maturity reached by traditional products in this category have caused the leading enterprises to turn to products with a greater added value. These enterprises apply new production and packaging technologies and pursue a policy of product differentiation and market segmentation by expanding their production in the range of "light" products or products containing mixed vegetable and animal fats, known as spreads. Producers invest heavily on brand marketing efforts.

Figure 8: Dairy products
Trade intensities



Source: DEBA

Table 6: Dairy products
Employment by country, 1992 (1)

EC	241 968
Belgique/België	7 617
Danmark	7 672
BR Deutschland	41 946
Hellas	N/A
España	20 512
France	58 183
Ireland	8 927
Italia	30 270
Luxembourg	N/A
Nederland	17 834
Portugal	9 042
United Kingdom	34 807

(1) Estimates
Source: DEBA

ENVIRONMENT

Cattle farming leads to pollution of the soil and of ground-water strata. The processing and manufacturing industry is faced with ecological problems from the angle of management of urban solid refuse and hence that of the regulations governing the nature of packaging. Germany is highly committed in this respect. With the rapid spread of production of UHT milk, some enterprises have started to introduce recyclable dark-glass bottles.

REGULATIONS

The organisation of the dairy and cheese product market, which began to operate on the 29th of July 1968, is governed by Basic Regulation 804/68, subsequently incorporated in the regulations determining: the market support system; the introduction of levies on cheeses, butter and powdered skimmed milk; the management of disposal of stocks by means of special sales; the gradual harmonisation of the hygiene and quantity standards applying to milk; and the introduction of milk quotas (Regulations 856/84, 857/84, 1447/84, 1527/88 and subsequent decisions) and co-responsibility levies.

Table 7: Dairy products
Usable production by country, 1991

(thousand tonnes)	Fresh milk products except cream	Drinking milk	Cream	Concentrated milk	Whole milk powder	Skimmed milk powder	Butter	Cheese
EC (1)	34 211	29 128	1 146	1 213	1 042	1 509	1 826	5 335
Belgique/België, Luxembourg	1 124	897	55	24	50	77	79	65
Danmark	770	640	49	0	108	17	71	287
BR Deutschland (1)	7 675	5 566	561	474	237	539	557	1 247
Hellas	625	680	7	0	0	0	3	165
España	3 830	3 446	43	40	17	30	38	159
France	5 930	4 495	172	70	313	452	496	1 502
Ireland	661	645	21	0	24	183	147	74
Italia	3 602	3 396	101	1	3	0	104	890
Nederland	1 810	1 378	56	406	209	66	203	600
Portugal	857	978	4	0	8	12	16	64
United Kingdom	7 329	7 007	77	198	73	133	112	283

(1) Including former East Germany.
Source: Eurostat

There have been many acquisitions, mergers and arrangements between private and co-operative enterprises, bringing about a considerable change in the structure of supply. The acquisition of local enterprises has been the method used by many to penetrate foreign markets. The biggest operations of recent years are: the acquisition made by BSN (F) of Galbani (I); the acquisition of Giglio (I), Farm Best (USA) and Milk Maid (USA) by Parmalat (I); the acquisition of Tallinn Margarine Factory (Estonia) by Unilever PLC (UK); the acquisition of Sandhurst Dairies (AUS) by QUF Industries (AUS); the acquisition of Sussex Dairies (UK) by Unigate (UK); the acquisition of Ala Zignano (I) by Polenghi Lombardo (I).

REGIONAL DISTRIBUTION

80% of the milk collected and conveyed to processing and manufacturing enterprises comes from France (Normandy and Brittany), the United Kingdom (Cornwall), the Netherlands, northern Italy, Spain and the new German Länder.

Germany, Spain and the United Kingdom, France and the Netherlands are major producers of fresh products and cheeses. The latter are also produced in Denmark. Powdered milk is chiefly produced in factories located in Northern Europe.

OUTLOOK

Prospects are linked to international agreements influencing extra-EC trade and by future EC agricultural policy and legislation. Further concentration and internationalisation of the industry is expected to be a major characteristic.

There may be a growth in the milk and cheese sector owing to the variety of low-fat products. The niche market for cream

Table 8: Dairy products
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.6	1.3
Production	0.6	1.2
Extra-EC exports	-1.0	-0.5

Source: Prometeia

may show a sharp growth in sales. The present decline in sales of butter will be halted only if the producers succeed in improving flavour and creaminess.

The main risks present for the sector can be specified in the replacement, in the consumption basket, of dairy and cheese products by substitute products containing a mixture of fats and intensifying global competition coupled with a reduction in market support schemes that will prove particularly painful for the small producer. Regarding opportunities they are mainly applicable for the leading enterprises that will pursue further their globalisation process and introduce further technological change.

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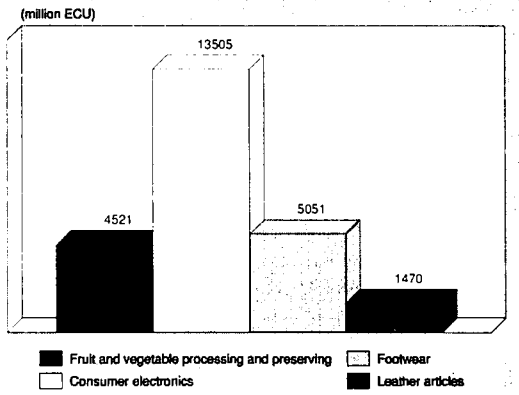
Fruit and vegetable processing and preserving
NACE 414

Although the market as a whole is going through a phase of slow growth demand for industrial products has been stronger at the expense of fresh products. The growing demand for natural foods without additives is an incentive for companies to diversity their products. The introduction of new types of fruit juices, products based on exotic fruits and innovative vegetable products is helping to increase sales in this subsector. The sector is dominated by multinationals, which are able to invest heavily in order to compete with other food sectors. However, many small and medium-sized firms survive by taking advantage of market niches. High labour costs in the EC handicap Community production in relation to products from Eastern European and the less developed world.

Figure 1: Fruit and vegetable processing and preserving Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

The sector's main products are:

- vegetable preparations in cans, cartons, etc., dried or irradiated products, soups, juices and sauces;
- fruit preparations in cans, cartons, etc., jams, jellies, juices and syrups.

Recent trends

Over the period 1988-1992 production rose by 4.1% in real terms while consumption increased at an average annual rate of 5.3%; hence the trade balance has constantly been negative. In the early 1980s, the introduction of advanced technologies resulted in labour being increasingly replaced by capital in the production process; during recent years this has ceased to be the case, and employment rose as a result. In 1992, however, the European recession caused employment to fall again by 2.7%.

International comparison

For tomato-based products, North America is the biggest processor in the world, with just under 45% of total processing, while the EC processes around a third of the total quantity of raw material supplied to the industry. For processed tomato-based products and for peaches in syrup, the EC's self-sufficiency ratio was over 100% in 1992, whereas for other products it is still a net importer of enormous quantities. Community production of pineapples in syrup is negligible and, for prunes and raisins falls far short of that of the leading producer, the United States.

The United States is both a big producer and a big exporter of dried fruit and tinned fruit juices and vegetables. The EFTA countries have only a modest market for tinned fruit and vegetables. This is due to the fact that the prices of the fruit and vegetables processed industrially in these countries are distinctly on the high side.

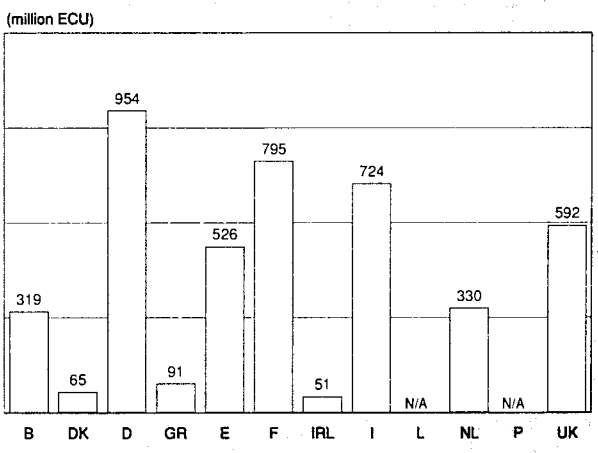
Foreign trade

Extra-EC imports increased substantially, at an average rate of 8.4% while extra-EC exports rose slowly, at an average annual rate of 1.1%. The balance of trade has always been negative and the gap is widening. In 1991 the ratio of exports to imports had deteriorated to 40%. This is due to the competitive pricing of extra-EC imports from non-EC countries bordering the Mediterranean basin and to the steady erosion of competitiveness of EC exports, including finished products, because of the high competitiveness of similar products in Eastern Europe and Asia.

In 1992 26.4% of EC exports went to the United States, 22.4% to the EFTA countries and 4.5% to Japan. Exports to the Middle East are also significant although they have been encountering difficulties from non-EC competition. There are no significant differences between these figures and those for 1987. Over 50% of imports come from Eastern Europe and developing countries with Turkey and Brazil being the most significant. Imports from the US and EFTA are quite limited.

The volume of intra-EC trade is more substantial in comparison to extra-EC trade and over the last decade it has been increasing its significance in overall EC trade.

Figure 2: Fruit and vegetable processing and preserving Value added by Member State, 1992



Source: DEBA

Table 1: Fruit and vegetable processing and preserving
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	11 212	13 067	13 345	13 275	14 388	15 405	16 726	18 265	20 210	20 558	20 000
Production	10 242	11 987	12 204	12 223	13 212	13 931	15 332	16 499	18 062	18 471	18 700
Extra-EC exports	1 126	1 383	1 535	1 304	1 294	1 368	1 634	1 456	1 512	1 551	1 540
Trade balance	-970	-1 080	-1 140	-1 052	-1 176	-1 473	-1 393	-1 765	-2 148	-2 087	-1 300
Employment (thousands)	138.6	138.7	135.0	131.6	132.8	129.3	130.2	131.7	131.8	128.2	127.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 2: Fruit and vegetable processing and preserving
Breakdown of production by country and by major product line, 1991

	Jam, marmalade, jelly and chestnut paste (thousand tonnes)	Canned vegetables excluding baked beans (million 850 ml tins)	Canned fruit (million 850 ml tins)
Belgique/België	30.0	145(1)	46.7
Danmark	39.4	N/A	N/A
BR Deutschland	203.3	180.3	126.1
Hellas	N/A	N/A	210.3
España	40.0	279.8	345.6
France	161.8	1327.4	277.4
Italia	50.5	233.4	218.5
Nederland	28.2	492.5	100.8
United Kingdom	132.9(2)	221.4(2)	N/A

(1) Estimated
(2) 1990 figures
Source: OEITFL/OEICT

Table 3: Fruit and vegetable processing and preserving
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	4.5	5.3	4.8
Production	4.2	4.1	4.2
Extra-EC exports	2.1	1.1	1.7
Extra-EC imports	4.5	8.4	6.2

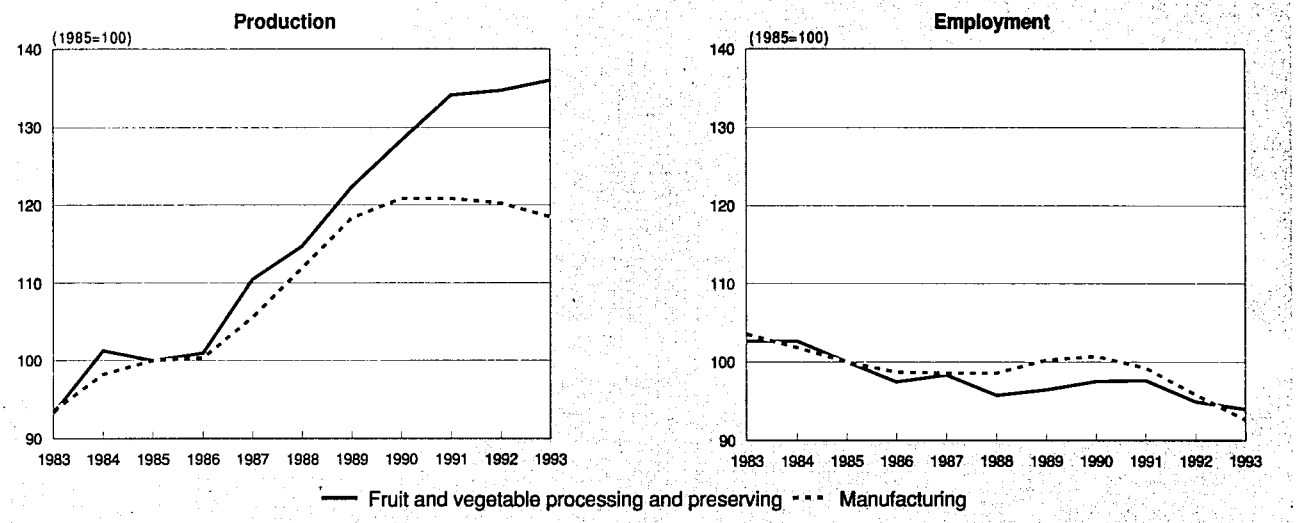
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Fruit and vegetable processing and preserving
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 126	1 383	1 535	1 304	1 294	1 368	1 634	1 456	1 512	1 551
Extra-EC imports	2 096	2 463	2 676	2 356	2 470	2 842	3 028	3 221	3 659	3 638
Trade balance	-970	-1 080	-1 140	-1 052	-1 176	-1 473	-1 393	-1 765	-2 148	-2 087
Ratio exports/imports	0.54	0.56	0.57	0.55	0.52	0.48	0.54	0.45	0.41	0.43
Terms of trade index	115.1	109.3	100.0	120.9	119.3	115.6	127.3	128.9	134.4	135.3
Intra-EC trade	2 968	3 512	3 790	3 818	4 179	4 514	4 947	5 532	6 185	6 374
Share of total imports (%)	58.6	58.8	58.6	61.8	62.9	61.4	62.0	63.2	62.8	63.7

Source: DEBA

Figure 3: Fruit and vegetable processing and preserving
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

MARKET FORCES

Demand

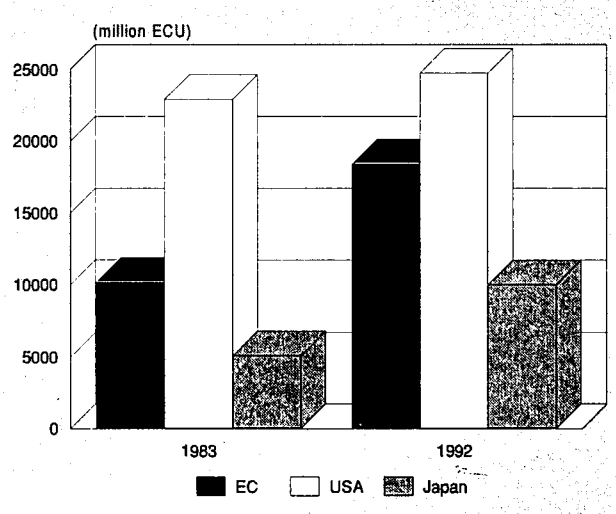
Demand for processed fruit and vegetable-based products is growing, and suggests possibilities for new products thanks to a tendency towards uniformity of consumption and greater demand for prepared foods. Products which have contributed to the expansion of the market are tinned tomatoes and fruit juices, which meet consumer preferences for genuine, light products. EC imports of concentrated exotic juices, especially from South American countries, are sought after by the European juice-processing industry. During the last 20 years a wide range of new exotic fruits has entered the market. Avocados, pineapples and kiwi fruit were regarded as very special luxury products only a couple of decades ago. The demand of the entire sector at European level has been boosted by investment in publicity and product innovation undertaken by the multinationals operating in this sector.

Demand for processed fruit and vegetables, as, for example, prepacked and sliced vegetables, is growing considerably. The best-selling products are: ready-to-serve vegetable soups, prewashed and pre-sliced carrots and onions, and ready-prepared mixed salads. Despite the success of these products, great efforts still need to be made in advertising to overcome consumers' doubts about the freshness of prepared vegetables, especially in countries which usually consume the fresh product.

Supply and competition

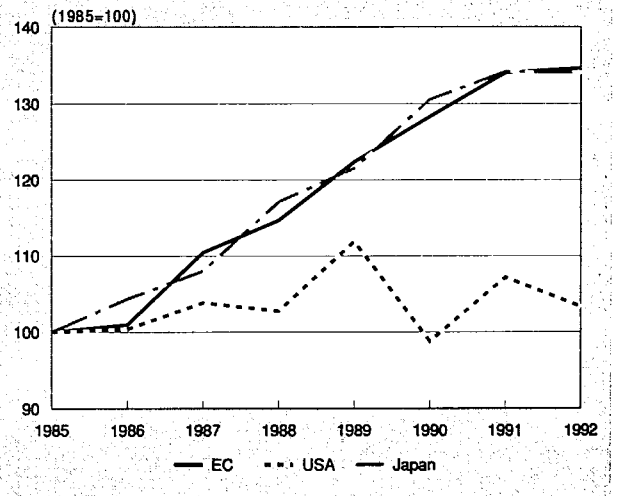
The industry is becoming more and more concentrated and many small firms are being absorbed by the multinationals or manoeuvring themselves in market niches. The multinationals have the capacity and resources for organising diversified production coupled with trading, advertising and R&D policies. The smaller firms generally have a firmly established

Figure 4: Fruit and vegetable processing and preserving
International comparison of production in current prices



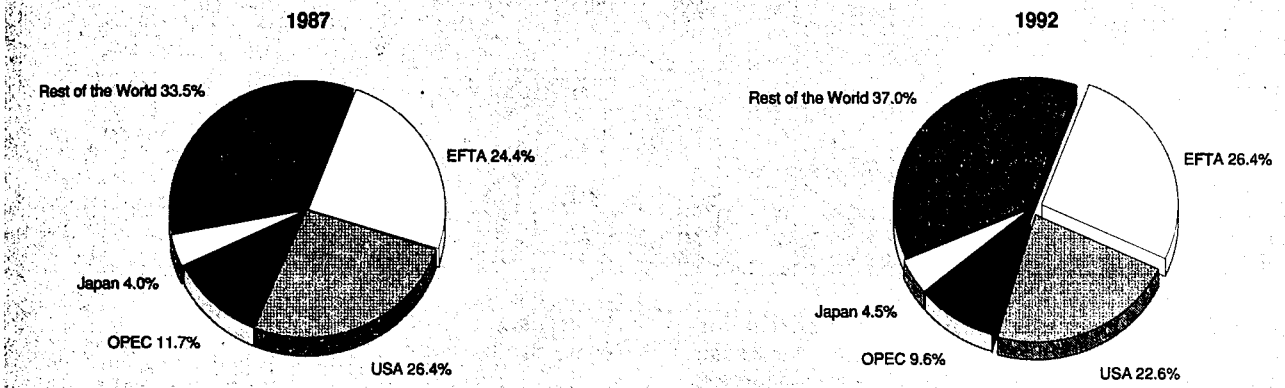
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Fruit and vegetable processing and preserving
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Fruit and vegetable processing and preserving
Destination of EC exports



Source: Eurostat

reputation at local level, helping them to concentrate on high-quality market segments.

The main countries producing tinned vegetables are those along Europe's Mediterranean seaboard which enjoy a favourable climate: Spain, Portugal, Italy and Greece. Fruit juices are imported from countries that produce exotic fruits while tomato pulp comes chiefly from Turkey and Israel.

Regarding tomato-based products it is worth noting the high degree of processing that takes place in major producing countries. A group of countries, comprising Chile, the United States, Canada, Tunisia, Portugal and Peru, use around 80% of their production for processing. High degrees of specialisation are also found in Israel, which processes 70% of its production, and also in Italy and Greece, where 60% is normally processed. An intermediate position is occupied by Argentina and Venezuela (50%), Algeria (45%), Taiwan and France (35-40%), Spain and Brazil (30%).

Production process

Automation in picking and gathering of fruit and vegetables have developed substantially in recent years. A sophisticated selection of hybrids have helped to gradually improve ripening.

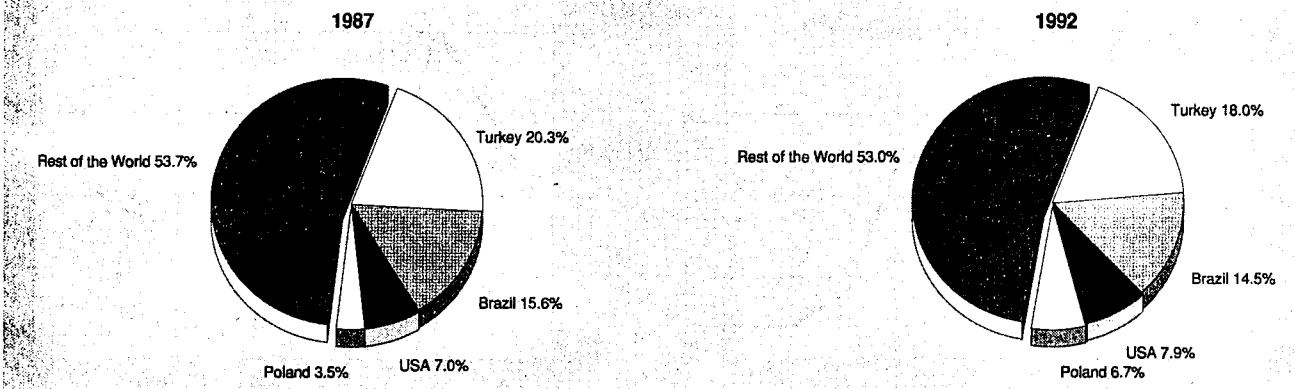
The absence of innovation in the tinned products subsector is the main reason for its loss of market shares to the benefit of deep-frozen products in recent years. The latter category has expanded greatly with the wide use of freezers by households. In the industrialised countries the market for deep-frozen products is now completely integrated into the distribution network. There is at present a balance between the two subsectors which are faced with competition from other subsectors such as fresh products and packaged long-life products. New processes - such as irradiation, extrusion and filtration techniques - have been adopted in the market for tinned fruit and vegetables in order to improve the nutritional value and organoleptic qualities of the products. The innovations resorted to by the preserving and canning industry are those used in other sectors, such as the chemical, energy and plastics industries.

INDUSTRY STRUCTURE

Companies

The multinationals are present in force on the tinned fruit and vegetable market, especially in Northern Europe while

Figure 7: Fruit and vegetable processing and preserving
Origin of EC imports



Source: Eurostat

Table 5: Fruit and vegetable processing and preserving
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	25.6	24.2	23.9	25.1	27.4	28.6	30.4	31.9	33.5	35.3
Productivity index	107.3	101.1	100.0	104.8	114.5	119.7	127.4	133.3	140.3	147.6
Unit labour costs index (3)	86.7	96.6	100.0	105.2	111.1	119.8	128.2	135.7	146.3	158.4
Total unit costs index (4)	80.2	95.6	100.0	102.5	109.1	118.1	128.0	135.2	144.2	154.1

(1) Estimates are used if country data is not available, especially from 1990 onwards."
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale."
Source: DEBA

Mediterranean countries tend to have more fragmented markets, with small and medium-sized firms. In 1991, the leading companies and the EC market shares in the various subsectors were as follows:

- Deep-frozen fruit: Unilever (UK/NL), Nordstern (D), Oetker (D), Prieto (E), Hengstenberg (D), Danisco (DK) which together had an 81% share;
- Tinned vegetables: Bonduelle (F), CGC (F), Grand Met (UK), HL Foods, Suiker Unie, Heinz (USA) had a 42% share;
- Frozen vegetables: Solcco (F), Pomona (F), Champix, Peyronnet, Casino had a market share of 35%;
- Tinned and packet soups: Heinz (UK), Unilever (UK/NL), Campbell Soup (USA), BSN (F), CPC (USA), Nestlé (CH) had an 82% share;
- Dehydrated soups: CPC (USA), Nestlé (CH), Unilever (UK/NL), Gallina Blanca (E), BSN (F), CSM (NL) held a 90% share;
- Tomato puree and ketchup: SME (I), Nestlé (CH), BSN (F), Heinz (USA), Mars (USA), CPC (USA) had a 54% share;
- Dehydrated sauces and condiments: CPC (USA), Nestlé (CH), RHM, Reckitt & Colman, Dalgety, Sara Lee had an 88% share.

Strategies

During the 1980s, countries such as Italy and Spain witnessed a change in the structure of supply in the tinned fruit and vegetable market towards growing concentration, by way of many take-overs and mergers. In the other European countries the multinationals have for many years shared the markets of the individual countries between them, leaving room only for niche enterprises. The most significant take-overs in 1992-1993 were: Hillsdown Holdings PLC (UK) by Beledia NV and Svanso Import A/S (DK) by Miko Konserves A/S (DK).

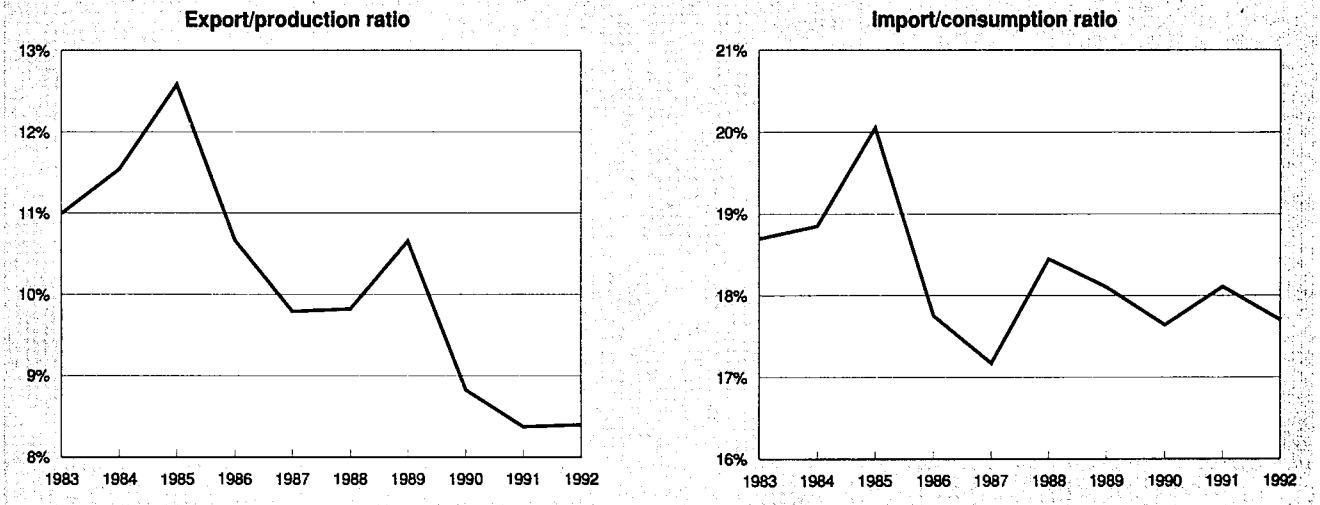
REGIONAL DISTRIBUTION

Fruit and vegetables have to be canned in factories close to the picking areas. The European regions involved in this market are: Navarra-Rioja, Andalusia, Estremadura and Aragona in Spain; Languedoc, Roussillon, the Loire Valley, Provence and Aquitaine in France; central and western Macedonia and Thessaly in Greece; Emilia Romagna, Lombardy and some southern regions in Italy.

ENVIRONMENT

The by-products and waste products of this industry do not have any significant impact on the environment. However, the problem of the volume and composition of packaging in connection with the disposal of solid urban waste.

Figure 8: Fruit and vegetable processing and preserving
Trade Intensities



Source: DEBA

Table 6: Fruit and vegetable processing and preserving Employment and production by country, 1992 (1)"

	Employment	Production (milion ECU)
Belgique/België	6 316	1 171.7
Danmark	1 168	231.0
BR Deutschland	22 710	4 123.3
Hellas	9 845	921.2
España	26 250	1 949.4
France	16 831	3 421.4
Ireland	1 326	142.1
Italia	16 770	3 112.4
Luxembourg	0	0.0
Nederland	6 726	1 371.7
Portugal	2 926	248.3
United Kingdom	17 298	1 778.4

(1) Estimates
Source: Eurostat

REGULATIONS

Regulation (EEC) No. 525/87 introduced a system of aid for production of tinned pineapple and Regulation (EEC) No. 762/89 introduced special measures for some types of pulse products. Directive (EEC) No. 88/593 introduced specific rules concerning the disclosure, on the labels on jellies and jams, of any sulphur dioxide residues and concerning authorisation for the use of red fruit juice as a colouring agent in some jams.

The regulation system takes account of the interests both of agricultural producers and of traders. Producer prices for some fruits and vegetables which are to be processed and canned are particularly important for certain regions and the support system is even more important for enabling them to contend with the price competition generated by products from the underdeveloped countries.

OUTLOOK

Future prospects for tinned fruit and vegetables vary from subsector to subsector. There may be an increase in the number of consumers during the next few years, because the pattern of food consumption is moving towards growing appreciation of products with a high service content. Factors contributing to the growth in demand will be innovations in packaging and the use of new production processes chiefly designed to improve quality. All this will probably have the effect of speeding up long-term growth.

The tinned products subsector and that of their most direct substitutes, deep-frozen products, are also positively influenced by demographic trend towards single number or generally smaller sized households and the growing participation of women in the labour force which tend to boost sales of convenience products.

Table 7: Fruit and vegetable processing and preserving Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	4.2	5.0
Production	3.0	4.0
Extra-EC exports	1.0	1.2

Source: Prometeia

Written by: Prometeia Calcolo Srl
The industry is represented at the EC level by: Organisation Européenne des Industries Transformatrices des Fruits et Légumes (OECTO/AIELD/OEITEI). Address: Avenue de Cortenbergh 172, Bte 6, B-1040 Brussels; tel: (32 2) 735 8170; fax: (32 2) 736 8175.

Processing of fishery products
NACE 415

Seafood consumption in the EC has shown a dramatic expansion over the last ten years. As a result, the EC industry developed sharply under the influence of large powerful agro-food companies. Since the supply of raw material of certain popular species by the EC fishing fleet does not meet industry requirements, large amounts of processed seafood are purchased in third countries, widening the negative trade balance. The market segment which shows the fastest growth is that of fish-based prepared dishes as these products match the changing social habits of EC consumers.

INDUSTRY PROFILE

Description of the sector

The outputs of the fish and seafood processing industry can be divided into five major categories:

- Frozen fish (excluding whole fish), e.g. frozen fish fillets, which are partly processed items using basic raw seafood material and can be either further processed into prepared dishes or consumed in that form;
- Dried, salted and smoked fish, e.g. smoked salmon, salted cod, consumed without any further industrial processing;
- Prepared or preserved fish, e.g. tuna cans, prepared dishes, surimi, which are ready to eat items;
- Aquatic invertebrates frozen dried or salted e.g. cuttlefish fillets, frozen mussels, which can be either further processed into prepared dishes or sold to consumers in that form;
- Crustaceans, molluscs and other aquatic invertebrates prepared or preserved e.g. crab cans, shellfish salads, which are ready to eat items.

The EC production of prepared or preserved fish exceeded 1 million tonnes in 1991, 55% of total EC production of processed fisheries products (2.1 million tonnes). The frozen fish (excluding whole fish) category ranks second with 450 237 tonnes (22% of total EC production).

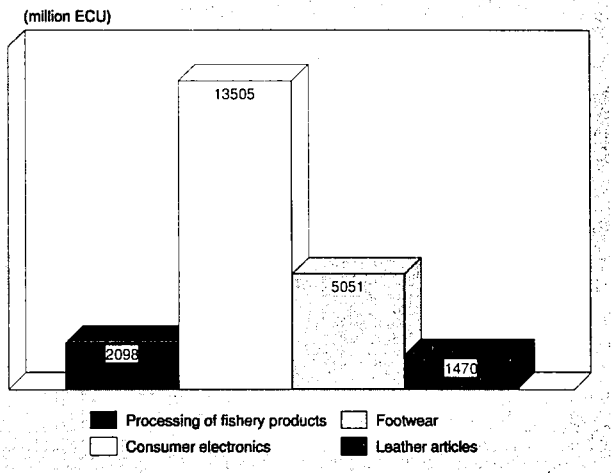
Recent trends

The fish processing sector is a rather concentrated industry with 75% of the products being manufactured in five Member States. The major producer is Spain with almost 24% of the total production, followed by Germany (17%) followed by the United Kingdom, Denmark and France with roughly 11% of total production each. The production of preserved fish dominates in most EC countries with the exception of Greece where the smoked or salted seafood products (e.g. salted anchovies) are the main manufactured items, while Ireland and the Netherlands produce mainly frozen fish fillets.

The apparent consumption of processed fisheries products has shown a dramatic increase over the past ten years having almost doubled. Meanwhile, EC production experienced an increase of 69% over the same period. As a result extra-EC imports grew strong at an average rate of 8.8% per annum while extra-EC exports remained fairly stable. Consequently, the trade balance deteriorated sharply over 1983-92 reaching a deficit of over 2 billion ECU with an export/import ratio as low as 25%. In terms of employment, the fish processing sector shows unsteady trends over the past ten years.

Since 1991, most of the EC Member States have been experiencing adverse economic conditions and the development

Figure 1: Processing of fishery products
Value added in comparison with other industries, 1992



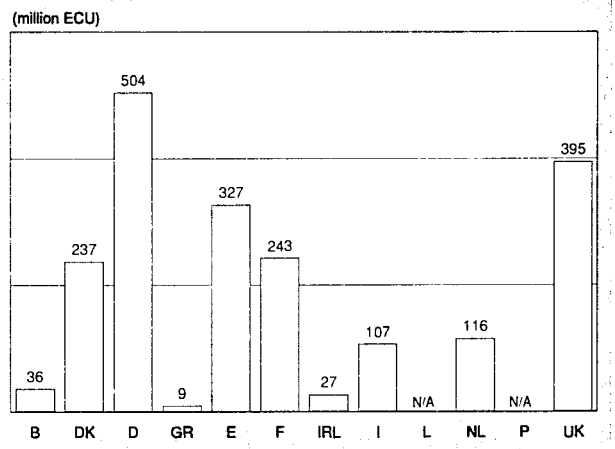
Source: DEBA

of the fish processing industry has been hampered by the drop in consumer demand and by a sharp increase in cheap imports from developing countries. The number of employees in the industry is shrinking (9 000 jobs lost since 1989) as a consequence of the difficulties of the smallest firms to compete on this rapidly evolving market, and the rising importance in mergers and acquisitions.

Foreign trade

The EC is a net importer of processed fisheries products. Few of the fisheries landings are used by the fish processing industry because they are too costly and mostly directed towards the fresh market, and do not fit the industry needs of constant sources of calibrated supply of raw material throughout the year. The two major imported items which are used for further processing are aquatic invertebrates frozen, dried or salted (33% of total extra-EC imports in 1991) and frozen fish (27%) which are both lacking in the EC landings and more expensive than similar products purchased from third countries. Extra-EC exports are dominated by prepared and preserved fish (38% of the extra-EC exports in 1991) and

Figure 2: Processing of fishery products
Value added by Member State, 1992



Source: DEBA

Table 1: Processing of fishery products
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	5 959	6 445	6 850	7 267	7 711	8 682	9 610	10 202	10 854	11 160	11 200
Production	5 232	5 671	6 005	6 221	6 538	7 265	8 069	8 188	8 571	8 835	8 860
Extra-EC exports	546.8	579.3	677.9	688.3	726.8	653.9	663.5	701.5	771.2	721.1	694.0
Trade balance	-728	-774	-845	-1 045	-1 173	-1 417	-1 541	-2 014	-2 283	-2 325	-2 300
Employment (thousands)	94.1	91.1	89.8	84.4	82.6	83.7	91.9	86.7	85.8	82.9	82.6

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 2: Processing of fishery products
Breakdown by major product line, 1991 (1)

(tonnes)	Apparent consumption	Production	Extra-EC exports	Extra-EC imports	Net exports
Frozen fish, excluding whole fish	811 993	450 237	56 617	418 373	-361 756
Dried, salted or smoked fish	295 978	153 082	20 876	161 772	-142 896
Prepared or preserved fish	1 418 512	1 146 478	78 551	350 585	-272 034
Aquatic invertebrates, frozen, dried or salted	687 946	223 202	40 905	505 649	-464 744
Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved	182 021	103 812	12 612	90 821	-78 209

(1) Estimates are used if country data is not available
Source: Cofrepêche, Eurostat

Table 3: Processing of fishery products
Breakdown of production by major product line and by country, 1991 (1)

(thousand tonnes)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EC
Frozen fish, excluding whole fish	7.1	78.9	19.9	4.5	107.0	4.5	97.8	6.0	43.8	26.3	54.2	450.2
Dried, salted or smoked fish	4.4	24.1	21.2	8.0	18.2	19.5	10.5	5.3	15.2	17.6	8.8	153.1
Prepared or preserved fish	19.5	107.1	306.1	2.6	211.0	176.8	10.1	121.5	12.0	39.9	139.4	1 146.5
Aquatic invertebrates, frozen, dried or salted	5.6	1.0	4.2	0.0	114.0	18.0	10.2	14.5	7.1	7.2	41.2	223.2
Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved	14.2	19.4	8.4	0.4	44.4	0.6	0.04	2.6	12.1	0.7	0.7	103.8

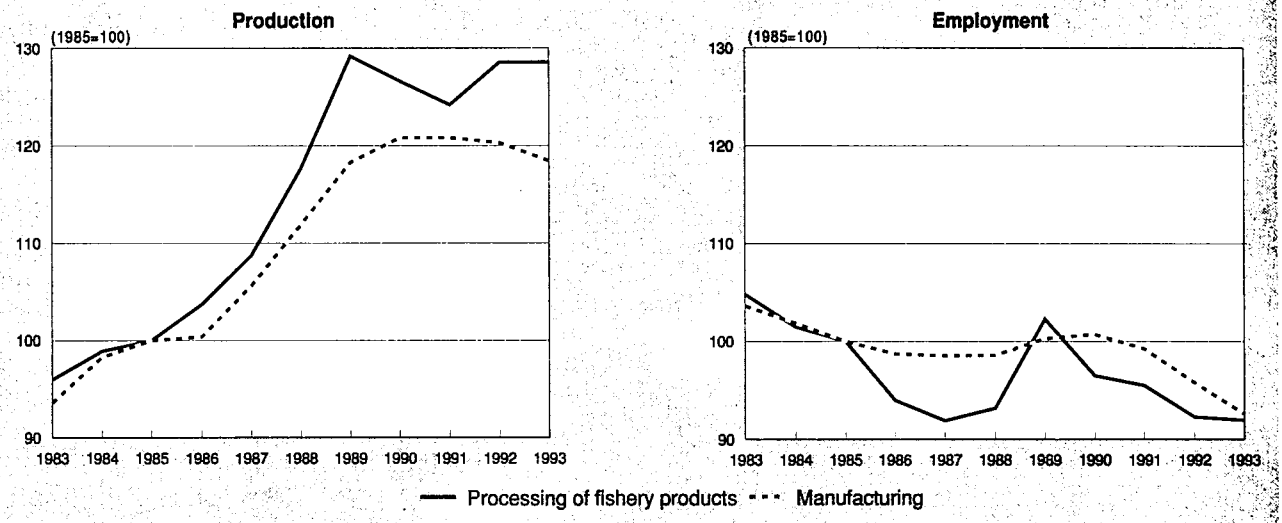
(1) Estimates are used if country data is not available
Source: Cofrepêche

Table 4: Processing of fishery products
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	5.3	4.3	4.9
Production	4.1	2.3	3.3
Extra-EC exports	0.5	2.3	1.3
Extra-EC imports	8.0	9.9	8.8

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Figure 3: Processing of fishery products
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

by semi-processed materials imported from third countries and re-exported after repackaging under a European brand.

The negative trade balance is therefore structural and the situation is not expected to improve in the future. The EC fisheries sector suffers from severe resource depletion and more extra-EC countries are now able to supply processed seafood products at EC quality standards and attractive prices.

The main suppliers of processed products are the EFTA countries which supply mostly frozen fillets of white fish (mainly cod, haddock, and saithe) and salted or smoked fish (smoked salmon from Norway). They are followed by Thailand, Morocco and USA where the seafood canning industry is healthy and expanding, while Argentina and Asian countries offer large quantities of processed shellfish.

Individual EC Member States primarily trade between them. Extra-EC exports are primarily directed towards the EFTA countries, the USA, Japan and the OPEC.

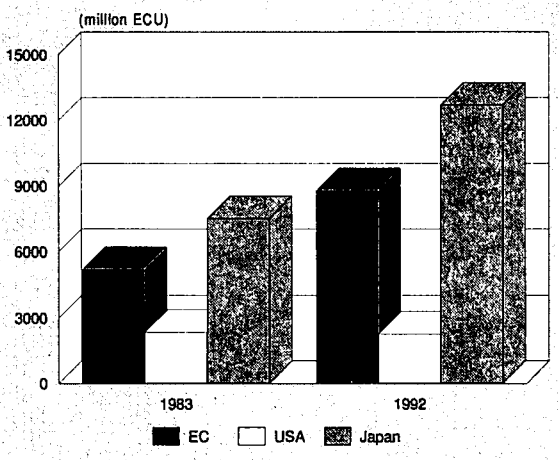
MARKET FORCES

Demand

The demand for fisheries products has grown dramatically over the past ten years due to a growing public awareness of the importance of fish as part of a healthy diet and the relative aversion of northern Europeans to fresh fish. The latter, combined with factors relating to changing social patterns, has boosted the consumption of processed items which rose from an average of 6.7 kg per person in 1983 to 9.8 kg in 1991, with further increases anticipated.

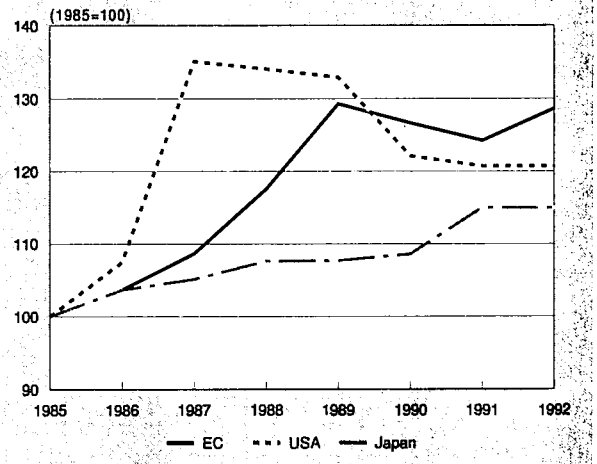
The market for fish-based ready to eat meals is the most rapidly growing market in all the EC Member States with the exception of Greece and Portugal where the purchasing power of customers is low. Reasons for this fast expanding market include changing social factors such as the growing participation rates of women in the labour force and the declining average household size. Some giant agro-food firms

Figure 4: Processing of fishery products
International comparison of production in current prices



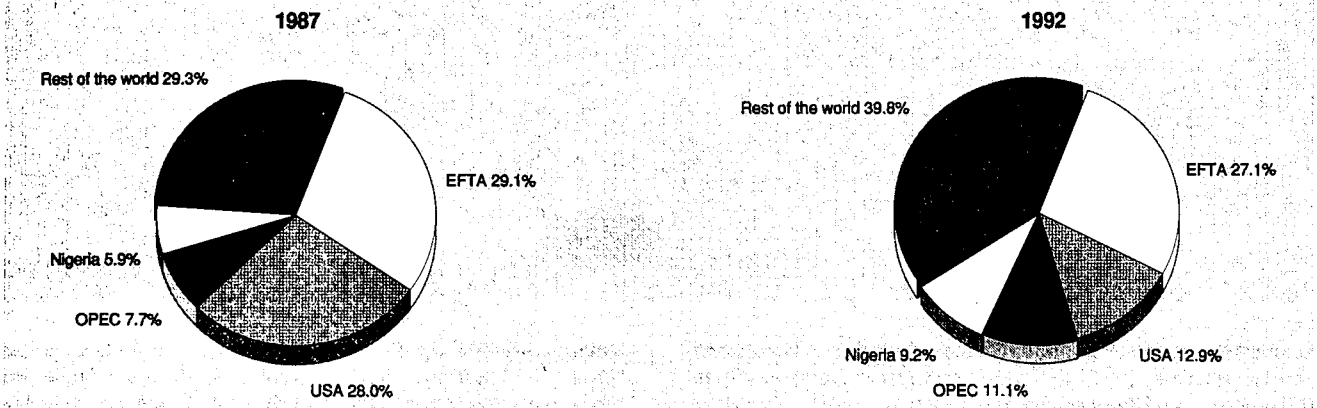
Source: DEBA

Figure 5: Processing of fishery products
International comparison of production in constant prices



Source: DEBA

Figure 6: Processing of fishery products
Destination of EC exports



Source: Eurostat

such as Unilever (UK/NL) and Nestlé (CH) dominate this market segment and use their advertising power to attract consumers.

The consumption of canned fish is steadily rising throughout the EC thanks to the marketing efforts of the leading firms which have adopted product differentiation policies through high quality standards and the introduction onto the markets of new forms of products such as tuna-based salads and elaborated mackerel-based preparations.

Lastly, the EC market for surimi seems to offer good prospects. It was estimated at 34 000 tonnes in 1990 and is expected to grow up to 50 000 tonnes in 1994. France and Spain clearly appear as the leading markets in Europe for these products. Other major markets include UK and Italy. The German market for this product is small as there is no traditional preference for crustaceans.

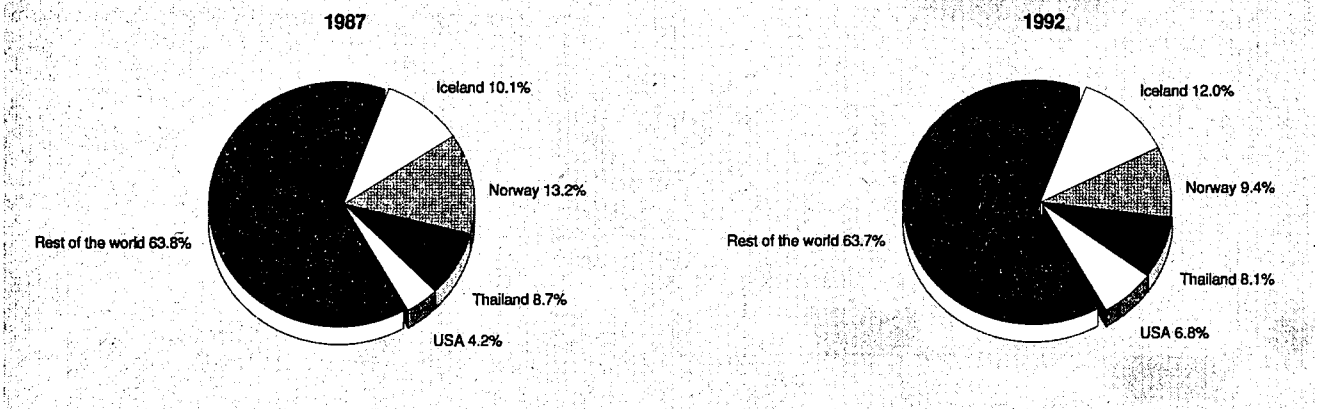
Supply and competition

A growing number of developing countries is becoming capable to supply quality products at low prices, dragging the EC industry into a restructuring phase. Since the EC industry cannot compete in terms of labour costs, a great amount of research has been devoted to alternative products of high quality standards, matching EC customers preferences. Further, mergers and takeovers have been aiming towards economies of scale in production and distribution. As a result, whilst the EC industry was characterised by a large number of independent small-scale units in 1983, the processing industry now includes an increasing component of large agro-food firms or holding companies. These factors helped boost productivity in the sector from 24 000 ECU per employee in 1990 to 25 000 in 1992.

The major competitive variable for the industry is the production cost. Over the last three years, the average price of cod and haddock, which are widely used in the preparation of fish-based ready meals, rose by as much as 40% due to a shortage in production (e.g. average price of imported cod rose from 1.06 ECU/kg in 1989 to 1.50 ECU/kg in 1992). This urged the industry to look for cheaper alternative species and the most powerful firms that had the financial and technical strengths to test and promote new products (e.g. Alaskan pollack or New Zealand hoki) were able to remain competitive on this market segment.

In an effort to secure supply sources, leading EC processing companies increasingly resorted to joint-venture in third countries where resources are presumed abundant. This is in par-

Figure 7: Processing of fishery products
Origin of EC imports



Source: Eurostat

Table 5: Processing of fishery products
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	546.8	579.3	677.9	688.3	726.8	653.9	663.5	701.5	771.2	721.1
Extra-EC imports	1 275	1 353	1 523	1 734	1 900	2 071	2 204	2 716	3 054	3 046
Trade balance	-728	-774	-845	-1 045	-1 173	-1 417	-1 541	-2 014	-2 283	-2 325
Ratio exports/imports	0.43	0.43	0.45	0.40	0.38	0.32	0.30	0.26	0.25	0.24
Terms of trade index	96.6	97.9	100.0	100.2	102.8	102.0	100.9	105.2	101.4	101.7
Intra-EC trade	850	915	1 103	1 291	1 447	1 523	1 710	2 006	2 215	2 084
Share of total imports (%)	40.0	40.3	42.0	42.7	43.2	42.4	43.7	42.5	42.0	40.6

Source: DEBA

ticular the case for Pescanova S.A. (E) in South-America and Africa, Pêche et Froid (F) and Compagnie Saupiquet (F) in West Africa and the Indian Ocean.

Production process

Production processes of fisheries products are now characterised by a certain degree of automation. Although research still focuses on the definition of new processing machines to save manpower, a great amount of work is being devoted to extending the shelf-life and quality of the end-products.

The Individual Quick Freezing (IQF) process is now an established preservation technique which allow the processor to supply the customer with frozen seafood in small, ready-to-cook quantities instead of solid blocks which had to be cut or thawed prior to packaging or use. The benefits of IQF have led many companies to invest in this freezing method, despite the high initial costs and the need for skilled staff. Another broad principle to extend shelf-life by up to three weeks without freezing is to apply temperature treatment after packing the raw material. This is done by using both vacuum packs and microwave pasteurisation. This technique is more economical as it entails energy savings with shorter time required for temperature treatment. Many processing plants throughout the EC are already using this means of conservation. The products preserved in this way are also much more convenient for consumers to microwave than frozen meals.

Intense product development has been taking place in the packaging industry. Notably, plastics have been developed with special properties such as thermal resistance, reducing the use of the traditional aluminium containers.

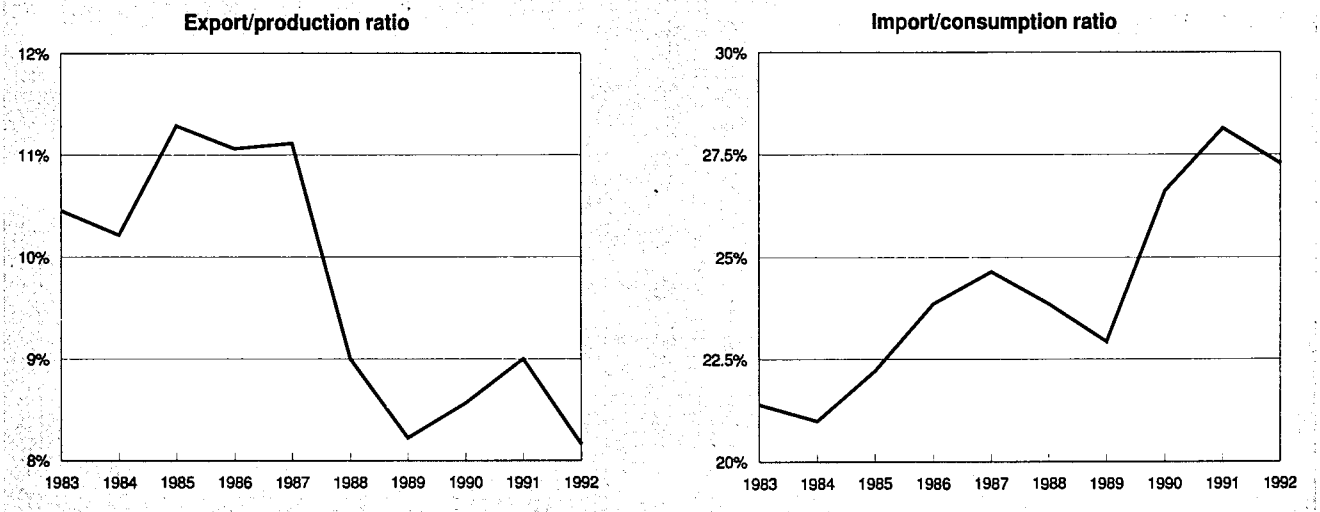
INDUSTRY STRUCTURE

Companies

The number of processing firms amounted to 1 860 in 1983, reaching a peak of 2 630 in 1988, before steadily decreasing to reach the 1991 number. A study carried out by Cofrepêche within a EC contract indicated that there were about 2 300 companies active in the fish processing sector in 1991. More than 55% of them are concentrated in Italy, France, and Spain where the number of small-scale units remains high. Another group of countries including the United Kingdom, Denmark and Germany hosts 29% of the total number of EC processing companies. The number of employees decreased by 11% over the 1983-88 period, increased by 9.8% between 1988 and 1989 and steadily decreased after to reach the 1992 figure of 82 900. Although no precise figures are available on the size of the firms, the average number of employees per firm is likely to have decreased from 50 in 1983 to 38 in 1991.

The largest EC processing company is Pescanova S.A. This company specialised in the processing and marketing of frozen seafood products turned over 399 million ECU in 1991. It is a vertically integrated company operating some 140 freezer

Figure 8: Processing of fishery products
Trade Intensities



Source: DEBA

Table 6: Processing of fishery products
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	18.7	19.9	20.1	21.3	22.5	23.8	24.3	24.0	24.2	25.3
Productivity index	93.0	98.9	100.0	106.2	111.9	118.6	121.2	119.4	120.3	126.0
Unit labour costs index (3)	86.3	93.2	100.0	103.6	107.4	116.2	118.4	126.9	134.7	144.7
Total unit costs index (4)	83.8	93.1	100.0	109.5	117.8	128.5	129.3	140.8	145.1	151.2

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

fishing vessels worldwide through participations in 50 companies located in Spain, South Africa, Namibia and South America. It also owns processing plants, a distribution network, and is involved in aquaculture. Most other firms are specialised in the manufacturing of frozen processed fisheries products. Only Compagnie Saupiquet, Pêche et Froid and Trinity Alimentari Italia SpA (I) are fish canning companies.

Strategies

Motivated by the dramatic expansion of the EC market for processed seafood products, the two multinationals Nestlé and Unilever have moved via acquisitions to gather within their respective groups the most efficient fish processing enterprises. Besides these leading agro-food groups, some holdings like United Biscuits (UK), Hillsdown Holdings (UK), Albert Fisher (UK), RT Holding Artlal (B), IFM-Bongrain (F) have invested in the fish processing sector through takeovers of existing companies. Other broad strategic actions involve differentiation policies concentrating on preparation and packaging.

ENVIRONMENT

The main environmental issue relates to the depletion of raw material supplies from the excessive exploitation of fish stocks. The EC has financed numerous projects in this area paying attention to the proliferation of aquaculture. The other major issue relating to the fish processing industry is connected with occasional death of dolphins caught in tuna fishing operations. As a result, the USA declared an embargo on raw tuna in 1990. This embargo concerned primarily South-American countries (particularly Mexico, Venezuela) but eventually led to a boycott of tuna cans manufactured in France, Italy and Spain as these countries were buying raw material from South America. On December 31, 1991 the EC through the ratification of a Protection of Wildlife Agreement has classified dolphins as a highly protected species. The embargo was lifted in 1992 for France when the French canning industry undertook to buy dolphin-safe tuna. Spanish and Italian cans remain embargoed.

REGULATIONS

The two key regulations for the fisheries product processing sector are:

Council Directive N° 91/493/CEE of 22 July 1991 laying down the health conditions for the placing on the market of fishery products, completed by Council Directive 92/48/CEE of 16 June 1992 on the health conditions onboard certain fishing vessels. This key regulation harmonises practices within the EC and requires the hygiene standards of all establishments where fishery products are prepared, processed, chilled, frozen, packaged or stored to be approved by a competent authority. This directive also applies to processing units of third countries exporting products to the EC to guarantee the safety of imported products at levels matching those of EC products.

Council Regulation (CEE) N° 3759/92 of 17 December 1992 on the common organisation of the market in fishery and aquaculture products. This regulation focuses on marketing standards, producer's organisations, and prices of the products with special reference to the EC canning industry.

OUTLOOK

The EC processing industry is anticipated to suffer somewhat from the recession in which the EC has stepped into over the last two years. However, the check in apparent consumption

Table 7: Processing of fishery products
The ten largest European companies, 1991

(million ECU)	Country	Turnover	Pre-tax profit	Employees
Pescanova	E	399	24.0	2 787
Nordsee Deutsche Hochsee Fischerei GmbH	D	244	N/A	1 100
Compagnie Saupiquet	F	231	6.1	1 885
Frio Condal	E	221	2.7	850
Pêche et Froid	F	217	N/A	1 800
Freiremar	E	214	3.5	900
Trinity Alimentari Italia	I	194	9.6	895
Frudesa	E	154	N/A	1 300
Nordstern Lebensmittel	D	146	N/A	713
Poul Agnar Fiskeindustri	DK	135	-1.1	544

Source: Cofrepêche

Table 8: Processing of fishery products
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.1	3.5
Production	0.8	1.5
Extra-EC exports	0.5	1.3

Source: Cofrepêche

and production is not expected to be dramatic neither prolonged. Globally, fish consumption is expected to further increase over the 1993-97 period and the industry should follow accordingly. Imports are anticipated to continue increasing as EC waters will continue to deplete, propelling the industry to purchase raw materials in third countries. As exports will not show significant progress due to the structural deficit of the EC in seafood products, the deficit of the trade balance will widen.

Written by: Cofrepêche
The industry is represented at the EC level by: Association des Industries du Poisson de la CEE (AIPCEE). Address: Avenue de Cortenbergh 172/6, B-1040 Brussels; tel: (32 2) 735 8170; fax: (32 2) 736 8175.

Deep-frozen products
NACE 412.21, 414.1, 415.1

Demand for deep-frozen products is has been expanding rapidly for a number of years. The growth of the market is connected with the development of an efficient distribution structure. This is one of the reasons why consumption is highest in the countries of Northern Europe.
The growth in demand and good profitability make this field of business highly attractive. The market is dominated by a small number of firms but niche markets allow local producers to co-exist alongside the multinationals. In certain market segments, saturation is leading to higher degrees of concentration via mergers and acquisitions.

INDUSTRY PROFILE

Description of the sector

The sector comprises a large number of food products processed by deep-freezing technology to preserve their organoleptic and nutritional characteristics. In the food industry, deep-freezing technology, which includes not only the industrial process but also the cold chain (storage, transport and domestic conservation) is undoubtedly the most important technological innovation since pasteurisation and sterilisation. The main NACE headings included in the sector are deep-frozen meat (412.21), deep-frozen vegetables (414.1) and deep-frozen fish and derivatives (415.1)

Recent trends

During the past five years production and apparent consumption in real terms can be estimated to have increased at an annual average rate of 6% and employment at a rate of over 3%. In 1992, growth was slower than in the preceding years, especially in the countries with lower per capita consumption. The recession has had an adverse effect in the countries where deep-frozen products have been most recently introduced and are consumed less regularly.

Within the EC consumption patterns can be separated into two distinct groups. In the Mediterranean area, where deep-frozen products are in the initial stage of development and in Northern Europe where demand might have exhausted most of its growth potential. In the latter group, Denmark, the UK and Sweden have a per capita consumption that averages at 35 kg compared to only 6 kg in most Mediterranean countries with the exception of Spain where consumption has more than tripled over the second part of the 1980s.

The most attractive growth rates are recorded in the more innovative, convenience-oriented segments: in particular, ready-to-serve meals have increased over the past ten years at a rate of over 10%. Meat has experienced the fastest growth, followed by potato by-products and vegetables.

Foreign trade

Trade is mainly in deep-frozen raw materials. The Mediterranean countries, for instance, import unpackaged deep-frozen fish from Northern Europe and package the fish in local production plants. The EC also imports deep-frozen concentrated citrus fruit juices from South America and the United States for use in the preparation of fruit juices and soft drinks. Significant import flows also come from Scandinavian countries (fish) and Eastern Europe.

MARKET FORCES

Demand

The chief factor responsible for the success of deep-frozen products is the possibility of storing at home products with the same nutritional characteristics and flavour as the corresponding fresh product. Apart from replacing other preservation technologies, deep-frozen products are actually taking market shares from fresh products.

In countries where the consumer is fully convinced that the product is good, per capita consumption is high. In the countries of the Mediterranean area, which have the lowest per capita consumption, deep-frozen products are used for their great convenience. They are only consumed occasionally, and consumption is in some cases limited by the small number of homes with freezers.

The level of consumption of the various types of deep-frozen products is connected with the specific eating habits of each country. Consumers prefer products which are consumed on a large scale in the fresh or processed state. In Italy for example, the most important segment is that of vegetables, whereas fish products come first in Spain, potatoes in Belgium and meat in the Netherlands.

The use of deep-frozen products in the restaurant trade has a considerable effect on the overall level of consumption. In the Community countries, with per capita consumption of between 8 and 44.8 kg, the restaurant trade accounts for a proportion of demand ranging from 22% in Great Britain to

Table 1: Deep-frozen products
Volume of consumption

(thousand tonnes)	1987	1988	1989	1990	1991	1992
EC	4 991	5 058	5 409	5 635	6 033	7 268
Belgique/België, Luxembourg	70	82	87	89	94	91
Danmark	185	198	208	218	220	232
BR Deutschland	1 256	1 287	1 364	1 405	1 593	1 854
France	985	1 082	1 230	1 350	1 450	1 520
Hellas	56	59	61	63	60	60
España	548	453	511	549	576	617
Ireland	77	80	82	84	86	88
Italia	320	339	356	380	414	450
Nederland	208	214	224	234	255	258
Portugal	56	59	61	63	65	67
United Kingdom	1 230	1 205	1 225	1 200	1 220	2 031

Source: Consumer Europe, IIAS for Italy

Table 2: Deep-frozen products
Consumption by main products

(thousand tonnes)	1987	1988	1989	1990	1991	1992
Vegetables	1 305	1 303	1 378	1 394	1 451	1 522
Potato products	926	1 010	1 076	1 114	1 164	1 194
Fish	564	592	645	685	702	726
Meat	669	662	677	684	710	731
Bakery products	343	373	396	436	460	479
Ready meals	431	484	546	604	658	723
Poultry	633	598	595	584	620	651
Fruit & fruit juices	31	35	36	38	39	41

Source: Consumer Europe

Table 3: Deep-frozen products
Market volume, 1992

(% in volume)	Vegetables	Potato products	Fish	Meat	Bakery	Ready meals	Poultry	Fruit & fruit juices	Total
EC	25.1	19.7	12.0	12.0	7.8	11.9	10.8	0.7	100
Belgique/België	28.0	37.9	10.3	9.3	4.7	5.1	4.7	0.0	100
Danmark	29.2	5.8	5.8	21.2	2.7	19.6	14.9	0.7	100
BR Deutschland	18.3	21.0	7.8	6.1	5.3	17.5	22.3	1.6	100
France	25.0	22.5	10.1	8.6	16.0	16.1	1.0	0.7	100
Hellas	28.5	38.7	21.9	1.5	5.8	2.2	1.5	0.0	100
España	30.8	11.9	33.1	9.9	8.2	4.7	1.4	0.0	100
Ireland	20.2	12.8	16.0	21.3	11.7	11.7	6.4	0.0	100
Italia	46.4	9.9	20.4	2.8	10.2	7.4	2.8	0.1	100
Luxembourg	40.0	20.0	20.0	20.0	0.0	0.0	0.0	0.0	100
Nederland	16.5	29.5	5.3	32.3	3.5	6.0	6.7	0.2	100
Portugal	25.4	5.1	16.9	5.1	39.0	5.1	3.4	0.0	100
United Kingdom	24.6	17.5	10.6	20.9	6.7	9.1	10.2	0.2	100

Source: Consumer Europe

Table 4: Deep-frozen products
Per capita consumption of frozen food products for selected EC countries (1992) and USA, (1991)

(kg)	B	DK	F	D	I	NL	E	UK	USA
Vegetables	1.9	6.6	5.6	4.0	4.1	3.0	4.7	7.3	17.0(1)
Potato products	4.4	4.0	5.9	4.2	1.2	5.5	1.8	6.1	0.0
Fish	1.2	5.1	3.3	1.8	1.2	0.8	8.3	3.2	4.1
Bakery	0.0	7.1	6.5	1.8	0.8	0.0	0.4	4.9	0.0
Fruit and juices	0.0	0.4	0.1	0.3	0.0	0.0	0.0	0.0	7.9
Ready meals	1.2	8.2	2.2	3.7	0.0	0.0	0.0	2.5	12.5
Poultry	0.1	9.3	3.6	5.8	0.2	0.0	0.0	5.9	8.2
Meat	0.3	4.2	2.5	1.4	0.2	4.7	0.3	5.6	2.5
Miscellaneous	0.0	0.0	1.7	0.2	0.2	2.7	0.2	0.0	0.0
Food service	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	14.1	44.9	31.4	23.2	7.9	16.7	15.7	35.5	52.2
Retail (%)	70.0	64.6	54.0	55.8	63.3	61.9	N/A	78.1	44.5
Catering (%)	30.0	35.4	46.0	44.2	36.7	38.1	N/A	21.9	55.5

(1) Includes potato products
Source: Swiss Frozen Food Institute

Table 5: Deep-frozen products
Number of producers by country,1991

Danmark	75
BR Deutschland	100
France	412
España	122
Italia	60
Nederland	30
United Kingdom	42

Source: Swiss Frozen Food Institute

44% in Germany. In the United States, where per capita consumption of deep-frozen products is 52.2 kg, the restaurant trade represents over 55% of the market and in Japan as much as 76%. The smaller importance of the catering channel in Europe is attributable to a more traditional type of restaurant cuisine. The expansion of fast food outlets should boost consumption of deep-frozen products in the EC, too.

Supply and competition

The number of plants in the leading EC countries has not changed during the last few years. The number of producers is highest in France (412) and lowest in the Netherlands (30). The high market fragmentation is attributed to low entry barriers for production while distribution and advertising are characterised by higher barriers.

The data on consumption and the concentration of supply suggest that there are considerable differences in plant capacity. In Germany, where consumption is highest, the number of plants is much lower than in France. The situation is even more marked in Great Britain.

Production process

Technological development is aimed at achieving high quality standards. The most difficult stages are upstream and downstream of the industrial process, because the system of legal provisions and supervision measures relating to production of raw materials and marketing of finished products creates very strong vertical integration. The main technological limit lies in the impossibility of deep-freezing large pieces, owing to the legal restriction fixing the maximum duration of the product-freezing process.

INDUSTRY STRUCTURE

Companies

About 800 producers of deep-frozen products are operating in the EC. There is a medium level of concentration, with the leader (Unilever-UK/NL) holding an 18% share of the market and the four leading companies combined accounting for 41%.

The degree of concentration is highest in the recently developed markets; the companies which shape the market are building up a strong leading position. The growth in consumption is tending to reduce the barriers to the entry of new competitors.

Three main strategic groups can be distinguished:

- multinational companies with wide product diversification; chief among these are Unilever and Nestlé (CH). The strategic aim is to control the market in order to maintain profitability;
- specialised multinationals: McCain (NL), the leader of the potato and derivatives section and the second-largest European company after Unilever, Grand Metropolitan (UK), Bonduelle (F) concentrating on vegetable products;
- national companies generally characterised by good product diversification. The most representative are Pescanova (E), the leader in Spain and Portugal; United Biscuits (UK), which holds about 12% of the British market; Ortiz-Mirko (F) and Danish Danisco (DK), with 11% shares in France and Denmark respectively. Another company in this category was Italgel belonging to the SME Group (I), with nearly 20% of the Italian market, but it was taken over by Nestlé in 1993.

OUTLOOK

The deep-frozen products industry is one of the few manufacturing sectors to maintain good growth rates. Average per capita consumption in the EC might in grow in the future to approach the higher level of US consumption figures. The current recession has had less adverse effects than in other food sectors.

The potential for further growth in commercial brands poses risks for the smaller producers while the further development of technologies for packaging fresh products in a controlled atmosphere poses risks for the sector as a whole. Opportunities present for the sector include the expansion of demand in the countries of Eastern Europe, more widespread ownership of microwave ovens and deep freezers, growth of modern distribution and expansion of fast food outlets.

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Table 6: Deep-frozen products
Concentration of supply for selected products

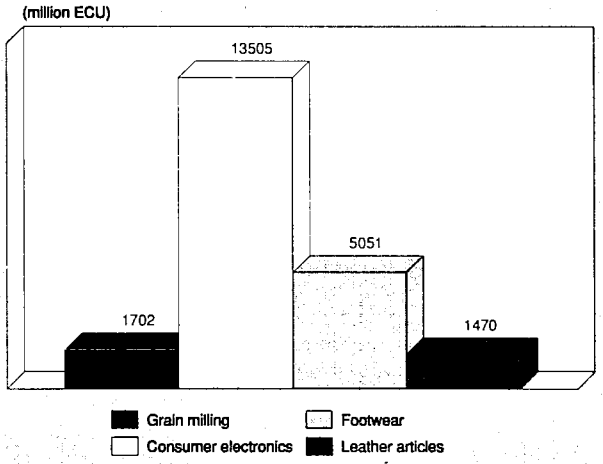
(% in volume)	Vegetables	Potato products	Fish	Bakery	Ready meals
Leading enterprise	23	38	25	19	22
First four enterprises	45	58	50	46	50

Source: Prometeia elaborations on "Consumer Europe" and "Food for Thought" data

Grain milling
NACE 416

The grain milling industry comprises of about 3 000 mills and provides the link between the agricultural sector and the processed finished products. Production of soft-wheat flours, hard-wheat semolinas and rye flours in the EC amounts to around 30 million tonnes. The grain milling sector has reached the peak of its growth. Demand for flours and flour-based products is on the whole stable. Changes within the sector are due chiefly to demand from the processing industry for flours.
Concentration of supply is going ahead in the sector with the closure of marginal units and take-overs of mills by the larger groups. Grain milling technology has reached a high level, especially as regards plant automation. Although technological change has improved product quality and added efficiency into the production process, capacity utilisation is still relatively low in some major producing countries.

Figure 1: Grain milling
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

The grain milling industry, includes the milling of grain into flour, bran making, seeds and grain milling husking. Produced flour is mainly intended for the baking industry although its use can vary significantly across Member States.

Recent trends

Apparent consumption of the grain milling industry's products is stable. From 1983 to 1992 it increased at current prices at an average annual rate of 1.4%, representing a real growth of 0.5%, which is indicative of demand saturation. Production in the EC increased particularly during the period 1988-1992 after having remained virtually unchanged for five years. The modest gains in production were mainly supported by moderate increases in extra-EC exports and a sharp fall in imports (by 25% per year at current prices). These trends became dominant from 1989 onwards, practically minimising the share of extra-EC imports in consumption. With regard to employment, the closure of many small units and technical modernisation led to a gradual fall in the number of persons employed: this is at present 36 000, which is 25% less than in 1983.

Foreign trade

While the share of extra-EC imports in apparent consumption fell from 6% to less than 1% in 1992, exports have continued to rise. The balance of trade has been improving over the last ten years, and shot up substantially from 1989 onwards, with extra-EC exports rising to twenty times the value of extra-EC imports.

Intra-Community trade declined from 1983 to 1992 at an average annual rate of 2.4% at current prices. Intra-EC trade accounts for 5% of production and 90% of total imports. The grain milling industries in the Member States meet a large proportion of domestic requirements for flours and other cereals derivatives, while the EC as a whole is practically self-sufficient.

The destinations of extra-EC exports show that only a small proportion is destined towards industrialised countries. In particular, the share of the United States, Japan and the EFTA countries is less than 2% and has fallen particularly since 1987. Imports are now almost insignificant; the largest decrease, however, has been in imports from the United States, in terms of both quantity and percentage. Middle Eastern countries - Algeria, Libya and Syria - represent the core export market accounting for almost 35% of the total. Eastern European economies are emerging export destinations with the republics of the ex-USSR alrcady accounting for 12% of total exports.

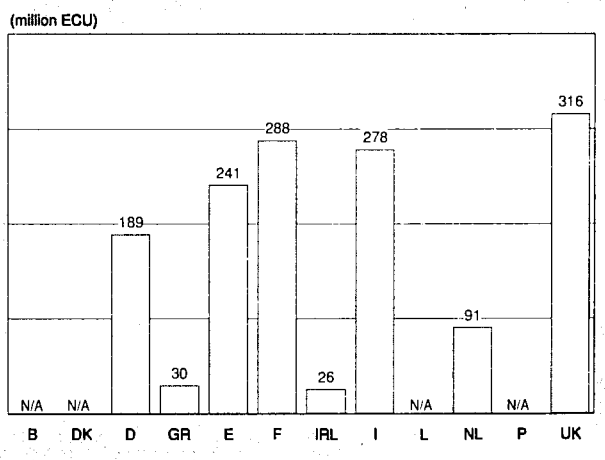
MARKET FORCES

Demand

Derivatives of cereal crops are largely basic food products. The increase in per capita incomes and in population in some developing countries has led in recent decades to a growth in demand for cereals and their derivatives which has made these countries major net importers, owing to the widening gap between consumption and production.

The finished product of the grain milling industry is chiefly a raw material for various food subsectors (manufacture of pasta, bread making, bakery products, packaged flours etc.). While total demand for flour-based products is more or less stable within the EC, substitution is taking place depending on the predominant food patterns and lifestyles. For example, the volume of the bread market in the EC has decreased by

Figure 2: Grain milling
Value added by Member State, 1992



Source: DEBA

Table 1: Grain milling
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	9 396	9 845	9 749	9 680	9 765	9 840	10 352	10 235	10 890	10 693	9 560
Production	9 629	10 434	10 527	10 158	10 181	10 215	11 087	10 947	11 630	11 567	10 700
Extra-EC exports	824.2	1 164.1	1 325.0	813.6	640.9	660.8	797.8	764.0	790.2	919.8	1 170.0
Trade balance	232.8	589.4	778.7	477.4	415.5	374.6	735.5	711.8	739.7	874.0	1 100.0
Employment (thousands)	48.4	47.5	44.7	43.2	42.5	39.9	39.8	38.6	38.4	36.2	35.1

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 2: Grain milling
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	-0.3	1.5	0.5
Production	0.3	2.5	1.3
Extra-EC exports	1.5	5.2	3.1
Extra-EC imports	-11.0	-36.5	-23.4

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Grain milling
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	824.2	1 164.1	1 325.0	813.6	640.9	660.8	797.8	764.0	790.2	919.8
Extra-EC imports	591.4	574.7	546.3	336.2	225.4	286.2	62.3	52.2	50.4	45.9
Trade balance	232.8	589.4	778.7	477.4	415.5	374.6	735.5	711.8	739.7	874.0
Ratio exports/imports	1.4	2.0	2.4	2.4	2.8	2.3	12.8	14.6	15.7	20.0
Terms of trade index	84.9	86.7	100.0	95.3	88.2	72.9	88.9	95.4	80.6	83.7
Intra-EC trade	680.9	798.8	888.6	834.8	847.2	878.2	450.0	468.5	511.0	548.2
Share of total imports (%)	53.5	58.2	61.9	71.3	79.0	75.4	87.8	90.0	91.0	92.3

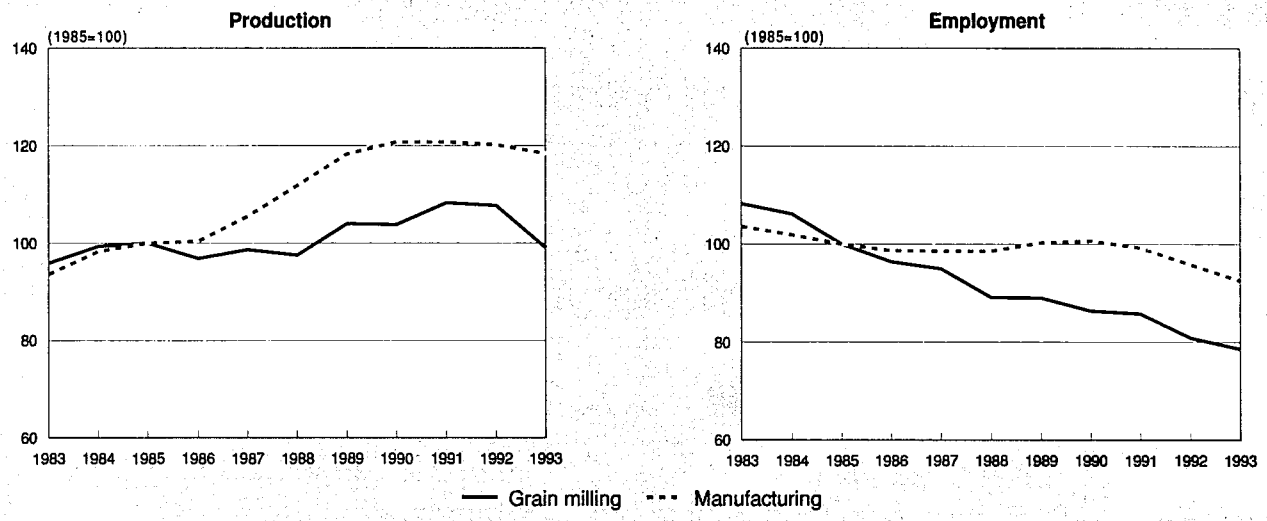
Source: DEBA

Table 4: Grain milling
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	28.7	29.0	32.9	33.7	35.8	38.1	41.1	44.9	44.8	47.0
Productivity index	87.4	88.3	100.0	102.5	108.8	116.1	125.0	136.8	136.2	143.0
Unit labour costs index (3)	87.7	94.0	100.0	106.0	110.0	119.1	127.1	137.5	147.2	162.6
Total unit costs index (4)	83.9	93.1	100.0	99.2	102.0	108.2	116.5	120.0	128.7	136.4

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Grain milling
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

2% during the last five years, whereas the share of the pasta products market has grown by 18% (a loss of 380 000 tonnes in the first case and an increase of 440 000 tonnes of finished products in the second).

With regard to the key final markets for the grain milling industry, the bread market is declining. The main countries in terms of per capita consumption are Germany (80 kg), Italy (68 kg) and France (62 kg). For pasta, Italy alone accounts for over 50% of the volume of the EC market, with per capita consumption of 27 kg, followed, a long way behind, by France (7 kg). There have, however, been large increases in consumption in all the EC countries except for marginal markets such as those of Portugal and Greece.

The biscuit market has also shown modest growth at Community level (+3% per annum in volume during the past five years), with Ireland ranking first in terms of per capita consumption with 14 kg, followed by the United Kingdom and Denmark (about 10 kg) and Italy (9 kg). The largest increase in recent years was, however, in Germany. On the other hand, the retail market for flours has reached an advanced stage of maturity in the EC. (Source: Consumer Europe 1993).

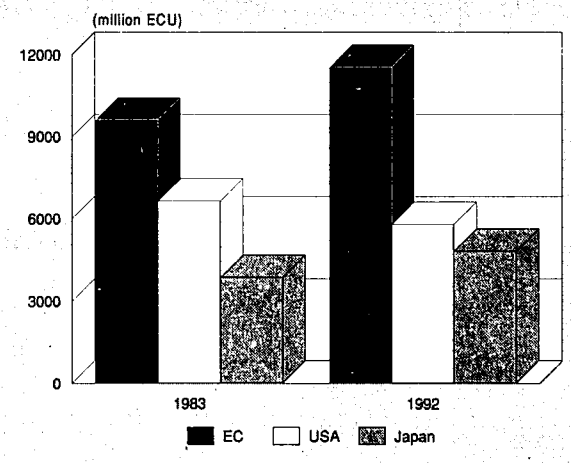
Supply and competition

International trade in cereals is characterised by large volumes, with exports monopolised by a few countries (the United States, Canada, Australia, Argentina, the EC) and by trade concentrated in the hands of a few multinationals. The volume of international trade is considerably smaller for the products of the grain milling industry. The EC has, however, a solid competitive position with a 60% share in international flour trade. The member countries generally have a high degree of self sufficiency, varying with the greater or lesser degree of fragmentation of supply.

Production process

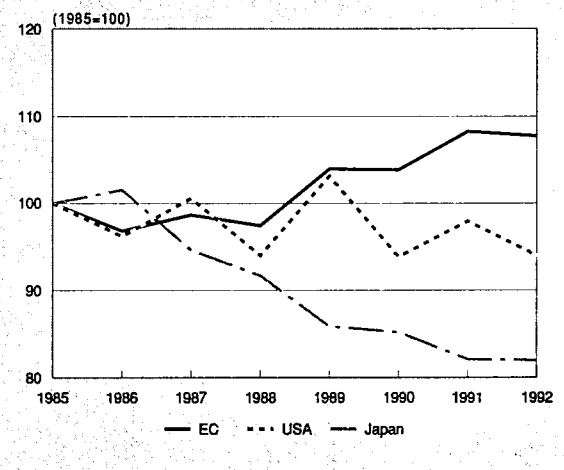
The grain milling industry has reached a degree of technological maturity with regard to plant. Innovations relate mainly

Figure 4: Grain milling
International comparison of production in current prices



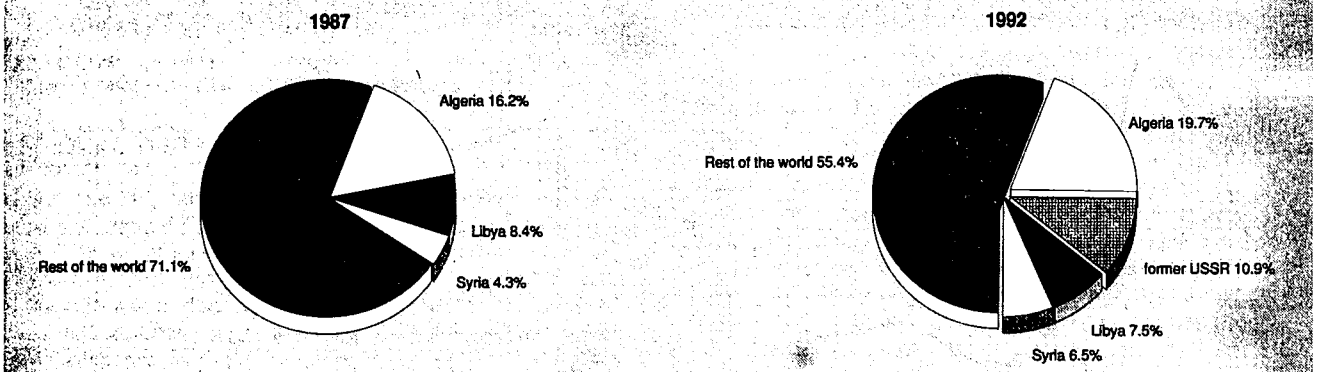
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Grain milling
International comparison of production in constant prices



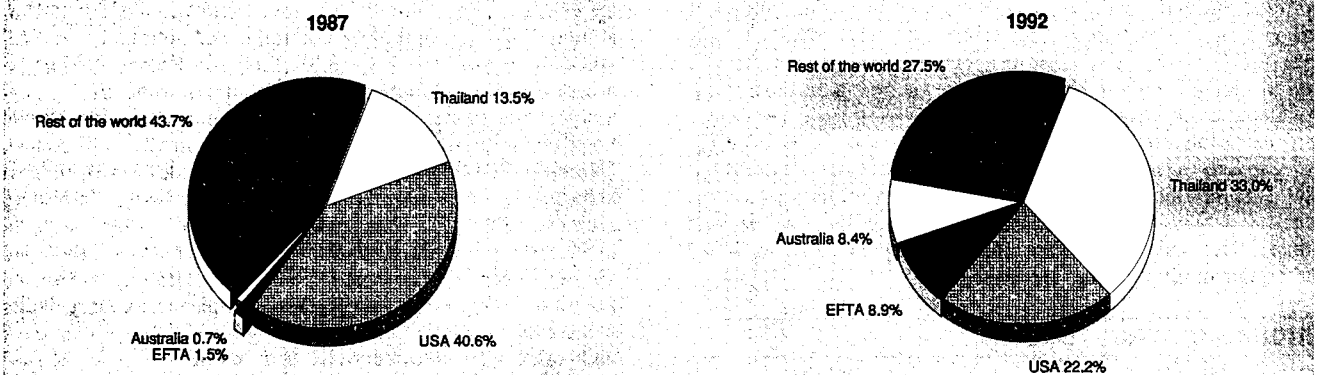
Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Grain milling
Destination of EC exports



Source: Eurostat

Figure 7: Grain milling
Origin of EC imports



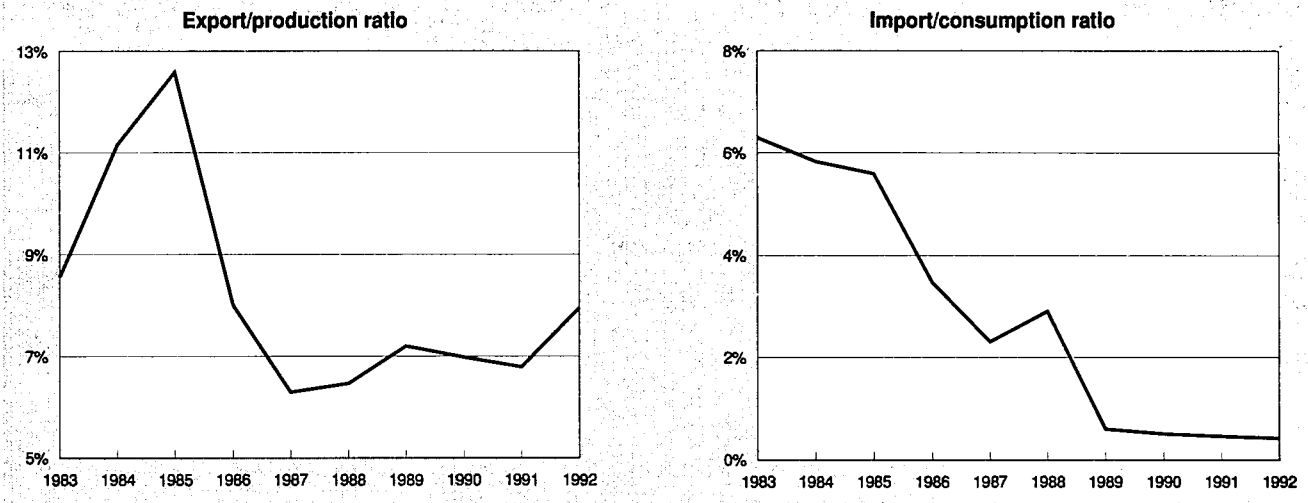
Source: Eurostat

Table 5: Flour
Destination of flour consumed in home country, 1991

(%)	Bakeries	Biscuits and rusk manufacturers, confectioners	Household flour	Other uses
Belgique/België	85.5	9.0	1.5	4.0
Danmark (1)	83.0	-	17.0	0.0
BR Deutschland	73.0	15.0	7.0	5.0
España	79.6	16.1	1.6	2.7
France	66.9	16.7	5.6	10.8
Italia (2)	77.0	23.0	-	-
Luxembourg	90.0	0.0	10.0	0.0
Nederland	53.9	14.0	0.3	31.8
United Kingdom	64.1	15.7	6.8	14.4

(1) Bakeries include biscuits and rusk manufacturers and confectioneries
(2) Biscuits and rusk manufacturers and confectioners include household flour and other uses
Source: National Milling Associations

Figure 8: Grain milling
Trade intensities



Source: DEBA

to improving flours (specific characteristics and stable quality standard for final users, processing industries and, to a smaller extent, consumers). With regard to the production process, productivity has increased steadily (added value per employee at 1992 prices has increased, overall, by 64% over the last ten years). Total production capacity has also increased, but there are still wide differences in the degree of utilisation of plant capacity, with substantial excess capacity in some cases. In the production of soft grain flour, for instance, utilisation of capacity ranges from 70-80% in France and Germany to 60% in Italy and only 35% in Spain. For semolina, Italy, by far the largest producer, has a degree of utilisation of less than 70%, while the figure for Germany is close to 90%, although production has declined.

INDUSTRY STRUCTURE

Companies

During the past twenty years the Community grain milling sector has become much more concentrated with the number of mills falling from 11 000 to the present 3400. There are still many small units, many of which are not included in the official statistics, especially in the major producing countries such as Italy and France. Thus, taking only mills covered by censuses, the United Kingdom, with around 80, has an annual output per unit of 48 000 tonnes of flour and semolina, while the figures for Italy (820 mills) and France (890 mills) are lower at 8400 tonnes and 6000 tonnes respectively. Germany (8500 tonnes) and Spain (5800 tonnes) are at the same level of production per unit, while Belgium (21 000 tonnes), Denmark (20 000 tonnes) and the Netherlands (26 000 tonnes) achieve higher average production figures. The grain milling sector in the EC is extremely fragmented partly owing to differences between national markets. Furthermore, there are various types of enterprises: companies forming part of the processing industry (making sweets, pastas, feeding stuffs etc.), export-oriented companies engaged in the cereals trade and mills, whose sole activity is grinding.

Strategies

The grain milling industry is characterised by a low degree of flexibility and diversification of production. On the strategic plane an interesting aspect in recent years has been the ten-

Table 6: Flour
Number of mills and total flour production, 1991

	Number of mills	Total flour production (2) (thousand tonnes)	Average production per mill (2) (thousand tonnes)
EC (1)	3 046	25 217.1	8.3
Belgique/België	55	1 162.3	21.1
Danmark	16	321.1	20.1
BR Deutschland	648	5 598.4	8.6
España	456	2 275.4	5.0
France	885	5 148.9	5.8
Italia	818	4 880.0	6.0
Luxembourg	4	39.9	10.0
Nederland	48	1 267.0	26.4
Portugal	37	660.0	17.8
United Kingdom	79	3 864.1	48.9

(1) Excluding Greece and Ireland
(2) Excluding durum wheat for Belgium, Luxembourg and the Nederlands, rye flour for the UK and soft wheat semolina for Luxembourg, the UK and Portugal
Source: National Milling Associations

dency towards mergers between mills and some big food processing companies (for instance, the take-overs by Barilla in Italy), a trend which is largely due to the quality demanded of the raw material. A limit to such integration is, however, imposed by the fact that many processing industries, for instance the bakery products industry, need access to a wide range of flours with specific characteristics. The process of concentration is likely to continue in the future, especially owing to take-overs of mills by large groups.

REGIONAL DISTRIBUTION

Within the EC, the Italian grain milling industry, with an output of around 3.6 million tonnes in 1992, accounts for over 70% of production of hard wheat semolina, most of which is used in the pasta products industry. Five times as much soft wheat flour as hard wheat semolina is produced in the EC, and the geographical distribution of production is more balanced: five countries (Germany, Italy, France, and United Kingdom and Spain) have an 80% share. Germany is also the main producer of rye flour. Among the countries named, the United Kingdom had highest added value for the grain milling sector as a whole in 1992, followed by France and Italy.

ENVIRONMENT

From the environmental point of view, the main problem of the grain milling industry in the past was that of the water used for washing the cereals after mechanical cleaning. In most cases this system has been replaced by pneumatic cleaning, which reduces waste water to a negligible quantity.

REGULATIONS

Activity as regards rules and regulations is aimed particularly at closer harmonisation of Community laws on labelling, additives, contaminants, the use of other substances such as gluten in flours, etc. One example is the permitted maximum limits for pesticide residues in cereals, which are still governed by directive (EEC) 86/362, amendments to which are at present being drafted. There are also proposals for new directives relating to additives, for which the general principles were harmonised by Framework Directive (EEC) 89/107. For example, for flour-processing agents the EC Commission plans to draft a specific directive, in view of the problems concerning some of these substances which are still being examined by the Scientific Committee.

Regulations 2081/92 and 2082/92 are amongst the latest developments. The first concerns the protection of designations of origin and geographical indications relating to agri-food products; the latter deals with the possibility of obtaining Community certification of specific qualities for a number of products (including pasta products, biscuit-making products, pastry-making and bread-making products). The framework of Community rules concerning organic methods of production of agricultural products and products for human consumption has also been completed.

OUTLOOK

The grain milling sector does not at present offer any great opportunities for the development of demand within the EC. Consumption of flour and flour-based products is as a whole stable and any growth in some subsectors is generally at the expense of others. The changes are chiefly in quality and may relate, in particular, to the demand from the secondary flour-processing industry for flours with increasingly specific characteristics. There may be opportunities for expansion of exports provided that the destination area, at present highly concentrated in the Mediterranean basin, is widened to new markets. With regard to the structure of supply, there will probably be a further reduction in the number of production units and an increase in utilisation of production capacity, especially in an important country such as Italy. The key factors for success for companies in the grain milling sector will increasingly lie in rationalisation of production processes and procurement policies.

Risks for the sector include: the low profitability, higher increases in processing and labour costs than in flour prices, falling demand for flours for bread making and growing international competition. Opportunities include: the opening up of new markets for both flours and processed products, rationalisation and diversification of production.

Table 7: Grain milling
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-0.5	0.5
Production	1.0	1.3
Extra-EC exports	1.5	3.0

Source: Prometeia

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Industrial baking
NACE 419

The factors which have favoured growth of this sector are the emergence of new patterns of consumption coupled with supply concentration. The sector has benefited from less fixed mealtimes with greater emphasis on breakfast and health foods. Market fragmentation has been accentuated as marketing-oriented firms capture a growing share of the market, through the introduction of new products and the revival in demand for traditional products. In addition, investment in advertising has contributed to a partial standardisation of demand. The future should see further erosion of individual bakers' production by the industrial groups.

INDUSTRY PROFILE

Description of the sector

NACE group 419 comprises five branches:

- 419.1 and 419.2: Industrial bakeries and other establishments making bread and confectionery
- 419.3: cakes and flour confectionery production
- 419.4: rusk making
- 419.5: biscuit factories

Small firms tend to operate in the making of bread and confectioneries while the rest of the sector is more geared towards larger scale production.

Recent trends

Over the last ten years apparent consumption and production have grown at the same rate of 3.3% at constant prices. Employment has also risen, but at the slower annual rate of 2%. Over the first half of the 1980s the sector expanded slowly and imports rose sharply. Since then a recovery in production has started to reverse the trend with extra-EC exports growing stronger. The latter developed are expected to persist in the future.

Foreign trade

Extra-EC imports account for less than 1% of apparent consumption and have remained at that level over the last ten years. Despite strong growth they account for barely a tenth of the value of internal Community trade. Although most extra-EC imports come from non-EC European countries their share has declined over the last five years mainly to the benefit of US products. Extra-EC exports account for 3% of production and this figure has remained virtually unchanged over the last ten years. The two main destinations are the EFTA countries and the United States.

MARKET FORCES

Demand

The demand for bakery products has risen steadily, partly due to the different nutritional values of the industry's products. Rising demand is explained mostly from higher appreciation for pleasure-eating (traditional confectionery and biscuits) and growing health consciousness for some traditional products such as individual-bakery bread as well as new products.

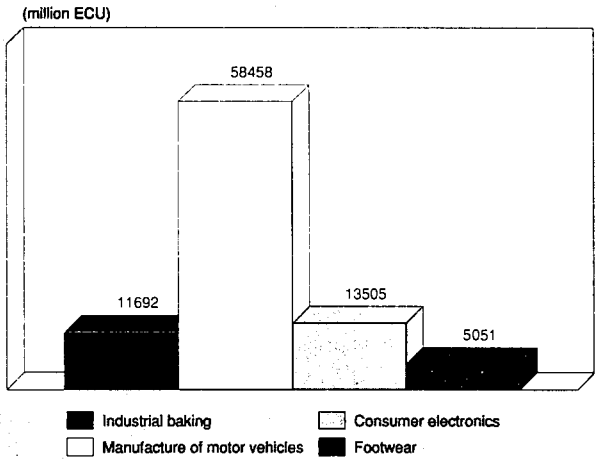
New products are emerging fast and centre around whole wheat and healthy ingredients, confectioneries and bread substitutes. Industrial bread companies are seeking mainly to provide a complete service at non-specialised sales points without altering traditional consumer patterns although the revival in demand for traditional products is fostering attempts to create market niches by offering bread-like substitutes.

A special feature of the market is the regionalisation of consumption, with marked differences in both quantity and quality. Per capita consumption of bread is a little over 10 kg in Portugal, around 30 kg in Denmark, Greece and the United Kingdom, close to 50 kg in Belgium, Luxembourg and Spain and reaches or exceeds 60 kg in France, Italy, Germany, the Netherlands and Ireland (Source: Consumer Europe 1993). There are also marked differences in the amount of biscuits and confectionery eaten but, with one or two exceptions, per capita consumption is highest in the Nordic countries.

Supply and competition

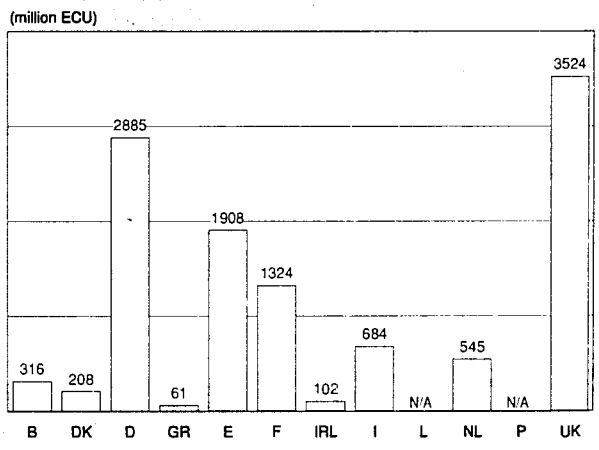
Supply comes from three strategic groups; individual bakers, small and medium-sized firms operating at regional level and marketing-oriented national and multinational companies. Bakers in the first group dominate the market for bread and confectionery and are capable of meeting consumer specific requirements at local level. Their position is threatened by the entry into the market of marketing-oriented companies

Figure 1: Industrial baking
Value added in comparison with other industries, 1992



Source: DEBA

Figure 2: Industrial baking
Value added by Member State, 1992



Source: DEBA

Table 1: Industrial baking
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	14 328	15 809	16 581	16 929	17 811	19 695	21 923	23 187	25 860	26 869	27 500
Production	14 672	16 209	17 043	17 343	18 174	20 041	22 351	23 651	26 412	27 437	28 100
Extra-EC exports	415.3	482.3	564.2	542.8	510.7	506.1	611.7	651.6	750.7	779.8	800.0
Trade balance	344.2	399.6	462.7	413.4	362.9	345.9	427.7	463.6	551.8	567.9	560.0
Employment (thousands)	410.3	411.3	402.6	405.0	417.2	429.7	455.1	460.4	468.0	456.2	450.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 2: Industrial baking
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	2.6	4.1	3.3
Production	2.6	4.2	3.3
Extra-EC exports	3.0	9.0	5.6
Extra-EC imports	12.8	6.2	9.8

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Industrial baking
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	415.3	482.3	564.2	542.8	510.7	506.1	611.7	651.6	750.7	779.8
Extra-EC imports	71.1	82.7	101.5	129.4	147.8	160.2	184.0	188.0	198.9	211.9
Trade balance	344.2	399.6	462.7	413.4	362.9	345.9	427.7	463.6	551.8	567.9
Ratio exports/imports	5.8	5.8	5.6	4.2	3.5	3.2	3.3	3.5	3.8	3.7
Terms of trade index	110.6	104.5	100.0	93.6	94.6	94.0	95.1	98.2	97.2	98.9
Intra-EC trade	739	880	1 002	1 128	1 223	1 361	1 491	1 681	1 977	2 241
Share of total imports (%)	91.2	91.4	90.8	89.7	89.2	89.5	89.0	89.9	90.9	91.4

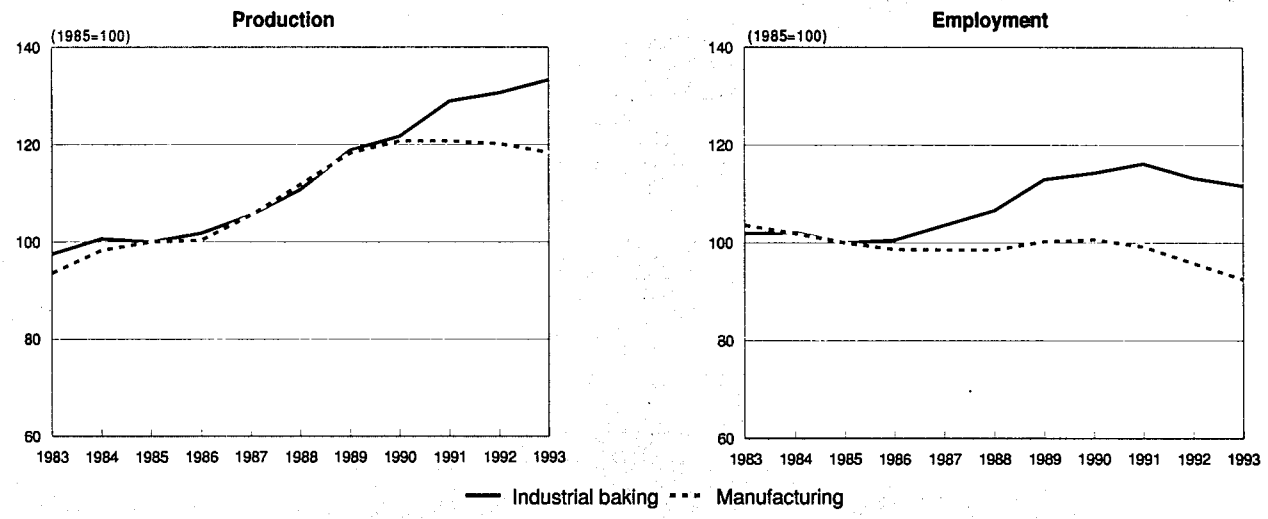
Source: DEBA

Table 4: Industrial baking
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	20.2	20.1	20.3	21.0	21.5	22.1	22.3	23.1	24.2	25.6
Productivity index	99.5	98.7	100.0	103.2	106.0	108.7	109.6	113.6	118.9	126.1
Unit labour costs index (3)	88.5	94.3	100.0	101.3	103.7	110.1	117.5	125.7	135.0	144.9
Total unit costs index (4)	84.5	93.9	100.0	100.4	101.3	107.9	114.2	119.8	129.7	139.8

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Industrial baking
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

and the development of "in-store bakeries" in supermarkets. Small and medium-sized firms are of considerable importance in all sections of the industry. Their survival depends on specialisation, local reputation and the continued existence of fragmented distribution structures.

Large companies benefit from the standardisation of consumption in some areas (e.g. biscuits), marketing campaigns and the diversification of production. Large companies are attempting to dominate various market segments via acquisitions of smaller firms and by expanding their own product range. The first strategy has been more appropriate for products with a short shelf life, like bread and fresh confectionery.

Production process

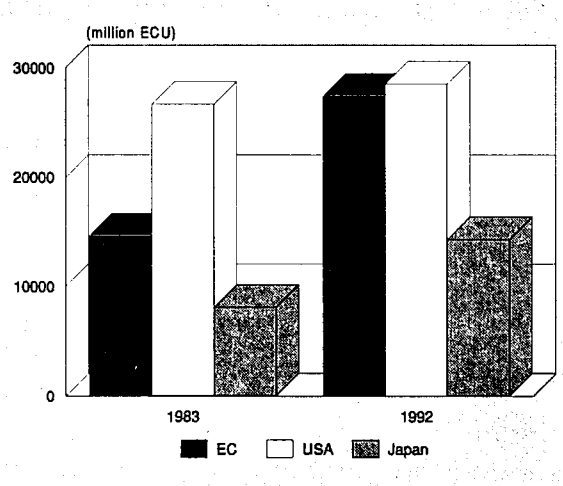
Production technology is finding fresh applications in identifying new areas particularly in the more industrially oriented section of the market. New substitutes for bread are in many cases similar as commodities and derive from traditional products such as crackers and breadsticks. The development and greater reliability of the cold chain has also stimulated the production of fresh and frozen confectionery at industrial level too. Individual producers bake more and more with closely controlled raw materials (enriched, semi-processed flours).

INDUSTRY STRUCTURE

Companies

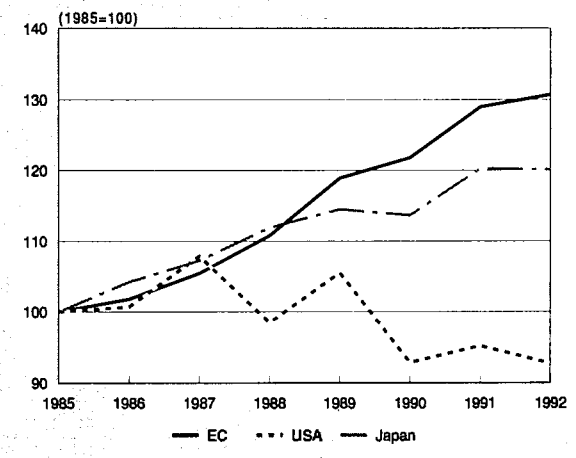
Supply is extremely fragmented, but large companies are gradually becoming stronger. However, it is only in Great Britain that they occupy a major position in the sector as a whole: Associated British Foods and Rank Hovis McDougall together hold half the market. Important companies are also found in other countries, but their main strength lies in industrial bread. The names are Barilla (I) in Italy, Pain Jacquet Sa (F) in both France and Germany, Anheuser (D) and Allied Lyons (UK) in Spain. In the market for bread substitutes, BSN (F) and Barilla together hold about 40% of the European

Figure 4: Industrial baking
International comparison of production in current prices



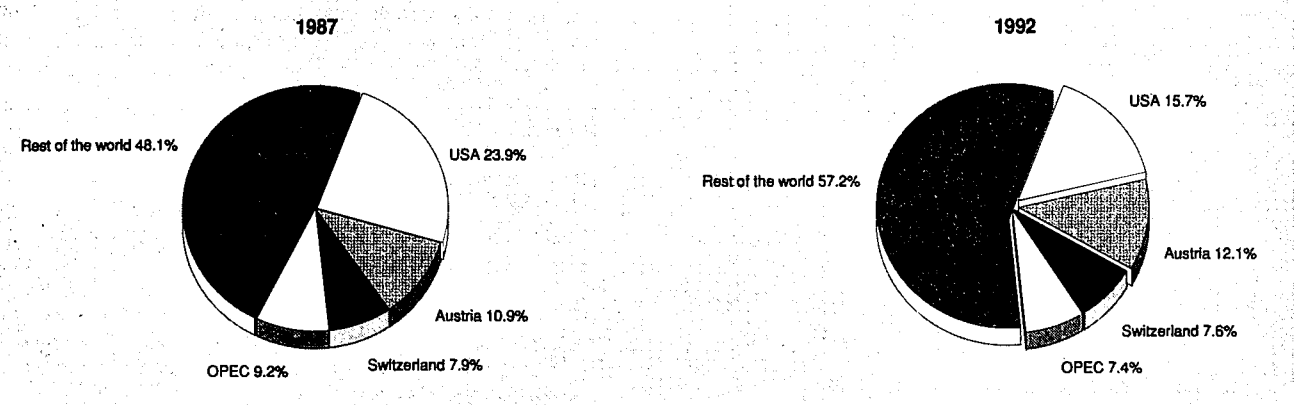
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Industrial baking
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Industrial baking
Destination of EC exports



Source: Eurostat

market while SME (I) has sold Pavesi to the Italian leader. Nestlé (CH) also operates in the market but has a smaller share.

In the case of biscuits, the size of the British market is reflected in the overall share of United Biscuits, the joint European leader. United Biscuits, BSN and Barilla together hold about 50% of the European market. The supply of industrial confectionery is less concentrated. The biggest companies are Barilla and Allied Lyons, which together hold around 20-25% of the market.

Strategies

The positions held by the major companies stem from the diversification of production and external growth, achieved by acquiring or allying with local firms.

The French group BSN, which is the leading European competitor in the case of biscuits, has favoured take-overs, the biggest of which have involved the Italian company Saiwa (sold by Nabisco) and the Irish firm W & R Jacob.

Barilla has invested heavily in advertising and has moved through acquisitions in the industrial bread sector - where it has become market leader- in industrial confectionery for catering (Unione Laboratori) and in the actual bakery sector, where it has bought its main Italian competitor Pavesi from the SME group.

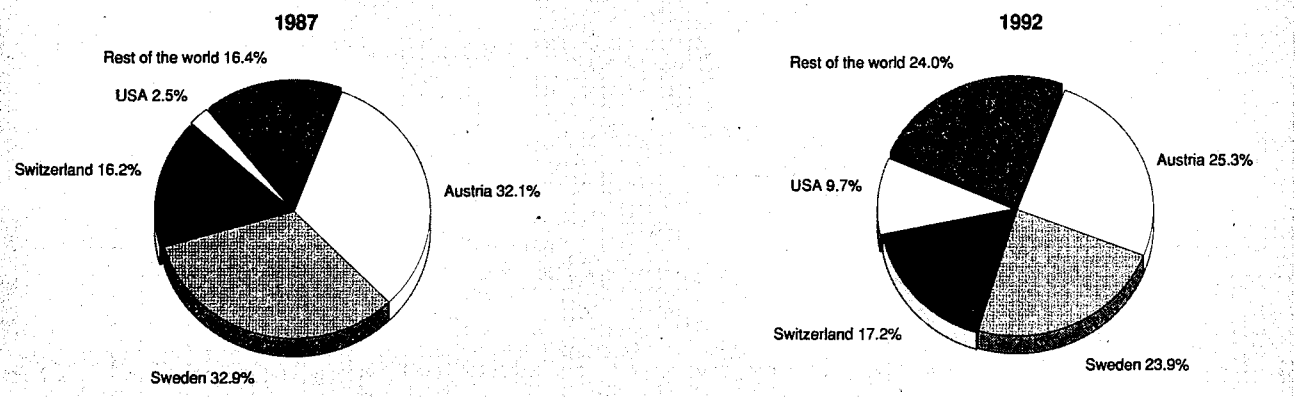
Allied Lyons uses both strategies; among the 50 or so joint ventures set up throughout the world the one with the Spanish firm Panrico stands out; the company has also bought Picard (F) in the bread substitutes sector.

United Biscuits has strengthened its position in Europe with purchases in Denmark (Oxford Biscuits), Hungary (84% of Gyori Keksz) and Finland (49% of Fazer Biscuits).

REGIONAL DISTRIBUTION

The location of bakeries is influenced by the difficulty of keeping individual bakery products (bread and confectionery), or industrial confectionery products in line with the marked differences in regional consumer preferences. In some cases, moreover, the cold distribution chain is unreliable with a consequent shortening of product shelf life.

Figure 7: Industrial baking
Origin of EC Imports



Source: Eurostat

Table 5: Industrial baking
Turnover and employment, 1992

	Turnover(1) (million ECU)	Employment(2)
Belgique/België	192.9	5 242
Danmark	92.8(3)	1 320
BR Deutschland(4)	4 996.6	92 887
France	1 408.1	1 800
Ireland	N/A	9 300
Nederland	1 663.0	40 600
United Kingdom	3 310.7	44 000

(1) Baking industry
(2) Employment in bread factories
(3) Only ryebread
(4) Enterprises with 20 or more employees
Source: AIBI

ENVIRONMENT

The major issue is the disposal of urban solid waste and companies are expected to encounter increasingly harsher regulations regarding the volume and physical composition of packaging material. Innovation in the area of packaging both for storage and marketing purposes is becoming a major challenge.

OUTLOOK

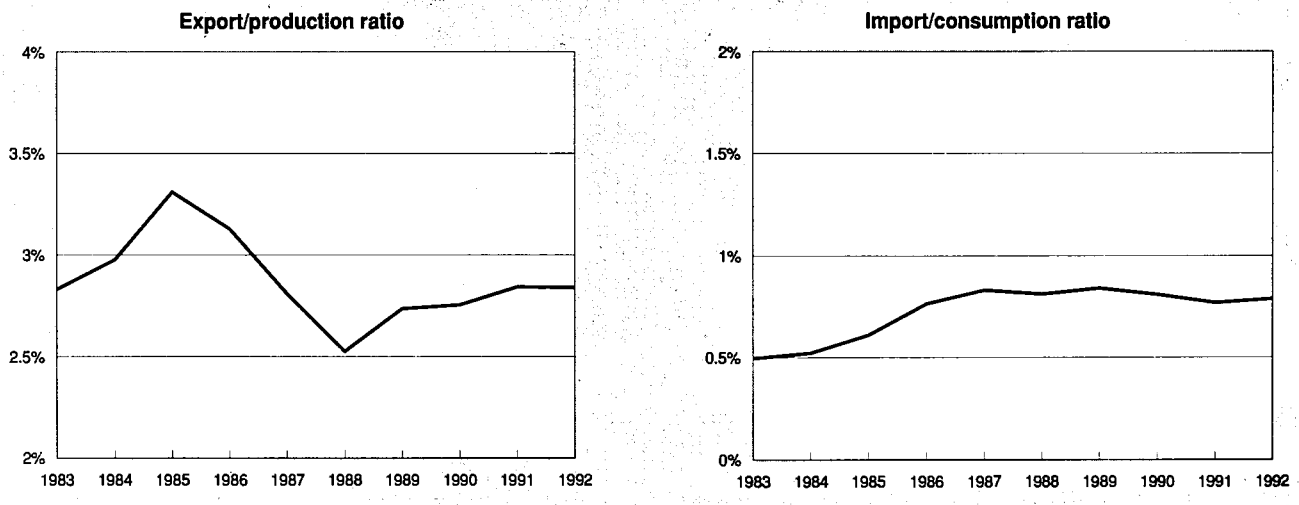
The trend towards the substitution of locally made bread for industrially produced bread is expected to persist. The single European market and technological innovation are important factors behind the shift to larger corporate scale. However, health consciousness, preferences for fresh products and diverse regional consumer patterns will sustain small scale production at artisan bakery level. Subsectors such as snacks, healthy whole wheat and dietary products as well as products geared towards pleasure-eating will expand further.

Table 6: Industrial baking
Total production of biscuits / rusks

(thousand tonnes)	1988	1989	1990	1991
Belgique/België, Luxembourg	181.0	204.8	216.3	218.3
Danmark	97.9	99.8	96.8	121.9
BR Deutschland (1)	410.5	444.9	553.9	615.0
Hellas (2)	41.0	41.0	45.0	48.0
España	162.0	161.0	165.0 (2)	173.0 (2)
France (3)	579.0	593.8	611.0	626.3
Ireland (4)	21.7	22.3	22.5	23.7
Italia (5)	641.3	648.3	669.9	690.4
Nederland	345.4	356.7	370.2	393.2
United Kingdom (6)	924.2	909.3	922.9	952.6

(1) Pastry not included
(2) Estimated
(3) Includes fine bakers' wares and "Viennoiserie"
(4) Only biscuits and wafers included
(5) Gingerbread not included
(6) Includes crispbread but not rusk or toasted bread
Source: Caobisco

Figure 8: Industrial baking
Trade intensities



Source: DEBA

Table 7: Industrial baking
Per capita consumption of biscuits / rusks

	1988	1989	1990	1991
Belgique/België, Luxembourg	13.7	14.8	15.4	15.3
Danmark	9.7	9.0	9.0	10.7
BR Deutschland (1)	6.0	6.1	6.9	6.9
España	4.2	4.3	4.4 (2)	4.5 (2)
France (3)	12.1	12.5	12.6	13.0
Ireland (4)	11.0	12.4	12.7	13.6
Italia (5)	10.8	11.1	11.3	11.6
Nederland	17.4	20.2	18.2	18.2
United Kingdom (6)	15.3	15.0	15.0	15.5

(1) Pastry not included
(2) Estimated
(3) Includes fine bakers' wares and "Viennoiserie"
(4) Only biscuits and wafers included
(5) Gingerbread not included
(6) Includes crispbread but not rusk or toasted bread
Source: Caobisco

Risks for the industry relate to traditional biscuit products which are facing the prospect of declining demand, the growth of in-store bakeries at non-specialised sales points, competition between market segments. Emerging opportunities relate to "industrialisation" of the individual bakery segments with consequent standardisation of consumption between regions, establishment of an eating pattern favourable to carbohydrates.

Table 8: Industrial baking
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	3.4	4.1
Production	3.5	4.2
Extra-EC exports	6.5	9.0

Source: Prometeia

Written by: Prometeia Calcolo Srl
The industry is represented at the EC level by: Association Internationale de la Boulangerie Industrielle (AIBI). Address: In den Diken 33, D-4000 Düsseldorf; tel: (49 211) 65 30 86/88; fax:(49 211) 65 30 88; and, Association des Industries de la Chocolaterie, Biscuiterie, Biscotterie et Confiserie de la CEE (Caobisco). Address: Rue Defacqz 1, B.7, B-1050 Brussels; tel: (32 2) 539 1800; fax: (32 2) 539 1575.

Sugar
NACE 420

The EC is the world's largest producer of sugar. Sectoral developments are governed by a set of import levies, export refunds and production quotas that are due for revision in 1993. Despite aims for self-sufficiency the EC has been the world's leading net exporter.
Production is highly concentrated primarily as a result of cross-border mergers between sugar companies and the reduction in the number of establishments due to rationalisation in the production process.

INDUSTRY PROFILE

Description of the sector

Sugar can be extracted from sugar cane or sugar beet, the latter being used for the whole of EC production. Beets produced are processed by a small number of high capacity factories.

Recent trends

The EC's share of world sugar production, at nearly 15 million tonnes, is 16%. The trend of production fluctuates widely with weather conditions and has been trending down over the period 1981-92. Consumption, bordering on 12 million tonnes, represents 11% of the world total. The average annual growth rate from 1981 to 1992 was 0.8%. Extra-EC exports rose at much the same rate (0.7%) and fluctuated between 2500 and 3500 tonnes depending on the world market.

Since the increase in Germany's production quota for the 1990/91 season, due to reunification, the quotas have remained unchanged. Production increased by 11% when the German quota was raised but subsequently fell by 7% during the next season and by 3% in the 1992/93 season, bringing it back to its 1989/90 level.

Foreign trade

The agreements of the Lomé Convention are still in force: the EC is still importing 1.3 million tonnes of sugar from Africa, the Caribbean and the Pacific (ACP) (the price corresponds to the EC intervention price). These quantities come on top of the internal surplus production and add to the amounts available for export. The main countries which import sugar from the EC are the OPEC countries (41.5%), the EFTA countries (7%) and the former Soviet Union (5.9%).

The volume of internal trade depends on the relationship between the production quota assigned and consumption. The countries where production exceeds domestic demand are: France (with a production/consumption ratio of 2.21), Denmark (2.15), Belgium (2.06), the Netherlands (1.8), Ireland (1.59) and Germany (1.43). The import-export balance is positive for these countries, but negative for the others.

MARKET FORCES

Demand

In the EC, 71% of the sugar is used by the food industry while 29% is for direct consumption either as such or as an ingredient. Sugar is used as an ingredient also by the chemical industry, pharmaceutical industry and in several other products.

The share of direct consumption ranges for 16% in the Netherlands to 45% in Italy. Italy, with the lowest per capita consumption (15.6 kg) ranks second for direct consumption. On the other hand in Belgium, which has the second highest total per capita consumption in the EC after Denmark, the quantity used for direct consumption is 11.6 kg. From 1982 to 1992 per capita consumption remained almost unchanged both in the individual countries and at Community level.

Direct sugar consumption is declining in all countries because eating habits have changed (i.e. less home-made desserts, jams, etc.); at the same time, indirect sugar consumption has increased through higher consumption of ready-made pastry, jams, etc. As a result, total sugar consumption not only has been maintained, but has also slightly increased in the past 10 years.

Sugar is also encountering competition from low-calorie sweeteners, for which an annual average growth rate of over 10% is recorded. The market for sweeteners is now equal to 15% of the value of direct consumption of sugar.

Supply and competition

The competitive situation is largely governed by Community policies for this sector. Sugar production goes deliberately beyond the quota set, because of the potential demand existing for EC sugar. Exports to the world market are encouraged, where prices are lower. The EC regulation system is aimed at supporting the countries whose production system is the weakest.

Economies of scale are achieved primarily by increasing the production capacity of plants. Average EC production per plant is 73 000 tonnes; this figure falls to 39 000 tonnes in Spain and reaches 149 000 tonnes in the Netherlands. Despite the rise in average productivity due to a reduction in the number of plants, costs remain fairly high compared with those of the main competitors outside the EC.

Production process

The production process is complex and consists essentially of a series of successive extractions, concentrations and purifications. The process consumes enormous quantities of energy, and consequently the industries in this sector generally produce their own energy. Plant development is aimed at op-

Table 1: Sugar
Main Indicators (1)

(thousand tonnes white sugar)	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93 (2)
Apparent consumption	10 855	10 686	10 890	10 790	11 068	10 869	10 902	11 112	11 639	11 808	12 000
Production	15 085	12 245	13 587	13 630	14 108	13 195	13 941	14 275	15 876	14 788	14 300
Exports	2 782	3 112	3 052	2 982	3 194	3 462	3 158	2 565	2 742	2 807	2 850

(1) Year runs: 1 October to 30 September; 1982/83 to 1985/86 EC 10.
(2) Rounded Prometeia estimates.
Source: CEFS, EC Commission DG VI

Table 2: Sugar
Areas under beet

(thousand hectares)	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92
EC (1)	2 098	1 905	1 936	1 886	1 899	1 840	1 835	1 866	2 102	1 984
Belgique/België	130	120	123	125	118	111	114	111	113	106
Danmark	76	72	74	73	69	67	69	67	66	64
BR Deutschland (2)	429	403	423	415	399	384	386	392	620	575
Hellas	41	38	28	43	44	28	34	49	44	39
España	260	249	209	178	195	182	190	172	170	160
France	533	462	501	464	421	420	417	427	474	435
Ireland	34	36	36	35	38	37	33	32	33	33
Italia	257	222	217	225	277	283	272	298	265	278
Nederland	137	117	129	131	137	128	123	124	125	124
United Kingdom	201	186	196	197	201	200	197	194	192	170

(1) Excluding Luxembourg and Portugal.
(2) Including former East Germany in 1990/91 and 1991/92.
Source: CEFS

timisation of the production process (extraction yield and energy saving) and automation.

Processing is highly seasonal since beet is planted in spring and harvested from September to November. The product cycle of beet sugar, in which the EC industry specialises, includes the following phases:

- extraction of content via beet slice treatment with steam and immersion into hot water tanks to produce a raw juice;
- purification, evaporation and crystallisation of the juice;
- processing of crystals to obtain sugar in its marketable form.

INDUSTRY STRUCTURE

Companies

The sector is highly concentrated, with oligopolistic tendencies, especially in Ireland, Greece, Denmark, Belgium and Italy. In all the countries the production quota of the two leading companies is not less than 55%.

The four leading companies account for 50% of Community production. The two largest total shares are held by Ferruzzi (I) (25%), the undisputed leader in Italy and the co-leader in France, and by Süd Zucker (D) (24%). The latter controls Sugana (A), Tirlemont (B) and has expanded in East European countries.

Strategies

Companies pursue three basic strategies:

- cutting costs in order to increase profitability in the domestic market and be able to operate in markets outside the EC;
- taking over of other companies in the sector.
- aim to remain competitive in the world market.

Acquiring plants in the EC chiefly means acquiring production quotas. For example, prior to recent events, the Ferruzzi Group, after becoming the European leader by taking over most of the Italian companies and Béghin Say, was expanding in the world market by taking over three major Hungarian producers. Tate & Lyle (UK) took over Alcantara (P) and has interests in the Australian Bundaberg Sugar and the Hungarian Hajdusagi Cukorgyar. Furthermore, many companies are diver-

Table 3: Sugar
White sugar production

(thousand tonnes)	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92
EC	15 085	12 245	13 587	13 630	14 108	13 195	13 941	14 275	15 876	14 788
Belgique/België	1 105	782	839	943	938	804	925	956	1 030	891
Danmark	537	346	547	530	499	388	506	487	544	468
BR Deutschland (1)	3 303	2 507	2 894	3 155	3 192	2 731	2 760	3 071	4298	3 886
BR Deutschland from molasses	9	19	19	19	19	19	19	20	19	19
Hellas	296	298	218	317	287	182	216	387	287	273
España	1 144	1 240	1 074	903	1 020	1 005	1 187	954	953	942
France - Metropolitan	4 446	3 562	3 957	3 953	3 410	3 649	4 045	3 868	4 364	4 069
France - DOM (2)	309	263	300	296	305	303	328	198	245	250
Ireland	222	197	222	174	186	223	195	214	226	213
Italia	1 180	1 244	1 275	1 244	1 719	1 718	1 480	1 729	1 458	1 509
Nederland	1 130	743	934	915	1 239	979	989	1 140	1 232	1 046
Portugal	9	9	5	4	5	2	2	3	2	2
United Kingdom	1 419	1 062	1 323	1 211	1 323	1 226	1 307	1 267	1 241	1 220
Share of world production (%)	15	13	14	14	14	13	14	15	16	16

(1) Including former East Germany in 1990/91 and 1991/92.
(2) DOM: D_partements d'outre mer (French overseas departements) are Guadeloupe, Martinique, Réunion.
Source: CEFS

Table 4: Sugar
International comparison

(%)	Production 1991	Exports 1990	Consumption 1989
Africa	7.3	8.2	7.8
North America	5.9	1.8	8.0
USA	5.9	1.7	7.0
Center America	13.0	29.5	6.0
Cuba	6.5	24.0	0.8
Mexico	3.4	N/A	3.8
South America	12.7	9.3	11.1
Brazil	7.8	5.2	6.9
Asia	31.4	13.7	36.8
China	7.0	2.1	6.7
India	11.2	N/A	10.3
Thailand	3.6	8.1	0.9
Europe	18.7	25.8	16.5
EC	13.5	23.7	11.9
Oceania	3.2	11.2	1.0
former USSR	7.8	0.5	12.8
Total	100.0	100.0	100.0

Source: Consumption: UN, Commodity Yearbook
Production: FAO, Production yearbook
Exports: FAO, Trade Yearbook

sifying into other sectors, especially the agricultural raw materials trade and the corresponding processing industries (paper, processing of cereals for the production of starches and alcohol, etc.).

REGIONAL DISTRIBUTION

The main regions where the production/consumption ratio is higher than 1 are Oceania (ratio: 3.2), Central America (2.15), South America (1.14) and Europe (1.13). Especially Cuba, with production 8.1 times greater than consumption, accounts for nearly a quarter of world sugar exports. The EC ranks second with a 23.7% share.

World consumption is growing steadily, stimulated by the developing countries where income elasticity of demand is still quite high, while the market has stopped expanding in the industrialised countries.

ENVIRONMENT

The sector is characterised by the enormous emission of liquid effluents with a high concentration of organic substances, which in the past has created problems of eutrophication of river water. Polluting emissions have decreased by 30% in the last ten years. The European sugar industry allocates 10% of its manufacturing margin to protect the environment.

REGULATIONS

The regulation of the sector dates back to 1968. The provisions are centred on a system of production quotas by country (and by production plant within the individual countries) and of guaranteed prices. These prices are, however, guaranteed until Quota A (the basic quota) and Quota B (the safety margin) have been reached; beyond these quotas (C Sugar) the price

Table 5: Sugar
Number of sugar factories

	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92
EC (1)	233	225	220	218	214	207	194	190	226	202
Belgique/België	15	15	15	14	14	14	12	12	11	11
Danmark	6	6	6	6	6	6	6	6	5	6
BR Deutschland (1)	48	48	47	46	44	42	38	38	79	60
Hellas	5	5	5	5	5	5	5	5	5	5
España	30	29	27	25	25	24	24	24	24	24
France	57	57	56	55	54	54	52	50	50	48
Ireland	4	4	4	4	4	3	3	2	2	2
Italia	45	38	37	40	39	37	33	33	31	29
Nederland	10	10	10	10	10	9	8	8	7	7
United Kingdom	13	13	13	13	13	13	13	12	12	10

(1) Including former East Germany in 1990/91 and 1991/92.
Source: CEFS

Table 6: Sugar
Per capita consumption trends

(kg/capita)	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92
EC	33.7	33.1	33.7	33.3	34.1	33.5	33.5	34.1	34.9	34.1
Belgique/België	37.1	38.5	37.9	38.3	36.9	37.5	37.7	42.4	42.8	41.9
Danmark	39.7	39.0	39.0	39.8	37.9	38.6	39.4	38.6	38.8	42.0
BR Deutschland (1)	35.6	34.7	36.1	35.2	35.2	35.5	35.1	36.5	37.0	34.8
Hellas	29.5	30.6	31.4	31.8	30.6	32.0	30.3	30.5	30.7	31.3
España	27.1	26.2	23.9	25.7	25.8	27.2	26.8	28.4	29.0	29.1
France	34.9	34.1	33.9	33.4	36.5	35.0	34.9	35.5	35.6	34.1
Ireland	39.8	39.7	38.8	38.6	37.9	39.2	37.9	37.5	37.5	38.0
Italia	26.7	25.7	28.9	26.8	26.7	26.0	26.7	27.5	27.2	28.3
Nederland	38.3	38.3	38.5	39.1	39.3	38.4	36.3	37.4	38.0	38.5
Portugal	29.1	30.3	34.2	30.1	31.0	29.8	31.2	30.6	30.6	29.0
United Kingdom	41.0	40.2	40.1	40.5	42.3	39.6	40.2	39.2	36.8	39.7

(1) Including former East Germany in 1990/91 and 1991/92.
Source: CEFS

Table 7: Sugar
Total sugar consumption (1)

(thousand tonnes)	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92
EC	10 855	10 686	10 890	10 790	11 068	10 869	10 902	11 112	11 639	11 808
Belgique/België	379	393	387	392	378	384	386	434	438	432
Danmark	203	200	199	204	194	198	202	198	200	218
BR Deutschland	2 193	2 127	2 203	2 148	2 155	2 168	2 152	2 254	2 785	2 800
Hellas	289	301	310	316	305	320	303	306	308	325
España	1 043	1 009	925	1 002	1 013	1 052	1 049	1 116	1 122	1 147
France	1 938	1 915	1 907	1 892	2 074	1 996	1 995	1 993	2 029	1 953
Ireland	140	140	137	137	134	138	134	132	132	134
Italia	1 519	1 465	1 649	1 534	1 528	1 494	1 539	1 584	1 667	1 640
Nederland	549	551	556	569	576	567	539	556	560	582
Portugal	294	306	345	304	313	300	314	308	308	301
United Kingdom	2 308	2 278	2 271	2 293	2 398	2 252	2 289	2 231	2 091	2 276
Share of world consumption (%)	12	11	11	11	11	10	10	10	11	11

(1) White sugar equivalent.
Source: CEFS

Table 8: Sugar
Consumption 1991/92

(thousand tonnes)	B	DK	D	GR	E	F	IRL	I	NL	P	UK
Total consumption	431.4	217.7	2 800.4	325.0	1 147.4	1 953.0	133.8	1 640.6	582.0	301.3	2 276.0
(kg/capita)	41.9	42.0	34.8	31.3	29.1	34.1	38.0	28.3	38.5	29.0	39.7
of which:											
Feedstuffs	2.3	0.4	0.0	3.5	0.0	0.0	0.1	0.0	1.0	0.0	3.0
Chemical industry	0.0	5.4	41.3	0.5	21.0	25.0	0.6	12.0	30.0	1.6	32.0
Human consumption	429.1	212.0	2 759.1	321.0	1 126.4	1 928.0	133.2	1 628.6	551.0	299.7	2 241.0
(kg/capita)	41.7	40.9	34.3	30.9	28.5	33.7	37.8	28.2	36.5	28.8	39.1
of which:											
Direct	118.9	51.4	609.9	120.0	390.5	565.0	50.7	728.2	89.1	125.9	560.0
(kg/capita)	11.6	9.9	7.6	11.6	9.9	9.9	14.4	12.6	5.9	12.1	9.8
Industrial	310.3	160.6	2 149.2	201.0	735.9	1 363.0	82.5	900.4	461.9	173.8	1 681.0
(kg/capita)	30.1	31.0	26.7	19.3	18.6	23.8	23.4	15.6	30.6	16.7	29.3

Source: CEFS

Table 9: Sugar
Company profiles

Company	Country	Domestic market share (%)
Eridania ZN	I	57
British Sugar	UK	49
Tate & Lyle	UK	43
Südzücker	D	40
Pfeifer & langen	D	15
Beghin Say	F	30
Eurosucre	F	30
Kio Ebro	E	32
Azucarera	E	21
CIA	E	19
Raffineria Trilemontoise	B	80
Damsco	DK	95
Hellenic Sugar	GR	70
Greencare	IRL	80
Suiker Unie	NL	55
CSM	NL	45
Alcantara	P	57
Rar	P	20

Source: ISMEA,1991

is fixed by the world market, in view of the production surplus and the fixed imports from the ACP countries.

For exports of sugar within Quotas A and B the price differential between the internal market and the world market is totally financed through production contribution. This contribution amounts to 2% of the price of A sugar and 39.5% of price of B sugar and is paid by the beet growers (60%) and the sugar manufacturers (40%).

Table 10: Sugar
Expected yearly growth rates

(%)	1993-94	1994-97
Apparent consumption	0.5	0.5
Production	1.0	1.0
Exports extra-EC	2.0	1.0

Source: Prometeia

The price system is differentiated according to the specific requirements of the Member States, in order to eliminate production weaknesses.

OUTLOOK

Low population growth and low income elasticity of Member States domestic demand for sugar imply a fair degree of market saturation. Hence, increases in consumption are likely to be marginal and likely to arise from increased industrial rather than domestic demand. In the long run, barring changes in the laws and regulations in force, the trend of production will be stable.

Written by: Prometeia Calcolo Srl
The industry is represented at the EC level by: European Committee of Sugar Manufacturers / Comité Européen des Fabricants de Sucre (CEFS). Address: Avenue de Tervuren 182, B-1150 Brussels. tel:(32 2) 762 0760; fax: (32 2) 771 0026.

Cocoa, sugar confectionery, ice-cream

NACE 421

Over the last decade, the sector has expanded rapidly primarily due to the strong performance of extra-EC exports. Although production and consumption are increasing, changes in consumer patterns due to health concerns are affecting the industry significantly. Hence, product innovation and the creation of new market segments is an important strategic supply-side variable.

The presence of a significant number of multinationals in the sector is responsible for the tendency towards internationalisation of brands and standardisation of consumption as all major food multinationals are active in the sector. There is steady growth and favourable profit margins in most industrialised countries although per capita consumption by country does reveal considerable differences in the size of markets.

INDUSTRY PROFILE

Description of the sector

NACE 421 is made up of three sections:

- the cocoa and chocolate industry;
- the caramels and related products industry (sweets, chewing gums, jellies and nougats);
- the ice cream industry.

Recent trends

The main economic indicators show the positive trend of the sector over the last decade. From 1983 to 1992 the annual average increase at constant prices was 5.5% for exports and 3.5% and 3.7% respectively for production and apparent consumption. The balance of trade was positive throughout the period, with an average annual increase of 9% at current prices. During the last five years a significant increase in exports to countries outside the EC has boosted sectoral growth. Numbers employed fell from 1983 to 1987 at an average annual rate of 2.1%. Conversely, over the last five years employment recovered slightly rising by 1.2%, but no further gains could be recorded in 1992.

International comparison

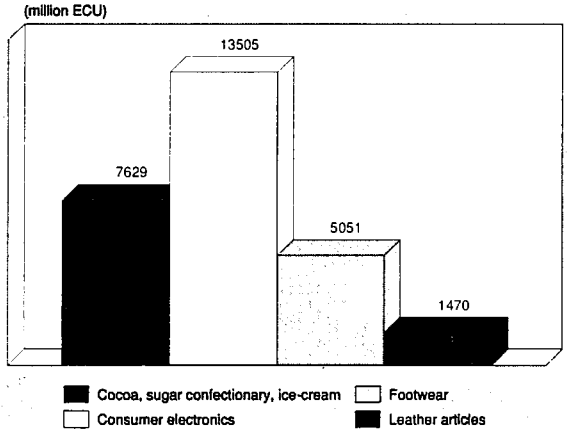
Production and consumption of cocoa derivatives and sugar confectionery in the three main trading blocs, the EC, the United States and Japan, show the importance of Europe in the world picture. The Japanese market is small compared with that of many other industrialised countries while the US market is slightly smaller than the European market.

Foreign trade

Extra-EC imports account for about 2% of apparent consumption. Their share has shrunk since 1983. At current prices, the trend of imports has been positive, but the rate of growth is much slower than that of trade between the member countries. Imports have come mainly from the EFTA countries, whose share increased considerably from 1987 to 1992. The proportion of EC imports accounted for by the United States also increased, but is still small.

Intra-EC trade, representing 88.1% of total imports, increased at an annual average rate of 10.3% from 1983 to 1992. Intra-EC trade represented about 16% of apparent consumption in 1992. Exports, which have grown more than production during the last five years, go to different trading areas. From 1987 to 1992 the shares of the three main destination areas, EFTA, the United States and Japan, decreased. Whereas 62% of exports went to the three trading blocs in 1987, their share was down to 48% in 1992.

Figure 1: Cocoa, sugar confectionary, ice-cream Value added in comparison with other industries, 1992



Source: DEBA

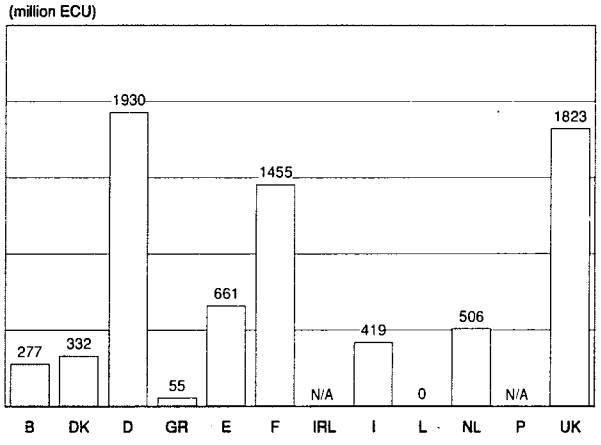
MARKET FORCES

Demand

The products which form part of the sector differ in nature and uses. Cocoa derivatives and ice creams are chiefly eaten for pleasure as snacks and desserts. Confectionery products, on the other hand, definitely rank as luxuries.

Calories content is regarded as very important for all products: for sugar confectionery, however, it is very often regarded as an adverse factor, whereas for ice cream and chocolate it may be a factor for success, especially when these products are used as snacks for the target groups, made up of children, young people, sportsmen and women.

Figure 2: Cocoa, sugar confectionary, ice-cream Value added by Member State, 1992



Source: DEBA

Table 1: Cocoa, sugar confectionary, ice-cream
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	13 924	15 422	16 945	16 603	16 559	17 687	18 254	20 766	23 074	23 348	23 600
Production	14 462	16 088	17 679	17 290	17 208	18 364	19 075	21 701	24 025	24 497	24 900
Extra-EC exports	975	1 244	1 359	1 230	1 144	1 150	1 311	1 466	1 495	1 693	1 860
Trade balance	537.6	666.0	733.7	687.9	649.5	676.5	821.0	935.5	950.9	1 148.8	1 300.0
Employment (thousands)	180.1	175.9	176.1	165.8	164.8	166.0	165.3	178.2	179.4	174.1	167.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 2: Cocoa, sugar confectionary, ice-cream
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	2.2	5.2	3.5
Production	2.3	5.4	3.7
Extra-EC exports	3.0	8.6	5.5
Extra-EC imports	2.0	6.3	3.9

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Cocoa, sugar confectionary, ice-cream
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	975	1 244	1 359	1 230	1 144	1 150	1 311	1 466	1 495	1 693
Extra-EC imports	436.9	578.2	625.4	542.3	494.7	473.4	490.4	530.9	543.7	543.8
Trade balance	537.6	666.0	733.7	687.9	649.5	676.5	821.0	935.5	950.9	1 148.8
Ratio exports/imports	2.2	2.2	2.2	2.3	2.3	2.4	2.7	2.8	2.7	3.1
Terms of trade index	118.4	104.6	100.0	110.0	115.3	123.2	131.5	138.6	142.7	144.4
Intra-EC trade	1 656	2 057	2 484	2 357	2 416	2 499	2 876	3 240	3 680	4 017
Share of total imports (%)	79.1	78.1	79.9	81.3	83.0	84.1	85.4	85.9	87.1	88.1

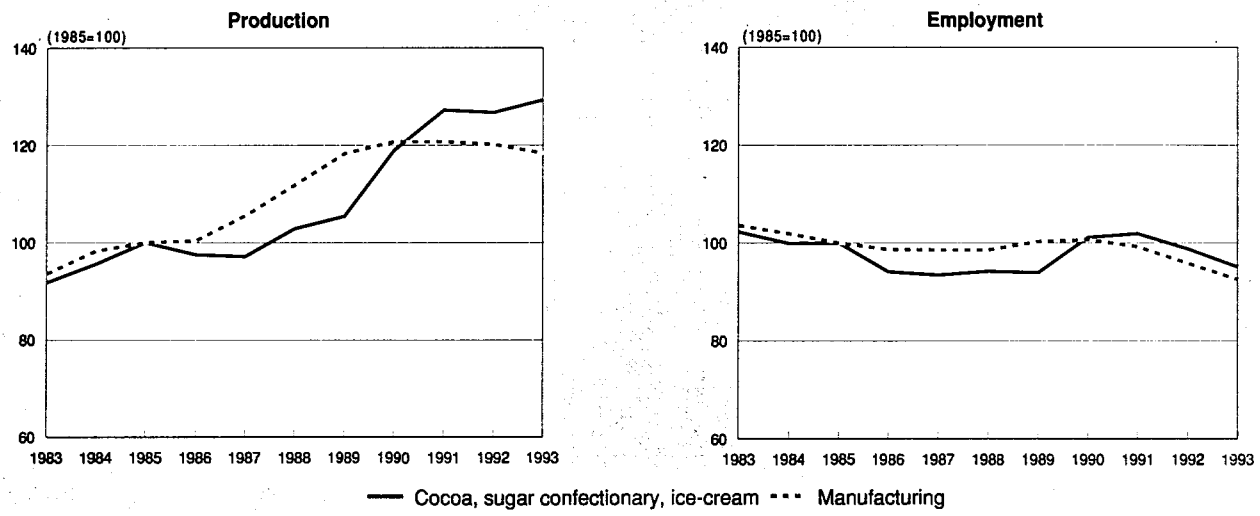
Source: DEBA

Table 4: Cocoa, sugar confectionary, ice-cream
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	29.3	28.0	28.3	32.4	33.6	36.4	38.9	40.7	42.4	43.8
Productivity index	103.8	99.2	100.0	114.8	119.1	128.8	137.8	144.2	150.1	155.1
Unit labour costs index (3)	87.1	93.0	100.0	102.4	106.0	113.1	119.4	123.5	134.6	143.4
Total unit costs index (4)	78.5	91.5	100.0	100.8	100.7	105.5	108.6	113.0	118.6	124.4

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for esale.
Source: DEBA

Figure 3: Cocoa, sugar confectionary, ice-cream
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

Product innovation has to some extent changed the fortunes of some products. In the confectionery subsector, the introduction of sugar-free products has stimulated the growth in demand, especially in the adult target group. In the field of cocoa derivatives, the new versions of bars eaten as snacks have a lower calorie content and present a healthier image of the product.

All segments are characterised by the important role of impulse buying. The ice cream market and, to a lesser extent, the chocolate market are also affected by a substantial seasonal variation of demand. Consumption of ice cream tends to be concentrated during the summer months, when demand for chocolate, especially in hot countries, is lowest.

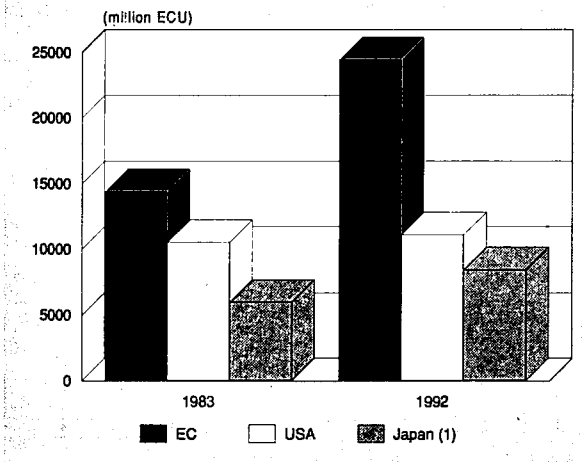
Per capita consumption of confectionery products, both sugar-based and chocolate-based, is very high in Germany (17.1 kg), Great Britain (14.1 kg), Belgium and Luxembourg (13 and 14.3 kg respectively) and the Netherlands (10.4 kg). In France, Spain and Italy per capita consumption is much lower, at 6.9, 5.5 and 3.6 kg respectively. (Consumer Europe 1993).

In the case of ice cream, the estimates of per capita consumption are difficult to interpret because of a number of factors. First of all, it is difficult to estimate the incidence of products made by small firms which form an important market segment in Italy, Spain and Greece. Secondly, the unit of measurement used for estimates, generally the litre, does not take account of the different characteristics of the products, especially as regards their consistency and the quantity of air incorporated during whipping. The average per capita figure in the EC is 5.9 litres, with no major differences between countries, except in the case of Portugal (2.1) and Luxembourg (18.4). (Source: Consumer Europe 1993).

Supply and competition

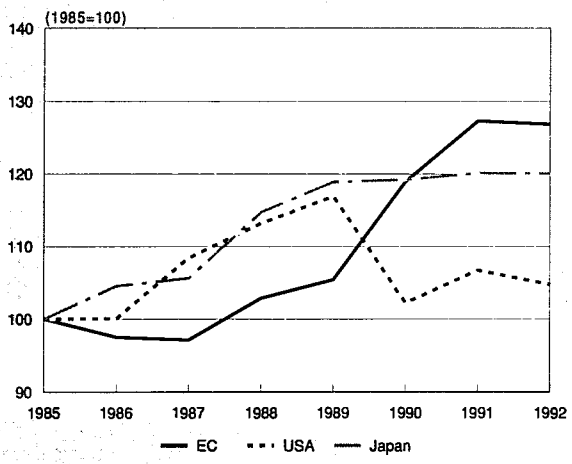
The cocoa/chocolate subsector is characterised by high concentration of supply. The market leaders are multinationals capable of controlling the supply of a product subject to wide

Figure 4: Cocoa, sugar confectionary, ice-cream
International comparison of production in current prices



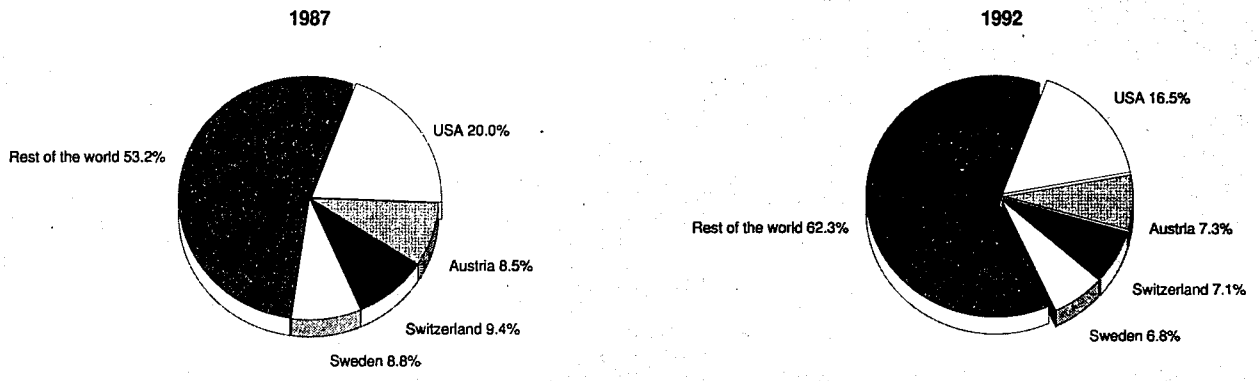
(1) 1985 instead of 1983
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Cocoa, sugar confectionary, ice-cream
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Cocoa, sugar confectionary, ice-cream
Destination of EC exports



Source: Eurostat

price fluctuations as in the case of cocoa. The supply of confectionery products is diversified: in this subsector, a large number of medium-sized firms distributing at national level operate side by side with the multinationals. In the ice cream subsector there is a third competitor: products made by small, non-industrial local firms. These ice creams provide for a considerable proportion of consumption in Italy, Greece and Spain. The productivity of the sector has grown almost continuously since 1985 at an average annual rate of 6%. The increase in labour costs is smaller (annual average rate of 5%).

The leading countries for production of cocoa derivatives and sugar confectionery are Germany, the United Kingdom, France and the Netherlands. Production in these countries (excluding Luxembourg and Portugal) accounts for about 80% of the total for the EC in 1991. The geographical breakdown of production is in line with that of consumption by country and area.

Production process

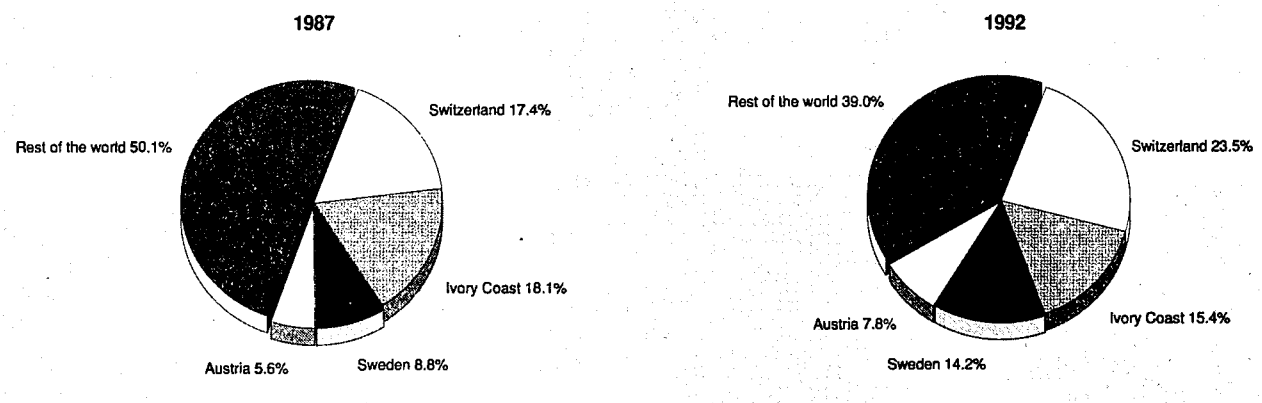
Product innovation plays a very important role in the sector; the main variable governing consumption is impulse buying, and the consumer is therefore particularly sensitive to the new products offered by the industry. In the cocoa subsector, the effect of fluctuations in the price of the raw material is of relative importance. Companies which supply the final consumer, most of which purchase semi-manufactured cocoa products have diversified the subsector by introducing a large number of products based on variety and richness of ingredients.

INDUSTRY STRUCTURE

Companies

In the ice cream sector (including small firms), Unilever (UK/NL) and Nestlé (CH) hold a combined share of around 40%. In the confectionery subsector the market is less concentrated. The main multinationals are Nestlé, Cadbury Schweppes (UK), Ferrero (I), Wrigley (DK) and the two US companies Philip Morris and Mars. The pronounced fragmentation of the subsector, with the resultant formation of market niches, makes it impossible to suggest an estimate of company shares. In the field of cocoa derivatives the main competitors are Nestlé, Mars, Philip Morris, Ferrero and Cadbury Schweppes.

Figure 7: Cocoa, sugar confectionary, ice-cream
Origin of EC imports



Source: Eurostat

Table 5: Cocoa, sugar confectionary, ice-cream
Production of chocolate and finished chocolate confectionery products

(thousand tonnes)	1986	1987	1988	1989	1990	1991
EC (1)	1 644.7	1 715.3	1 750.5	1 838.1	2 036.7	2 170.2
Belgique/België	88.1	93.5	97.6	107.3	120.0	124.0
Danmark	20.9	22.0	24.3	23.1	24.5	30.0
BR Deutschland	413.1	435.8	471.7	486.3	593.6	681.5
Hellas (2)	15.6	15.6	15.6	15.6	17.2	18.5
España	96.2	110.0	111.9	111.0	123.1	126.4
France	266.3	267.9	279.4	282.8	276.0	317.9
Ireland	22.4	25.0	26.3	28.1	29.9	27.5
Italia	84.5	87.5	101.1	154.3	161.6	161.6
Nederland (3)	174.0	185.5	186.0	188.0	219.5	211.0
United Kingdom (4)	463.7	472.6	436.6	441.6	471.3	471.8

(1) Excluding Luxembourg and Portugal
(2) 1987 value for 1988
(3) Estimated for 1988
(4) Excluding biscuits or waffles covered in chocolate for 1988
Source: Caobisco

Strategies

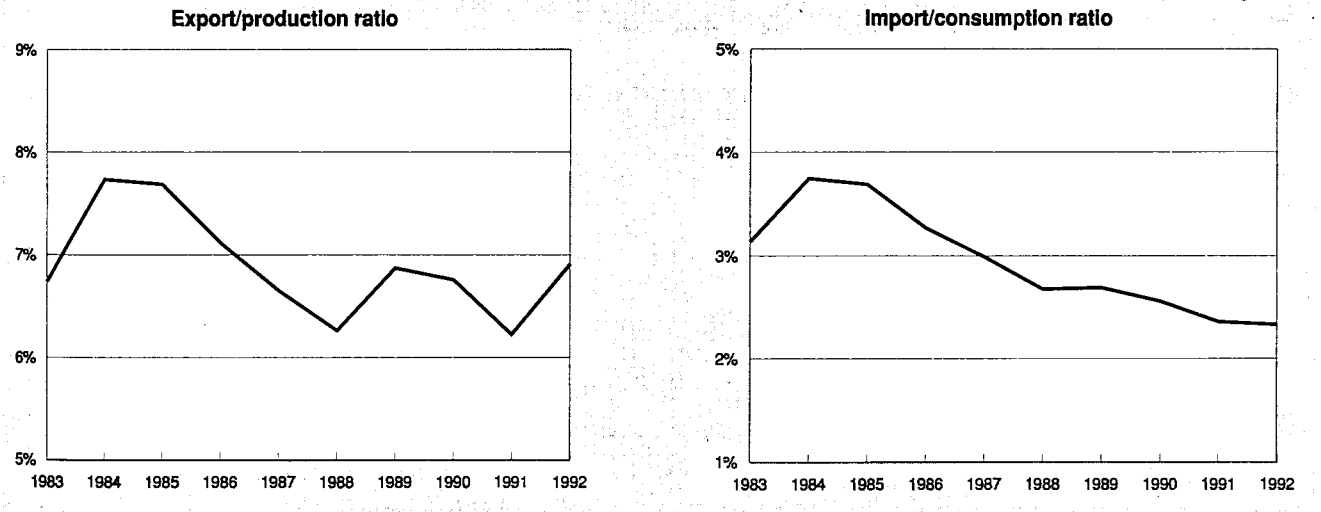
The policy pursued by the multinationals relies on all the variables of the marketing mix and also on external growth and extra-sectoral diversification. Investment in R&D makes it possible to launch successful and innovative products on the market. A recently introduced segment is that of chocolate-coated ice cream bars; Unilever, which launched the product with the Winner brand, was followed by Mars, with the brand of the same name and with Bounty (both brands previously belonged to the chocolate snack market).

Product innovation and the introduction of new brands is chiefly a characteristic of the ice cream market. Distribution is of special importance for ice cream, for which the cold chain is used, and for chocolate, during the months when temperatures are particularly high. Lastly, the high proportion of products bought on impulse calls for immense investment in advertising, which is another obstacle preventing small firms from entering the market. Important changes in the structure of supply include the increase in Nestlé's total share thanks to the take-over - in 1993 - by its food-sector financing company SMI (I) of 61% of Italgel (I), a company which produces ice creams and deep-frozen products. Towards the end of the 1980s the Swiss firm completed two other important operations, the take-over of Buitoni-Perugina (I) and of Rowntree (UK). Philip Morris, which operates in the food market via Kraft General Foods, established its position by the take-over of Jacobs Suchard AG (CH).

REGIONAL DISTRIBUTION

Cocoa is a colonial product; as in the case of coffee and tea, there is a clear distinction between producing countries and consuming countries. The main producing areas are West Africa and South America. Consumption of cocoa is still strongly concentrated in the industrialised countries. Over the years, the relative importance of the United States has declined in favour of Europe.

Figure 8: Cocoa, sugar confectionary, ice-cream
Trade intensities



Source: DEBA

Table 6: Cocoa, sugar confectionary, ice-cream
Production of sugar confectionery (1)

(thousand tonnes)	1988	1989	1990	1991
EC (2)	1 291.6	1 327.9	1 395.1	1 457.4
Belgique/België	48.2	59.3	66.2	64.4
Danmark (3)	33.9	38.2	39.2	44.4
BR Deutschland	387.5	411.9	443.6	474.5
Hellas	10.2	10.2	11.3	12.4
España	82.0	85.0	88.6	95.1
France	148.9	149.9	156.6	158.4
Ireland	18.0	17.7	19.7	21.8
Italia	119.9	120.9	116.7	121.4
Nederland	115.9	115.0	125.0	139.8
United Kingdom	327.1	319.8	328.2	325.2

(1) Excluding candied fruit
(2) Excluding Luxembourg and Portugal
(3) Excluding chewing gum
Source: Caobisco

REGULATIONS

The EEC Directive on cocoa and chocolate was adopted in 1973. It allowed in the United Kingdom, Denmark and Ireland the use of vegetable fats other than cocoa butter.

In the medium term the Commission will re-examine the subject and adapt the directive to the new rules and regulations on labelling.

OUTLOOK

Owing to the diversification of the product, segments which are at different phases in their life cycle constantly exist side by side. The more traditional products, such as sugar sweets and chocolate bars, reached the end of their expansion phase some years ago. New products (for instance, bars eaten as snacks and sugar-free products) which are being launched on the market at short intervals, are in the initial phase and are constantly being replaced by new versions. At present the

Table 7: Cocoa, sugar confectionary, ice-cream
Per capita consumption of chocolate and finished chocolate confectionery products

(kg)	1988	1989	1990	1991
Belgique/België, Luxembourg	6.9	6.9	7.4	7.2
Danmark	5.8	5.6	5.7	6.6
BR Deutschland	6.9	6.8	6.6	6.9
España	1.7	1.2	1.9	1.5
France	4.4	4.6	4.3	4.7
Ireland	5.9	6.0	6.4	6.7
Italia	1.7	1.8	1.8	1.9
Nederland	6.2	6.4	6.8	7.7
United Kingdom	7.0	7.1	7.4	7.4

Source: Caobisco

Table 8: Cocoa, sugar confectionary, ice-cream
Per capita consumption of sugar confectionery

(kg)	1988	1989	1990	1991
Belgique/België, Luxembourg	3.9	4.8	5.1	5.1
Danmark	4.9	5.3	5.2	5.7
BR Deutschland	6.4	6.5	5.5	5.6
España	2.1	2.2	2.3	2.0
France	2.6	2.6	2.6	2.7
Ireland	5.9	5.9	5.8	5.8
Italia	2.2	2.3	2.2	2.2
Nederland	4.5	5.2	5.7	5.6
United Kingdom	5.1	5.0	5.1	5.1

Source: Caobisco

Table 9: Industrial Ice cream Production by country

(million litres)	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC (1)	1 373.9	1 402.7	1 518.5	1 556.1	1 730.9	1 980.3	2 025.3	2 135.3	2 174.30
Belgique/België, Luxembourg	78.3	80.3	110.0	110.0	150.0	160.0	112.5	171.0	155.2
Danmark	39.8	40.8	52.0	49.4	54.4	57.9	58.0	70.4	88.0
BR Deutschland	295.0	306.0	330.5	325.3	356.4	381.8	435.4	538.7	560.2
Hellas	41.4	44.1	44.1	44.4	42.1	48.8	48.0	46.0	46.0
España	97.9	104.0	116.4	130.7	146.8	160.6	168.7	172.0	164.6
France	192.2	192.9	209.2	212.2	228.2	270.6	291.5	289.2	304.9
Ireland	25.6	23.3	23.3	24.4	24.0	27.8	29.4	31.8	23.2
Italia	213.8	225.5	223.3	227.7	298.0	317.3	322.4	332.2	332.2
Nederland	40.0	40.0	48.9	48.0	52.0	82.0	86.0	90.0	98.0
United Kingdom	350.0	346.0	361.0	384.0	379.0	473.5	473.4	394.0	402.0

(1) Excluding Portugal
Source: Euroglaces

Table 10: Cocoa, sugar confectionary, ice-cream Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.5	2.5
Production	2.0	3.2
Extra-EC exports	7.0	5.5

Source: Prometeia

recession, which is adversely affecting all sectors, chiefly penalises impulse buying and products which are not capable of reviving the interest of consumers.

Risks for the sectors are specified in the accentuation of the tendency towards consumption of health products and falling consumption by the main target group: children. Opportunities for the sector include the growing tendency towards snacks and the internationalisation of brands and standardisation of consumption.

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The industry is represented at EC the level by: Association of the ice cream industries of the EC (Euroglaces). Address: rue Fondary 51-53, F-75015 Paris; tel: (33) 1 45 79 80 75; fax: (33 1) 45 79 61 29; and, Association des industries de la Chocolaterie, Biscuiterie et Confiserie (Caobisco). Address: Rue Defacqz 1, Bte. 7, B-1050 Brussels; tel: (32 2) 539 1800; fax: (32 2) 539 1575.

Compound feed
NACE 422

The structure of both supply and demand differs between the two sections of the compound feed industry, producing for livestock and domestic animals respectively. The first section is extremely fragmented and operates in a market now at a high; the second is highly concentrated and is expanding rapidly.
In the animal feed section there is strong competition between companies, with profit margins being cut as a result. Competition centres on pricing policy and lowering costs.
By contrast, in the pet food section large sums are being invested in research and development and in advertising with the aim of establishing a brand policy to boost market shares and above all profitability.

INDUSTRY PROFILE

Description of the sector

The industry comprises of two subsections:

- the animal feed section which embraces the various activities involved in the production of livestock feed;
- the pet food sector which makes products for domestic animals and is divided according to the physical structure of the product, which may be dry (dehydrated) or in juice (in cans).

Pet foods account for not more than 5% of the whole sector by volume but for over 20% by value. In addition, pet foods are going ahead fast, while animal feeds long ago reached saturation point.

Recent trends

For the sector as a whole, the growth rate of EC production is still positive but is tending downwards. Real average annual growth running at 3.1% over the five years 1983-88, fell to 2.3% from 1988 to 1992 (including pet food).

Production follows the demand curve as imports and exports are of little consequence; extra-EC exports account for 3.6% of production and imports for 2.5% of apparent consumption (including pet food).

Production is rising at more than the average rate for the manufacturing industry as a whole. The pet food section has a real growth rate above the average for the sector running at 6% per annum over the last five years. These products are still at the introductory stage in some countries and consumption is increasing exponentially.

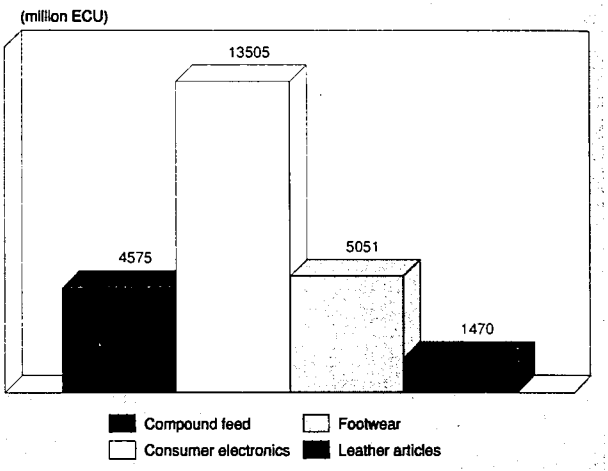
Employment has fallen in line with the average figure for the manufacturing sector. As regards productivity, added value per employee (including pet food) rose by an annual average of 4.9% from 1983 to 1992. In the immediate past, growth has been more modest with a 2.7% increase in 1992 over the previous year.

Foreign trade

Trade trends show a varied pattern. There was a linear increase of imports, which maintained a 2 - 2.5% share of consumption. The share of exports in production varies from a minimum of 2.5% in 1987 to a maximum of 3.6% in 1992. These differences are due in part to the productive capacity installed in the EC and in part to the fluctuation of world raw material prices.

From 1987 to 1992, the United States and EFTA share of imports rose while their share of exports fell. Over the same period, intra-EC trade increased by an annual average of 12.2%; in 1992, this trade accounted for 11% of consumption.

Figure 1: Compound feed
Value added in comparison with other industries, 1992



Source: DEBA

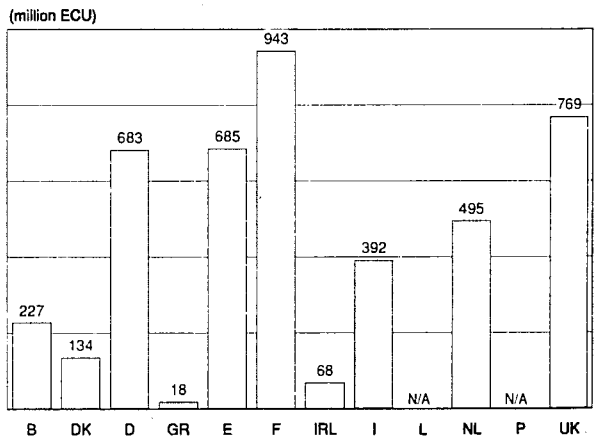
MARKET FORCES

Demand

Overall demand for animal feed is stable and is affected primarily by changes in cattle stock which are not always adequately offset by changes in pigs and poultry stocks. Industrial feeds still account for around 40% by value. The Netherlands and Italy, with 46% and 53% respectively spend the highest proportion on commercial feeds.

The price of materials has forced a change in the composition of compound feeds. Cereals are progressively being replaced by oilseed cakes and meals. Today, cereals account for 30% of the raw materials used, oilseed cakes and meals for around 25%, by-products of the food industry for 18% and manioc for 5-6%. This trend is likely to be reversed with the cereal price decline due to CAP reform.

Figure 2: Compound feed
Value added by Member State, 1992



Source: DEBA

Table 1: Compound feed
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	23 314	25 226	24 520	23 436	24 294	26 248	28 663	27 798	28 672	28 880	29 100
Production	23 567	25 652	24 819	23 634	24 405	26 400	28 825	27 913	28 899	29 202	29 400
Extra-EC exports	746.1	914.2	797.7	718.4	620.2	732.9	824.6	747.7	864.5	1 047.6	1 020.0
Trade balance	253.3	426.4	299.0	197.7	111.2	152.7	162.6	115.2	227.8	322.3	320.0
Employment (thousands)	93.8	92.4	88.1	85.8	88.8	89.8	90.4	89.8	88.8	87.1	86.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 2: Compound feed
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	3.1	2.3	2.7
Production	3.0	2.3	2.7
Extra-EC exports	-0.8	8.7	3.3
Extra-EC imports	5.1	8.3	6.5

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Compound feed
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	746.1	914.2	797.7	718.4	620.2	732.9	824.6	747.7	864.5	1 047.6
Extra-EC imports	492.8	487.8	498.7	520.7	509.0	580.2	662.0	632.5	636.7	725.3
Trade balance	253.3	426.4	299.0	197.7	111.2	152.7	162.6	115.2	227.8	322.3
Ratio exports/imports	1.5	1.9	1.6	1.4	1.2	1.3	1.2	1.2	1.4	1.4
Terms of trade index	88.5	87.9	100.0	107.7	108.4	98.6	102.3	114.6	110.0	111.0
Intra-EC trade	1 237	1 369	1 463	1 596	1 508	1 772	2 018	2 089	2 362	2 682
Share of total imports (%)	71.5	73.7	74.6	75.4	74.8	75.3	75.3	76.8	78.8	78.7

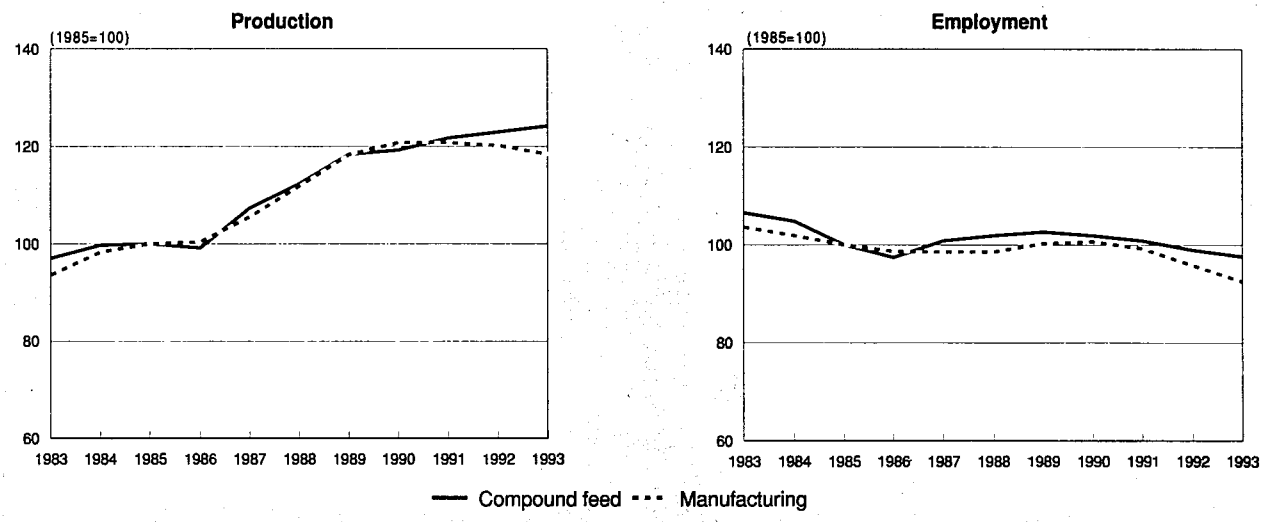
Source: DEBA

Table 4: Compound feed
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	34.2	34.6	39.6	41.1	44.8	45.6	49.2	51.6	51.1	52.5
Productivity index	86.3	87.4	100.0	103.9	113.2	115.1	124.2	130.3	129.0	132.6
Unit labour costs index (3)	85.9	92.5	100.0	103.3	108.5	113.4	120.9	126.9	134.9	143.9
Total unit costs index (4)	90.3	98.8	100.0	97.6	97.4	105.2	111.8	110.2	117.6	122.1

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Compound feed
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

The countries where animal feed is produced on an industrial scale there is a search for increasingly convenient compound feeds. By contrast, where the sector is fragmented, preference is tilted towards simple or cereal-based feedstuffs.

The demand for pet foods has special features. Products with high added service content are gaining ground all the time as family incomes increase and less time is available for activities in the home. As a result, consumption of pet foods is rising, boosted by vigorous marketing by firms in the sector which, thanks to high productivity, are investing large sums in advertising and product quality and diversification.

Supply and competition

The picture of competition within the EC shows that production is highly concentrated with consequent economies of scale in a number of countries (Northern Europe) but extremely fragmented in the Mediterranean area (Italy, Spain, Greece), due to the small scale of stock farms there and the close link with agricultural organisations. Domestic production is self-sufficient in the individual countries. Exports of compound feed are handicapped by the high incidence of transport costs.

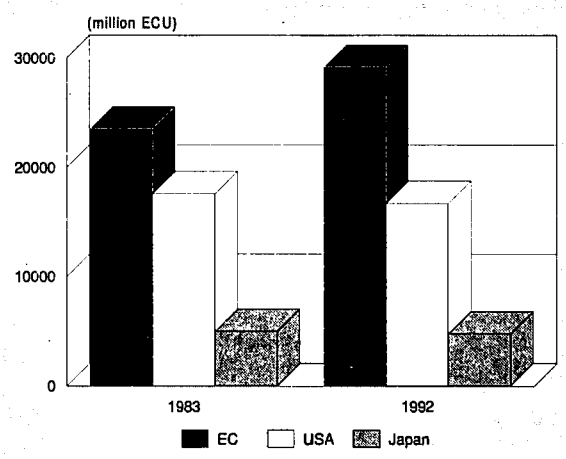
In the case of pet foods, there is a flow of trade from the countries where the market is saturated to countries where it is still developing. However, in the latter cases development seems to be taking place quite fast.

Production process

New materials account for such a high proportion of production costs that technological advances have less impact. The industry is nevertheless maximising productive efficiency by automation.

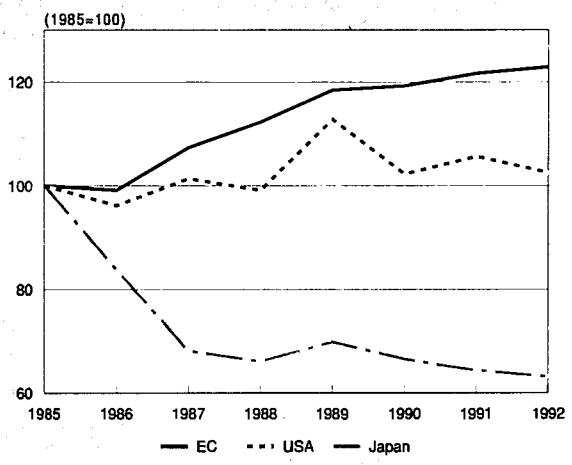
The best results in terms of cost competitiveness are obtained by better-planned purchasing and better product distribution. The ability to keep stocks down to a minimum according to demand opens the way to substantial savings. Small local firms often keep their costs at a sufficiently competitive level thanks to flexibility of production which enables them to gear their output to demand with low transport and storage costs.

Figure 4: Compound feed
International comparison of production in current prices



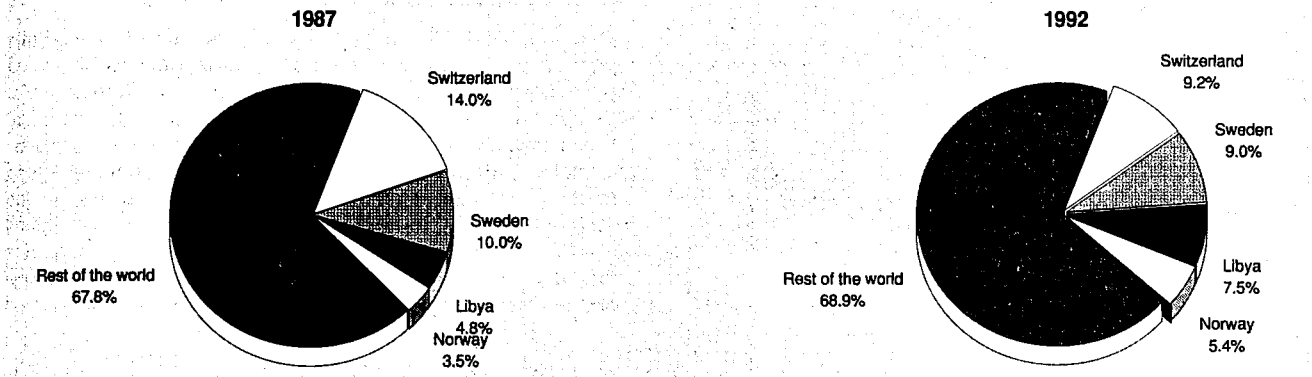
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Compound feed
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Compound feed
Destination of EC exports



Source: Eurostat

The pattern of pet food production is set by marketing, and principally by research and development of new products, in order to widen the range and improve the organoleptic properties which are decisive for product success.

INDUSTRY STRUCTURE

Companies

Feed supply is fragmented and shared between a few big companies and many small-capacity firms. The total number of production plants is around 4 300. They are generally located in the areas with the highest concentration of livestock farming; this applies in particular to the smaller firms because the area served is limited.

Of particular importance in this section are major firms of the private sector belonging to the top ten for each country. Co-operatives and consortia, according to FEFAC estimates, account for over 30% of compound feed produced in the Community. In Great Britain and Belgium co-operatives are not a major element, but in the Netherlands they account for 40-50% of production. There are very few multinationals. One of them, like Purina Ralston, Denkavit, BP Nutr (Hendrix) and Kofu, with a number of plants in the main Community producing countries. The incidence of transport costs and feeding patterns on livestock farms, which vary from country to country, account for the predominance of local firms as regards supply.

The European market for pet foods is dominated by four multinationals with production structure covering the whole of EC territory. Mars (USA) has over 50% of the market, thanks to the leading position of Unisabi in France, Elfem in Germany and the Netherlands, Dolma in Italy, Pedigree P.F. in the United Kingdom. Quaker (USA), and controls about 15% of the EC market; Nestlé (CH) and Dalgety (UK) both have under 10%. Some small and medium-sized enterprises operating at regional or national level have significant shares.

Strategies

Production capacity is under-used (35 - 40% of potential) in the animal feed section. In the short term, the reorganisation of many plant in search of economies of scale has led to the closure of less efficient firms as operators expected.

The competitive strategy of the biggest firms focuses on research and development and technical assistance. In the first case, the aim is to produce better-quality feed in an attempt to differentiate from competitors and keep or increase profits.

Figure 7: Compound feed
Origin of EC imports

Source: Eurostat

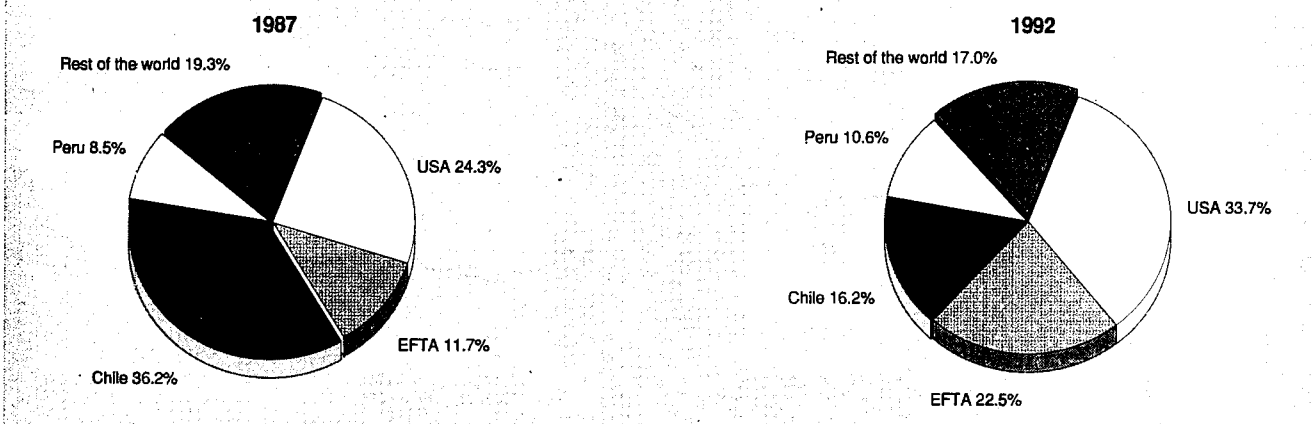


Table 5: Compound feed
Production per livestock class (1)

(thousand tonnes)	1991	1992
Cattle feed	34 997	33 946
Pig feed	38 094	39 019
Poultry feed	30 741	30 997
Other	6 318	6 426
Total	110 150	110 388

(1) Excluding Greece, Luxembourg and former East Germany
Source: FEFAC

The aim of technical assistance is to win loyal customers and to counter in some measure the effects of increased competitiveness. Small firms, with lower transport and management costs, pursue aggressive pricing policies.

The main strategic variables of the pet food industry are the introduction of new products and a brand policy backed by heavy investment in advertising.

ENVIRONMENT

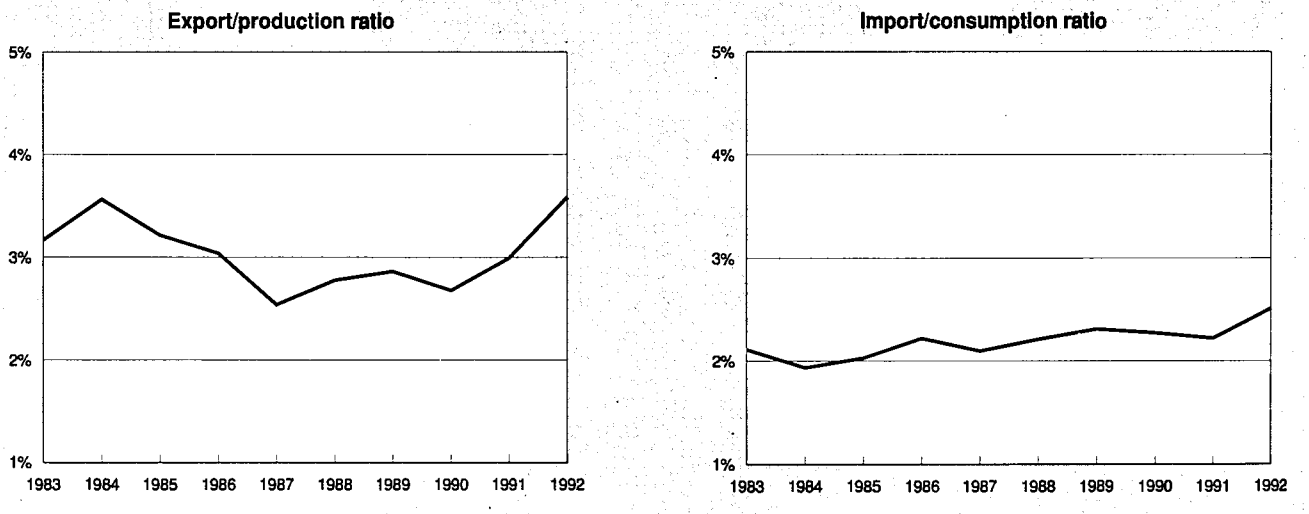
The compound feed industry has a vital role to play in improving the quality of meat. It is important to note that feed is the biggest cost element in meat production. Producers are always looking for the highest possible conversion rate between feed consumed and meat produced. To this end, widespread use is made of legally authorised substances which improve this rate. Apart, obviously, from monitoring by the accredited official bodies, improvement of the technical characteristics and nutritional quality of feed will help to correct this state of affairs. Vocational training for breeders is important, backed by technical assistance from the big firms.

Table 6: Compound feed
Estimated cereal consumption by the animal feed Industry

(million tonnes)	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93
EC (1)	38.22	36.18	35.70	32.43	30.33	29.70	33.51	32.67	31.74	N/A
Belgique/België	1.16	1.03	0.92	0.86	0.67	0.70	0.68	0.64	0.65	N/A
Danmark	1.72	1.72	1.58	1.43	1.43	1.32	1.40	1.23	1.34	1.69
BR Deutschland (2)	4.18	3.93	4.15	3.62	3.03	3.06	7.51	5.73	4.95	N/A
España	7.57	7.57	8.26	7.28	7.10	6.74	4.60	6.05	5.30	5.20
France	7.53	6.91	6.58	5.56	5.10	5.33	6.09	5.70	6.06	5.64
Ireland	0.75	0.84	0.79	0.62	0.49	0.51	0.56	0.62	0.69	0.70
Italia	5.62	5.57	5.53	5.53	5.46	5.65	5.80	5.80	5.90	5.70
Nederland	2.49	2.53	2.56	2.00	2.04	2.10	2.15	2.13	2.20	N/A
Portugal	1.86	1.53	1.16	1.01	0.83	0.74	0.79	0.90	0.95	1.04
United Kingdom	5.34	4.55	4.17	4.52	4.18	3.55	3.93	3.87	3.70	3.68

(1) Excluding Greece and Luxembourg
(2) Excluding former East Germany
Source: FEFAC

Figure 8: Compound feed
Trade intensities



Source: DEBA

Table 7: Compound feed
Industrial consumption of raw materials (1)

(thousand tonnes)	1988	1989	1990
Cereals	30 644	30 725	31 586
Manioc	6 324	5 756	5 898
By-products from food industry	16 490	17 625	18 193
Oils and fats	1 550	2 173	2 325
Cakes and meals	25 802	24 979	25 491
Pulses	N/A	4 270	5 007
Animal meals	2 528	3 003	3 027
Dairy products	1 499	1 445	1 427
Dried forage	2 558	2 058	2 122
Minerals, additives, vitamins	2 033	2 408	2 293
All others	10 309	5 824	4 776
Total	99 737	100 266	102 145

(1) Excluding Greece, Luxembourg and ex-DDR
Source: FEFAC

Table 8: Compound feed
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.4	1.0
Production	0.5	1.0
Extra-EC exports	10.0	5.0

Source: Prometeia

OUTLOOK

In the short term, the demand for compound feeds is expected to remain largely stable, due to the small increase of livestock. The recession, which has hit all Member States, will affect the sector in 1994. Another factor is that the meat market is at full growth; this is affecting prices and is therefore likely to make breeders less willing to spend.

The demand for pet food will go on rising rapidly (5%) but consumption may slow down in 1994. Risks for the sector include: lower Community support for some imported raw materials, less cattle breeding and increased competition and low price policies. Opportunities include: replacement of cereals by other high protein and energy value raw materials, increased feed consumption by the poultry and pig sectors, progressive raising of feed quality standards.

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Miscellaneous food products
NACE 417, 423

The products included in NACE groups 417 and 423 recorded good growth over the past decade. The categories with the greatest development potential at present are pasta, ready-to-serve thick soups and diet products, while the markets for tea and vinegar are stationary. The most important multinationals of the food industry operate in most subsectors of the miscellaneous food products and their brand products have substantial shares in all the markets of the Member States.

INDUSTRY PROFILE

Description of the sector

The sector covers production of pasta products (NACE 417) and of various commodities which constitute completely different markets (NACE 423): tea, coffee, chicory and other coffee substitutes; vinegar and other food dressings; diet products; ice; prepared desserts; preparations for clear soups, ready-to-serve thick soups and sauces; food products not included in the other NACE groups.

Recent trends

Pasta

Production of pasta in the EC is in excess of 3 million tonnes. The main indicators for the pasta sector display a positive trend. Over 1981-1991 the volumes produced in the EC increased at an annual average rate of 2.5% while apparent consumption rose in real terms by 1.5% per annum. Over the last five years the average rate of growth increased to 3% for production and 1.7% for apparent consumption.

Trade has expended significantly with extra-EC exports growing on average by 16.7% per annum and extra-EC imports 11.7%, in current prices. In 1992 the number of persons employed in the sector was 19 300, down 16% on 1983. From 1989 onwards, however, employment remained virtually stable.

Other food products

NACE Group 423 covers a variety of products with different market trends and growth rates. However, overall production and apparent consumption showed an annual average growth of about 8% at current prices from 1983 to 1992. Extra-EC exports increased by 6.4% per annum, while imports rose at an annual average rate of 1.7%. Employment rose substantially, by 14% during the period under review. The main subsector in terms of value is that of hot drinks. Among other food products, condiments and dressings (except for vinegar and salt), ready-to-serve soups and diet and baby foods have in recent years recorded growth rates ranging from 2% to 5% per annum in terms of volume.

International comparison

The EC is the leading world market for pasta, with a volume of around 2.7 million tonnes. Average per capita consumption (8.4 kg) is, however, equal to that of the United States, a growth market amounting to 2 million tonnes. The volume figures for the countries of the former Soviet Union are at the same levels, with per capita consumption of 7 kg. Japan's per capita consumption is very much lower (1.3 kg) and the total remains stable at 160 000 tonnes.

The EC, the United States and Japan are not coffee producers. The EC is the main net importer of green unroasted coffee; average per capita consumption is around 4 kg, which is slightly higher than the figure for the United States, where the market is contracting. In Japan per capita consumption is 2.8 kg but demand is growing steadily. That country grows a modest amount of tea (3.5% of world production of raw material), but per capita consumption is less than 1 kg, as in the United States and the EC.

Foreign trade

Pasta

Under the powerful stimulus of extra-EC exports, whose share of production rose from 3% in 1983 to 7% in 1992 in terms of value, the balance of trade in pasta has grown strongly at current prices in recent years, at the rate of 17.4% per annum. Intra-EC trade has also increased rapidly (by 14.5% per annum at current prices). Italy alone exports nearly 90% by volume of the pasta products manufactured in the EC and has won large market shares not only in the EC but also in some EFTA countries and Japan. The share of the latter regions and of the United States in extra-EC exports has decreased compared with 1987.

Other food products

Extra-EC imports remained substantially stable over the last decade. Consequently, their share in production decreased (from 5.6% in 1983 to 3.4% at present in terms of value). On the other hand extra-EC exports increased, pushing up the trade surplus. Intra-EC trade also increased considerably, representing in value almost twice as much as extra-EC exports and four times as much as extra-EC imports.

The significant weight of hot drinks in this subsector is evident in international trade. In 1992, imports of green unroasted coffee amounted to over 1.8 million tonnes, having increased at an average annual rate of 2.4% in volume from 1985 onwards. Conversely, imports of tea, at around 200 000 tonnes, fell by 1.9% per year over the period 1986-1991.

Table 1: Pasta (1)
Main indicators in current prices (2)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (3)
Apparent consumption	2 971	3 578	3 858	3 969	4 292	4 438	4 374	4 709	5 113	5 206	5 160
Production	3 052	3 694	3 992	4 090	4 421	4 580	4 563	4 901	5 364	5 551	5 460
Extra-EC exports	96.3	135.9	159.9	144.8	154.1	166.9	215.8	221.4	287.3	386.5	347.0
Trade balance	81.0	116.2	134.3	121.7	129.3	141.8	188.3	191.6	250.9	345.2	300.0
Employment (thousands)	23.0	23.5	22.4	22.5	22.6	22.6	19.6	19.6	19.7	19.3	19.3

(1) NACE 417
(2) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(3) Eurostat estimates.
Source: DEBA

Table 2: Other food products (1)
Main indicators in current prices (2)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (3)
Apparent consumption	18 111	21 489	22 380	24 813	24 321	24 794	27 978	29 316	33 203	35 057	35 500
Production	18 655	21 744	23 167	25 631	25 286	25 864	29 194	30 581	34 526	36 621	37 100
Extra-EC exports	1 607	1 882	2 185	1 941	1 903	2 060	2 294	2 383	2 516	2 798	2 870
Trade balance	543.9	255.2	787.7	818.1	965.0	1 070.0	1 215.4	1 265.2	1 322.5	1 563.7	1 600.0
Employment (thousands)	166.8	166.2	165.7	175.3	180.6	174.6	180.4	191.9	193.2	190.0	187.0

(1) NACE 423
(2) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards."
(3) Eurostat estimates.
Source: DEBA

MARKET FORCES

Demand

Pasta

Italian traditions serve as a sufficient explanation for the country's leadership in this subsector. The cessation of growth in demand in Italy is due to high per capita consumption, amounting at present to nearly 30 kg per year. The spread of the Mediterranean diet has stimulated higher consumption in nearly all the EC countries. Over the last five years the highest growth rate was recorded in Denmark, but the country with the highest per capita consumption after Italy is France (7.1 kg), followed by Portugal (5.4 kg) and Germany (5.1 kg). (Source: Consumer Europe 1993).

Other food products

Demand for tea in the EC has long ceased growing, chiefly because of the decline in per capita consumption in United Kingdom - the traditional tea-drinking country together with Ireland - from 3 kg to 2 kg during the last few years. Demand is being affected particularly by the strong competition from other non-alcoholic beverages such as soft drinks. The drop in the Anglo-Saxon countries has not been counterbalanced by the increases recorded in other countries such as France and Italy. Furthermore, per capita consumption there is low and tea is still a "special" product not firmly established in European food culture, except in the Anglo-Saxon countries.

Consumption of coffee is more solidly based in Europe. Over the last five years EC demand has risen by 1.4% per year in volume. Per capita consumption is highest in the Northern European countries, and specifically, within the EC, in Germany (8.5 kg), the Netherlands (8.3 kg) and Denmark (6.8 kg). (Source: Consumer Europe 1993). Italy is, however, the second market in terms of value after Germany, while the United Kingdom accounts for 45% of the volume of consumption of soluble coffee.

Table 3: Pasta (1)
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	96.3	135.9	159.9	144.8	154.1	166.9	215.8	221.4	287.3	386.5
Extra-EC imports	15.3	19.7	25.6	23.1	24.8	25.1	27.5	29.8	36.4	41.3
Trade balance	81.0	116.2	134.3	121.7	129.3	141.8	188.3	191.6	250.9	345.2
Ratio exports/imports	6.29	6.90	6.25	6.27	6.21	6.65	7.85	7.43	7.89	9.35
Terms of trade index	96.7	95.4	100.0	102.8	98.8	99.3	101.8	101.4	100.0	98.8
Intra-EC trade	175.5	200.3	235.2	279.1	314.6	347.4	391.3	480.8	556.3	595.8
Share of total imports (%)	92.0	91.0	90.2	92.4	92.7	93.3	93.4	94.2	93.9	93.5

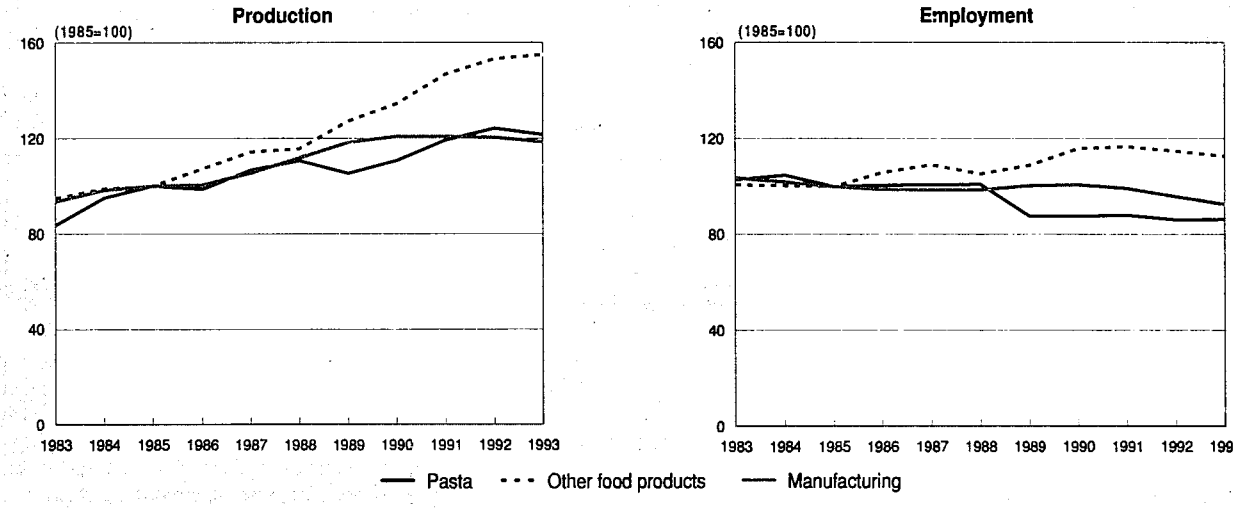
(1) NACE 417
Source: DEBA

Table 4: Other food products (1)
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 607	1 882	2 185	1 941	1 903	2 060	2 294	2 383	2 516	2 798
Extra-EC imports	1 063	1 627	1 398	1 123	938	990	1 078	1 118	1 194	1 234
Trade balance	543.9	255.2	787.7	818.1	965.0	1 070.0	1 215.4	1 265.2	1 322.5	1 563.7
Ratio exports/imports	1.51	1.16	1.56	1.73	2.03	2.08	2.13	2.13	2.11	2.27
Terms of trade index	112.7	88.0	100.0	124.5	140.6	151.5	154.4	155.6	160.1	168.6
Intra-EC trade	1 702	2 112	2 397	2 725	2 864	3 155	3 646	4 035	4 629	5 073
Share of total imports (%)	61.6	56.5	63.2	70.8	75.3	76.1	77.2	78.3	79.5	80.4

(1) NACE 423
Source: DEBA

Figure 1: Miscellaneous food products
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

Demand for ready-to-serve soups is ceasing to grow. The United Kingdom is the country with the most firmly established industrial tradition in this subsector and accounts for 50% of consumption of tinned soups in the EC. The Netherlands and Belgium also have high per capita consumption levels. Germany is the largest market for condiments and dressings, consumption of which is highest in the Northern European countries. Mayonnaise and salad dressing are still growing, although slowly, while demand for vinegar is stable. The main vinegar producers are Germany and France (53% of EC production) but per capita consumption is highest in Denmark and Belgium.

Supply and competition

Pasta

The EC pasta industry meets the whole of internal demand. Italy has large shares in the main Community markets. For instance, imports of Italian pastas account for 25-30% of consumption in France and Germany.

Other food products

The subsectors included in NACE Group 423 are characterised by the strong position of multinationals, which operate in the individual national markets either directly or with brands which have been taken over. The degree of concentration of supply is generally medium to high and the critical factors for success are investment in advertising and distribution. Brand policy predominates in the markets in question, supported by the great importance of modern distribution.

Production process

In the pasta subsector, Italy enjoys a kind of technological and qualitative leadership. Technological development has been concentrated on perfecting the fundamental phase of drying, which gives the pasta its flavour and consistency. In Italy, plant capacity and utilisation has increased. Average output per plant is around 13 000 tonnes, exceeded only by that of France (28 800 tonnes per unit).

With regard to tea, the production process is basically confined to packaging the imported product, whereas the coffee-drying industry has a more sophisticated technology, especially in the roasting phase. The technology of soluble coffee is very complex and requires substantial investment in plant.

Table 5: Green coffee
Imports into the EC

(thousand tonnes)	1985	1986	1987	1988	1989	1990	1991	1992
EC	1 551.7	1 537.3	1 645.3	1 651.3	1 649.1	1 819.8	1 773.9	1 828.7
Belgique/België, Luxembourg	101.2	81.6	88.7	95.7	77.0	77.8	61.7	65.9
Danmark	46.3	46.5	50.8	50.0	55.1	50.6	51.6	56.0
BR Deutschland	423.4	452.9	487.0	492.4	500.2	580.7	609.8	622.8
Hellas	20.3	12.5	21.4	22.7	22.4	23.7	8.6	3.7
España	133.4	149.1	147.2	149.0	158.1	175.3	170.4	194.7
France	275.8	281.5	297.0	303.0	304.1	312.9	322.1	321.7
Ireland	0.5	0.7	0.8	0.9	0.9	1.0	1.5	1.9
Italia	281.1	251.5	263.3	259.4	270.6	307.9	267.0	267.7
Nederland	144.8	141.2	155.5	150.7	137.9	151.5	150.6	154.9
Portugal	22.1	20.8	27.4	25.2	25.7	29.7	30.7	31.6
United Kingdom	102.9	99.0	106.3	102.3	97.2	108.6	100.0	107.9

Source: EUCA

Table 6: Tea
Imports into the EC

(tonnes)	1986	1987	1988	1989	1990	1991	1992	% of total in 1992
EC	224 974	195 250	215 779	216 346	198 371	205 823	205 258	100.0
Belgique/België, Luxembourg	1 498	1 214	1 316	1 587	1 486	1 984	1 617	0.8
Danmark	2 432	2 155	2 001	2 109	2 024	2 026	1 939	0.9
BR Deutschland	14 551	14 699	14 757	14 021	14 650	16 136	18 195	8.9
Hellas	398	370	363	407	303	690	350	0.2
España	719	768	747	770	747	721	750	0.4
France	10 036	9 148	10 155	10 090	11 056	11 852	11 750	5.7
Ireland	11 295	10 885	10 376	10 607	11 512	10 895	11 423	5.6
Italia	3 295	3 489	3 485	4 093	4 363	4 683	5 052	2.5
Nederland	9 429	9 725	9 598	9 551	10 125	10 464	9 290	4.5
Portugal	255	218	282	250	211	291	250	0.1
United Kingdom	171 066	142 579	162 699	162 861	141 894	146 081	144 642	70.5

Source: CEdT

INDUSTRY STRUCTURE

Companies

The number of industrial producers of pasta fell from over 300 in 1981 to 254 in 1991. The concentration of supply has increased owing to the many take-overs of national companies by multinationals. The market leader in Europe is Barilla (I) with a 23% share, followed by BSN (F) with 16% and by Nestlé (CH).

In the hot drinks subsector, multinationals are well to the fore, especially Unilever (UK/NL) and Teekanne (D) for tea and other infusions and Philips Morris (USA), Sara Lee (USA) and Nestlé (CH) for coffee. Together with Lavazza (I), the last three groups hold nearly 60% of the coffee market. Nestlé alone accounts for about half the supply of soluble coffee and coffee substitutes.

The multinationals are also extremely active in the subsector comprising condiments and dressings, ready-to-serve soups and diet products. Unilever, Philips Morris with Kraft General Foods, Nestlé, HJ Heinz (USA), Campbell Soup (USA) and CPC (USA) are the major players.

Strategies

In addition to take-overs, which are particularly important in the pasta subsector, strategies are based on the popularity of product brands and large investment in advertising. Despite wide-spread product differentiation, product innovation is considered to be relatively poor.

REGIONAL DISTRIBUTION

In the production of pasta, Italy has a 70% share, followed by France (9%) and Germany (8%). The hot-drinks subsector is characterised by processing of imported raw materials. Distribution of production approximately coincides with consumption. The United Kingdom dominates the tea market and is among the main world net importers of raw material (for other vegetable infusions the largest market is Germany). Germany is the leading importer of unroasted coffee, with a 34% share of the EC total of over 1.8 million tonnes imported in 1992. With regard to product groups such as food dressings (excluding tomato derivatives) and ready-to-serve soups, the highest consumption levels are generally in the Northern European countries. Germany and the United Kingdom are the largest markets.

Table 7: Instant coffee
Consumption

(tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991
EC	96 881	100 131	97 141	96 326	97 006	98 024	96 383	98 466	98 812
Belgique/België, Luxembourg	1 271	1 251	1 257	1 318	1 296	1 344	1 390	1 460	1 490
Danmark	440	570	300	408	360	380	506	479	660
BR Deutschland (1)	14 000	13 000	12 500	12 000	11 900	11 500	11 700	12 500	13 000
Hellas	3 500	4 500	3 357	3 470	3 180	3 180	4 559	5 153	5 249
España	8 500	8 500	8 500	8 700	8 900	9 430	9 400	9 600	9 690
France	14 300	16 100	16 400	16 200	16 300	17 000	16 500	17 400	17 200
Ireland	1 540	1 970	2 287	2 350	1 760	1 760	1 957	2 115	1 711
Italia	1 900	1 700	1 300	1 490	1 490	1 500	1 631	1 759	1 812
Nederland	1 400	1 400	1 440	1 590	1 530	1 530	1 510	1 450	1 770
Portugal	800	800	800	800	1 390	1 400	1 400	1 400	1 730
United Kingdom	49 230	50 340	49 000	48 000	48 900	49 000	45 830	45 150	44 500

(1) 1990 and 1991 including former East Germany
Source: AFCASOLE

Table 8: Vinegar
Production by Member State

(thousand hl)	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	154	171	164	168	182	206	207	212
Danmark	145	142	119	133	154	152	164	154
BR Deutschland	1 177	1 230	1 192	1 235	1 269	1 362	1 437	1 632
Hellas	N/A	N/A	N/A	80	80	N/A	N/A	N/A
España	381	398	417	405	413	417	423	436
France	987	930	885	1 051	1 230	1 130	1 119	1 137
Ireland	10	9	10	9	8	11	9	9
Italia	526	540	535	535	550	550	560	540
Nederland	84	N/A	N/A	N/A	N/A	N/A	173	193
Portugal	N/A	N/A	N/A	75	77	89	77	69
United Kingdom	636	638	663	702	635	725	678	746

Source: CPIV

Table 9: Vinegar
Per capita consumption by country, 1992

(litres)	
Belgique/België	3.2
Danmark	3.5
BR Deutschland	2.2
España	1.0
France	1.5
Ireland	0.6
Italia	1.0
Portugal	0.7
United Kingdom	1.3

Source: CPIV

Table 10: Vinegar
Number of vinegar plants

	1991	1992
Belgique/België	10	7
Danmark	3	3
BR Deutschland	34	31
España	31	31
France	22	20
Ireland	1	1
Italia	44	41
Portugal	8	8
United Kingdom	5	5

Source: CPIV

OUTLOOK

The sectors in question do not, as a whole, present any great opportunities for development as far as demand in the EC is concerned. The highest growth rates are likely to occur in the case of condiments, except vinegar, and above all in that of ready-to-serve soups, thanks to their convenience for the consumer. These products do, however, run up against opposition in the Southern European countries with eating traditions which do not favour their use. For pasta there is very great growth potential outside Italy, but for the time being the greatest opportunities for the industry are to be found in exporting and particularly in penetrating markets in Eastern Europe. Consumption of tea has long ceased to increase. The coffee market, which is much larger, has consumption levels which it would be difficult to increase any further.

Risks for the sector are more evident in the case of hot drinks: especially for tea due to competition from other non-alcoholic beverages while the spread of health-conscious life styles poses a risk for future demand for condiments. Further opportunities exist for pasta reflected in its rising export potential over the recent past. Finally, there is a growing interest for tea-based cold drinks and good prospects for ready-to-serve soups due to their convenience aspect compatible with modern life styles.

Written by: Prometeia Calcolo Srl
The industry is represented at the EC level by: European Federation of Coffee Rosters Associations (EUCA). Address: Boulevard Baudouin 21, 7th Floor, B-1210 Brussels; tel: (32 2) 223 0141; fax: (32 2) 223 1244; and, Association of Soluble Coffee Manufacturers of the EEC (AFACSOLE), and European Tea Committee (CEdT/ETC). Address: 51-53 rue Fondary, F-75015 Paris; tel:(33 1) 45 79 80 75; fax: (33 1) 45 79 61 29; and Standing International Vinegar Committee (CPIV), and Federation of Soup Industry Associations of the EEC (FAIBP). Address: Reuterstrasse 151, D-5300 Bonn; tel: (49 228) 21 20 17; fax: (49 228) 22 94 60.

Alcohol and spirits
NACE 424

The spirits sector accounts for about a quarter of the wider market for alcoholic drinks. In relation to other alcoholic drinks (beer, wine, etc.) spirits have the highest bottling strength, although the manner in which they are consumed often makes their serving strength comparable with other alcohol drinks. Spirits are penalised by high taxation and in some markets by government restrictions on advertising and promotion.
The European market is made up of a few multinationals and a large number of local producers. Spirits are distributed mainly through specialist firms and the trend is to build sales through both traditional retail outlets and supermarkets.

INDUSTRY PROFILE

Description of the sector

The sector comprises two main categories of product: ethyl alcohol of agricultural origin and spirits as opposed to spirit drinks. Official statistics treat the first as spirit drinks and the second as industrial. Ethyl alcohol is used in a variety of alcoholic drinks, vinegars, pharmaceutical products, cosmetics and other industrial products.

The three main categories of alcoholic drinks are:

- whisky, particularly Scotch, but also Canadian, Irish, Bourbon and other non-Scottish whiskies
- vodka, rum, gin, brandy (including also cognac, armagnac, French eaux-de-vie and various German brandies); and
- punch and cocktails, liqueurs, pastis/anisette (the French national liqueur), bitters and grappas (widely drunk in Italy) and other minor types.

Recent trends

Value added was ECU 3 353 million for 1992, which was 2% down on the previous year. The United Kingdom and France jointly accounted for 48.3% of European added value, with Spain contributing 15.4%, Italy 14.3% and Germany 12.3%.

From 1983 to 1988, production and consumption declined at an average rate of 1.1% and 2.3% per annum, respectively. However, from 1988 to 1992, small improvements materialised in an average growth rate of 0.3% in both production and consumption. The number of people employed in the sector has been falling for the last ten years due to declining output and to technological improvements in areas such as bottling.

International comparison

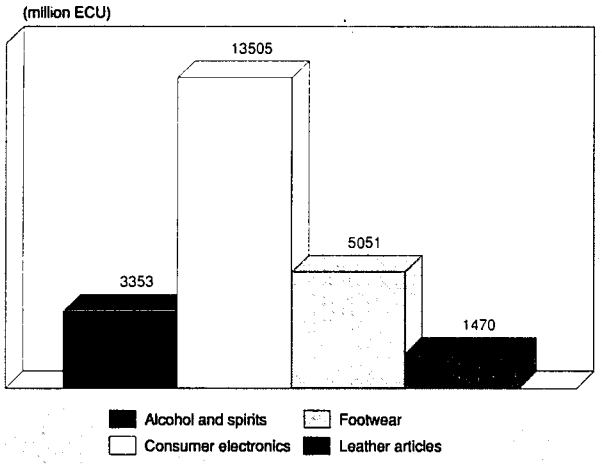
In 1992, the alcoholic drinks industry (beer, wine and spirits) grew by 2% in the United States with an output worth around 23 billion dollars. Different spirit drinks performed in different ways, but overall spirits recorded a decline amounting to 1.5% in current values, with production worth 3.3 billion dollars.

Foreign trade

The Community is the major world exporter of alcoholic drinks, with products such as scotch whisky, brandy (cognac, armagnac and Weinbrand) being the leading exports, although products such as gin, vodka, rum and well-known liqueurs, which are sold virtually throughout the world, must not be overlooked.

In 1992, over 40% of Community exports went to the United States and Japan; the latter's share rising from 9.7% to 15.7% between 1987 and 1992. Almost 33% of Community imports

Figure 1: Alcohol and spirits
Value added in comparison with other industries, 1992



Source: DEBA

came from the United States and the EFTA countries. Five years earlier the figure was 20.3%. The biggest share is held by the United States, rising from 14.2% in 1987 to 26.8% in 1992.

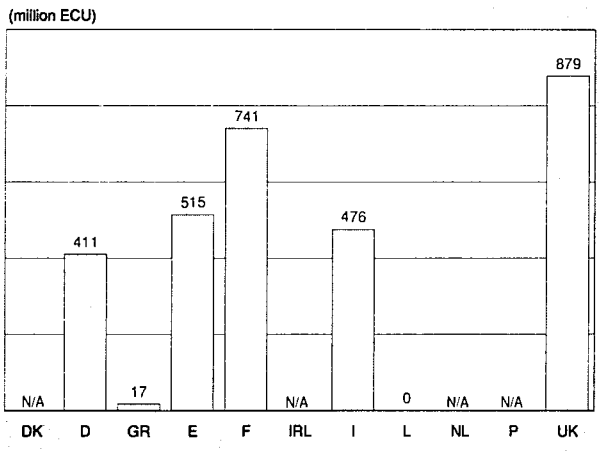
MARKET FORCES

Demand

Although there are regional differences in production (Scotch whisky and gin in the United Kingdom, corn brandy in Germany, anisette or ouzo in Greece, brandy and eaux-de-vie in France, grappa and bitters in Italy, and brandy in Spain) there is an increasing demand form consumers to have available to them a greater range of spirit drinks. During 1992, average European consumption was estimated at 5.7 litres per head. The figure for individual countries varied, however, from 14 litres in Greece to 3 litres in Italy.

The success of multinational drinks companies has increased the availability of different drinks in different markets. Recently, the demand for alcoholic drinks has fallen in Italy

Figure 2: Alcohol and spirits
Value added by Member State, 1992



Source: DEBA

Table 1: Alcohol and spirits
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993(2)
Apparent consumption	8 687	8 855	9 032	9 171	9 030	9 111	9 047	9 703	10 681	10 540	10 500
Production	10 520	10 912	11 259	11 155	11 067	11 421	11 749	12 596	13 667	13 756	13 300
Extra-EC exports	1 982	2 216	2 395	2 160	2 235	2 505	2 958	3 219	3 327	3 579	3 210
Trade balance	1 833	2 057	2 227	1 984	2 037	2 309	2 702	2 893	2 987	3 216	2 800
Employment (thousands)	65.4	62.3	58.6	56.0	52.2	49.5	48.2	47.9	48.5	46.4	44.5

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 2: Alcohol and spirits
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	-2.3	0.3	-1.1
Production	-1.1	0.3	-0.5
Extra-EC exports	3.4	1.3	2.4
Extra-EC imports	3.2	10.0	6.2

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Alcohol and spirits
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 982	2 216	2 395	2 160	2 235	2 505	2 958	3 219	3 327	3 579
Extra-EC imports	148.9	158.5	168.0	176.2	198.5	195.8	256.4	326.1	340.0	362.7
Trade balance	1 833	2 057	2 227	1 984	2 037	2 309	2 702	2 893	2 987	3 216
Ratio exports/imports	13.3	14.0	14.3	12.3	11.3	12.8	11.5	9.9	9.8	9.9
Terms of trade index	93.1	94.9	100.0	95.8	94.0	88.7	85.8	89.7	91.2	95.4
Intra-EC trade	974	1 020	1 188	1 281	1 314	1 523	1 704	1 864	2 119	2 176
Share of total imports (%)	86.7	86.6	87.6	87.9	86.9	88.6	86.9	85.1	86.2	85.7

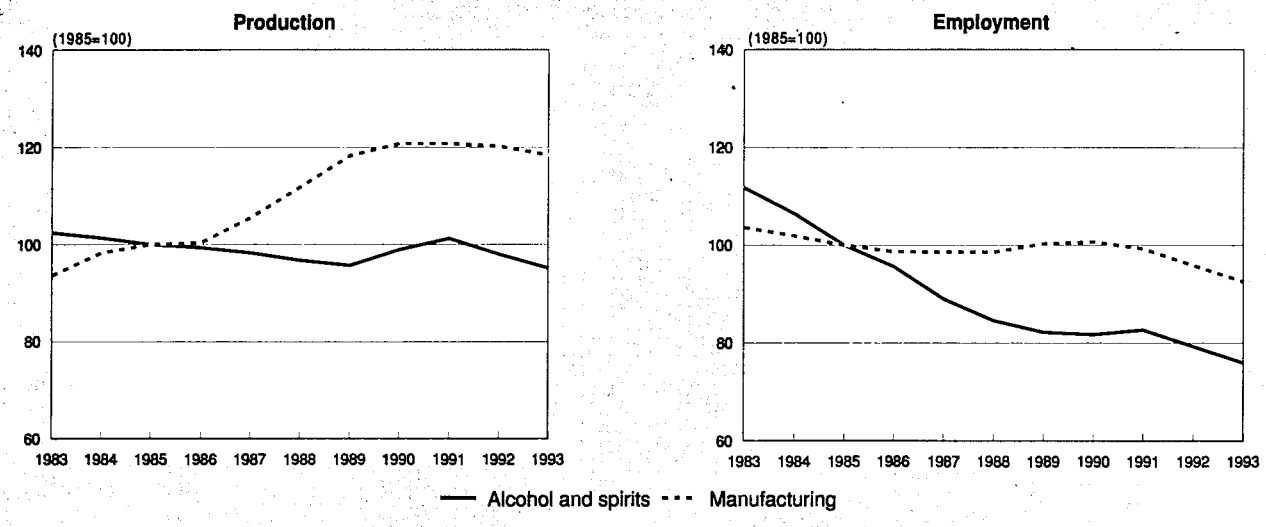
Source: DEBA

Table 4: Alcohol and spirits
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	64.3	65.0	71.3	74.7	79.3	80.4	73.1	74.8	68.4	72.2
Productivity index	90.2	91.2	100.0	104.8	111.2	112.7	102.6	104.9	96.0	101.2
Unit labour costs index (3)	85.8	92.4	100.0	105.0	109.8	117.3	127.5	133.1	144.0	154.3
Total unit costs index (4)	81.0	91.9	100.0	98.6	108.0	120.7	138.1	150.5	163.1	175.5

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Alcohol and spirits
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

and the United Kingdom, partly because of the state of the economy, and in the case of the United Kingdom, because high taxation has made these drink products expensive and so adversely affected sales. By contrast, demand has risen in countries like Germany, Spain and France. In Germany the reason is to be found in reunification, because spirits are very widely purchased by people living in former East Germany, where consumption in 1991 was estimated at 16 litres per head. The higher demand in Spain stems from higher average wages per head and the removal of tariff and trade restrictions since Spain joined the EC. The reason for increased demand in France is an effective marketing and distribution policy and the fact that drinkers enjoy the additional products now available to them.

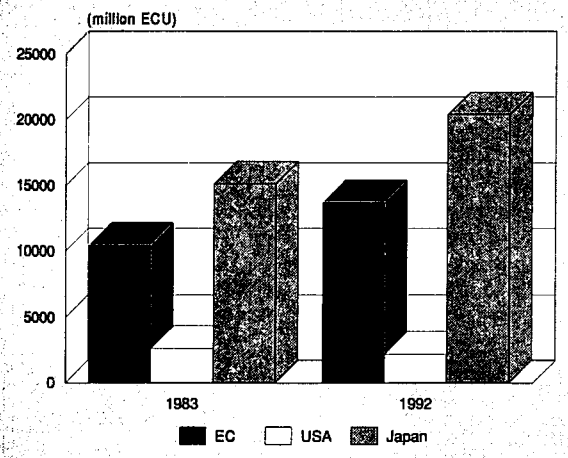
Supply and competition

The main operators in the alcoholic products industry are the multinationals which, are securing new markets for their international brands. Supply is highly concentrated in the United Kingdom and France, but is very fragmented in Germany. In Greece, a large number of local producers exist side by side without any major multinational presence. The markets for aperitifs and regional products (grappas) are very fragmented in Italy and have reached saturation point. Competition between international brands is very fierce with each company carrying a broad product range.

Production process

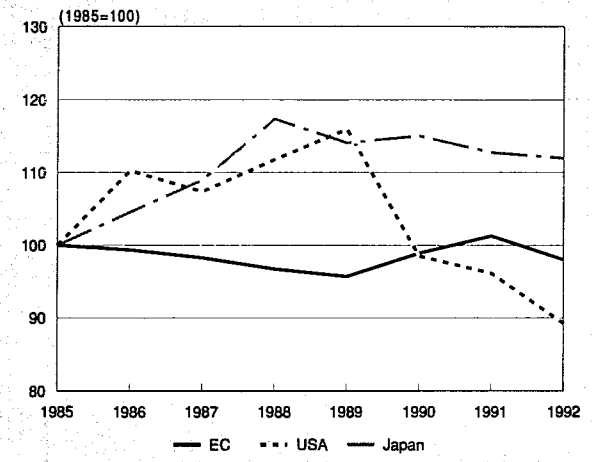
Alcoholic drinks are produced by fermenting and filtering agricultural products such as grapes, fruit and grain. The production of distillates is based on a tradition and culture of rural economies. This background is still to be found in drinks such as Scotch whisky, although there has been a general move to large scale plants.

Figure 4: Alcohol and spirits
International comparison of production in current prices



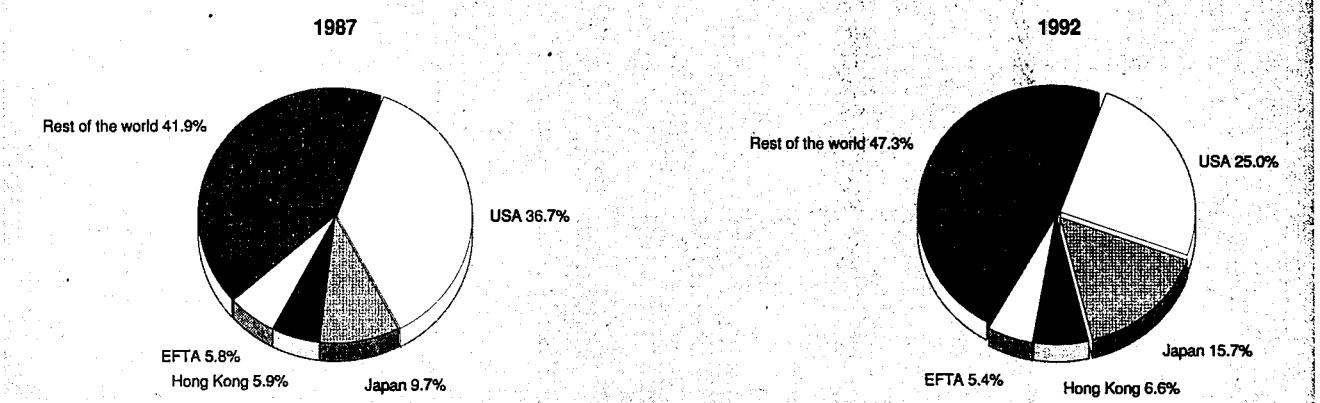
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Alcohol and spirits
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Alcohol and spirits
Destination of EC exports



Source: Eurostat

INDUSTRY STRUCTURE

Companies

International drinks such as whisky, gin and rum, which are distilled and distributed by the leading multinationals operating in the alcoholic products market often belong to companies registered in the United Kingdom or the United States. They compete vigorously with local firms for market share and the two groups provide consumers with a wider choice of spirit drinks across the EC. Small firms are often able to establish niche market opportunities by specialising in the production of local specialities.

At the European level, the leading distillers and distributors of alcoholic products are: Guinness (UK), Pernod Ricard (F), Grand Met (UK), Allied-Lyons (UK), Martini & Rossi (I) and Seagrams (USA). These six firms control over 40% of the EC market.

Strategies

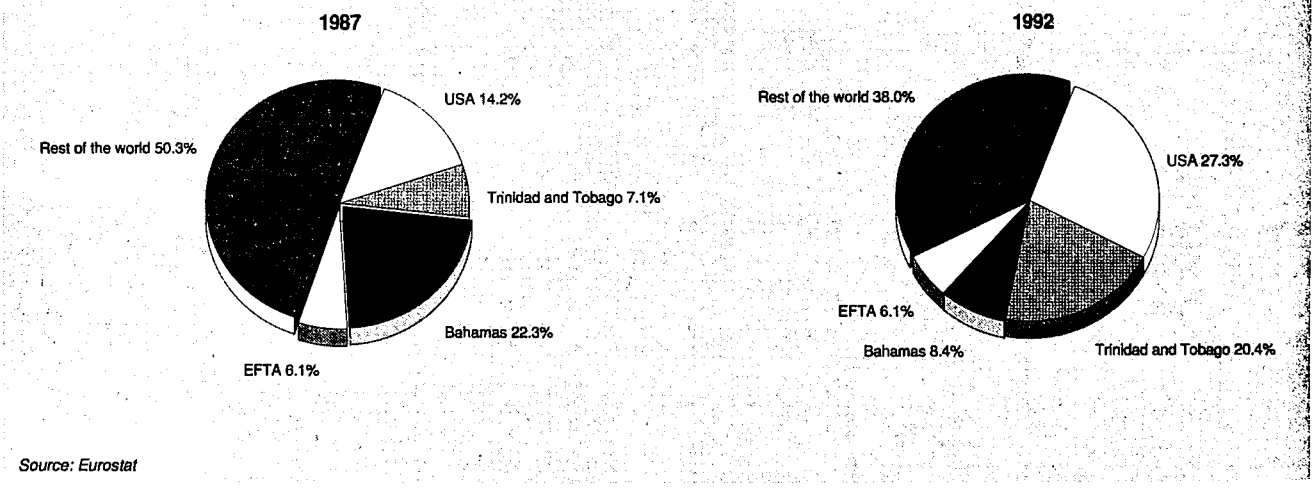
Over the last ten years, the drive to consolidate and increase the market shares of the major brands on the world market has led to a series of take-overs which have modified the ownership structure. The most recent are as follows: Pernod Ricard has acquired Irish Distillers (IRL), and Guenther Reh AG (D) has acquired Langenbach & Co GmbH/Hermann Kendermann GmbH (D).

ENVIRONMENT

The alcoholic products industry is paying more attention to environmental issues centred on packaging. It is also reviewing disposal of waste which, in many cases, can be passed back into the agricultural system in the form of animal feed. The industry is particularly concerned that Member States tackle environmental issues through a uniform approach so as not to be faced with many different forms of legislation which could act as barriers to trade.

Looking at the future and the tax incentives recently introduced by the Community, alcohol of agricultural origin may find uses in new directions, for example as an additive for fuel for land vehicles in place of lead tetraethyl. This might help to alleviate, in some measure, the problem of atmospheric pollution.

Figure 7: Alcohol and spirits
Origin of EC imports



Source: Eurostat

Table 5: Ethyl alcohol of agricultural origin
Estimated annual production (in pure alcohol)

(thousand hl)	1984	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	93	89	86	63	52	45	3	3	3
Danmark	121	133	135	N/A	115	139	145	152	181
BR Deutschland (1)	636	634	684	658	694	676	791	1 139	N/A
Hellas	320	N/A	317	N/A	268	292	294	283	N/A
España	N/A	2 723	2 054	2 921	2 821	1 159	1 964	3 353	N/A
France	4 296	4 215	4 137	4 759	4 350	4 189	5 768	4 993	N/A
Ireland	106	N/A	N/A	73	N/A	N/A	78	N/A	N/A
Italia (2)	2 914	1 653	3 357	3 943	N/A	3 404	2 678	2 655	3 569
Nederland	637	672	648	614	720	N/A	838	N/A	N/A
Portugal	87	73	60	70	68	80	90	105	100
United Kingdom	418	453	510	N/A	1 272	N/A	1 609	770	N/A

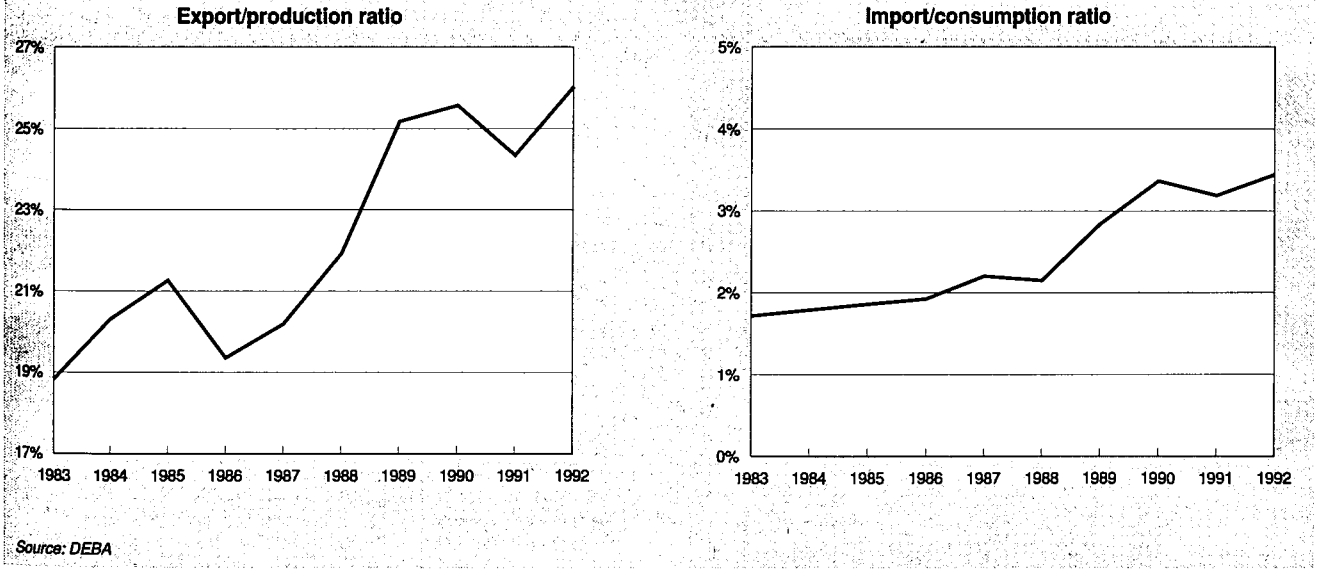
(1) Including former East Germany from 1991
(2) Including wine distillates from 1986
hl: hectolitres
Source: National statistics and UEAES

Table 6: Spirit drinks
Estimated annual production (in pure alcohol)

(thousand hl)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC (1)	9 252	8 863	9 388	9 207	9 284	9 696	10 277	11 563	11 772	11 702
Belgique/België	74	74	74	64	64	60	57	51	49	47
Danmark	79	87	93	77	74	69	70	70	69	65
B.R. Deutschland (1)	1 080	1 055	1 031	997	976	1 010	1 010	1 231	1 667	1 649
Hellas	105	105	105	105	105	105	105	149	150	150
España	1 070	1 070	1 214	1 201	1 129	890	899	1 057	876	966
France	2 200	1 800	2 150	2 100	2 060	2 280	2 460	2 700	2 750	2 880
Ireland	125	125	125	120	120	100	100	82	80	80
Italia	900	850	800	750	700	609	678	694	700	750
Luxembourg	3	2	2	2	2	2	2	2	1	2
Nederland	378	325	311	306	296	311	286	290	298	312
Portugal (2)	88	90	83	85	78	80	80	87	102	101
United Kingdom	3 150	3 280	3 400	3 400	3 680	4 180	4 530	5 150	5 030	4 700

(1) Including former East Germany from 1991
(2) Including wine distillates
Source: National associations and UEAES

Figure 8: Alcohol and spirits
Trade intensities



Source: DEBA

Table 7: Alcohol and spirits
Employment (direct) in distilleries (1)

	1991	1992
Belgique/België	320	N/A
Danmark	870	800
BR Deutschland (2)	6 373	6 216
France (Cognac)	N/A	6 000
Italia (3)	N/A	13 240
Luxembourg	14	12
Nederland	N/A	1 475
United Kingdom (Scotch Whisky)	15 310	15 035

(1) All enterprises; small and medium enterprises are estimated
(2) Only enterprises with 10 or more employees
(3) Estimated
Source: UEAES

Table 8: Alcohol and spirits
Total exports for Cognac

(hl pure alcohol)	1991	1992
Total exports	371 370	354 810
or which to Japan	75 433	67 552
USA	55 606	79 221(1)
Hong Kong	40 166	39 366
United Kingdom	37 087	32 534
BR Deutschland	25 584	25 479
Singapore	10 998	9 952
Malaysia	10 325	7 701
Taiwan	6 405	12 184
Nederland	9 808	8 762
Belgique/België, Luxembourg	9 514	8 778
Sales in France:	23 983	20 784

(1) Increase due to the sojabean conflict
Source: UEAES

Table 9: Alcohol and spirits
Total exports for Scotch Whisky

(hl pure alcohol)	1991	1992
Total exports	2 277 484	2 312 724
of which to EC excl. UK	856 600	925 000
USA	408 800	384 100
Japan	180 200	185 600
Australia	68 500	69 700
South Africa	56 100	59 500
Thailand	54 700	48 000
Rep. of Korea	51 900	46 100
Brazil	46 000	31 100
Sales in UK	382 600	357 900

Source: UEAES

REGULATIONS

Regulation 1576/89 defines the various categories of spirit drinks and lays down specific rules for the labelling of products.

OUTLOOK

If the recent growth of consumption recorded in some Member States is to continue, it will be in the face of factors such as high prices sustained by the taxation of spirit drinks at a level much higher than that levied on other alcoholic drinks and campaigns to cut down alcohol consumption generally.

Production and apparent consumption are forecast to decrease slightly in the mid- to long-term. In contrast, extra-EC exports are expected to grow slightly.

Firms operating in the sector will continue to market the typical features of their products as they seek to establish their brands in the appropriate sector of the individual country market they have chosen for that particular brand.

Table 10: Alcohol and spirits
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-0.7	-0.2
Production	-0.6	-0.1
Extra-EC exports	0.5	1.0

Source: Prometeia

Written by: Prometeia Calcolo Srl
The industry is represented at the EC level by: Confederation Européenne des Producteurs de Spiritueux (UEAES). Address: Avenue de Tervuren 192, Bte 3, B-1150, Brussels; tel: (32 2) 779 2423; fax: (32 2) 772 9820.

Wine
NACE 425

The wine market has been shrinking since the late eighties. This is in line with the trend for consumption of all alcoholic products as a result of consumers' greater awareness of health problems and the campaigning of increasingly active health protection groups.
Recent trends have revealed changing consumer preferences and ordinary and table wines are losing market shares to quality wines. Changes are taking place in the distribution of wine which is increasingly being sold by modern distributors and through networks specialising in the sale of alcoholic products.

INDUSTRY PROFILE

Description of the sector

The variety of products marketed is so wide that it can be sub-divided under many headings, the chief of which are:

- by colour (red, white, rosé)
- by quality (table, IGT, DOC, DOCG, VQPRD etc.)
- by alcoholic strength
- by type (still, sparkling, fortified, etc.)
- by method of packaging (bottles and flasks of different capacities, "brik"-type cartons, bag-in-box, cans, etc.)
- by geographical area of origin

"Wine coolers" are a fairly new development, widely sold on the United States market but meeting resistance in the traditional wine-drinking countries, which are reluctant to accept such major changes.

Total Community added value amounted to 2407 million ECU in 1992. Three major producing countries accounted for 78.8% of this figure - Spain with a 28.9% share, France with 33.7% and Italy with the lower figure of 16.2%.

Recent trends

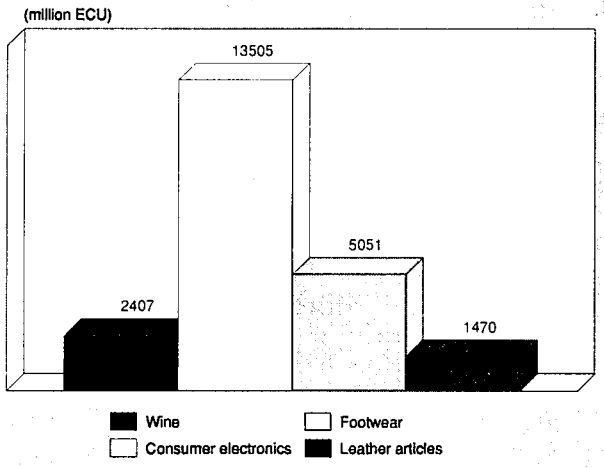
Cyclical variations are quite common in this sector particularly due to varying weather conditions. During the 1983-92 period, consumption rose by a real annual average of 1% and production by 0.4%. Exports fell sharply at an annual average rate of 6.8%. Since 1989, the trade balance has become steadily worse due to a big increase in imports and a marked drop in exports. From 1991 to 1992, both production and consumption fell by 1% and exports by 2.4%. The trade balance was 4.3% down as a result but was steadily favourable. The downward trend of the sector, worsened by the current recession in Europe, was reflected in lower employment (down 2.9%).

In 1990 and 1991 too much wine was produced and was handed over to the intervention scheme for compulsory distillation. In response to the falling trend of wine drinking, the Community introduced a system for the up-rooting of vineyards in order to reduce total European production. However, the effectiveness of these measures was partially offset by higher vineyard yields.

International comparison

The last forty years have witnessed a tremendous expansion of wine growing throughout the world. The Community is the leading producer with over 60% of world production, followed by the CIS, the United States (15% of the total) and Argentina. Production in the former USSR countries which had grown rapidly over the previous 35 years, fell back unexpectedly from 1985 onwards because of the campaign against alcoholism.

Figure 1: Wine
Value added in comparison with other industries, 1992



Source: DEBA

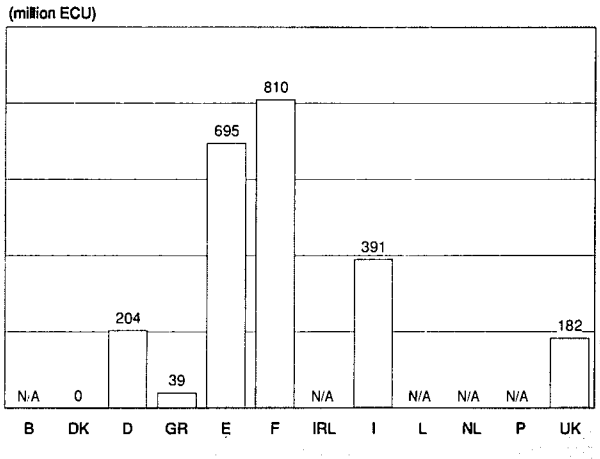
Foreign trade

The EC is the leading figure in the world wine market despite the fact that exports are declining. Italy is the leading exporting country in terms of quantity but France stays easily in the lead in terms of earnings. Spain is by no means negligible exporter while Germany and the United Kingdom are the world's biggest importers.

From 1987 to 1992, the share of Community exports going to the United States fell from 56.2% to 40.3% but the share going to the EFTA countries and Japan increased (from a combined share of 18.9% in 1987 to 24.7% in 1992).

Over the same period, the shares of EC imports by country of origin were up for the United States and the EFTA countries but down for Japan and the rest of the world (rising from 15.8% to 24% for the first group and falling from 20.7% to

Figure 2: Wine
Value added by Member State, 1992



Source: DEBA

Table 1: Wine
Production in volume

(1000 hl)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EC (1)	221 208	210 549	194 245	189 040	211 420	212 018	160 293	178 664	187 187	158 614	192 732
Belgique/België	3	2	2	2	2	2	2	2	2	1	N/A
BR Deutschland (1)	16 133	13 397	8 887	6 102	10 921	9 713	9 981	14 466	9 510	10 699	13 300
Hellas	4 500	5 250	5 025	4 782	4 334	4 467	4 345	4 531	3 526	4 021	4 061
España	39 219	32 465	36 249	34 511	37 042	41 481	23 249	31 276	42 231	32 570	36 700
France	79 953	68 547	64 360	71 297	73 974	69 340	57 620	60 508	65 530	41 500	61 500
Italia	72 648	82 200	70 900	62 340	76 962	75 822	61 010	59 727	54 868	59 645	67 700
Luxembourg	256	185	152	107	160	142	142	232	151	86	271
Portugal	8 489	8 483	8 655	9 893	8 017	11 047	3 938	7 901	11 351	10 077	9 200
United Kingdom	7	20	15	6	8	4	6	21	18	15	N/A

(1) including former East Germany for 1991 and 1992
Source: Eurostat

Table 2: Wine
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	2.1	-0.4	1.0
Production	1.3	-0.8	0.4
Extra-EC exports	-7.2	-6.2	-6.8
Extra-EC imports	-1.0	17.0	6.7

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Wine
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	5 685	6 244	6 756	6 799	7 353	7 408	8 115	9 220	9 367	9 281	9 330
Production	6 299	6 954	7 527	7 502	8 048	8 092	8 869	9 922	10 025	9 910	10 100
Extra-EC exports	635.4	734.0	794.8	723.9	716.6	708.6	781.7	737.9	701.4	684.3	810.0
Trade balance	613.4	710.0	770.7	703.0	695.1	684.0	754.1	702.0	657.4	629.2	770.0
Employment (thousands)	55.9	56.3	54.6	53.7	53.6	48.5	49.1	49.2	47.9	46.5	45.2

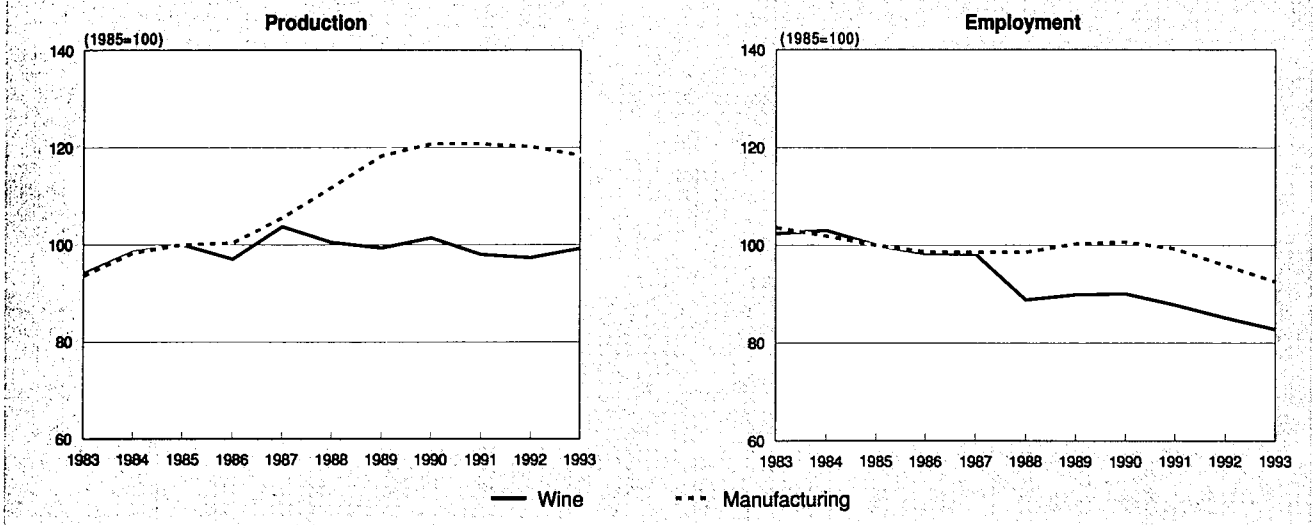
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 4: Wine
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	635.4	734.0	794.8	723.9	716.6	708.6	781.7	737.9	701.4	684.3
Extra-EC imports	22.0	24.0	24.1	20.9	21.5	24.6	27.6	35.9	44.1	55.1
Trade balance	613.4	710.0	770.7	703.0	695.1	684.0	754.1	702.0	657.4	629.2
Ratio exports/imports	28.9	30.6	33.0	34.6	33.3	28.8	28.3	20.6	15.9	12.4
Terms of trade index	92.0	96.9	100.0	97.6	89.4	127.4	131.2	133.1	132.2	132.8
Intra-EC trade	788	831	935	1 008	1 100	1 212	1 297	1 428	1 441	1 444
Share of total imports (%)	97.3	97.2	97.5	98.0	98.1	98.0	97.9	97.5	97.0	96.3

Source: DEBA

Figure 3: Wine
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

13.6% for Japan and from 63% to 42.7% for the rest of the world).

In both 1991 and 1992, the Commission organised the sale of stocks of alcohol compulsorily distilled from wine. Until now uses have been found for all these stocks in the fuel sector both within the Community and in the Caribbean, Central America and Brazil.

MARKET FORCES

Demand

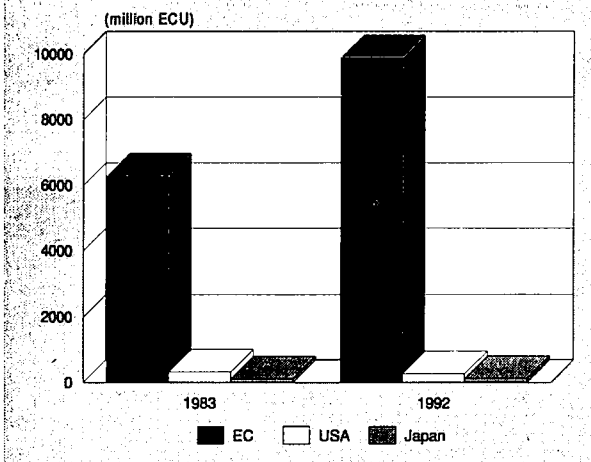
A distinction must be made between the countries where wine is traditionally regarded as a popular drink, as in the case of France, Italy and Spain and the countries where beer is traditionally the popular drink, as in the case of Germany and the United Kingdom.

In countries like France, Italy and Spain where wine production and drinking are part of the popular culture, falling sales reflect a change in consumers' tastes and strong competition from alternative products. Sales of quality wines are increasing, however, and for the next few years the trend in this subsector is expected to be upward. The "vin de pays" subsector, with a medium price range, is also expanding.

By contrast, in countries where beer is the popular drink, wine sales have been rising in recent years; but in these countries also, the demand for wine can be affected by concern for health and the recession. In the late eighties and early nineties wine consumption did, however, increase in both quantity and value.

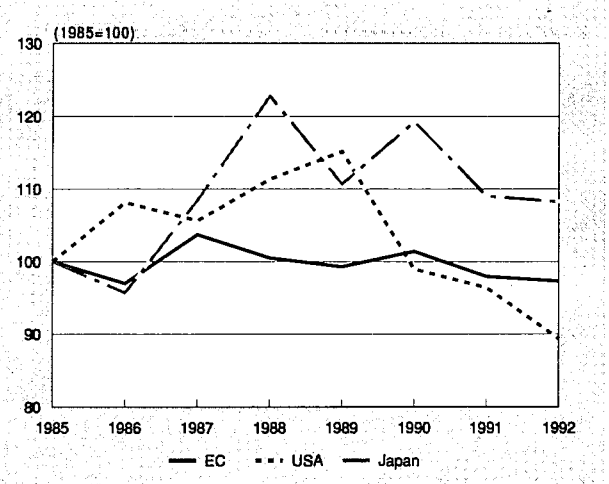
In addition to the lower sales of table wines, there has also been a further change in consumers' tastes. Red wine has lost ground in the market, while light white and rosé wines are meeting with more success. The reason is to be found in the fact that consumers are looking for light wines which go well with light meals. In consequence, French, Italian and Spanish producers have turned to new methods of fermentation

Figure 4: Wine
International comparison of production in current prices



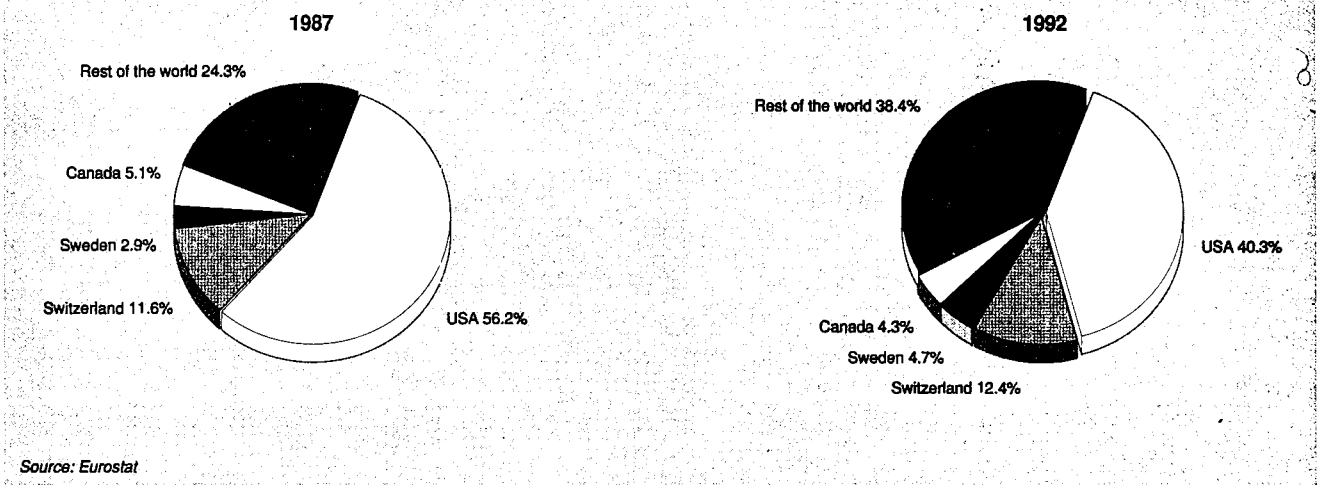
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Wine
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Wine
Destination of EC exports



Source: Eurostat

in order to produce lighter red wines. Sparkling wines are greatly appreciated on the European market.

The present sales position is critical for wines with a high alcohol content, such as sherry and port. In the United Kingdom, which is the market with the highest sales, more enthusiasm is being shown for lighter varieties of these two products. The trend is the same for the various types of vermouth and flavoured drinks.

In 1992, average annual wine consumption per head in the Community was around 37 litres, with variations between countries. France leads with 64.5 litres per head, followed by Italy with an average of 61.6 litres and Luxembourg with 58.2 litres. In the same year, per head consumption in Portugal was 57 litres while the figure for Spain was only 43 litres. These countries are followed by those which by tradition have never drunk much wine but beer instead; the most noteworthy are Germany and the United Kingdom with 22.8 and 10.4 litres per head respectively.

Supply and competition

The European wine industry is very fragmented. Over the last few years, however, increasingly market-oriented groups with multinational interests have been emerging.

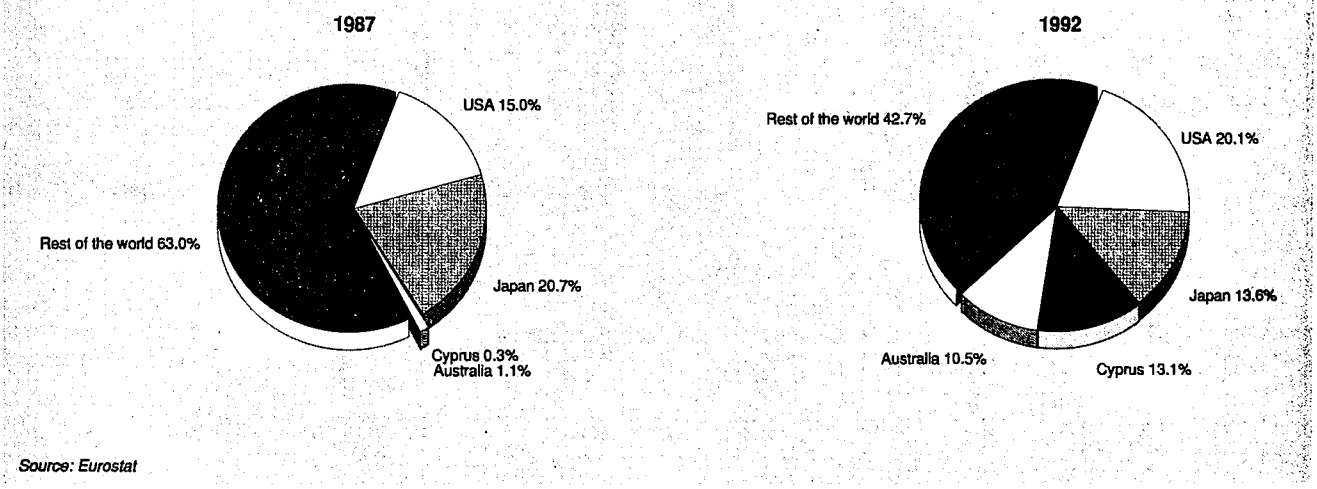
In the major wine producing countries, particularly in southern Europe, production is in the hands of thousands of small growers with a family property and vineyards producing unspecified quantities. Trade associations in the sector are trying to stimulate the total production of such growers on the sole basis of area cultivated and average harvest. It is, therefore, very difficult to determine the size of the market, the more so because the calculations are complicated by the long time which wine sometimes needs to mature.

Competition within the Community involves chiefly products in the middle-high range. The countries mainly concerned are France and Italy. Italian wine is facing competition particularly from Spain, Greece and the North African countries. In general, European production as a whole is suffering from competition from the major world growers of wine grapes, which include Turkey, the CIS, Chile, California, Japan, Algeria, Morocco, Romania, Bulgaria and South Africa.

Production process

Wine is made by two different processes known as white and red vinification; there have been no major changes in these processes over the years. The sector is so fragmented that it

Figure 7: Wine
Origin of EC Imports



Source: Eurostat

Table 5: Wine
Consumption per capita

(l/head)	1989	1990	1991	1992
EC (1)	42.0	39.0	38.0	37.0
Belgique/België	18.7	19.7	18.4	20.9
Danmark	21.2	18.4	21.7	22.0
BR Deutschland (1)	26.2	26.0	26.1	22.8
Hellas	33.3	31.8	25.7	25.3
España	46.0	41.0	44.0	43.0
France	73.2	71.9	67.2	64.5
Ireland	4.2	4.4	4.5	3.9
Italia	69.7	58.6	62.0	61.6
Luxembourg	61.3	58.2	59.3	58.2
Nederland	13.5	13.1	14.0	14.0
Portugal	53.0	54.0	59.0	57.0
United Kingdom	11.7	12.8	10.9	10.4

(1) Including former East Germany for 1991 and 1992
Source: Eurostat

is difficult to give a complete picture of the production techniques employed.

Small growers use methods which are difficult to control and give widely varying results; the supply includes products of very different qualities.

Associations and private wine co-operatives tend to invest more in advanced technologies because they are more interested in renewing and up-dating their plant in order to achieve economies of scale and improve product quality.

INDUSTRY STRUCTURE

Companies

The sector comprises a vast number of operators at various stages of the production chain. There is a very high degree of agriculture/industry integration, due to much interaction between the various stages of production.

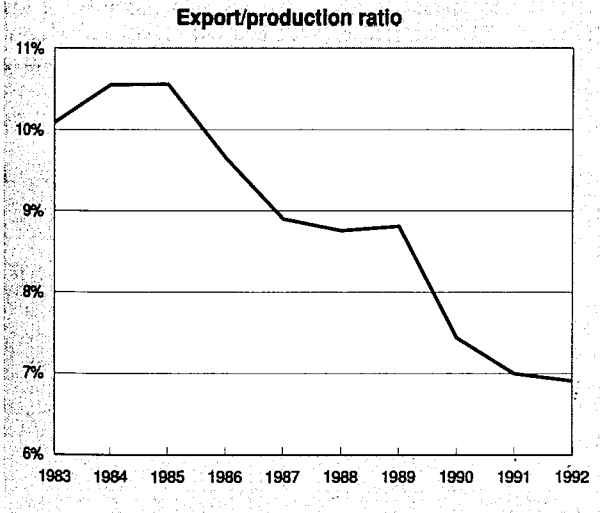
Associations now vinify around an 80% share of the total processed product in Italy and about 60% in France. Groups operating on a wider than national scale account for only 15% of the European sales. They are Pernod Ricard (F), Allied-Lyons (UK), Seagrams (USA) LVMH (F), Castel Frères SA (F) and Grand Met (UK).

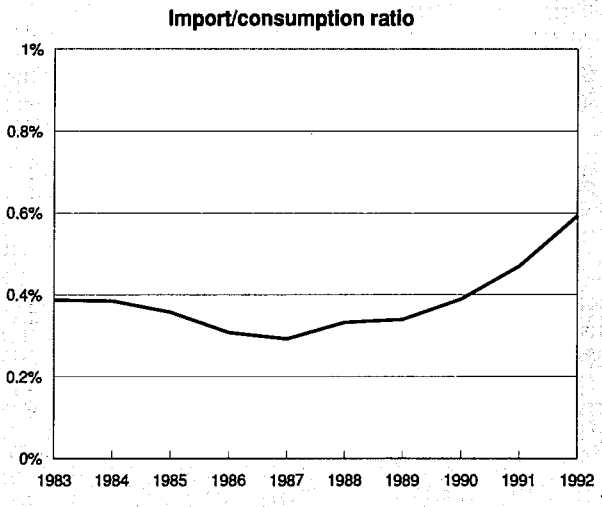
Strategies

The main reasons why it is not easy to define operators' strategies in this sector are the extreme fragmentation of the wine-growing and producing industry and the vast range of products available on the market. Every subsector differs as regards production process, production structure, way of reaching the final market, type of packaging and bottling, methods of consumption and section of the market served.

There have been some take-overs in this sector over the last ten years led in 1992-1993 by the following: Castel Frères SA (F) acquired Société des Vins de France (F), Caviro (I) acquired the Carapelli (Poggese) brand (I), Guenther Reh AG (D) acquired Langenbach & Co. GmbH/Herman Kendermann GmbH (D).

Figure 8: Wine
Trade Intensities





Source: DEBA

Table 6: Wine
Gross human consumption

(1000 Hl)	1989	1990	1991	1992
EC(1)	135 897	127 751	132 232	127 536
Belgique/België	1 848	1 958	1 837	2 092
Danmark	1 087	947	1 118	1 137
BR Deutschland (1)	16 137	16 292	20 781	18 290
Hellas	3 336	3 198	2 623	2 595
España	17 883	15 892	17 158	16 834
France	41 009	40 473	38 019	36 903
Ireland	147	154	158	137
Italia	40 081	33 754	35 782	35 572
Luxembourg	230	220	226	227
Nederland	1 996	1 955	2 098	2 111
Portugal	5 435	5 570	6 182	5 636
United Kingdom	6 708	7 338	6 250	6 002

(1) Including former East Germany for 1991 and 1992
Source: Eurostat

REGIONAL DISTRIBUTION

The parts of the Community where grapes are grown and wine production plant are located are widely scattered over large areas. Grapes are grown more especially in certain regions of the various producing countries.

- in Italy, where grapes are grown principally in Sicily, Apulia, Veneto, Emilia-Romagna, Piedmont, Tuscany and in smaller quantity in Latium, Valle d'Aosta, Valtellina, Trentino-Alto Adige and the Cinque Terre;
- in France where grapes are grown in Languedoc-Roussillon, Gironde, Burgundy, the Loire Valley, Alsace, Champagne, Provence-Cote d'Azur, Pyrenées and Charente;
- in Spain where grapes are grown in La Mancha, Logrone, Navarre, Tarragona, Saragossa, Valencia, Alicante, Murcia, Andalusia, Rioja, Malaga and Jerez de la Frontera;
- in Germany, where grapes are grown along the Rhine and Mosells, in Franconia and Württemberg.

ENVIRONMENT

The sector has no serious impact on the environment except by way of the quantity of pesticides used in grape growing. This sector too has recently seen the spread of integral/organic cultivation methods which further reduce environmental pollutants.

Wine sold in bottles involves the problem of recycling the glass which has always created logistic difficulties; to eliminate this problem some companies have promoted the sale of wine in cardboard "briks".

REGULATIONS

Council Regulation No. 24 of 4 April 1962 laid down the principles for the organisation of the wine market. The major legislation approved by the EC was Regulation No. 822/87. The purpose has been to promote the free movement of wines throughout the Community by protecting both the quality image and the consumer at the same time.

Regulations 2392/89 and 997/81 lay down specific rules for labelling, while Regulation 3895/91 specifies in addition that labels for sweet dessert wines, semi-sparkling and effervescent wines must show alcohol content by volume.

Recently, a communication of the EC Commission has been published on the development and future of the wine sector (COM/93/380) in view of a reform.

OUTLOOK

Trends for the wine market over the next few years will depend on consumers' views on health problems, life styles and available incomes.

The market may be expected to expand in Germany and the United Kingdom but the larger French and Italian markets will continue to contract.

In the United States, sales of red wine will continue to increase, partly due to recent research claiming that this product has properties which help to prevent and cure heart complaints. In the coming years this trend may perhaps also influence the countries of Europe.

Table 7: Wine
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	54.2	51.8	57.7	56.1	60.2	62.3	48.6	46.9	49.7	51.8
Productivity index	93.9	89.9	100.0	97.3	104.4	108.0	84.2	81.3	86.3	89.8
Unit labour costs index (3)	82.9	90.3	100.0	101.5	106.1	111.9	121.9	128.8	136.0	148.7
Total unit costs index (4)	82.1	90.0	100.0	98.9	106.3	114.4	131.2	146.0	150.6	152.0

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Table 8: Wine
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-1.5	-1.1
Production	-1.9	-1.5
Extra-EC exports	-6.0	-5.0

Source: Prometeia

It will increasingly be producers' policy to up-grade their brands as a vital means of attracting and keeping loyal customers. Supermarkets will continue to extend the range of wines on sale, but specialist retailers will still have an important role in this market.

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The industry is represented at the EC level by: Comité de la Communauté economique européenne des industries et de commerce des vins (COMITE VINS). Address: Rond Point Schuman 9, bte 4, B-1040 Brussels; tel: (32 2) 230 9970; fax: (32 2) 230 4323.

Brewing and malting
NACE 427

The sector holds the dominant position among alcoholic drinks. Production and consumption of beer have been virtually unchanged over the last ten years. The levels of consumption reached in many North European countries seem to suggest that these markets are now saturated. Further possibilities for growth are developing in the countries round the Mediterranean and particularly in Spain.
Health and safety on the road constraints plus the reduction in the 18 to 35 years old population group constitute the major threat for consumption. On the hand, the development of new market segments may provide an effective way out of the present stagnation. In particular, alcohol-free, low-alcohol and light beers constitute the basis for diversification to meet drinkers' new demands.

INDUSTRY PROFILE

Description of the sector

The sector comprises the malting and brewing industries. Beer is brewed from barley malt made in malt-houses. According to the production process beers may be classified into the following three main categories:

- bottom fermentation beer;
- top fermentation beer;
- spontaneous fermentation beer (typical in Belgium).

Beers are also classified according to alcohol content. The sector also includes non-alcoholic beers, normal beers (table and premium), special beers and double malt beers. According to the degree of malt toasting, beers can be divided into light and stout ales.

Recent trends

Over the last ten years, apparent consumption and production of beer, at current prices, have risen by about 3%. The same indicators at constant prices record a downward movement and stagnation of the market. Extra-EC exports have risen by 3% in constant prices in 1992, and their share accounted for 4.5% of the value of production in the same year. Imports have risen much faster, but their share of apparent consumption is very small (less than 1% in 1992).

Employment has been falling by an average of 3% annually from 1983 to the present. The figures for the most recent years seem to indicate that employment trends are a little less unfavourable, this is due to signs of recovery over the last five years, thanks to good export performance, with an 8.6% increase at current prices and 7.5% at constant prices.

International comparison

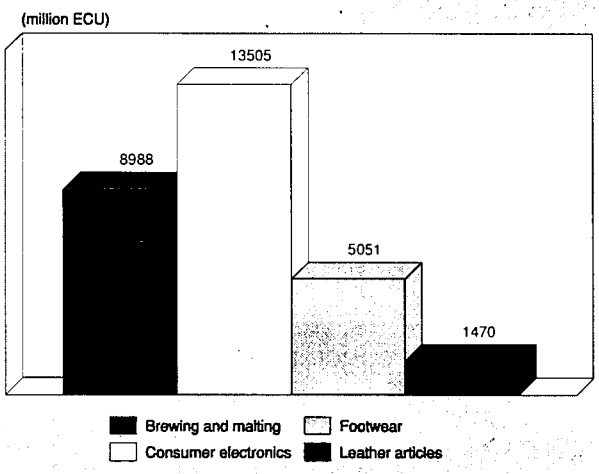
The international picture highlights a growing Japanese market while the United States and European markets have reached full growth. In the late eighties, growth in Japan reached about 5% due to the fact that beer consumption is much lower than in other industrialised countries (about a quarter).

By contrast, European markets, where there is a long tradition of beer drinking, are reaching saturation (north European countries).

Foreign trade

Intra-EC and extra-EC trade account for about 5% of the value of production. Over the last ten years, internal trade has accounted for over 90% of total imports. Extra-EC imports account for a marginal share of consumption even though they did record an average annual increase of over 20% from 1988 to 1992.

Figure 1: Brewing and malting
Value added in comparison with other industries, 1992

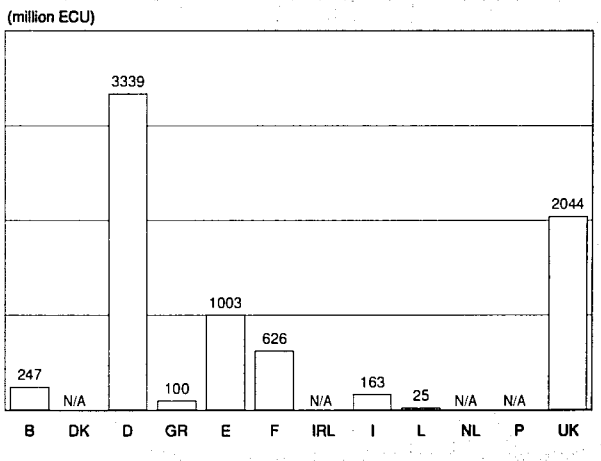


Source: DEBA

The three main trading blocs - the United States, EFTA and Japan - do not contribute significantly to EC imports, a large part of which in fact come from the rest of the world. From 1987 to 1992, the EFTA countries lost importance as exporters to the EC; their share fell and was overtaken by that of the United States which gained ground in the Community market. It has been Mexico that has achieved the most spectacular market penetration in the last few years by supplying almost a quarter of the imported beer into the EC market.

Even though beer exports rose and the trade balance remained favourable, the relationship between exports and imports changed over the last ten years. In the early 1980s exports were about 20 times higher than imports but this figure had fallen to 10 by the early nineties. The United States are the main outlet for European exports but their share has fallen over the last five years. Against this, exports increased to Japan and other countries outside the three main trading blocs. The share of exports to EFTA countries remained constant from 1987 to 1992.

Figure 2: Brewing and malting
Value added by Member State, 1992



Source: DEBA

Table 1: Brewing and malting
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	18 754	18 675	19 293	19 783	20 030	21 234	21 677	22 778	24 338	25 038	25 500
Production	19 624	19 604	20 242	20 697	20 833	22 024	22 592	23 757	25 331	26 099	26 500
Extra-EC exports	910	969	992	958	846	840	970	1 049	1 108	1 168	1 030
Trade balance	870.3	929.7	948.8	913.7	803.1	790.9	914.4	978.7	993.7	1 061.0	990.0
Employment (thousands)	172.5	164.5	159.9	154.4	148.0	143.4	141.1	137.9	136.7	132.2	128.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Eurostat estimates.
Source: DEBA

Table 2: Brewing and malting
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	-0.6	-0.5	-0.5
Production	-0.7	-0.1	-0.4
Extra-EC exports	-1.3	7.5	2.5
Extra-EC imports	10.8	18.7	14.3

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Brewing and malting
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	910.1	969.4	992.0	957.5	845.6	839.8	970.2	1 048.6	1 108.4	1 168.3
Extra-EC imports	39.8	39.7	43.2	43.8	42.5	48.9	55.8	69.9	114.7	107.2
Trade balance	870.3	929.7	948.8	913.7	803.1	790.9	914.4	978.7	993.7	1 061.1
Ratio exports/imports	22.9	24.4	23.0	21.9	19.9	17.2	17.4	15.0	9.7	10.9
Terms of trade index	84.4	88.6	100.0	104.2	107.3	113.1	115.8	112.0	109.3	106.8
Intra-EC trade	588.4	628.6	707.0	739.4	807.1	873.4	961.7	1 130.6	1 277.4	1 366.1
Share of total imports (%)	93.7	94.1	94.2	94.4	95.0	94.7	94.5	94.2	91.8	92.7

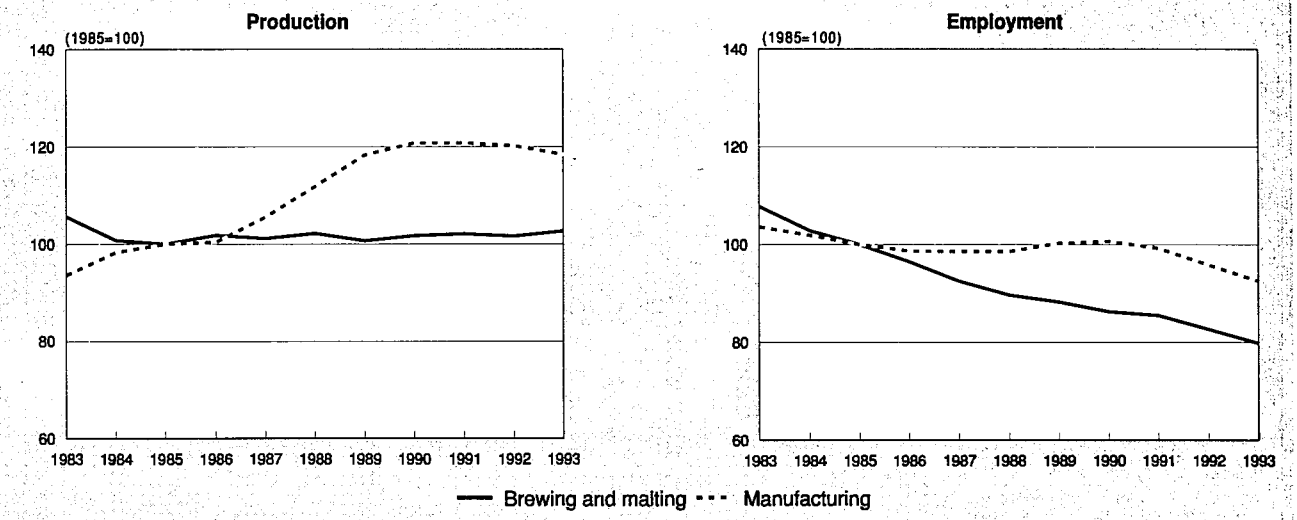
Source: DEBA

Table 4: Brewing and malting
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	56.1	52.4	54.8	60.2	63.3	64.7	61.0	61.7	66.3	68.0
Productivity index	102.5	95.6	100.0	109.9	115.6	118.1	111.4	112.7	120.9	124.1
Unit labour costs index (3)	89.9	95.5	100.0	105.6	111.5	115.1	121.9	129.1	136.3	145.7
Total unit costs index (4)	91.9	97.8	100.0	107.2	112.9	122.3	129.4	138.5	148.9	160.1

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Brewing and malting
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

MARKET FORCES

Demand

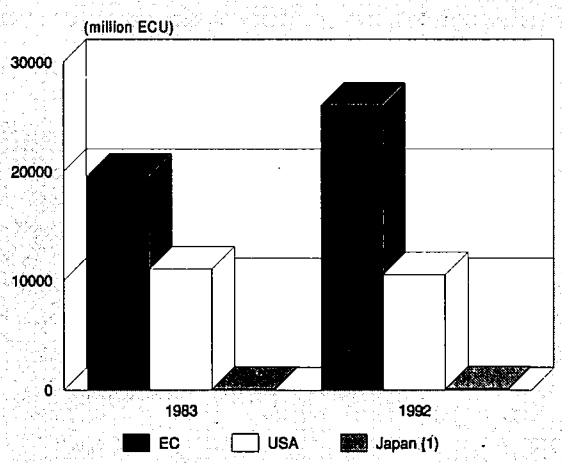
Per capita consumption of beer varies very widely in the EC countries. The biggest consumers are in North Europe: Germany (144.2 litres), Denmark (128.2 litres), Belgium and Luxembourg (112.0 litres), the United Kingdom (102.6 litres) and the Netherlands (90.2 litres). Consumption is stable, except in Germany, due mainly to competition from alcohol-free drinks and the emergence of a powerful "health" and "road safety" trend.

Among the Mediterranean countries, the market in Spain is growing and per capita consumption has reached 70.5 litres. Italy is at the back of the queue with a per capita consumption of about 23 litres. After a period of sustained increase (seventies to early eighties) the Italian market seems to have reached full growth. Consumption in France and Greece is around 40 litres per head.

One of the reasons for the different levels of consumption is competition in the Mediterranean countries from another major alcoholic drink - wine. In Greece, Italy and France wine is the alcoholic drink most widely and frequently drunk. Against this, consumption of beer, in Mediterranean countries, is affected by seasonal factors, young peoples preferences and outdoors eating habits. The perception of beer as a thirst-quenching drink means that it is drunk most during the summer months; the length of the summer has often determined the size of the market. The growth of beer bars has created an image of the product which does not really attract consumers or favour higher consumption at home.

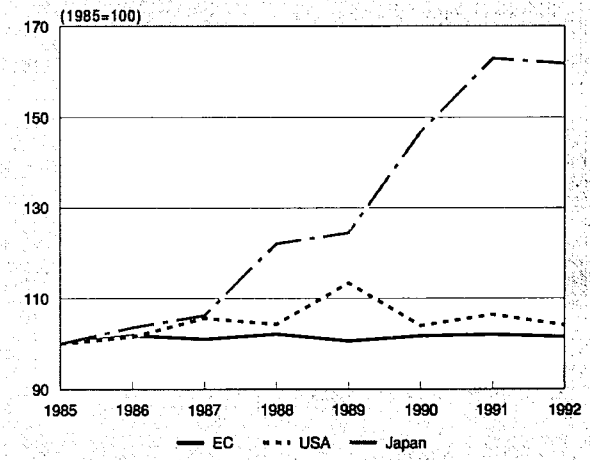
The most dynamic segments of the market are light and alcohol-free beers. At the moment they account for only a very small proportion of total sales. They are however becoming important as they offer a new image of beer in general, more in line with consumers' concern for health, and they are capable of appealing to new target groups (for example, women and teenagers).

Figure 4: Brewing and malting
international comparison of production in current prices



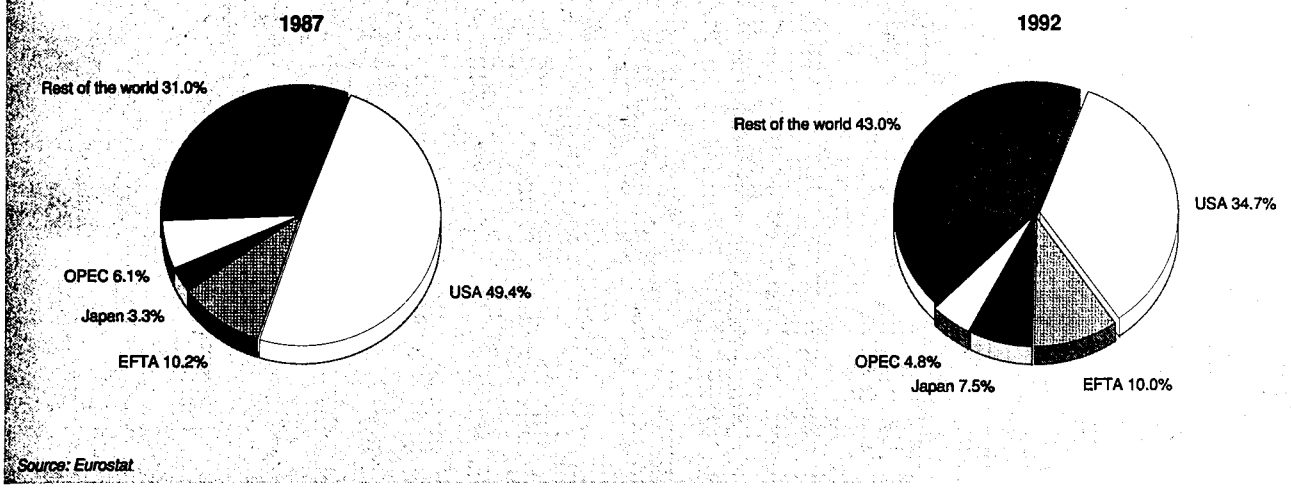
(1) 1985 instead of 1983
Source: DEBA

Figure 5: Brewing and malting
international comparison of production in constant prices



Source: DEBA

Figure 6: Brewing and malting
Destination of EC exports



Source: Eurostat

Supply and competition

The main beer producers in Europe are Germany and the United Kingdom. This domination stems from beer's historically important place in the range of beverages drunk. Malt production capacity is highest in the same two countries, followed by France. The main feature is the strong presence of multinationals. Take-overs in recent years have created a strategic situation in which local producers suffer and are marginalised (except in the extremely fragmented German market).

The current trend is for international brands to impose themselves increasingly; their spread is linked with the presence of the multinationals in the various countries, through take-overs or contracts with local companies. These contracts are for production under licence or for exclusive import and distribution rights. Concentration and the need to cut production costs have led to the closure of many breweries. Except for Germany, Belgium and the United Kingdom, no country now has more than 30 breweries. In the first three countries, the amount of beer brewed, but more especially the fragmentation of supply, are reflected in the number of establishments: 1290 in Germany, 121 in Belgium and 99 in the United Kingdom.

INDUSTRY STRUCTURE

Companies

Two European groups are the leaders; they are Heineken (NL) and the BSN group (F). They are also among the world leaders; Heineken with a 4.5% share is third in the sector, while BSN with 2.4% is fifth.

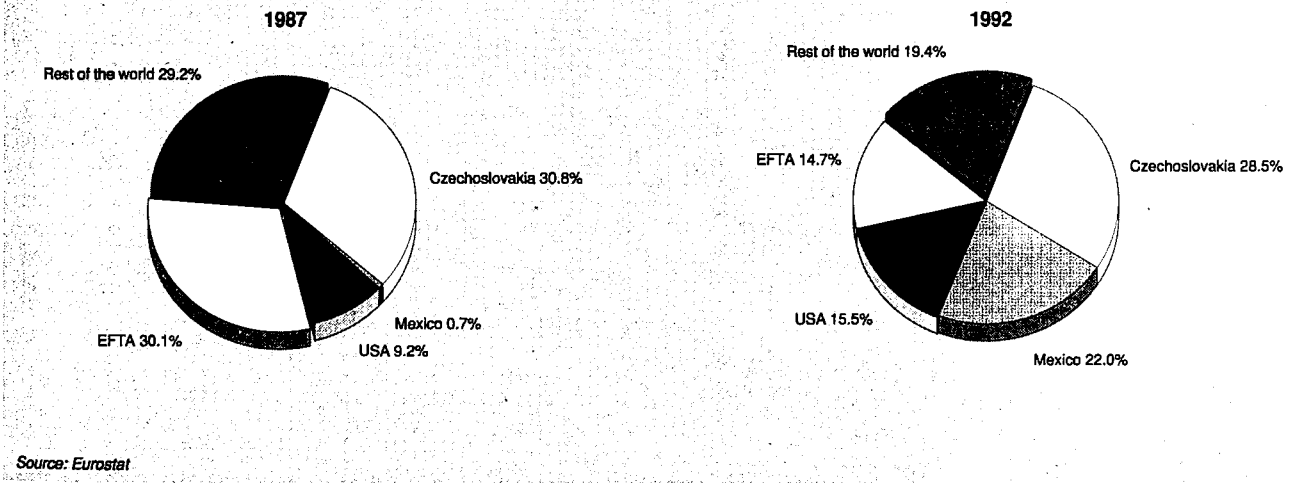
Heineken's share is over 50% in the Netherlands and about 25% in France where it is second biggest; it has 20% of the Spanish market (through its partner El Aguila) and 25% of the Italian market.

The BSN group leads in France (the Kronenbourg and Kanterbrau breweries produce nearly 50% of the total) and in Italy, through Peroni, with about 40% of the market. The company is among the leaders in Belgium, Spain and Greece.

The third biggest European company is Bass (UK) with a 22% share of the British market.

The three world leaders, Anheuser-Busch Inc. (USA), Philip Morris-Miller Brewing (USA) and Forster's Brewing Group (Australia) operate in Europe with their own divisions or through marketing agreements with major European firms.

Figure 7: Brewing and malting
Origin of EC imports



Source: Eurostat

Table 5: Brewing and malting
Beer statistics, 1992

	Number of breweries	Number of employees	Total production (1000 hl)	Imports world (1000 hl)	Exports world (1000 hl)	Per capita consumption (litres)
Belgique/België	121 (1)	9 000 (1)	13 799 (1)	427	3294	112.0 (1)
Danmark	18	4 470	9 775	19	2 466	128.2
BR Deutschland	1290	65 000 (1)	120 158	2 969	6 473	144.2
Hellas	7	N/A	4 010	182	130	40.0
España	30	12.5	26 082	1 806	316	70.5
France	25	7 000 (3)	21 297	2 758	1 028	40.0 (3)
Ireland	7	3 023	6 633	770 (3)	2 876	123.0 (1)
Italia	20	4 090	10 923	2 747	146	23.6 (3)
Luxembourg	5	310	569	40	163	112.0
Nederland	14	8 379	20 659	529	7 495	90.2
Portugal	8	3 300	6 893	160 (4)	501	65.6 (3)
United Kingdom	99 (1)	30 400 (2)	55 888	5 534	2 084	102.6

(1) 1991 figures
(2) 1990 figures
(3) Estimated
(4) Estimated EC imports
Source: CBMC

Strategies

The leading firms have expanded in Europe mainly by acquiring local companies and by granting concessions by contract for the production under licence or the distribution of their own brands.

Heineken produces locally in the Netherlands. France (Société Générale de Brasserie, the second biggest firm in the market), Greece, Spain (with a majority share in El Aguila), Italy (through controlling interest in Birra Dreher, the second biggest firm on the market) and Ireland.

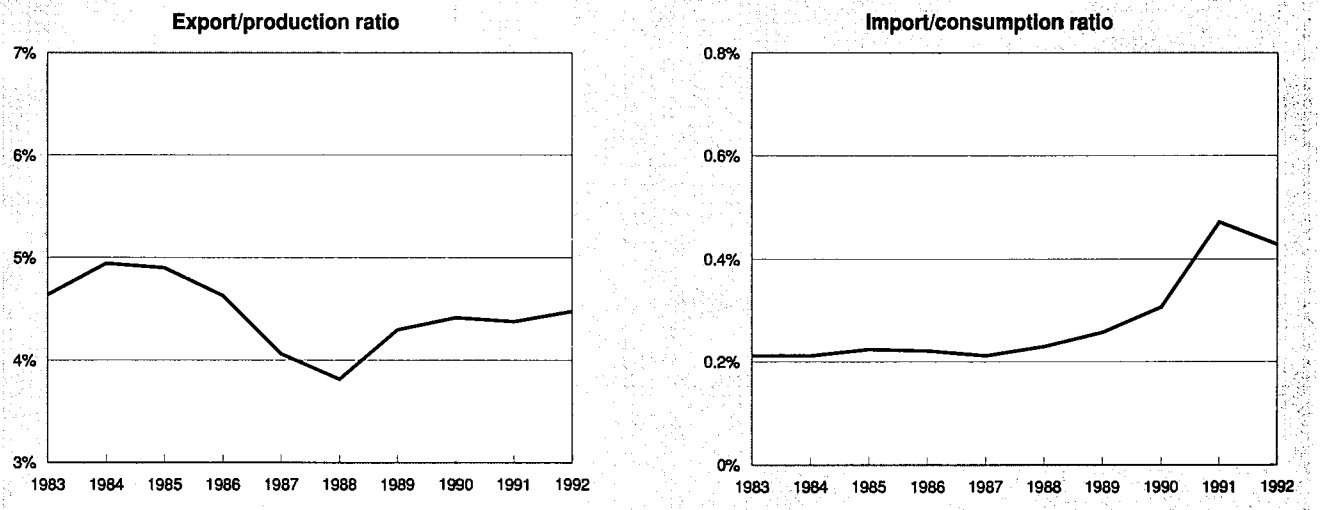
The BSN group leads in its own country, with a 100% holding in Kanterbrau and Kronenbourg). BSN has become stronger on many markets by way of joint ventures with European firms and take-overs carried through over the last few years. In Italy, BSN leads through its holding in the Peroni company. The group has shareholdings in Belgium (Alken-Maes), Spain (Mahou, and Cervezas San Miguel since 1992) and Greece.

The strategy of all the multinationals named is to diversify production between sectors, to create an international market for their own brands and to introduce new products (alcohol-free and light beers).

ENVIRONMENT

The main ecological problems affecting the sector relate to packaging. While the industry mainly uses returnable packaging, non-returnable bottles and cans, particularly for home consumption, raise the problem of containers, recycling and waste disposal. For home consumption, 330 ml bottles are mainly used but the expansion of supermarket sales has made returnable empties unpopular. Can packaging restricts recycling efforts as no widespread aluminium recycling efforts have been established.

Figure 8: Brewing and malting
Trade intensities



Source: DEBA

Table 6: Brewing and malting
Maltings, 1992

	B	DK	D	F	IRL	I	NL	UK	Total
Independent	4	4	69	7	5	2	2	11	104
Associated to breweries	2	2	32	1	2	0	1	6	46
Associated to other industries	0	0	0	0	1	0	0	5	6
Total	6	6	101	8	8	2	3	22	156

Source: EUROMALT

REGULATIONS

The "pure beer law" (Reinheitsgebot) in force in Germany since the 16th century and in Greece since 1922 has come under dispute in the Community. According to this law, beer must be made only of four ingredients: hop, malted barley, yeast and water. The enforcement of this law for imported beers in practice prevented the marketing of many types of beer brewed in the EC from ingredients not allowed by the pure beer law.

In 1987 the European Court of Justice made two rulings finding against the two Member States on the grounds that, by prohibiting the sale of beers legally brewed in another Member State but not in compliance with their laws, they were in breach of their obligations regarding the free circulation of goods as laid down in Article 30 of the Treaty.

OUTLOOK

The high levels of consumption in the northern countries suggest that demand will stay at its present level or decline. Germany would seem to be the only exception to this trend. In that country, further room for growth is foreseen, due to the current success of new segments of the market for low-alcohol beers.

Table 7: Brewing and malting
Number of maltings plants, 1992 (1)

Capacity size (thousand tonnes)	0-9	10-19	20-29	30-39	40-49	50-99	100-199	200+	Total
Belgique/België	0	0	1	0	0	0	4	1	6
Danmark	2	0	2	0	1	1	0	0	6
BR Deutschland	60	11	8	8	4	8	1	1	101
France	3 (2)	-	-	-	-	-	2	3	8
Ireland	1	4	2	0	0	1	0	0	8
Italia	0	0	0	2	0	0	0	0	2
Nederland	0	1	0	0	0	1	1	0	3
United Kingdom	7	3	1	0	2	1	6	2	22
Total	135 (2)	-	-	-	-	-	14	7	156

(1) All maltsters whether independent or associated with the brewing distilling or other industries are included
(2) Total number for capacity size 0-99
Source: EUROMALT

Table 8: Brewing and malting
Total capacity of maltings plants, 1992 (1)

Capacity size (thousand tonnes)	0-9	10-19	20-29	30-39	40-49	50-99	100-199	200+	Total
Belgique/België	0.0	0.0	21.0	0.0	0.0	0.0	518.0	210.0	749.0
Danmark	9.0	0.0	48.0	0.0	40.0	90.0	0.0	0.0	187.0
BR Deutschland	200.0	140.0	200.0	270.0	200.0	500.0	130.0	230.0	1 870.0
France	97.4 (2)	-	-	-	-	-	(3)1 282.6	-	1 380.0
Ireland	8.0	41.5	53.5	0.0	0.0	75.0	0.0	0.0	178.0
Italia	0.0	0.0	0.0	70.0	0.0	0.0	0.0	0.0	70.0
Nederland	0.0	26.0	0.0	0.0	0.0	60.0	125.0	0.0	211.0
United Kingdom	35.2	48.6	30.0	0.0	67.0	68.4	787.5	572.6	1 609.3
Total	2 398.6 (2)	-	-	-	-	-	(3) 3 865.7	-	6 254.3

(1) All malsters whether independent or associated with the brewing distilling or other industries are included
(2) Total capacity for capacity size 0-99
(3) Total capacity for capacity size 100+
Source: EUROMALT

Table 9: Brewing and malting
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-1.0	-0.5
Production	-0.8	-0.3
Extra-EC exports	5.0	5.5

Source: Prometeia

The Spanish market offers the most interesting prospect in southern Europe. Sales are still showing sustained growth and the vigour of the market suggests that the product will make further inroads and that consumption will increase at the expense of wine.

Wine consumption is often used as a guide for determining the situation of the beer sector. In Italy, falling wine consumption has for a long time fuelled expectations that beer drinking will increase. At the moment, however, the real alternatives to alcoholic drinks are alcohol-free products, chiefly soft drinks, and mineral waters.

Risks for the industry relate to population changes and increasing emphasis on the health and safety factors to the disadvantage of all alcoholic drinks. Emerging opportunities relate to the development of alcohol-free or low alcohol beers, and especially light beers, whose main drawing card lies in the close association with the taste and image of more traditional products, stronger outdoors eating habits and consumer targeting of the elderly and teenagers particularly through alcohol free drinks.

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Soft drinks, mineral waters

NACE 428

The market for soft drinks is expanding continuously, while mineral waters are growing the fastest. Despite raising environmental issues, the use of PET plastic containers has slackened the grip of the distributive factor and has widened companies' action range.
There has been increased concentration in the mineral water branch as a result of take-overs but local firms are still strong, more especially in areas where glass containers are still used on a large scale. The market for soft drinks is controlled by multinationals. Isotonic beverages continue to experience strong growth.

INDUSTRY PROFILE

Description of the sector

The sector covers ready-to-drink soft drinks, water based drinks, optionally sweetened, acidulated, carbonated and which may contain fruit, fruit juices and salts.

Production in the sector is not specialised. Its geographical distribution depends on national consumption and the existence of springs in the case of mineral waters. In the mineral water market, companies (multi-national and national) draw mainly from licensed springs. In the soft drinks sector, the multinationals operate with international brands and produce in the individual countries.

Recent trends

The market has expanded enormously over the last ten years. At current prices, the average annual increase has been around 9% for both production and apparent consumption, which is equivalent to 4.5% in real terms. Extra-EC exports have risen by an average of 9% (7% in real terms) and the trade balance has shown a constant and fast growing surplus. Employment has been virtually unchanged.

The market for mineral waters has grown more than that for soft drinks. Any further expansion of the mineral waters branch depends in particular on higher demand in countries where the product is still at not well established e.g. the United Kingdom.

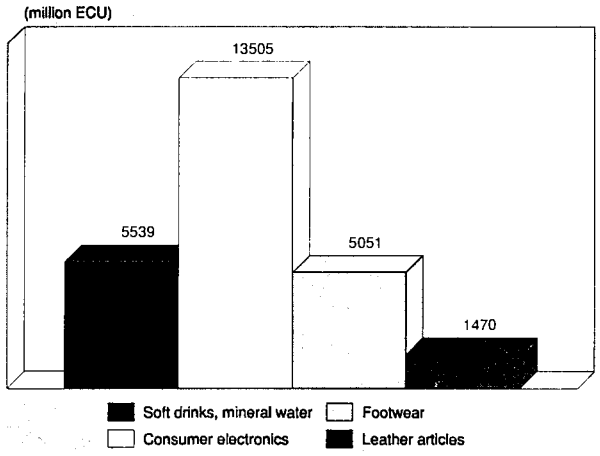
Added value is the highest in Germany followed by France, Great Britain (due to the large volume of soft drinks) and Spain. Even though the size of the Italian industry is much the same as the French and bigger than the Spanish, its added value is much lower.

Foreign trade

Trade is mainly between Member States. Intra-EC imports account for over 90% of total imports and this has been the case since the early 1980s. In extra-EC trade exports are five times greater than imports. In relation to production and consumption, extra-EC trade is insignificant, as exports account for barely 2% of production and the figure for imports is virtually nil.

Until recently extra-EC exports were primarily absorbed by the US and EFTA countries while since 1992 Japan is rapidly gaining importance as an external market. Extra-EC imports come mainly from the EFTA countries and to a small extent from the United States.

Figure 1: Soft drinks, mineral waters
Value added in comparison with other industries, 1992



Source: DEBA

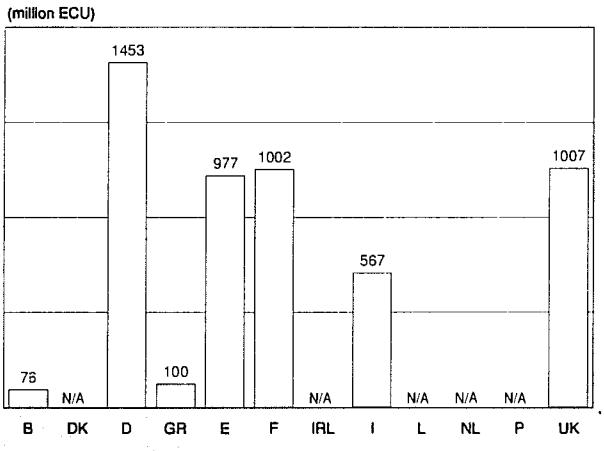
MARKET FORCES

Demand

The growth of the market has benefited from the general trend towards health products, with a consequent move towards the consumption of soft drinks at the expense of alcoholic drinks. Total per capita consumption figures are very high. The leading drinkers of mineral waters per capita are the Italians (115 litres) followed by the Germans, French, Belgians and Luxembourgers (80-90 litres). Per capita consumption of soft drinks is highest in Great Britain (over 100 litres) followed by Germany, the Netherlands and Spain (Source: Consumer Europe 1993).

The market for mineral waters has achieved the highest growth as it has been replacing drinking water, particularly in countries where the quality of the latter is becoming worse and consumers are becoming more health conscious. A powerful stimulus to the market has been given by the convenience arising from the use of plastic containers for carbonated waters, using PET in particular, compared to glass. Although packaging is

Figure 2: Soft drinks, mineral waters
Value added by Member State, 1992



Source: DEBA

Table 1: Soft drinks, mineral waters
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	8 366	8 556	9 299	10 344	11 061	12 385	15 082	16 770	17 124	17 748	18 000
Production	8 532	8 767	9 504	10 543	11 261	12 586	15 321	17 042	17 476	18 064	18 300
Extra-EC exports	185.6	237.0	232.8	229.7	232.1	246.1	308.2	341.1	421.7	393.4	326.0
Trade balance	166.8	211.4	205.7	198.5	199.4	201.2	239.1	271.6	352.3	315.8	240.0
Employment (thousands)	98.1	94.7	91.5	93.0	92.3	95.3	99.6	100.2	101.1	98.4	96.7

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Soft drinks
Main indicators by country, 1991

(million litres)	B	DK	D	E	F	GR(1)	IRL	I	NL	P
Apparent consumption	610	239	5 272	2 880	N/A	N/A	208	2 290	536	365
Net exports	51.0	12.7	-14.0	-35.0	N/A	N/A	-31	13.7	394.3	0.0
Production for home market	661	251	5 258	2 845	2172	535	177	2 304	931	365
Consumption per capita (litres)	83.8	53.3	87.0	73.5	38.0	52.1	68.5	41.7	73.0	36.5
Number of enterprises (2)	23.0	9.0	226.0	92.0	N/A	15.0	15.0	16.0	13.0	48.0
Employment (number)	3 307	N/A	24 500	16 250	N/A	N/A	2 100	7 000	2 601	2 564

(1) 1990 figures.
(2) Enterprises with 20 or more persons employed.
Source: UNESDA

Table 3: Mineral waters
Main indicators by country,1991

(million litres)	B	D	E	F	I	P	UK
Apparent consumption	869	5 820	1 623	4 009	5 990	274	449
Production	665	5 680	1 636	5 192	6 000	281	296
World exports	266.9	33.6	19.1	1 251.6	78.6	9.0	5.6
Trade balance	-204.0	-139.7	12.6	1 183.0	10.4	7.4	-153

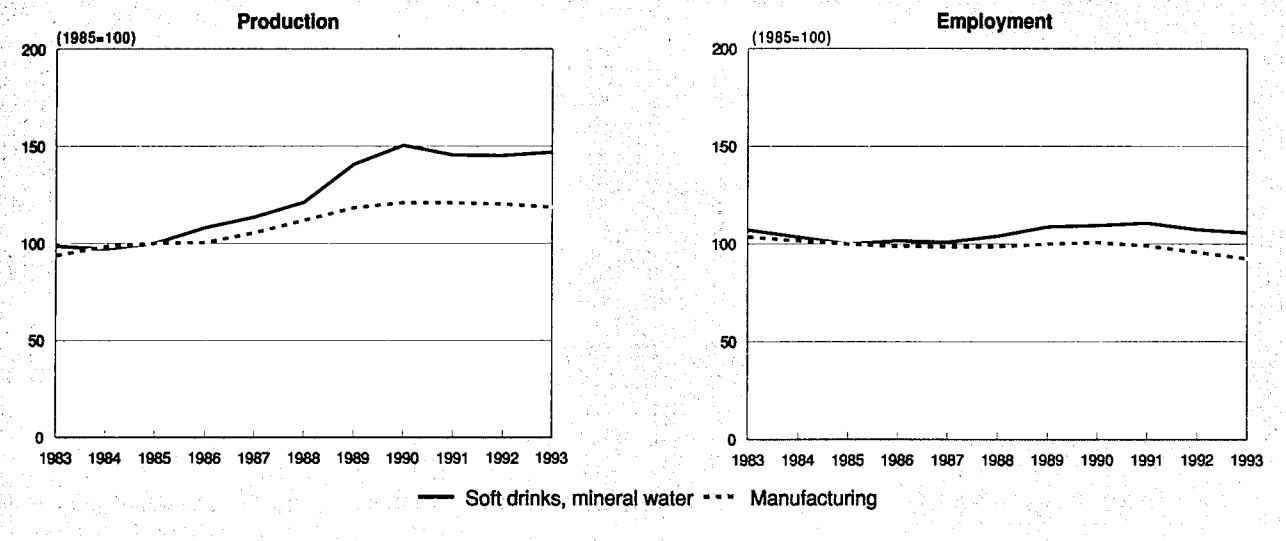
Source: Mineracqua, Eurostat

Table 4: Soft drinks, mineral waters
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	4.2	4.5	4.4
Production	4.2	4.6	4.4
Extra-EC exports	4.0	11.2	7.1
Extra-EC imports	18.3	10.7	14.9

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Figure 3: Soft drinks, mineral waters
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

gaining importance in product differentiation there are divergencies between countries. Germany is a noted example where awareness of environmental problems and legal restrictions have slowed the progress of plastic containers. Overall, in the soft drinks market, plastic packaging has been a growth factor and has given special impetus to home consumption.

Supply and competition

There is little competition between Community countries and even less from outside the EC. Regarding national markets, the rapid growth of the mineral waters branch has attracted the attention of major multinational companies. However, internationalisation has been limited by the fragmentation of supply, with its numerous brands and springs, matched by the regionalisation of consumption. In the soft drinks market a major factor has been the presence of multinationals which, by making use of advanced marketing techniques, have brought soft drinks to the centre of the market for non-alcoholic drinks. In addition, the market is now so partitioned that a growing range of consumer preferences can be covered.

Production process

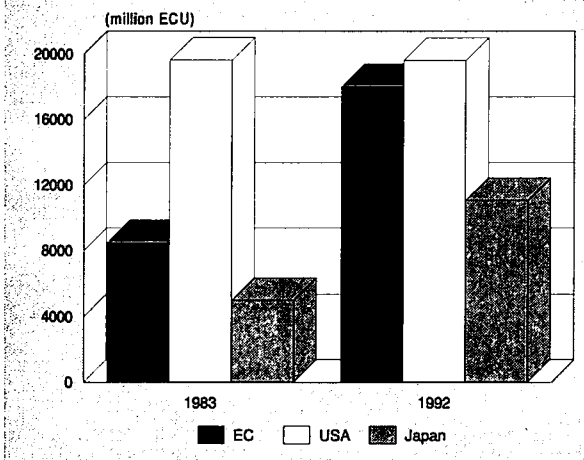
The use of PET has enabled firms to widen their range of distribution, thus favouring a moderate measure of concentration in production. The most recent innovation are light and fruit-based soft drinks and flavoured and slightly carbonated mineral waters.

INDUSTRY STRUCTURE

Companies

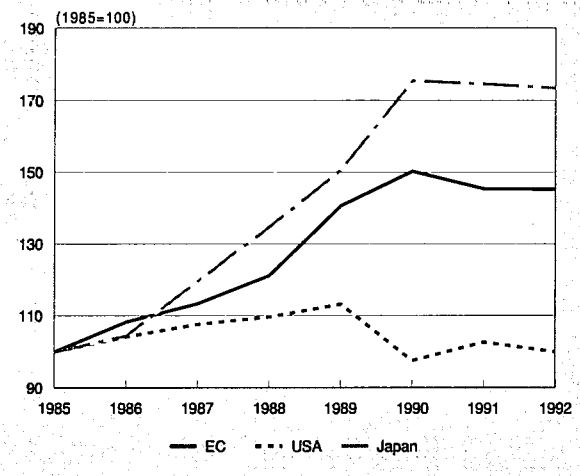
Over the last few years supply has become more concentrated in the mineral waters sector. Two multinationals, Nestlé (CH) and BSN (F) control 30-35% of the Community market. Nestlé and BSN are the two leaders in France with about a 70% share, followed by Castel. In Italy, the four leading groups (Garma, Nestlé, BSN and San Benedetto) control over 50% of the market. In Germany, supply is more fragmented: the main firms have no more than a 10% share each (Ueberkinger, Bitburger Brauerei, Brau & Brunnen). The soft drinks market

Figure 4: Soft drinks, mineral waters
International comparison of production in current prices



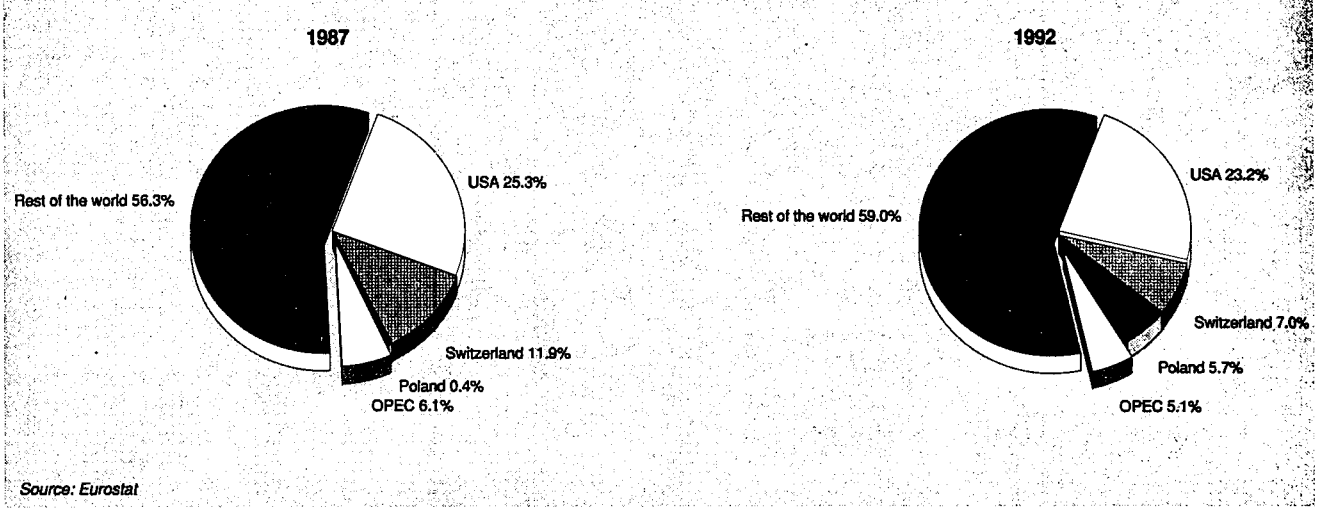
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Soft drinks, mineral waters
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Soft drinks, mineral waters
Destination of EC exports



Source: Eurostat

is more concentrated than the mineral waters market, two companies - the leader Coca Cola (USA) and Cadbury Schweppes (UK) control 45% of the Community market. However, it is important to note that Coca-Cola is a brand owner more than a producer, operating a licensing system (although the company has recently started to take over some of its bottlers, e.g. in France, Belgium and the Netherlands).

Strategies

Take-overs started a little later for mineral waters than for other branches of the food industry but have significant enough to change the pattern of supply. The outstanding example is the take-over by Nestlé of Perrier, the leading world group. However, in the wake of this deal the Swiss multinational had to undertake, by decision of the EC Anti-trust Commission, the sale of the Volvic brand to BSN, as well as a further eight other Perrier brands held by the Société commerciale des eaux du bassin de Vichy, which will go to Castel. Through Perrier however, the Nestlé group now controls many major springs in a number of countries (United Kingdom, France, Spain, North America, Italy).

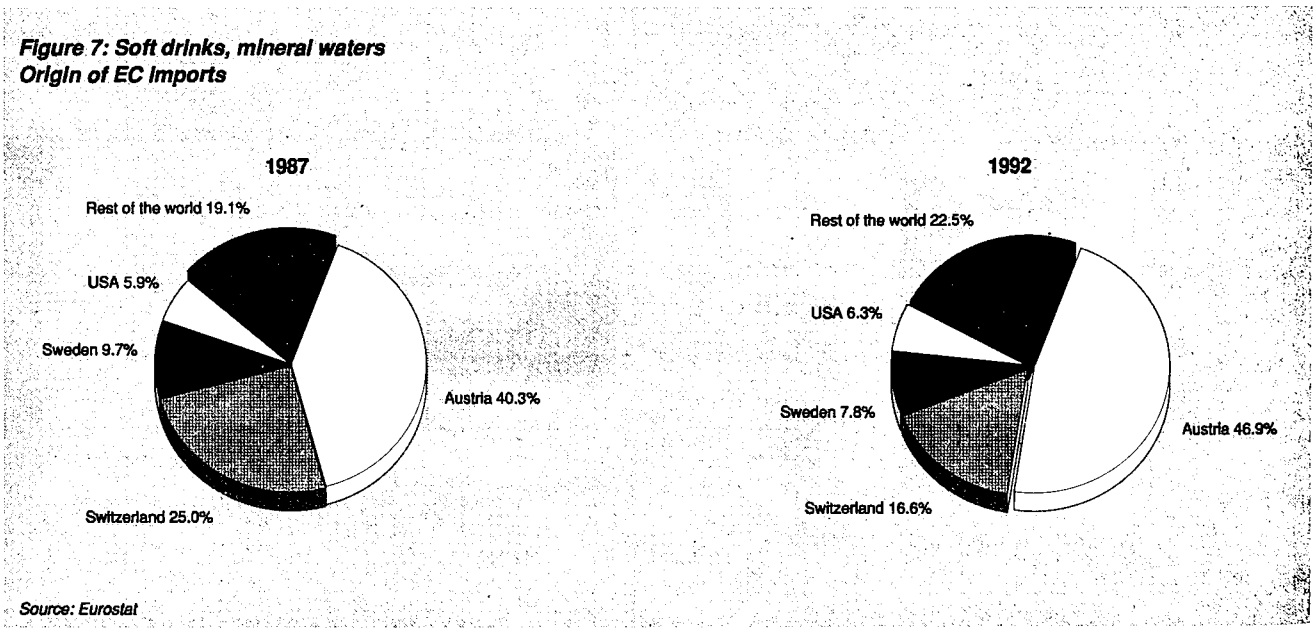
BSN, which trades in Italy through Italaquae, has reorganised its holdings in that country by selling Fabia and Sangemini to Terme di Acqui and by concentrating its efforts on the Ferrarelle and Boario brands. The Italian market has also been entered by Garma, which has bought the market leader, Fonti Levissima, together with other brands.

In the soft drinks sector, the multinationals generally operate in the various markets either by granting production licences to national firms or through their own establishments. In this market, strategy concentrates on marketing policies, distribution, diversification of products and investment in advertising. In the soft drinks markets generally and in the market for mineral waters in particular, local firms have nevertheless maintained a major role, especially in market areas where glass containers are still used on a considerable scale and distribution is the decisive factor.

ENVIRONMENT

The soft drinks sector is affected by the environmental debate, which concerns in particular plastic containers. The Community has tried to deal with the question of packaging through Council Directive 85/339/EEC on the use, recycling, re-use and disposal of containers for consumable liquids. This Di-

Figure 7: Soft drinks, mineral waters
Origin of EC imports



Source: Eurostat

Table 5: Soft drinks, mineral waters
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	185.6	237.0	232.8	229.7	232.1	246.1	308.2	341.1	421.7	393.4
Extra-EC imports	18.8	25.6	27.1	31.2	32.7	44.9	69.1	69.5	69.4	77.7
Trade balance	166.8	211.4	205.7	198.5	199.4	201.2	239.1	271.6	352.3	315.8
Ratio exports/imports	9.87	9.26	8.59	7.36	7.10	5.48	4.46	4.91	6.08	5.07
Terms of trade index	85.2	90.3	100.0	95.2	103.3	90.2	84.7	94.3	91.9	82.1
Intra-EC trade	266.5	312.9	331.6	395.4	470.2	544.2	698.3	779.1	860.7	1041.8
Share of total imports (%)	93.4	92.4	92.4	92.7	93.5	92.4	91.0	91.8	92.5	93.1

Source: DEBA

rective has been applied in different ways in Member States, with consequent obstacles to the free movement of products.

In Denmark, apart from 3,000 hectolitres per annum per producer, beer and soft drinks must be marketed exclusively in approved re-usable containers, and this restriction has been upheld by the European Court of Justice. In Germany, manufacturers and distributors must take containers back for recycling. In the case of drinks, a deposit of 0.50 DM has been introduced for non-returnable containers. In France, a decree was promulgated in April 1992 concerning the disposal of waste containers and the same issue was dealt with in Belgium by an agreement reached in 1990 between the government, producers, distributors and users of containers; the Netherlands have set the target of reducing container waste by 10% by the year 2000 and of increasing the percentage of containers recycled. Italy has also adopted legislation on the disposal and recycling of containers for consumable liquids. In particular, Law 475/88 sets minimum targets for the recycling of containers (50% for glass and metal, 40% for plastics and poly-composites and from March 1993 onwards there should be penalties for failing to meet targets. In 1992, at Community level, the EC Commission in any case approved a draft directive aimed at harmonising Member States' policies on containers.

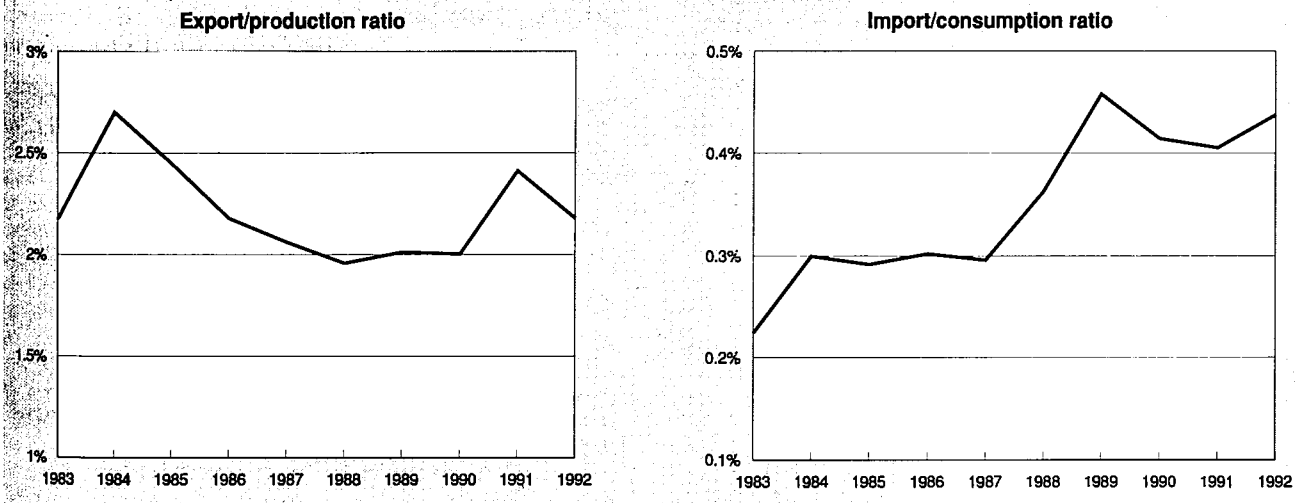
OUTLOOK

The demand for non-alcoholic drinks still has ample room for expansion. Overall, growth margins depend on a further drop in the consumption of alcoholic drinks. The highly fragmented markets and the continued existence of geographical areas where consumption is still very limited suggest that markets will grow steadily.

In the soft drinks sector, isotonic drinks and still drinks (including fruit-based drinks) are currently being introduced or having their life cycle extended. The introduction to the European market of decaffeinated colas is a positive response by the industry to consumers' differing requirements. The market for drinks taken with meals also offers growth possibilities for mineral waters. A further growth factor is the increasing demand for health products in general. Here, mineral water is a direct competitor of soft drinks.

Regarding risks to market outlook one would include health attitudes working against carbonated drinks, increased costs resulting from legislation concerning the disposal and recycling of containers. Regarding opportunities the expansion of mineral water in certain national markets seems likely while growing health consciousness should be working in favour of mineral waters and light drinks as well as the wider use of sports drinks.

Figure 8: Soft drinks, mineral waters
Trade intensities



Source: DEBA

Table 6: Soft drinks, mineral waters
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	47.0	46.0	47.8	51.1	53.9	53.0	54.4	57.6	55.7	56.3
Productivity index	98.3	96.1	100.0	106.8	112.6	110.9	113.8	120.4	116.5	117.8
Unit labour costs index (3)	86.2	92.8	100.0	104.1	109.4	115.2	124.8	134.4	143.4	154.4
Total unit costs index (4)	83.1	90.3	100.0	107.4	115.3	124.9	146.8	164.6	170.6	184.4

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Table 7: Soft drinks
Packaging used, 1991

(%)	B	D	E	IRL	P	UK
Returnable glass/plastic	34.4	69.9	42.1	14.0	63.6	11.0
Non returnable plastic	44.2	0.0	33.1	53.0	16.9	50.8
Metal	13.3	14.3	16.8	23.0	8.1	35.3
Cardboard	3.1	0.0	0.0	0.0	3.7	0.0
Non returnable glass	1.6	7.5	4.7	5.0	5.9	2.9
Pre/post mix	3.4	8.3	3.3	5.0	1.8	0.0

Source: UNESDA

Table 8: Soft drinks, mineral waters
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	3.9	4.4
Production	4.0	4.5
Extra-EC exports	9.0	11.0

Source: Prometeia

Written by: Prometeia Calcolo Srl
The industry is represented at the EC level by: Union of soft drinks associations (UNESDA). Address: Boulevard Louis Schmidt 35, Bte 14, B-1040 Brussels; tel: (32 2) 735 3749; fax: (32 2) 732 5102.

Tobacco
NACE 429

Over 1983 to 1992 production and apparent consumption of tobacco products in the EC at constant prices decreased steadily. The whole market is sustained by the cigarette branch, albeit subject to legislative restrictions and anti-smoking campaigns. Possibilities for expanding production are connected with exports, which have risen rapidly in recent years.

INDUSTRY PROFILE

Description of the sector

Within the tobacco sector the following activities can be distinguished:

- growing and initial processing of tobacco;
- manufacturing of tobacco products.

The principal outlet for industrial processing of tobacco is the smoking-tobacco market, covering the following finished products:

- cigarettes, cigars, cut tobaccos for hand-rolled cigarettes and pipe tobaccos;
- snuffs and chewing tobaccos.

The most important production subsector is cigarette-making.

Recent trends

Although over 1983-1992 apparent consumption and production declined in real terms exports grew favourably. The stagnation in the sector affected the trend of employment, which fell at an average annual rate of 5% during that period.

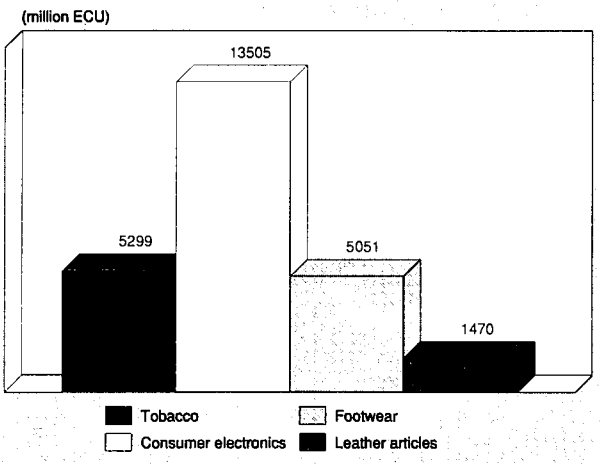
However, strong export performance to non-EC countries, particularly over the period 1988 to 1992, helped to halt the sharp decline observed over the first part of the 1980s allowing production and apparent consumption to stage a weak recovery. In recent years, however, imports have also increased considerably.

The main producing country in the EC is Germany, which in 1992 accounted for 29.7% of the total number of cigarettes made. Next come Great Britain and the Netherlands, with 17.9% and 12.7% respectively. The leading producers are different for the other categories. In 1991 Belgium produced 26.6% of the EC's output of cigars and Denmark, with a volume share of 29.8%, was the biggest producer of pipe tobacco, while 49.8% of tobacco for hand-rolled cigarettes was produced in the Netherlands.

International comparison

EC production of cigarettes in recent years was comparable to that in the United States, but displayed a more favourable trend. In 1992 the number produced reached 708 billion, with an average annual increase over the last five years of 1.7%, against 654 billion in the United States and an average decrease of 1%. During the same period, apparent consumption increased in the EC at an average annual rate of 0.8%, to 615 billion cigarettes, while in the United States it fell gradually to 500 billion cigarettes. The Japanese market is about half the size of the EC market; production and consumption (303 billion cigarettes in 1989) are stable. The world picture shows no change, with the important exception of China, which leads for both production and consumption (1600 billion cigarettes in 1989); and substantial growth is still taking place.

Figure 1: Tobacco
Value added in comparison with other industries, 1992



Source: DEBA

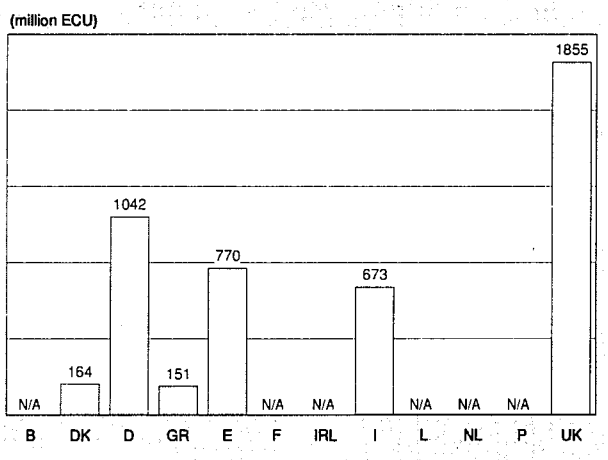
Foreign trade

The EC's balance of trade in tobacco products has constantly shown a surplus over the past decade, with an improvement in the trend during the last few years. From 1983 to 1992 the proportion of output exported to non-EC countries, increasing at an average rate of 4% per annum. With regard to destination areas, the share of the EFTA countries and the United States decreased during the last five years.

Similar trends were observed with respect to extra-EC imports which, however, represent only a small proportion - about 1% - of consumption. Overall, the EC had, in 1992, a 27% share in the volume of world imports and a 35% share in world exports of cigarettes.

Intra-EC trade at current prices grew at an average annual rate of about 7% during the past decade. In 1992 its value was about double that of extra-EC exports and more than five times that of extra-EC imports. The leading net importers in the EC are Italy, France and Spain. The country with the highest level of exports in terms of value is the Netherlands, followed by the United Kingdom and Germany.

Figure 2: Tobacco
Value added by Member State, 1992



Source: DEBA

Table 1: Tobacco
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	29 641	28 145	28 616	28 650	29 984	30 397	31 811	33 315	36 745	38 051	36 700
Production	30 043	28 582	29 212	28 986	30 232	30 745	32 270	33 894	37 487	38 992	37 700
Extra-EC exports	705.0	665.4	713.1	611.8	594.7	648.1	739.5	889.5	1 211.3	1 423.6	1 370
Trade balance	401.7	436.9	596.0	336.3	248.3	348.8	459.3	578.5	741.4	940.8	1 000
Employment (thousands)	117.9	110.4	104.4	96.8	91.8	87.5	83.7	81.4	79.3	77.3	73.7

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Tobacco
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	-2.0	0.8	-0.8
Production	-2.1	0.8	-0.8
Extra-EC exports	-4.1	18.1	5.2
Extra-EC imports	4.3	23.5	12.5

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Tobacco
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	705.0	665.4	713.1	611.8	594.7	648.1	739.5	889.5	1211.3	1423.6
Extra-EC imports	303.3	228.5	117.1	275.5	346.4	299.3	280.2	311.0	469.8	482.8
Trade balance	401.7	436.9	596.0	336.3	248.3	348.8	459.3	578.5	741.4	940.8
Ratio exports/imports	2.32	2.91	6.09	2.22	1.72	2.17	2.64	2.86	2.58	2.95
Terms of trade index	99.0	91.7	100.0	106.9	118.8	140.4	143.8	155.7	159.3	228.6
Intra-EC trade	1 461	1 481	1 962	1 785	1 768	1 917	2 096	2 259	2 500	2 634
Share of total imports (%)	82.8	86.6	94.4	86.6	83.6	86.5	88.2	87.9	84.2	84.5

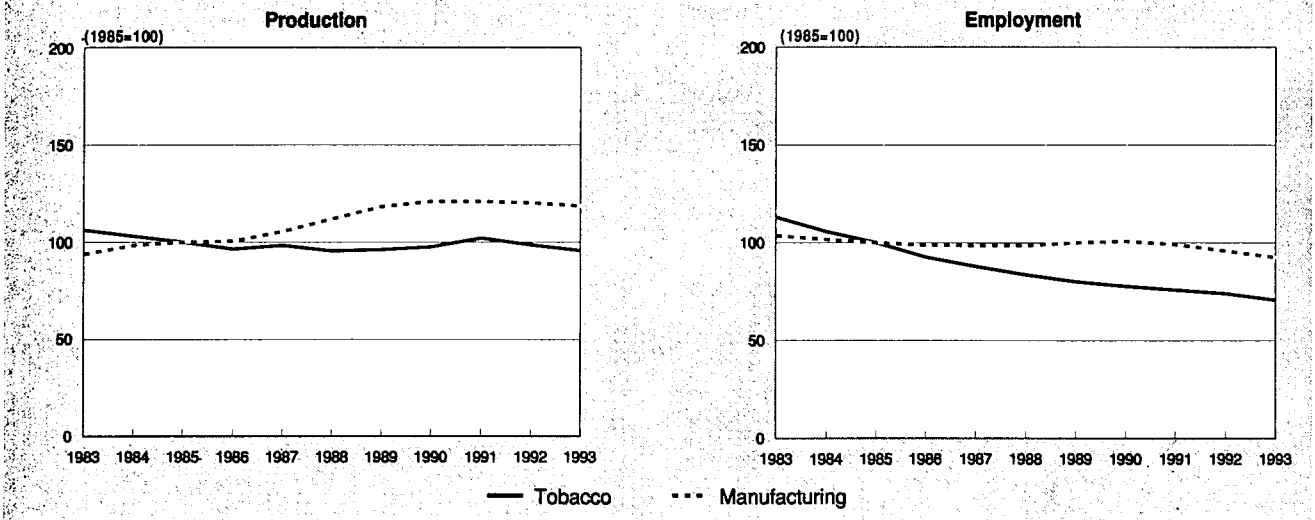
Source: DEBA

Table 4: Tobacco
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	51.9	43.6	44.0	43.1	52.1	52.0	60.9	63.7	69.0	68.6
Productivity index	118.0	98.9	100.0	97.9	118.4	118.1	138.4	144.6	156.7	155.8
Unit labour costs index (3)	86.3	93.6	100.0	101.6	107.4	114.8	120.1	129.6	138.9	147.6
Total unit costs index (4)	79.2	92.7	100.0	106.4	114.6	116.8	129.1	140.7	164.3	171.9

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Tobacco
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

MARKET FORCES

Demand

Overall demand for tobacco products in the EC ceased to grow long ago. The market is, however, sustained by the cigarette subsector, which is the most important, with a 90% share in terms of value, the volume of output having increased by 4% during the last five years while that of other products fell. Consumption of tobacco is adversely affected by awareness of the health risks, the increase in taxes on cigarettes and the limitations imposed on advertising. Filter cigarettes represent over 95% of sales in the leading markets, with the partial exception of France (80%). Consumers are turning more and more to cigarettes with "mild" tobacco mixtures and a low tar-condense and nicotine content. Targeting of female smokers is increasing.

Within the EC, the market which has shown the greatest growth in recent years - leaving aside Germany, where it has benefited from the reunification process - is that of Spain. Spain is the only country among the main cigarette consumers where per capita consumption has appreciably increased; elsewhere - particularly in Italy and the United Kingdom it has decreased.

Supply and competition

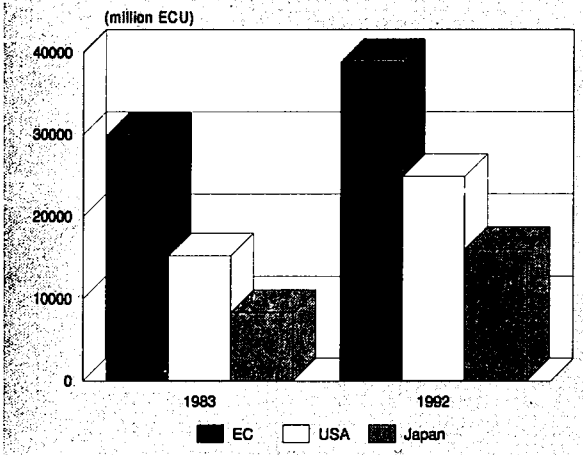
The state of competition in the sector is affected in some of the countries with the highest consumption by the presence of state monopolies which control at least half of the market. Apart from this aspect, supply is characterised by the multinationals in the sector, which rely on a high degree of brand loyalty. The increase in taxes has accentuated the segmentation of the market, a large section of consumers having changed to less expensive brands.

INDUSTRY STRUCTURE

Companies

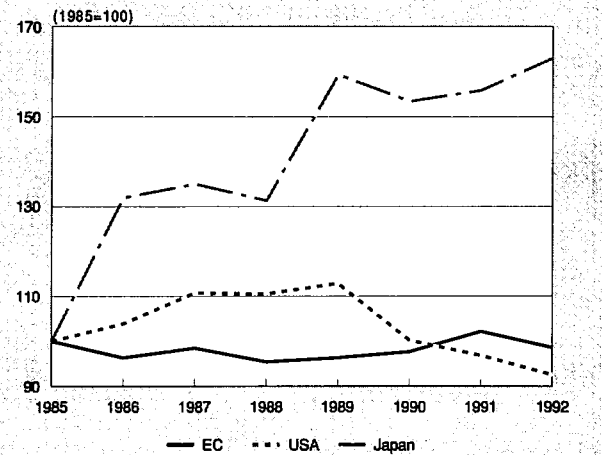
The tobacco products sector is characterised by the high concentration of supply. In the cigarette subsector, for example,

Figure 4: Tobacco
International comparison of production in current prices



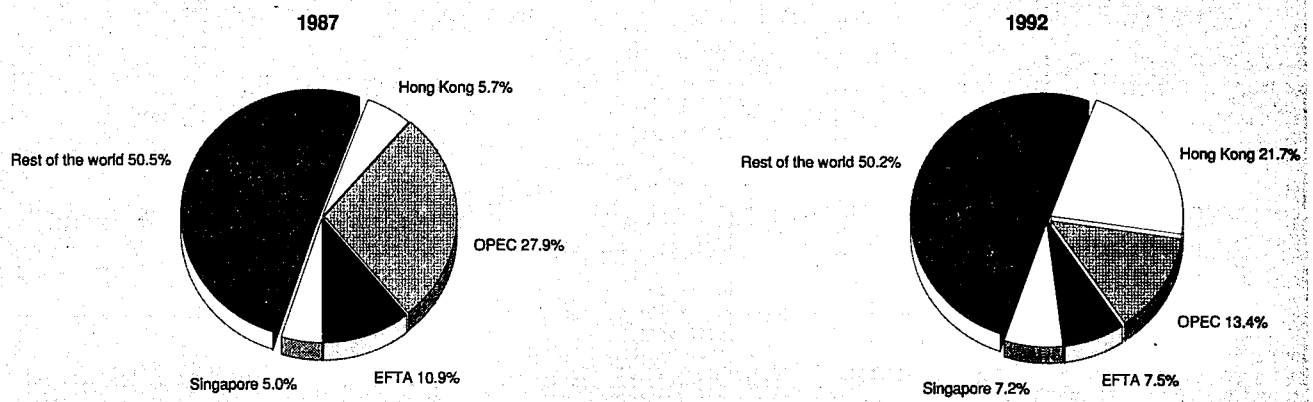
(1) 1985 figure; 1983 is not available.
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Tobacco
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Tobacco
Destination of EC exports



Source: Eurostat

the share of the four leading companies (monopolies or multinationals) in the five main markets ranges from 85% to 95% in volume. In 1991 the monopolies held nearly 50% of the market in France (Seita) and Italy (State Monopoly) and 66% in Spain (Tabacalera). Within the EC the main private tobacco companies are in the United Kingdom: these are multinationals such as BAT Industries, Hanson/Imperial and Rothmans International, the only companies capable of holding their own against the American multinationals (Philip Morris, American Brands, RJR Nabisco), with substantial shares in various markets. In particular, BAT Industries ranks third in Germany with a 21% share in terms of volume in 1991, behind Philip Morris (33%) and Reemstman (24%); Rothmans International controls 13% of the French market, preceded by Seita (48%) and Philip Morris (24%).

The penetration of the multinationals in the EC countries is assisted in some cases by agreements with the monopolies. In Italy Philip Morris sells its products to the State Monopolies, which distribute them through their own channels, while some of the tobaccos are produced directly by the Monopolies under licence, as is also the case in Spain with Tabacalera. There are also, however, some cases of alliances between the multinationals themselves: Rothmans, for example, markets the Philip Morris and BAT Industries brands in the United Kingdom and promotes and has rights for some American Brands cigarettes outside the United States.

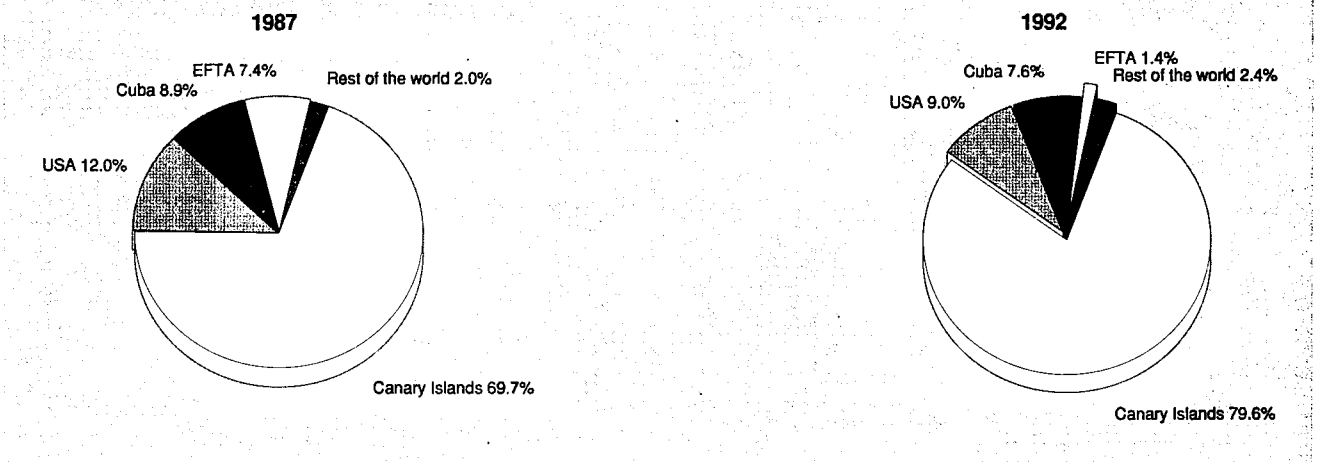
REGIONAL DISTRIBUTION

At world level there is a certain degree of overlapping between production of leaf tobacco and finished products. Asia provides the largest proportion of raw material, thanks in particular to China, which alone accounts for about 40% of world production in terms of volume, followed by the United States with 10%. The EC share is 6% and, within it, Italy and Greece together provide about 80% of production. China is also by far the leading cigarette-producing country. It is followed, far behind, by the United States, with a volume of 12% in 1992. The EC, which is the main importing area for leaf tobacco, produced 13% of world output of cigarettes in 1992.

REGULATIONS

The development of legislation has a considerable effect on the market for tobacco products, especially in the case of cigarettes. The most important limitations imposed on con-

Figure 7: Tobacco
Origin of EC imports



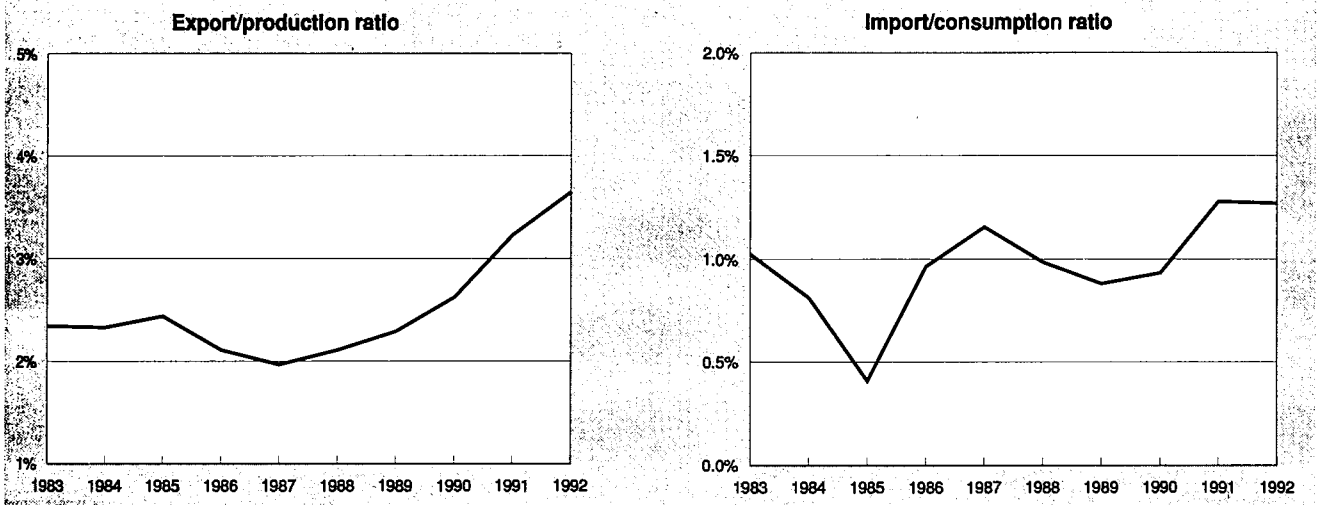
Source: Eurostat

Table 5: Cigarettes Production

(millions)	1987	1988	1989	1990	1991	1992
EC	651 767	654 569	661 401	698 924	717 730	707 988
Belgique/België, Luxembourg	26 877	27 046	25 884	25 977	25 419	25 350
Danmark	11 162	11 144	11 205	11 387	11 407	11 500
BR Deutschland	190 340	191 322	189 551	204 651	221 111	210 000
Hellas	28 853	28 780	28 533	29 430	29 050	29 250
España	80 500	78 400	79 500	82 500	85 000	87 500
France	54 160	53 307	54 225	55 495	50 311	49 000
Ireland	7 700	7 750	7 800	7 850	7 850	7 850
Italia	70 339	66 486	67 759	61 746	57 642	56 300
Nederland	52 335	61 724	68 849	78 345	87 078	90 000
Portugal	14 966	14 610	14 595	15 526	15 659	14 700
United Kingdom	114 535	114 000	113 500	126 017	127 203	126 538
USA	689 400	694 500	677 200	709 700	694 500	654 000

Source: FAO

Figure 8: Tobacco Trade Intensities



Source: DEBA

sumers and on the industry result from the gradual spread of the ban on smoking in public places, the requirement that warnings about the harmful effects of smoking be shown on packaging and the restrictions on advertising. An EEC directive has prohibited TV advertising, but the possibility of a decision to prohibit all direct or indirect advertising of tobacco is still under discussion, and is being opposed by some EC Member States. The tobacco industry has had to and is still having to take action to implement the 1988 EEC directive which called for a reduction in the tar-condense content to 15 mg per cigarette with effect from 1993 and to 12 mg from 1998 onwards. Lastly, proposals for harmonising the level of taxation in the various Member States are being examined at EC level.

OUTLOOK

Despite the legislative restrictions and the anti-smoking campaigns, the market for tobacco products has not collapsed and has actually grown slightly in recent years, mainly thanks to cigarette consumption. The expansion is, however, mainly

Table 6: Cigarettes Consumption, 1991

(billions)	Total	Per capita (No.)
EC (1)	607.7	1 759
Belgique/België, Luxembourg	17.9	1 726
Danmark	8.2	1 600
BR Deutschland (1)	146.6	1 833
Hellas	29.6	2 900
España	84.5	2 164
France	97.1	1 702
Ireland	6.1	1 744
Italia	90.5	1 567
Nederland	16.1	1 067
Portugal	15.6	1 583
United Kingdom	95.4	1 657

(1) Including former East Germany.
Source: CECCM

Table 7: Tobacco leaf
External trade

(thousand tonnes)	1987	1988	1989	1990	1991	1992
Imports						
World	1 411	1 336	1 420	1 447	1 596	1 581
EC (1)	609	570	595	614	692	677
Five largest non-EC importers						
USA	220	167	194	199	267	260
Former USSR	54	49	50	50	50	60
Japan	88	69	86	80	101	87
Egypt	42	54	43	48	42	47
Bulgaria	21	29	32	28	20	18
Exports						
World	1 362	1 357	1 432	1 515	1 648	1 718
EC (1)	286	258	305	340	352	343
Five largest non-EC exporters						
USA	199	220	231	230	229	230
Brazil	174	199	194	188	191	200
Zimbabwe	99	101	104	116	126	151
Turkey	106	78	117	95	137	95
India	55	44	58	70	69	75

(1) Including former East Germany from 1991.
Source: FAO

Table 8: Cigarettes
External trade

(thousand tonnes)	1987	1988	1989	1990	1991	1992
Imports world	372.2	389.3	406.7	450.5	516.7	521.5
EC (1)	114.3	118.5	122.9	129.8	133.9	139.7
Five largest non-EC importers						
Former USSR	61.0	61.0	55.0	65.0	100.0	100.0
Saudi Arabia	16.1	17.3	18.0	18.5	19.0	19.0
Japan	36.4	40.8	45.7	51.8	55.4	56.5
Colombia	12.9	16.1	14.0	13.4	12.9	12.7
USA	1.5	1.2	2.6	2.7	5.6	9.0
Exports world	399.4	453.4	506.4	621.6	707.4	693.0
EC (1)	154.1	167.7	172.3	196.9	236.9	245.2
Five largest non-EC exporters						
USA	100.2	118.5	141.7	164.3	179.4	160.0
Bulgaria	74.8	73.5	68.8	61.2	57.2	55.0
India	0.8	0.8	0.9	2.5	4.9	4.0
Switzerland	8.5	11.0	12.5	15.4	16.9	17.1
Former USSR	0.6	0.6	0.0	0.0	0.0	0.0

(1) Including former East Germany from 1991.
Source: FAO

Table 9: Tobacco
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.0	-1.0
Production	0.5	-0.4
Extra-EC exports	15.0	10.0

Source: Prometeia

due to the reunification of Germany. During the next few years the volume of cigarettes smoked, too, is likely to decrease, as has already occurred in the case of other tobacco products in the main EC markets, except Spain. The difficulties imposed on consumption by legislation and the social pressure against smokers might lead to a reduction in their number. The best opportunities for companies in the sector are provided by the increase in exports to the countries of Eastern Europe and to developing countries, where consumption is growing.

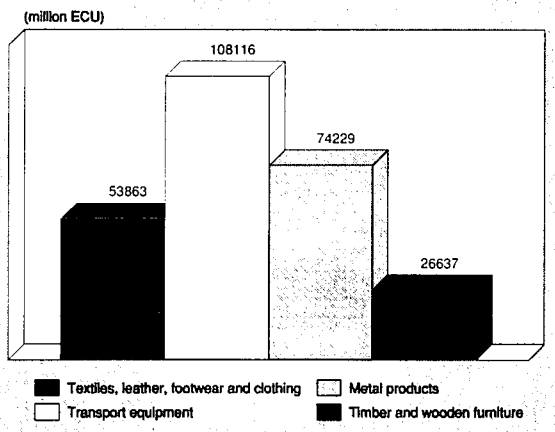
Written by: Prometeia Calcolo Srl

Overview

NACE 43, 44, 45

The sector can be divided into the upstream industries of textiles and leather and the downstream industries of clothing and footwear.
There is significant linkage between the two with the clothing industry absorbing half of the output of the textile industry and the footwear industry absorbing almost half of the leather production.
The industry is important in employment terms with a labour force of around 2.7 million people in 1993. This, however, represents a decline of some 27% over the previous decade. Growth in production in the sector lagged behind growth in consumption between 1983 and 1993, leading to a sizeable balance of trade deficit.
The output of the industry can be either mass-produced items or higher quality goods serving market niches. The former is now subject to intense competition from low cost producers in developing countries and EC companies have yielded market share to these countries in recent years. The higher quality end of the market is less determined by price, and EC firms possess a competitive advantage in relation to design, market response and distribution.

Figure 1: Textiles, clothing, footwear, leather
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

This overview covers the four related industries of textiles, leather, clothing and footwear. NACE 43 covers the textile industry which produces natural and synthetic fibres, NACE 44 covers the tanning and dressing of leather. NACE 451 and 452 comprise the footwear industry covering mass produced indoor and outdoor footwear, hand-made footwear and other special footwear. NACE 453 covers the manufacture of clothing and clothing accessories from various materials.

The textile industry covers a variety of production processes - fibre preparation, spinning, weaving, knitting, finishing and dyeing, and uses both natural and man-made fibres. It includes the manufacture of household and technical textiles - the latter being a rapidly growing sector. The clothing industry covers the manufacture of garments and clothing accessories.

The two industries together account for some 9% of manufacturing employment in the EC, employing nearly 2.7 million people in 1992. In terms of value added, the industry is mainly concentrated in Italy, Germany, France, and the UK.

EC foreign trade in textiles and clothing is subject to the MFA (Multi-Fibre Arrangement), which dates from 1974. Under this, bilateral agreements to limit imports of textile and clothing, from developing countries and NICs, are negotiated by the EC. The USA follows the same practice. In the GATT Uruguay Round, which was concluded in December 1993, it was agreed to phase out the MFA over a period of ten years from 1995. The intention was the eventual integration of the textile and clothing trade into the GATT, on the basis of strengthened GATT rules and disciplines.

The footwear industry absorbs just under half of leather output in the EC, with the garment industry accounting for over one fifth.

Recent trends

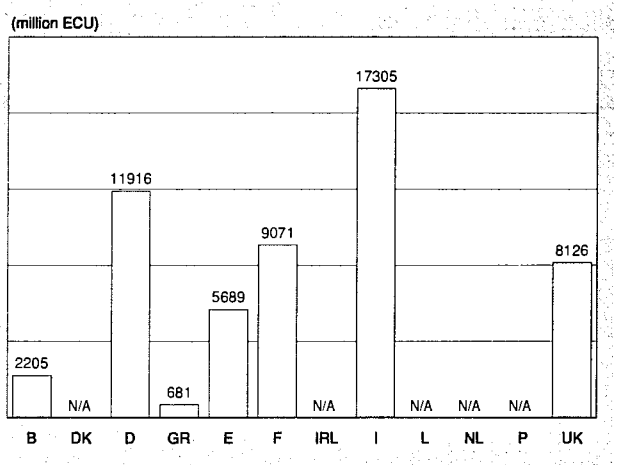
Overall consumption rose significantly faster than production in the period 1983 to 1993, with the value of production falling in the 1990s. Production growth was sluggish in the latter half of the 1980's partly a result of the poor export performance in that period.

Extra-EC exports grew rapidly in the early 1980s, dipped in the 1986 to 1988 period but recovered to a 1992 level 73% above the 1983 level in current prices. Extra-EC imports grew dramatically in the late 1980s and early 1990s. However, this growth slowed significantly in 1992. Between 1983 and 1992, the average real annual extra-EC import growth rate was over twice the extra-EC export growth rate.

Employment fell in the sector by a total of 22%, from 1989 to 1993. The largest fall in percentage terms was in the leather industry, in which employment fell by 38%.

Footwear is the most export oriented of the four industries with over one fifth of its output going to extra-EC markets. Textiles and leather have similar export orientation with about one-sixth of production value sold outside the EC while about a tenth of clothing production is sold outside the Community.

Figure 2: Textiles, clothing, footwear, leather
Value added by Member State, 1992



Source: DEBA

Table 1: Textiles, clothing, footwear, leather
Main Indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993(2)
Apparent consumption	136 526	152 052	164 569	173 941	180 684	187 059	195 663	201 304	206 290	205 476	203 000
Production	135 424	152 242	166 035	174 071	176 845	181 579	190 923	193 734	192 388	192 047	188 000
Extra-EC exports	16 895	21 554	24 493	23 077	22 620	23 412	27 513	28 347	28 183	29 199	28 000
Trade balance	-1 102	191	1 466	130	-3 840	-5 480	-4 740	-7 570	-13 900	-13 429	-15 000
Employment (thousands)	3 734	3 693	3 563	3 491	3 492	3 420	3 349	3 236	3 101	2 926	2 730

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat, OETH and Cotance estimates
Source: DEBA, OETH, Cotance

Table 2: Textiles, clothing, footwear, leather
Breakdown by major industries of the sector, 1992

(million ECU)	Apparent consumption	Production	Extra-EC exports
Textiles	113 415	109 608	16 967
Clothing	66 594	56 855	6 853
Footwear	18 977	18 689	4 176
Leather	6 490	6 895	1 203

Source: DEBA, OETH, Cotance

Table 3: Textiles, clothing, footwear, leather
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	1.8	0.3	1.1
Production	1.0	-1.0	0.1
Extra-EC exports	3.4	4.6	3.9
Extra-EC imports	8.4	9.3	8.8

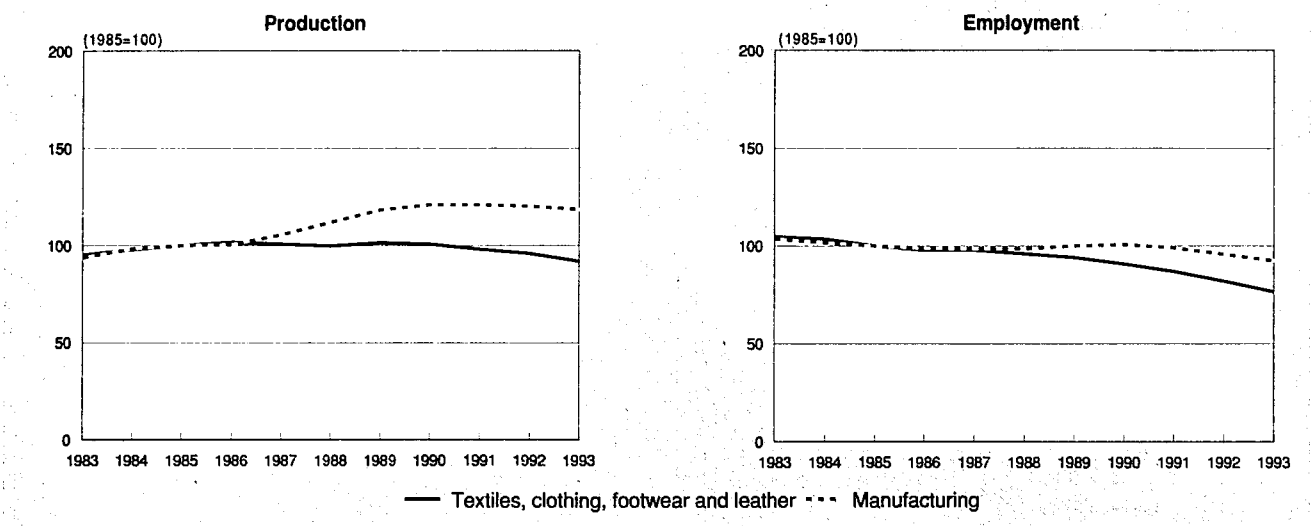
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA, OETH, Cotance

Table 4: Textiles, clothing, footwear, leather
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	16 895	21 554	24 493	23 077	22 620	23 412	27 513	28 347	28 183	29 199
Extra-EC imports	17 997	21 363	23 017	22 947	26 460	28 892	32 253	35 916	42 084	42 628
Trade balance	-1 102	191	1 476	130	-3 840	-5 480	-4 740	-7 570	-13 900	-13 429
Ratio exports/imports	0.94	1.01	1.06	1.01	0.85	0.81	0.85	0.79	0.67	0.68
Intra-EC trade	26 370	30 511	33 885	37 180	39 246	40 130	44 363	48 722	51 574	52 460
Share of total imports (%)	59.4	58.8	59.5	61.8	59.7	58.1	57.9	57.6	55.1	55.2

Source: DEBA

Figure 3: Textiles, clothing, footwear, leather
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA, OETH, Cotance

Textiles and clothing

Both the textile and clothing industries have suffered from falling production in recent years. Production rose from 1983 to 1986, but then fell off, to reach nearly 10% below the 1985 level in 1993. Consumption in both textiles and clothing has risen, by 1.1%, per annum between 1983 and 1992. This has however been accounted for by imports growing faster than exports, especially of clothing. Despite expanding EC exports of textiles and clothing, the trade balance deteriorated continuously between 1983 and 1992, reaching a deficit of 13.5 billion ECU in 1992. Employment in both industries has been falling, on account of increasing labour productivity in both, as well as on account of market trends. In 1993 it is estimated that total employment was 23% below the 1985 level - a loss of over 700 000 jobs, of which 400 000 were in textiles and 300 000 in clothing.

International comparison

The EC is the origin of 20% of world production of footwear. In the leather industry, Europe (primarily the EC) represents nearly half of world trade, with the value of leather production over three times the level of the USA and Japan production combined.

Production of textiles and clothing is 37% larger in the EC than in the USA, and more than 4 times as large as in Japan. From 1985 to 1992, in current prices, production has increased most in the USA (19.6%), followed by the EC (14.8%), and Japan (11.8%).

In the USA the rise in production has been related to strongly expanding exports. In 1992, these were close to the level of Japanese exports, although they are still much lower than EC exports.

In recent years, textile and clothing production has decreased most strongly in Japan and the EC, while in the USA there was a slight recovery in 1992, mainly in textiles. In the EC, production decreased more rapidly in clothing than in textiles, whereas in Japan the textile industry was more badly hit than clothing.

Foreign trade

The ratio of extra-EC exports to extra-EC imports hovered around parity up to 1986 but subsequently fallen to just over two-thirds in 1992. Leather is the only industry to display a ratio in excess of one, while footwear, which had a ratio of 2:1 in the early to mid 1980s dropped below one in 1991, although there was some recovery in 1992. Consistent with the deterioration in the trade balance, extra-EC imports now account for a greater proportion of total trade than in 1983.

EFTA countries are the principal destination for EC exports in 1992, accounting for nearly 32% of exports for the sector. The USA remained the second most important destination, although its significance has decreased in relative terms since 1987.

China has nearly doubled its percentage share of EC imports since 1987 and is now the single most important source of imports. In particular it accounts for 15% of imports in both footwear and clothing. Other East Asian countries are also important sources of materials and goods: South Korea and Indonesia in the footwear industries and India in the leather sector.

Total production in the EC fell by 3% in real terms from 1983 to 1993. In that period, the proportion of production exported to extra-EC markets increased by 20%. Intra-EC trade rose by 99%. This suggests a declining dependence on national domestic markets and increased geographical diversification, particularly to destinations within the Community.

Import penetration rose to about one fifth of total consumption in 1992 from under one sixth in 1982. Penetration is highest in clothing, at almost 25%, and in footwear, at almost 24%. Apart from the leather industry, which experienced an increase of 24% and textiles which increased by 34%, import penetration has increased significantly in each of the other sectors.

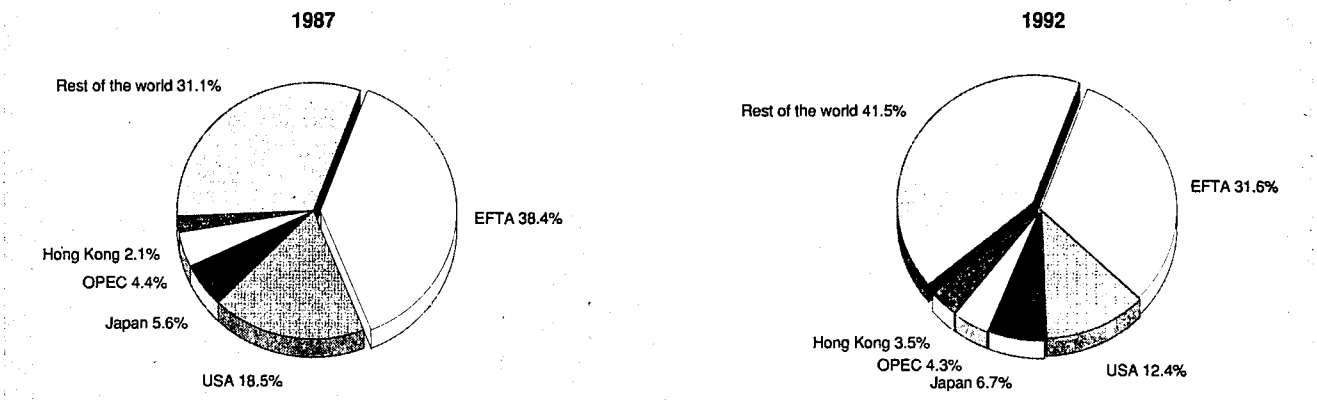
Textiles and clothing

During the last ten years, the volume of exports of textiles and clothing from the EC has been growing at an annual average rate of 5.2%. Imports, however, have grown much faster, at an annual average rate of over 13%.

The clothing industry in particular has had to face increasing competition from lower-cost countries, even though its export record has been a good one. its exports have, not unexpectedly, been in a higher price bracket than its imports.

Clothing manufacturers have to an increasing extent been resorting to outward processing trade (OPT). This involves the

Figure 4: Textiles, clothing, footwear, leather
Destination of EC exports



Source: Eurostat

export of EC fabrics to nearby countries in East Europe and the Mediterranean rim, for making up into clothing. This clothing is then re-imported into the EC. Such imports now make up some 10% of EC clothing imports.

OPT has helped the EC textile industry, and has helped EC clothing manufacturers who practice OPT to keep up their level of profitability. It has however, at the same time, been one of the factors which have reduced EC clothing production.

In 1992, 60% of EC exports of textiles and clothing went to 10 countries, among which were Switzerland (10.9%), the USA (10.3%), and Austria (9.9%). These are also the largest EC customers for textiles and for clothing separately. In comparison with 1988, export shares tended to decrease for the major customers and to increase for the smaller ones,. like Poland, Tunisia, and Morocco. These increased their imports from the EC mainly in textiles, in relation to expanding clothing OPT.

Among major countries of origin for imports, China and Hong-Kong were the largest suppliers to the EC of clothing in 1992, while Turkey and China were major textile suppliers. Thus, China appears as the major country of origin for textiles and clothing in 1992. Mediterranean countries increased their share in total imports between 1988 and 1992.

MARKET FORCES

Demand

The nature of the products of all four sectors is such that fashions and tastes are key factors in determining demand. Product life cycles can be very short as fashions change quickly. This forces companies to be ready to respond very quickly to shifting demand requirements and has moved producers towards shorter production runs and quick-response manufacturing. Most of the primary fashion centres of the world - Paris, Milan and Barcelona - are located in the EC. Thus EC producers have a competitive advantage in relation to speed of response to demand changes.

Product innovation in the downstream industries is driven by changing fashions and the developments of new fabrics in the textile sector. Thus, developments in the textile industry itself allow innovations in the clothing sector.

Textiles and clothing

Spending on clothing as a proportion of total consumer spending in the EC decreased over the decade, but the absolute level of consumption rose.

The apparent consumption of textiles and clothing has grown less, as an annual average, between 1988 and 1992 (0.2%) than between 1983 and 1988 (1.8%). While consumption of knitted fabrics increased from 1988 to 1992, woven fabrics lost ground. Among textile end-uses, household textiles and technical textiles also showed a fall in consumption in those years.

Both textiles and clothing have had to face difficult market conditions due to several factors, including growing import competition and declining production in end-use sectors. Important market shares within the EC have been lost to lower-cost imports from countries like China, Turkey and Hong Kong. Exports to advanced countries like the USA and EFTA countries have had to face similar difficulties as within the EC, but textile exports to East Europe and the Mediterranean rim have expanded owing to higher outward processing trade flows.

Footwear and leather

The output of the clothing and footwear industries are almost completely directed to final consumer markets and is therefore affected by income developments in the general economy. Some output is sold to manufacturing or service industries, especially medical clothing or protective footwear. On the other hand, textiles and leather, are largely used as inputs into other industries, rather than being sold to end consumers.

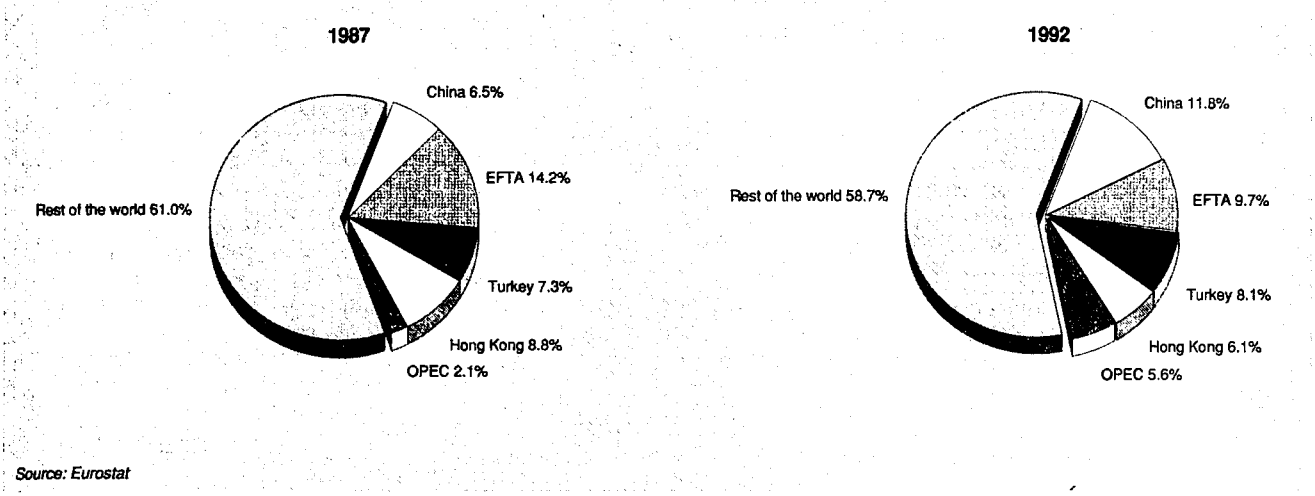
While both footwear and clothing are necessities up to a certain income level, they become discretionary beyond this level.

The EC market for these two products can be divided into mass produced items and high quality goods for which price is less of a determinant. The market for mass produced items is being increasingly supplied by low-cost imports from newly industrialised or LDCs. In the mass production market, price remains a key consideration and EC producers have lost market share because of the inability to compete with firms whose labour costs, in particular, are much lower than their own. In the high quality products, price is not as important and price elasticity is lower.

Supply and competition

Production in the EC lagged behind growth in consumption between 1982 and 1991, as cheaper imports gained increasing market share. Much of this is due to the competitiveness of companies in countries with lower labour costs, especially in East Asia. This fall in production has been accompanied by a structural rationalisation in the sector, with larger firms closing plants and some smaller firms closing altogether.

Figure 5: Textiles, clothing, footwear, leather
Origin of EC imports



Source: Eurostat

Some firms in the sector have relocated production plants to lower labour cost countries in order to achieve lower costs of production and aid competitiveness.

Distribution in the industry has become increasingly concentrated as some of the larger producers have either developed their own retailing networks or entered into alliances with existing retail chains.

Investment in the sector in the recent past has focused on modernisation and automation rather than expansion, and overcapacity is not a problem, particularly in up-market products.

In the context of the completion of the EC internal market, national quotas will disappear and the use of Article 115 of the Treaty of Rome, which allows a country to exclude imports which would cause a serious market disruption, is likely to be greatly reduced.

Export development, seen as a key strategy throughout the sector, is hampered by trade restrictions in some of the potential destinations. Japan, for example, operates a restrictive trade policy vis-a-vis footwear and leather production.

Production within the EC is hampered by the difficulty or cost of obtaining raw materials from LDCs. Increasingly, LDCs are attempting to develop downstream industries and retain their raw materials for domestic value-added production at home. A case in point is the leather industry, where rawhides previously exported are being processed further in the country of origin. Production is also hampered by the costs associated with meeting environmental regulations which are more stringent than those in developing countries.

The industry is somewhat vulnerable to the volatility of world commodity prices, e.g. wool, cotton and raw hides. Profitability has been squeezed in the EC in recent years as wage cost outstripped productivity gains and the pressure of cheap imports prevented EC producers from increasing their own prices. Other costs, such as those due to expanding up-market output ranges, and the associated advertising and promotional costs to establish a market foothold, have squeezed margins further. However, the EC industry possesses a significant competitive advantage in the areas of design and quality.

Textiles and clothing

EC textile and clothing manufacturers have to achieve international competitiveness, while having among the highest labour costs in the world. Although labour costs have increased rapidly in lower-cost countries, disparities between them and developed countries still remain strong. The textile industry is considered as capital-intensive, but labour in the clothing industry still remains a major means of production. Recent innovations in technology point to a reduction in labour content in the long-term, but few clothing manufacturers are in a position to invest heavily in new and innovative machinery in the near future.

Competition in clothing has focused in recent years on reduced production costs through delocalisation strategies to lower-cost areas outside the EC. Among these, outward processing has developed rapidly. EC fabrics are sent (mainly) to East Europe and the Mediterranean rim, and re-imported as made-up garments to the EC under reduced tariffs and special quotas. This has favoured the competitiveness of clothing manufacturers in the EC, but also the EC textile industry through the utilisation of fabrics of EC origin.

Part of the textile industry operates in the highly innovative field of industrial textiles, in connection with other industry sectors like automobiles, aeronautics or medicals. Competition mainly operates between industrialised countries, based on research and development efforts and investment in new technology. Unlike the clothing industry, the EC still has a strong competitive position in this area.

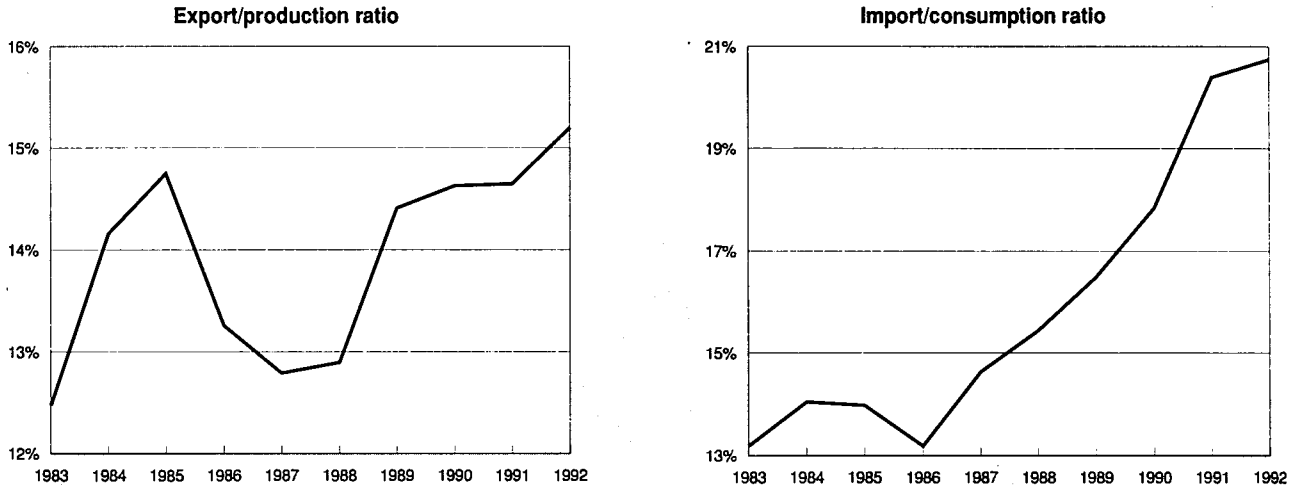
Production process

Employment in the industry has decreased dramatically since the MFA was introduced in 1973. Much of this decline can be attributed to technological advances and the inevitable shedding of labour. There is substantial use of outworkers, in footwear and certain sectors of the leather goods industries. While the introduction of technology in the clothing and footwear sectors was more limited than in textiles and leather, the application of computer aided design (CAD) and computer aided manufacture (CAM) have become more widespread.

The use of just-in-time (JIT) systems has also become an important feature within the industry particularly in the clothing and footwear sectors. An example of an integrated JIT manufacturing and retailing is the Benetton group which links retailers, production units and warehousing and allows rapid response to market changes or trends.

In addition, the level of labour skills is higher in the EC than elsewhere (including the US), giving EC producers a competitive advantage in the production of higher quality products. The EC-sponsored RETEX programme is enhancing the quality of labour in the regions where it is being implemented. The FORCE and EUROFORM Programmes also assist in the vocational training of workers for the industry.

Figure 6: Textiles, clothing, footwear, leather
Trade intensities



Source: DEBA, OETH, Cotance

Product innovation and development is an important strategy for EC industry, particularly in the context of declining competitiveness for mass produced goods.

Textiles and clothing

In the EC stock of spinning machinery, nearly 60% are short-staple spindles, used for fibres such as cotton, and nearly 40% long-staple spindles, used for wool and other long fibres. This contrasts with the worldwide situation, where short-staple spindles predominate. The difference reflects the fact that the EC is a large wool producer on the world level.

In weaving, the EC textile industry uses a high proportion of modern shuttle-less looms, unlike many Asian countries. Knitting machinery has become increasingly automatic and capital-intensive in the EC, as well as in other developed countries.

Technological innovation in clothing has been more in the use of new fibres and fabrics than in the process of manufacture, which is still relatively labour-intensive, but even so there have been important productivity gains in this sector.

Recently investment has decreased both in textiles and in clothing. Due to its more capital-intensive nature, investment in the textile industry is still more than four times larger than in clothing, in ECU terms.

From 1988 to 1992, investment in textiles and clothing decreased by an annual average rate of 3.5%; it fell by 4% in textiles and increased slightly by 0.5% in clothing. After 1991, investment decreased in clothing also.

INDUSTRY STRUCTURE

Companies

There are approximately 160 000 firms in the EC industry employing 2.7 million people, despite the sharp reduction in the number of employees over the past decade. A significant number of firms within the sector are small, employing less than 20 people. In the leather industry north European tanneries tend to be larger than their southern counterparts. Italy has the lowest ratio with an average of 10 workers per plant compared to an average per plant of 90 workers in Germany.

Most of the smaller firms supply domestic or neighbouring markets and the level of extra-EC exports from these firms is low.

Textiles and clothing

In terms of turnover and employment, the EC textile and clothing industry is mainly incorporated within enterprises employing more than 20 people, although a large number of small firms operate in clothing. In 1992, the industry was composed of 143,000 enterprises, of which 117,000 had less than 20 employees.

The small size of most firms is a major feature of the clothing industry, while in the textile industry, given higher capital requirements and technological skills, the average firm is larger.

Among the largest textile and clothing companies within the EC, several have their activities as well in textiles as in clothing (e.g. Coats Viyella UK), Benetton (I) or Courtaulds (UK)). Others are specialised in certain product lines, like the large Belgian carpet manufacturer Beaulieu.

Strategies

Faced with competition from low cost producers abroad, EC producers have reacted by moving up-market into the production of higher quality goods, which are less price sensitive and are not amenable to the same degree of mass production as standard items. This strategy is consistent with the spirit of the MFA as originally constituted. Northern European countries in particular have moved towards producing higher quality goods. Countries such as Spain, Greece and Portugal have not moved as quickly towards up-market goods, and remain vulnerable to low cost competition from outside the EC.

In the downstream industry of footwear the move away from mass produced items has necessitated increased investment in advertising, branding, adoption of quality management systems of production and distribution, and the implementation of JIT systems. In the leather and leather goods sector, companies have also identified more profitable, though often relatively small, market niches.

The prospect of a move upmarket by East Asian producers however, will increase the competitive threat faced by the industry in the EC and further strengthen the need for quality in production and distribution.

Textiles and clothing

Both textile and clothing manufacturers have to operate in a highly competitive industry. Technological innovations, and new production management strategies, such as quick-response and just-in-time, have helped to improve the industry's competitiveness.

In textiles, modern automatic technology has made it possible for medium-sized plants as well as large plants to be viable. Textile firms now tend to be less vertically organised than previously, and prefer to specialise on a limited number of processes.

The clothing industry has made several advances in the sphere of automation, but because of its continuing reliance on many labour-intensive processes, manufacturers have increasingly explored the possibility of subcontracting outside the Community, especially for long-run and lower quality products. The countries of East Europe and the Mediterranean rim have been important here because of their proximity.

REGIONAL DISTRIBUTION

Textiles and clothing

The textile industry is located in a relatively small number of regions, with a heavy population of workers. The clothing industry is more widely spread, in relatively smaller pockets of employment.

When the two industries are considered together, a number of regions stand out for their heavy concentration of employment. Employing more than 150 000 workers are Lombardia (I) and Cataluna (E). Employing between 100 000 and 150 000 are four regions - Veneto (I), Bayern and Nordrhein-Westfalen (D), and Norte (P).

There are eight regions employing between 50 000 and 100 000, three each in Italy and France, one in Germany and one in the UK. There are fourteen regions employing between 25 000 and 50 000.

The figures are more significant when looked at as a proportion of all industrial employment in a region. Regions with over 30% of industrial employment in textiles and clothing are Norte (P), Kentriki Makedonia (GR), Dytiki Ellada (GR), and Castilla-la Mancha (E). It is noteworthy that the last three are not included in those areas with the heaviest absolute level of employment.

Regions with 20-30% in textile and clothing employment, as a proportion of industrial employment, are nine in number, including two in Portugal and two in Greece. Two further Greek regions have textile and clothing employment of 15-20%. It is evident that in Greece and Portugal, two of the EC's least prosperous Member States, regional dependence on the textile and clothing industries is of considerable importance.

Footwear and leather

The industry is of considerable social and economic importance in certain regions of the EC, which tend to have both the upstream and downstream industries. Three Italian regions the Marches, Tuscany and Veneto account for almost two-thirds of footwear employment in Italy. The centres of Santa Croce sul Arno, San Miniato, Castelfranco, Montopoli and Fucecchio produce about 90% of all Italian sole leathers. Thus, structural changes affecting the industry tend to have a disproportionate effect on these regions. To date contraction of the leather industry has hit northern EC countries most severely but is increasingly affecting southern Member States.

ENVIRONMENT

Compliance with national and EC regulations imposes costs on EC producers which are not felt by producers in other countries where such regulations and controls are much more limited or not implemented vigorously by the authorities.

Textiles and clothing

In the manufacturing processes, textiles pose greater difficulties than clothing. There is heavy use of energy in man-made fibres, and many cleaning processes with natural fibres (as well as the use of pesticides etc. in their growth). The danger of pollution in water - used widely for many textile processes - has been countered by EC and national regulations (which affect industry generally) on effluents discharged to water.

Clothing manufacture raises fewer environmental problems. Here however the question of the final disposal of garments raises difficulties for synthetic fabrics, because these are not biodegradable, unlike fabrics made from natural and cellulosic fibres.

There are heavy costs involved in improving environmental standards. The EC Commission has estimated that environmental costs in dyeing and finishing account for between 3.5% and 9.2% of total costs, depending on the Member State involved.

An American study of a polyester garment has shown that one of the greatest sources of environmental damage arises from the laundering and cleaning of clothing. It found that over 80% of energy requirements were related to consumer use, as well as 90% of solid waste emissions.

REGULATIONS

Textiles and clothing

The EC negotiated in December 1992 an extension of the MFA (Multi-Fibre Arrangement) for another year, and of the then existing bilateral textile arrangements for two more years. A further extension of one year was agreed in December 1993. The MFA makes provision for quotas on imports of particular textile and clothing products, negotiated through bilateral agreements.

Within the GATT and the Uruguay Round negotiations, which were concluded in December 1993, provision was made for the phasing out of the MFA over a ten year period from 1995. The intention was the eventual integration of the textile and clothing trades into the GATT, on the basis of strengthened GATT rules and disciplines. Market access negotiations were to be concluded by April 1994.

The transitional arrangement will have three phases, with an assessment of the situation before the end of each phase. The agreement contains a specific transitional safeguard arrangement which could be applied to products not yet integrated into the GATT.

In connection with the MFA and the related bilateral trade agreements, the European Commission has launched a textile anti-fraud initiative (TAFI) for the detection of anomalous imports. This initiative aims at preventing certain economic operators from subverting the intentions of the MFA agreements.

In 1991, the European Commission launched an export promotion scheme (EXPROM), which seeks to develop new markets outside the EC, including those for EC textile and clothing products, by investigating the potential of new markets and supporting exploratory missions and trade fairs.

The establishment of OPT quotas at EC level from 1st January 1993, as part of the Single Market process, requires the elimination of disparities in the interpretation of OPT regulation 636/82 between Member States. The European Commission

has proposed revisions to the regulation which aim to harmonise its application throughout the EC.

In the field of intellectual property rights, the European Commission has proposed EC internal legislation regarding the protection and registration of trademarks, models and designs in textiles and clothing. These anticipate forthcoming results from the concluded Uruguay Round.

In the area of research and development, the textile and clothing sectors have achieved much success and are one of only two sectors to have been invited to coordinate their research as part of a targeted programme under the Brite/Euram, and participate also in technological initiatives regarding SMEs. For SMEs, the initiatives developed by the European Commission, in the framework of programmes such an Interprise and Euro-partenariat, represent a helpful contribution to co-operation and the improvement of business contacts.

In 1992, the European Commission adopted a new RETEX programme, aiming at a diversification of production activities in those regions which are strongly dependent on the textiles and clothing industries, and have been defined as assisted regions by the EC. RETEX mainly focuses on "soft" measures, i.e. on the improvement of know-how within firms, cooperation between firms in the same region or sector, and the use of new technologies to improve quality.

The European Commission, in association with professional organisations also continues its initiatives as regards the improvement of statistical and economic information e.g. short-term and structural data and analysis, and the study of prospective scenarios for the industry, namely in the framework of the OETH.

Footwear and leather

In the footwear industry, bilateral trade arrangements existed at national level to control the import of low cost products from Asian and East European countries. These have been largely phased out and trade policy is increasingly determined at EC level. Many EC countries also provided assistance to domestic producers but most of these have been phased out and are being replaced by centralised EC programmes.

OUTLOOK

The recovery in world economies, while slower than expected, will lead to an increase in demand for the output of the industry although there may be some shifting of the importance of specific products within the sectors.

Imports are likely to continue to make inroads on EC markets due to their greater price competitiveness and the impact of a freer trade regime. Countries with low import penetration at present may be most at risk. Export market development will continue to be a key strategy for EC producers with new markets appearing for footwear and leather goods in increasingly prosperous Asian NICs. Success in this regard may depend on gaining access to markets currently protected such as the Japanese market.

In the longer term the ability of EC producers to develop higher quality products, to find new uses for existing products, and to respond quickly to market changes will determine their performance. The possibility of East Asian producers following EC firms up-market remains a threat and only serves to emphasise the need for quality and service in the manufacture and distribution of products. The EC leather industry is expected to face increased competition from developing countries in the purchase of raw materials and in the demand for finished leather. Within the footwear sector the move up-market by some developing countries means that new additional locations will begin to compete with EC producers.

The increased demand from East Europe provides an opportunity for EC producers, but one in which they will face substantial competition from the lower-cost producers. The admission of greater quantities of imports from East Europe will increase competition at the lower end of the EC market.

Textiles and clothing

Both the textile and clothing industries of the EC have been affected by the recession of the early 1990s, which itself has reflected that in the world economy as a whole. Even in 1993 the EC textile and clothing industries have remained depressed. In the first half of the year the volume of textile production was some 8% below that of the same period of 1992. Clothing production was down by a similar amount.

Employment in textiles and clothing together fell by 124 000 in 1991 and fell by 153 000 in 1992. In 1993 the fall was even greater, at 170 000 or over 9%.

The trade balance in textiles and clothing continued to deteriorate in 1993, and reached a level of over 14 billion ECU, nearly 6% above the 1992 deficit.

The slow rate of recovery of the world economy, including that of the EC, does not hold out good prospects for an upturn in the textile and clothing industries in the short to medium term. Some help however may be given by the strengthening of the USD since the last quarter of 1992. This has worked to the disadvantage of US exporters, and of exporters in those countries (such as Hong Kong) whose exchange rates are traditionally linked to that of the USA. Those EC member states who have substantially devalued their currencies since September 1992, on the other hand, have potentially benefited more than the average.

The consequences of the advent of the EC's Single Market at the beginning of 1993 are not yet clear. It may well affect the distribution of imports among member states, and may also lead to an increase of imports, if previously unfilled MFA quotas are now taken up.

It was one of the aims of the Uruguay Round of the GATT to phase out the MFA, and to return textiles and clothing to GATT rules. The agreement reached in the negotiations, which was concluded in December 1993, was to phase out the MFA over a period of ten years from 1995.

The phasing out of the MFA will occur gradually. In the medium term the recovery of the EC and the world economy will be among the principal factors affecting the EC's textile and clothing industries. Apparent consumption of EC textiles and clothing is expected to fall slightly in 1993-94. Production is expected to fall by 3.5% during this period, but exports are expected to rise by 1.5%.

During the period 1993-97 the EC's apparent consumption of clothing is anticipated to rise by 1% per annum, and that of textiles by a similar amount. production of clothing is expected to fall by 2% per annum, but that of textiles to remain unchanged. Exports of both are likely to rise - exports of textiles being linked partly to the expected growth in OPT.

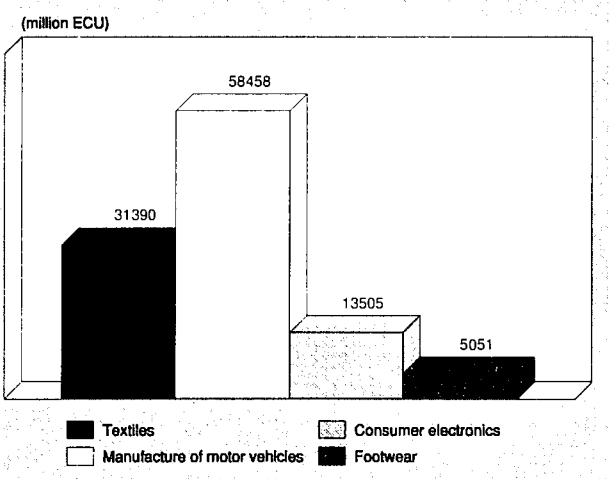
In the longer term, a further growth in the delocalisation of clothing production to neighbouring lower wage countries is a strong possibility. As regards the textile industry, this is now very capital-intensive. Its growth will be linked partly to the fortunes of EC clothing manufacture. Growth will also depend on future high-tech developments, including those in technical textiles. If these developments continue to be successful, and market specialisation continues to be pursued, there might be little incentive for the industry to follow the clothing industry in delocalising production to lower wage countries.

Written by: Observatoire Europeen du Textile et de l'Habillement (OETH) for textiles and clothing; and Fitzpatrick Associates for footwear and leather.

Textiles
NACE 43

The textile industry comprises the production processes of fibres preparation, spinning, weaving, knitting, finishing and dyeing. It uses both natural and man-made fibres. The textile industry accounted for 3.5% of the value added of manufacturing industry in the EC in 1992, 4.1% of turnover and 5.5% of employment.
EC production of textiles (in volume) has been falling since 1990, and in 1993 was 7% below its 1985 level. Imports have increased faster than exports, and the trade balance became negative after 1986, but the exclusion of raw material imports would show an EC trade surplus of manufactured textiles. The sector's competitiveness has been influenced in particular by the evolution of exchange rates, especially against the USD.
Substantial fabric exports go to East Europe and the Mediterranean rim, for subsequent processing into clothing for re-import into the EC. This is OPT (outward processing trade). Household textiles and carpets are the second most important end-use, after clothing, followed by technical and other textiles.
Regionally, the industry is concentrated in a relatively small number of districts, of high textile employment. Employment in textiles as a whole has decreased, especially in the period since 1989, partly because of market changes and partly because of investment in modern technology which has led to increased productivity.
There are a number of environmental problems associated with the textile industry. These have been addressed by both national and EC regulations affecting water and air quality. The slow rate of recovery of the world economy does not hold out good prospects for the EC textile industry in the medium term. The EC's textile industry is however now very capital intensive, and firms in the industry are adopting strategies appropriate to modern competitive conditions. Much depends on the health of the EC's clothing industry, which itself has been depressed. The outlook for the textile industry also depends partly on the effects of phasing out the MFA (Multi-Fibre Arrangement): this was agreed upon in the Uruguay Round of the GATT.

Figure 1: Textiles
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

The textile industry (NACE 43) covers a variety of production processes (preparation of fibres, spinning, weaving, knitting, finishing, dyeing, and also knitwear products) using various types of natural fibres (e.g. cotton, wool, linen, silk) and man-made fibres (e.g. synthetic, cellulosic, carbon, glass etc.). Products include clothing fabrics, household textiles and industrial textiles as end-uses, or as inputs to other industries (e.g. clothing, car upholstery).

In terms of value added, the textile industry represented 3.5% of manufacturing industry in 1992. The EC textile industry is mainly concentrated in Italy (36% of production), Germany (18%), France (15%), and the UK (11%). In comparison to the manufacturing industry, the textile industry represents 5.5% of employment and 4.1% of turnover in 1992.

Recent trends

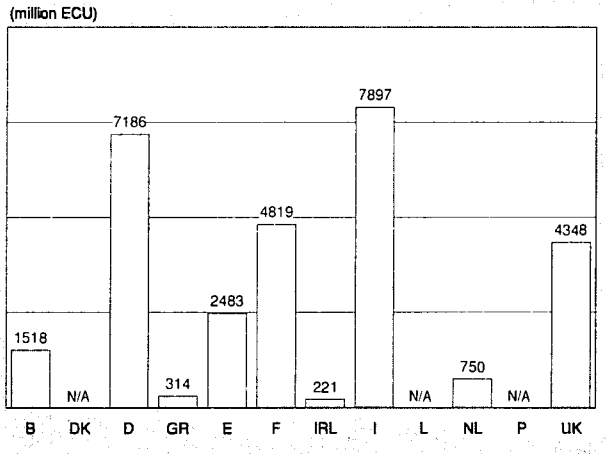
EC production of textiles (in volume) rose steadily until 1987, at a comparable pace to that of total manufacturing. However, production has been declining since 1990, and in 1993 was 7% below its 1985 level (1985=100). Apparent consumption increased in real terms over the period 1983 to 1992 by 1.1% per annum, while production rose by 0.3% per annum. From 1991 to 1992, production in current prices decreased by 1.8%, while apparent consumption fell by 1.6%. In 1992, employment was 18% below its level in 1985.

The value of EC production (at constant prices) has followed a different trend from that of production in volume. It increased from 1983 to 1991, and has since declined, but was still nearly 5% above the 1985 level in 1993. Quality changes, which were not picked up in the price deflator, may account for the apparent discrepancy with the volume trends.

As imports increased faster than exports, the trade balance became negative after 1986 and more than doubled in 1991 alone. The trade deficit reached 3.8 billion ECU in 1992.

Employment in textiles was some 1.5 million in the EC in 1992, of which one quarter was in the knitting industry. Employment decreased steadily between 1983 and 1992, resulting in a reduction of 23%, or some 420 000, during the decade. This evolution was combined with a steady rise in productivity.

Figure 2: Textiles
Value added by Memeber State, 1992



Source: DEBA

Table 1: Textiles
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	76 119	87 302	94 957	100 047	105 126	107 696	113 503	114 637	115 289	113 415	110 000
Production	76 061	87 842	95 871	100 823	104 390	106 823	113 180	113 356	111 574	109 608	106 000
Extra-EC exports (3)	10 404	12 775	14 160	13 207	13 131	14 083	16 028	16 324	16 389	16 967	16 500
Trade balance (3)	-58	540	914	776	-736	-873	-323	-1 281	-3 715	-3 807	-4 000
Employment (thousands)	1 924	1 904	1 830	1 799	1 789	1 745	1 720	1 651	1 592	1 507	1 410

(1) Production and employment figures, as well as trade, are for all sizes of firms.
(2) Rounded OETH and Eurostat estimates.
(3) Including raw materials and knitwear.
Source: OETH, DEBA

Table 2: Textiles
Breakdown by product line, 1992 (1)

(thousand tonnes)	Apparent consumption	Production	Extra-EC exports
Spinning	2 755.0	2 456.5	127.9
Woven goods & fabrics	2 696.0	2 551.1	498.3
of which			
- Woven goods	2 176.1	2 033.2	452.0
- Knitted fabrics	519.9	517.9	46.3
Textiles-final uses (1)	2 802.6	2 718.3	348.6
of which			
- Carpets	699.8	703.4	87.1
- Household textiles	872.4	760.7	50.5
- Industrial textiles	418.8	393.6	42.8
- Other textiles (2)	811.6	860.6	168.2

(1) Excluding knitwear.
(2) Including non-woven goods.
Source: DG III of the European Commission

Table 3: Textiles
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	2.1	-0.1	1.1
Production	1.6	-1.2	0.3
Extra-EC exports	3.5	4.0	3.7
Extra-EC imports	7.0	8.5	7.6

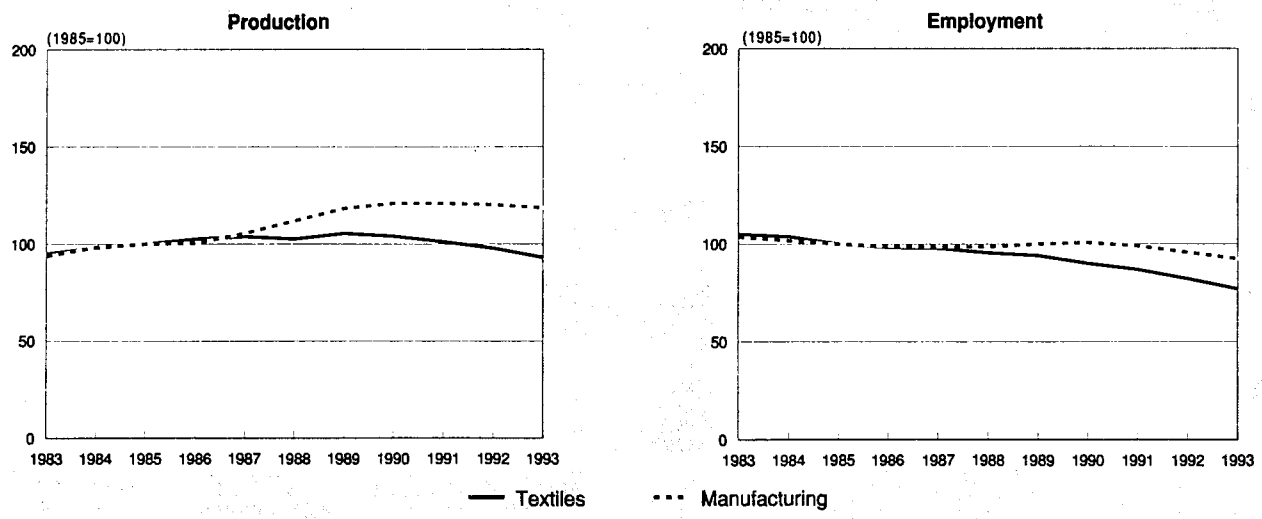
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards. Firms of all sizes are considered.
Source: OETH, DEBA

Table 4: Textiles
External trade in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	10 404	12 775	14 160	13 207	13 131	14 083	16 028	16 324	16 389	16 967
Extra-EC imports	10 462	12 235	13 246	12 431	13 867	14 955	16 351	17 605	20 105	20 774
Trade balance	-58	540	914	776	-736	-873	-323	-1 281	-3 715	-3 807
Ratio exports/imports	99.4	104.4	106.9	106.2	94.7	94.2	98.0	92.7	81.5	81.7
Terms of trade index	102.3	98.4	100.0	110.4	113.1	113.9	113.4	116.9	116.0	117.1
Intra-EC trade	16 463	19 025	21 097	23 261	24 619	25 617	28 099	30 338	31 866	32 353
Share of total imports (%)	61.1	60.9	61.4	65.2	64.0	63.1	63.2	63.3	61.3	60.9

(1) Including raw materials and knitwear.
Source: DEBA

Figure 3: Textiles
Production in constant prices and employment compared to EC manufacturing (1)



(1) Firms of all sizes are considered.
1993 are Eurostat estimates.
Source: OETH. DEBA

Estimates for 1993 confirm the downward trend in production and employment. In particular, employment is expected to fall to only 77% of its 1985 level.

International comparison

EC textile production was twice the level of USA production in 1992, at current exchange rates, and 4 times larger than production in Japan. The EC and USA industries increased their production in current prices at different growth rates between 1985 and 1992 (14% in the EC against 29% in the USA), while in volume terms the EC textile industry has shown a decline in recent years in opposition to the recent recovery in the USA.

In Japan, however, the decline of production was stronger than in the EC. In volume terms Japanese textile production was at 86% of its 1985 level in 1992.

In the EC, apparent consumption increased by 19% between 1985 and 1992 while USA consumption went up by 28% during the same period, but apparent consumption in Japan actually decreased.

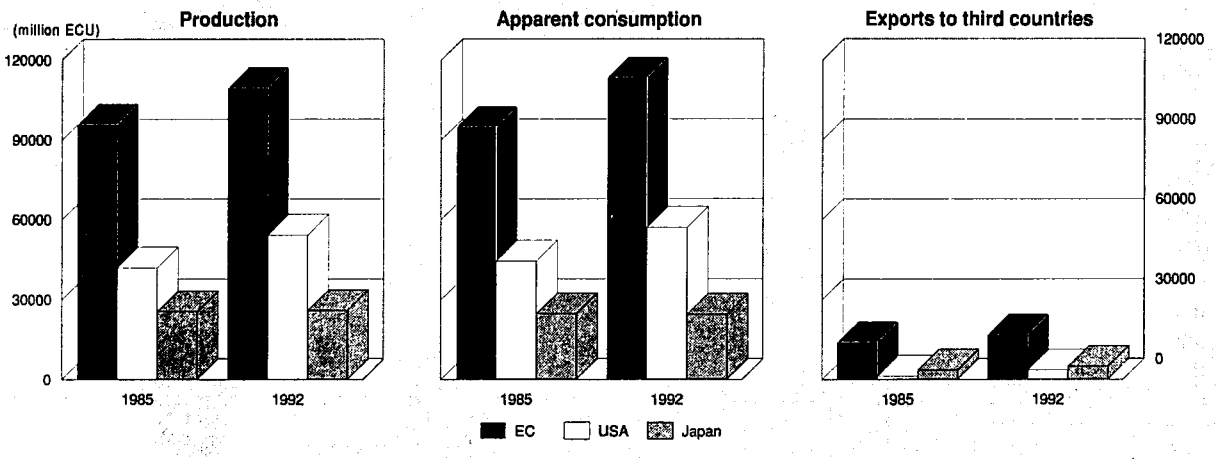
In comparison to the EC, USA exports are at a lower level (representing 20% of the value of EC exports in 1992), but they nearly tripled from 1985 to 1992. Textile exports from Japan are higher than USA exports, although they increased less over the period. EC exports increased less than exports from either the USA and Japan.

Foreign trade

Extra-EC exports and imports of textiles both increased between 1983 and 1992, with imports increasing more rapidly than exports. This resulted in a trade deficit after 1986. As the EC textile industry has to import most of its natural fibres (e.g. cotton and wool) to be used as raw materials in the spinning, knitting and weaving processes, the trade deficit is mainly related to these imports. The exclusion of raw material imports would show an EC trade surplus in manufactured textiles of 1.9 billion ECU in 1992.

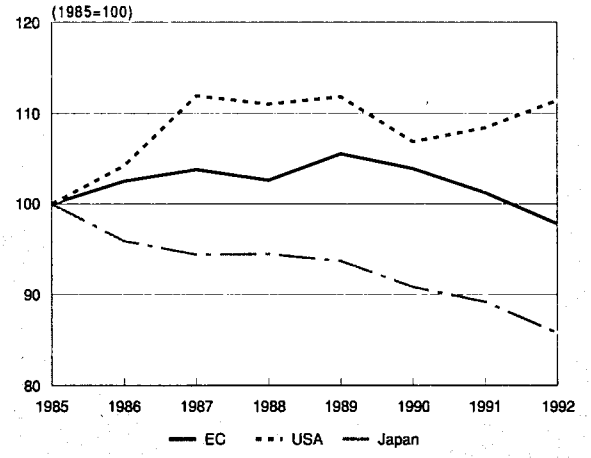
Extra-EC exports of textiles rose less in recent years than before 1988, but extra-EC imports rose faster. The export/import ratio consequently deteriorated sharply, extra-EC exports

Figure 4: Textiles
International comparison of main indicators in current prices



(1) For 1992, average exchange rates for that year have been used.
For 1985, in order to avoid problems of comparison which are due to exchange rate movements, the 1992 exchange rate was also used.
Source: OETH, DEBA, US Department of Commerce, JCFA, MITI, Comitextil

Figure 5: Textiles
International comparison of production in constant prices



Source: DEBA, US Department of Commerce, MITI, Comitextil

representing 82% of extra-EC imports in 1992, as compared with 106% in 1986. Intra-EC trade (in current prices) steadily increased during the decade, but the share of intra-EC imports in total imports into EC countries fell from 65% in 1986 to 61% in 1992. Rising imports drove the import/consumption ratio up from 13.7% in 1983 to 18.3% in 1992.

The largest textile export market for the EC is the USA, followed by Austria, and Switzerland, followed by Japan and Sweden. All these countries took a lower percentage than in 1988. A striking feature of the change in exports since 1988 has been a rise from 1.6% of the total to 4.6% in the case of Poland, 2.6% to 4.1% in the case of Tunisia, and 2.6% to 3.9% in the case of Morocco - all countries involved in OPT (outward processing trade) for the EC clothing industry, i.e. the export of cloth, for making-up into garments, and re-importing. In 1992 Poland was ranked first in OPT imports of clothing into the EC. According to Eurostat data nearly 10% of EC textile exports in 1992 were for OPT purposes.

Turkey was the largest source of imports of textiles into the EC in 1992 (10.6%), together with China (8.9%). They have both increased their share since 1988. In that year, Switzerland had been the largest source of imports, but had fallen to fourth place (6.9%), after Austria in third place, in 1992.

In terms of product lines, EC exports and imports mainly consist of cotton products, which represent 60% of exports and 85% of imports. EC exports of wool products represent 25% of total exports of textiles, for which the EC is one of the largest world exporters. Woven fabrics accounted for 91% of fabric exports in 1992, and knitted for 9% (excluding fully-fashioned).

Textile exports other than yarn and fabrics represented some 36% of total textile exports. These were carpets, household textiles and technical textiles, and non-woven fabrics, in order of size. Fabrics represented 51% and yarn some 13% of total textile exports.

On the import side, woven fabrics accounted for 92.5% of fabric imports, and knitted for 7.5%. Imports other than fabrics represented 29% of the total. Fabrics represented 43% and yarn some 28% of total textile imports.

MARKET FORCES

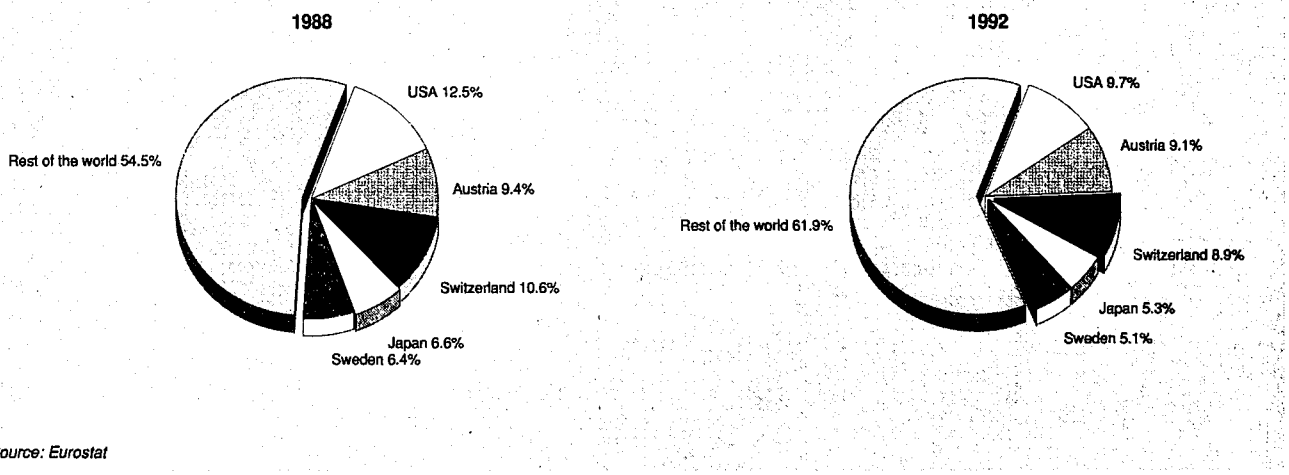
Demand

The growth of apparent consumption of textiles, in current prices, has slowed down in recent years. In terms of constant prices the movement was even slightly negative. The decreasing share of household expenditures on clothing had a negative impact on final consumption, combined with the worsening balance of trade in clothing and depressed general economic conditions. Technical textiles products also suffered from declining production in end-use sectors like the automotive industry. In terms of consumption, clothing remains the major textile end-product with 53%, followed by technical and other textiles (20%), household textiles (15%) and carpets (12%).

Compared with 1988, the consumption of fabrics fell by 9% in volume terms, with a fall of 12% in woven and a rise of 6.5% in knitted fabrics. The consumption rose also for fully fashioned knitwear. The consumption of textiles in non-clothing uses increased by 2%, largely on account of an increase in carpets (19%). There was a fall of 7% in the consumption of household textiles and of over 3% in that of technical textiles.

Strategic trends towards policies of quick-response, reduced stocks, just-in-time deliveries and the development of outward sourcing strategies, under which garments are manufactured

Figure 6: Textiles
Destination of EC exports



Source: Eurostat

Table 5: Textiles
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	18.6	18.6	19.6	20.9	22.1	22.4	22.2	24.0	24.9	26.3
Productivity index	94.9	94.9	100.0	106.6	112.8	114.3	113.3	122.4	127.0	134.2
Unit labour costs index (3)	86.6	93.5	100.0	103.4	108.1	114.6	123.1	132.2	141.1	155.9
Total unit costs index (4)	81.8	93.4	100.0	100.2	105.5	113.5	124.7	132.1	139.7	150.4

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

outside the EC using fabrics of EC origin, have had an increasing and favourable impact on the demand for EC produced fabrics.

Expenditure on clothing is highly sensitive to income levels and fashion trends. For household textiles, another major textile end-product, fashion sensitivity has lost some of its influence, due to difficult economic conditions in recent years. It has been estimated that fashion affects only 20% of households in the purchase of household textiles. Retailing patterns in household textiles are thus more price-led than fashion-led.

Technical and other textiles (including non-woven goods) have replaced household textiles as the second most important market. These textiles include carbon, glass, aramid and other special fibres, in addition to conventional textile fibres. The products go into such high-tech uses as defence equipment, high-speed trains, aircraft and racing cars, as well as leisure products such as mountain bicycles, tennis racquets and golf clubs. Technical textiles are often divided into industry textiles, transportation, geotextiles, technical apparel, medical and leisure textiles. The industry acts as a subcontractor for other industries, and there therefore have to be close links between the producers of technical textiles and the final users of them.

Unlike clothing and household textiles, technical textiles of this advanced type are exposed to import competition from advanced rather than low-cost countries.

Supply and competition

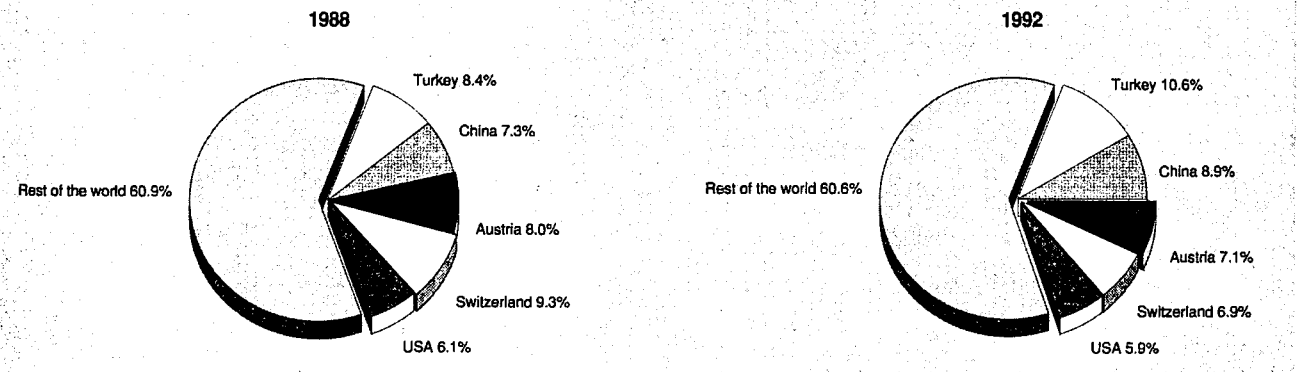
Although machinery equipment in the EC textile industry remains globally the most modern worldwide, this position has been affected by a decrease in investment in recent years. This evolution is related to persistent high interest rates and to the constraints of an overcapacity of textiles on the world level. In addition, based on data provided by ITMF, the low rate of utilisation of machinery in comparison to the EC's main competitors (76% in the EC against 97% in Taiwan and 91% in the USA, for spinning and weaving) represents an important competitive disadvantage.

The sector's competitiveness is also influenced by the evolution of European exchange rates, in particular against the USD. Following the fall in the dollar after the mid-1980s, the competitiveness of the EC textile industry deteriorated, as was illustrated by the evolution of EC exports to and from the dollar zone. The export/production and import/consumption ratios have continuously increased since 1988. The trend may however be changing with the recent increase in the strength of the USD.

Among competitive factors, labour costs play an important role. This mainly concerns the clothing industry, as labour-intensive production is far more important in the downstream and less capital-intensive activity of garment production. Labour costs in spinning and weaving are however from four to twenty times higher in EC countries, as compared with developing countries.

Wage disparities are also significant between Member States, especially as between Southern and Northern EC countries. In recent years, labour costs have increased worldwide. Growth rates have in some developing countries been higher than in EC countries (e.g. Turkey, Taiwan, South Korea), although

Figure 7: Textiles
Origin of EC imports



Source: Eurostat

Table 6: Textiles
Breakdown by size of enterprise, 1990

number of employees	number of enterprises (1)	% of enterprises (1)	% of employment	% of turnover
Less than 20	48 120	76.8	20.6	18.7
More than 20	14 500	23.2	79.4	81.3

(1) Estimates.
Source: OETH, DEBA

the wage gap still remains important. USA labour costs in spinning and weaving represent only some 50% of EC labour costs in such Member States as Germany, the Netherlands, Denmark and Belgium, but Japanese labour costs are the highest worldwide.

Although labour costs have risen in all EC countries, the EC textile industry has also increased its productivity (value added per person employed) over the last decade. The productivity index was at 134 in 1992, compared to its 1985 level.

The EC textile industry depends greatly on extra-EC imports of natural fibres as raw materials. Raw material prices tend to be higher in the EC than in the USA or in developing countries. Over the past two years, the world price of cotton has however decreased by 30% from previously high levels. Present low world cotton inventories exert less downward pressure on world prices, which are expected to rise in 1993/94. As compared with cotton, wool prices have decreased even more since 1988.

Production process

The EC textile machinery market showed mixed trends in 1992. In spinning, there was a severe fall in shipments of short-staple (cotton) spindles. In contrast, there was an increase in shipments of long-staple (wool) spindles. In weaving, deliveries of shuttle-less looms to the EC fell substantially.

In the EC stock of spinning machinery, 58% are short-staple spindles (used for such fibres as cotton), 38% long-staple spindles (used for wool and other long fibres) and the remaining 4% open-end rotors. These shares are not representative in terms of production capacity, as open-end rotors are judged to be 5 times more productive than spindle machinery. Worldwide, short-staple spindles account for 87% of total textile machinery, while long-staple spindles account for 8% and open-end rotors 5% of the total.

Open-end rotors are relatively less important in the EC, than in many other countries, as they are mainly used for other fibres than wool - the EC is a large wool producer on the world level.

Asia accounts for 62% of the world's short-staple spindles and 42% of long-staple spindles. Open-end rotors are mainly used in East Europe and the former Soviet Union (58% of the world total).

Knitting machinery has become increasingly automatic and capital intensive, especially in the more developed countries.

In weaving machinery, the EC textile industry uses a high proportion of shuttle-less looms (40%), these being the most modern machinery used in the weaving process. In contrast, shuttle-looms are the major type of machinery used in Asia and South America. Recent investment trends worldwide have been mainly in shuttle-less looms.

INDUSTRY STRUCTURE

Companies

In 1992, the EC textile industry contained nearly 63 000 firms, of which 77% were firms with less than 20 employees. These small firms employ 21% of the total workforce (310 000 employees) and generate 19% of total turnover. From the early 1980s, small textile firms increased their share of both employment and turnover in all major EC countries. In the USA, small firms represent only 30% of the total number of firms in the textile industry.

Both small and large textile firms have suffered from the overall decline in production and employment in recent years, but smaller firms have performed better. While the total decline in EC textile employment from 1988 to 1992 was nearly 14%, firms with less than 20 employees decreased their employment by only 4%.

In terms of turnover, nearly 24% is concentrated among the fifty major firms, and the three biggest firms (Coats Viyella (UK), Benetton (I) and Beaulieu (B)) represent 5% of the

Table 7: Textiles
The ten largest European companies, 1992

Company	Country	Turnover (million ECU)	Employees
Coats Viyella Group	UK	2 867	62 248
Benetton Gruppo	I	1 526	5 818
Chargeurs	F	1 473	10 490
Beaulieu Group (1)	B	1 372	N/A
D.M.C.	F	1 262	11 056
Marzotto	I	1 230	12 294
Courtaulds Textiles	UK	1 209	21 800
Freudenberg Textil (1)	D	853	6 000
Miroglio Gruppo Tessile (1)	I	685	6 200
Dawson International	UK	568	11 973

(1) 1991 figures.
Source: Comitextil, Textilwirtschaft, DABLE

total. The concentration decreases rapidly, as the following fifty firms (i.e. 51-100) only add 6% to the share of total turnover. Large firms (more than 500 employees) are mainly to be found in the UK, Germany, Italy and France. The three largest EC textile companies are also to be found among the 10 major world companies. These are dominated by the Japanese company Kanebo. Major USA companies are Sara Lee, Burlington and Spring.

Strategies

EC investment in the textile industry has continuously decreased over recent years. From 1988 to 1992, the fall was 15%, in current prices. Italian companies were the major investors, and in 1992 they generated 30% of total EC investment in textiles, followed by Germany (21%) and France (16%). In terms of investment per employee, the major investment efforts were made by Belgian, Dutch and German firms. The lowest level of investment per employee is to be found in Portugal and Spain.

Strategy regarding textile mills has changed over time in certain instances. In the 1960s and 1970s, for example, several 'supermills' were built in the UK, and it was thought that in this way the plants would be able to meet low-cost imports head-on. In practice many of these plants were not efficient, and were not able to meet import competition. The textile industry had to adapt to smaller, more specialised plants, producing quality products for specific markets.

Now there is an emphasis on quality throughout the EC, but modern automatic technology has made it possible for both large and medium-sized plants to be viable, provided that they are flexible, have a quick response time, and are closely geared to the needs of their customers, both manufacturers and retailers.

Modern textile plants in the EC are competitive by world standards. Subcontracting relations have gained in importance over recent years, both within and outside the EC. Textile firms tend now to be less vertically integrated, relying more on subcontractors, and to concentrate on a limited number of processes.

REGIONAL DISTRIBUTION

The main textile regions of the EC can be classified by size of employment. According to Comitextil data, the largest regions, those employing 100 000 or more, are Lombardia (I), Cataluna (E) and Norte (P). The next largest textile regions, employing between 50 000 and 100 000, are both in Germany - Baden-Wurttemberg and Nordrhein-Westfalen. The 5 largest regions represent nearly 30% of total EC employment in textiles.

The smaller textile regions are spread more widely. Regions employing between 25 000 and 50 000 workers include Veneto, Piemonte and Toscana (I), Rhone-Alpes (F) and West Yorkshire, Derbyshire and Nottinghamshire (UK).

There are a number of textile regions employing between 10 000 and 25 000 workers. These are in Portugal, Belgium, the UK, Italy, France, Germany and Denmark. It is interesting that, included among these, are the once prosperous UK cotton regions of Greater Manchester and Lancashire. In Belgium both the regions of this size are Flemish - West- and Oost-Vlaanderen.

ENVIRONMENT

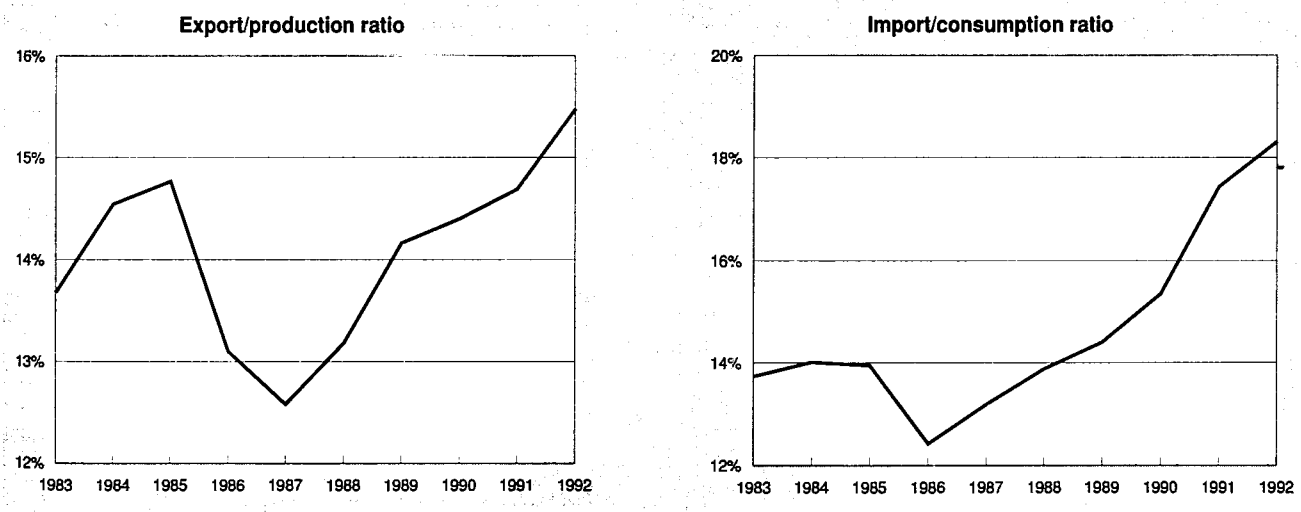
The textile industry uses natural fibres, as well as man-made fibres (cellulosic and synthetic). Wood pulp is the basic element in producing cellulosic fibres, while synthetic fibres are produced from oil derivatives (the main synthetic fibres are polyamide, acrylics, and polyester). The production process therefore uses natural resources - water, land, animals, wood pulp, and oil.

The production of textiles requires considerable volumes of water - in the production of fibres, in processing fibres and in fabric finishing, among which dyeing and finishing require the most water.

During processing wool has to be cleaned and degreased and cotton has to be washed. Chemical applications are used in the processing of both man-made and natural fibres, to obtain easy care properties, fast colour, soil resistance, crease resistance, handle, flame retardancy etc. Dyes may cause particular problems of colouring rivers and streams, although not necessarily with seriously harmful effects.

Then there are the environmental problems, common to all consumer products, connected with packaging. And once the textile product is in the hands of consumers, repeated laundering consumes much energy and detergent (as shown in a study by Franklin Associates for the American Fiber Manu-

Figure 8: Textiles
Trade Intensities (1)



(1) Firms of all sizes are considered. Trade data include raw materials and knitwear.
Source: OETH, DEBA

Table 8: Textiles
Expected real annual growth rates (1)

(%)	1993-94	1993-97
Apparent consumption	-0.5	1.0
Production	-3.0	0.0
Extra-EC exports	1.0	2.5

(1) Firms of all sizes are considered.
Source: OETH

facturers Association), and gives rise to a great deal of water-borne effluent.

Final disposal is another problem. Products made from natural fibres, and also from cellulosics, biodegrade effectively. However, polyester, nylon, polypropylene and acrylics are persistent, yet account for 65% of total fibre usage in textiles.

The growing level of pollutants in the environment, including those connected with the textile industry, are being increasingly controlled by legislative control on discharges to water, air emissions and waste production, by active regulatory bodies on national and EC levels. There has for example been much EC legislation on emissions to water, and this has affected the textile industry, with its heavy water usage.

The Fifth Framework Programme for the Environment, proposed by the EC Commission in 1992, encompasses all environmental issues manufacturer and users will have to integrate into their strategy in the future.

There are costs as well as benefits in the improvement of environmental standards. The Communication of the European Commission to the Council on the competitiveness of the European textile and clothing industry, concluded that environmental costs in dyeing and finishing account for between 3.5% (Belgium) and 9.2% (Germany) of total costs. Member States with lower costs at present are likely to see an increase, as environmental policy is strengthened.

Expenditure on the environment is often considered as an additional cost which detracts from the competitiveness of the industry. A recent study by the European Commission (The State of the Environment in the EC) shows however that there is a correlation between the environmental standard maintained by a firm and its competitive position. The more dynamic enterprises are in fact increasingly using the environment as a tool in their strategy to strengthen their market position. It is argued that the additional short-term costs involved (R&D, new investment, advertising etc.) are generally more than offset by the long term benefits (increased market shares, product differentiation, etc.) of such a policy.

OUTLOOK

During most of the 1980s the EC textile industry saw a rise (in current prices) in apparent consumption, production and extra-EC exports. In the recessionary period of 1990-92 however, apparent consumption and production rose little in current price terms, and fell slightly in real terms.

The slow growth of GDP in the leading EC countries, together with the slow growth of their trade, was a major reason for the continued state of depression in the EC's textile industry, which saw in 1993 further falls in production and especially employment.

The recession in the EC reflected that in the world economy, although there was some recovery in 1992 in the USA. More recently, the strengthening of the USD has worked to the disadvantage of USA exports, and of the exports of those countries whose exchange rates are traditionally linked to that of the USA. This has influenced the competitiveness of the EC textile industry, although those Member States who have substantially devalued their currencies since September 1992 have benefited more than the average.

Even in 1993, however, the EC textile industry has remained depressed. In the first half of the year the volume of production was some 8% below that of the same period in 1992. Exports were also down, as were imports. The deficit on the textile balance of payments was estimated to rise to nearly 4 billion ECU in 1993.

Employment continued to fall in 1993, with a decrease of some 95 000, or 6%. The absolute level of the fall was greater than that in either 1991 or 1992.

Apparent consumption has continued to fall, and in general demand was weak in 1993.

The slow rate of recovery of the world economy, including that of the EC, does not hold out good prospects for an upturn in the industry in the short to medium term. Much depends on the demand from the clothing industry in the EC, which has also been depressed. Sales of household textiles have recently been stronger in several Member States, although imports have been important here. Technical textiles, of developing importance in the EC, have however also suffered from the recession.

The EC OPT (Outward Processing Trade) regulations require the export of EC-made fabrics for subsequent making up in other countries - mainly in practice those countries bordering the EC. The extent to which the existing trend towards more OPT continues will depend partly on the harmonisation of the rules for implementation of the OPT regulations, that is being undertaken by the EC Council.

The Single Market has given the impetus for the re-consideration of the OPT regulations. It may affect also the distribution among Member States of imports of textiles and clothing under MFA quotas, because country quotas have been abolished. But it is as yet too early to say what the effect of this has been.

Another important factor is the conclusion of the Uruguay Round of the GATT, which will bring increased import competition.

Bearing in mind all the various factors, the industry may well suffer further falls in production and apparent consumption in 1993-94. In the following years apparent consumption may increase again, while production is expected to follow a zero-growth pattern in real terms. It is estimated that between 1993 and 1997 the average real annual growth rate of production will be 0%, and of apparent consumption 1.0%.

Investment in the EC textile industry fell off in 1992, but is likely to rise again. The industry has now become very capital-intensive, and has seen large rises in productivity. In the long term its growth will depend partly on future high-tech developments, including that in the field of technical textiles. If these developments continue to be successful, and provided that there is a positive economic environment, there might be little incentive for the industry to delocalise production to low wage countries. Developments in market or product specialisation, and also in the flexibility of organisation, will also be important factors. Bearing in mind all these factors, restructuring in the EC textile industry still has a long way to go.

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Clothing
NACE 453

The clothing industry covers the manufacture of garments and clothing accessories, but not the manufacture of knitwear. The EC's apparel production is based 55% on man-made fibres and 45% on natural fibres. The clothing industry employs 1.2 million people in the EC - some 25% fewer than in the textile industry. The clothing industry accounted for 1.7% of the value added of manufacturing industry in the EC in 1992, and also for 2.5% of turnover and 3.4% of employment.
The EC spends a higher proportion of income on clothing than either the USA or Japan, but the proportion has been declining. The volume of EC's production of clothing has been decreasing since 1987 and in 1993 was 15% below its 1985 level. The trade balance is negative and has been deteriorating. The industry has had to face strong growth of imports from low wage countries, in spite of import quotas under the MFA (Multi-Fibre Arrangement).
Clothing exports are mainly directed towards other developed countries, and the internal market of the EC is also a major customer. Outward processing trade (OPT)) has been a growing activity, moving labour-intensive making-up operations to nearby lower wage countries.
Employment in the industry has been declining - the industry lost nearly 280 000 jobs in the period 1983-92, of which 75% were lost within the last 5 years (1988-92). This was due to increasing productivity, as well as to market changes. Regionally, the clothing industry is widely spread across the EC, in smaller pockets than the textile industry. Its environmental problems are not serious, although the final disposal of garments made from synthetic fibres remains a problem.
The outlook for the clothing industry depends partly on the effects of phasing out the MFA, which was agreed upon in the Uruguay Round of the GATT. Moves towards higher quality, new fibres and fabrics, and quick turn-round time - as well as the further development of OPT - will be factors helping the firms in the industry. This is however likely to lead to further reductions in the size of the industry's labour force.

INDUSTRY PROFILE

Description of the sector

The clothing industry covers the manufacturing of garments and clothing accessories. It is strongly linked to the textile industry which provides various types of fabric (woven, knitted, or crocheted). It does not cover production of knitwear. Statistically, the knitting industry is included in textiles - NACE 43. Relying on textile production and imports for the supply of fabrics, apparel production is based 55% on man-made fibres, 30% on cotton, and 15% on wool.

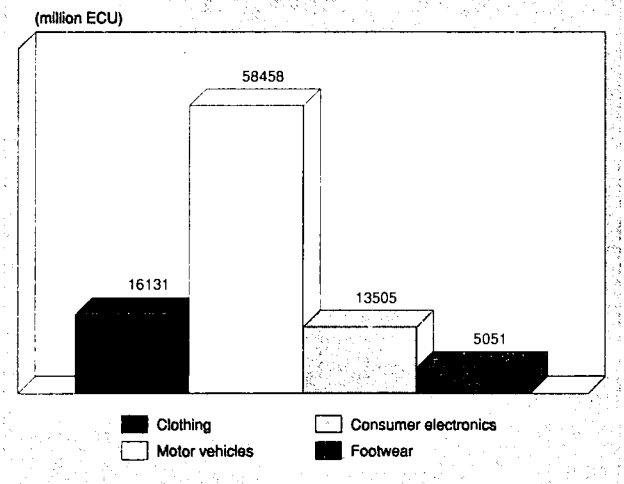
In comparison to total manufacturing, the EC clothing industry represents 2.5% of turnover, 1.7% of value added and 3.4% of employment, based on firms with more than 20 employees.

The production of clothing reaches from the design stage (styling, prototyping, definition of collections) to development (fabric sourcing, pattern making, the planning of cutting), and manufacturing (cutting, sewing, pressing, finishing).

In terms of clothing products, different classifications can be used: e.g. men's, women's and children' wear, outerwear and underwear, woven clothing and knitwear, low, medium, and high-quality wear.

With an employment of over 1 million, the clothing industry is one of the major job suppliers in the EC. In terms of production, the industry is mainly concentrated within Italy (37%), France (22%), Germany (17%), and the UK (10%).

Figure 1: Clothing
Value added in comparison with other industries, 1992



Source: DEBA

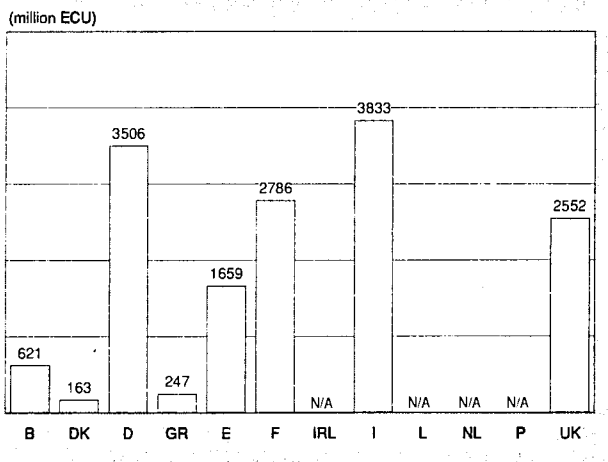
Recent trends

EC production of clothing (in volume) rose until 1986 but has decreased steadily since 1987. In 1993, production was 15% below its level in 1985. While on the basis of real annual average growth rates, apparent consumption slightly increased between 1983 and 1993 (0.9%), production decreased by 1.1% during the same period.

The value of EC production of clothing (in constant prices) has followed a different trend. It has been rising since 1983, and in 1993 was 11.3% above its 1985 level. This can partly be explained by the fact that the value of production is derived from the value of turnover, which in some cases includes subcontracting outside the EC. Part of the explanation may also be that there has been an increase in quality, not caught by the price index used to deflate the figures.

The trade balance, already negative in 1983, deteriorated continuously and reached a peak deficit in 1991 of 10 billion ECU. In particular, the EC clothing industry has had to face a growing impact from lower-cost countries, whose clothing

Figure 2: Clothing
Value added by Member State, 1992



Source: DEBA

Table 1: Clothing
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	44 395	46 985	51 196	55 178	56 053	57 889	60 014	62 802	66 227	66 594	67 900
Production	42 140	44 444	49 097	52 429	51 661	52 586	54 296	55 748	56 225	56 855	57 600
Extra-EC exports (3)	3 324	4 240	5 058	5 133	5 040	5 093	6 218	6 727	6 682	6 853	6 440
Trade balance (3)	-2 255	-2 541	-2 099	-2 749	-4393	-5303	-5718	-7054	-10002	-9739	-10000
Employment (thousands)	1 406	1 381	1 347	1 321	1 339	1 326	1 287	1 263	1 198	1 130	1 060

(1) Production and employment figures, as well as trade, are for all sizes of firms.
(2) Rounded OETH and Eurostat estimates.
(3) Including raw materials and excluding knitwear.
Source: OETH, DEBA

Table 2: Clothing
Breakdown by product line, 1992

(million pieces)	Apparent consumption	Production	Extra-EC exports
Shirts (1)	1401.9	677.3	121.5
Blouses	419.0	225.3	38.4
Men's coats and raincoats	33.1	12.3	3.3
Women's coats and raincoats	112.1	62.1	11.1
Men's suits	34.5	16.8	4.6
Women's suits	26.9	36.1	34.1
Skirts	235.5	176.7	23.7
Dresses	188.1	98.0	11.3
Pullovers (2)	933.3	687.1	75.6

(1) Excluding Greece.
(2) Knitted.
Source: DEBA, DG III of the European Commission Textiles, CITH, CETH

Table 3: Clothing
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	1.1	0.7	0.9
Production	-0.3	-1.7	-0.9
Extra-EC exports	6.6	5.9	6.3
Extra-EC imports	11.3	10.9	11.1

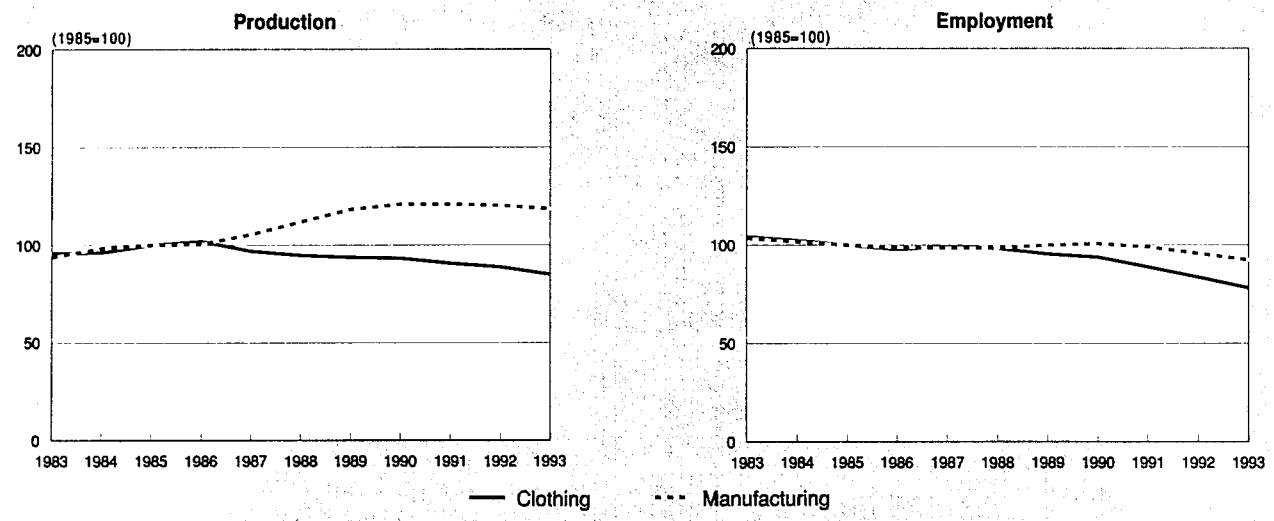
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards. Firms of all sizes are considered.
Source: OETH, DEBA

Table 4: Clothing
External trade in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	3 324	4 240	5 058	5 133	5 040	5 093	6 218	6 727	6 682	6 853
Extra-EC imports	5 579	6 781	7 157	7 882	9 432	10 396	11 937	13 781	16 684	16 592
Trade balance	-2 255	-2 541	-2 099	-2 749	-4 393	-5 303	-5 718	- 7 054	-10 002	-9 739
Ratio exports/imports	0.60	0.63	0.71	0.65	0.53	0.49	0.52	0.49	0.40	0.41
Terms of trade index	110.6	101.6	100.0	110.0	109.5	113.1	113	113.8	112.5	114.6
Intra-EC trade	5 335	6 132	6 853	7 591	8 077	8 130	9 347	10 964	11 969	12 407
Share of total imports (%)	48.9	47.5	48.9	49.1	46.1	43.9	43.9	44.3	41.8	42.8

(1) Including raw materials and excluding knitwear.
Source: DEBA

Figure 3: Clothing
Production in constant prices and employment compared to EC manufacturing (1)



(1) Firms of all sizes are considered.
1993 are Eurostat estimates.
Source: OETH, DEBA

imports to the EC increased by an annual real average rate of 11.4% between 1983 and 1992.

For the first time since the beginning of the 1980s, the trade balance improved slightly in 1992 (with a deficit reduction of 2.6%, as compared to 1991).

Employment in clothing followed a downward trend during the whole period 1983-1992, and nearly 280 000 jobs were lost in these ten years. Simultaneously, the clothing industry generated continuous improvements in productivity.

International comparison

In 1992, EC production of clothing in current prices was 11% higher than in the USA and 5 times higher than in Japan. USA exports in 1992, although expanding on account of the then favourable exchange rate, were 40% of the EC exports. Japanese exports were even lower, although in terms of the export/production ratio, Japan has the most export-oriented clothing industry. In 1992, 14% of production was exported, against 12% in the EC and 5% in the USA.

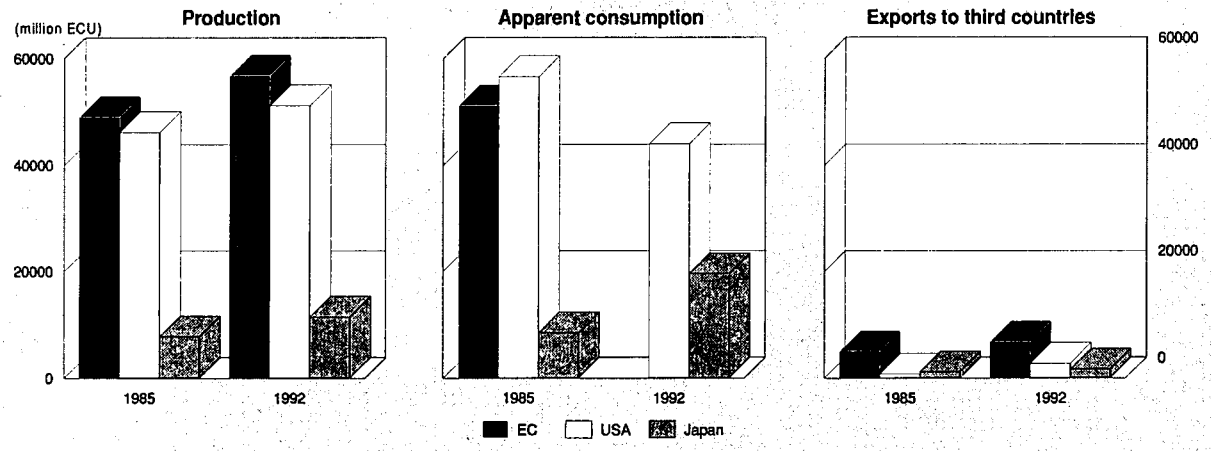
In terms of trends, USA clothing production has declined since 1988, and was 5% lower in 1992 than in 1985. EC production started to decline earlier, in 1987, and decreased more rapidly, being nearly 15% lower in 1993 than in 1985. In volume terms, the Japanese clothing production decreased continuously between 1985 and 1992, although compared to 1985, the level of production has fallen less than in the EC.

On the world market for clothing, major shifts in market shares have benefited Far East suppliers like Hong Kong, Thailand, and China, whose exports to third countries have risen dramatically over recent years. Among countries nearer the EC borders, export-oriented clothing industries have developed mainly in Turkey, Tunisia and Morocco, and recently among East European countries. These have been partly linked to the development of outward processing strategies on the part of European clothing firms.

Foreign trade

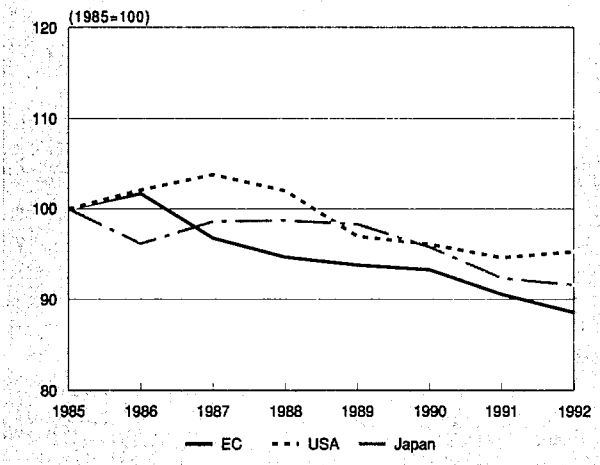
For more than a decade, the EC clothing industry has had to face increasing competition from lower-cost countries,

Figure 4: Clothing
International comparison of main indicators in current prices



(1) For 1992, average exchange rates for that year have been used.
For 1985, in order to avoid problems of comparison which are due to exchange rate movements, the 1992 exchange rate was also used.
Source: OETH, DEBA, US Department of Commerce, Nikkei, JCFA, MITI, Comitextil

Figure 5: Clothing
International comparison of production in constant prices



Source: DEBA, US Department of Commerce, JCFA, Comitextil

mainly in the Far East and Mediterranean rim, through growing clothing imports in the low- and medium-price and quality segments of the market. The terms of trade index, comparing prices received for exports to those paid for imports, increased in 1992 to nearly 115, as compared to 1985.

Between 1983 and 1992 extra-EC exports of clothing nearly doubled, but imports to the EC tripled. In 1992, imports represented 16.6 billion ECU, or 25% of EC apparent consumption of clothing, against 12.6% in 1983.

In 1992, EC clothing exports to third countries represented only 40% of imports from these countries. This ratio had been 60% in 1983.

EC exports of clothing are mainly oriented towards other developed countries, such as the EFTA countries, the USA and Japan. The main extra-EC customers are Switzerland (16.4% of EC exports of clothing in 1992), Austria (12.3%) and the USA (12%). These main customers tend to buy a lower share of total EC exports than they did in 1988. The destination of EC exports has become less concentrated, as other markets have gradually developed. For EC clothing producers, the internal EC market still remains a major customer, as intra-EC exports are double extra-EC exports. The share of intra-EC imports in total imports represented 43% in 1992, although this share had decreased from nearly 49% in 1983.

The main countries of origin for extra-EC imports of clothing are the lower-cost countries, in terms of labour costs and raw material prices. While Hong Kong was the major supplier to the EC in 1988 (17.1% of the total), this position has shifted to China in 1992 (14.3%), the most rapidly expanding clothing supplier in terms of exports to the EC. As labour costs rise in the traditional low-cost countries like Hong Kong and South Korea, clothing production has moved to even cheaper Far Eastern countries like China, Indonesia, the Philippines, and - more recently - Vietnam and Laos. Apart from these Far Eastern countries, most other suppliers are geographically close to the EC, such as Tunisia, Turkey, Morocco, and Poland.

For some Mediterranean countries, notably Turkey, clothing exports to the EC are mainly direct exports of garments. For Poland, on the other hand, 75% of clothing exports are linked to previous EC exports of fabrics, in the framework of outward processing trade (OPT) subcontracting relations. In Tunisia and Morocco - also important for OPT - links to EC firms tend to be closer, and several are in the form of joint-ventures or capital ownership.

MARKET FORCES

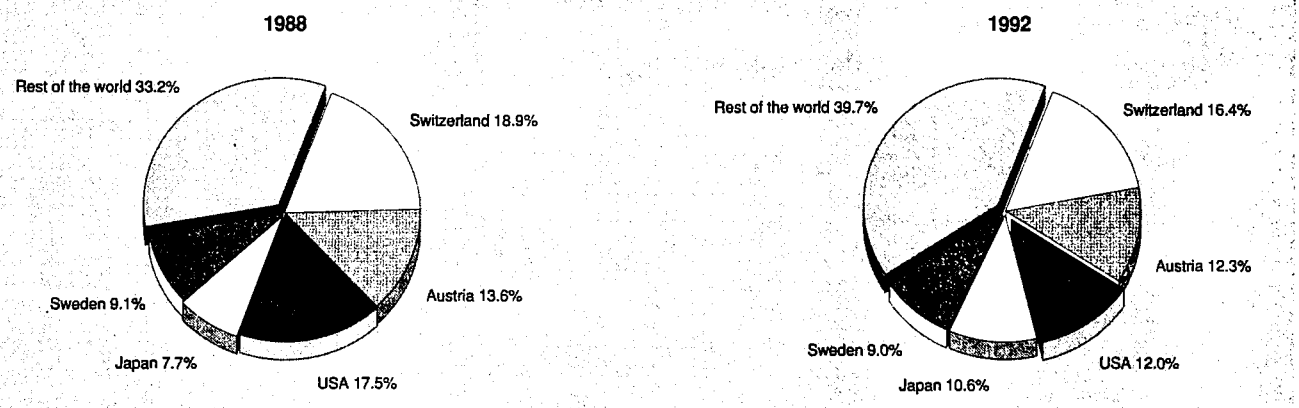
Demand

EC spending on clothing (including footwear) as part of total spending on consumer goods has shown a downward trend over the last decade, but the proportion of consumer expenditure on clothing is higher than in the USA or Japan. In the EC, the share of consumer expenditure on clothing decreased from 8.4% in 1980 to 7.3% in 1992. Equivalent shares in the USA and Japan in 1990 were 5.5% and 6.3% respectively.

Consumer expenditure on clothing, in absolute terms, has followed an upward path in most EC countries. This trend has been related to decreasing relative clothing prices, compared with all consumer prices. The volume of retail sales of clothing reflects this, and was at a level of 111 in 1992 compared to 1985. Declining EC output of clothing from 1983 to 1992 meant that, despite an expanding market, EC clothing producers lost market share during this period.

In terms of product lines (in numbers of garments), apparent consumption has been strongest for shirts, jerseys, and blouses. Consumption has increased for most clothing products, but

Figure 6: Clothing
Destination of EC exports



Source: Eurostat

Table 5: Clothing
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	17.7	17.6	18.2	18.1	18.7	18.9	19.4	20.2	20.9	22.0
Productivity index	97.0	96.6	100.0	99.5	103.0	103.7	106.6	110.7	114.6	120.7
Unit labour costs index (3)	87.8	93.6	100.0	102.9	105.9	110.2	118.3	125.3	133.5	143.0
Total unit costs index (4)	83.7	90.1	100.0	103.8	108.7	114.3	129.4	138.5	148.8	160.4

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Table 6: Clothing
Breakdown by size of enterprise, 1992

number of employees	number of enterprises (1)	% of enterprises (1)	% of employment	% of turnover
Less than 20	69 054	85.8	34.2	32.3
More than 20	11 384	14.2	65.8	67.7

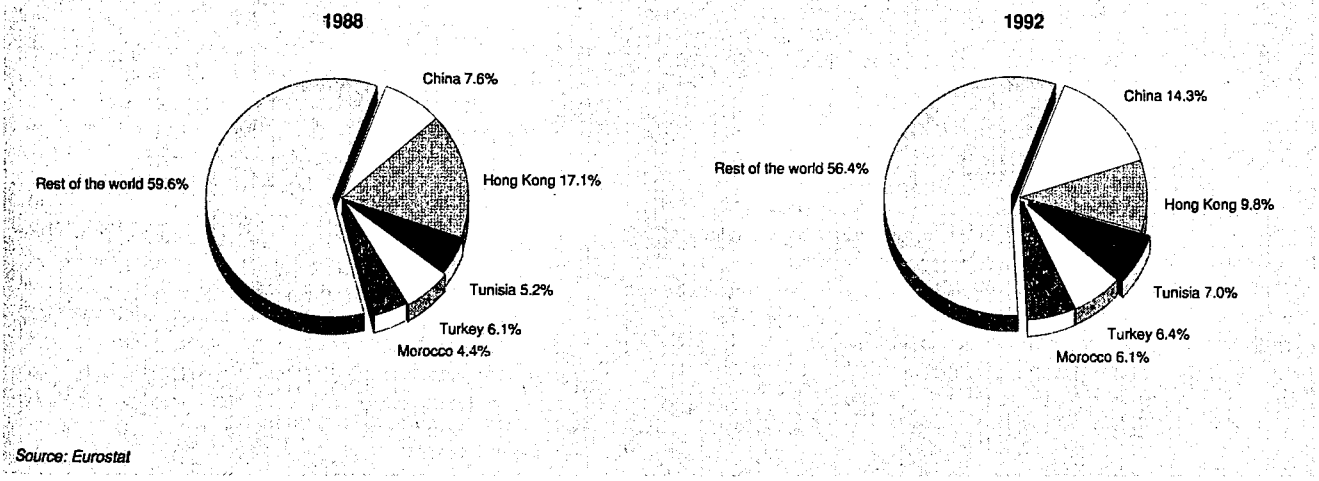
(1) Estimates.
Source: OETH, DEBA

slight falls in demand occurred in 1992 for trousers and parkas. At the same time, EC production of these products declined, widening the gap between the size of the EC market and the market share held by EC producers. For shirts, the market share held by EC producers was 40% in 1992, although the market share for jerseys was at 66%. For men's coats, the market share held by EC producers represented only 27% of consumption in 1992. An increasing part of the demand for clothing has been supplied by extra-EC imports.

The decrease in EC production can be linked to important price differences between EC produced items and imports from outside the EC. These are mainly explained by substantial labour cost differences, as clothing manufacture is a highly labour-intensive process. A recent study by the Institut Français de la Mode (IFM) showed that, at identical fabric costs, the cost of clothing production in the EC could be nearly twice the total cost in Morocco or Tunisia. Price differences with Far East suppliers like China can be even higher.

Partly because of the influence of cheap imports on the low-quality segment of the clothing market, there has been a swing from cheap, low fashion, mass produced items in recent years towards higher quality, more classic, yet individual clothing. Consumer demand has grown to become more and more subject to fluctuations in fashion and taste. In response to these changes, EC clothing producers are moving towards shorter production runs and quick-response manufacturing. In the fashion-led segment of the market, consumption trends cannot be fixed for a whole season in advance, thus making long runs difficult. The success of companies like Benetton (I) indicates that quick response to fluctuations in consumer preferences, within a season, can be a major element of success.

Figure 7: Clothing
Origin of EC imports



Source: Eurostat

Table 7: Clothing
The ten largest European companies, 1992

Company	Country	Turnover (million ECU)	Employees
Coats Viyella	UK	2 867	62 248
Benetton	I	1 526	5 818
Courtaulds	UK	1 209	21 800
GFT Gruppo (1)	I	1 013	N/A
Triumph Gruppe (1)	D	1 006	N/A
Levi-Strauss-Europe (1)	B	979	N/A
Steilmann Gruppe (1)	D	879	N/A
Industrias Diseno Textil (1)	E	843	N/A
Baird (William)	UK	736	16 997
Escada Konzern	D	703	6 081

(1) 1991
Source: Comitextil, Textilwirtschaft, DABLE

Supply and competition

EC clothing producers have to operate in a highly labour-intensive environment, although recent technological innovations (e.g. CAD - computer-aided design) indicate that the labour content could become less important in the long run.

Growing import competition from lower-cost countries, mainly due to important wage differences, have forced EC firms to adopt delocalisation strategies in order to achieve lower costs of production. The development of these strategies has also been influenced by increasing pressure on prices from traders and organised retailers within the EC. International subcontracting, under the form of outward processing trade (OPT), has expanded in recent years. Fabrics of EC origin are exported to lower-cost countries like Poland, Tunisia, or Morocco, to be processed into garments and reimported as clothing into the EC. Such production may be granted special quotas and tariff conditions (such as duty paid on value added only).

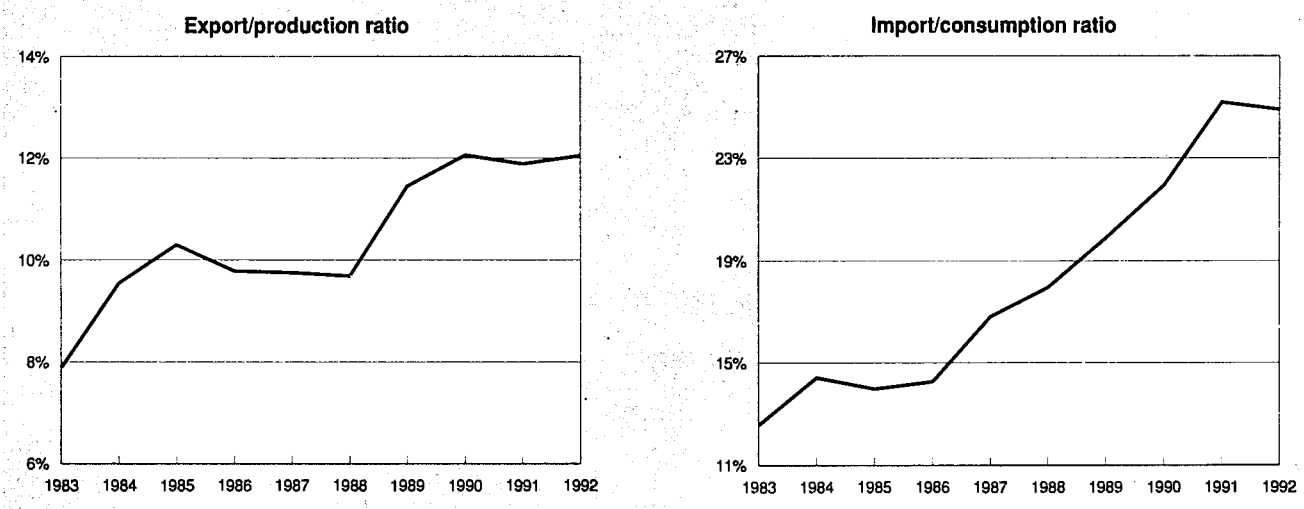
OPT clothing imports into the EC represented in 1992 about 10% of total imports of clothing, or nearly 134 000 tonnes. These imports result from previously exported EC fabrics on a CMT (cut, make and trim) basis. Between 1988 and 1992, OPT imports of clothing to the EC increased from 9% to 10%, as a share of total imports. They increased by 66% in volume during the same period. The major OPT importers in the EC are Germany (62% of OPT imports), France and the Benelux countries.

The major countries of origin for OPT imports are either located in East Europe or the Mediterranean rim. This indicates that proximity of the subcontracting country is an important element of OPT strategy.

As quick-response systems, reduced stock policies and just-in-time strategies develop, delivery times appear as an essential element of OPT. Average lead times for orders in China or other Far East suppliers range between 4 to 7 months. In East Europe and the Mediterranean countries, the lead time is 3 to 6 weeks, depending on the availability of fabrics. But the selection of potential subcontractors always takes place within a certain price range. Therefore, distant countries can be expected to be less attractive OPT partners for the EC as long as nearby subcontractors remain price competitive.

The competitiveness of EC clothing producers is strongest in the higher-quality and fashion-led segments of the market. Among factors which can determine the competitive advantage of EC manufacturers - in addition to movements in exchange

Figure 8: Clothing
Trade intensities (1)



(1) Firms of all sizes are considered. Trade data includes raw materials and excludes knitwear.
Source: OETH, DEBA

rates and inflation - are quality, reliability (in respect of delivery times), short cycle time, availability of high-quality fabrics, technical know-how, production flexibility, and the possibility of repeated runs. These competitive criteria, it is claimed, are better fulfilled by EC producers than by their foreign counterparts in lower-cost countries.

Production process

The production of clothing includes various manufacturing stages, from design to final packaging. At the design stage, the product is styled, materials (fabric and accessories) are selected, and a prototype is developed. Once collections are defined, the product enters the development stage, where the actual manufacturing is prepared through the making of patterns, material requisition, and the planning of cutting. Manufacturing consists of fabric cutting, sewing, pressing and finishing.

In comparison to the textile industry, technological innovation in clothing has been less in the use of sophisticated machinery than in the development of new types of fibre (e.g. microfibres) and fabrics. Important productivity gains have however been realised in terms of production time, quality, and the reduction of losses e.g. through electronic cutting control, laser cutting, automatic sewing machines, and the computer management of production and stocks.

Investment is relatively low compared to other industries (23% of the level of investment in textiles). In 1992, the EC clothing industry invested 893 ECU per employee, in comparison with 2 872 ECU per employee in the textile industry. Being a largely labour-intensive industry, investment in new technology is naturally more limited in comparison to more capital-intensive industries.

INDUSTRY STRUCTURE

Companies

The clothing industry includes a large number of small and medium sized firms. In 1992, the industry was composed of nearly 80 500 companies, of whom 86% had less than 20 employees. These represented 34% of employment and 32% of turnover. A large part of these small manufacturers operate as subcontractors for larger producers or traders.

As a labour-intensive industry, the clothing industry has few entry barriers in terms of capital required. In addition, many firms have a local and family background from which some have expanded to become larger international groups. But most firms continue to operate on a local level.

Among the largest clothing companies, firms like Coats Viyella (UK) and Courtaulds (UK) produce textiles and clothing, whereas others like GFT (I) or Steilmann (D) mainly buy-in fabrics, and concentrate on clothing. Classification by turnover therefore has to be looked at carefully, as activity definitions are not entirely comparable.

Although some companies are specialised in certain products (e.g. Levi-Strauss Europe in jeans and related products, Escada (D) mainly in women's wear), most large companies have a diversified range of clothing lines, operating at the same time in knitwear, women's outerwear, children's wear and sportswear - Steilmann is an example of this.

Strategies

Among the main EC clothing producers, different marketing and selling strategies have been adopted. While some firms follow specialisation strategies in terms of product lines and/or markets, others use a more diversified approach, operating within several different product groups, combined to more export-oriented selling policies. Companies like Hugo Boss (now belonging to Marzotto SPA (I)) focus on high-quality men's wear, whereas a company like Laura Ashley (UK) has diversified beyond the limits of clothing, into home textiles and decoration accessories. While Triumph (D) exported only 4% of its production outside Germany in 1991, Escada's (D) exports reached 65%.

In terms of production strategies, companies choose between their own production, and local or international subcontracting, or a mixture of both. These options depend on criteria like quality, price, and short-cycle or long-cycle products. As proximity to the subcontractor and long-term relationships have developed, regional textile and clothing areas like Prato in Tuscany or the "Sentier" in Paris find their 'metier' in short-cycle products, while long-run and often lower-quality products are processed within lower-cost countries outside the EC.

The Directorate General for Industry of the European Commission is sponsoring a major study of European subcontracting in the clothing sector. The aim of the study is to give a full picture of the extent of subcontracting within the EC, and to assist in developing relevant policies.

REGIONAL DISTRIBUTION

According to Comitextil data, the largest clothing producing region in the EC is Lombardia (I), with over 75 000 employees. This is followed by Veneto (I) and Bayern (D), both with between 50 000 and 75 000 employees.

In the regions with between 25 000 and 50 000 employees, Italy again predominates, with four regions. Also in this category are Nordrhein-Westfalen (D), Ile de France (F), Cataluna (E), Norte (P), and Greater Manchester (UK).

There are some twenty-five regions in the EC with between 10 000 and 25 000 employees. Among these, six are in the UK, four each in Italy, Spain and France, three in Germany, and two in Portugal.

Compared with the textile industry, the clothing industry appears to be spread in a larger number of smaller pockets throughout the EC. This suggests that, as regards regional vulnerability to any decline of the industry, the regions dependent on the textile industry, being more concentrated, may be the more vulnerable.

ENVIRONMENT

As regards the process of manufacture, the clothing industry gives rise to fewer environmental problems than the textile industry. As regards use, the pollution caused by repeated washing and cleaning, and the energy used, are of considerable environmental importance.

The recycling of clothing is a common activity, particularly that of wool clothing. Recycled wool may not need dyeing and does not have to be scoured, thus saving water and energy. The final disposal of clothing may give rise to problems, however, since synthetic fabrics are not biodegradable, although natural and cellulosic fabrics are.

The EC is in the process of introducing a system of 'eco-auditing', through the use of which firms will be able to monitor the environmental effects of their production processes. This affects all industries. Another scheme which affects many individual products is that of 'eco-labelling'. This undertakes to give on the label of a product full details of its environmental history, and also deals with the problem of disposal. Much work has been carried out on this scheme, which involves a detailed study of each product to be labelled, with international agreement on the final eco-label. The process has taken longer than was anticipated, but is now well under way, and is beginning to produce agreed eco-labels for a number of products, including clothing products.

Table 8: Clothing
Expected real annual growth rates (1)

(%)	1993-94	1993-97
Apparent consumption	-0.50	1.00
Production	-4.00	-2.00
Extra-EC exports	2.00	2.00

(1) Firms of all sizes are considered.
Source: OETH

OUTLOOK

The production of clothing in the EC continues to suffer from the recession of the early 1990s. Production in the first half of 1993 was at 8% below its level in the same period a year earlier. It was running at less than 90% of its 1985 level during this period, as well as in the whole of 1992.

Both imports and exports of clothing (extra-EC only) were down in early 1993 on the 1992 level. Although exports were above their 1985 level, imports were as much as two and a half times as high.

The foreign trade balance deteriorated again in 1993, with the estimated deficit rising to over 10 billion ECU.

Employmcnt in 1993 continued to fall, with the absolute fall of some 75 000 being greater than that in 1991 or 1992.

The apparent consumption of clothing, in real terms, rose in the EC by 1.1% per year in the period 1983-88, and in 1988-92 by only 0.7% per year. Production decreased in both periods, but the rise in exports was strong, even in 1988-92.

Given the continuation of the recession, apparent consumption is expected to fall slightly in 1993-94, although this may not be universal in the EC, since there has been a small pick-up in retail sales in some countries. Production is expected to fall by 4% during the 1993-94 period, but exports are expected to rise.

During the period 1994-97 apparent consumption of clothing is anticipated to rise by 1% per annum. Production is expected to fall by 2% per annum, but exports to increase by the same amount.

In the medium term, much will depend on the world economic situation. In clothing, in particular, the development of sub-contracting abroad will be of great importance, but will of course affect production much more than consumption. Another important factor is the conclusion of the Uruguay Round of the GATT, which will bring increased import competition. Already, the ending of the country import quotas, with the advent of the Single Market, is likely to strengthen competition from imports.

More open access to imports from East Europe will be a factor making for greater competition in the EC clothing market. Links between EC manufacturers and those in East Europe may strengthen as a result.

The EC clothing industry has to be prepared therefore for continued strong competition from abroad, as well as within the EC itself. It has already moved up-market, in a move to weaken import competition, and this process will no doubt continue.

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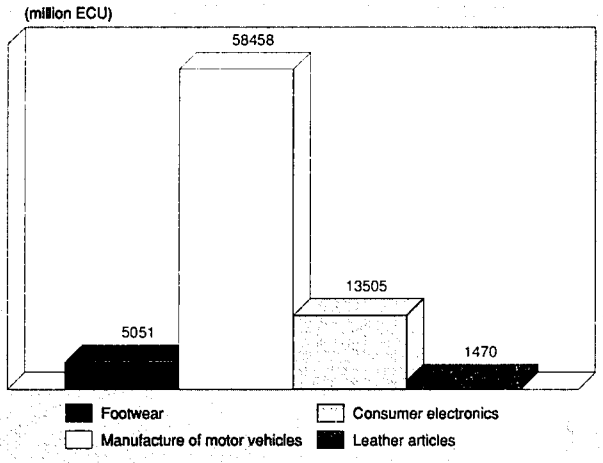
Footwear
NACE 451, 452

The EC is one of the world's largest footwear markets but increasing consumption over the last decade has been accompanied by much smaller increase in production. There was rapid growth of extra-EC imports in both value and volume terms. Italy accounts for almost half of the value of EC production and over half of extra-EC exports. Increased competition from lowlabour cost countries has led to relocation of EC manufacturing facilities to lower labour cost Mediterranean countries, and to developing countries. The structure of distribution is changing - a number of large manufacturers are developing their own retail chains as well as factory outlets, while some of Europe's large fashion groups now have manufacturing interests in footwear. Technology developments in the industry, particularly computer-based applications, have shortened production lead times enabling quick response to fashion changes and the introduction of just-in-time (JIT) manufacturing.

Figure 1: Footwear
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

The different types of footwear produced within the Community are classified in NACE codes 451 and 452 as follows: mass produced outdoor footwear (451.1) mass produced indoor footwear (451.2), special types of footwear (451.3), and handmade footwear (452). It is also common to classify footwear into broad groups by the major material of the upper - leather, synthetic, rubber, textile and other. Some of Europe's large fashion groups have interests in a number of sectors which includes the manufacture of footwear to sell through their own outlets.

Recent trends

The EC footwear industry employed approximately 301 000 workers in 1993 (including firms with less than 20 employees) according to the Confédération Européenne de l'Industrie de la Chaussure (CEC). Eurostat data, which excludes firms with less than 20 employees, estimated total employment in 1992 as 234 500 workers. This difference reflects the importance of small enterprises in the footwear sector.

The industry is relatively labour intensive. The value of production in 1992 was 18.8 billion ECU including labour costs of 4.1 billion ECU, equivalent to 22% of production value. Total value added for the industry in 1992 was estimated as 5.1 billion ECU. Apparent consumption in 1992 was marginally higher than production reflecting a small deficit on extra-EC trade.

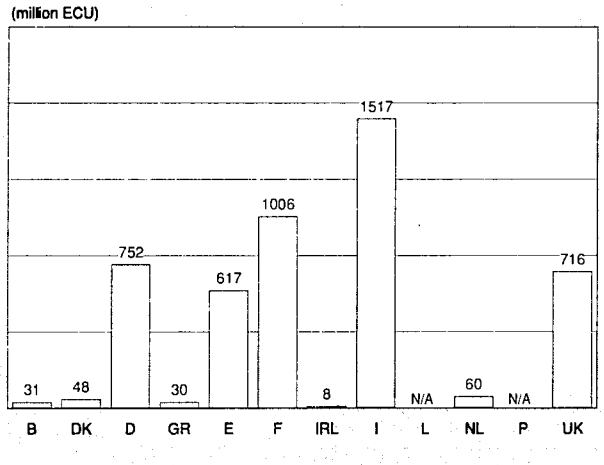
The deficit in the EC's footwear trade balance in 1992 was 288 million ECU and, following an even larger deficit in 1991, was only the second ever year a deficit was recorded. This trend is symptomatic of the increasing vulnerability of the EC footwear industry to low-cost extra-EC producers. Production value data for the EC footwear industry points to stagnation during the 1980s with some recovery in recent years, mainly as a result of very strong growth in Italy, although some of this recovery may be more apparent than real. In addition to trade data, other indicators such as volume of production, employment and value-added show a less favourable trend in the development of the EC footwear industry.

Italy is Europe's major footwear producer accounting for 49% of the total value of EC production in 1992. The next largest producer, France, accounted for 15%. Other major producers are Germany (11%), Spain (10%) and the United Kingdom (9%). Portugal is another major European producer.

The CEC estimate that 1992 footwear production will be 1.08 billion pairs, with leather footwear accounting for two out of every three pairs of shoes produced in the EC. The importance of different types of footwear production varies across Member States. The production of leather footwear accounted for 88% of footwear produced in Portugal, 80% in Germany, 70% in Italy, and 74% in the Netherlands in 1992. Over 50% of Belgian output is slippers and approximately 30% of footwear produced in the United Kingdom is synthetic or rubber uppered. In France, slippers account for 32% of production while textile uppered and synthetic uppered footwear account for 12% and 11%, respectively.

The 1980s was a difficult period for the European footwear industry, although modest growth resumed in recent years following substantial rationalisation in the earlier part of the decade. However, import penetration by low-cost producers remains a key feature of the sector, rising in each of the ten years to 1992 except for 1992 itself.

Figure 2: Footwear
Value added by Member State, 1992



Source: DEBA

Table 1: Footwear
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	10 450	11 297	11 364	11 925	12 556	13 421	14 240	15 718	17 844	18 977	19 500
Production	11 570	13 297	13 726	13 791	13 582	13 881	15 139	16 498	17 363	18 689	18 600
Extra-EC exports	2 528	3 643	4 189	3 801	3 393	3 192	3 923	4 116	3 938	4 176	3 930
Trade balance	1 119.8	2 000.7	2 361.6	1 866.1	1 025.9	460.4	898.6	779.7	-481.1	-288.2	-890.0
Employment (thousands)	322.7	328.4	307.7	294.1	289.5	277.2	272.4	259.1	250.6	234.5	212.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Footwear
Breakdown by materials, 1992

(million pairs)	Apparent consumption	Production	Extra-EC exports
Leather	771.6	706.7	173.1
Synthetic	236.0	161.2	43.3
Textile	278.8	70.7	21.3
Rubber	8.9	9.3	2.0
Other	35.3	17.7	16.2
Slippers	267.6	115.8	15.5

Source: CEC, Eurostat

Table 3: Footwear
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	1.8	5.7	3.5
Production	-0.2	4.7	2.0
Extra-EC exports	-1.4	5.6	1.7
Extra-EC imports	9.6	9.7	9.7

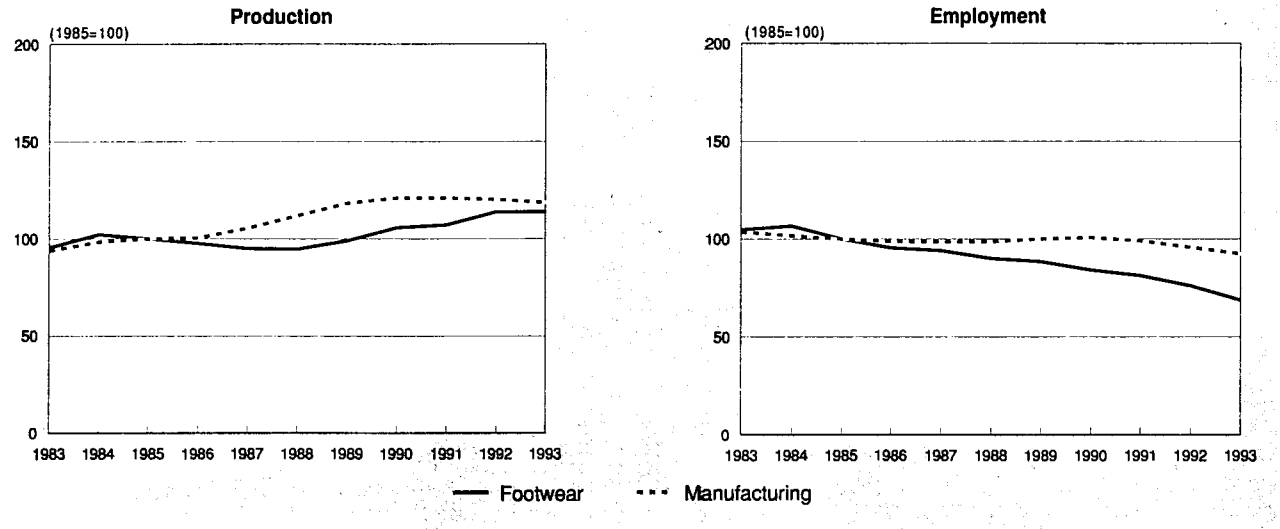
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Footwear
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	2 528	3 643	4 189	3 801	3 393	3 192	3 923	4 116	3 938	4 176
Extra-EC imports	1 408	1 642	1 827	1 935	2 367	2 732	3 024	3 336	4 420	4 464
Trade balance	1 119.8	2 000.7	2 361.6	1 866.1	1 025.9	460.4	898.6	779.7	-481.1	-288.2
Ratio exports/imports	1.8	2.2	2.3	2.0	1.4	1.2	1.3	1.2	0.9	0.9
Terms of trade index	106.3	102.2	100.0	109.4	113.5	117.4	114.0	117.3	113.1	109.6
Intra-EC trade	3 720	4 209	4 681	5 085	5 266	5 045	5 517	6 090	6 520	6 407
Share of total imports (%)	72.5	71.9	71.9	72.4	69.0	64.9	64.6	64.6	59.6	58.9

Source: DEBA

Figure 3: Footwear
Production in constant prices and employment compared to EC manufacturing



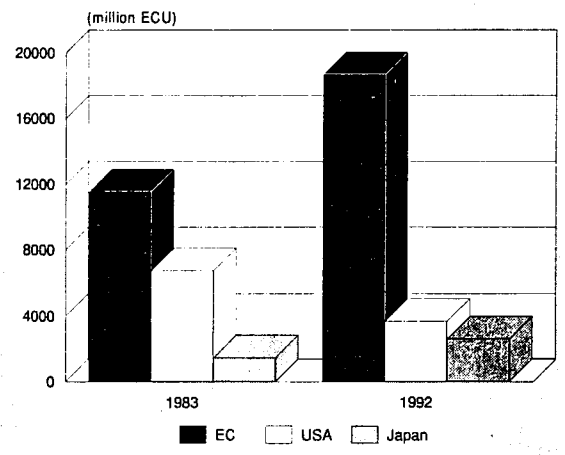
1993 are Eurostat estimates.
Source: DEBA

While production by EC companies increased in recent years, apparent EC consumption grew more rapidly with EC producers continuing to lose considerable market share to extra-EC imports. Between 1986 and 1992, the value of apparent consumption grew by 59% in current prices, while the value of EC production over the same period rose by 36%. There has been somewhat of a turnaround in the footwear industry in recent years compared to the early to mid-1980s, with strong real annual average growth rates of EC production and extra-EC exports in the latter half of the period. The turning point appears to have been 1988 and the value of production in constant prices shows continuous, albeit slow, growth each year since 1988. It is estimated that from 1988 to 1992, the value of EC production in constant prices increased by 20%.

However, rising production values over the last four years paints a somewhat misleading picture. Some of the problems which beset the industry in the early 1980s still remain and are reflected in other indicators such as the trend in employment, in value-added, in the number of shoes produced in the EC and in the deteriorating EC trade balance. While the value of production deflated for increases in producer prices has risen in recent years, the actual volume of production has fallen and stocks have also increased. In contrast to Eurostat constant price data, CEC estimates of shoe production volume indicate an overall fall of 5% in 1992 and of 3% in Italy (Eurostat constant price data shows growth of 17%).

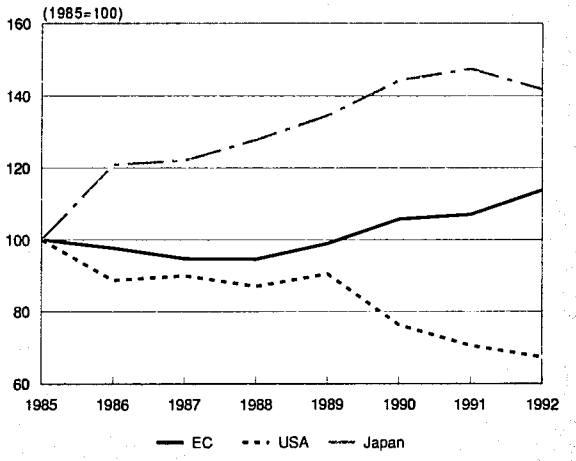
In addition, analysis of trends for individual Member States indicate that the value of production in constant prices fell in most Member States in recent years and only Italy recorded a significant increase. A substantial portion of the growth in the value of production in Italy is a result of adding value, often through marketing or presentational inputs, to completed or almost completed shoe imports and re-exporting at much higher prices. Thus, while the value of production in constant prices rose by 24% (1.5 billion ECU) in Italy over the 1990-92 period, imports rose by 74% (0.4 billion ECU) and value-added in constant prices fell by 6% (0.1 billion ECU). Overall, value-

Figure 4: Footwear
International comparison of production in current prices



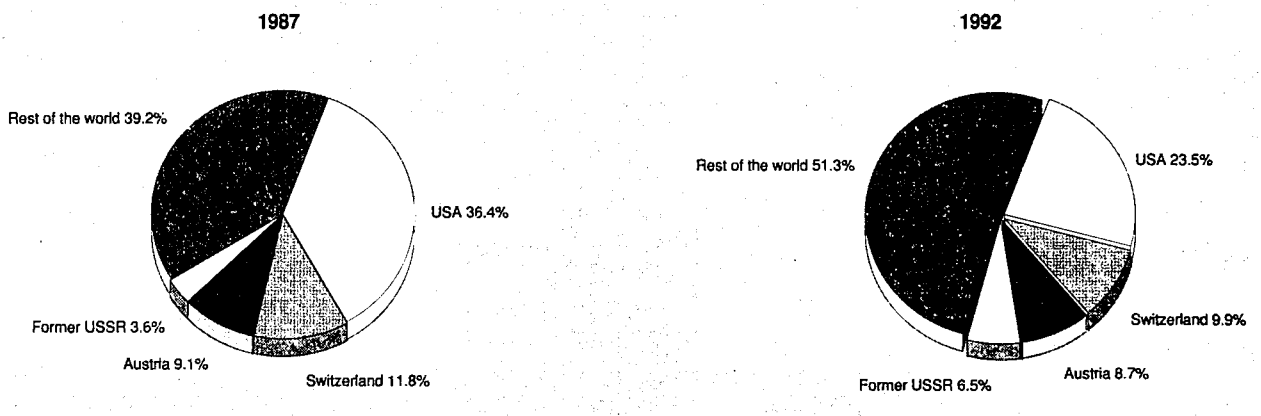
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Footwear
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Footwear
Destination of EC exports



Source: Eurostat

added in the EC footwear industry has fallen slowly but continuously in constant prices since 1984, declining by 13% over the 1988-92 period. Similarly, employment in firms with over 20 workers declined by 36 500 to 234 500 over the five years to 1992.

The footwear industry within the EC is dominated (in value terms) by five Member States - Italy, France, Germany, Spain, the United Kingdom and Portugal. Their relative importance has, however, declined marginally. They accounted for 93% of the value of EC production in 1992, compared to 94% in 1983. However, the relative importance of Italy has increased considerably while that of the other four, particularly France and Germany has decreased. Almost all of the growth in production recorded over the 1988-92 period was in Italy, with an overall increase in the value of production in constant prices of 62%. In contrast, over the same period, France, Spain and the United Kingdom recorded little or no growth while production in Germany declined sharply. Small increases in production were also recorded in the Netherlands and Portugal. Portugal was the only Member State to record continued growth throughout the 1980s but real output fell marginally during both 1991 and 1992.

CEC data indicates the volume of all footwear remained almost constant between 1988 and 1992, but that the quantity of non-leather footwear production decreased by 6% to 706.7 million pairs. Most of this decrease occurred during 1992 and is reflected both in the overall fall in footwear production of 36.5 million pairs and a rise in slipper production of 9.7 million pairs.

International comparison

The EC is a major producer of footwear, accounting for around 10% of global footwear production and 20% of world footwear exports. Footwear production is, however, dominated by low-cost developing countries and newly industrialised countries (NICs), with the United States and Japan accounting for only 3% and 4%, respectively, of world footwear production. In contrast to the European experience, the footwear industry in the USA has contracted considerably over the last ten years, with the value of production in current prices falling by 46% over the period 1983-92. The corresponding statistic for the EC was a growth of 62%. Similarly while production value in constant prices increased by 14% over the 1985-92 period in the EC, it fell by a third in the USA.

Foreign trade

International trade in footwear is not covered by the Multi Fibre Arrangement (MFA) which governs trade in the textile and clothing sectors. The EC footwear sector is heavily dependent on international trade, with 22% of EC production exported to extra-EC destinations in 1992. In current prices, extra-EC exports have increased by 10% since 1986, while the current price value of extra-EC imports increased by 130% over the same period. By 1992 extra-EC imports accounted for 24% of apparent consumption in the EC, compared to 16% and 13% in 1986 and 1983, respectively. However, some of this increase includes growth in imports of partly finished shoes for further production.

Increasing import penetration of the internal EC market is now reflected in an overall trade deficit on footwear trade. Traditionally the EC recorded a surplus in footwear trade but, despite a sharp slowdown in imports in 1992 and a continued rise in extra-EC footwear exports, a further deficit, albeit smaller, of 288.2 million ECU was recorded.

Extra-EC imports are spread across a variety of footwear types with textile uppered footwear accounting for 28% of the total by volume in 1992. Leather footwear accounted for a further 26% of the volume of extra-EC imports, with slippers and synthetic-uppered footwear accounting for 19% and 13%, respectively. In contrast, the majority of extra-EC exports were leather-uppered in two out of every three pairs in 1992.

The EC has a trade surplus in footwear with the USA, Japan and the EFTA countries. However, it has a large trade deficit in footwear trade with developing countries and with the former Eastern Bloc. The leading market for extra-EC exports is in the EFTA countries, the other important market being the USA. However, the importance of the USA as an export destination has declined. Italy is the EC's major exporter, accounting for 54% of extra-EC exports in value terms. Other major extra-EC exporters include Germany, Spain, France, Portugal and the United Kingdom. In 1992, Italy, Spain and Portugal were the only EC Member States with a surplus in the value of their extra-EC trade.

The majority of extra-EC imports to the Community come from developing countries and their value has been increasing steadily. The United States and EFTA countries accounted for only 10% of extra-EC imports in 1992, compared to 18% in 1987. The largest growth in imports to the EC in nominal terms has been from China. China and Vietnam are the largest exporters of footwear to the EC. Germany is the largest importer of extra-EC footwear, importing 34% of the total value

of extra-EC imports in 1992. Italy, the United Kingdom and France are also major importers in value terms.

MARKET FORCES

Demand

Most footwear is purchased by individual consumers. Spending on footwear tends to be cyclical, expenditure being reduced or deferred in recessionary times with a compensating upturn during a recovery. Contract sales to major customers such as the military, or industries requiring specific work or safety footwear are important niche markets.

While having a fashion content, footwear is seen primarily as a necessity and a smaller proportion of income is spent on footwear as income rises. Some niches within footwear, in particular the market for trainers and certain segments of the ladies footwear market, are strongly influenced by fashion trends. In addition, demand for sports footwear has been boosted by higher levels of sports participation. Increased fashion demand has also resulted in increasing usage of coated fabrics and textiles, rather than leather, for uppers or lining material.

Both volume and value figures show the largest market for footwear in the EC are Italy and Germany, each accounting for 26% of the value of consumption in 1992. France (20%) has the highest per capita consumption of footwear, 5.99 pairs per annum in 1992 compared to an EC average of 4.63 pairs. Comparison between Members States show significant differences in prices paid per pair - reflecting to some extent greater quality and fashion consciousness. The price paid per pair is highest in Italy.

Innovations in manufacturing technology have helped maintain the competitiveness of European footwear producers. Increasing use of Computer Aided Design (CAD) and Computer Aided Manufacture (CAM) has allowed European manufacturers to introduce quick response and just-in-time manufacturing to compete with low-labour cost countries as well as allowing the production of high quality low-volume runs to take account of fashion trends.

The importance of these technological developments for the competitiveness of EC manufacturers is closely linked to their proximity to the large European market. Footwear technology, by comparison with many industries, is relatively basic and in general is not proprietary. Most technological advances are embodied in capital equipment and the machinery manufacturer will readily sell their product to buyers in NICs and developing countries. The key for EC manufacturers is the utilisation of such advances to maximise their proximity to the world's most lucrative footwear market and to the footwear industry's leading fashion centres. Even these advantages are being negated. Low cost producers close to the European market in North Africa and East Europe may become more important in the medium. However, European manufacturers can now use CAD systems to transmit new designs on-line to production facilities in low cost countries.

Supply and competition

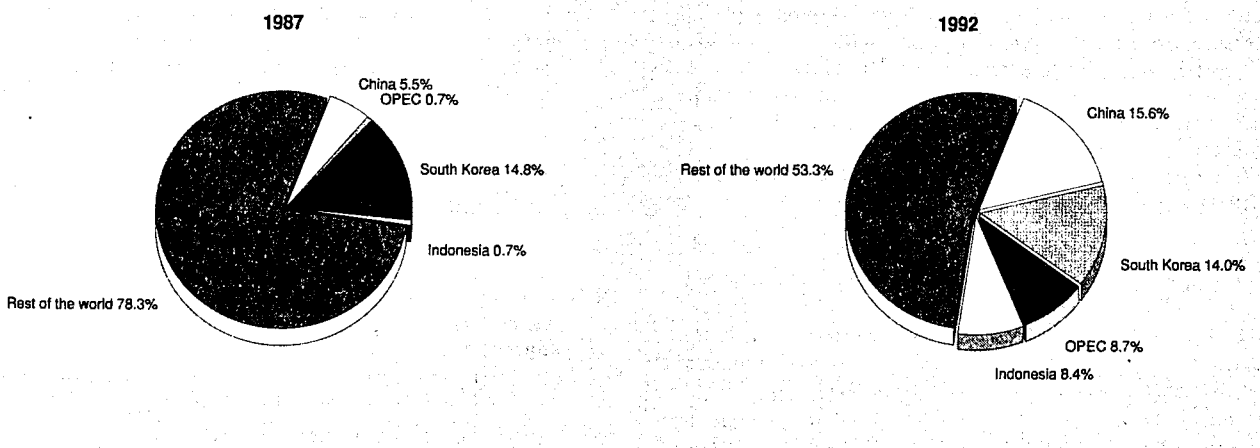
Distribution of footwear has traditionally been mainly through independent retailers, but the retailing sector has become more concentrated. The importance of larger generalist stores and multiple retail chains have increased at the expense of independent retailers and has led to shifts in relative bargaining strengths of retailers.

Some large manufacturers such as the Bata Organisation (F) and Bally (UK) have also established retail arms with outlets in a number of European countries. Other manufacturers such as André (F), Charles Jourdan (F), Clarks (UK), Eram (F), and Salamander AG (D) also operate retail units both within their own domestic markets and in other Member States. Footwear manufacturers are also becoming increasingly involved in direct selling to customers through factory shops and "seconds" shops. Clarks International have opened five Clarks factory shops as well as two K Shoes factory shops. Manufacturers are also seeking to benefit from the move by retailers towards combining their clothe lines with accessories. Increasingly, footwear companies are attempting to link with retailers or operate in-store concessions.

The key competitive advantages of EC footwear manufacturers, under pressure from lower priced imports, is based on time and service quality, with successful EC manufacturers offering strong commitments on price, delivery performance and flexibility. In response to the needs of the retail groups, footwear manufacturers are increasingly adopting quick response strategies, although the number of companies using this strategy remains relatively low by comparison with the clothing sector. Many SMEs have adopted these strategies.

With a large number of firms, the presence of few restrictions on extra-EC imports and few barriers to intra-EC trade, the internal EC market in footwear is relatively competitive. Internal EC competition increased in the run up to the completion of the single market in 1993, with some of the larger retail chains expanding into other EC Member States. However,

Figure 7: Footwear
Origin of EC imports



Source: Eurostat

Table 5: Footwear
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	19.9	19.9	20.3	20.9	20.4	20.8	20.0	20.7	20.8	21.5
Productivity index	98.1	98.0	100.0	102.8	100.7	102.7	98.4	102.2	102.6	106.2
Unit labour costs index (3)	88.2	94.6	100.0	102.6	103.8	109.0	113.2	120.4	127.9	137.7
Total unit costs index (4)	82.0	91.8	100.0	103.9	104.8	112.4	127.2	146.3	159.3	184.5

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed, in thousands of ECU.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

ongoing recession in major EC markets has dampened the impact of the single market during 1993.

The removal of customs and other physical barriers to intra-EC trade has led to a reduction in transport cost and delivery time. This benefits firms who are dependent on markets in other Member States and those competing on the basis of delivery performance and quick response. The approximation of VAT on footwear will not now take place until at least 1997, at which time Member States which currently have low VAT on footwear - Ireland, Spain, Italy and Luxembourg - will experience price increases.

Imports of footwear to the EC originate mainly from the low labour cost countries, most notably China, South Korea, Indonesia, Thailand and Taiwan, although imports from other developing countries, such as India and Brazil, are growing.

Extra-EC exports are generally high quality leather footwear to developed countries such as the USA, Canada, Switzerland, Austria and other EFTA countries. The volume of exports to destinations such as the USA and Canada has fallen, partially explained by the depreciation of the dollar during the latter half of the 1980s. The long run competitiveness of the EC footwear industry will depend on its ability to continue to supply high quality products to high income markets. In common with the leather industry upstream, expansion into some extra-EC markets is blocked by high duties and tariff barriers (particularly Japan), while restricted access to some of raw materials necessary for higher-value added European production is also a problem.

To help improve the prospects of EC footwear firms, there is a budget for export promotion voted by the European Parliament with the aim of improving access to markets of non-EC countries and to reduce high levels of duty imposed on extra-EC exports by many countries. The on-going Uruguay round of the General Agreement on Tariffs and Trade (GATT) negotiations may also yield some benefits in this regard.

The fragmented nature of the footwear industry makes it difficult for manufacturers to benefit from economies of scale. Pressure from cheap imports coupled with increases in the cost of labour has led to a decline in profitability in the sector. European manufactures trying to compete with cheap imports have tried to maintain market share by expanding their existing line of products, while companies responsive to changing fashions are producing smaller production lots and recouping increased product costs through higher prices.

Production process

The traditional production process for footwear is a relatively simple labour intensive manufacturing process, which can be divided into a number of stages. The first stage, called "clicking", involves the cutting out and preparation of components for the upper and the sole. This is followed by "closing", when the components are stitched together to produce an "upper". The upper is then shaped and an insole and a sole are affixed. Finally, the shoe is finished by cleaning, inspecting and boxing.

Footwear production is still mainly based around a stack of foot-shaped formers, the last, over which the upper is draped and constructed and to which the sole is joined. Mechanised footwear production has usually been organised in a track system along which progressively assembled shoes are carried and are lifted from the track by operatives to perform the next stage. The introduction of the "rink" system has increased productivity and has led to a significant reduction in the volume of rejects. The "rink" system involves arranging the various steps in the shoe-making process in sequence, generally in the shape of a horseshoe. Each function is the responsibility of an operator, although each operator should have the flexibility to perform a number of tasks. Work is passed from one operator to the next, one pair at a time. The team is responsible for quality control and inspects its own work.

Production of footwear within the EC is becoming more mechanised and specialised. The introduction of computer-aided design (CAD), which allows a shoe to be designed on computer and the details to be downloaded to production machines, has been one of the most important developments. CAD reduces the time span between design and production to a few hours enabling quick response to style changes for fashion footwear. The use of CAD systems has been accompanied by computer aided manufacture (CAM) and computer integrated manufacture (CIM). CAD systems are increasingly being linked with computer aided cutting systems using waterjet, laser or die cutters. Operators can view a piece of leather with the use of video and computers and create shoe patterns, having taken account of any blemishes on the raw material.

Unit labour costs in current prices in the EC footwear industry increased continuously over the last ten years, registering an overall increase of 56% over the 1983-92 period. In recent years, these unit cost increases have been relatively sharp, rising by 22% between 1989 and 1992. However, labour productivity has risen very slowly, by just 8% between 1983 and 1992. The need to rationalise costs to maintain competitiveness with developing countries has led larger companies in some Member States to transfer production facilities to lower labour cost countries within the EC, including Portugal.

INDUSTRY STRUCTURE

Companies

The footwear industry within the Community is highly fragmented, characterised by a large number of small business. According to the CEC, there were about 14 730 footwear firms in the EC in 1992, employing an average of 21 workers, compared to 15 396 firms in 1991. More than half of these firms, 55%, were in Italy. Major EC footwear manufacturers include Salamander AG (D), Romika & Co. KG (D), Eccolet Sko (DK), Eram (F), André (F), Clarks (UK), Church & Co (UK), Simod SpA (I) and Filanto SpA (I).

Strategies

Available investment data on the EC footwear industry is dated, with 1989 the latest year for which information is available for most Member States. In 1989, the value of investment in current prices for all Member States, except the Netherlands, was 295 million ECU, roughly equivalent to levels in 1985 and 1986 in nominal terms. This is less than 2% of the value of production and indicated little confidence in the future of footwear manufacturing in the EC during the second half of the 1980s.

The nature of the production process makes automation of the shoe-manufacturing difficult, although a number of state-of-the-art plants in northern Europe are using robotics to reduce labour content. For example, Bata Holland's "precision manufacturing unit" assembly line features computerised robots for the automatic roughing, control, loading and unloading. However, the low level of major investment in plant and machinery, which might result in substitution of capital for labour, has not helped maintain employment. Rather, employment in the EC footwear industry fell by 13% over the five years to 1992 and by 25% since 1983. Only in Portugal has employment increased over the last ten years, although along with stagnation in production volumes employment growth in Portugal ceased in 1988 and fell slightly during 1991 and 1992. This reflected the sourcing strategies of major EC producers who sought to take advantage of lower labour costs in Portugal in the early and mid-1980s. The creation of clusters of foreign footwear firms in Portugal also helped stimulate indigenous Portuguese manufacturers leading to rapid growth in that country. The fall-off in production and employment in Portugal in recent years is partially due to economic conditions in general but also reflects rising labour costs, which increased by almost 90% per person employed in the footwear industry in Portugal between 1987 and 1992.

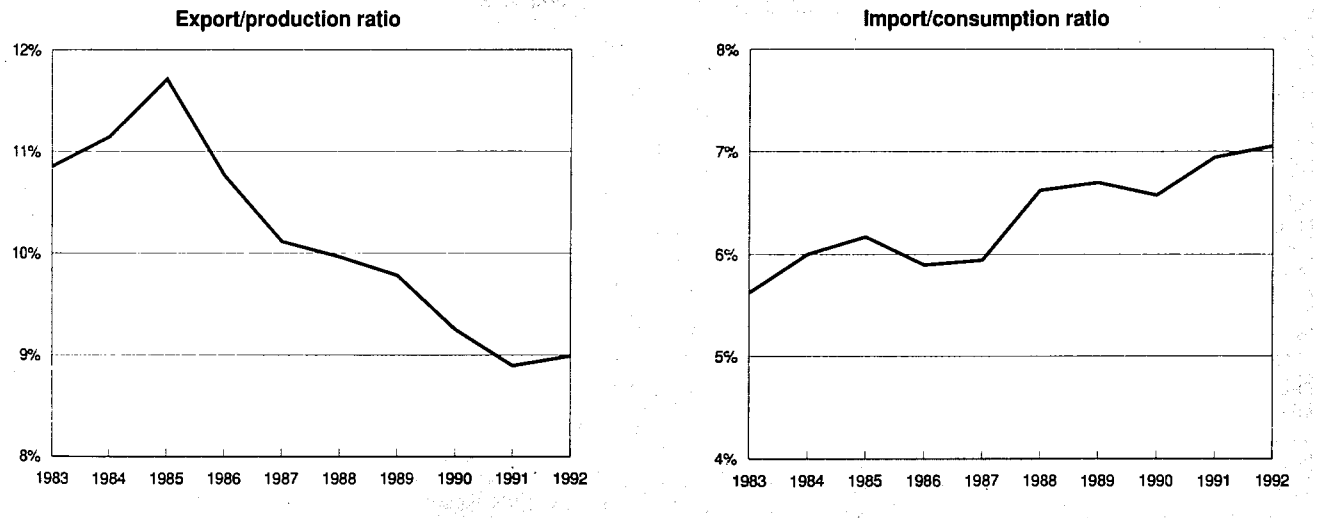
Companies which have transferred production to lower-cost countries within the EC such as Spain and Portugal include the French company, Charles Jourdan, that transferred production from the Rhône valley to Spain. Some French manufacturers now sub-contract to Portugal as well as to extra-EC countries such as Tunisia, Morocco and China. Eram, one of France's largest producers and distributors of footwear operates ten plants within France along with one in Portugal and one in Spain. Many German producers have transferred their production to Portugal and many also operate plants in Austria, while United Kingdom manufacturer, Clarks, have two plants in Portugal. The Danish footwear manufacturer, Eccolet, operates plants in Portugal and former Czechoslovakia as well as in Denmark. Bata, the world's largest footwear organisation is to modernise a manufacturing facility in former Czechoslovakia.

Many EC producers have also shifted operations to low labour cost developing countries outside of the EC. The German company, Wortmann, has factories which manufacture inputs in Taiwan, Hong Kong, China, Thailand, Brazil as well as in different EC countries. Europe's leading sports footwear manufacturers such as Adidas and Puma also transferred substantial proportions of their production facilities to the Far East during the second half of the 1980s. This was done in order to remain competitive with their main competitors who already manufacture the majority of their footwear in the Far East. Puma closed its last German manufacturing facility during 1993. South Korea, Taiwan and Thailand are the most popular countries for sourcing as some of the lower cost countries are not yet as well organised or as reliable. The importation of uppers and other labour-intensive parts from low labour cost countries for assembly is also common, although this is less popular in Italy and most popular in Germany, which pioneered such outward processing in Eastern Europe. However, the trend of locating production facilities in Eastern Europe is likely to slow. Labour costs in these countries have been increasing implying that any benefit to footwear manufacturers will only exist in the short term.

Some quality and image conscious footwear companies almost completely refrain from sourcing production in low-cost locations. While Bally's in-house production contracted rapidly during the 1980s, most of the subsequent subcontract work is in high-cost locations with the major portion of the company's sub-contractors located in Italy. Bally's fashion studios in Milan, Paris and London co-operate closely with these sub-contractors. Some leading German retailers also source production of their private label shoes with Italian sub-contractors.

Some EC footwear firms, particularly sports footwear firms, are adopting global strategies, acquiring manufacturing and retail outlets or franchises outside the EC, as part of their expansion strategies. However, this process is also working in reverse with Japanese and South Korean companies such as Asics and Kukje each establishing a strong presence in

Figure 8: Footwear Trade intensities



Source: DEBA

Table 6: Footwear
Number of firms, 1992

EC	14 729
Belgique/België, Luxembourg (1)	56
Danmark (2)	14
BR Deutschland	206
Hellas (2)	1 868
España	2 239
France	276
Ireland	22
Italia	8 162
Nederland (2)	84
Portugal	1 090
United Kingdom	712

(1) 1991 figure.
(2) Estimate.
Source: CEC

Europe. This trend is not confined to sports footwear - the acquisition of part of Charles Jourdan by Dickson Concepts, a Hong Kong retailing group in early 1992 indicates a similar trend in the classic footwear market.

Integration of retailing and manufacturing has been an important feature of the footwear sector over the last decade. Reflecting the greater importance of the EC as a market for footwear rather than as a manufacturing base, many footwear companies now place greater emphasis on retailing aspects of their operations than on manufacturing - France's Groupe Andre, for example, which has been increasing its retail presence in France and other EC markets sold Jallate, a world leader in safety shoes, in early 1993. In addition, strategies both in terms of capital investment and new organisational structures place increasing emphasis on quick response, flexibility and other aspects of delivery performance. In France, Bata's computerised manufacturing system can provide customers with a coated sample in real time, and can achieve a three day turnaround for urgent repeat orders. Similarly, Bally recently introduced a computerised merchandise information system aimed at minimising stocks, shortening order delays and improving cooperation between Bally's production units, its sub-contractors and retailers.

REGIONAL DISTRIBUTION

Much of the EC's footwear industry is concentrated in particular countries and within regions in these countries. These regions are often areas with little alternative employment to the footwear industry. The industry is most regionally concentrated in Iberian Peninsula. In Portugal, Averio accounts for over half of footwear production while Porto and Braga account for a further 31% and 11%, respectively, while in Spain 62% of footwear firms were located in the Valencia region in 1991. Three Italian regions the Marches, Tuscany and Veneto account for almost two-thirds of footwear employment in Italy, and hence a fifth of footwear employment in the EC. Similarly over 60% of shoes produced in France in 1991 came from the Pays de Loire and Aquitaine regions. In addition, the industry often tends to be even more concentrated in towns and areas within regions such as Herzogenaurach and Pirmasens in Germany, and Northamptonshire in the United Kingdom. The impact of any adverse developments for the industry are therefore particularly concentrated within specific areas of the EC.

ENVIRONMENT

Environmental issues are more important in industries supplying the footwear industry than in the industry itself. The leather and tanning industry is a major source of raw materials to European producers. Suppliers in this sector are under pressure to use water and chemicals more carefully to reduce effluent. The need to install water effluent treatment equipment to meet increasing environmental standards will lead to increased tanning costs and an increase in costs of the raw material for the footwear industry, although there is already sourcing of materials outside the EC. Further problems for the industry are caused by divergence between existing national legislation and the EC Directive on PCP (pentachlorophenol), with the maximum permitted limit set at very low levels in some Member States. The lack of standard testing procedures also exacerbates the situation.

Suppliers of raw materials for non-leather footwear production are likely to face increasing constraints from regulations on usage of polyurethane and polyvinyl chloride (PVC).

REGULATIONS

With the arrival of the single market the national quotas for footwear imports from some low cost producers which many Member States had established have become somewhat redundant as a result of the dismantling of border protection. Previously, national quotas could be protected through Article 115 of the Rome Treaty. This Article helped preclude extra-EC footwear imports from circumventing Member State level import controls by routing goods through another Member State. With no physical internal border controls since January 1993, the use of this Article has become very problematic and it is now being phased out.

EC authorities are currently working on the development of a global proposal in relation to imports from low-cost countries which would cover a range of product areas, including footwear. For example a series of quotas would be set at EC level for nine different categories of footwear. The quota levels are still under discussion but would be set in value terms and would significantly reduce EC imports of footwear in the categories concerned.

Following concerns about the impact that national legislation on footwear labelling in France and Spain would have on intra-EC trade, a proposal for an EC Directive has been forwarded concerning the labelling of the materials used in the main components of footwear for sale to the final consumer. The Directive deals primarily with indicating the composition of footwear by means of either "pictograms" or text and should be soon adopted by the Council.

OUTLOOK

The EC footwear industry faces a difficult future, although there are some encouraging factors. These include the possibility that a GATT agreement may ease some of the trade restrictions which EC manufacturers face on some lucrative extra-EC markets, recovery in the key extra-EC markets of Japan and the USA and better prospects for Member State economies from 1994. A stronger Yen and a stronger USD will also improve competitiveness of extra-EC exports.

However, recovery in the EC will also lead to resumed growth of extra-EC imports of footwear from low-cost competitors. The rate of growth of sourcing of production in lower-cost countries slowed in recent years, but the shifting of manufacturing facilities outside the EC is unlikely to halt. The industry's fundamental difficulty is that it is caught in a wider global shift of comparative advantage in labour intensive industries. In the case of footwear, this shift is accentuated by the fact that it is a basic commodity for which there is tra-

ditionally strong local demand and also is a producing sector in developing countries at early stages of industrialisation. Thus, as labour costs in countries such as Taiwan and South Korea climbed as a result of ongoing economic development, new and additional locations such as China and Indonesia have come on-line. In addition, technology is relatively basic and non-proprietary.

The full impact of the Single Market has thus far been blunted by the impact of the recession on consumer demand. However, it can be expected to increase competition within the EC and is likely to cause a further squeeze on the margins of European manufacturers. How competitive the internal market becomes will also depend on the evolution of EC trade policies, not only in the context of the GATT but also with regard to arrangements vis-a-vis East Europe. In addition to improved ease of access for East European footwear, easier access to East Europe will facilitate EC manufacturers in locating production facilities in these countries. Provided political stability is maintained, the volume of extra-EC footwear imports from Eastern Europe seems likely to increase as does the volume of imports of uppers or partially assembled inputs.

Consumption of footwear can be expected to fall in the short-term as major EC markets remain in recession, but is expected to pick up in the medium term. Growth in consumption is, however, expected to lag behind overall economic growth both in time and in magnitude. With increasing import penetration, both employment and production by EC firms are expected to fall in the medium term. While the increasing use of technology by footwear companies will assist the industry in regaining competitiveness, it will not provide the complete solution. Increased cost effectiveness will also be needed along with greater emphasis on marketing and satisfying the changing demands of the consumer.

Table 7: Footwear
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.0	2.0
Production	-3.0	-1.0
Extra-EC exports	2.0	2.0

Source: Fitzpatrick

Growth in exports to extra-EC markets is expected to offset some of the impact of contracting sales in the internal EC market. A more rapid return to growth in the USA and Japan than in Europe, facilitated by recent (and likely future) exchange rate movements, will boost EC exports of high value-added quality footwear to these markets. New markets are also likely to appear in the increasingly prosperous Asian NICs with a positive outcome to the GATT negotiations and, although uncertainty in this regard complicates any forecast, growth is likely in any case.

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Leather tanning and finishing

NACE 441

Tanning and finishing is a traditional sector of EC industry. Despite its exposure to increased and often unfair foreign competition, the EC leather sector remains at the forefront of the world industry representing about half of total world trade. Against a background of a shrinking domestic market, EC tanners have concentrated in smaller but lucrative market niches, placing emphasis on quality and fashion while consolidating their competitive advantages of flexibility in production and quicker delivery times and improving their environmental performance.

INDUSTRY PROFILE

Description of the sector

The NACE 441 (tanning and dressing of leather) includes: tanning and dressing (NACE 441.1); manufacture of imitation leather based on natural leather (NACE 441.2); and currying, dyeing and finishing of leather (at independent workshops) (NACE 441.3).

The NACE nomenclature includes (under position 441.2) activities which can not be classified as genuine leather according to the definition set by the International Council of Tanners (ICT).

Tanning and finishing consists of converting raw hides and skins into leather which serves for the production of footwear, clothing, furniture, and other consumer goods. Leather is thus an intermediate product used as an essential raw material in downstream industrial processes or crafts. Only "chamois" is sold directly to consumers as a cloth able to absorb four times its weight in water and therefore ideally suited for drying cars and kitchenware. The tanning industry depends upstream on the agricultural sector and on the availability of animal hides and skins obtained as a by-product in abattoirs.

The economic weight of the single tanning sector is with an added value of nearly 1 300 million ECU relatively small compared to other industries, but considered as a whole, the leather, footwear and other leather articles industry induced by the tanning industry accounts for over 10 000 million ECU competing in importance with consumer electronics or clothing.

Italy is by far the most important Member State in terms of leather production with output valued at 4.6 billion ECU in 1992, nearly 60% of total EC output, ranking among the world's leading tanning industries. Italy accounts for 72% of establishments in the sector, a total of 2 200. Next comes Spain with only 278 tanneries (9% of the total) but about 928 million ECU and 13% of the production value. France, Germany and United Kingdom each produce about 500 million ECU. However, in terms of companies, they represent, respectively, 5%, 1.8% and 2%. Portugal's importance in the sector has grown in recent years due to the boost in demand derived from the relocation of downstream industries to that country. There are now 115 tanning establishments located in Portugal. The production value in other Member States is relatively small and their tanning sector minimal.

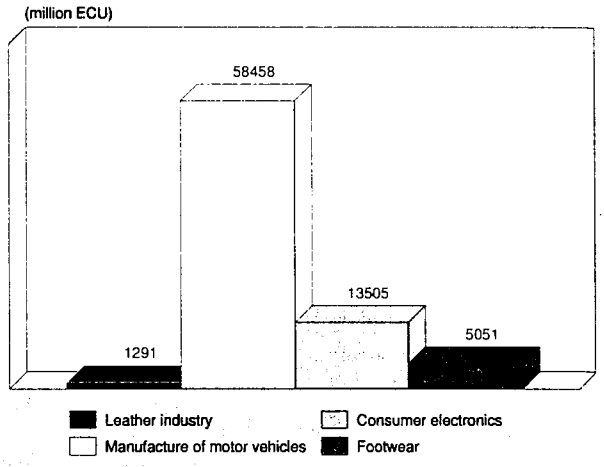
Recent trends

Leather production in the EC has experienced a severe downturn since 1989 when it reached record levels of over 8 000 million ECU. Since the beginning of the decade, the industry's turnover has fallen sharply, coming close to the figures of the early 1980s and reflecting the general economic crisis. Consumption of leather is dropping rapidly in the EC as more and more downstream industries disappear, either relocating their factories in low cost countries or closing down their business because of the fierce and often unfair competition from extra-EC producers.

As a consequence, EC tanners have been forced to look for alternative foreign markets which could make up for the loss in the domestic one. In value terms, extra-EC exports progressed significantly until 1989. Since then, they have slightly decreased, but they stabilised at about 1 200 million ECU in 1992. Intra-EC trade experienced the same trend, while the value of extra-EC imports remained relatively stable at a high level over the past decade.

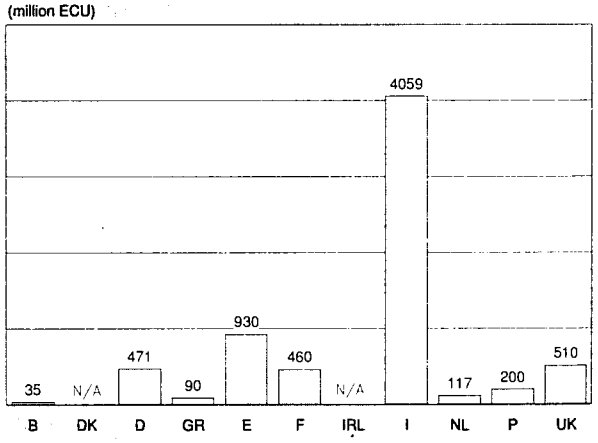
All EC Member States' leather industries continued to loose ground during 1992 in terms of production and market share, with Italy and the Netherlands faring best with decreases of 2% and 5%, respectively. The EC sector's turnover (in current prices) declined by 9% compared to 1991 and EC tanners faced difficulties in maintaining a reasonable share of the

Figure 1: Leather tanning and finishing
Value added in comparison with other industries, 1992



Source: Eurostat

Figure 2: Leather tanning and finishing
Production by Member State, 1992



Source: Cotance

Table 1: Leather tanning and finishing
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993(2)
Apparent consumption	5 562	6 468	7 051	6 791	6 949	8 053	7 905	8 146	6 929	6 490	6 150
Production	5 653	6 659	7 341	7 028	7 212	8 289	8 308	8 132	7 226	6 895	6 500
Extra-EC exports	639	896	1 087	936	1 057	1 044	1 344	1 180	1 173	1 203	1 100
Trade balance	91	191	290	237	263	236	403	-14	298	405	350
Employment (thousands)	81	80	78	77	75	72	70	63	60	55	50

(1) Including Eastern Germany
(2) COTANCE estimates
Source: COTANCE, Eurostat

Table 2: Leather tanning and finishing
Breakdown by major product line, 1991

(million m2)	Apparent consumption	Production	Extra-EC exports
Cattle and calf	220	180	15
Sheep and goat	56	86	31
Others	22	7	4

Source: COTANCE

Table 3: Leather tanning and finishing
Average real annual growth rates

(%)	1983-88	1988-92	1983-92
Apparent consumption	2.5	-6.9	-1.8
Production	2.7	-6.4	-1.4
Extra-EC exports	2.8	3.8	3.3
Extra-EC imports	0.8	2.0	1.4

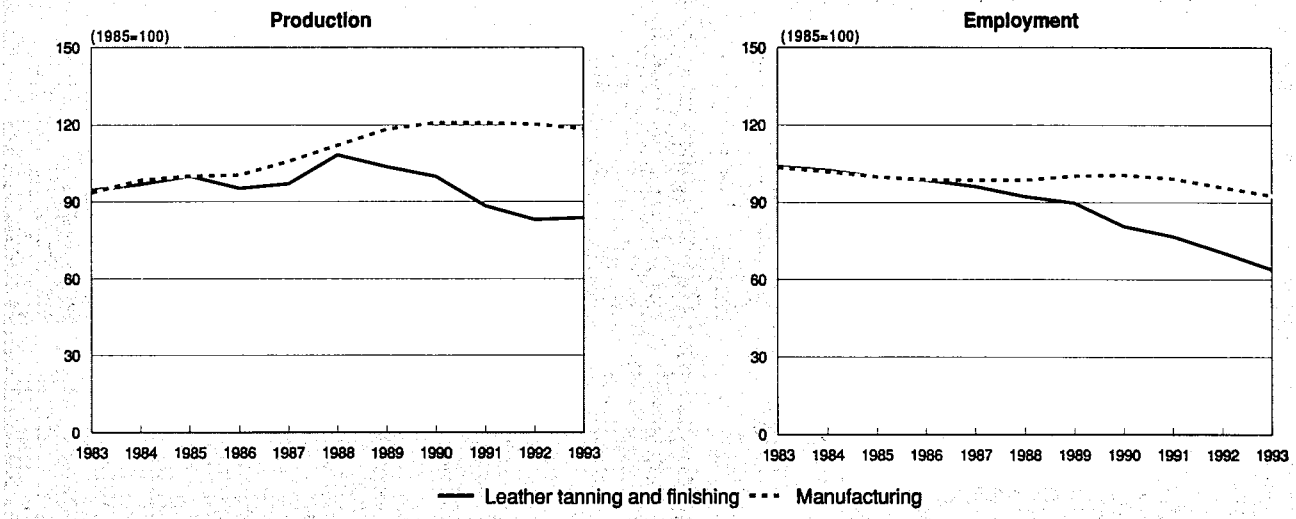
Source: COTANCE, Eurostat

Table 4: Leather tanning and finishing
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993(1)
Extra-EC exports	639	896	1 087	936	1 057	1 044	1 344	1 180	1 173	1 203	1 100
Extra-EC imports	548	705	787	699	794	808	941	1194	875	798	750
Trade balance	91	191	300	237	263	236	403	-14	298	405	350
Ratio exports/imports	1.2	1.3	1.4	1.3	1.3	1.3	1.4	1.0	1.3	1.5	1.5
Intra-EC trade	852	1 145	1 253	1 243	1 283	1 338	1 400	1 330	1 219	1 293	1 200
Share of total imports (%)	60.9	61.9	61.4	64.0	61.8	62.3	59.8	52.7	58.2	61.8	61.5

(1) COTANCE estimates
Source: COTANCE, Eurostat

Figure 3: Leather tanning and finishing
Production in constant prices and employment compared to EC manufacturing



1993 are estimates
Source: Cotance, Eurostat

shrinking EC market. The instability of the EMS had detrimental consequences on leather trade with the devaluation of several European currencies conferring more damage on the industry than advantages, particularly for operators relying on imports for their raw material supply. Uncertainties in the outcome of the Uruguay Round continue to erode EC tanners confidence in a somewhat brighter future. Preliminary 1993 data for the main indicators show no signs of recovery in the short term.

International comparison

The EC tanning sector remains at the forefront of the world leather industry well ahead of the USA and Japan. Its well established image of quality and reliability combined with its leadership in terms of fashion and design still secure EC tanners a privileged position with regard to other competitors. Despite recent contractions, the EC leather market remains with a value of nearly 6 500 million ECU, one of the world's largest trade areas for this industry.

Behind a wall of protection, Japan's tanning industry continues to enjoy a significant and lucrative captive market while distorting international trade.

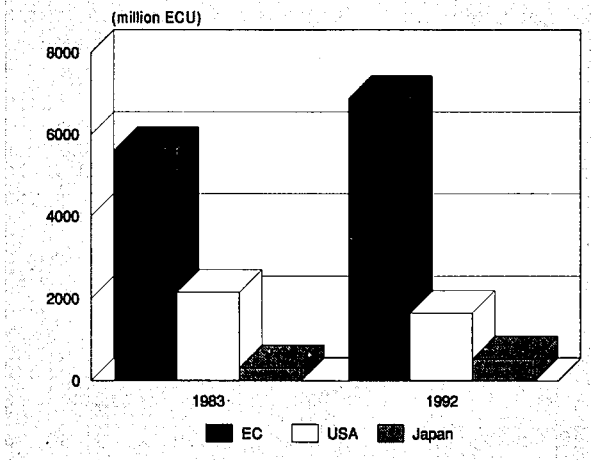
The USA, the world's largest supplier of cattle hides, takes advantage of its large, guaranteed and concentrated supply of raw materials and maintains a profitable leather industry, particularly up to the wet blue stage.

However, as consumption of leather is shifting to other markets in developing countries and newly industrialised countries (NICs), especially in Far East Asia and Latin America, it is the leather industry in those countries that experiences the fastest growth. In this respect, China represents both an enormous market opportunity and a tremendous threat to competitors.

Foreign trade

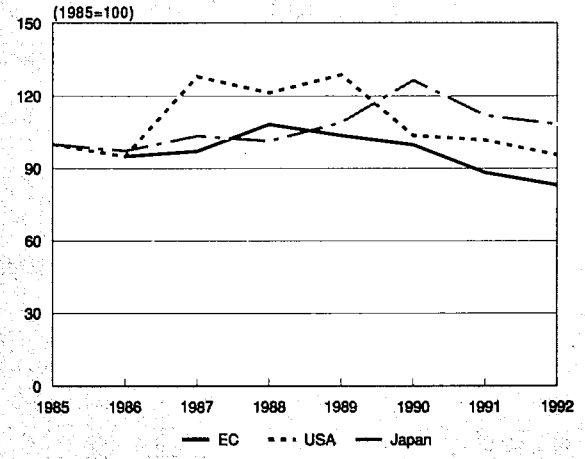
While EC tanneries still account for about half of world trade in leather, developing countries and East Asian NICs are pro-

Figure 4: Leather tanning and finishing
International comparison of production in current prices



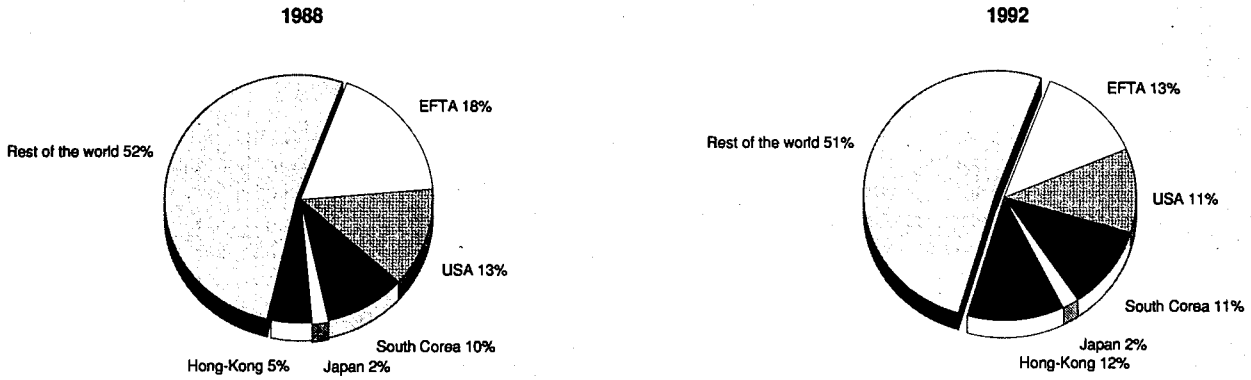
Source: Cotance, Census of Manufacturers, Nikkei

Figure 5: Leather tanning and finishing
International comparison of production in constant prices



Source: Cotance, Census of Manufacturers, Nikkei

Figure 6: Leather tanning and finishing
Destination of EC exports



Source: Eurostat

gressively increasing their share as they develop their domestic tanning industries and adopt strong export oriented strategies. In this respect, the EC offers them, at a cost to its own tanning industry, easy access to its internal market through the Generalised System of Preferences (GSP). As a result, India and Pakistan have managed to become the largest single suppliers of finished leather to the EC accounting for 18% and 12%, respectively, of all extra EC imports in 1992. Argentina's share represents 6%.

Unfair trade practices and protectionist measures proliferate in a number of the EC's trading partners in the leather area. Japan's leather market for instance is virtually closed. Leather exports to that country are heavily discouraged by a penalising tariff-quota system established in 1986 and recently renewed until at least 1996. EFTA countries and the USA remain the most important export markets for the EC tanning industry with a share of 13% and 11%, respectively, of all exports of finished leather in 1992.

MARKET FORCES

Demand

As an intermediate product, leather is normally sold to industrial customers for the manufacture of a wide range of consumer goods and some technical applications. Demand for leather depends, therefore, on sourcing decisions of client sectors which in turn try to fulfil the needs of the general public. Footwear, garments, leather goods upholstered furniture and cars constitute the most typical outlets for leather. Among the factors which influence demand for these products, and thus for leather, per capita income, consumer spending, fashion considerations and lifestyle rank as the most important. EC tanners have so far been reasonably successful in providing fashion services to their clients and anticipating colour trends and consumer preferences, taking advantage of their proximity to the major fashion centres.

The footwear industry remains the most important market for EC leather consuming 49.3% of total production in 1992. The clothing industry accounted for 20.5%, while leather upholstered furniture and cars absorbed 16.8% in 1992. Leather for leather goods and other uses was the least important end use, accounting for the remaining 13.4%. The importance of the different downstream uses varies across Member States according to their particular patterns of specialisation. In Germany, for instance, upholstery leather represents 48% of the total leather production.

Reduction of consumer spending has been evident in most consumer good markets over the last three years but has been a particular problem for the EC leather industry for whom luxury products are a major target market segment. Similarly, the present recession is seriously affecting demand in key extra-EC markets. Demand for quality leather from the EC is, however, increasing in the fast growing economies of the Pacific Rim with the emergence of a relatively wealthy middle class.

Supply and competition

The move of the EC tanning industry towards the supply of more qualitative but smaller market niches as a result of the fierce competition from developing countries in the standard and bulk leather segments has led to a loss of significant production capacities in most Member States. The United Kingdom, for instance, lost 75% of its output capacity over the last decade. The lack of early structural adjustment, combined with the persistence of the recession, has resulted in substantial and costly unused capacities for some tanneries in other Member States. In southern France, a number of tanneries, mainly supplying the clothing market, are running at about 30% of capacity. Flexibility and adaptability in the supply of industrial customers has been a major theme in the restructuring of the EC leather sector, but shorter and more diversified runs also entails additional unit costs and precludes the development of economies of scale.

Reflecting the openness of the EC internal market, EC tanners do not benefit from a dominant position. They do, however, have some non-price advantages such as quick response and just-in-time (JIT) techniques that are becoming more important as EC producers attempt to maximise the advantage of market proximity.

Table 5: Leather tanning and finishing
Destination of output, 1992

	(%)
Footwear industry	49.3
Clothing industry	20.5
Furniture upholstery	16.8
Other industries	13.4
Total	100.0

Source: COTANCE estimates based on 80% of production

Table 6: Leather tanning and finishing
Labour productivity and unit costs (1)

(1985 = 100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (2)	27.1	26.0	26.1	26.7	27.8	27.0	29.0	29.6	30.5	28.1
Productivity index	103.8	101.2	100.0	102.3	106.5	103.2	110.8	113.3	116.7	107.7
Unit labour costs index (3)	89.8	96.4	100.0	104.6	108.2	115.7	124.5	135.2	143.8	158.4
Total unit costs index (4)	74.0	94.5	100.0	96.4	104.5	110.4	126.5	126.4	123.1	121.9

(1) Estimates are used if country data is not available, especially from 1990 onwards
(2) Value added per person employed (1991 prices in thousands of ECU)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

The EC leather industry is increasingly threatened by an often unfair foreign competition in its domestic and export markets exerted by extra-EC tanners with protected access to raw materials and governmental support in the development of their trade. As hides and skins typically represent 50% of the production cost of leather, tanners are very vulnerable to fluctuations in raw material prices on world markets. Export restrictions on raw hides and skins create an artificial oversupply in the captive market distorting the competition to the advantage of domestic manufacturers. These unfair trade practices have indeed been implemented by a number of developing countries in order to boost the growth of their domestic tanning industry. Price advantages of up to 20% due to the lower cost of raw materials have been recorded in finished leather imports from Argentina, India and other countries.

Social dumping has a less important impact on the EC leather industry as tanning is a capital intensive industry where labour costs do not account for a significant part of production costs. Environmental dumping, however, is putting additional threats on the competitiveness of the EC tanning industry. Whereas European tanners have to contend with a competitive disadvantage estimated at 2% to 4% of turnover for environmental protection, their counterparts in developing countries face virtually no environmental cost because of the lack of regulations or of their effective enforcement.

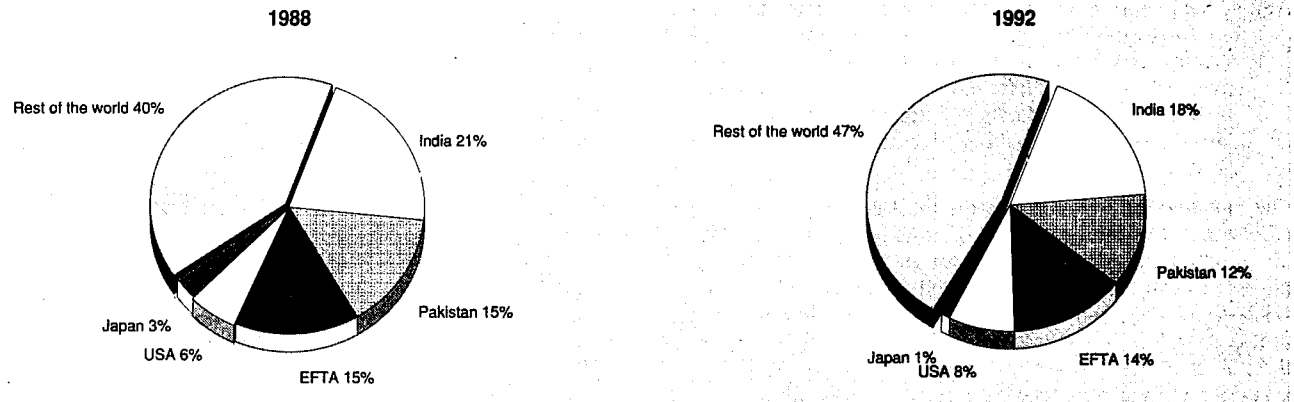
The world hides and skins market appear to be turning around after several years of increased supplies and lower prices. Hide prices began dropping in 1990 remaining low through 1991 and early 1992 due primarily to increased slaughter in the EC, the former Soviet Union and Australia. However, lower slaughter rates reduced world supplies in the latter half of 1992 and early 1993. With this, and continued high utilisation in the USA market, early 1993 world hide prices have shown a significant improvement compared with a year ago. Improvement in prices should continue through 1993, but only gradually as continued sluggishness in the world economy, particularly outside the USA, dampens growth in world leather demand.

The EC tanning industry's supply capacity also varies according to the different subsectors and the developments in the different user industries. Between 1980 and 1990, bovine leather consumption and production grew in the EC due to an increased demand in the footwear and upholstery markets but EC production failed to keep pace with the growth in EC consumption in the second half of the decade. In the sheep and goat leather sector, lower priced imports of garment leather and leather clothing from developing countries and NICs have contributed to the increasing overcapacity in EC tanneries.

By providing a more competitive service to manufacturers, EC tanners may find themselves in a position either to charge a higher price and/or to attract a more consistent level of orders.

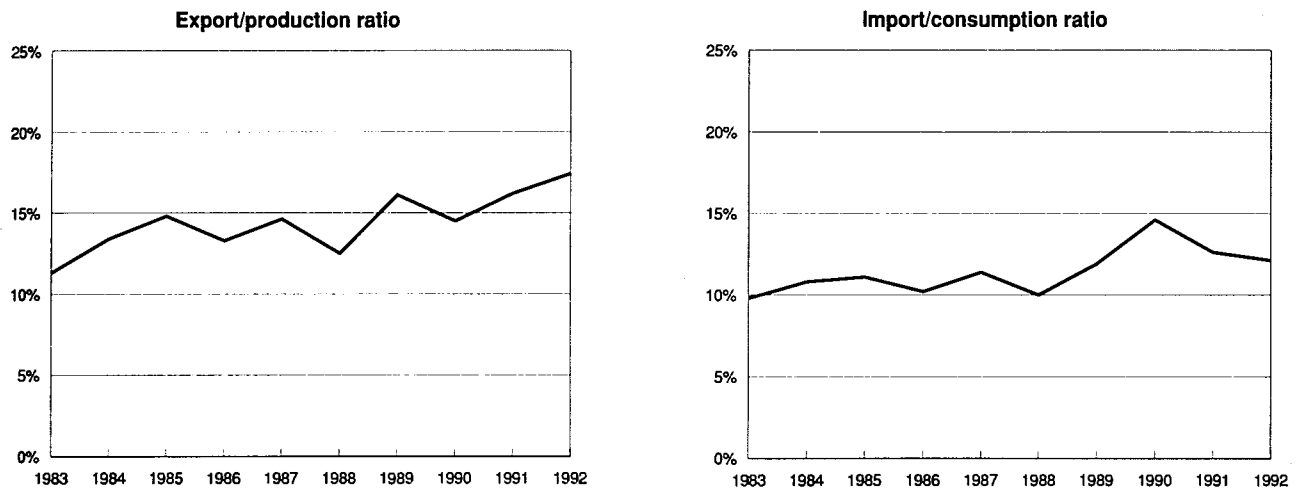
The completion of the internal market has not had a significant effect on the EC tanning industry as intra-EC barriers to trade in leather were non-existent. The progressive erosion of the EC market for leather due to relocation of client industries to low wage countries has a more important impact on competition among EC tanners.

Figure 7: Leather tanning and finishing
Origin of EC imports



Source: Eurostat

Figure 8: Leather tanning and finishing
Trade intensities



Source: Cotance, Eurostat

The EC tanning industry is increasingly being put under pressure by lower priced imports, particularly from lower cost producers in South America and Asia with protected access to raw materials. Export restrictions on raw hides and skins have been implemented by a number of developing countries to accelerate the growth of their domestic tanning industry. These trade restrictions give companies located in those countries a considerable price advantage.

Additional threats to the EC tanning industry are caused by relatively high wages and increasingly stringent environmental regulations. The latter factor is the more potent threat. Lower labour costs in many non-EC countries, while a direct competitive threat, is relatively less important. Tanning is a capital intensive industry where labour costs do not account for a significant proportion of production costs.

The competitiveness of the EC leather industry depends on its ability to secure reasonable access to potentially profitable export markets for its high quality output and so achieve economies of scale in production. Among OECD countries, which are target export markets for the leather sector due to their high level of discretionary consumer expenditure, Japan is the only one that EC tanners have not managed to penetrate significantly. The principal reason for this is restricted access due to a tariff-quota system which effectively limits imports to 1% to 2% of Japanese production. It is estimated by some European producers that exports to Japan could increase six fold if that market were free. The present round of multilateral trade negotiations in the context of the General Agreement on Tariffs and Trade (GATT) discussions may somewhat ease the level of Japanese protection.

Production process

The EC leather industry is well endowed with tanning machinery and chemical producers placing EC tanners at the forefront of leather technology in the design and production of leather for the most demanding outlets. Many EC leather producers cooperate with upstream raw material suppliers for the improvement of the quality of hides and skins and with downstream manufacturers in the development of new products, but vertical integration is not a common feature in the sector. Close cooperation also occurs with machinery producers and specialist chemical suppliers particularly for improving existing tanning techniques and environmental performance.

INDUSTRY STRUCTURE

Companies

The number of tanneries operating in the EC continued to decline in 1992, falling to 3 071 companies. This is a decrease of 10% compared to 1991 and 23% compared to 1983.

The EC's tanning industry is mainly composed of small and medium sized enterprises. With a total workforce of 54 574 people in 1992, the average number of workers per plant was 18. North European tanneries tend to be larger than their southern counterparts. Italy in particular has the lowest ratio of workers per plant with an average of 10, reflecting cluster development and a successful blend of competition and co-operation where producing units specialise in only a limited number of operations and rely on the activities of neighbouring units for other aspects of the production process. In Germany, the average number of workers per plant is over 90, and is about 60 in both Belgium and the United Kingdom. In Portugal, Spain and France, the average ranges from 20 to 50 people per tannery, while the Netherlands is an exception among northern Member States with an average of only 28 workers per plant.

The leading tanneries in the EC include: Gruppo Mastrotto (I), Industria Conciaria Europa S.p.A. (I), Motta Alfredo S.p.A. (I), Grupo Colomer (E), Grupo Lederval (E), Costil Tanneries de France S.A. (F), Tanneries du Puy (F), Freudenberg (D), Lederfabrik Louis Schweizer GmbH & Co. (D), Roser (D), Conolly (UK) and Pittards (UK).

Strategies

The EC tanning industry is undergoing a continuous process of structural adjustment in order to face the challenges of the present and forthcoming business environment. EC tanneries have to excel in quality or fashion succeeding in market segments where price considerations are not the most important factor. Investments in quality assurance systems of the ISO 9000 series, research and development in product innovation and improving skills of the workforce appear to be the main strategies of EC tanners for strengthening their competitiveness. Export orientation and building strategic alliances in key foreign markets are also important.

REGIONAL DISTRIBUTION

For historical reasons, tanneries are regionally and/or locally concentrated. The centres of Santa Croce sull'Arno, San Miniato, Castelfranco, Montopoli and Fucecchio produce about 90% of all Italian sole leathers and some 35% of that Member State's soft leathers. The centres of Vic and Igualada in the Spanish region of Catalonia have a long established tradition in the leather business, while Alcanena in southern Portugal, Graulhet and Mazamet in southern France and Backnang in Germany are other examples of areas with a high concentration of tanneries, often playing an essential role in the local and/or regional socio-economic life.

ENVIRONMENT

The tanning industry has historically been regarded as a polluting activity. However, many of these potentially negative environmental impacts are either innocuous or have been successfully tackled by EC tanners. Few modern tanneries in the EC, for example, now have the characteristic odour of ammonia released in the early stages of raw material conditioning for tanning.

In profitably recovering a by-product of the meat industry, which would otherwise be landfilled, the tanning industry helps to maximise use of a renewable natural resource and relieves abattoirs of disposal problems. It is worth noting that a large part of the waste is inherited from operations upstream of the tanning process, deriving from improper hygienic conditions of animals when presented to the abattoir and salting and other chemical preserving operations after skinning. The later washout of salt, pesticides or fungicides as well as the removal of dung and animal hair require particular attention in tannery effluent treatment plants. Treatment plants, however, generate another form of residue (generally sludge) which carries the organic and inorganic matter collected after filtration, cleaning and sedimentation of the effluent before it is released ieither to a municipal plant for further treatment or directly to the environment if quality standards are met. Sewage sludge has been successfully used in agriculture in replacement of chemical fertilisers or as a soil conditioner. Recent research developments have scientifically proven that there is no observable effect of chromium containing sewage sludge when disposed on agricultural land. Trivalent chromium salts are now the most widely used tanning agents in industrial leather production. Contrary to the toxic hexavelant form, which is not used in tanning, trivalent chromium does not represent a threat to the environment.

However, leather tanning can be a source of environmental impact if basic precautions are not taken in the factory. The concept of environmental protection is being integrated into the management strategies of EC tanneries. Recognising that pollution prevention is often easier to apply than "end of pipe" solutions, the industry is developing cleaner production technologies in experimental projects, often in cooperation with other EC tanners. Joining efforts to tackle commonly specific problems as well as cooperative research in cleaner technologies have already brought positive results in the field of recovery of by-products such as glue, gelatine or leatherboard or in the recycling of tannery liquors for reuse.

REGULATIONS

At the EC level, it is possible to distinguish three main areas where the leather industry is particularly addressed. These are trade related, technical and ecological regulations.

Trade regulations

The EC common customs tariff in chapter 41 provides for import duties on leather. These range from 3% to 7% and are among the lowest in the world. As far as GSP rules are concerned, the European leather industry seeks the immediate re-imposition by the EC of customs tariffs for hides and tanned skins and for manufactured leather goods as soon as the ceilings set within this system are reached. According to COTANCE, anti-dumping and anti-subsidy regulations and other trade "weapons" have been largely unsuccessful, mainly due to excessively bureaucratic procedures.

Technical regulations

The Commission has issued a proposal for a footwear labelling directive, laying down the means to be used for footwear labelling referring also to the constituent materials of it and thus defining leather. This Directive, however, remains unadopted by the Council even though it would sensibly improve consumer information on shoes and leather.

Environmental regulations

EC environmental instruments of a specific importance include the European Waste Catalogue and the VOC (volatile organic chemical) Directive, which lays down standards in relation to atmospheric emissions. These may have negative consequences on the EC tanning industry if measures are set without consideration of the capability of industry to assume ever increasing standards. The EC Commission's move in the field of environmental liability may also have a negative impact on financially weak small to medium sized enterprises (SMEs), a description which aptly fits many tanneries.

OUTLOOK

Overall, despite prospects of a modest upturn in demand for leather, a substantial increase of production in the EC seems unlikely in the short term. The non-completion of the Uruguay Round and the general economic recession has worsened the situation. Leather consumption also reflects the effects of recession for the third consecutive year, and demand remains flat. Against this background, the outlook for the EC leather industry is bleak.

Table 7: Leather tanning and finishing
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-1.8	-0.8
Production	-0.8	-1.2
Extra-EC exports	0.3	0.4

Source: COTANCE

Written by: COTANCE and Fitzpatrick Associates
The industry is represented at the EC level by: Confederation of National Associations of Tanners and Dressers of the EC/Confédération des Associations Nationales de Tanneurs et de Mégissiers de la CE (COTANCE). Address: 3 rue Belliard, B-1040 Brussels; tel: (32 2) 512 7703 fax: (32 2) 512 9157.

Overview
NACE 46

In 1992, the wood processing industry reached a production value in current prices of 35.6 billion ECU. The sector is still characterised by a number of barriers to trade between Member States. However, the completion of the EC single market and the progressive removal of barriers to trade should result in an increase of intra-EC trade, which represented 34% of total trade in 1992. From 1993-1997, demand for products of the wood industry is expected to grow by 1.9% per year.

INDUSTRY PROFILE

Description of the sector

According to the NACE definition of sector 46, woodworking can be divided into :

- sawmills and plane mills (NACE 461);
- semi-finished wood products, such as particleboard, fibreboard, plywood, etc. (NACE 462);
- wooden building components, such as carpentry, joinery and parquet flooring (NACE 463);
- wooden containers and pallets (NACE 464);
- other wood manufactures (NACE 465); and
- cork, basketware, wickerwork, brushes and brooms (NACE 466).

In view of the typical small and medium sized enterprise (SME) character of these activities in all the EC countries, the output of these groups is considerably underestimated by the majority of statistical analyses since the latter generally ignore smaller businesses (less than 20 people employed).

Recent trends

In 1992, consumption in current prices in the EC amounted to 43.7 billion ECU, an increase of 1.5% compared to 1991.

Production amounted to 35.6 billion ECU in 1992, an increase of 1.1% compared to 1991. Sawing and planing of wood accounted for 16% of total production, the semi-finished wood products for 23%, the wooden building components for 36% and the other wood products for 25%.

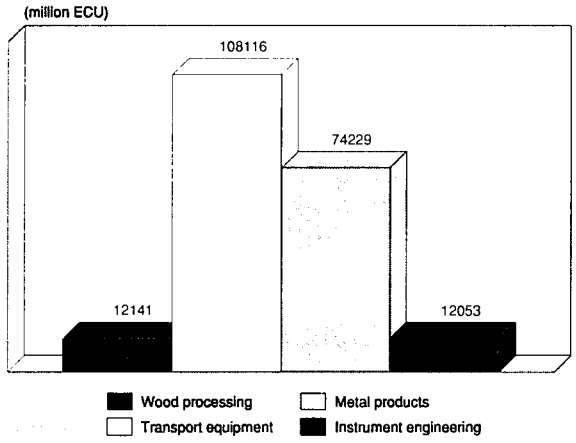
The trade balance deteriorated in 1992 due to trade evolution in the wooden building components and the other wood products. The woodworking industry employed about 424 000 people in 1992, a decrease of 2.6% compared to 1991.

Between 1983 and 1992, apparent consumption increased by an average real growth rate of 2.5% per year. Production in constant prices increased by 27.2% compared to 1985 while during the same period the manufacturing industry as a whole grew by 20.3%. Extra-EC exports have remained stable since the 1989 jump, albeit with a very slight decline. Employment since 1985 has fluctuated around 430 000 people, although in 1992 employment dropped to 424 000.

Foreign trade

Extra-EC imports, after rising continually from 1985 to 1990, declined by 5% in 1991 but increased again by 2.6% in 1992. The ratio of extra-EC exports/extra-EC imports, after having reached a level of about 23% in 1985, remained stable at a level of roughly 20%. Intra-EC trade increased constantly during the period 1983-1992, amounting to 5.2 billion ECU in 1992 and representing 34% of total imports.

Figure 1: Wood processing
Value added in comparison with other industries, 1992



Source: DEBA

The import penetration rate progressively declined, from 26% in 1983 to 23% in 1992.

MARKET FORCES

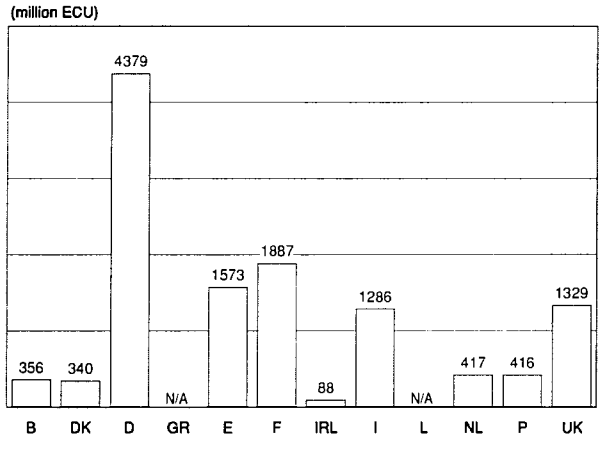
Demand

Since the products of the woodworking industry are very heterogeneous, these products have different types of buyers, i.e. industrial or final consumers.

Demand for the products of the woodworking industry largely depends on two sectors: the building or construction industry on the one hand and the furniture industry on the other hand. Since these two sectors are highly cyclical, demand for the products of the woodworking industry is largely influenced by the evolution of general income and interest rates.

In 1993, the building industry in Western Europe will experience a further decline. It is estimated that total building

Figure 2: Wood processing
Value added by Member State, 1992



Source: DEBA

Table 1: Wood processing
Main indicators at current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	27 268	28 812	28 858	29 345	32 258	36 210	40 281	42 737	43 015	43 675	43 900
Production	21 548	22 865	23 403	23 749	25 971	29 186	32 346	34 445	35 240	35 640	35 800
Extra-EC exports	1 412	1 616	1 626	1 611	1 651	1 776	2 055	2 033	2 019	2 014	2 000
Trade balance	-5 720	-5 946	-5 455	-5 596	-6 287	-7 024	-7 935	-8 292	-7 775	-8 035	-8 070
Employment (thousands)	454.9	447.4	428.8	411.4	420.9	429.8	436.7	441.3	435.3	424.1	418.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Cal-Bois estimates for 1993
Source: DEBA

Table 2: Wood processing
Breakdown by sector, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Sawing and processing of wood	11 313	5 846	259
Semi-finished wood products	9 717	8 128	468
Wooden building components	13 214	12 643	403
Wooden containers	3 191	3 198	63
Cork, plaiting, brushes, brooms	2 156	2 146	483
Other wood products	4 085	3 679	338

(1) Except for trade figures, estimates are used if country data is not available.
Source: DEBA

Table 3: Wood processing
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	3.2	1.7	2.5
Production	3.2	1.9	2.6
Extra-EC exports	0.6	-0.8	-0.1
Extra-EC imports	2.7	0.7	1.8

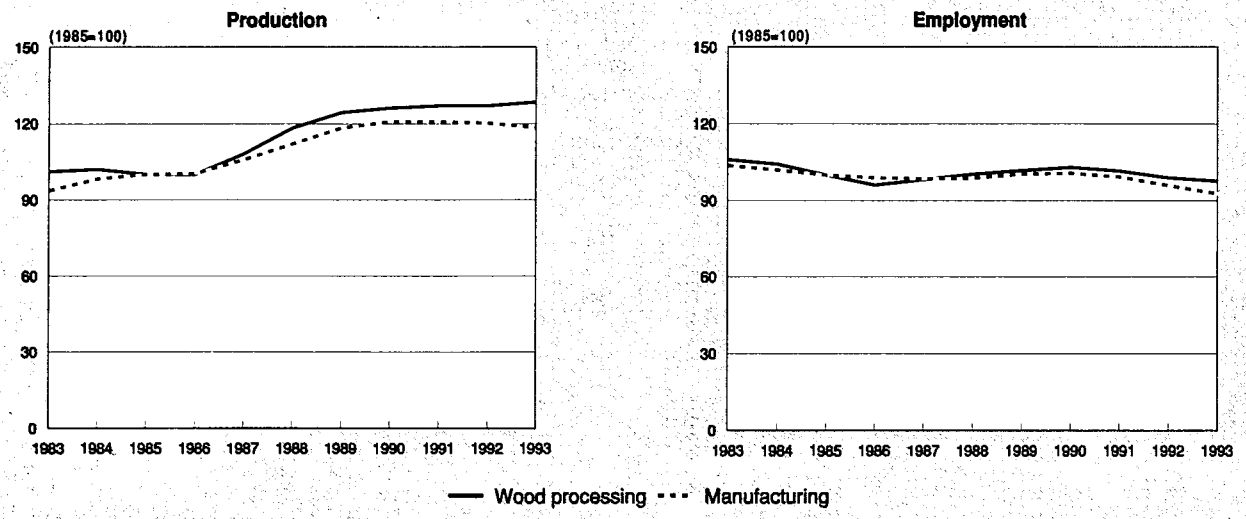
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Wood processing
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 412	1 616	1 626	1 611	1 651	1 776	2 055	2 033	2 019	2 014
Extra-EC imports	7 133	7 563	7 081	7 207	7 939	8 800	9 991	10 326	9 794	10 049
Trade balance	-5 720	-5 946	-5 455	-5 596	-6 287	-7 024	-7 935	-8 292	-7 775	-8 035
Ratio exports/imports	0.20	0.21	0.23	0.22	0.21	0.20	0.21	0.20	0.21	0.20
Terms of trade index	99.3	95.3	100.0	111.9	113.4	112.7	110.5	110.5	114.6	119.1
Intra-EC trade	2 603.1	2 963.6	3 144.6	3 326.1	3 573.9	4 026.0	4 548.4	4 907.1	5 042.7	5 207.3
Share of total imports (%)	26.7	28.2	30.8	31.6	31.0	31.4	31.3	32.2	34.0	34.1

Source: DEBA

Figure 3: Wood processing
Production in constant prices and employment compared to EC manufacturing



1993 are Cel-Bois and Eurostat estimates.
Source: DEBA

output will be reduced by more than 1%. This stands in contrast to a general GDP growth of 0.75% which is forecasted for 1993. The European construction industry continues its downward trend for the second year and no longer follows the general economic development. The main reasons for the negative trend are the high level of interest rates, a surplus of buildings in some countries, large public budget deficits and the widespread uncertainty about the development of the individual economies. The decline in European building volume is slightly curbed by the comparatively positive trends in Germany, Portugal and the United Kingdom, where a certain increase in construction activity is expected.

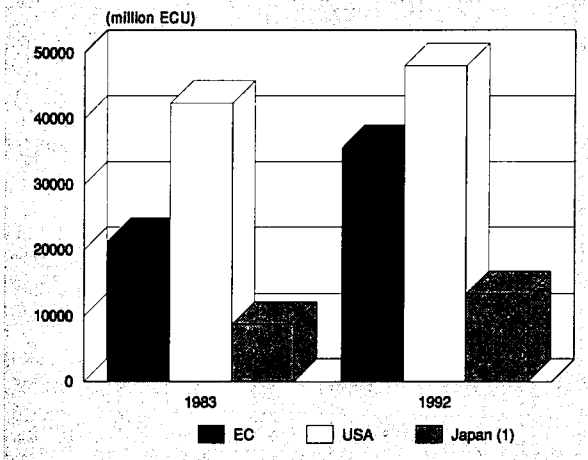
Depending on the country, 1992 was either a year of stagnation or a year of deep recession for the furniture manufacturers in Europe. Actually, if Denmark and Germany among others succeeded in maintaining their production at 1991 levels (the growth of turnover was just sufficient to offset price increases), furniture industries of countries such as France, Italy, the UK and some other countries continued to sink deep into recession, reaching negative, double-digit real growth rates. Only Portugal showed an important positive real growth rate. Generally, all national furniture markets are suffering from a weakened demand which affected the production of the domestic manufacturers as well as imports. While 1993 should confirm these trends, a slight recovery is expected for 1994.

Supply and competition

The deficit in the EC trade balance can be explained by the dependence of important subsectors on tropical hardwood (and on sawn timber), imports of plywood from South East Asia (especially from Indonesia), hardboard from South America (especially Brazil), and imports of wood products from the countries of central and Eastern Europe at extremely low prices.

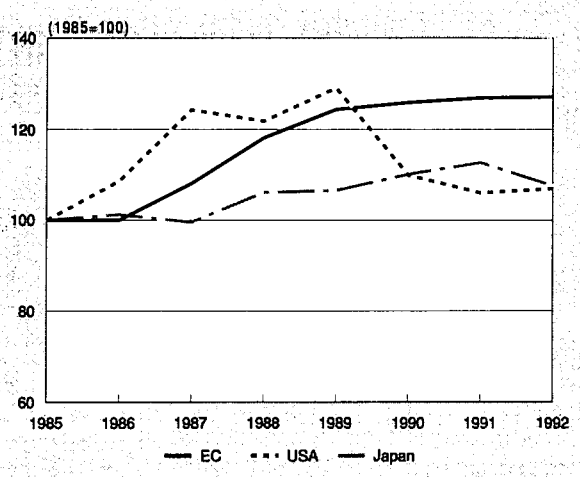
The political and economic developments in the countries of central and Eastern Europe will continue to have important implications since these countries have very large wood re-

Figure 4: Wood processing
International comparison of production in current prices



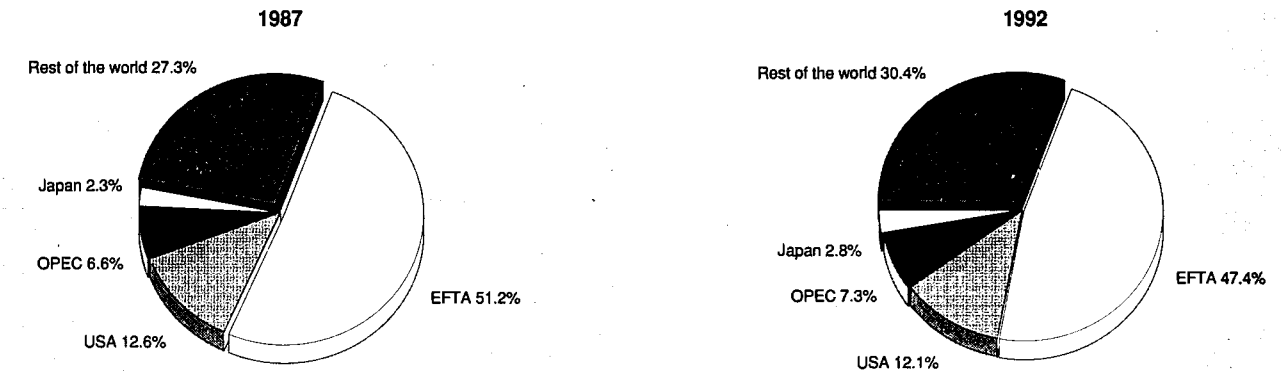
(1) 1983, excluding manufacture of articles of cork, straw and other plaiting, brushes and brooms.
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Wood processing
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Wood processing
Destination of EC exports



Source: Eurostat

serves and a very low wage labour force as compared to the EC-countries.

Although imports of raw materials like tropical hardwood are likely to continue, an improvement in the trade balance of the sector could be achieved depending on the EC's forestry policy. An increase in the domestic supply of wood could be achieved through the use of marginal land. As there are important surpluses of agricultural products within the EC, there is a tendency to convert agricultural land into forestry areas. This could possibly lead to an improvement of the trade balance of the EC woodworking industry and would also have a positive ecological impact.

Trade flows among Member States are more significant than extra-EC exports. This may partly be explained by the importance of transport costs which affect trade in wood and wood products. During the period 1988-1992, the value of intra-EC trade increased by a nominal average rate of 6.6% per year.

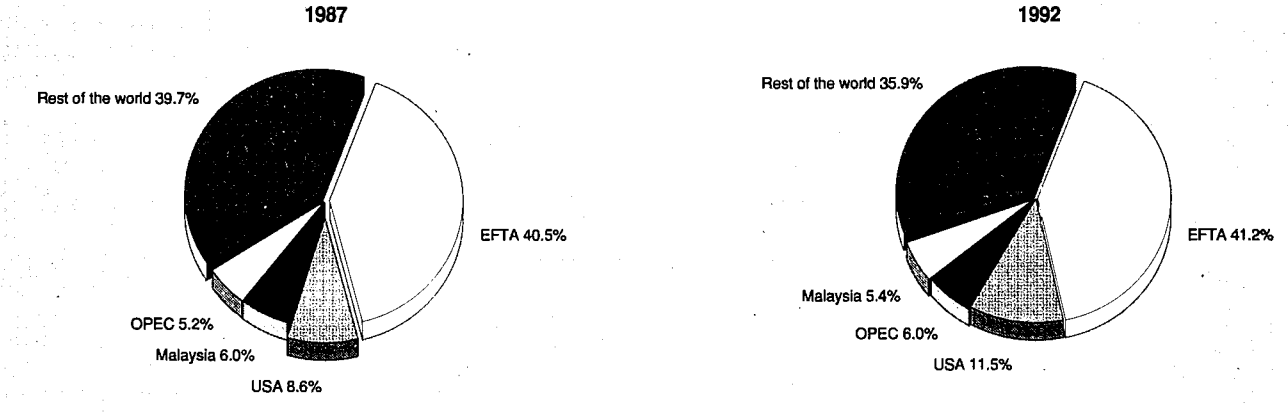
In the past, competition has been affected by a large number of technical barriers to trade between Member States (nationally oriented standards that have already been in existence for a long time, major differences in the procedures for technical approval, etc.). In light of the European integration, the sector will be influenced by the results of discussions on the short term implementation of European standards and technical reference documents. This technical integration is expected to result in increased trade between Member States. Thus, it is of crucial importance for the industry to follow up on the activities in the regulatory and technical fields. Within the European Committee for Standardisation (CEN), 7 technical committees were created to work out standards for products in the woodworking field: CEN/TC 33 for doors, windows, shutters and building hardware; CEN/TC 38 for durability of wood and derived products; CEN/TC 112 for wood based panels; CEN/TC 124 for timber structures; CEN/TC 175 for round and sawn timber; CEN/TC 207 for furniture; and CEN/TC 261 for packaging.

INDUSTRY STRUCTURE

Companies

The woodworking industry, including the manufacture of wooden furniture, has about 242 000 companies, 94.2% thereof being enterprises with less than 20 employees, representing 46% of employment and 34% of turnover. Companies

Figure 7: Wood processing
Origin of EC imports



Source: Eurostat

Table 5: Wood processing
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	22.4	22.1	22.6	24.1	25.6	27.1	27.0	27.3	27.8	28.6
Productivity index	99.0	97.7	100.0	106.5	113.1	119.6	119.1	120.5	122.6	126.4
Unit labour costs index (3)	88.9	94.1	100.0	103.7	107.9	114.6	121.6	130.4	140.2	149.4
Total unit costs index (4)	87.1	94.1	100.0	104.3	110.7	121.4	133.1	140.0	146.2	153.5

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

with more than 99 employees represent 0.6% of the enterprises but they realise 36% of turnover and account for 25% of total employment in the wood processing industry.

Strategies

Since woodworking started as an artisanal activity, the family structure of its SMEs is still very important. The industry enjoyed rapid growth between 1960 and 1974.

Like most sectors of European industry, the woodworking industry went through a major crisis during the second half of the 1970's until the beginning of the 1980's. Due to substantial investment efforts since 1983, the EC woodworking industry is heading for overcapacity problems in the beginning of the 1990's, despite achieving a balance in the late 1980's. This balance, in part, was due to a significant increase in the demand for products of the wood processing industry. In order to respond to this increased demand, the enterprises of the woodworking industry made substantial investments. Since new machines normally outperform older ones, new investments resulted in a rationalisation of the production process and an improvement of efficiency and productivity.

As demand slowed down in the beginning of the 1990's, investments were focused on the introduction of new products (e.g. oriented strand board, medium density fibreboard, etc.) and new production technologies.

In order to cope with extra-EC competition, many small and medium sized enterprises have adopted a strategy of diversification and specialisation.

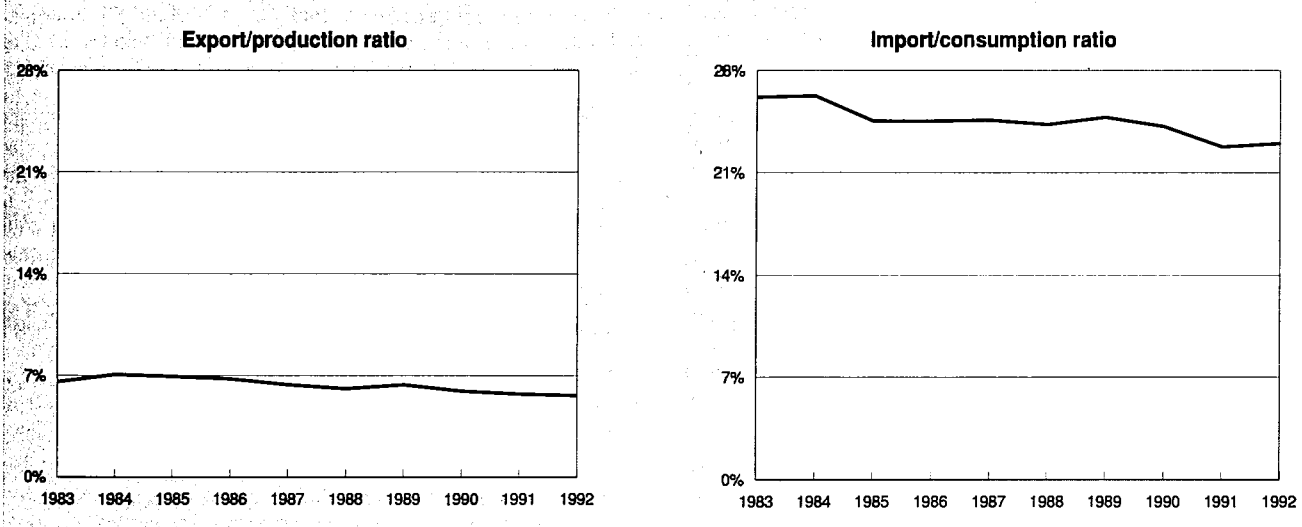
Skill shortages

Due to the very fast evolution in production techniques, the sector is experiencing increasing difficulties in finding properly trained staff. This implies that considerable attention will have to be paid to higher training standards in this field, as qualified executives are certainly needed, as well as skilled workers. In the context of the Eurofortech/EC-Comett programme, a training and education programme in the area of timber engineering and design has been worked out, known as STEP (Structural Timber Education Programme). STEP aims at organising more than 100 Euro-wide courses, seminars and workshops on the structural use of timber. STEP has a budget of almost 1.5 million ECU.

ENVIRONMENT

Wood is a renewable raw material. Its transformation into finished products requires a minimum of energy and, depending on the subsector, it results in minimal to no pollution to air, water or soil. Some discussions have, however, arisen on the use of tropical timber, the recycling and disposal of packaging waste and the tax related to CO_2-emission. This evolution is certainly not unique to this sector, but has to be seen in a much broader context.

Figure 8: Wood processing
Trade Intensities



Source: DEBA

Table 6: Wood processing
Breakdown by size of enterprise, 1990 (1)

number of employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	227 532	94.2	46.0	33.9
20-99	12 599	5.2	28.5	30.1
100 or more	1 532	0.6	25.5	36.0

(1) Estimates; includes the manufacture of wooden furniture (Nace 4670).
Source: Eurostat

The protection of tropical forest

The deforestation of the tropics is an alarming situation that gives rise to general concern. The most important reason for this deforestation is the circle of poverty, population pressure, over-indebtedness and economic underdevelopment that results in an increasing demand of land for farming, industrial purposes and infrastructure at the expense of forests.

Unqualified and destructive timber exploitation only accounts for a minor portion of the deforestation (approximately 6%). Nevertheless, it is an ecologically irresponsible action. In order to preserve the biological variety and protect endangered animal and plant species as well as to prevent erosion, it is necessary to turn large areas of forest into nature reserves where any kind of commercial exploitation is prohibited. The tropical forests must be protected, but adequate account has to be taken of their economic and social functions. This requires a land planning that designates protected forests, commercially exploited forests and areas for agricultural, industrial and infrastructure purposes.

Environmentally sound and sustainable forest management schemes can contribute, to a large extent, to the preservation of forests. The European woodworking industry fully supports the introduction of these schemes. Generalised bans and boycotts do not contribute to the preservation of tropical forests. On the contrary, they are likely to accelerate the deforestation of tropical areas due to the increase of poverty that would result from them. The International Tropical Timber Organisation's (ITTO) guidelines for sustainable forestry, which have been adopted by all producer and consumer countries, constitute the first internationally recognised criteria for an environmentally sound, sustainable forest management. It is essential to achieve the implementation of these guidelines before the target date 2000 agreed upon within ITTO.

The measures agreed upon in this context should be implemented in collaboration with competent environmental organisations. An important incentive for the realisation of sustainable forestry is the introduction of an attestation of origin. An attestation scheme can be established on a country basis or on a case by case basis. The interests of the wood producing countries of the Third World have to be considered appropriately when coordinating international measures for the protection of tropical forests. Even in the problem zone of the tropical forests, ecology and economy are not irreconcilable contrasts.

In the same context, some "green parties" even contest the use of wood from temperate forests! Although the European woodworking industry is in favour of a generalised labelling-scheme in which temperate forests have to be submitted to the same criteria of sustainability, there is no fear for deforestation in this area.

On the contrary, studies and EC-figures show that there has been an enormous increase in wood potential in the EC and in the EFTA countries. The data indicate that there is a potential increase of annual removal of 105 million m^3 in the EC alone in 1992. It should be clear that these enormous wood reserves are bringing the prices down very rapidly. This should be taken into consideration by the woodworking industry as well as national and international authorities. EFTA, the EC and its Member States should strengthen the market for wood products through promotional activities.

The tremendous potential is likely to increase even more when 16 million hectares of agricultural land within the EC will be available for alternate uses due to agricultural policies requiring a percentage of farmed land to be taken out of food crop production. A majority of this land is expected to be used for reforestation.

Recycling and disposal

During recent years, national as well as European authorities have begun to focus on packaging and packaging waste. Within the range of packaging materials, wood takes a specific place. As already stated, wood is a renewable raw material. Compared to other materials, wood needs a small amount of energy for processing and therefore helps to reduce the use of valuable energy resources.

Wood waste cannot be considered as real waste, since it can be and is used to manufacture other materials such as particleboard, fibreboard, laminated wood, etc. If this use of wood waste is not possible, it can also be used for energy production. Many woodworking companies heat their workplaces mainly with bark and wood waste from their operations. Modern firing installations have reached a very high technical standard and, from an environmental point of view, have to be regarded as being highly efficient.

Based on the arguments above, wood is a very suitable packaging material. It can be recycled to produce other materials or can be used to produce energy. Treated or coated wood packaging can be burned in suitable firing installations together with household wastes.

The woodworking industry continues to defend the re-use of timber packaging materials for energy production as one of the solutions for recycling.

CO_2 reduction policy

In the past, after considerable effort, the woodworking industries have managed to achieve quite good results in the reduction of energy consumption. This branch of industry is well aware of the necessity to reduce the emissions of CO_2 to protect the atmosphere. Therefore, it will aim at further CO_2 reductions and will support political concepts consistent with that purpose if they can be realised in an economic way and be combined with the necessary political measures.

Wood as a raw material should be promoted more extensively. This includes an increase of the forest area as this leads to an increased CO_2 absorption and helps to redress the balance against the disappearing of tropical rain forests.

Product promotion could include, for example, specific orders from public authorities for anti-noise barriers made from wood or wood based materials to be placed along roads and railway

tracks as part of a positive attitude towards the use of wood construction.

One should also remember that about 30% of the CO_2 emissions are caused by private households, mainly for heating purposes. It is therefore necessary to try to reduce energy consumption for the heating of houses. Wooden constructions, which account for a very low average energy consumption, could very well contribute to this.

Finally, one should point out the positive and expandable role of the thermal use of wood waste. This would restrict the use of other non-renewable energy sources, that are less "CO_2 friendly".

REGULATIONS

There are relatively few technical regulations in the woodworking industry, so one can state that the "single European market" is practically realised. The "construction products directive" and the related European standardisation activities certainly helped a lot in this respect. A similar effort is being made regarding the placement of biocidal products on the market (including wood preservatives), where an EC-directive is being prepared and should allow the removal of barriers to trade in this field. Finally, a lot of discussions are going on related to the "phyto-sanitary" field and plant protection.

The following items are of specific concern for the woodworking industries.

German "Gefahrstoffverordnung"

In 1986, Germany notified a "decree on dangerous substances", introducing, among other things, a requirement that wood based materials and furniture made thereof should not provoke a concentration of more than 0.1 parts per million (ppm) of formaldehyde in a "testing chamber". This gave rise to detailed opinions/observations from different Member States. Between 1986 and 1991 the subject remained under discussion.

On 12 February 1991, the German government notified its "Prüfverfahren für Holzwerkstoffe" (test methods for wood based panels) that these can be considered the implementing orders of the formaldehyde section in the "Gefahrstoffverordnung". Again six Member States and the EFTA Secretariat as well as the Commission itself introduced detailed opinions/observations.

In spite of this, a final decision on the implementing orders was taken when, at the end of October 1991, the German government published the test methods for wood based panels in the "Bundesgesundheitsblatt".

Compared to the initial proposal of the German authorities, some beneficial changes were introduced. The main request of industry, that the results of the "derived test methods" (such as perforator and gas analysis values) should be considered as equivalent to the tests in "large chambers", was met.

In principle, however, this industry remains opposed to this regulation and believes it requires a lot more clarification.

Regulations related to wood dust

In some countries, there are very stringent regulations on the exposure to wood dust on the workplace, due to its presumed risks for workers.

For the time being, wood dust does not appear on the EC-list of carcinogenic substances at work places, because no direct relationship between exposure to pure wood dust and certain types of cancers of the higher respiratory system have been proven. Research continues, however. The industry launched a research programme to be performed at the Cancer Research Centre in Heidelberg. The programme, which will be co-financed by the EC, will take approximately 3 years. It is expected to provide vital scientific evidence in the wood dust discussion.

German "Verpackungsverordnung"

The German "Verpackungsverordnung" (regulation on packaging waste) came into force on 1 August 1991. The main implications of this regulation are: from 1 December 1991, all transport packaging such as pallets and crates have to be taken back and recycled; from 1 April 1992, it must be possible for a consumer to return the "Umverpackungen", i.e. the packing material meant to avoid theft or used for publicity; from 1 January 1993 on, used sales packaging has to be taken back by commerce and industry to be recycled and there is an obligation for deposit on certain one way packing.

According to this "Töpfer-law", recycling is equivalent to "material recovery". This poses specific problems for wood material as "material recovery" is not always possible. The German law does not allow energy recovery.

As a consequence, recycling systems for wooden packaging in Germany had to be developed in a very short period of time. The "Grow" label is already used for vegetable and fruit crates. It still is difficult and costly to find industrial consumers of recycled wood.

As other countries, like France, already have a national law concerning packaging wastes or are developing one, the problem is also being dealt with on the European level. The actual version of the proposal for an European Directive does authorise energy recovery. This clearly is the best solution for certain wood wastes.

Volatile organic compounds

The Commission of the EC has developed a proposal for a Council Directive concerning the limitation of the emissions of VOCs from certain activities and industrial installations. The aim of this directive is to reduce the emissions of VOCs from certain industrial installations and processes. It is part of a strategy for an overall reduction of the emission of VOCs in the EC.

The proposal covers two activities of the woodworking sector, namely coating of wooden surfaces and wood impregnation. It is based on the principle that all enterprises, using more than two tonnes of organic solvents per year and with a nominal capacity of more than 10 kg per hour, should apply a strict management plan and emission limits for organic compounds. Those using more than 25 tonnes per year and with a nominal capacity of more than 25 kg per hour should apply even stricter emission limits.

It could therefore have important implications on a lot of SMEs in the subsectors of the woodworking industries, such as furniture, joinery, parqueting, etc. Actually, the discussions on this subject continue.

Import arrangements concerning the countries of central and Eastern Europe

In December 1991, interim or European agreements were signed between the EC and Poland, Hungary and the former Czechoslovakia. These interim agreements stipulate that certain products originating in these countries may benefit from a suspension of customs duties on imports into the EC within the limits of annual tariff quotas or ceilings. They further stipulate that the volumes or values of the tariff quotas or ceilings shall be increased progressively to arrive at a complete abolition of customs duties on imports by the end of the twentieth century.

An interim agreement has also been signed with Romania, so that import arrangements for certain industrial products have been worked out for this country as well. The agreement aims at creating a free trade area with Romania within ten years.

For most of the products of the woodworking industry, duties on imports into the EC originating from the above mentioned countries have beeп abolished. However, there still exist some quotas or ceilings for products such as particleboard, fibreboard, plywood, windows, doors, parquet panels, shuttering, etc.

The republics of the former Soviet Union have been included in the 1993 EC Generalised System of Preferences (GSP). In this context, fixed duty-free amounts are applicable to imports into the EC of some products, such as fibreboard and plywood.

OUTLOOK

Average real annual growth for the period 1993-97 is estimated at 1.9% for consumption and 1.8% for production. This picture is strongly influenced by the sectors of semi-finished wood products and the wooden building components. Extra-EC exports are expected to decrease by 0.3% annually until 1997.

The increasingly stringent requirements with respect to health and environment will increase the costs of the industry. Furthermore, the industry is facing increasing social and environmental dumping, especially from countries of central and Eastern Europe. The implementation of European standards, however, will have a beneficial impact on trade between Member States. The agreement signed in May 1992 between the EC and EFTA substantially increases the market potential by creating a European Economic Area of 400 million consumers.

Table 7: Wood processing
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.5	1.9
Production	1.5	1.8
Extra-EC exports	0.2	-0.3

Source: Cei-Bois

Written by: Cei-Bois
The industry is represented at the EC level by: European Confederation of Woodworking Industries (Cei-Bois). Address: rue Royale 109-111, B-1000 Brussels; tel: (32 2) 217 6365; fax: (32 2) 217 5904.

Sawing and first processing of wood
NACE 461

Though half of EC consumption of sawn, planed and dried timber is met by imports, the restructuring of the industry that took place in the early 1980's had a favourable impact on EC production, and could even lead to a decrease in extra-EC imports in the 1990's. Structural changes have taken the form of increased vertical integration and/or the merging of small production units. The average annual real growth rate for the period 1993 to 1997 is estimated at 0.6% for consumption and 1.1% for production.

INDUSTRY PROFILE

Description of the sector

The first stage in the processing of wood falls under NACE code 461. The companies engaged in the following activities are grouped into this code:

- saw milling,
- planing of wood and
- drying and seasoning of wood.

Recent trends

The further improvement of the trade balance in 1992, for the second consecutive year, is explained by a slight reduction in consumption (-0.3%) while production stagnated.

Production in 1992 amounted to 5.8 billion ECU and represents 16% of total production of the wood industry.

Sawing and the first processing of wood had a value added of 1.8 billion ECU in 1992. This is more than the European leather articles industry and represents 13% of the value added of the European consumer electronics industry. Sawing and the first processing of wood represents about 15% of the value added of the wood processing sector (12.1 billion ECU).

In 1992, the most important producers in the EC were Germany (representing about 27% of value added), Spain (representing 21% of value added) and the United Kingdom (accounting for about 20% of value added).

Employment in 1992 decreased by 4% to 72 000 people, reaching its lowest level in ten years. Employment in the sector represents 17% of total employment in the wood industry.

Apparent consumption, after a constant rise from 1986 to 1990, decreased in the beginning of the 1990's and stagnated in 1992. Production rose sharply in 1988 (17%). Afterwards, production growth slowed down considerably. The beginning of the 1990's correspond to a deceleration or stagnation in economic activity.

Production in constant prices increased by 27.8% compared to 1985, outperforming the manufacturing industry average (20.3%).

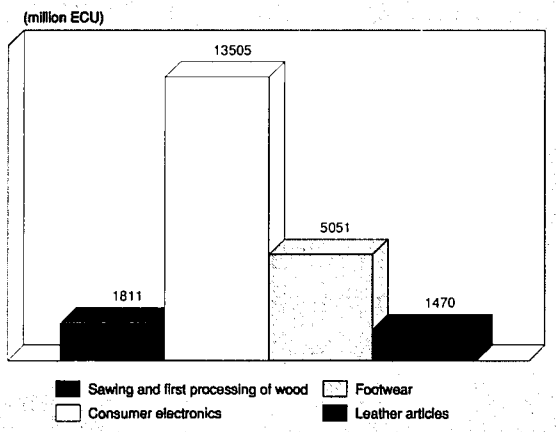
Foreign trade

The negative picture of the trade balance is reflected in the very low extra-EC exports/extra-EC imports ratio averaging 5% for the last decade. The share of intra-EC trade in total imports remains low, averaging 13% in the 1980s, but slightly increased in the beginning of the 1990s to 14%.

The import penetration rate declined by about 7% in the period 1983-92, reaching 50.6% in 1992. Although the import penetration rate remains very high, European producers have been successful in substituting extra-EC imports since 1984.

In 1992, extra-EC imports mainly came from the EFTA countries (49%) and the USA (11%). Extra-EC exports are mainly destined for the EFTA countries (66%).

Figure 1: Sawing and first processing of wood Value added in comparison with other industries, 1992



Source: DEBA

MARKET FORCES

Demand

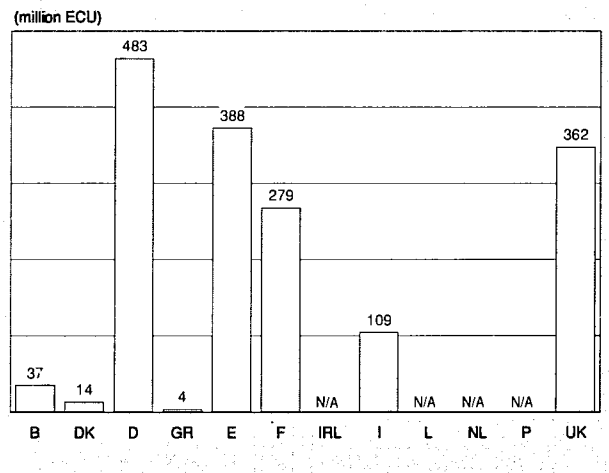
Only 5% of EC production is exported while 8% of EC production is directed to the final consumer. The large majority of EC production goes to industry, more specifically to the pallets, carpentry and furniture industries. This situation is not expected to change in the near future.

New products are emerging based on new techniques, such as gluing, in order to increase value added. There is an important automation process taking place in the large sawmills, more specifically in the softwood sector.

Supply and competition

The EC saw milling market has been hurt by massive imports coming mainly from Sweden and Finland. The devaluation

Figure 2: Sawing and first processing of wood Value added by Member State, 1992



Source: DEBA

Table 1: Sawing and first processing of wood
Main indicators at current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	8 453	8 771	8 436	8 408	9 438	10 626	11 799	12 252	11 345	11 313	11 200
Production	3 771	3 878	4 025	3 960	4 482	5 253	5 597	5 970	5 841	5 846	5 830
Extra-EC exports	194.5	233.5	245.9	261.4	270.9	275.5	301.5	302.9	281.4	259.2	240.0
Trade balance	-4 681.5	-4 893.1	-4 411.3	-4 448.0	-4 956.5	-5 373.0	-6 201.6	-6 282.0	-5 504.1	-5 466.4	-5 400.0
Employment (thousands)	81.7	78.7	77.6	74.4	75.7	79.8	77.8	77.4	75.4	72.3	70.7

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Cel-Bois estimates.
Source: DEBA

Table 2: Sawing and first processing of wood
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	2.5	-0.8	1.0
Production	3.9	0.2	2.2
Extra-EC exports	4.1	-5.5	-0.3
Extra-EC imports	1.4	-2.0	-0.1

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Sawing and first processing of wood
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	194.5	233.5	245.9	261.4	270.9	275.5	301.5	302.9	281.4	259.2
Extra-EC imports	4 876.0	5 126.6	4 657.2	4 709.4	5 227.4	5 648.5	6 503.1	6 584.9	5 785.5	5 725.6
Trade balance	-4 681.5	-4 893.1	-4 411.3	-4 448.0	-4 956.5	-5 373.0	-6 201.6	-6 282.0	-5 504.1	-5 466.4
Ratio exports/imports	0.04	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05
Terms of trade index	100.1	93.5	100.0	113.1	114.9	107.6	103.8	104.5	107.9	115.8
Intra-EC trade	536.4	666.0	699.8	725.7	756.6	823.0	919.3	997.4	934.8	951.5
Share of total imports (%)	9.9	11.5	13.1	13.4	12.6	12.7	12.4	13.2	13.9	14.3

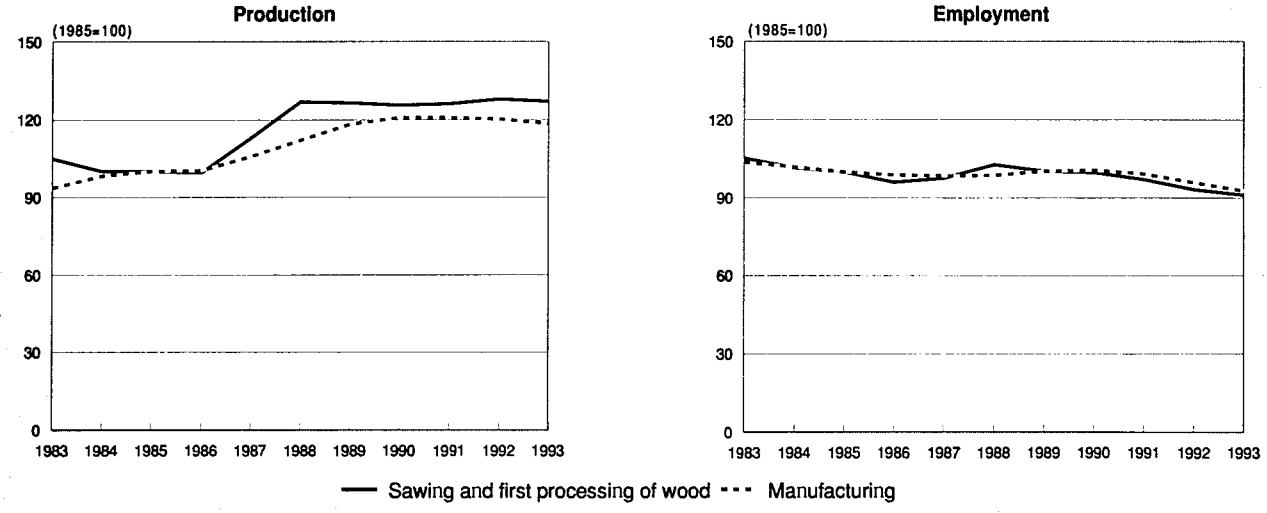
Source: DEBA

Table 4: Sawing and first processing of wood
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	19.8	18.5	19.4	20.1	22.2	24.1	22.8	22.3	23.2	25.0
Productivity index	102.1	95.4	100.0	103.3	114.4	124.3	117.4	114.6	119.5	128.9
Unit labour costs index (3)	88.4	94.1	100.0	100.0	104.8	112.7	120.4	127.2	138.4	146.3
Total unit costs index (4)	90.3	97.1	100.0	103.3	113.6	125.3	139.6	148.4	149.8	158.3

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Sawing and first processing of wood
Production in constant prices and employment compared to EC manufacturing



1993 are Cei-Bois and Eurostat estimates.
Source: DEBA

of the currencies of these countries led to a huge increase of exports to the Community. This created high tensions on the European market while domestic production in most of the importing countries dropped by approximately 15 to 25%.

There are also serious problems in the pallets industry where very cheap products are entering the EC market, coming from Central and Eastern European countries, but from mainly Poland.

INDUSTRY STRUCTURE

Companies

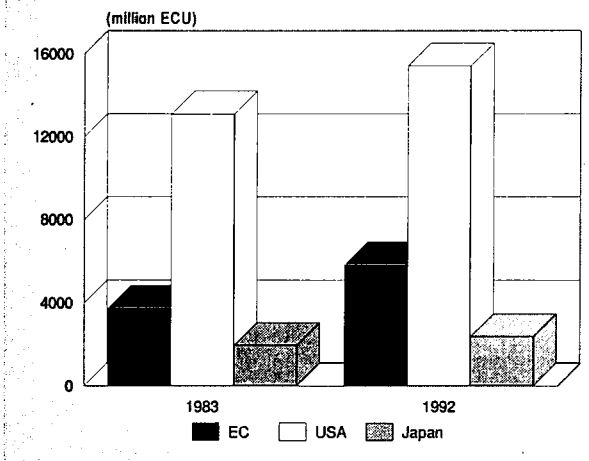
Some 3 700 enterprises, employing more than 20 persons each, operate in the first processing of wood in the EC. Altogether, about 72 000 persons were working in this sector in 1992. The sector is dominated by small and medium sized enterprises so that total employment is likely to be considerably larger than the official figures.

Strategies

The investments that took place in the course of the 1980's contributed to the reorganisation of the industry, a necessity caused by the strong competition from non-EC producers. There were three main types of structural changes: the closure of non-profitable enterprises, the merging of small production units, and an increased tendency towards vertical integration. Moreover, there is a growing need for highly qualified personnel.

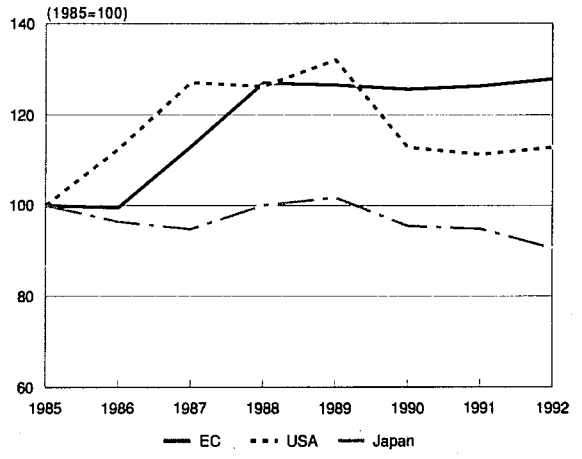
Investments focused on plant modernisation and existing projects. Investments are principally taking place inside the EC. There is a tendency for large companies to disinvest, mainly because of cash problems. Furthermore, there are a lot of mergers and acquisitions taking place in the sector.

Figure 4: Sawing and first processing of wood
International comparison of production in current prices



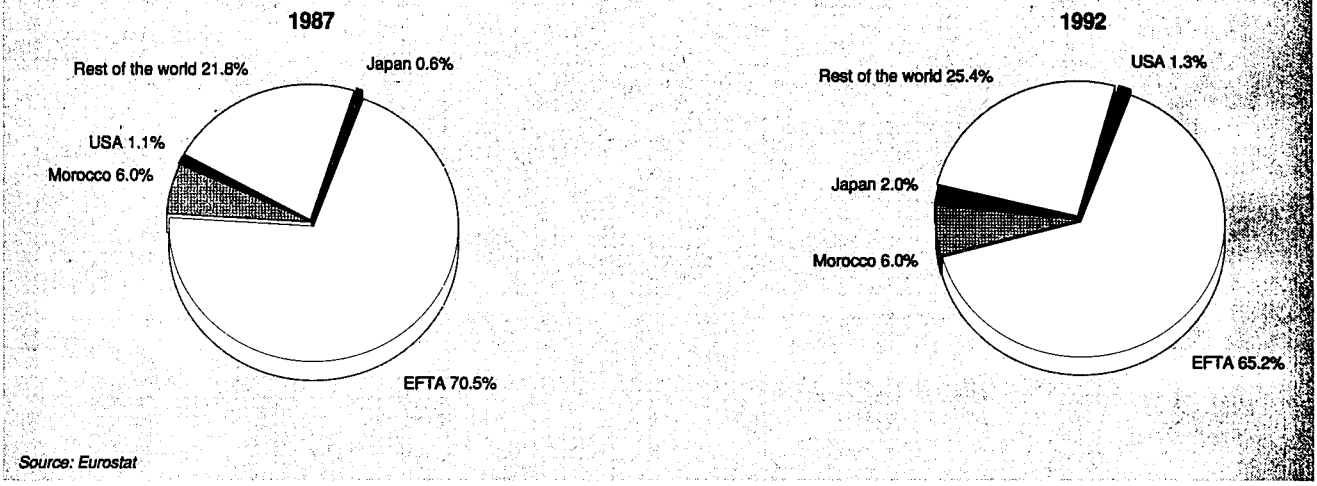
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Sawing and first processing of wood
International comparison of production in constant prices



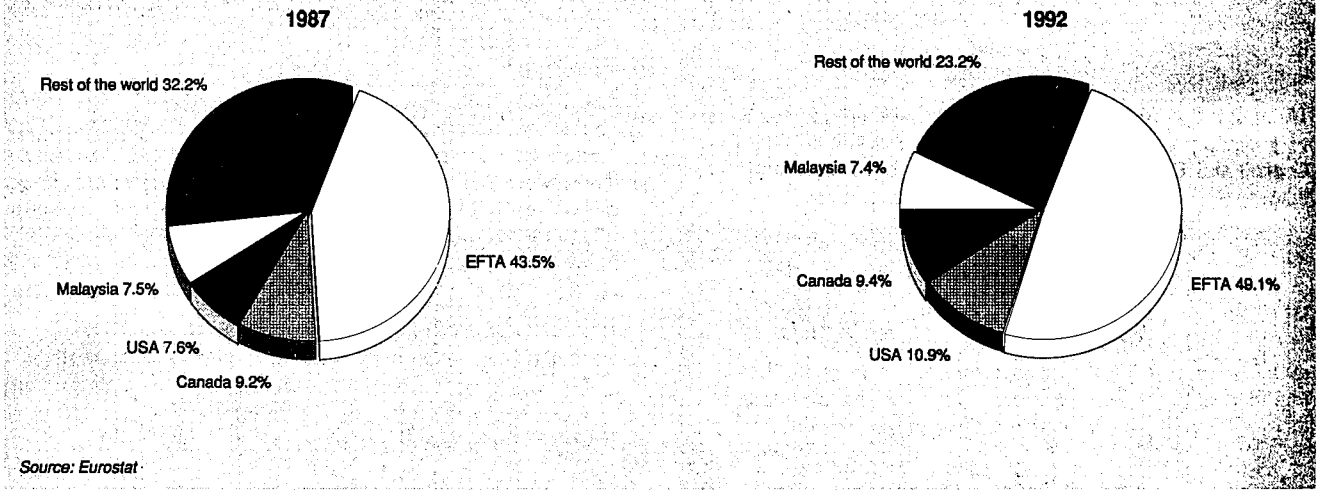
Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Sawing and first processing of wood
Destination of EC exports



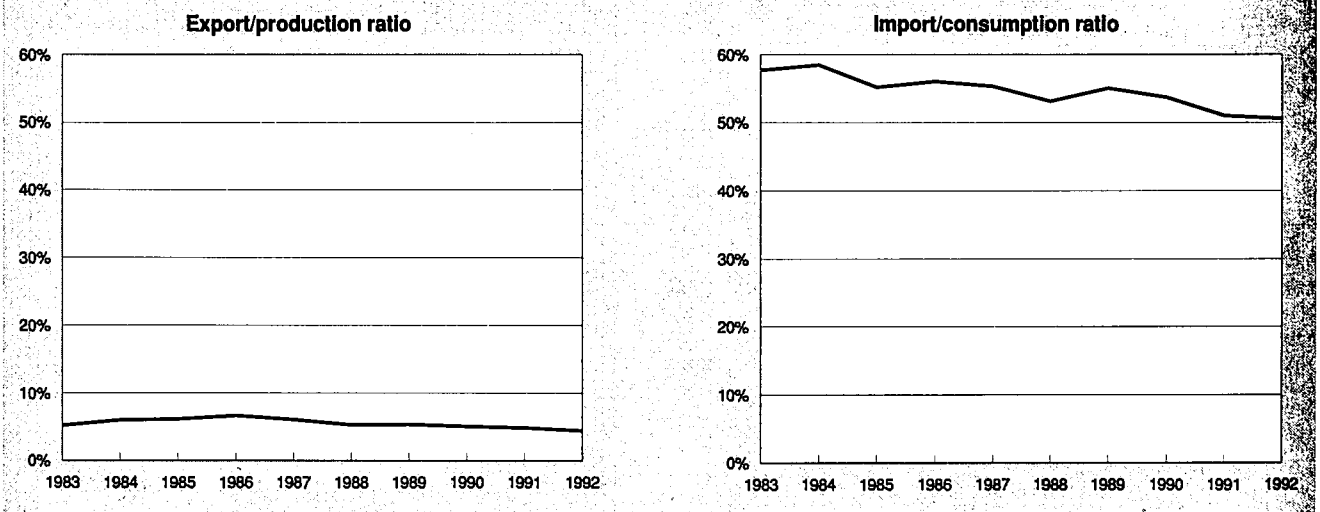
Source: Eurostat

Figure 7: Sawing and first processing of wood
Origin of EC imports



Source: Eurostat

Figure 8: Sawing and first processing of wood
Trade intensities



Source: DEBA

The main strategy for the enterprises of the first processing of wood is to produce goods with a higher value added. They tend to become subcontractors for the second processing, instead of remaining simple raw material suppliers. By producing more custom-made goods for the second processing of wood, the EC enterprises can improve their competitiveness vis-à-vis extra-EC competitors.

Due to their geographical proximity, the enterprises of the first processing of wood can also respond in a more flexible way to the needs of enterprises of the second processing of wood (e.g. just-in-time delivery).

OUTLOOK

Consumption which stagnated in 1992 (-0.3% compared to 1991) is expected to increase slightly in 1994. For the period 1993-1997, a real annual growth rate of 0.6% is expected. Production, which also stagnated in 1992 (in current prices), is expected to increase in the period 1993-97 by a real average growth rate of 1.1% per year. This means that EC production will continue to substitute for extra-EC imports. Extra-EC exports are expected to decrease by an estimated annual rate of 3.8% in the period 1993-97 as attention will be focused on the EC market.

Table 5: Sawing and first processing of wood
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.5	0.6
Production	1.0	1.1
Extra-EC exports	-2.1	-3.8

Source: Cei-Bois

Written by: Cei-Bois
The industry is represented at the EC level by: European Confederation of Woodworking Industries (Cei-Bois). Address: rue Royale 109-111, B-1000 Brussels; tel: (32 2) 217 6365; fax: (32 2) 217 5904.

Semi-finished wood products
NACE 462

The manufacture of semi-finished wood products is the second largest woodworking sector, representing 23% of the total value of production of wood. Approximately 1 600 firms are involved in the manufacture of semi-finished wood products, employing about 67 000 people. The average annual growth rate for the period 1993 to 1997 is estimated at 1.8% for consumption and 2.2% for production.

INDUSTRY PROFILE

Description of the sector

This group mainly covers wooden board material (particleboard, fibreboard and plywood), which is in turn used as an intermediate product in either the furniture or construction industries (the 'industry' circuit), or as a finished product (the 'do-it-yourself' circuit). Besides raw boards, there are also surface improved panels (boards covered with veneer, PVC or melamine resin impregnated paper).

NACE 462 also includes enterprises who deal with the impregnation of wood with chemical preservatives.

Recent trends

Apparent consumption in current prices amounted to 9.7 billion ECU in 1992, approximately the same level as in 1991. Of the total value of consumption of raw wooden board material, particleboard represents 45%, fibreboard 32% and plywood an estimated 23%. In volume, consumption of particleboard accounts for 71% of total consumption of wood based panels.

Production of semi-finished wood products represents 23% of total production of the wood industry. Particleboard production in volume represents about 80% of the wood based panels industry in the EC.

The sector of the semi-finished wood products employed about 67 000 people in 1992, representing 16% of total employment in the wood processing industry.

In 1992, semi-finished wood products reached a value added of approximately 2.5 billion ECU, representing 18% of the EC consumer electronics industry. Germany is the most important producer, accounting for 34% of total value added.

Apparent consumption increased constantly since 1983, except in 1986. In 1992, consumption was 28% higher than in 1987. Production has followed the same pattern, as have extra-EC exports (except for 1990 to 1992 when there was a slight decrease in exports). Production in constant prices increased by 26.3% as compared to 1985, showing a better performance than the manufacturing industry average (+20.3%). Employment, however, decreased from 1983 to 1986 and stabilised afterwards at a level of about 68 000 people.

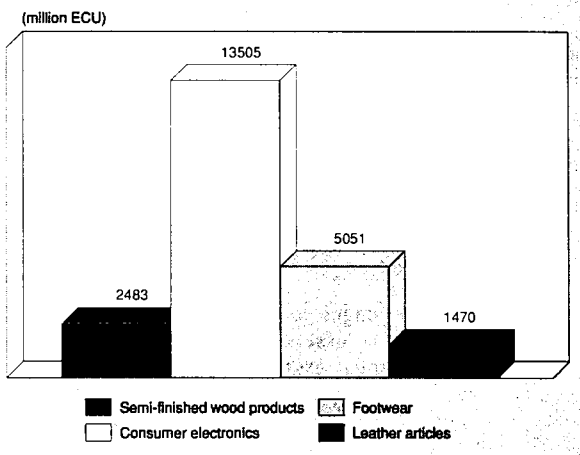
Foreign trade

The trade balance, after constant deterioration since 1982, improved in 1991. In 1992, there was again a slight deterioration explained by a small reduction in production (-0.4%) and higher extra-EC imports (+1.3%). The negative trade balance is mainly due to massive imports of plywood. The share of intra-EC trade in total imports reached 45% in 1992, showing an increasing trend during the past ten years.

The ratio of extra-EC exports/extra-EC imports remained stable during the past several years, exports representing about 23% of imports. The import penetration rate also remained stable during the same period at about 21-22%.

The EFTA countries are the major trading partners for the subsector of the semi-finished wood products, representing 54% of EC exports and 35% of EC imports in 1992.

Figure 1: Semi-finished wood products Value added in comparison with other industries, 1992



Source: DEBA

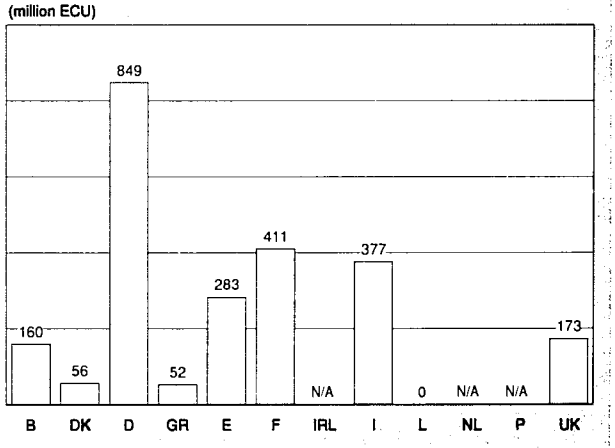
MARKET FORCES

Demand

The important gap in the particleboard market between production capacity and demand has made it very difficult for manufacturers to recover the heavy investment costs. Chipboard production is almost fully automated and the investment threshold, especially for the continuous lines, is high. Important modernisation and concentration took place during recent years and the industry has reached a very high level of technology and efficiency. This ensures that the industry can match high quality standards in the near future.

The trend in buyer's preferences has been to replace solid wood, tropical wood, plastics and other wood based panels by MDF (medium density fibreboard), especially for furniture manufacturing. MDF acts as a good substitute material for more expensive types of solid wood. Thin MDF is a strong

Figure 2: Semi-finished wood products Value added by Member State, 1992



Source: DEBA

Table 1: Semi-finished wood products
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	6 277	6 829	7 056	7 020	7 576	8 453	9 129	9 585	9 724	9 717	9 510
Production	5 145	5 636	5 901	5 813	6 305	6 970	7 621	7 950	8 161	8 128	8 070
Extra-EC exports	281.6	333.0	363.2	376.4	399.7	414.6	480.6	474.3	468.1	467.5	500.0
Trade balance	-1 132.0	-1 193.1	-1 155.1	-1 207.0	-1 271.0	-1 482.4	-1 507.3	-1 634.7	-1 562.5	-1 589.0	-1 400.0
Employment (thousands)	76.5	75.7	71.9	65.9	66.8	66.7	68.0	69.4	69.0	66.6	66.1

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Cel-Bois estimates.
Source: DEBA

Table 2: Semi-finished wood products
Breakdown by sector, 1992

(thousand cubic metres)	Apparent consumption	Production	Extra-EC exports (1)
Particle-board	21 000	19 300	4 000
Fibre-board - hardboard	1 580	1 260	430
Fibre-board - MDF	2 030	2 240	230
Plywood	4 950	1 600	127

(1) Total exports for particle-board and fibre-board (hardboard).
Source: Cel-Bois

Table 3: Semi-finished wood products
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	4.3	2.2	3.3
Production	4.1	2.7	3.5
Extra-EC exports	4.5	1.1	3.0
Extra-EC imports	5.0	0.0	2.7

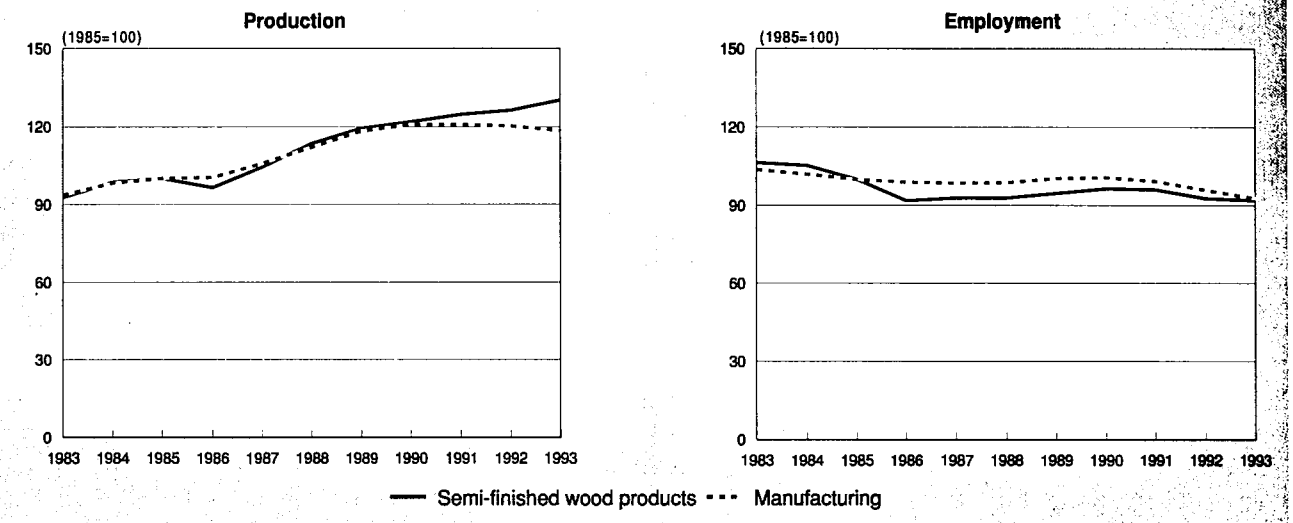
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Semi-finished wood products
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	281.6	333.0	363.2	376.4	399.7	414.6	480.6	474.3	468.1	467.5
Extra-EC imports	1 414	1 526	1 518	1 583	1 671	1 897	1 988	2 109	2 031	2 057
Trade balance	-1 132	-1 193	-1 155	-1 207	-1 271	-1 482	-1 507	-1 635	-1 562	-1 589
Ratio exports/imports	0.20	0.22	0.24	0.24	0.24	0.22	0.24	0.22	0.23	0.23
Terms of trade index	97.3	97.9	100.0	109.8	109.3	109.1	105.2	111.5	107.7	108.4
Intra-EC trade	972.0	1 065.6	1 153.5	1 224.6	1 304.8	1 466.7	1 632.1	1 682.4	1 733.6	1 709.3
Share of total imports (%)	40.7	41.1	43.2	43.6	43.9	43.6	45.1	44.4	46.1	45.4

Source: DEBA

Figure 3: Semi-finished wood products
Production in constant prices and employment compared to EC manufacturing



1993 are Cei-Bois and Eurostat estimates.
Source: DEBA

competitor and a potential substitution product for thin plywood and hardboard. As thin plywood is mainly produced in Indonesia, European competition is not affected by it.

The development of new applications will continue to gather momentum and, hence, influence demand. The range of speciality boards is being extended constantly. Specialities like moisture resistant boards, fire retarding panels, bendable, lacquered, printed and melamine faced boards have joined other specialities like very thin as well as very thick boards.

Apart from the traditional customer branches of MDF, (i.e. the furniture industry, the production of furniture parts and the production of profiles and skirtings), MDF becomes more and more attractive for interior design, exhibition stands, the production of window frames and door skins, the manufacture of TV and radio cabinets and for architects and designers.

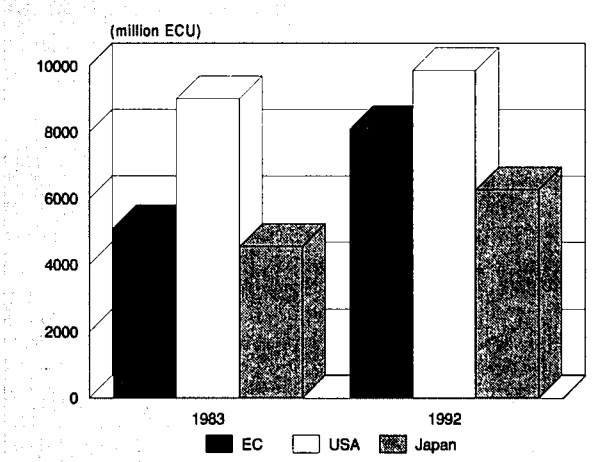
For plywood, one of the tendencies relating to the world market is the reinforcement of export limitations of wood due to international environmental pressures (such as the reduction of trade in logs in Malaysia, the limitation of log exports from the USA, etc.).

Oriented Strand Board (OSB) is a relatively recent type of wooden board material, at least in Europe. It is mainly used in the construction industry because of its mechanical properties. OSB is also a substitution product for plywood.

Supply and competition

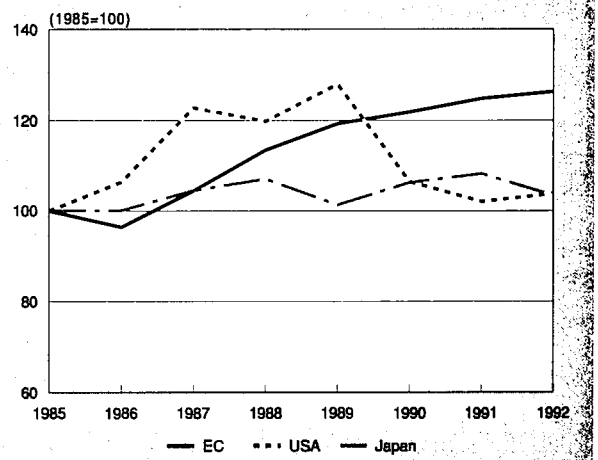
Overcapacity puts supplementary pressure on the market and leads, in many cases, to increased risks of mill failures. The EC industry has signalled its willingness to maintain its competitiveness. The necessary condition, however, is that extra-EC competitors respect the prevailing rules for international trade and competition. Large imports into the EC at very low prices, from East European countries and countries benefiting from the Generalised System of Preferences (GSP), are a real threat for the industry. The completion of the single European market will be very difficult for the industry if imports from East European countries are not controlled fairly, especially

Figure 4: Semi-finished wood products
International comparison of production in current prices



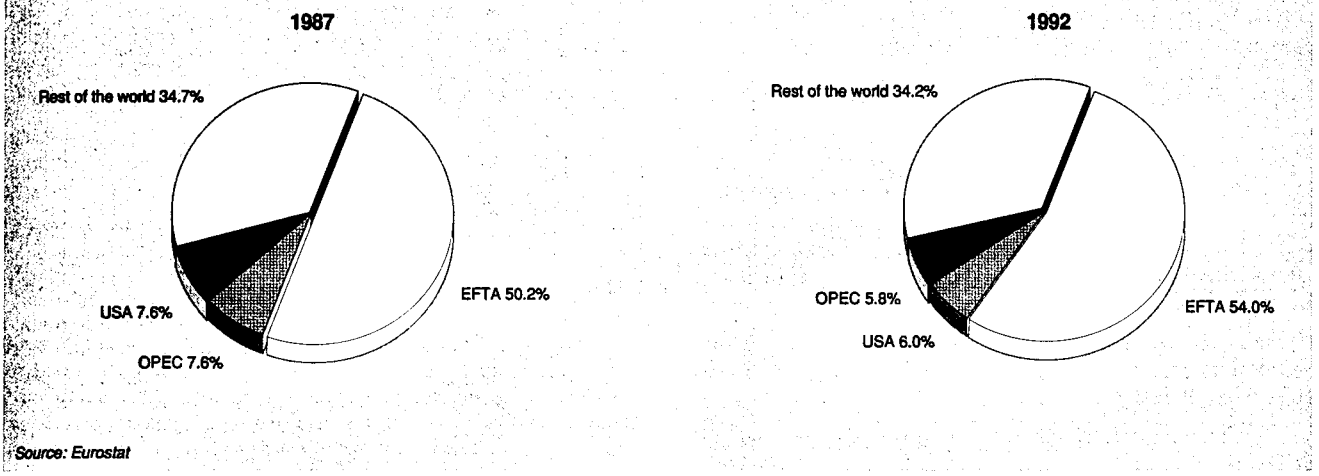
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Semi-finished wood products
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Semi-finished wood products
Destination of EC exports



Source: Eurostat

in the light of the European or interim agreements signed with these countries aiming at a complete abolition of customs duties on imports by the end of the twentieth century.

Pressure from foreign competition also results from exchange rate variations as well as less environmental friendly log harvesting methods. Pressure by foreign competition is also the result of low labour costs, better availability of raw materials and trade practices and policies, such as dumping from countries of Central and Eastern Europe and the GSP countries or the United States' request in the context of GATT to reduce import duties on wood to 0%. Technological advantages are not considered as a factor affecting competition in EC and extra-EC markets.

The deficit in the EC trade balance for semi-finished wood products is the consequence of large inexpensive wood reserves outside the EC (North America, Scandinavia and Eastern Europe) and the huge import of plywood from North America and South East Asia as well as hardboard from South America and Eastern Europe. For the plywood sector, the most important competitive advantage of the EC plywood manufacturers over the large single-product manufacturers in the USA and Indonesia is that European industry is specialised in the manufacture of small series of special, custom-made goods from very different types of wood.

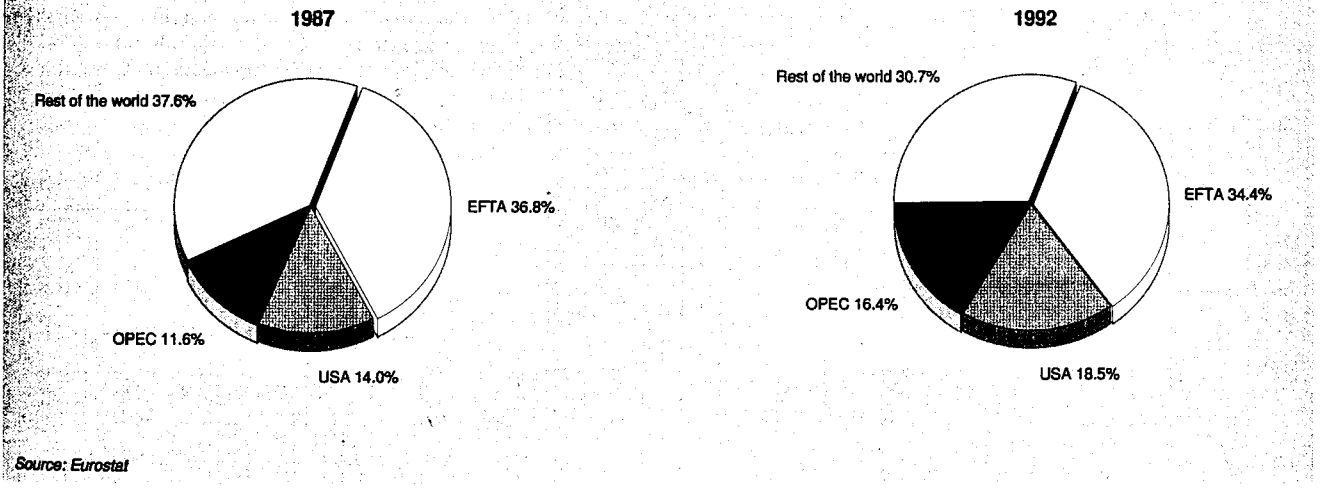
For particleboard and MDF, competition is mainly taking place within the EC. For plywood and hardboard, there is a strong competition from outside the EC.

In the fibreboard sector, the number of companies switching from the so-called wet to the dry process is expected to increase further due to strict regulations regarding environmental protection. Currently, replacement investments required to meet these regulations automatically result in an expansion of capacity that contributes to overcapacity on the European market. This situation is aggravated by strong pressure from imports from Central and Eastern Europe and the persisting weak demand in the construction activity in most of the EC and EFTA countries.

Competition is also distorted by the fact that producers in Eastern Europe can continue to use the wet process because of a lack of environmental regulations, whereas producers in the EC are forced to switch to the more ecological, but also more expensive dry process.

OSB is mainly produced in the United Kingdom and France and the product has reached a high standard of acceptability

Figure 7: Semi-finished wood products
Origin of EC imports



Source: Eurostat

Table 5: Semi-finished wood products
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	22.9	24.9	25.2	28.4	30.7	32.9	33.4	34.7	35.4
Productivity index	90.9	98.7	100.0	112.7	121.7	130.6	132.4	137.4	140.5
Unit labour costs index (3)	84.7	93.0	100.0	103.7	108.8	115.7	121.5	131.5	140.8
Total unit costs index (4)	82.0	90.1	100.0	103.7	111.0	122.2	131.1	134.1	139.0

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

in these and several other European countries. During this decade it is expected to become a major product in the European panel industry.

The completion of the single European market offers a lot of opportunities to the sector, as normally all barriers to trade will be removed. The creation of a European economic space could also contribute to the development of a flourishing market. Furthermore, economic reforms in the countries of Central and Eastern Europe offer some good prospects for increased trade with the industrialised countries.

INDUSTRY STRUCTURE

Companies

According to estimates, about 1 600 firms are involved in the manufacture of semi-finished wood products. The particleboard industry consists of approximately 120 companies, employing 20 000 people. Total employment in the industry is about 68 000 persons, which means that the average number of employees per firm is about 40. This is relatively high compared to other subsectors of the woodworking industry.

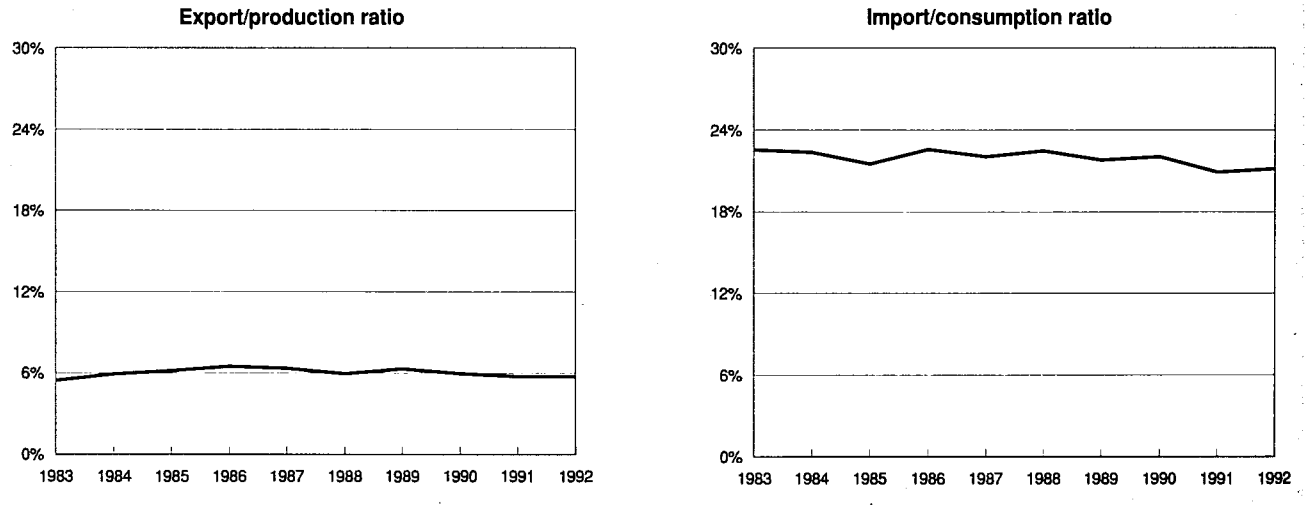
Strategies

The chipboard industry is a capital-intensive sector. Production is virtually fully automated, requiring huge research and development efforts; the investment threshold, especially for the continuous production lines, is high. These circumstances imply that an average chipboard firm exceeds the small to medium size enterprise (SME) dimension of the sector and that the added value in the case of this activity is lower than in the rest of the woodworking industry where the high percentage of labour costs raises the value added. In recent years, the sector has gone through a major restructuring and an apparent concentration has taken place. Large competitors have begun to expand their market share by investing in larger plants and by investing across Europe.

In the fibreboard sector, investments are focused on the development of new products, the modernisation of existing products, the increase of capacity and the switching to eco-friendly production methods (as converting from the wet process in the hardboard industry to the dry process in the MDF industry). In order to reduce overcapacity, diversification of products is taking place aiming at the development of structural boards, for example. As far as firm structures are concerned, there are several new joint investments by board manufacturers concerning MDF, but there are as yet no major changes in hardboard.

Until recently, the plywood sector was rather labour-intensive. Technological development and computer applications in production control and the operation of machinery have, however, lowered production costs to a great extent, and have at the same time enabled a substantial reduction in the percentage of wood waste. The sector is still highly suited to product

Figure 8: Semi-finished wood products
Trade intensities



Source: DEBA

diversification (with a greater utilisation of European wood species), especially when production methods allow the manufacture of small series of special, custom-made goods. The nature of investments, carried out by the European companies themselves, is to modernise and to find new product developments.

REGULATIONS

The common external tariff on imports coming from outside the EC is the same for particleboard, fibreboard and plywood, and has been maintained for some time now at 10%.

The interim, or European, agreements signed between the EC and Hungary, Poland, the former Czechoslovakia and Romania changed the regulations formerly applicable to these countries.

Customs duties on imports applicable in the EC to particleboard and plywood coming from Poland, Hungary, the former Czechoslovakia and Romania were abolished since the European agreements became effective. Fibreboard from Hungary, Poland, the former Czechoslovakia and Romania will benefit from the suspension of customs duties on imports within the limits of annual EC tariff quotas or ceilings amounting to 5.6 million ECU for fibreboard from Poland and the former Czechoslovakia, 6.3 million ECU for fibreboard originating in Romania and 9.1 million ECU for fibreboard from Hungary.

As far as the republics of the former Soviet Union are concerned, since their inclusion in the 1993 EC GSP, a fixed duty-free quota of 4.2 million ECU applies on imports of fibreboard into the EC originating in Russia, Ukraine and Belarus. As far as plywood is concerned, there is a fixed duty-free quota of 90 300 m^3 for plywood from Russia, Ukraine and Belarus.

Annual import quotas on imports of particleboard and plywood originating in the Republics of Croatia, Slovenia, Bosnia-Herzegovina and Macedonia have been fixed for 1993. The annual ceiling for particleboard is 41 523 tonnes, while for plywood, the annual ceiling reaches 161 162 m^3. As soon as these ceilings have been reached, the levying of a customs tariff of 10% may be reintroduced by the Commission, by means of a regulation.

OUTLOOK

Consumption as well as production of semi-finished wood products is expected to grow in the coming years. The average growth rate for the period 1993 to 1997 is estimated at 1.8% for consumption and 2.2% for production. Extra-EC exports are expected to grow by 1% annually from 1993-1997.

In the particleboard industry, it seems that the countries of Northern Europe will see a slow recovery in 1993 after many years of recession. Countries in Central Europe suffered badly from the downturn of the German economy. Their recovery will, among other factors, depend on western world support to Russia and the other East European countries to help them to rebuild their economies. The industry in the countries of Southern Europe is heading for a period of restructuring which has already started in some countries. All these developments will take some time to materialise. Therefore, one should not expect any significant recovery before 1994.

In the fibreboard sector, the MDF industry represents a European production capacity of more than 4 million m^3. Compared to particleboard (30.7 million m^3) and sawn timber (68 million m^3), the share of MDF in the market of wood and wood products still appears quite moderate. The relative success of MDF compared with the stagnation of the traditional woodworking sectors can be attributed to the innovative power of the industry making efforts to upgrade its products to meet specific requirements for special applications which are increasingly in demand. The European MDF industry will, furthermore, increasingly open up export markets for its products outside the EC and EFTA for special MDF boards.

The sector of semi-finished wood products is facing a number of risks, including the additional costs associated with the increasingly stringent health and environmental requirements, competition with imports and the persistence of overcapacity. However, political reforms in the countries of Central and Eastern Europe offer a potential for exports and possibly joint-ventures.

Table 6: Semi-finished wood products
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.4	1.8
Production	1.7	2.2
Extra-EC exports	0.9	1.0

Source: Cei-Bois

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The industry is represented at the EC level by: European Confederation of Woodworking Industries (Cei-Bois). Address: rue Royale 109-111, B-1000 Brussels; tel: (32 2) 217 6365; fax: (32 2) 217 5904.

Wooden building components
NACE 463

The manufacture of wooden building components accounts for 36% of the production value of the woodworking industries, making it the main subsector in the European Community's wood processing industry. It depends largely on trends in the building industry. The sector of wooden building components is highly involved in renovation work, making the sector less dependent on cyclical new building construction.

INDUSTRY PROFILE

Description of the sector

The NACE definition of this subsector bears the title 'Manufacture of carpentry and joinery components and of parquet flooring'. The subsector produces a wide variety of wooden building components: doors, window frames, shutters, partitioning and other walls, staircases, constructions of glued and laminated wood, prefabricated buildings of wood, etc. This subsector of the woodworking industry distinguishes itself from the carpentry subsector of the construction industry by its industrial scale and production methods.

In 1992, production in current prices reached a value of 12.6 billion ECU, which was 35.5% of the total production of the woodworking industries (excluding wooden furniture). This makes the manufacture of wooden building components the most important subsector of the woodworking industries.

Apparent consumption amounted to 13.2 billion ECU. This means that the trade balance is slightly negative.

The industry employs approximately 160 000 people, representing 37.6% of the total employment in the woodworking industries.

In 1992 the wooden building components industry created a value added of 4.5 million ECU. This is roughly the same as the footwear industry or one third of the consumer electronics industry.

In absolute value, Germany is the biggest producer. In relative terms, the proportionally high share of Spain in the total EC production of wooden building components is evident.

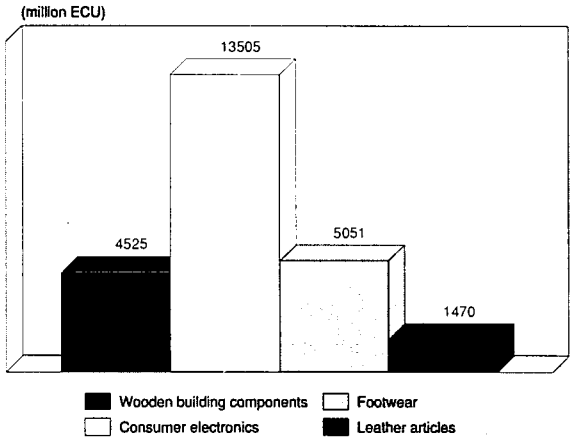
Recent trends

Throughout the eighties, apparent consumption of wooden building components has increased steadily at an average real growth rate of 2.6%. Unfortunately, production within the EC was not able to keep pace with the rapidly growing demand, despite the decrease in extra-EC exports. This resulted in a steep rise in extra-EC imports, especially between 1988 and 1992 (+17.7% average real annual growth), and a negative trade balance from 1987 on.

Nevertheless, production in constant prices grew at a rate of 30% between 1985 and 1992, which is 10% more than the EC manufacturing industry average. This rapid growth was mainly realised between 1987 and 1989, the years in which economic growth and construction activity recovered after a period of recession.

Employment declined in the first half of the eighties. Thanks to increasing demand, employment started to grow again in 1987 to reach a peak of 163 000 people in 1990. Since then, employment has remained relatively stable at approximately 160 000. Compared to 1985, the wooden building components

Figure 1: Wooden building components Value added in comparison with other industries, 1992



Source: DEBA

industry has increased its share in total EC industrial employment.

The beginning of the nineties saw a slowdown of economic growth that was also felt in the wooden building components industry. In 1992, production in constant prices grew only by 0.2%. Extra-EC exports even declined in current prices, causing a further deterioration of the trade balance. Employment decreased by 1.1% in 1992.

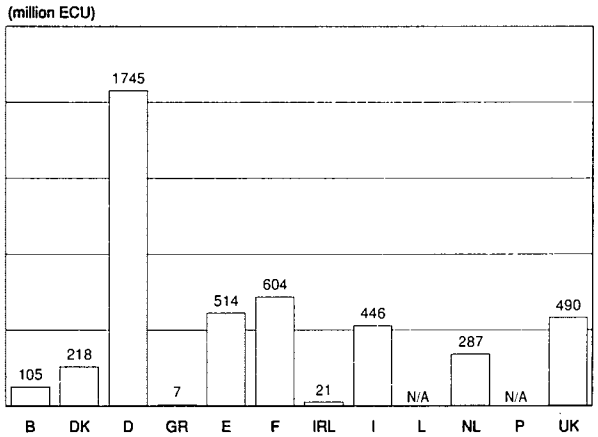
International comparison

In the USA, the wooden building components industry is significantly larger than in the EC. In 1983, the difference was more than 36%. This is undoubtedly due to the higher popularity of wood as a construction material in the USA. Nevertheless, the sector is growing more rapidly in the EC (+30% between 1985 and 1990) than in the USA (+17% in the same period). This is not only due to cyclical factors, but also to the fact that wood is enjoying an increase in popularity as a construction material in the EC, too.

Foreign trade

Between 1983 and 1992, extra-EC exports have declined at an average real annual rate of -6.0%. However, extra-EC imports have grown by an average rate of more than 10% during

Figure 2: Wooden building components Value added by Member State, 1992



Source: DEBA

Table 1: Wooden building components
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	7 496	7 734	7 620	8 095	9 004	10 162	11 175	11 940	12 564	13 214	13 700
Production	7 657	7 896	7 721	8 131	8 996	10 101	11 084	11 757	12 220	12 643	13 000
Extra-EC exports	437.6	451.2	377.3	344.7	351.4	375.4	436.0	441.4	422.4	403.2	385.0
Trade balance	161.1	162.0	100.3	36.2	-8.6	-61.1	-90.9	-182.4	-344.8	-570.5	-670.0
Employment (thousands)	164.7	161.1	153.3	148.2	155.4	160.5	160.7	163.0	161.3	159.5	158.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Cei-Bois estimates.
Source: DEBA

Table 2: Wooden building components
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	2.8	2.5	2.6
Production	2.2	1.5	1.9
Extra-EC exports	-8.5	-2.8	-6.0
Extra-EC imports	4.9	17.7	10.4

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Wooden building components
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	437.6	451.2	377.3	344.7	351.4	375.4	436.0	441.4	422.4	403.2
Extra-EC imports	276.5	289.2	277.0	308.5	360.0	436.5	526.9	623.8	767.2	973.8
Trade balance	161.1	162.0	100.3	36.2	-8.6	-61.1	-90.9	-182.4	-344.8	-570.5
Ratio exports/imports	1.58	1.56	1.36	1.12	0.98	0.86	0.83	0.71	0.55	0.41
Terms of trade index	102.2	99.1	100.0	112.8	114.0	110.2	108.9	111.2	110.5	114.2
Intra-EC trade	371.4	402.9	403.2	434.0	481.6	567.8	638.3	744.3	821.9	930.0
Share of total imports (%)	57.3	58.2	59.3	58.5	57.2	56.5	54.8	54.4	51.7	48.8

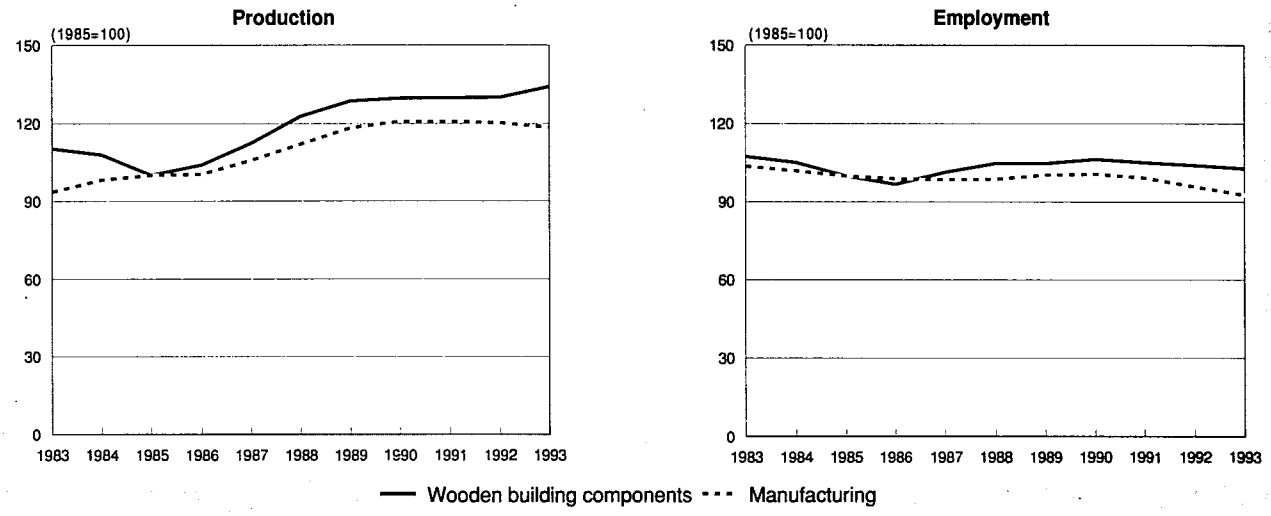
Source: DEBA

Table 4: Wooden building components
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (2)	24.6	24.3	23.4	25.3	26.5	27.5	27.9	27.8	28.0	28.4
Productivity index	105.1	103.7	100.0	107.9	113.3	117.4	119.3	118.6	119.4	121.2
Unit labour costs index (3)	92.3	96.3	100.0	104.7	108.1	115.0	123.8	131.3	140.2	150.1
Total unit costs index (4)	92.6	96.3	100.0	107.4	112.2	122.1	134.2	141.0	149.3	157.1

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed (thousand ECU).
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Wooden building components
Production in constant prices and employment compared to EC manufacturing



1993 are Cei-Bois and Eurostat estimates.
Source: DEBA

the same period. The trade balance has deteriorated continuously during the observation period and became negative in 1987.

This is not as dramatic as it may sound. After all, extra-EC trade in wooden building components remains rather limited. Extra-EC exports represent only 3.2% of production, while extra-EC imports only cover 7.4% of consumption.

The largest part of the wooden building components sector works closely together with the local construction industry. Extra-EC trade remains limited to a few highly standardised products that can be transported at relatively low costs (e.g. plane doors).

Nevertheless, intra-EC trade is increasing rapidly. This is undoubtedly due to the process of European integration that has brought about a harmonisation of technical standards and a broadening of the "local" market horizon.

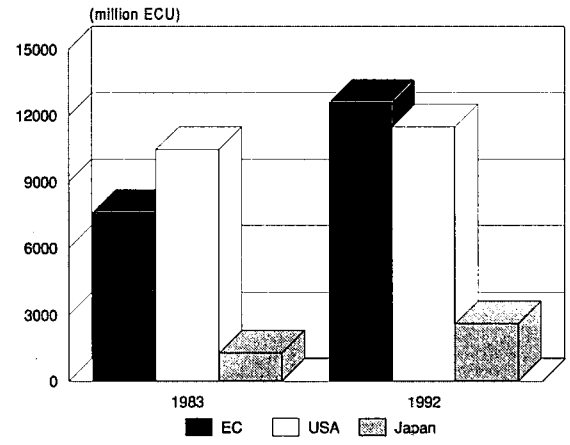
Extra-EC exports are still mainly oriented towards the EFTA countries (53.8%), because of the geographical proximity and the partial similarity in building traditions. However, the EFTA countries are no longer the main origin of extra EC-imports (44.8%). Imports of cheap standardised products are now coming from low wage countries in Eastern Europe and South East Asia.

MARKET FORCES

Demand

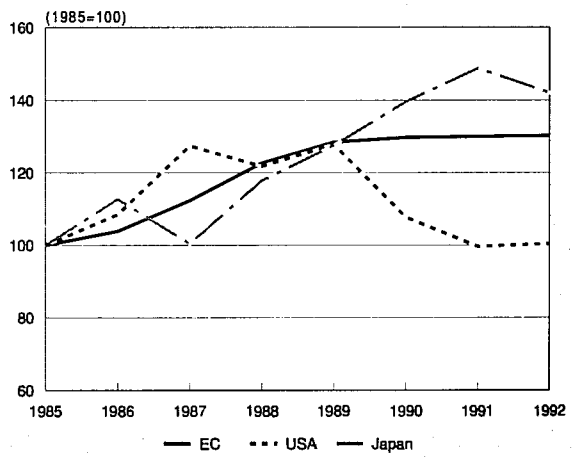
Demand in the sector depends heavily on the trends in the building sector. The recent trend in buyer's preferences, in a market not confronted with saturation, is to use more softwood. During the past decade, renovation has expanded significantly. Thus, the demand for wooden building components for this purpose increased as well. This development has made the subsector less dependent on cyclical new building construction. In the private housing construction market, the single

Figure 4: Wooden building components
International comparison of production in current prices



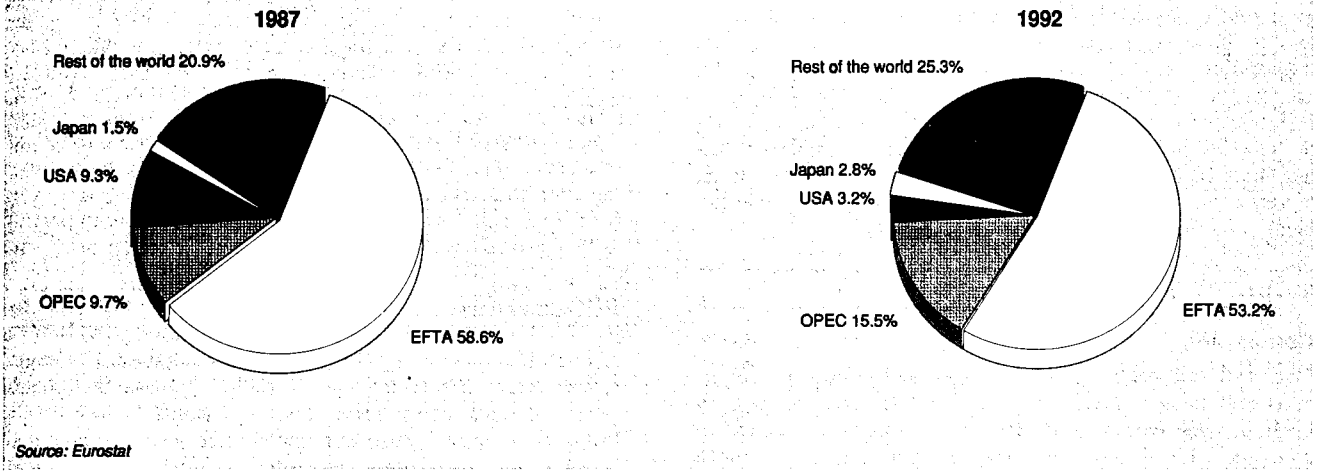
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Wooden building components
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Wooden building components
Destination of EC exports



Source: Eurostat

EC market will not significantly impact the demand for building components since well-defined regional markets will continue to exist within Europe. This is largely due to the specific climatic conditions and local building traditions and styles, rather than any specific standards laid down by the various local authorities.

Wooden joinery and parquet flooring in private housing has benefited from growing consumer preference in recent years.

The demand for wooden building components is becoming more dependent on characteristics such as thermal and acoustic insulation, rather than the more traditional properties associated with wood, particularly in the non-residential building sector.

Supply and competition

International competition remains rather limited because of existing differences in climatic conditions and building traditions. Transport costs are also a limiting factor for international trade since most products are heavy and voluminous.

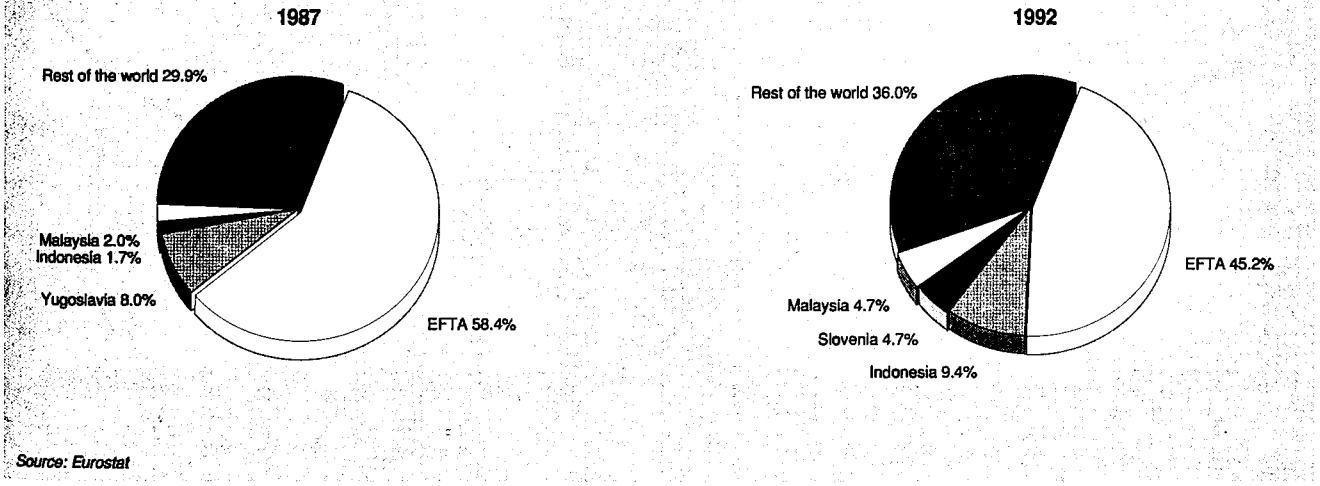
Nevertheless, pressure from foreign competition does exist, mainly due to lower labour costs. Factors such as better availability of raw materials or technological advantages are less important.

The significance of wood treatment for the wooden building components industry is apparent, since this process has enabled the use of wood in applications where previously rapid biological attacks would have excluded its use. Thus, wood is gaining market share from alternative building materials in non-traditional markets. Treated wood is now used in relatively new applications such as agriculture, vineyards and horticulture, fruit-growing, enclosures, playgrounds, hydraulic engineering, etc.

Products such as fire-resistant wooden doors may, initially, appear unusual. However, the high degree of dimensional stability of wood provides these doors with a competitive advantage over metal or synthetic products, since the latter deform more rapidly at high temperatures.

Producers of wooden window frames experience competition from substitution products made from other raw materials such as aluminium and polyvinyl chloride (PVC). However, wooden frames still have the largest market share in the EC with 40%, well ahead of aluminium and PVC.

Figure 7: Wooden building components
Origin of EC imports



Source: Eurostat

Production process

It is mainly the production process that distinguishes the industrial manufacturer of wooden building components from the local carpenter. The machinery and production techniques used in a factory producing doors or window frames, for example, are more similar to those in the furniture industry than to those of the individual carpenter. Computer aided design-computer aided manufacturing (CAD-CAM), state of the art computerised numeric control (CNC) machinery and automated coating installations have already found their way into the wooden building components industry. The industry has thus become the supplier of the individual carpenter who integrates the prefabricated components into the building at the local construction site.

INDUSTRY STRUCTURE

Companies

The ideal enterprise for coping with specific climatic conditions and local building traditions and styles is a small to medium-sized enterprise (SME) that optimises its size in accordance with clearly determined geographical limits and a technical specialisation. Indeed, it is the SMEs that make up the vast majority of this industry.

Strategies

Recent investments concentrated on plant modernisation and increasing capacity (e.g. in Germany due to the five new Länder). Investment is being predominantly undertaken by the European producers themselves, so foreign investment is not important.

Producers tend to specialise considerably and the sector is characterised by a lot of acquisitions, particularly in Germany.

Most manufacturers of wooden building components work on a local or regional scale because of the differences in climatic conditions and building traditions. However, by conforming to the European construction products directive, many enterprises will be able to expand their potential market to the EC.

Shortly stated, there are three possible strategies for the enterprises in this sector. The first strategy is to specialise and focus on the local market, by taking the specific preferences and requirements of local consumers and building companies into account. Aspects such as service and flexibility are very important within this strategy, which is followed by many of the SMEs in the sector.

The second strategy involves concentration and mass production of highly standardised building components. The market for these products is the EC. Economies of scale and price leadership are the keys to success. Large companies who follow this strategy have to reckon with competition from extra-EC imports.

A third strategy is to focus on a product with specific technical properties. This is also a specialisation strategy but, unlike the first strategy, it allows operation on an EC level, even for SMEs. This strategy will probably become more important as the harmonisation of standards for these products proceeds.

REGULATIONS

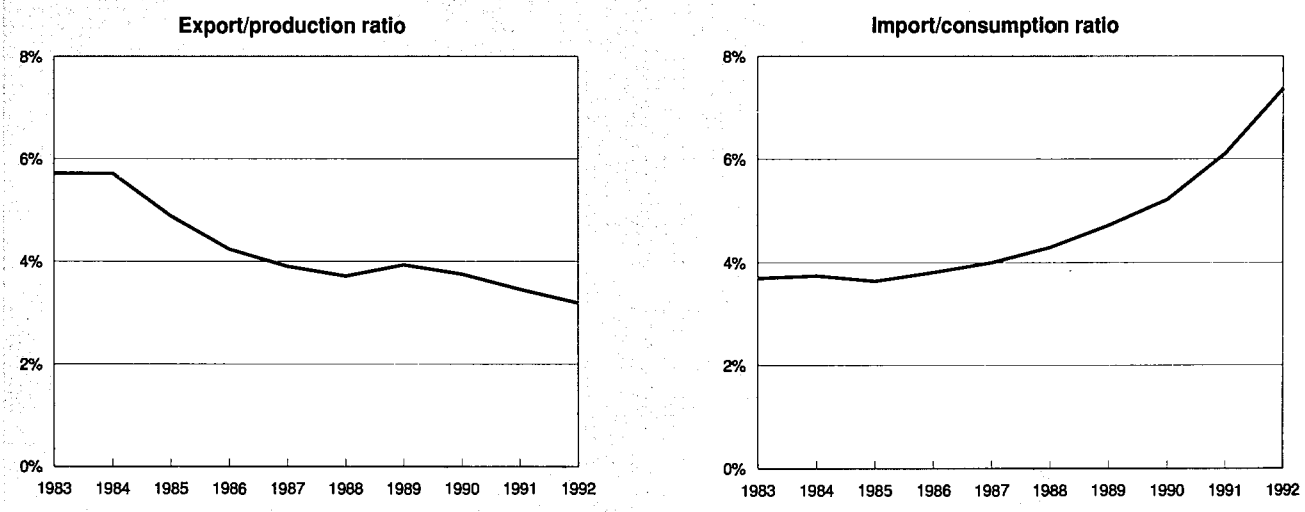
Council Directive 89/106 on the approximation of laws, regulations and administrative provisions of the Member States related to Construction Products, (the so-called "Construction Products Directive") still can not be applied despite its adoption in 1988 and its entering into force in 1991. The reason is that the "Standing Committee on Construction", responsible for its application, has not formally adopted the so-called interpretative documents yet. These interpretative documents define in more detail the six essential requirements for a construction, as listed in the Directive.

Construction products fulfilling all essential requirements can obtain the CE-mark, enabling free trade and use of the product in all Member States.

Meanwhile, the preparation of European standards concerning product specifications for products wishing to obtain the CE-mark is progressing steadily. Five technical committees of CEN, the European Committee for Standardisation, are preparing standards for wooden construction products. New or innovative products, not covered by a European Standard, could obtain the CE-mark via a "European Technical Approval", issued by EOTA, the European Organisation for Technical Approvals.

It is hoped that the interpretative documents will be adopted by the end of 1993, which could imply that, 5 years after its adoption, the Construction Products Directive would be fully operational.

Figure 8: Wooden building components
Trade intensities



Source: DEBA

OUTLOOK

Apparent consumption of wooden building components is expected to grow by 1.6% in 1994, thanks to the fall of interest rates, the revival of construction activity in the United Kingdom and the important structural needs in the five new German Länder. The average real annual growth rate of consumption from 1993 to 1997 is estimated at 2.0%. As in the past, extra-EC imports are expected to increase further. As a result, the average growth rate of production (1.3%) will be lower than that of consumption. This may be partially explained by standardisation at the European level which leads to uniform products and hence, increases in extra-EC imports.

Extra-EC exports are expected to decrease by an estimated 1.1% in 1994 and by 1.9% in the following years.

In the future, European standardisation and the single market should give producers the opportunity to expand within the European market instead of depending on the local market. Activity in the renovation market will make the sector less dependent on the cyclical new construction industry.

Table 5: Wooden building components
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	1.6	2.0
Production	1.1	1.3
Extra-EC exports	-1.1	-1.9

Source: Cei-Bois

Written by: Cei-Bois
The industry is represented at the EC level by: European Confederation of Woodworking Industries (Cei-Bois); Address: rue Royale 109-111, B-1000 Brussels; tel: (32 2) 217 6365; fax: (32 2) 217 5904.

Other wood products
NACE 464, 465, 466

Production and consumption in this industry have improved consistently since 1982 despite increasing competition from low wage countries in Eastern Europe and the Far East. The industry is characterised by a large number of small to medium sized enterprises (SMEs) with relatively stable employment. Significant investments have taken place in recent years to automate the production process as much as possible in order to compete more effectively with imports. However, the trade balance has continued to deteriorate.

INDUSTRY PROFILE

Description of the sector

This chapter covers several smaller and very heterogeneous subsectors of the woodworking industry. The most important is wooden containers (NACE 464), which comprises boxes, crates, pallets, barrels, cable drums, etc.

NACE 465 groups together miscellaneous wood manufactures. The most important products are wooden frames for paintings, photographs, mirrors and similar objects.

NACE 466 includes the manufacture of articles of cork, basket ware, wickerwork and other articles of plaiting materials (except case and wicker furniture) and the manufacture of brushes and brooms.

In 1992, the current value of production of these subsectors added up to 9.1 billion ECU representing 25.3% of the total production of the woodworking industries (except wooden furniture).

Employment amounted to 125 700 or 29.6% of the total employment in the woodworking industries, proportionally more than its 25.3% share in the total production of the woodworking industries. This shows that these subsectors are very labour intensive.

Wooden containers and pallets account for 3.2 billion ECU or 35.4% of the production of the "other wood products". Brushes and brooms represent a current production value of 1.2 billion ECU (13.3% of "other wood products). Extra-EC exports of wooden containers remain limited.

The value added of these subsectors adds up to 3.3 billion ECU, roughly one quarter of the consumer electronics industry.

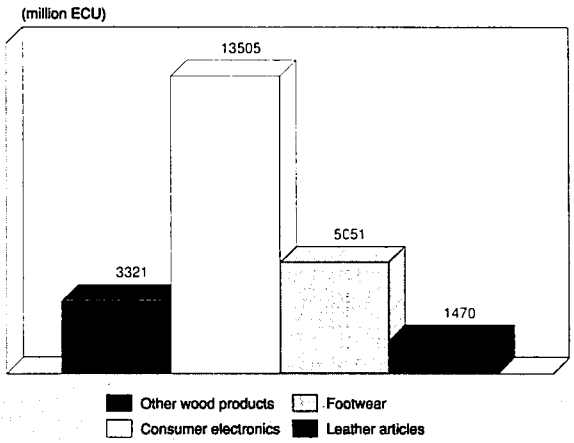
Germany is by far the most important producer of "other wood products", and not only in absolute value. The per capita production is also much higher in Germany than in other EC countries, like France, Italy or the United Kingdom.

Recent trends

Apparent consumption grew constantly from 1983 to 1992. Until 1986, however, this growth was rather limited. From 1987 until 1989, there was an important increase in the level of consumption, followed by a moderate growth in 1990-1991 and a stagnation in 1992.

EC producers were initially slow to react to the upswing in consumption, however, and there was a remarkable rise in extra-EC imports in 1987. EC production responded to strong demand at home with big increases in 1988 and 1989. In fact, extra-EC imports have been increasing steadily since 1987, taking a continuously higher share of EC consumption. On the other hand, extra EC-exports only grew by a real annual rate of 0.6% between 1988 and 1992.

Figure 1: Other wood products
Value added in comparison with other industries, 1992



Source: DEBA

Employment declined steadily from 131 900 in 1984 to 122 800 in 1988. There was an important rise in employment in 1989, again followed by a decrease in the years 1990-1993. In 1993, employment is estimated at 124 100.

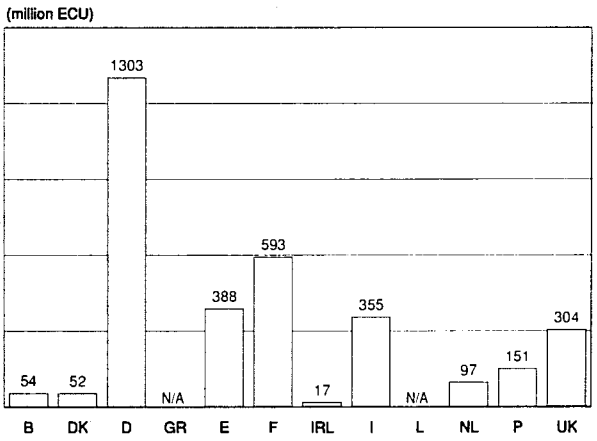
Because of the slowdown in economic growth and international trade, demand for "other wood products" stagnated in 1993 at an estimated 9 462 million ECU. Production even decreased in current prices to an estimated 8 911 million ECU. Despite the slowdown in demand, the trade balance further deteriorated due to an increase in extra-EC imports.

Foreign trade

Although most of the subsectors dealt with in this chapter are exposed to strong competition from extra-EC low wage countries, the import penetration ratio remains relatively low at about 13.7% in 1992 up from 11.2% in 1983. The share of production exported to non-EC markets has averaged a steady 10 % throughout the eighties up to 1992.

External trade in wooden containers and pallets is of limited importance but has nevertheless increased noticeably since 1989. Extra-EC imports now cover 1.8% of the consumption of wooden containers and pallets. These increased imports

Figure 2: Other wood products
Value added by Member State, 1992



Source: DEBA

Table 1: Other wood products
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	5 042	5 478	5 746	5 822	6 240	6 969	8 179	8 960	9 382	9 432	9 460
Production	4 974	5 455	5 757	5 845	6 188	6 862	8 043	8 767	9 019	9 023	8 910
Extra-EC exports	498.4	598.7	639.5	628.8	629.3	710.6	837.3	814.7	847.4	883.6	906.0
Trade balance	-68.0	-22.2	11.2	23.3	-51.3	-107.5	-135.5	-193.3	-363.2	-409.4	-550.0
Employment (thousands)	131.9	131.9	126.0	122.9	122.9	122.8	130.1	131.5	129.6	125.7	124.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Cei-Bois estimates.
Source: DEBA

Table 2: Other wood products
Breakdown by sector, 1992 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Wooden containers	3 191	3 198	63
Brushes and brooms	1 184	1 198	222
Articles of cork and plaiting materials	972	948	260
Others	4 085	3 679	338

(1) Except for trade figures, estimates are used if country data is not available.
Source: Cei-Bois, DEBA

Table 3: Other wood products
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	498.4	598.7	639.5	628.8	629.3	710.6	837.3	814.7	847.4	883.6
Extra-EC imports	566.4	620.9	628.3	605.5	680.6	818.1	972.8	1 008.0	1 210.6	1 293.0
Trade balance	-68.0	-22.2	11.2	23.3	-51.3	-107.5	-135.5	-193.3	-363.2	-409.4
Ratio exports/imports	0.88	0.96	1.02	1.04	0.92	0.87	0.86	0.81	0.70	0.68
Terms of trade index	106.1	103.6	100.0	113.2	117.3	116.9	119.0	122.4	120.5	121.4
Intra-EC trade	723.3	829.1	888.1	941.8	1 030.9	1 168.5	1 358.7	1 483.0	1 552.4	1 616.6
Share of total imports (%)	56.1	57.2	58.6	60.9	60.2	58.8	58.3	59.5	56.2	55.6

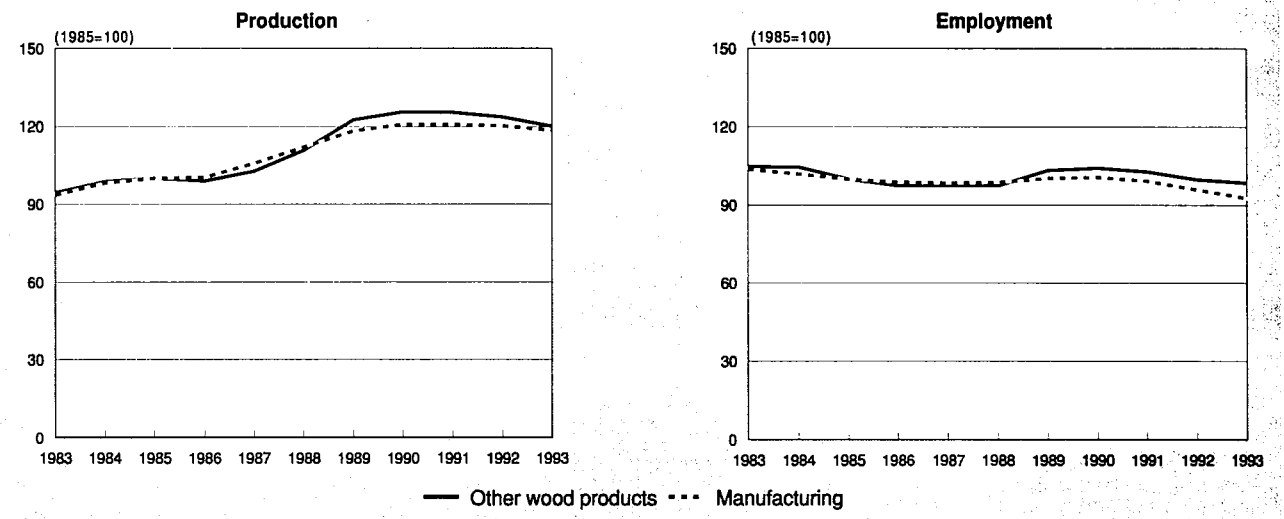
Source: DEBA

Table 4: Other wood products
External trade in brushes and brooms, 1992

(million ECU)	Brooms	Toilet brushes	Fine hair brushes	Paint brushes/ rollers	Industrial brushes	Domestic brushes	Others
Extra-EC exports	9.4	70.3	23.1	28.8	28.2	30.3	33.6
Extra-EC imports	10.5	74.6	26.1	22.9	8.5	21.9	23.6
Trade balance	-1.1	-4.3	-2.9	5.9	19.6	8.4	10.1
Ratio exports/imports	0.9	0.9	0.9	1.3	3.3	1.4	1.4
Intra-EC trade	3.9	76.6	21.7	37.4	40.6	39.9	47.4
Share of total imports (%)	26.9	50.7	45.4	62.0	82.6	64.6	66.8

Source: Eurostat

Figure 3: Other wood products
Production in constant prices and employment compared to EC manufacturing



1993 are Cei-Bois and Eurostat estimates.
Source: DEBA

mainly consist of cheep pallets made in East European countries like Poland, Hungary and former Czechoslovakia.

The trade balance for wooden containers and pallets, which was still largely positive at the beginning of the survey period, has gradually worsened and showed only a very small surplus in 1992. Most of the trade takes place within the EC. This figure might be overstated, however, as some international movements of pallets are "invisible" since consignments of empty pallets are included in the customs statistics, whereas loaded pallets are not.

Although the EC brushes and brooms industry experiences severe competition from China and Eastern Europe, the external trade balance remains positive. Differentiating with regard to product lines, there is a positive trade balance for industrial brushes, paint brushes and rollers and domestic brushes. The trade balance is negative for toilet brushes, fine hair brushes and, since 1992, also for brooms.

Articles of plaiting materials are mainly imported from countries in the Far East, such as South Korea, Taiwan and the Philippines.

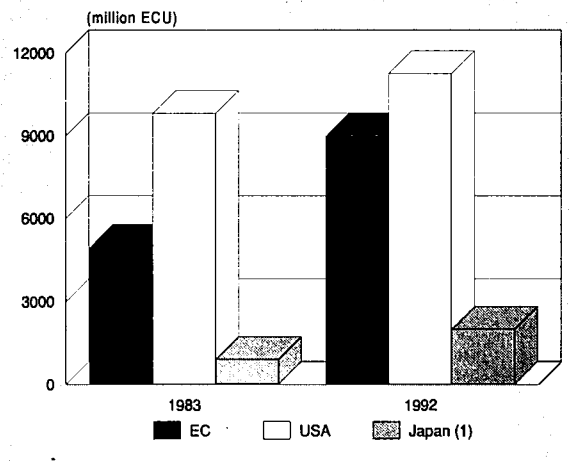
MARKET FORCES

Demand

Since the products dealt with in this chapter are very heterogeneous, these products also have different types of buyers, i.e. industry or final consumers.

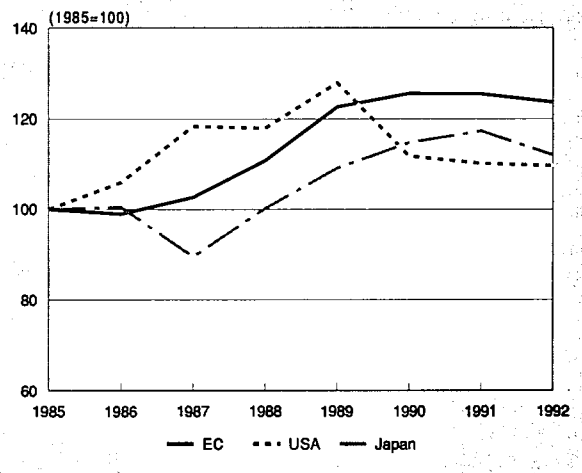
Wooden containers are mainly bought by industry. In fact, demand for these products has an indirect character and relies on demand for other products which are transported and stored in containers or on pallets. Since most products can be transported either in a wooden container or on a pallet, demand for these packaging materials depends largely on the general macroeconomic situation.

Figure 4: Other wood products
International comparison of production in current prices



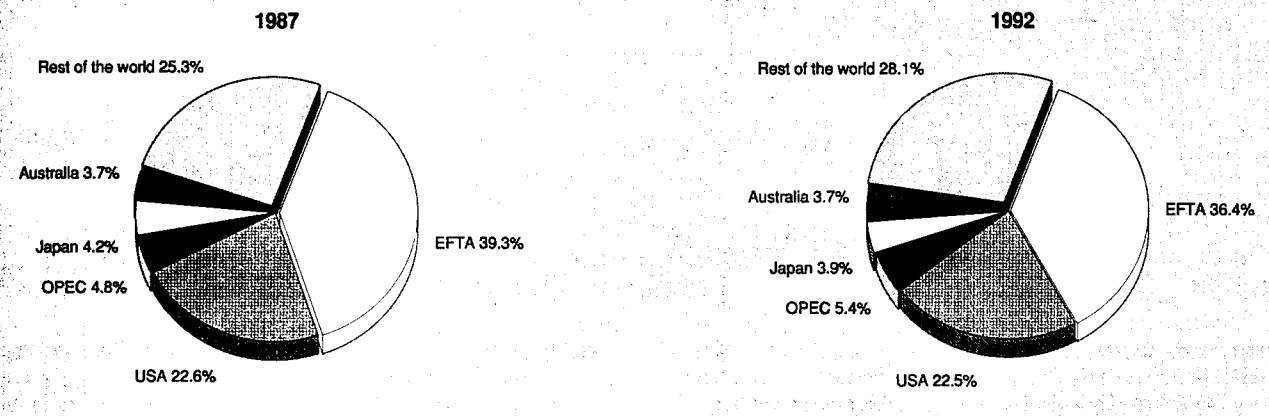
(1) 1983, excluding manufacture of articles of cork, straw and other plaiting, brushes and brooms.
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Other wood products
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Other wood products
Destination of EC exports



Source: Eurostat

Since trade, intra-EC as well as extra-EC, is intensifying, there is a potential stimulus for sustained growth for the sector of transport-related packaging like wooden containers and pallets. For the moment, however, demand for wooden containers is rather weak due to the slowdown in economic growth and international trade.

Wooden containers are used during the transportation or storage of products in order to improve their manoeuvrability. This requires light structures that are able to withstand rough handling. Standardisation of pallet dimensions makes them highly suitable for repeated and different uses.

With the exception of industrial brushes, most brushes and brooms are bought by final consumers. Industrial brushes are sold by direct sales contact between the industrial client and the supplier. Personal hygiene products (tooth-brushes, hair-brushes, make-up brushes) are distributed by specialist chains, pharmacies and supermarkets. Household brushes are offered to individuals by supermarkets; the same applies to paint brushes and rollers. It is worth noting that large distribution centres also import products directly from outside the EC.

Wooden frames for photographs, paintings, mirrors, etc., are also mainly destined for final consumers. These products are distributed by large distribution centres as well as by small specialised businesses, like photographers, art galleries and gift shops.

Demand for bottle corks comes from the wine, champagne and beer producers. Cork is also used for insulation and, recently for flooring with increasing success.

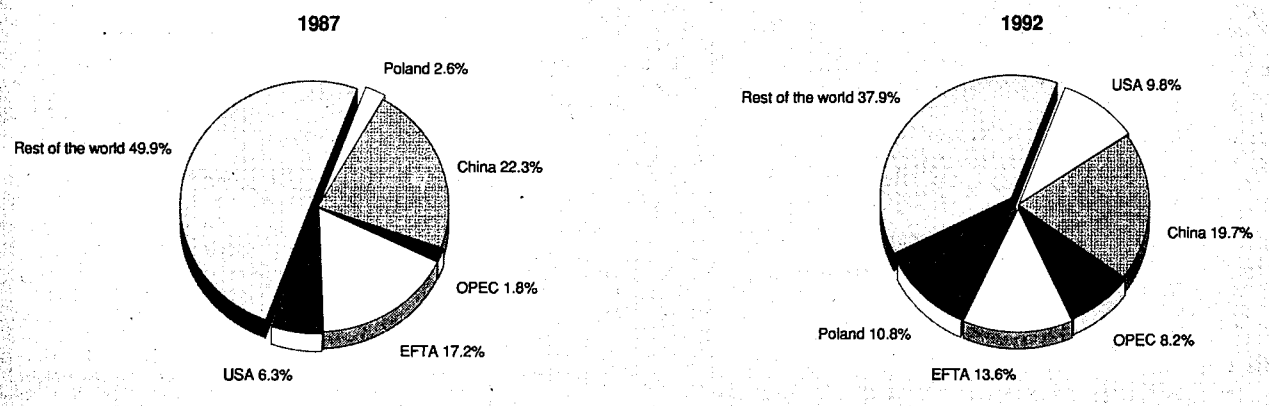
Supply and competition

Since 1990 demand for wooden containers has weakened due to the general slowdown in economic growth and international trade, putting pressure on the supply side to lower profit margins.

For all the subsectors under observation, internal EC competition remains rather limited. Foreign competition from extra-EC countries, however, is fierce in all product lines. The major extra-EC competitors are not the other industrialised countries like USA and Japan, but low wage countries in the Far East and Eastern Europe.

It is clear that lower labour costs are the main competitive advantage of these extra-EC competitors. They also have a lower regulative burden (lower social and environmental costs).

Figure 7: Other wood products
Origin of EC imports



Source: Eurostat

Table 5: Other wood products
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	21.3	20.3	22.4	23.1	23.9	25.4	25.0	25.9	26.1	26.4
Productivity index	95.1	90.5	100.0	103.1	106.7	113.3	111.8	115.4	116.7	118.0
Unit labour costs index (3)	87.8	91.8	100.0	104.9	109.3	115.8	120.4	130.9	141.0	149.6
Total unit costs index (4)	82.6	93.0	100.0	103.4	108.8	120.0	133.4	142.7	150.3	157.2

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Because of the relatively low degree of complexity of the production process, it is difficult for EC producers to realise technological advantages. Even with the highest possible level of automation, the lower labour costs of the extra-EC competitors is often of overriding importance, especially when combined with dumping practices. The EC brushes and brooms sector has already been involved several times in anti-dumping procedures regarding Chinese brushes.

Since 1990, there has been a sharp rise in the imports of pallets from Eastern Europe (especially Poland, Hungary and former Czechoslovakia) at extremely low prices that barely cover transportation costs. These imports are a serious threat for the survival of the EC pallets producers. In the case of pallets, it is clear that European standardisation of pallet dimensions has led to increasing extra-EC imports.

Most of the extra-EC imports of brushes and brooms come from China and Eastern Europe. China has a quasi-monopoly where imports of paint brushes are concerned. Imports of brushes from China and Eastern Europe have disrupted EC production on more than one occasion. Products from these countries are often offered at dumping prices. The EC industry hopes that trade agreements with these countries, as well as certain structural changes in their markets, will rectify the situation.

Availability of raw materials often plays an important role, too. China has a quasi-monopoly for pig hairs, used in paint brushes. Articles of straw, cork and other plaiting materials are mainly imported from South East Asia. Eastern Europe has large reserves of wood that are suitable for the production of pallets.

Since 1985, production and employment in the "other wood products" sector have grown more rapidly (23.6%) than the EC manufacturing industry average (20.3%).

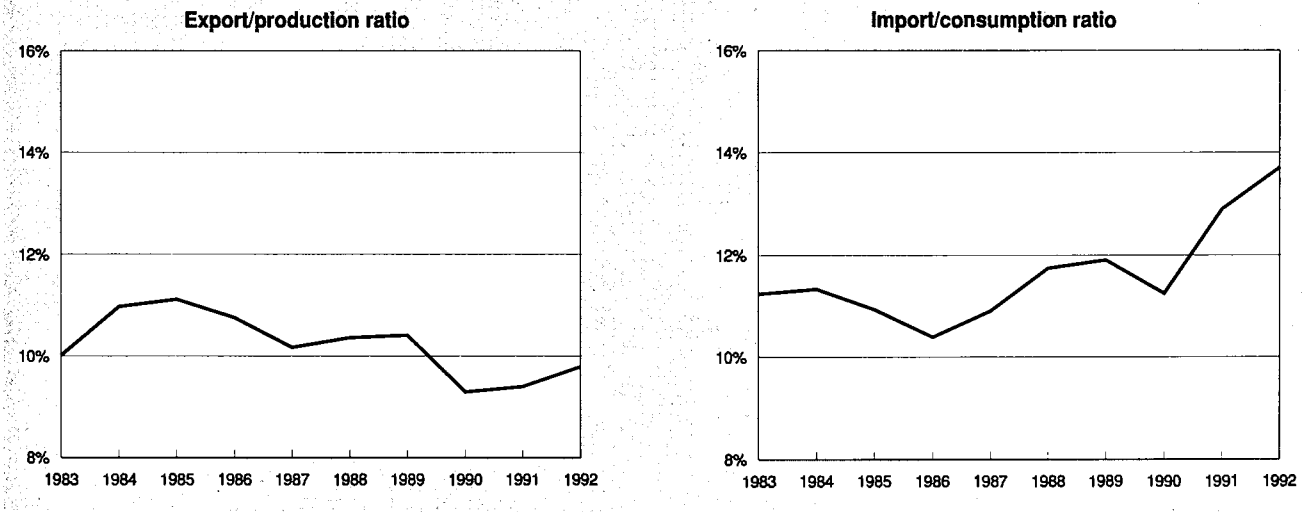
Production process

The raw materials used for the production of wooden containers and pallets are mostly local types of wood, such as poplar and pine. Pallet dimensions have, to a large extent, been standardised. The handles of brushes and brooms are mostly made of wood or plastic. The hairs can be synthetic fibre, animal (pig hair) or vegetable (coconut fibre).

Although the degree of complexity of the production process is relatively low, automation is possible. During the second half of the 1980's, the wooden containers sector has realised important automation and rationalisation investments.

Because of external competition, EC producers of brushes and brooms need to acquire high-performance machines that introduce the fibres, attach them to the frame and adjust the packing material all in one cycle. In this way, toothbrushes and nail brushes, etc. can be produced in very large quantities. The packaging and labelling operations are also performed automatically. The manufacture of paint brushes, particularly

Figure 8: Other wood products
Trade intensities



Source: DEBA

fine brushes, is less automated, although here too, significant progress has been made.

The workforce still has an important role to play in the case of certain operations (for example, the manufacture of paint brushes). In addition, automation has generated an increasing need for people with technical knowledge of machines and tools.

INDUSTRY STRUCTURE

Companies

Most of the enterprises in these subsectors are SMEs. The number of enterprises employing more than 20 people is estimated at 5 200, of which 1 400 are in the wooden containers sector.

Among the subsectors dealt with in this chapter, the wooden container subsector is the most capital-intensive. The size of the enterprises is also relatively larger.

Strategies

The major strategy for all the enterprises of these subsectors is to rationalise and automate the production process as much as possible to face the competition from extra-EC, low wage countries.

For the producers of wooden containers, specialisation in custom-made packaging helps to minimise competition from low wage countries which mainly produce standardised products. Because of geographical proximity, EC producers can respond in a more flexible way to the needs of their customers (e.g., special dimensions, just-in-time delivery).

Producers of wooden containers and especially pallets are working out systems for recycling (see the environmental section in the Overview to wood processing at the beginning of this chapter). This should provide them with a competitive advantage over the producers of plastic and metal pallets.

REGIONAL DISTRIBUTION

The firms in the wooden containers industry are mostly located in the vicinity of the available raw materials and/or major transport centres, such as harbours and airports. The brushes and brooms industry is mainly concentrated in Germany (33%), United Kingdom (23%), Italy (17.5%) and France (16.5%). Portugal is the most important producer of cork.

Table 6: Other wood products
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	2.8	3.3
Production	2.3	2.6
Extra-EC exports	1.0	0.8

Source: Cei-Bois

OUTLOOK

After a slowdown in 1991-1993, production and consumption will grow again at a steady pace. It is expected that consumption will grow faster (at an average real annual growth rate of 3.3% between 1993 and 1997) than production (2.6%). This means that extra-EC imports will increase their market share. Extra-EC exports, however, will probably slow down.

The risks for these subsectors come from increasing imports from low wage countries in the Far East and Eastern Europe, and from European standardisation which may lead to increasing extra-EC imports (e.g., pallets).

Opportunities for EC producers will come from specialisation in custom-made packaging and from working out systems for recovery (energy recovery, production of particleboard, repeated use, etc.).

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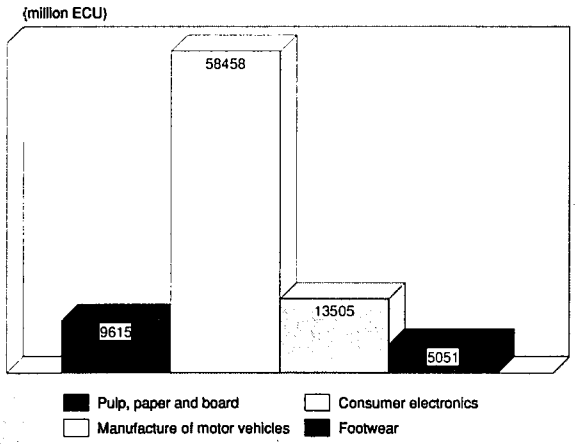
The industry is represented at the EC level by: European Confederation of Woodworking Industries (Cei-Bois). Address: rue Royale 109-111, B-1000 Brussels; tel: (32 2) 217 6365; fax: (32 2) 217 5904.

Pulp, paper and board
NACE 471

The pulp, paper and board industry recorded a new record production of 49.2 million tonnes in 1992, and was the tenth consecutive year of volume growth in the industry. Although this performance compares positively with other industries, it doesn't provide a clear picture of the industry in 1992. Since 1990, the growth in demand slowed down, and growth rates of exports have also fallen as well as their prices, operating rates and profit margins. In 1992, the pulp, paper and board industry experienced a tough year: production value dropped 3%. The pulp portion of the industry experienced a year worse than the paper and board portion with a decrease in pulp production volume. The increase in consumption of pulp was met by increased imports.
The industry was hit hard by the general economic slowdown, currency movements, political uncertainty related to the Maastricht ratification and the General Agreement on Tariffs and Trade (GATT). The industry experienced clear symptoms of overcapacity. All these factors pushed prices down, in some cases dramatically, eroding the profitability of the companies. A tough, and in some cases dramatic, restructuring process was undertaken.
Environmental legislation and public action of pressure groups are becoming the main concerns for the industry. The future performance of the pulp, paper and board industry will depend on its ability to address these concerns.

Figure 1: Pulp, paper and board
Value added in comparison with other industries, 1992



Source: DEBA

INDUSTRY PROFILE

Description of the sector

The products of the industry are divided in three categories: pulp, paper and board.

Market pulp is wood pulp for paper making, produced for sale in competition with similar pulp from other producers. It excludes pulp for use by the producing mill or other mills which it owns or controls in the same country. However, it does includes pulp shipped to affiliated firms in other countries.

Paper and board comprises products such as printing and writing paper, sanitary and household paper, wrapping and packaging paper and board, and various sorts of specific quality paper.

There are three main final uses of these products: in communications, for printing, writing and drawing; in the packaging industry, for transportation, storage and presentation of traded goods; and in a variety of special applications such as hygienic paper, nappies, fiduciary paper (money or cheques) or technical uses (filters and insulation).

Within the EC, market pulp production is concentrated in Germany, France Portugal, Spain. Newsprint is produced mainly in Germany, the United Kingdom and France. Most of the EC kraftliner production is in France and most uncoated graphic paper is produced in Germany, the United Kingdom, Italy and Spain.

In this monograph, paper and board together will always be referred to as "paper".

Recent trends

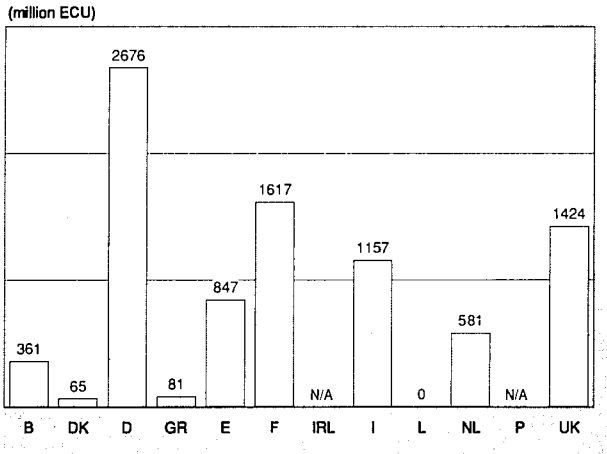
Volume production in the industry increased by 2.4% in 1992, reaching 49 240 tonnes. Nevertheless, as a result of the lower prices caused by overcapacity, currency movements, etc., the overall production of the industry dropped 3% in current value terms. The evolution of pulp (19% of total industry production) and paper (81% of total industry production) followed different directions in 1992. Pulp production, measured in tonnes, dropped 0.1% in 1992, while paper production, measured in tonnes, increased by 2.5% in 1992.

The pulp, paper and board industry is significant in terms of value added when compared to other industries; it represents 16% of the value added of the motor vehicle manufacturing industry and 71% of that of the consumer electronics industry.

The breakdown by country shows that Germany is the main producer in the industry, followed by France (the EC's top pulp producer), the United Kingdom and Italy.

Waste paper was a major element of the industry. The industry consumption of waste paper in 1992 represented 52.9% of total paper production. In 1992, chemical pulp production continued to increase while mechanical production continued its decline. On the paper side, graphic grades grew in 1992 faster than other grades; coated woodfree grades are rapidly gaining market share.

Figure 2: Pulp, paper and board
Value added by Member State, 1992



Source: DEBA

Table 1: Pulp, paper and board
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	25 663	31 430	32 029	32 172	34 565	38 926	44 838	44 541	43 643	42 328	38 200
Production	18 484	22 645	23 468	23 438	24 939	27 853	30 856	31 011	30 833	30 452	29 300
Extra-EC exports	1 150	1 887	2 120	1 871	2 032	2 287	2 526	2 417	2 518	2 655	2 550
Trade balance	-7 179	-8 785	-8 561	-8 734	-9 626	-11 073	-13 982	-13 530	-12 810	-11 875	-8 900
Employment (thousands)	197.3	193.7	188.3	186.2	186.3	186.7	188.0	188.0	187.6	184.7	177.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Pulp, paper and board
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	5.0	3.3	4.2
Production	5.2	2.4	4.0
Extra-EC exports	11.2	6.0	8.8
Extra-EC imports	5.3	5.7	5.5

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Pulp, paper and board
Production in volume of main world producers, 1992

(thousand tonnes)	Pulp	Paper and board	Total
EC	9 405	39 835	49 240
USA	59 277	74 461	133 738
Canada	22 579	16 581	39 160
Japan	11 200	28 322	39 522
Sweden	9 590	8 378	17 968
Finland	8 525	9 130	17 655

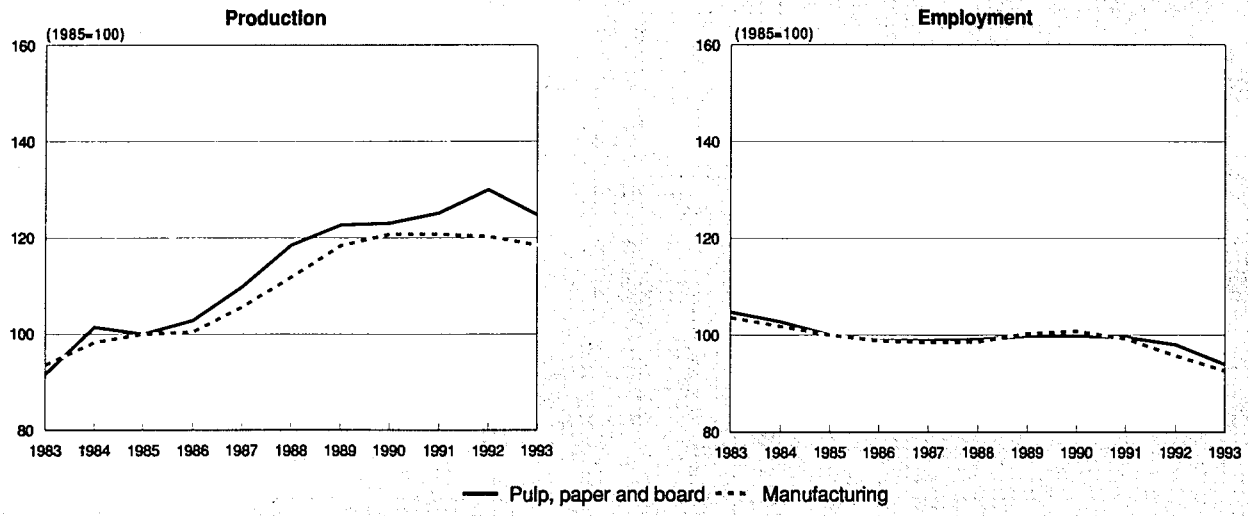
Source: CEPI

Table 4: Pulp, paper and board
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 150	1 887	2 120	1 871	2 032	2 287	2 526	2 417	2 518	2 655
Extra-EC imports	8 329	10 672	10 681	10 605	11 658	13 360	16 508	15 947	15 328	14 530
Trade balance	-7 179	-8 785	-8 561	-8 734	-9 626	-11 073	-13 982	-13 530	-12 810	-11 875
Ratio exports/imports	0.14	0.18	0.20	0.18	0.17	0.17	0.15	0.15	0.16	0.18
Terms of trade index	98.7	92.0	100.0	100.0	94.8	93.3	90.2	91.1	97.0	98.6
Intra-EC trade	3 926	4 941	5 306	5 557	6 133	7 062	8 139	8 408	8 217	7 982
Share of total imports (%)	32.0	31.6	33.2	34.4	34.5	34.6	33.0	34.5	34.9	35.5

Source: DEBA

Figure 3: Pulp, paper and board
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

Employment in the industry suffered a reduction of 2 900 jobs (15%) in 1992 as a result of the restructuring process companies undertook. Spain, Greece and the Netherlands were the only countries with positive employment growth in 1992 with 3%, 0.6% and 0.2%, respectively.

Real production in the pulp and paper sector experienced a 4% rate of growth from 1983-1992. This growth rate was higher in the mid 1980's, reaching 5.2% from 1983-1988, compared to 2.4% from 1988-1992. Between 1983 and 1993, total output in the pulp and paper industry rose faster than EC manufacturing as a whole.

The trend of employment contrasted with that of production. The number of jobs in the pulp and paper sector decreased steadily since the first half of the 1980's (except in 1988 and 1989 as a result of the upward phase of the business cycle), from 197 300 in 1983 to 184 700 in 1992. This plummeting of employment in the first few years of the 1980's illustrates the deep restructuring process which occurred in the industry.

International comparison

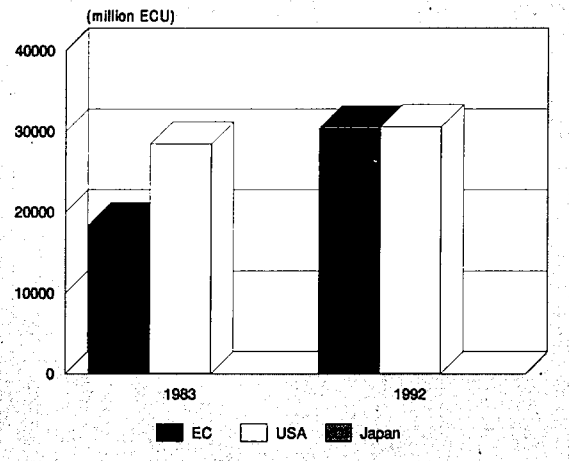
In 1992, total EC pulp production stood at around 9.4 million tonnes, while paper production reached 39.8 million tonnes.

With 49.2 million tonnes in 1992, the EC was the world's second larger producer of pulp and paper, after the USA, with an output of 133.7 million tonnes. Japan and Canada followed with around 39 million tonnes each. As far as pulp is concerned, the EC is only the fifth largest producer in the world. The EC was the second largest producer of paper after the USA, and was followed by Japan, Canada, Finland and Sweden.

Foreign trade

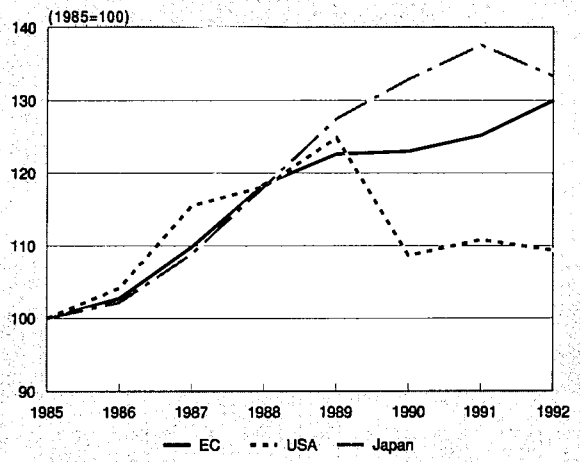
Despite the international economic slowdown, EC exports of pulp and paper rose by 5.4% to 2.6 billion ECU in 1992. EC imports in 1992 decreased by 5.2% to 14.5 billion ECU. EC Trade balance in the sector has traditionally had a negative evolution; nevertheless, in 1992, it improved by 7.3% (11.875 million ECU).

Figure 4: Pulp, paper and board
International comparison of production in current prices



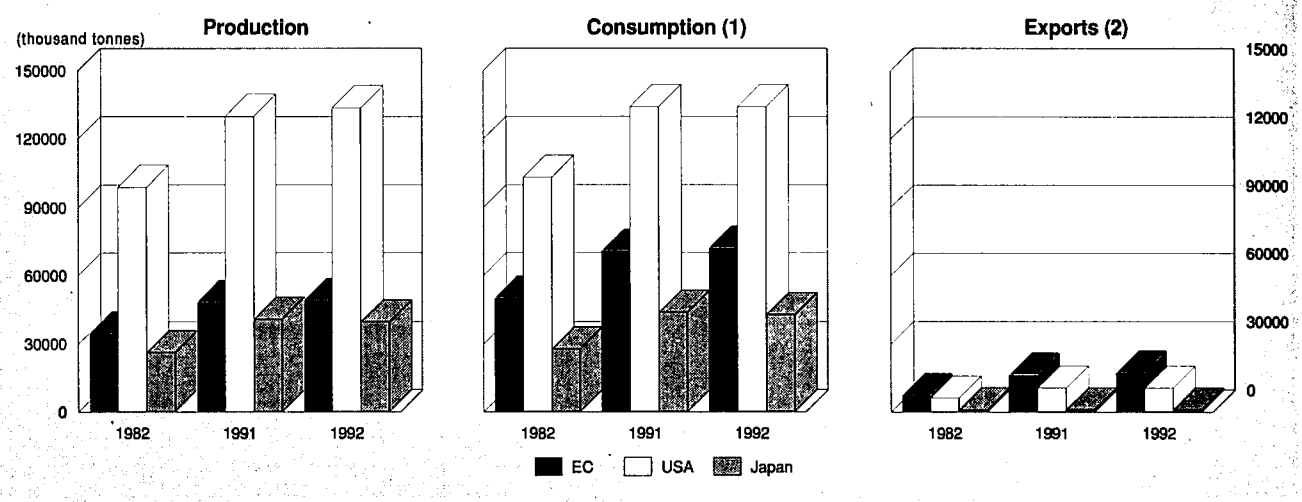
Source: DEBA, Census of Manufacturers

Figure 5: Pulp, paper and board
International comparison of production in constant prices (1)



(1) Production in volume for Japan
Source: DEBA, Census of Manufacturers, CEPI

Figure 6: Pulp, paper and board
International comparison of main indicators in volume



(1) 1990 figure for 1991 and 1992 for the USA
(2) Exports to the world for the EC
Source: CEPI

Intra-EC trade grew rapidly in the second part of the 1980's and, in 1991, was double that of the 1983 value, although in 1992 it decreased by 2.8%. The exports/production ratio rose to 8.7% in 1992 from 6.2% in 1983. The import/consumption ratio remained relatively constant throughout the decade, reaching 34.3% in 1992.

The EFTA countries (especially Sweden and Finland) are the main trading partners of the EC, receiving 27.9% of EC exports in 1992 and originating 70.9% of EC imports in 1992.

Globally, USA is the EC's second largest trading partner, absorbing 12.5% of EC exports and originating 10.8% of EC imports in 1992. Canada continues to be the second largest exporter to the EC, taking, at the same time, a minimum percentage of EC exports. Japanese imports into the EC represented 0.1% of total EC exports, while Japan absorbed 1.9% of EC exports.

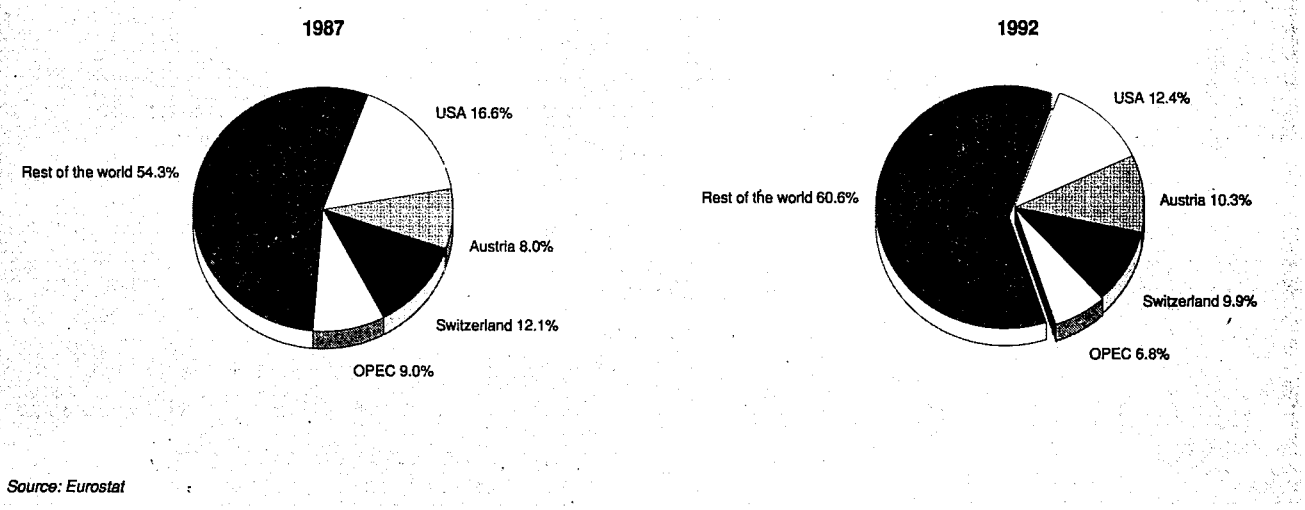
MARKET FORCES

Demand

The principal customers of the paper and board production industry are the paper and board converting industry, the printing industry and final consumers. The market power of these three groups in influencing prices has inevitably grown with the current oversupply on the market. In particular, the market power of the printing industry and final consumers is increasingly demonstrated in the field of environmental issues. Effective campaigns by green pressure groups are forcing the paper and board production industry to adapt to new standards.

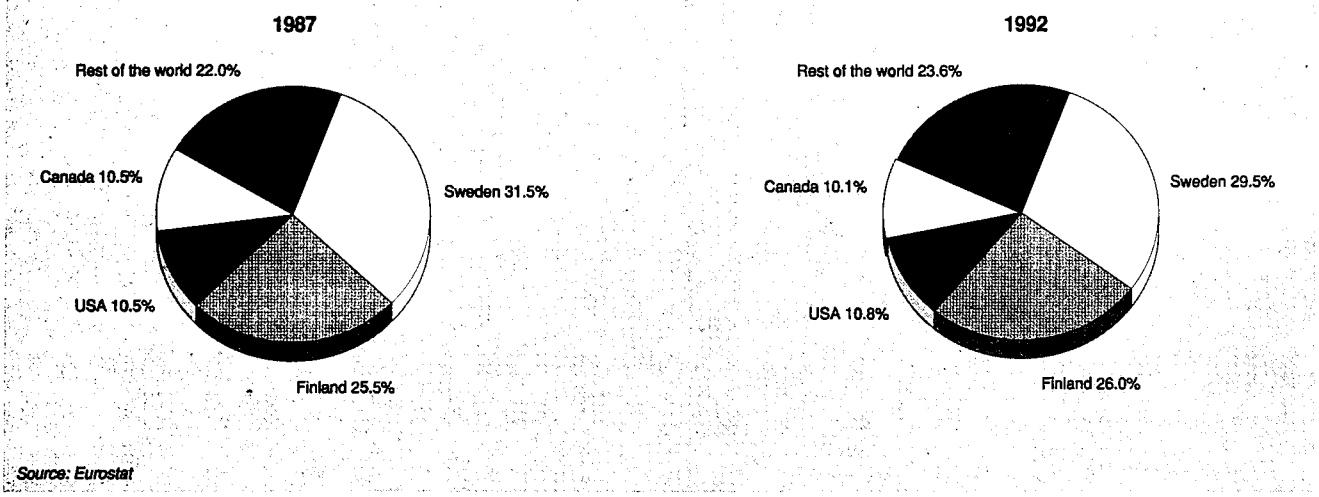
Despite the boom in German demand of pulp and paper due to the unification process, consumption in the EC slackened in 1992 by 3% in line with the general slowdown in economic activity. The German market continued to be the largest European market, and the fact that no kraft pulp production is allowed in Germany still generates considerable imports of these raw materials. The EC is the largest single importer of

Figure 7: Pulp and paper
Destination of EC exports



Source: Eurostat

Figure 8: Pulp, paper and board
Origin of EC imports



Source: Eurostat

pulp in the world. A short description of the activity for each subsector is given below.

Newsprint

Newsprint is largely made from waste paper and mechanical pulp. Although belonging to the category of uncoated graphic papers, newsprint can be lightly calendered, to facilitate the increasing use of colour in newspaper advertising. Newsprint is used in letterpress, flexographic or offset printing. Newsprint consumption is directly related to the revenues of printed advertising. In this respect, depressed spending on advertising in 1992 led to lower demand for newsprint. In the EC, apparent consumption of newsprint in 1992 went down by 0.2, although production volume increased by 3.2%.

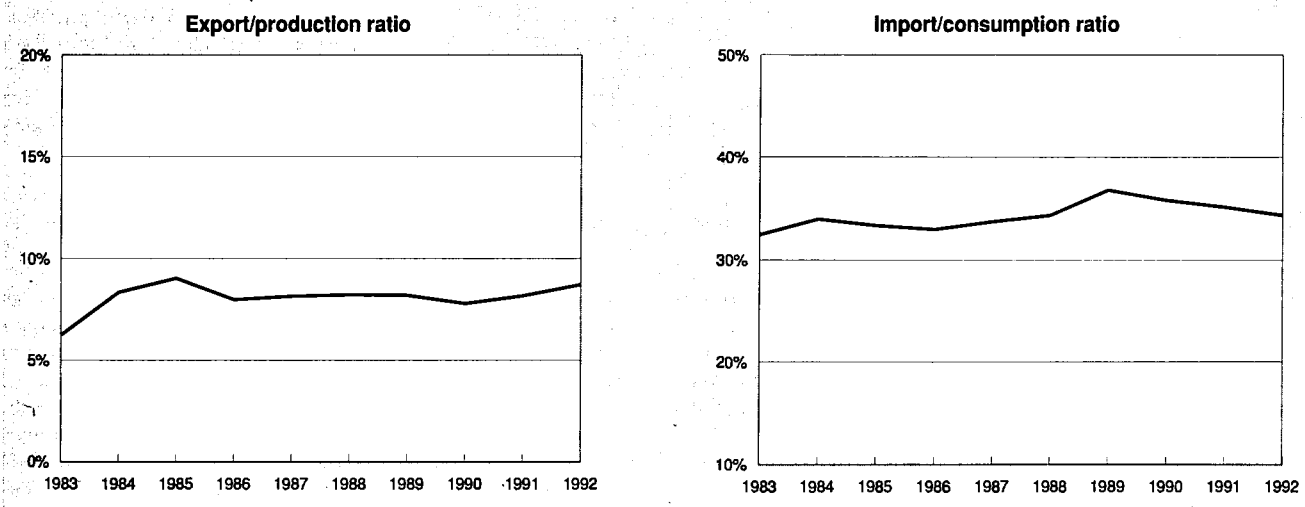
Uncoated graphic paper

These grades include directory, heavily filled and super-calendered paper. They are used in rotogravure and offset. A distinction is made between uncoated mechanical and uncoated woodfree graphic paper. Production and consumption of uncoated mechanical in the EC and EFTA in 1992 slightly decreased. In 1992, production of uncoated woodfree grade in the EC and EFTA increased by approximately 1%, while consumption rose by 2.1% and exports by 8.3%. Overall 1992 production of uncoated graphic papers in the EC decreased by less than 0.1%.

Coated graphic paper

A distinction is made between coated mechanical printing paper and coated woodfree printing paper. The coated mechanical grade is made with a mixture of mechanical and chemical pulp and used to print catalogues, magazines and advertising material. The coated woodfree grade is made almost exclusively of chemical pulp and it is used for high-quality "glossy" printed products. The coated graphic paper grades did well in 1992 experiencing rising production (+ 5.5%) and consumption (+5.3%). Production of coated woodfree grew at a faster rate than coated mechanical. Coated woodfree has gained market share over coated mechanical, accounting in 1992 for 48% of total coated paper output, compared with 43% in 1983. Growth in imports of coated graphic paper outstripped growth in exports.

Figure 9: Pulp, paper and board
Trade Intensities



Source: DEBA

Table 5: Paper and paperboard
Production, consumption and trade balance by subsector

(thousand tonnes)	1989	1991	1992
Newsprint			
Production	2 771	3 049	3 146
Apparent consumption	6 623	6 643	6 626
Net exports	-3 852	-3 594	-3 480
Uncoated graphic papers			
Production	7 104	7 568	7 562
Apparent consumption	9 742	10 530	10 570
Net exports	-2 638	-2 962	-3 008
Coated graphic papers			
Production	6 500	6 855	7 235
Apparent consumption	7 251	8 159	8 594
Net exports	-651	-1 304	-1 359
Folding boxboard and other boards			
Production	5 781	6 112	6 202
Apparent consumption	6 962	7 315	7 402
Net exports	-1 181	-1 203	-1 200
Sanitary and hygienic			
Production	2 369	2 630	2 717
Apparent consumption	2 593	2 868	3 026
Net exports	-224	-238	-309
Total paper and board			
Production	N/A	N/A	39 835
Apparent consumption	N/A	N/A	53 974
Net exports	N/A	N/A	-14 139

Source: CEPI

Non-graphic grades

Non graphic grades include kraftliner paper, corrugated board materials, packaging paper, folding boxboard and greyboard. Kraftliner is used for the outer lining of corrugated board. This product is mainly produced in France, Spain and Portugal. Most of these non-graphic grades experienced slight increases in production and consumption in 1992. Folding boxboard and other boards experienced a 1.5% rise in production and a 1.2% increase in consumption in 1992.

Hygienic and sanitary products

The main final products of this grade are hygienic paper and napkins and industrial wipes. Production and consumption of these grades grew by 3.3% and 5%, respectively, in 1992 but exports fell sharply reaching a net exports deficit a 309 000 tonnes.

Supply and competition

Paper and board

Overcapacity is the industry's current biggest problem and it is particularly acute in the printing paper segment. In 1992, the average overcapacity rate reached 87.9%.

The present situation is directly related to the outstanding growth of the 1980s. Confident with double-digit growth figures and cheap loans in those years, many companies in the EC, Scandinavia and North America decided to build new, larger and more efficient paper mills. These machines are now a source of huge capacities in a market which, although growing, can not absorb all the new supplies. Recent and planned capacity increases have consistently exceeded the growth in European market demand.

Steeply increased interest rates and a general economic slowdown have now created a bad situation for many of the world's larger, and often heavily indebted, companies. Smaller manufacturers, who have been more cautious in the past, are in a slightly better position.

The gradual abolition of EC frontiers, both in legal as well as in practical terms, has a further impact on internal EC competition. In this process, access to the German market remains crucial. Although this market is well served by German based, and partly Scandinavian owned production facilities, the country's high labour costs encourage strong competition from efficient French and Dutch producers.

The international competitiveness of the EC paper and board industry is generally good. Its productivity stands out positively against competitors in North America and Scandinavia. EC industries have invested less in super-capacity and more in strategically flexible production techniques. At the moment, this strategy is proving to be vital to overcome rapidly changing market conditions for the various grades of paper products. Otherwise, the competitiveness of EC paper industries is a relative concept since many outside competitors moved into Europe. Some 50-60% of the EC production capacity is foreign owned with Swedish and Finnish companies as the main shareholders.

The EC paper industry is also gradually adapting to Community-wide economies of scale. National EC producers previously concentrated on the manufacturing of all paper and board grades for the national market. This resulted in rather small nationally oriented production facilities having a high degree of product diversification. Through a series of mergers and acquisitions, these producers are now seeking economies of scale comparable to those of their main competitors in the world. Many EC manufacturers have focused on niche markets, specialising in higher value added products, such as carbonless paper, thermal paper and watermarked paper. Most of them have no integrated links with wood processing plants, and buy pulp on the world market.

Table 6: Pulp, paper and board
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (2)	31.6	34.5	36.2	42.9	44.9	47.9	46.4	48.7	49.4	52.1
Productivity index	87.5	95.5	100.0	118.5	124.2	132.5	128.4	134.6	136.6	144.0
Unit labour costs index (3)	85.4	93.0	100.0	105.5	111.3	118.0	123.2	130.6	139.5	145.4
Total unit costs index (4)	78.2	96.0	100.0	98.3	104.6	116.7	128.9	128.9	134.3	137.2

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed; in thousands of ECU.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

The US paper industry remained badly affected by the persisting economic recession. Much of US paper production is volume oriented which makes it less easy to adapt to changing market conditions. In 1992, USA production of paper and board reached 74.5 million tonnes. However, general economic conditions are currently better than in Europe, therefore USA has better medium term expectations.

The Canadian pulp and paper industry was hit by legislative developments in its main market, the USA. An increasing number of American states demand by law that newsprint, for example, be made partly from recycled wastepaper instead of virgin fibres. Canada therefore is searching out new outlets for its virgin-based pulp products, notably in Europe. In 1992, Canadian paper and board production reached 8.4 million tonnes.

The Finnish pulp and paper industry was drawn into that country's deep economic recession and, although Finnish machines are among the world's most advanced,. the large investments in them resulted in most companies becoming heavily indebted. The Finnish industry also suffered from disruption in its former annual imports of 5 million m^3 of wood from the former Soviet Union. Furthermore, Finland also lost the large Russian export market for their paper products. Finnish paper and board production reached 9.1 million tonnes in 1992.

As for the Scandinavian countries in general, the EEA treaty between the EC and EFTA that took effect in 1993 will not cause much change the trading conditions in the paper industry. Under existing trade agreements, EFTA countries already enjoy a zero tariff for paper imports into the EC.

The Japanese market, although important, is largely self-contained and of limited direct relevance to European producers. Japan produced 28.3 million tonnes of paper and board in 1992. The Far East paper market is the fastest growing in the world, notably in the ASEAN (Association of South East Asian Nations) countries and South Korea. One of the potential main suppliers in that area will be Indonesia. Indonesian government policy is actively aiming to become a world leader in paper and pulp production. It is not yet fully clear how European producers are situated to compete on the Asian market.

Pulp

The prices of various grades of pulp were subject to highly cyclical changes after 1986, the year when steep prices rises began. In the peak year of 1989, prices for Northern Bleached Softwood Kraft (NBSK - the prime grade) had risen between 44 and 75%. By 1990, these prices had dropped again by 35%. In 1992, they varied widely throughout the year, but at the and of the year remained close to their lowest levels of the past several years.

Analysts mainly attribute these large fluctuations to an initially tight market in the latter part of the 1980s and a subsequent overshoot in pulp capacity development. In response to a booming demand for paper in most parts of the world, many pulp mills were delivering pulp not only to their regular customers and integrated paper production units but also to many outsiders who increased capacity. Most pulp mills were running at full capacity.

A logical reaction to these developments was to increase pulp producing capacity by building larger and more efficient pulp mills, often accompanied by restructuring of the industry at large. Some of these new production capacities have now been established. They are often so big that the opening of one mill (with an average annual capacity of 400 000 tonnes) has an immediate effect on world market prices. In 1991 and 1992, it became clear that a number of planned new production units were no longer economically justified.

Production of chemical pulp has grown since 1983 at slower rates than mechanical pulp. This is a result of the substitution of chemical pulp for mechanical pulp as well as by other materials such as recycled fibres, mineral fillings and coating pigments.

Production process

The pulp, paper and board manufacturing industry is traditionally linked to the forestry and wood processing industry. due to lower costs of transport and the main raw material (cellulose), dependence on the supplying industries is decreasing. The original vertical integration of forestry, pulp mills and paper manufacturers is gradually replaced by more horizontal integration: big conglomerates in Europe and elsewhere are shaping up to produce every conceivable paper-related product from a variety of raw materials. This increasingly includes recycled paper.

The EC pulp and paper sector is highly innovative, modernising its machine park at a fairly rapid rate. Scale advantages and efficiency gains still continue to increase productivity. But despite this trend, the unit labour costs and the total unit costs continue to rise. Labour costs rise slightly because the industry workforce needs continuous training and ever higher technical education. Total unit costs increase even faster because of the high levels of investments needed to stay competitive. The level of indebtedness of many major EC producers is significant.

INDUSTRY STRUCTURE

Companies

The number of paper and pulp companies is still gradually decreasing and their average size is getting bigger. Nevertheless, the level of concentration within the EC is still low compared to the situation in Scandinavia and the USA. The

five largest companies in the EC are: KNP BT (NL), Arjo Wiggins Appleton (UK), PWA (D), Jefferson Smurfit (IRL) and Jamont (B). Most of the largest companies are integrated, participating in the pulp, paper and board industry as well as in the paper and board converting industry.

The major events in recent years were the 1990 takeover of the EC's largest firm, Feldmuehle Nobel (D), by the Swedish giant, Stora, and the merger of Arjomari (F), Appleton (USA) and Wiggins (UK) in the same year.

The years 1989-1990 were marked by increased acquisitions by Scandinavian and American companies within the EC and some regrouping among EC companies. The USA's largest paper company, International Paper, bought Zanders (D), Cookson Graphics (UK) and Laurent-Espaly (F). In 1989, the Swedish firm, SCA, bought Reedpack (UK). Kymmene of Finland bought Chapelle Darblay (F). The Irish based Jefferson-Smurfit internally restructured its US operations and acquired some smaller mills in the USA as well as in Europe.

The year 1992 was a quiet one as far as mergers and acquisitions were concerned. During 1992, firms have been developing minor operations to strengthen their markets and to step into new ones. USA and Scandinavian companies have acquired some small mills in the EC, while the process of regrouping among EC firms has continued. The main operation among EC firms was the KNP (NL), Bührmann-Tetterode (D) and VRG merger which created KNP-BT. This consolidation began in 1992 and was completed in early 1993. Other operations undertaken in 1992 were: Jamont (B) acquiring Dancrepe (D), Metsa-Serla (SF) expanding its position in Finland by buying Kotka Tissue mill, Bührmann-Tetterode (D) buying 49% of Hartmann & Flinsh (D) making its share of Hartmann & Flinsh now 75% and Saffa (I) acquiring 76% of the Kolicevu Board Mill in Slovenia

Late in 1993, KNP-BT (NL) and Leykam Mürztaler (A) announced plans to form a new company, KNP Leykam, which will be Europe's largest coated paper producer.

Strategies

Practically all top European (EC and EFTA) paper manufacturers have been involved in major restructuring activities in the past years. Because of the overcapacity, industries are now less convinced that bigger is better. The financial world is also less keen to finance the mergers and takeovers of already firmly indebted companies.

The average production per American mill is much higher than in the EC; 75% of EC mills, mostly non-integrated, have an annual capacity of less than 50 000 tonnes. By contrast, 60% of the EFTA mills, mostly integrated, have a capacity of more than 50 000 tonnes. However, further restructuring should not necessarily entail expansion of scale. In many market niches, the industry needs smaller and more flexible production units which are increasingly closer to their markets. The recent rate of structural change was greater in Europe than in North America and Japan, this may have contributed to increased uncertainty in the industry.

ENVIRONMENT

Although the industry was among the first to acknowledge the importance of monitoring the "eco-balance" in its production processes and actively recycles a large proportion of paper, it has become the target of several hard hitting protest campaigns.

Protest campaigns of international environmental organisations focused on four main issues: the bleaching method using chlorine and chlorine compounds necessary to obtain a flawless white colour in quality paper; the quantity of forest wood used in paper production; the degree of recycled paper to be used in the production process; and the high and growing per capita consumption of paper in the Western world.

In response to these pressures and a growing consumer awareness, the industry has a strong case to present. Firstly, the pulp and paper industry is one of the few which actually regenerates its raw materials. Sustainable forestry is employed in Europe where at least two trees are planted for every one that is harvested, with the result that forests in Europe are actually increasing. Secondly, the industry has switched largely from the use of pure chlorine gas to the much less harmful chlorine-dioxide as the main active ingredient in the bleaching process. Thirdly, the industry already recycles almost half of the paper consumed in Europe and is still stepping up this activity. In 1992 the European paper industry used 25 million tonnes of recovered fibre, equal to the use of chemical pulp. There are, however, other effective methods of waste disposal besides recycling, such as energy recovery in state-of-the-art incineration plants.

REGULATIONS

The European Community is presently developing a regulation which will affect the pulp and paper industry. The industry fully supports this pan-European of harmonisation, rather than the development of national legislation, because the latter risks hampering international trade without actually improving the environmental impact of global pulp and paper activities.

A proposal for a packaging waste directive that aims to increase the amount of waste to be recovered places increased responsibility on manufacturers to assist in waste disposal. In Germany, legislators have already set very high recovery standards and forbid incineration for packaging waste. The impact of this policy in this crucial market may influence pending EC legislation.

One major effect of the German legislation which has already been demonstrated is its important effect on the waste paper market. Waste paper prices have become so low that collection by private enterprises is not attractive. In certain cases, prices have even become negative because municipalities no longer knew what to do with their growing stocks. All these direct and indirect market developments will have to be carefully considered in the development of waste management policy, integrated prevention and pollution control, eco-labelling, eco-audits, etc.

OUTLOOK

General macroeconomic variables such as reduced consumption, unstable currencies, excess productive capacity, together with a significant political uncertainty, do not point out to a rapid recovery in demand or profitability. Also, USA and Japanese economic recoveries seem to be too slow to boost the world economy.

The European market, mainly driven by slowdown forces, is rapidly changing its conditions. The industry must be very flexible to adapt to these new conditions. Unstable supply and demand developments among the different paper grades make it crucial that modern facilities flexibly produce the kind and quantity of paper which the market is willing to absorb. The industry will undertake further restructuring activities in next few years.

Demand may pick up by mid or late 1994. This will release the pressure on prices, nevertheless overcapacity will still remain since considerable capacity increases have been recently developed and some are still planned.

The Eastern markets will have positive impact in the EC pulp and paper industry but only in the medium or long-term outlook. In the short run, it is likely that demand in Eastern Europe will grow particularly for lower grades of paper such

Table 7: Pulp, paper and board
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-3.5	1.6
Production	-1.5	1.8
Extra-EC exports	5.5	6.0

Source: P&G

as newsprint. In the long run, new production facilities in these countries might serve other European consumers.

Written by: Sociedad de Estudios P&G
The industry is represented at the EC level by: Confederation of European Paper Industries (CEPI). Address: Avenue Louise 306, B-1050 Brussels; tel: (32 2) 627 4911; fax: (32 2) 646 8137.

Paper and board converting

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The paper and board industry is strongly influenced by the activity of the general economy. Since the beginning of general economic slowdown in 1990, the industry has nearly come to a standstill. Its production increased slightly in 1992, nevertheless it reached a new record high of 44.4 billion ECU. The best performance of the industry indicators was achieved by its trade balance, with a strong improvement due to very significant export increases. Although production experienced a slowdown in some products in the industry, packaging products which make up the main proportion of the industry production value experienced a large growth, fuelled by increasing demand as a result of Germany's unification. Overcapacity in the paper production industry continued to spill over to the paper converters, pushing their prices down as well. Nevertheless, the paper and board converting industry has carried out a significant restructuring process, in which integrating and collaborating forces have been displayed. This leaves the industry in a much more solid position for the coming years, and facing a new set of challenges.

INDUSTRY PROFILE

Description of the sector

The paper and board converting industry covers all processing of paper and board into final applications in packaging, communications and other special uses. The industry manufactures a wide variety of products in packaging, often in combination with plastics and metal foils, in stationery and office supplies, wallpaper, labels, hygienic material, etc.

The distinction between the paper and board manufacturing and the paper and board converting industry is not easy to make. Increasingly, the major European paper producing manufacturers integrate forward into the production chain. As such they become active in both production and converting markets.

Recent trends

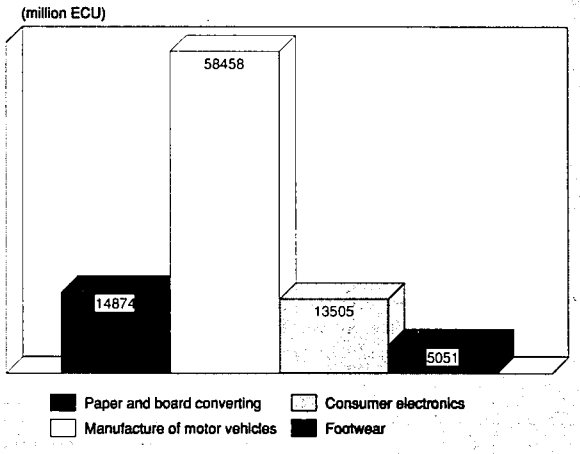
The size of manufactured goods made of paper and board increased steadily in the EC during the 1983-1992 period. The trade balance has always been of small proportion, although positive. In 1992, the trade balance experienced a significant improvement which contrasts with the reduction of previous years due to the increase in imports. In 1992, EC exports rose 6.2% and imports fell by 0.5%. The main trade flow, approximately 75%, takes place within the EC.

The paper and board converting industry is a major contributor to overall industrial activity. Its value added in 1992 reached 25% of that of the motor vehicles manufacturing industry and was 10% higher than the consumer electronic industry. The breakdown by country shows that the largest producer within the EC is Germany, with 30% of total value added in 1992 followed by the United Kingdom (23.1%), France (20.2%) and Italy (10.1%). At the same time, production and employment, measured in constant prices (1985), grew faster than those in the average EC manufacturing industry.

The breakdown by country shows that the largest producer within the EC is Germany, with 30% of total value added in 1992, followed by the United Kingdom (23.1%), France (20.2%) and Italy (10.1%).

Average growth rates during the 1983-1992 period were 3.5% and 3.4% in consumption and production, respectively. Both production and consumption grew much faster in the first half of the period, 4.5% and 4.4%, respectively. Extra-EC exports grew at an average annual rate of 5.5% in the period 1983-1992, the rate being higher in the latter half of the 1980's and first years of the 1990's (5.8%). From 1983-1992, extra-EC imports grew at an average annual rate of 7.2%, although the rate was higher during the first half of the period: 7.9% from 1983 to 1988.

Figure 1: Paper and board converting
Value added in comparison with other industries, 1992



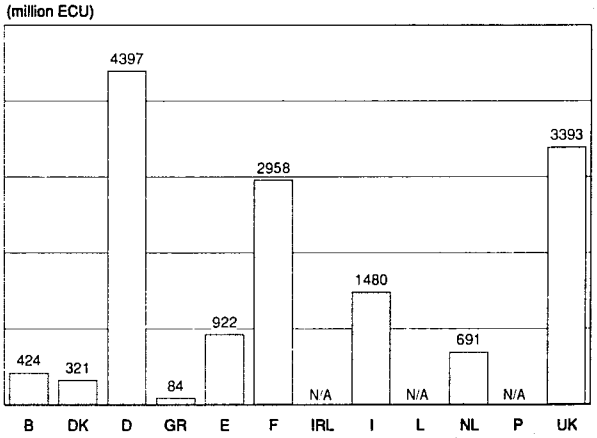
Source: DEBA

International comparison

The EC paper and board converting industry is widely diverging in its activities. Thus, it is difficult to make clear comparisons between Scandinavia, North America and Asia. The EC is the second largest producer of paper and board after the USA. In 1992, EC production was about 60% of that of the USA. Nevertheless EC production compared with the USA accomplished a higher growth rate during the 1985-1992 period. Japan's production, nevertheless, experienced the highest growth rate: approximately 27% from 1985-1992.

As in Europe, the prosperity of the paper-derived products industry in other regions is closely related to the health of the economy at large. Thus, the persistent recession in North America has had a negative impact on the sales of packaging products in the last few years.

Figure 2: Paper and board converting
Value added by Member State, 1992



Source: DEBA

Table 1: Paper and board converting
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	24 492	27 553	30 093	30 520	32 609	36 097	39 847	43 596	44 274	44 396	42 900
Production	25 037	28 190	30 849	31 157	33 078	36 529	40 348	43 995	44 546	44 879	43 600
Extra-EC exports	1 681	2 008	2 247	2 205	2 231	2 519	2 873	3 011	3 172	3 368	3 480
Trade balance	545.1	636.2	756.4	637.2	469.1	431.7	501.2	399.0	272.7	483.1	710.0
Employment (thousands)	389.8	386.0	381.4	375.4	383.4	389.2	399.6	405.5	404.8	401.4	380.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Paper and board converting
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	4.5	2.2	3.5
Production	4.4	2.2	3.4
Extra-EC exports	5.3	5.8	5.5
Extra-EC imports	7.9	6.4	7.2

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Paper and board converting
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	1 681	2 008	2 247	2 205	2 231	2 519	2 873	3 011	3 172	3 368
Extra-EC imports	1 136	1 372	1 490	1 568	1 762	2 088	2 372	2 612	2 899	2 885
Trade balance	545.1	636.2	756.4	637.2	469.1	431.7	501.2	399.0	272.7	483.1
Ratio exports/imports	1.48	1.46	1.51	1.41	1.27	1.21	1.21	1.15	1.09	1.17
Terms of trade index	106.6	100.6	100.0	101.2	100.4	98.1	94.9	94.6	96.1	97.0
Intra-EC trade	3 576	4 233	4 920	5 228	5 756	6 303	7 248	7 978	8 296	8 546
Share of total imports (%)	75.9	75.5	76.8	76.9	76.6	75.1	75.3	75.3	74.1	74.8

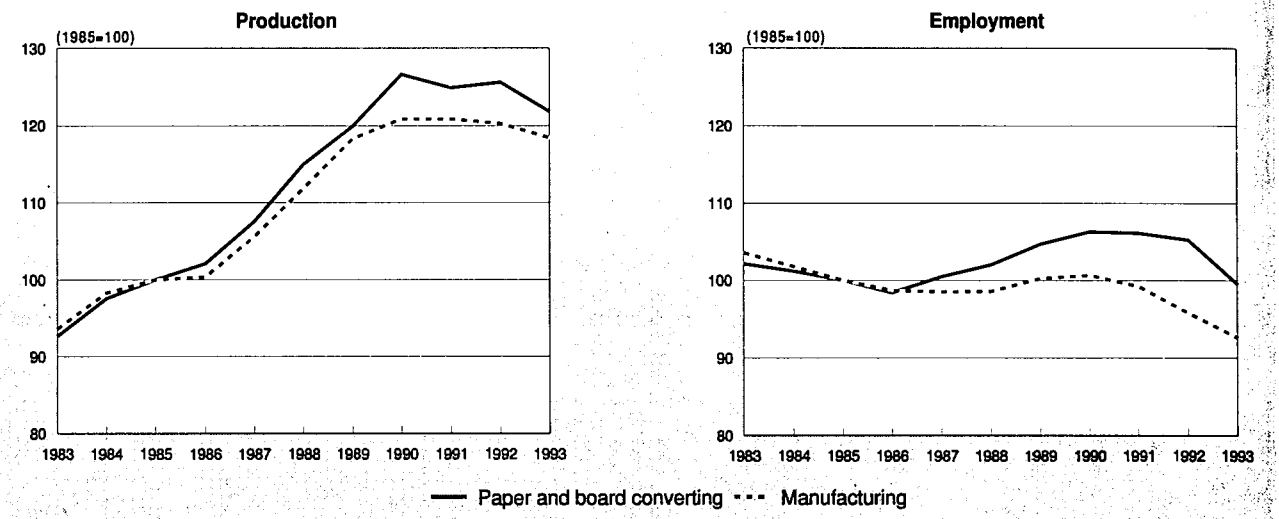
Source: DEBA

Table 4: Paper and board converting
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (2)	30.0	30.4	31.1	34.3	34.6	35.3	34.4	36.2	36.8	37.1
Productivity index	96.4	97.6	100.0	110.1	111.3	113.5	110.6	116.3	118.2	119.1
Unit labour costs index (3)	88.1	93.3	100.0	103.8	108.1	115.5	121.4	130.0	137.5	143.9
Total unit costs index (4)	81.1	92.4	100.0	101.3	106.3	117.0	126.3	135.5	140.6	145.2

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed; in thousands of ECU.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Paper and board converting
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

Foreign trade

Trade in most goods of the paper converting industry is limited. In packaging products, the volume/weight (i.e. corrugated board/containers) ratio makes transporting over longer distances particularly uneconomical. For other packaging materials, i.e. bags, sacks, folding boxes, this is no longer valid due to container transport systems. For hygienic products, office products, labels, envelopes, the volume/weight ratio is less relevant, and they are exported to distant markets in Asia and South America. Most production is organised as close as possible to the market to keep costs low. Both ratios of exports/production and imports/consumption reached a level of 7.5% and 6.5% in 1992.

Given the importance of geographical proximity for trade of paper and board, the main trading partners are the EFTA countries, which account for a share of about 40% of extra-EC exports and 68% of extra-EC imports in 1992, the USA takes only about 7% of total extra-EC exports and originates 13% of total extra-EC imports.

MARKET FORCES

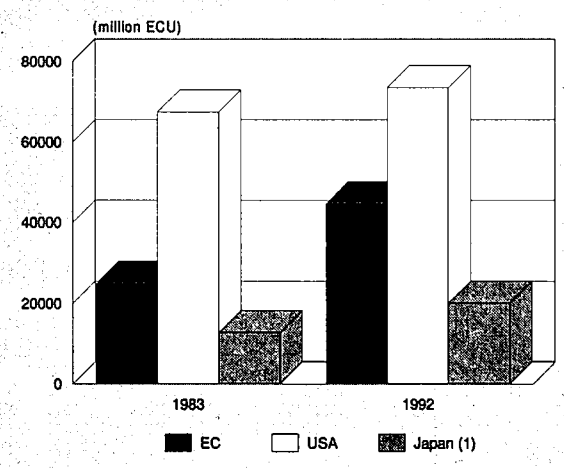
Demand

The 1992 market situation for the different product groups of the industry was as follows.

Packaging products represented approximately 60% of the industry's production. It includes corrugated and solid fibre board, folding and rigid board boxes and containers, paper packs and carrier bags and other wrappings of consumable items. Demand for packaging products continued to grow at high levels in the EC. The industry received an extra impulse by the unification of Germany, which already was the most important market. It was a particularly welcome boost since most EC Member States experienced lagging demand. Uncertainty arose out of the different environmental legislation in the EC Member States.

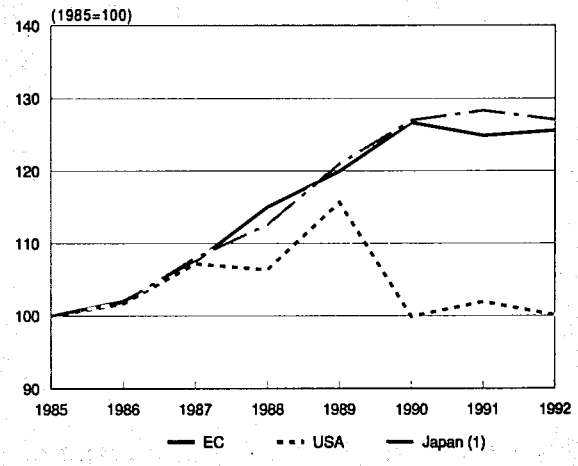
Household and hygienic paper goods represented the second largest segment of production in the industry. It includes high

Figure 4: Paper and board converting
International comparison of production in current prices



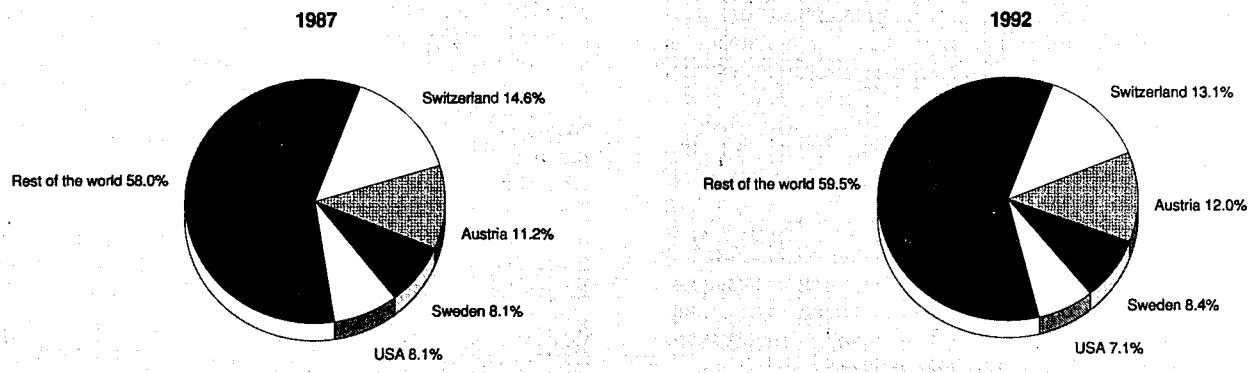
(1) Excluding Japanese Sic 1833
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Paper and board converting
International comparison of production in constant prices



(1) Excluding Japanese Sic 1833
Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Paper and board converting
Destination of EC exports



Source: Eurostat

quality products containing cellulose, cotton tissue and crepe paper, which are used in nursing, baby care and feminine hygiene. Demand for these products has grown exceptionally in the past two decades. Demand for products of slightly less added value, such as travelling items, kitchen towels and toilet paper has grown rapidly as well. It seems that after this period of strong growth, the market for these products has reached certain saturation levels in the EC, although consumption per capita of various goods still lies below the US average. Some growth of demand may still be possible in southern EC Member States.

Stationery and office supplies was the third largest segment of production in this industry. It includes envelopes, labels, printing and copying paper, and products for special applications such as fax paper. Shifts in consumer patterns and the emergence of new technologies has taken away demand from mail-related stationery such as envelopes to electronic transmission-oriented stationery such as fax-paper and computer printing paper. Overall demand for office supplies is still gradually rising. Although some long term effects are expected of a transition to an electronic "paperless office", most analysts believe that stationery consumption in the EC will still expand.

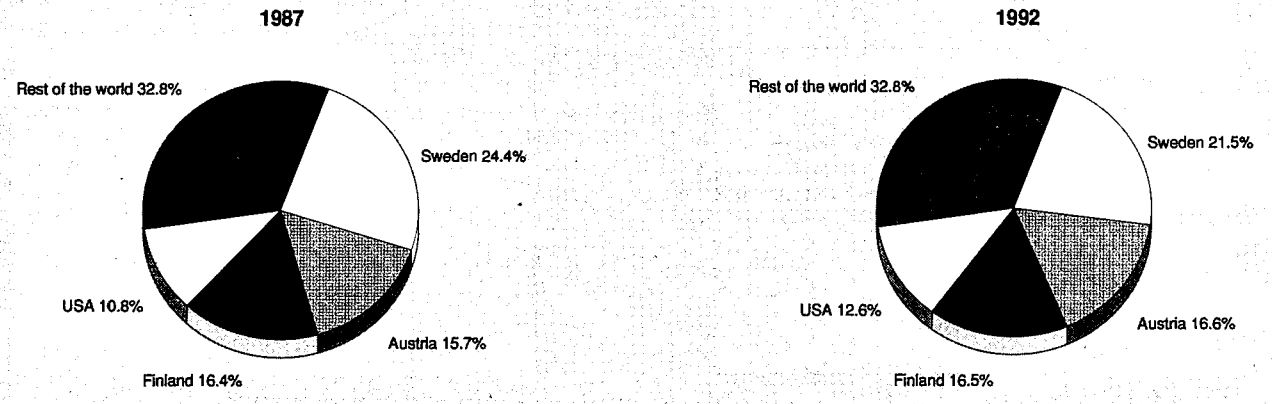
The fourth and last segment of production, miscellaneous, includes a wide variety of products such as core and tubes, wall paper, metallised paper, etc. This segment, because of the different nature of its products, exhibited a variety of tendencies during the last few years. Nevertheless, it generally showed a steady production increase.

Supply and competition

Overcapacity and the resulting pressure on prices in the paper and board manufacturing industry had an impact on the market for paper converting goods. But lower costs for the converting industry's raw materials have not led to higher profit margins as labour costs, transport and energy costs increased dramatically. The converting industry's customers have been able to negotiate lower prices for the end products. These customers include increasingly integrated retail trade chains which have considerable market power. Moreover, the industry is faced with steeply rising operating costs as a result of higher costs of labour and the financing of large capital investments.

The principal customers of the packaging industry are distributors, retailers and food processors. These customers are shaping up for the European single market and have much to gain with increased scale advantages and integration of

Figure 7: Paper and board converting
Origin of EC imports



Source: Eurostat

international operations. There are indications of heightened levels of cooperation among the principal players in this field. In the process, they become more powerful negotiating partners for their suppliers in the packaging industry. A similar trend takes place in the hygienic and stationery products sector.

The EC paper converting industry is gradually adapting to EC-wide economies of scale. The pace of restructuring is largely determined by the activities of non-EC manufacturers in the EC market. Major Scandinavian groups such as Stora (S), SCA Packaging (S), MoDo (S) and Iggesund (S) have been very active acquiring both paper mills and paper converting production units throughout the EC. The advent of the Scandinavians in the EC market had an important positive impact on the productivity of the EC-based industry as a whole. Their introduction of new production techniques and process innovations has been quickly followed by a substantial part of the EC industry. Labour costs and general productivity now compare positively against Scandinavian and perhaps even better against North American industry.

At the same time, some USA firms have enlarged their activities in the EC paper and board manufacturing and converting industries.

Production process

In some of its branches, the paper and board converting industry is integrated with the paper and board production industry. But as a whole it still remains essentially a separate and moderately fragmented industry of small and medium-sized firms. Originally, these two sides of the branch were clearly separated in an upstream side closely related to forestry and bulk paper production and a downstream side related to packaging and other applications, often of smaller scale. Today, bulk paper producers are integrating forward into the production chain. In competition with their Scandinavian counterparts, the large EC paper manufacturers acquire smaller converting production units. In doing so they gain efficiency, secure market shares and guarantee a steady demand for the raw materials.

These integrating forces led to synergies in new capital investments and a reorganisation of labour. As one notable result, the productivity index went up almost 20% from 1985 to 1992.

INDUSTRY STRUCTURE

Companies

Major EC, Scandinavian and North American companies in the paper and board converting industry are integrated: they produce paper and board as well as developed converting production. Together with further integration, companies in the industry have experienced a rapid rate of mergers and acquisitions.

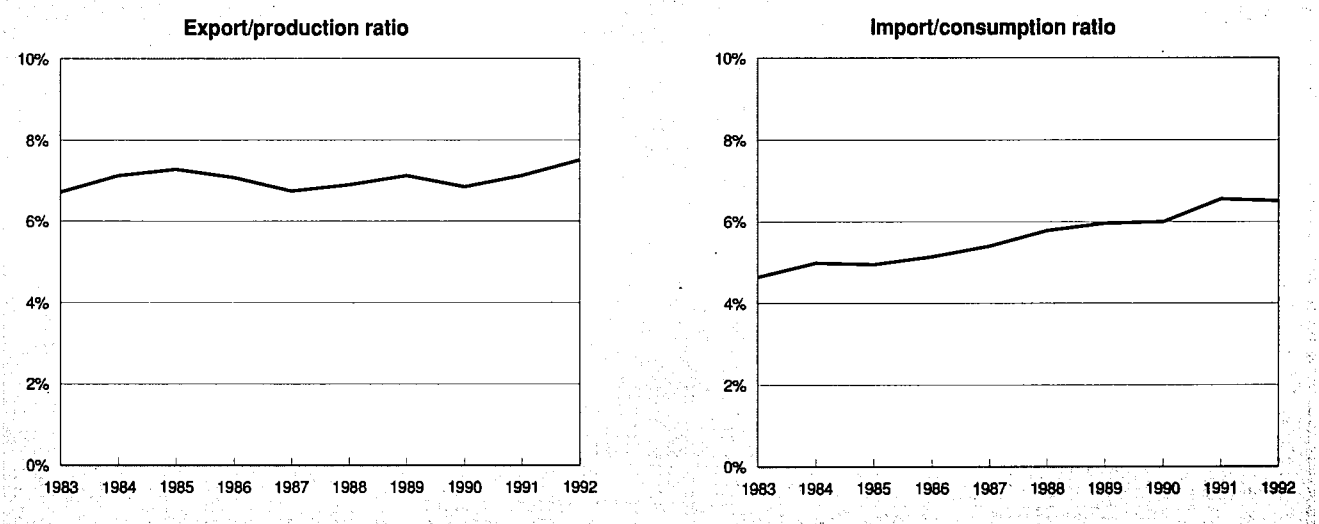
Major EC companies are: KNP BT (NL), Arjo Wiggins Appleton (UK), PWA (D), Jefferson Smurfit Group (IRL), Jamont (B), Saint-Gobain Paper Wood (F), David S. Smith (UK), Torras (E), La Rochette (F) and MD Papier (D). Scandinavian and North American firms are of a larger size than EC firms. Stora (S), Svenska (S) and United Paper (SF) are among the largest Scandinavian firms. The larger North American companies are International Paper (USA), Kimberly-Clark (USA), and Georgia Pacific (USA). Japan has some companies that are among the world's largest in the industry (integrated): Nippon Paper Industries, Oil Paper and Honshu Paper. Similar to the EC, most of the world largest above mentioned firms are integrated.

In 1992, there was a reduction in the number of enterprises. Following CITPA estimations, there were around 4 900 in 1992 compared to approximately 5 300 in the previous year. Most of existing companies are small and medium-sized. This large reduction has been caused by integration of companies as well as by multiple acquisitions carried out by extra-EC companies.

Strategies

The strategies of the EC paper converting industries are guided by the integrating forces from mergers and acquisitions which thrived in the late 1980s but which have been temporarily slowed down. Continued inward investments of Scandinavian and North American producers within the EC are forcing EC producers either to join them or to cooperate among themselves. The general expectation is that when business picks up again somewhere in 1994, the concentration of the industry will receive a new boost.

Figure 8: Paper and board converting Trade intensities



Source: DEBA

REGIONAL DISTRIBUTION

As with the bulk of EC paper production, most EC paper converting is concentrated in the United Kingdom, Germany and France. Some of the specialised packaging industries have settled close to foodstuffs production areas in Southern Europe and smaller countries in the North such as Denmark and the Netherlands. The biggest market, both for packaging stationery and hygienic products is Germany. This market has become even more crucial for EC producers after the reunification in 1990. Further details on regional distribution will be available in 1995 in PRODCOM.

ENVIRONMENT

The paper and board converting industry is directly related to environmental issues since society takes special concern with its raw material, trees. At the same time, the industry is related with general environmental issues such as energy efficient processes, solvent emissions, solid waste, etc.

The paper and board converting industry, mainly the corrugated board producers, are manufacturing products that meet modern environmental demands, following society's increasing demands for environmentally friendly products. As an example, no material comes from endangered tropical rain forest and there is an increasing replacement of primary fibres by recycled fibres. Waste paper and board is the most recycled material in the EC: 50% of municipal solid waste paper and board is recycled. Technological improvements in manufacturing and recycling processes have encouraged the use of recycled fibres. The percentage of recycled fibres in the total fibres used in the production processes varies depending on the products as follows: 80% in corrugated board containers, 70 to 100% in solid board containers, 50 to 70% in folding boxes, 60 to 100% in household or toilet paper and 60 to 100% in office products and stationary.

The packaging industry is most concerned with legislative developments in several EC Member States. Early in 1992, Denmark, the Netherlands, Germany and France implemented legislation to set minimum amounts of packaging waste which are to be recovered by manufacturers. The other main element of these new laws are minimum amounts of packaging waste which need to be recycled into the production process.

REGULATIONS

The EC is developing a waste packaging directive which will directly affect the paper and board converting industry as well as the pulp, paper and board industry. Through this directive, the EC is trying to increase the amount of material to be recycled and to create a harmonised legislative framework for all EC Member States.

Germany already has legislation with quite high packaging recovery standards. Other Member States are starting to consider similar legislative measures as a consequence of the recycling directive. In the case of Germany, the effects of legislation have already highlighted the problems related to the fact of not having a developed market for recycled materials. Waste paper prices have recently become so low that collection by private enterprises is no longer economically attractive.

Table 5: Paper and board converting
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	0.0	1.0
Production	0.2	1.5
Extra-EC exports	5.0	6.0

Source: P&G

OUTLOOK

The paper and board converting industry will face a negative growth in production in 1993 (measured in ECU): the first year with a negative growth after a decade of continued growth. The coming years, will experience slow growth as a result of general consumption slowdown. Most experts think that overcapacity in bulk production could be reduced by 1994. This fact, together with the restructuring process undertaken by the industry and new technical developments introduced, would allow some restoration of prices and profits.

New opportunities could be offered by the opening of new markets in East European countries. Tied closely to the transport and trading of consumable items, the demand for packaging products seems set to grow with increasing competition and consumer choice. The spending power of consumers in East European countries, however, will take several years to grow significantly. The new trading accords with some of the East European countries allow increased exports of certain goods to the EC. Since local production of EC-standard packaging material is hardly available in those markets, this might also trigger additional demand for the EC packaging industry. Stationery and hygienic products will probably profit less from these market openings.

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Printing and publishing
NACE 473, 474

Printing and publishing, with all its historical and cultural importance, is a mature sector of moderate and steady growth which benefits from a reduced susceptibility to movements in the economy by comparison with other media. Nevertheless, the industry is currently undergoing a technological revolution which could bring the whole of paper-based production into question.

INDUSTRY PROFILE

Description of the sector

The printing and publishing sector comprises all the stages necessary to transform a piece of creative work into a manufactured product available for distribution to the public.

The finished products of the printing and publishing sector are diverse and include books, encyclopaedias, daily and periodical press, maps, and musical scores.

Recent trends

In most EC countries, consumption and production doubled between 1983 and 1992. Since 1991, however, overall EC consumption growth has slowed down, reflecting the recession in the United Kingdom, the largest printing and publishing producer in the EC. Growth in consumption in South European countries such as Italy, Spain and Portugal, on the other hand, held steady.

As shown in Figure 2, the United Kingdom, France and Italy together account for over 50% of the value added of the sector in Europe, with the United Kingdom dominating with more than 20%. Data on Germany are not available.

The EC trade balance with the rest of the world remains in surplus both in value and volume terms. Following a period of marked volume growth, the balance has stabilised since 1985 as exports performed less well.

Figure 3 shows the remarkable growth of production for the printing and publishing sector during the 1983-1992 period. Employment in the sector has been rapidly growing after a temporary slump in 1986, and stabilised since 1990.

International comparison

With a population slightly higher than that of the USA and a diversity of languages and cultures, Europe publishes five times as many titles, 250 000 a year. From 1982 to 1986, the number of titles published rose in Europe by 10%, while production over the same period fell in the USA and Japan.

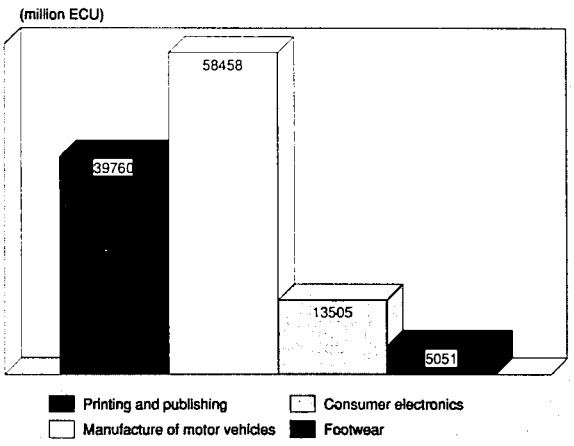
The USA remains the world leader in printing and publishing. In 1991 US production was worth 36% more than that of the EC and nearly double that of Japan, which had the fastest growth during the 1982-1991 period.

Foreign trade

EFTA is the EC's main partner in the printing and publishing sector for both imports and exports, surpassing trade with USA.

In fact, although language considerations do predominate in matters of trade, new markets are developing as economic frontiers expand. Within the EC, the wide use of the English language has allowed the United Kingdom to benefit the most from the single European market, closely followed by the Netherlands. The United Kingdom is becoming a crucial centre for European publishers, as well as an important entry point

Figure 1: Printing and publishing
Value added in comparison with other industries, 1992



Source: DEBA

for American printers and publishers wishing to establish themselves in the European market.

Intra-EC trade is growing at the expense of commerce with the rest of the world. Trade intensities are very low in the printing and publishing industry: the export/production ratio is about 4 to 5% and the import/consumption ratio is around 2%. This is related to the fact that major national markets are dominated by large domestic business groups.

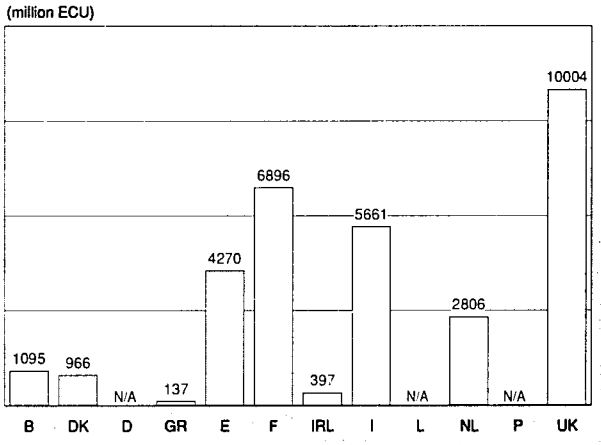
MARKET FORCES

Demand

Developments in the book, magazine and newspaper trade depend on a complex variety of factors, including economic and social aspects such as demographics, education, leisure trends, number of public libraries, buying power and financing possibilities ranging from sponsoring to advertising.

Books do not follow the rules which generally dictate the economic performance of other products. The book, in fact, is one of those basic products whose evolution takes place over the long term in keeping with the demographic circumstances. And every European country has seen a reduction in its birthrate.

Figure 2: Printing and publishing
Value added by Member State, 1992



Source: DEBA

Table 1: Printing and publishing
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	43 181	47 796	51 642	54 608	60 637	69 017	77 670	83 095	88 299	89 606	90 500
Production	44 411	49 462	53 601	56 424	62 521	70 903	79 665	85 231	90 402	91 859	92 600
Extra-EC exports	2 179	2 785	3 147	3 060	3 108	3 248	3 555	3 775	3 969	4 161	4 130
Trade balance	1 230	1 665	1 959	1 816	1 885	1 886	1 995	2 136	2 103	2 253	2 100
Employment (thousands)	819.5	809.5	801.7	786.5	811.1	832.4	869.1	882.1	886.4	882.6	865.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Printing and publishing
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	6.5	3.1	5.0
Production	6.5	3.1	5.0
Extra-EC exports	8.3	6.4	7.4
Extra-EC imports	7.5	8.8	8.1

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Printing and publishing
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	2 179	2 785	3 147	3 060	3 108	3 248	3 555	3 775	3 969	4 161
Extra-EC imports	950	1 120	1 188	1 243	1 223	1 361	1 560	1 639	1 866	1 908
Trade balance	1 230	1 665	1 959	1 816	1 885	1 886	1 995	2 136	2 103	2 253
Ratio exports/imports	2.29	2.49	2.65	2.46	2.54	2.39	2.28	2.30	2.13	2.18
Terms of trade index	105.3	102.0	100.0	106.4	112.6	113.3	110.3	114.7	101.3	102.7
Intra-EC trade	2 200	2 583	2 881	3 131	3 449	3 850	4 221	4 555	4 854	4 919
Share of total imports (%)	69.8	69.8	70.8	71.6	73.8	73.9	73.0	73.5	72.2	72.0

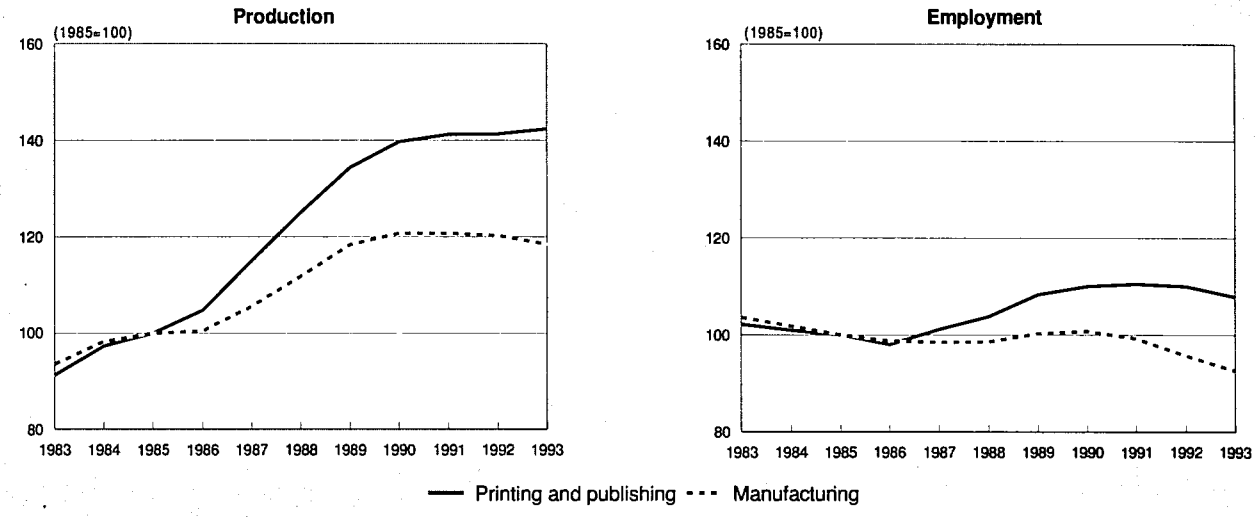
Source: DEBA

Table 4: Printing and publishing
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	34.0	35.7	36.9	39.9	41.1	42.9	43.4	44.6	45.0	45.1
Productivity index	92.2	96.9	100.0	108.2	111.5	116.5	117.8	120.9	121.9	122.2
Unit labour costs index (3)	86.6	92.8	100.0	104.1	108.2	114.3	121.2	127.0	134.1	137.8
Total unit costs index (4)	85.3	92.5	100.0	105.5	114.0	124.8	134.5	141.0	148.9	154.3

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Printing and publishing
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

Stagnancy in new school entries intensifies this trend, as a reduction in the number of children has not been offset by a wider provision of education.

The situation appears most favourable in the United Kingdom and France, where a slight rise in population is forecast. Meanwhile, the average birth rate in Europe has stabilised at around 1.9 children per couple; the corresponding figure for the rest of the world is 3.6.

Analysis of consumption trends for books reveals a marked difference between the South and the North, with the Southern Europe characterised by relatively weak reading habits. The same considerations apply to newspaper reading and, to a much lesser extent, magazine reading.

Books represent 27.5% of leisure spending in Italy, compared with 18.7% in 1981, but only 46% of the population can be described as "readers", among whom 70% read less than five books a year. In Spain 63% of the population does not read for leisure.

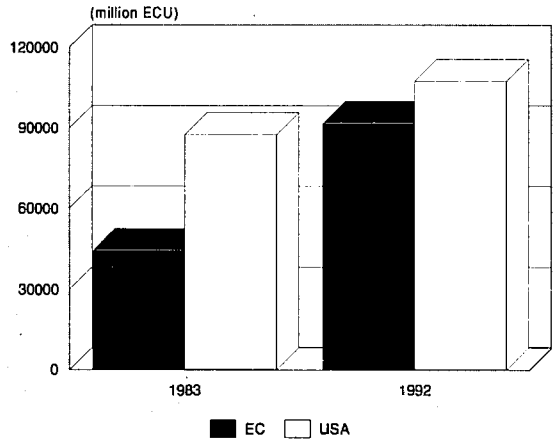
There is a strong correlation between the level of education attaincd and the tendency to read. On average, 93% of graduate Italians read regularly, compared to a figure of 26% for those less qualified.

While reading ranks behind television and radio, nearly 50% of Britons read one book per month. Despite such a high consumption rate, the level of buying is very low: of the 56% of regular readers, only 60% actually purchase their books. This situation is due to the importance of public libraries - seven times more numerous in the United Kingdom than, for example, in France.

Overall, Europe is a mosaic of contrasts. In addition to major cultural differences, we can highlight:

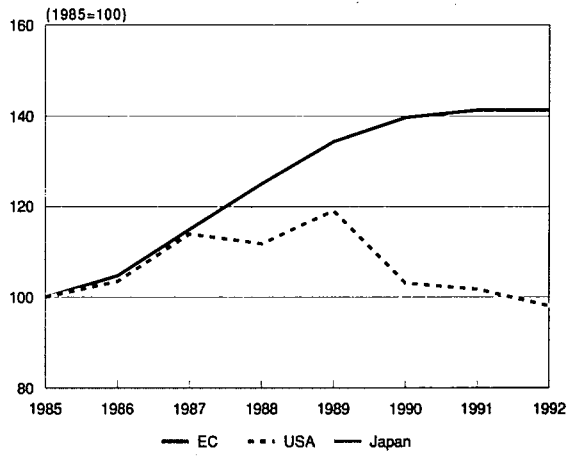
- the ageing of the readership in Northern Europe linked to demographic factors, as well as regular consumption of books, magazines and newspapers due to improvements in living standards and the cultural importance of reading in these regions.

Figure 4: Printing and publishing
International comparison of production in current prices



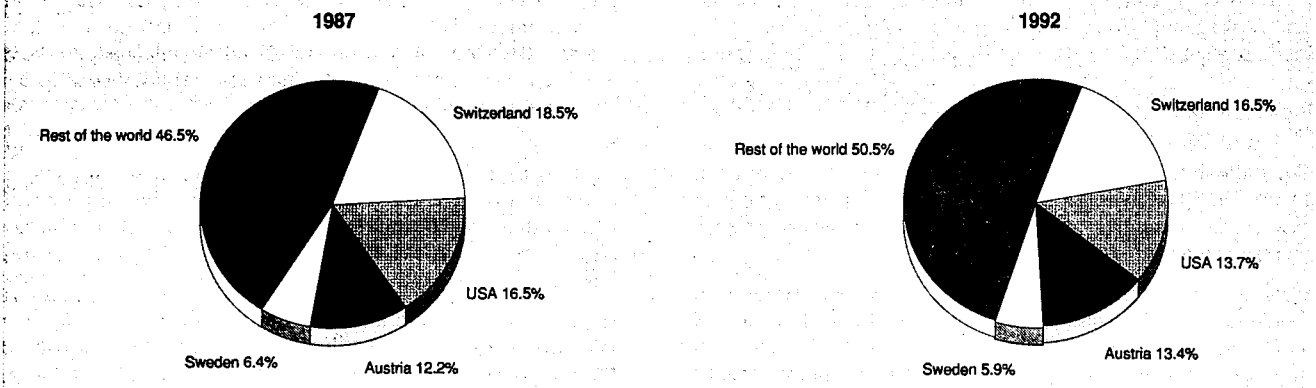
Source: DEBA, Census of Manufacturers

Figure 5: Printing and publishing
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers

Figure 6: Printing and publishing
Destination of EC exports



Source: Eurostat

- increased importance given to reading in the cultural habits of Southern Europe due to improved education. This now means that the most committed readership is among the young.

Despite national disparities throughout Europe, it would appear that two sectors of editorial are emerging to cater to the interests of the main groups and the upper segment of small and medium-sized businesses - youth and educational publishing.

For a long time, children have been considered prime consumers; seen as the readers of tomorrow, they have spearheaded the youth sector as a major arena for socio-cultural activity. Educational success is a key factor for professional development and one of the main sources of parental concern. Encyclopaedias and dictionaries, as part of the educational publishing sector, also represent a rapidly expanding-market.

Supply and competition

Two separate phenomena have given rise to talk of a "publishing crisis" in Europe. On the one hand, stagnant sales have held down the number of titles published. On the other, the titles that have been published testify to editorial dynamism and healthy competition.

In the book publishing in particular, the apparent contradiction between these two phenomena has led to what some see as a crisis of over-production, resulting in a reduction in the size of average print runs. Stagnation or even reduction in the number of copies published emerges as a widespread phenomenon.

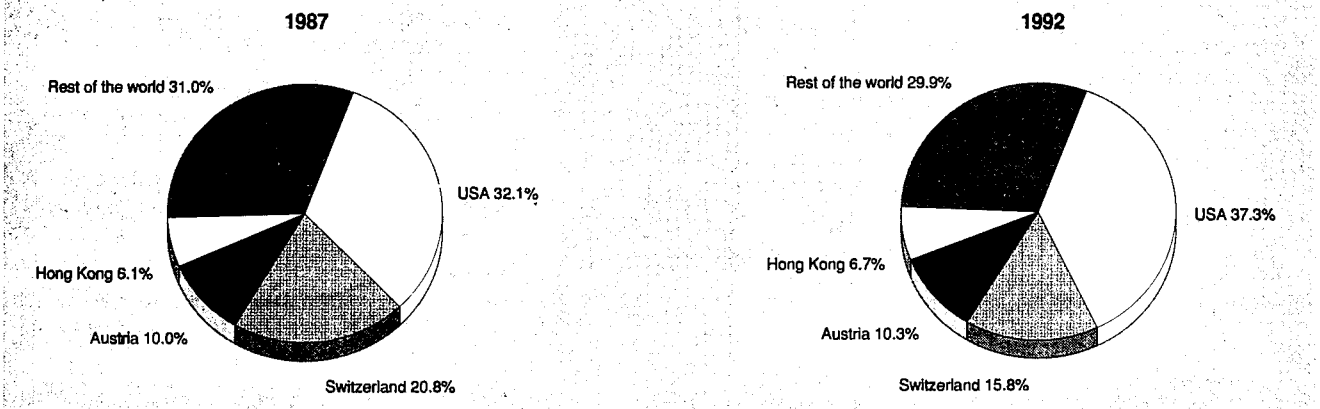
In Germany, the average print run for a contemporary novel never exceeds 5 000 copies. Those countries with the most vigorous publishing sector are the ones most hurt by cutbacks in average print runs.

The countries where production has grown most are the United Kingdom (with 68% growth between 1976 to 1986) and Spain, with a growth rate of 50% over the same period.

The number of titles published gives some indication of the expansion of the market; the percentage of new titles gives a further indication of market health.

Accordingly, Germany exhibits a high number of published titles, but a low ratio of new titles (27% of the total in 1989). France and Italy come in the middle, with the ratio of new titles to overall published output roughly balanced. Finally, the Netherlands, Spain and the United Kingdom exhibit strong

Figure 7: Printing and publishing
Origin of EC imports



Source: Eurostat

market vitality, with new titles accounting for some two-thirds of total published output.

Commercially speaking, new titles are high-risk area for publishers, whereas reprints reduce uncertainty and hold down fixed costs on a larger number of units over a longer period. The strategy of differentiation practised by the major publishing groups can be seen, to some extent, as "competition by attrition", with each publishing house attempting to secure maximum shelf space in retail bookseller outlets and, by definition, crowding out its competitors.

The reduction in average print runs and price rises are related. In practise, the average production cost of a book falls in relation to the number of copies published. Lower print runs therefore push up average unit costs.

Book prices do not obey the laws of supply and demand. In fact, eleven EC countries have adopted different forms of single-price arrangements. Only in Portugal is there a system of free pricing for books. On the other hand, books benefit in general from lower value-added tax rates. These range from zero in Italy, Portugal, the United Kingdom and Ireland to 22% in Denmark.

Book publishing has been affected by developments in audio-visual media, but the press has been affected even more. Advertising revenue, the principal source of finance for the press, has fallen dramatically over the last ten years, with advertising spending in the press dropping from 77% of total revenues in 1980 to 41,6% in 1990. Over the same period the corresponding figures for TV advertising revenues rose from 15,8% to 25,1%.

Nevertheless, despite forecasts that dailies, weeklies and periodicals would disappear as a result of the rise of audio-visual media, the principal newspapers have maintained their profit level over the last ten years.

The market for the press in southern European countries is relatively underdeveloped. Huge disparities are shown by the following figures on the ratio between daily newspaper circulation and population: Germans are top ranking in the EC as 426 copies are sold daily per 1 000 inhabitants against 157 in France, 81 in Spain and only 39 in Portugal.

In addition, the press is highly competitive. In European countries on average, ten daily titles together account for more than 50% of national circulation. This situation is most pronounced in the United Kingdom, where that percentage is reached by combined circulation of only four titles.

The 1990s will be witness to a major upheaval in printing and publishing as the very notion of paper-based media is progressively challenged. A CD-ROM (Compact Disc - Read Only Memory) is capable of storing up to 550 million characters - the equivalent of about 25 000 printed pages - and has become a vital storage medium for activities such as archiving, data banks and directories.

Meanwhile, the CD-I (Compact Disk Interactive) has a storage capacity capable of storing and reproducing sound and images as well as text. The CD-I also permits interactive audio-visual applications via a simple remote control device. Units are already on sale in the USA, and the launch of CD-I on the UK market was planned for June 1992.

Given this enormous text and image data storage capacity and know-how, CD-I publishers will play a major role in these markets: when it comes to targeting the public at large, the industry will be critically dependent on publishers.

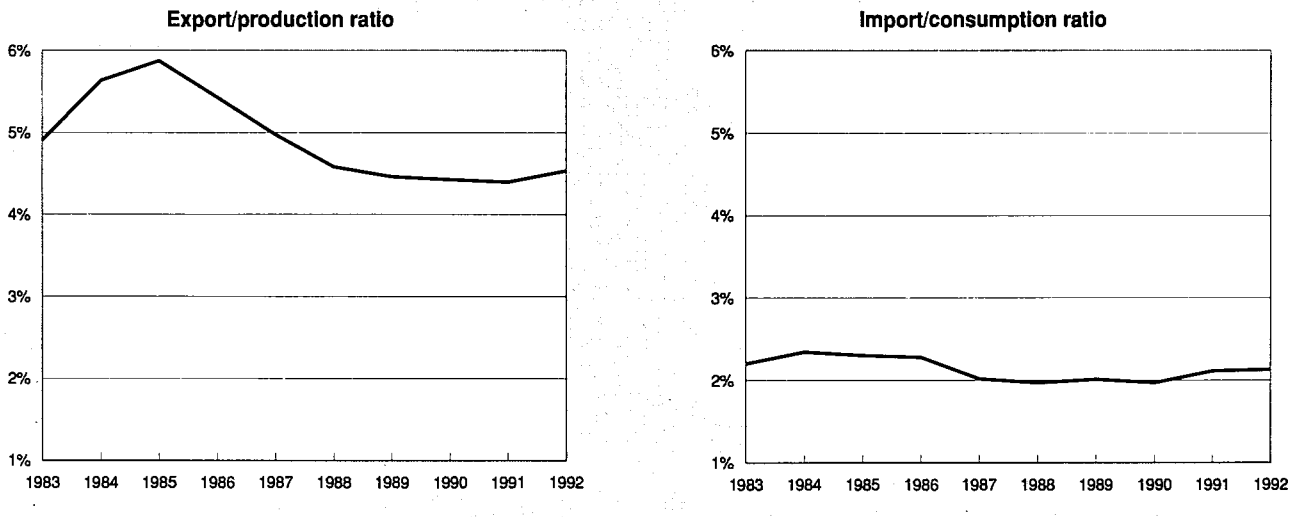
Production process

The printing and publishing sector is characterised by strong value added and a high dependence on skilled personnel. In Germany, where manpower is particularly expensive, printing labour costs can represent 36% of total costs in Germany.

The main stages in the manufacture of a book are: editing the work following acceptance of the author's manuscripts; a technical stage where typesetting and pagination allow a calculation of the costs of production and the raw materials needed; return of the composed text to the publisher in proof form; initial correction; layout and illustration with preparation of a "dummy" copy for the printer; checking printer's final proofs; printing a determined number of copies; distribution of the requisite number of copies to points of sale; and acceptance of returns or unsold copies at the publisher's expense.

In the course of the last few years, computer-assisted publication (CAP) and desk-top publishing (DTP) have generated professional interests. Computerisation of design and manufacture has allowed considerable gains in time and cost, but CAP will add to salary costs in the short term, since the process requires new skills from the workforce. CAP seems to be better adapted to limited print runs and, as a result, is more cost-advantageous to smaller publishers than to the major groups.

Figure 8: Printing and publishing
Trade intensities



Source: DEBA

In hardware terms, computerisation opens up the possibility of creating new forms of published product such as CD-ROM and CD-I. For example, a 9-volume dictionary weighing 50 kg can now be captured on 6 cm disc weighing a few grams and the entirety of its information accessed in a matter of seconds.

In the printing sector, most films now use electronic systems for composition and image processing. Photo composition has now replaced hot metal as the main technology. Micro-publishing (desk-top publishing) has also brought about considerable changes in the sector by facilitating PC-driven integrated text and image processing.

These technological innovations imply improved qualifications for staff and increases in productivity. Output per employee has thus risen from ECU 59 000 in 1980 to ECU 73 000 in 1989 (at constant 1985 ECU values).

A special feature of publishing is the cost burden of "returns", i.e., unsold copies. This burden is all the more difficult to bear in a period of recession. Books which are not sold are returned and destroyed/recycled.

Part of the problem is that available sales space tends to remain constant, whereas the number of titles on the market continues to grow. Inevitably, this disparity leads to a reduction of the time a book is on display, and its overall life-span. Volume and speed of returns has affected some publishers disproportionately, with several experiencing rates of return of over 60%.

Both the printing and the publishing industries require an increasing level of capitalisation. the best-known example is in dictionaries and encyclopaedias, where long production and commercialisation lead times presuppose financial resources to absorb heavy cost burdens both during the period of investment and to cover the costs of promotion and publicity to launch the title on the market.

INDUSTRY STRUCTURE

Companies

Europe's publishing sector is highly fragmented. Most groups have activities beyond merely publishing, covering a wider range of economic activities such as printing, press and publishing, bringing together a range of activities of creation and manufacture of paper-based media. Fewer than 10% of all printers operate independently of a publisher.

The main groups such as Bertelsmann (D) and Hachette (F) range even further afield, and are involved in multi-media activity.

The trend towards concentration by acquisition and merger is not equally marked in every country, but it is growing everywhere.

In Italy, the three main groups are Mondadori (30% of the market), Rizzoli (12%) and Fabbri (10.5%).

In the United Kingdom, the two publishing giants are Pearson and Reed which, between them, have 31% of the domestic market.

In the Netherlands, where 500 publishers serve a population of 15 million, three houses dominate: Elsevier, Wolters-Kluwer and VNU, which together control two third of the nation's publishing activities.

In Spain, five groups - Planeta, Anaya, Plaza y Janes, Circulo Lectores and Salvat - represented 38% of the market in 1983.

In France, five main groups, control three-quarters of the market. Groupe de la Cité and Hachette hold two-thirds of the national market between them - a situation without parallel elsewhere in Europe. Having said that, French publishing as a whole is characterised by modest levels of globalisation and poor sales of French language books on international markets (as compared with the performance of Anglo-Saxon publishers).

Strategies

The two main aspects of strategy are concentration and globalisation. Publishing groups are developing both vertical (publishing and distribution) and editorial (diversification) strategies in these new areas as well as in traditionally profitable areas, the net result being to favour economies of scale. However small publishing houses have a capacity for creativity and flexibility which allows them to stay in the market.

Publishers, in the strict sense of the word, tend on the whole to be medium-sized in Europe, with the exception of the major Dutch groups Elsevier and Wolters-Kluwer. The latter has recently purchased Liber, the second largest publisher of Sweden, as part of its strategy of expansion in the Scandinavian markets.

Mixed books/press houses are becoming more numerous, as a result of a growing synergy between the two activities: newspapers and magazines remain the most reliable media for book promotion. Thus, Mondadori acquired control of L'Espresso, a famous Italian weekly magazine, in 1989.

The most prestigious names belong to the multi-media groups: Bertelsmann (D), Time-Warner (USA), Paramount (USA), News Corporation (AUS) and Hachette (F). These groups have a presence in all the main mass media markets - books, cinema, television, press - and all have extensive international connections.

Globalisation strategies are pursued in general by way of subsidiaries or by acquisitions. In practise, publishing groups - acknowledging their limited knowledge of international markets and the cultural differences implicit in language and business practices - are more likely to expand by acquisitions rather than industrial or commercial means.

Bertelsmann and Hachette are the most international of the major global groups. Between now and the mid-1990s, however, they will in all probability be joined by groups like Pearson and Reed, which have made no secret of their intention to diversify away from their pronounced Anglo-Saxon orientation.

Meanwhile, the Single European market is obliging publishers to consolidate their position in Europe: what is at stake is not so much Europe itself, but the principal European languages which predominate on world markets: English, Spanish, and, to a lesser extent, French.

Expansion both in Europe and throughout the world is nevertheless limited by the national character of information. None of the multi-media groups has a major position across Europe in the three main media - press, TV and radio.

ENVIRONMENT

Paper consumption in developed countries is of the order of 120 kg a year per inhabitant. Demand in the OECD countries for wood pulp, paper and cardboard is projected to grow substantially in volume, from 150 million tonnes today to some 200 million tonnes by 2010.

Western Europe uses a total of 27.5 million tonnes a year of graphical paper. Books consume 1.5 million tonnes, magazines 4.6 and newspapers 6.8. The remaining 14.7 million tonnes go to advertising, free sheets, directories and catalogues. The use of recycled paper is increasing.

The publishing industry is itself involved in the debate about collection and recycling. Research is being carried out, not merely on how to increase paper recycling, but to analyse the overall environmental economics of the paper chain. New areas of interest include the valorisation of the energy content

of paper fibres that underwent different life cycles and have lost their useful mechanical properties.

REGULATIONS

As a cultural product, books ought to remain affordable to consumers. For this reason, most European countries apply conservative measures on pricing, Portugal being a notable exception. These measures would appear to be crucial to the continued existence and development of the distribution networks needed to keep books available to the public and, by extension, for the survival of literary creativity in all its diversity.

In the United Kingdom, the Net Book Agreement governs the fixing of book prices. It is for the publisher to decide whether his books should be sold at a free or an imposed price. In practice, only textbooks tend to be sold at free market prices.

In Germany, publishers themselves operate the rules on price fixing. In Germany, bookshops are bound by collective contract with 1 700 affiliated publishers to respect the fixed cover price. A similar arrangement operates in Italy. In France and Spain, legal provisions exist to enforce the obligation to sell at the published cover price.

One way out of the problem is to purchase and sell rights on a pan-European level; this, of course, would entail larger investment on part of publishers.

It will be difficult, especially in the case of more internationally-oriented publications such as English-language encyclopaedias and technical and scientific literature, to maintain an imposed price which differs according to the country concerned. The logic of the Single Market calls for application of a European price in the country with the lowest applicable value-added tax.

The book publishers' concern on VAT is echoed in the daily and periodical publishing business. The present differences in taxation policy with some zero-rate strongholds may come to an end if the EC were to decide to harmonise the rates applicable to publications. The industry is running massive lobby efforts to safeguard the possibility of having zero VAT on print.

OUTLOOK

The publishing sector is best described as a mature sector posting regular if moderate year-on-year growth. Because of its peculiar mix of historical and cultural factors, the publishing market is relatively immune from economic swings.

The cultural habits of consumers are the key to future development in the sector. Its evolution depends on socio-economic factors such as demographic trends, education, industrialisation, political trends (as in Spain, Greece and Portugal) and, not least, tradition.

Table 5: Printing and publishing
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-1.0	1.0
Production	0.0	2.0
Extra-EC exports	0.0	1.5

Source: LEK Partnership

New technologies now seem to be complementing rather than substituting for the written word: in fact, those countries which have emerged as the prime consumers of images are also those which remain most attached to the written word.

The most promising sub-sectors of the publishing industry are those connected with knowledge, teaching and professional training - such as dictionaries, encyclopaedias, textbooks, practical guides and books aimed at the youth market.

The application of new technologies in publishing - either as production aids or as new media per se - is still at an embryonic stage. New products derived from books or developed from synergy between different media - sound, images, text and data - can be expected to multiply and stimulate global markets.

The development of EC regulation on media concentration as well as EC research programmes may influence the way the European media houses will adapt to the technological change and become competitive multi-media operators.

Written by: LEK, based on Panorama 1993
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Printing
NACE 473

Comprising more than 60 000 firms and employing some 670 000 people, the Community's graphic industry handles a turnover of over 50 billion ECU. The industry is mainly made of small enterprises, as 85% of the companies of the industry employ less than 20 persons. The graphic industry is a modern, high-technology industry which, by keeping up with the latest manufacturing processes and investing heavily in new machinery over the last few years, has placed itself at the forefront of technical progress. Image processing in modern printing is now carried out by computer or computer assisted equipment. This technology requires highly-skilled workers.

INDUSTRY PROFILE

Description of the sector

Printing firms produce a wide variety of products ranging from simple visiting cards printed in one colour, to bulky, four-colour, direct mail catalogues. The smaller firms work mainly with local clients, for whom they produce personal or commercial printed documents, whereas bigger firms often deal with clients further afield and supply, for example, printed advertising material, books or continuous stationery. Some large firms run both a printing and a publishing house, and specialise in newspapers and magazines.

Larger firms, doing gravure printing, often print and/or publish magazines, catalogues and long-run advertising material for the international market.

Of course, this variety of markets goes together with a variety of results; the economic health and vitality of local markets can vary substantially because of their economic, cultural and social situation.

Recent trends

Despite the economic growth of the last few years and the positive effect on employment and production, the graphic industry in Europe is now developing differently from country to country. Germany, for example, benefited from a continuation of its economic growth, partly because of the increase in demand after the unification of Germany, but the situation has declined considerably since then. On the whole, though, in 1992 the growth of the graphic industry somewhat exceeded that of the community's economy. In 1992 exports to non-EC-countries amounted to 1 500 million ECU, whereas imports amounted to 718 million ECU.

Foreign trade

No detailed figures on trade in graphic products (or trade structure) are available because external trade statistics do not distinguish between the trade of printing firms and that of publishing houses.

The production of graphic products in EC Member States is mainly determined by internal demand. The export rate is in general below 10%. This relatively low figure is due to several characteristics of the industry, such as the need for frequent contacts with the client, the great need for communication during the work, linguistic barriers or the relatively high costs of transport. Exports concern mainly large runs or special contracts, such as catalogues or other printed advertising, books or newspapers. Exports are in general done by a small number of large firms working in gravure or web-offset.

Most of the external trade with non-EC countries is done with other Western European countries. The amount of printed work done by EC-printers for outside clients has increased considerably in recent years. Trade with Eastern countries remains low but is expected to develop in the near future. Exports to non-EC countries are about twice as important as imports.

MARKET FORCES

Demand

In the graphic industry there is a direct link between demand and production because this sector supplies mainly to order. Printing firms are rarely able to manufacture for stock as other industrial sectors can.

Demand for printed products is influenced by a number of demographic and economic factors such as population growth, composition of households, training and education as well as economic growth. The graphic industry, just like the publishing sector, is above all a supplier of products which disseminate information and knowledge and cater for leisure activities. Its role stems from its cultural, intellectual and educational vocation within the context of the exchange of ideas and information found in democratic societies. Despite the low growth of population, the number of households and managerial jobs continues to grow as does the proportion of income available for education and information. All this continues

Table 1: Printing
Turnover (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	1 479	1 675	1 853	2 059	2 150	2 323	2 522	2 728	2 867	3 049
Danmark (2)	1 354	1 552	1 747	1 975	2 096	2 200	2 224	2 355	2 348	N/A
BR Deutschland (3)	9 595	10 329	10 905	11 849	12 756	13 518	14 660	16 296	17 813	18 231
España	2 483	2 923	3 174	4 147	4 550	5 160	6 173	7 424	7 628	N/A
France (4)	4 354	4 611	5 079	5 559	6 196	13 680	14 875	15 930	15 777	16 021
Italia (5)	6 667	7 384	7 459	7 764	8 764	9 432	10 593	11 039	11 088	10 592
Luxembourg	N/A	N/A	N/A	N/A	89	97	104	114	137	N/A
Nederland (4)	2 014	2 172	2 341	2 614	3 109	3 336	3 605	3 936	4 131	4 166
United Kingdom	N/A	N/A	N/A	N/A	N/A	4 184	4 561	4 621	4 582	N/A

(1) Eurostat estimates are used if country data is not available.
(2) Enterprises with 6 or more employees.
(3) Enterprises with 20 or more employees.
(4) Enterprises with 10 or more employees.
(5) Including NACE 474.
Source: Intergraf, DEBA estimates

Table 2: Printing
Employment (1)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	26 884	26 956	26 918	26 850	27 064	28 351	29 362	29 358	28 595	27 552
Danmark (2)	N/A	N/A	N/A	N/A	37 450	37 411	37 318	36 921	34 813	34 333
BR Deutschland	208 820	210 185	211 399	214 654	220 211	222 495	227 222	234 429	244 890	246 268
España	90 019	83 655	76 500	78 000	78 100	82 000	85 000	85 000	92 143	93 018
France (3)	79 636	79 981	77 982	77 536	133 968	136 601	140 262	139 971	140 862	139 300
Italia (4)	60 421	55 468	49 512	46 366	48 316	48 410	48 849	N/A	N/A	N/A
Nederland	48 939	46 970	47 774	49 144	54 517	53 191	53 686	55 653	56 986	57 137
Portugal	19 219	18 634	17 878	24 242	24 845	23 586	N/A	27 862	28 970	26 804
United Kingdom	N/A	84 302	83 800	84 600	82 600	N/A	N/A	N/A	N/A	N/A

(1) Eurostat estimates are used if country data is not available.
(2) Enterprises with 6 or more employees.
(3) Enterprises with 10 or more employees.
(4) Enterprises with 20 or more employees.
Source: Intergraf, DEBA estimates

to stimulate the demand for newspapers, magazines, periodicals and books. Consequently, the number of books printed has never been so high. New technologies have opened up new and ever growing markets, such as for computer manuals and educational material. On the other hand, private demand represents only a small part of the graphic market.

The advertising expenditures of the economy as a whole is one of the most important factors influencing demand and production in the graphic industry. Almost two thirds of the industry's turnover depend directly or indirectly on advertising. Any political decision affecting advertising, in general or in particular also affects the graphic industry and consequently can jeopardise employment. The printing of catalogues, advertising brochures, pamphlets and company reports is ever increasing as are advertising inserts in newspapers.

General commercial printing is an important part of graphic production. Individuals, municipalities, industry, commerce and insurance companies are now big clients for printed products of all kinds, including stationery, visiting cards etc.

These products, printed on separate sheets remain one of the main activities of the small printer who is often limited to local custom. Larger printers will deal with continuous forms and customers further afield. The demand for continuous business forms is constantly increasing, mainly due to the growth in electronic data processing used for example in electricity bills and insurance certificates. The continuous forms market is expanding substantially in some countries, partly because of increasing electronic processing of information, whilst the market is suffering from a harsh crisis in other countries, such as Italy.

Labels, packaging products, wall calendars, illustrations and postcards form yet another sector of the graphic industry. These products are often printed by specialised firms.

The upward trend in overall demand has been stimulated by the development of new and existing products. At the same time, printers are now trying to cater for special requests. Quality standards are rising visibly, particularly in creativity and design by electronic means and improved equipment for colour printing. Multicolored pictorial information is increasing for advertisements, magazines and company reports, and newspapers are also now making use of colour.

Progress in technology has also led to a number of electronic data processing functions being carried out at the client's office, for example, articles are often now drafted on the client's computer. The printer then has to transfer the information - off-line and on-line - to and from the client.

Information needs are satisfied by an increasing variety of electronic means and communication devices. Nevertheless, the permanence and high degree of information stored in the printed product have enabled it to retain its position as a simple, easy, accessible and efficient means of communication. A number of printed products are complemented by electronic media and vice versa (for example, specialised magazines). It is clear that the necessity to process and exchange information efficiently will continue to increase.

Supply and competition

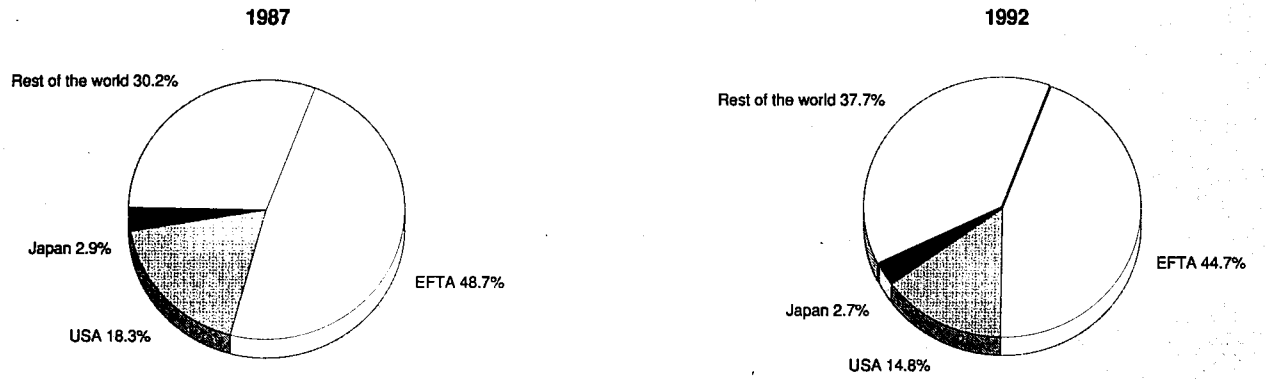
The publisher remains one of the printer's main clients, and accounts for about 40 to 50% of production. The printing of newspapers is almost exclusively carried out for publishing firms. Furthermore, in this area, publishing houses and printing houses often form a legal entity and belong to one owner.

Table 3: Printing
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	600.6	730.1	866.4	930.2	1 008.4	1 100.0	1 191.7	1 412.9	1 493.8	1 482.7
Extra-EC imports	288.3	361.8	390.9	505.4	466.8	495.4	574.0	613.9	724.0	718.0
Trade balance	312.3	368.3	475.5	424.8	541.6	604.6	617.7	799.0	769.8	764.7
Ratio exports/imports	2.1	2.0	2.2	1.8	2.2	2.2	2.1	2.3	2.1	2.1
Intra-EC imports	915.2	1 075.8	1 213.0	1 535.6	1 667.4	1 875.4	2 137.2	2 312.7	2 494.6	2 579.6
Share of total imports (%)	76.0	74.8	75.6	75.2	78.1	79.1	78.8	79.0	77.5	78.2

Source: Eurostat

Figure 1: Printing
Destination of EC exports



Source: Eurostat

The printing of newspapers accounts for roughly one-fifth of the total printing production.

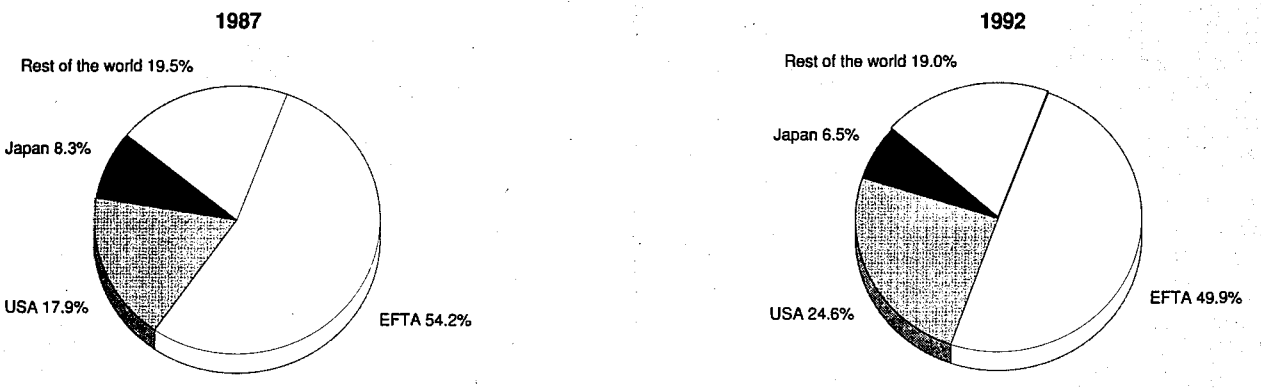
Publishing houses are also important clients of the magazine printer. In countries such as Germany, widely circulated magazines are invariably produced by printing houses which are owned by publishing houses. In other countries like Great Britain and France such a situation is rare: printing and publishing represent two distinct and different activities. These publishing houses are dealing increasingly on the international markets. Other types of publications, such as specialised magazines, religious, scientific or professional are printed for independent publishers or for publishing houses linked to printing houses. The production of periodicals accounts for about one-fifth of the total print production. Book printing follows a similar pattern to that of periodicals. Book publishers - independent or linked to printing houses - are not the only ones to order the printing of books, paperbacks or hardbacks; industry, public authorities and other organisations are also ready clients. Book printing accounts for about one-tenth of the total printing production.

The market for printed advertising material consists of a wide range of goods, such as direct mail catalogues, prospectuses, advertising inserts, posters or leaflets. The structure of this market is as diversified as its products as a large proportion of the clients are made up of direct mail companies, commerce and industry. Political parties and other organisations are also big consumers of printed advertising material. This sector has grown considerably over the last few years, stimulated mainly by the development of new forms of advertising, such as direct mail. The production of printed advertising material accounts for a quarter of the total printing production.

Printed matter for individuals and professionals is often taken on by the small printing firms. These cater for the municipalities, various organisations, industry, commerce and local individuals to whom they supply visiting cards, business forms, headed paper, invoices, transport tickets and cheques. These small firms often print in single sheets, whereas the larger or more specialised firms deal with continuous printing and produce different types of continuous forms, completed on computer by the clients themselves. The production of this printed matter accounts for about one-fifth of the total printing production.

The tenth of the printing production which has not been attributed to any of the above categories accounts for various products such as calendars, fine-art prints, postcards and greetings cards, cartographic products etc. Alongside these printed

Figure 2: Printing
Origin of EC imports



Source: Eurostat

Table 4: Printing
Trade by country, 1992

(million ECU)	Exports extra-EC	Imports extra-EC	Imports intra-EC
EC	1 482.7	718.0	2 579.6
Belgique/België, Luxembourg	42.6	26.1	291.5
Danmark	68.4	37.3	84.2
BR Deutschland	632.2	260.0	426.4
Hellas	2.6	6.2	24.4
España	58.0	24.5	115.8
France	194.8	124.2	657.0
Ireland	6.3	5.8	50.9
Italia	115.4	41.4	135.1
Nederland	84.4	42.3	364.4
Portugal	2.6	4.8	45.7
United Kingdom	275.3	145.4	383.9

Source: Eurostat

products the sector also produces rubber or polymer stamps, reprographic products such as photocopies, overhead foils and microfilms.

Alongside these printing firms can be found suppliers of services who often take the place of printers when these cannot cater for exact needs. This is why composition and word-processing are sometimes carried out by trade typesetters; the same applies to reproduction (image processing) and to finishing. Services such as the design of printed matter and the production of layouts and dummies are also offered to the client. In the future, firms who will offer new services through desk-top-publishing processes will complete the existing structure of the graphic industry.

Production process

Current developments in the industry indicate a close link between the printing sector and the development in communication and information technology. Innovations in equipment and graphic machinery have taken the industry to the forefront of technological progress, an industry where equipment has a major impact on the type, the quantity and the flexibility of the work carried out as well as on the professional skills and the organisation of the work in general. Many aspects of the print production process are now commonly automated, measured and controlled by computers. In the last few years, there has been a substantial increase in investment in new printing machinery in several Community countries.

There have been particularly fast changes in the sectors of pre-press and reproduction. Even small printing and reproduction firms now use totally electronic pre-press systems with word and image processors. Photo-composition is the dominating technology and is progressively taking over the old system of hot-metal composition. The latter is still used, however, in certain specialised jobs.

Desk-top-publishing has also brought about a number of changes. Generally speaking, desk-top-publishing allows combined processing of both text and image; in other words, one can not only capture, process and display text but also capture line illustrations from files as well as read and modify simple illustrations with the help of scanners.

This new development means that a number of customers are now able to do their own keying work which in turn has led to ever greater demands in photo-setting especially in capturing, processing and converting the very varied information found in printed matter. A number of customers have tried to accomplish these operations themselves but have had to face the fact that such systems require the experience of a professional typesetter and that the cost is often underestimated.

Upstream of the printing process, reproduction has also undergone a number of important changes due to the rapid developments in micro-electronics. Photomechanical reproduction by camera which was once quite common has already been widely replaced by electronic image processing. Such systems process and convert image-data through electronic whole-page transmission; after the lay-out of the page with the text, the illustrations are mounted electronically. These very expensive systems are installed in the large printing firms and in reproduction firms dealing with colour magazine and catalogue printing. Other less expensive systems, such as powerful personal computers are now being used for colour separation. In this area, technological progress is comparable to that found in composition. In fact, there are now very definite signs that the two areas of composition and reproduction will eventually merge.

Equipment and production techniques now used in printing and in finishing have also been influenced by the arrival of the micro-processor. The latter is being increasingly used to control such functions as tension of the paper web, ink flow, machine control, labelling and despatching. To a great extent these two areas also show signs of merging. Certain printed products, such as books, are already being produced by what is known as on-line finishing, in other words the printing and binding are carried out on the same production line.

The use of electronics in information and communication now play a significant role in printing as a whole. The effect is quite obvious in the transmission of information from client to printer as this is now, more often than not, carried out through electronic media. The transmission of information within a printing house - for example, in newspaper printing, from the editing department to the printing floor or in the case of magazine printing, from one printing department to another - is becoming quite common.

On the other hand, publishing firms have tried to evaluate the impact of this new technology in communication on printed products and are looking into ways of becoming more involved in these areas. Publishers and printer-publishers have often invested in such areas as data-processing units, data banks, videotext and even local radio stations, whereas the printers tend to remain faithful to purely technical operations.

Bearing in mind that most equipment manufacturers now offer similar techniques and know-how in all European countries,

if not world-wide, the technological progress of the graphic industry can be considered to be similar in all the Community countries.

INDUSTRY STRUCTURE

Companies

The graphic industry in the Community, is made of small and medium-sized companies. A typical printing firm employs fewer than 20 employees, as some 85% of all the firms belong to this category. The remaining 15% are nearly all firms employing between 20 and 500 workers. Only a very small number of printing firms employ over 500 workers; in Germany this category stands for 0.3% of all the firms and this percentage is even lower in a number of other countries.

Labour and training

Printing has traditionally been a high wage industry, reflecting the above-average levels of skill required from its labour force. Printers have also often been among the first to benefit from improved working conditions - shorter hours, longer holidays and other advantages. In half the Community countries the working week is 37.5 hours or less. In most others it is not more than 40. Only Portugal still has a basic week of 45 hours. German printers already enjoy 6 weeks annual holiday and in five other countries they have at least 5 weeks.

At the same time, wage costs have a considerable impact on total production costs and have even increased in the last few years. Furthermore, important investment costs need to be made to ensure that the necessary qualified personnel is available. Despite all this and the swift technological developments of recent years, which have enabled new markets to be won, employment has remained relatively stable in the graphic industry.

Training goals have been adapted everywhere over recent years to attract trainees with the necessary qualities to the industry, to give them broad- based knowledge of the various stages of print production and of the different processes like offset lithography and photogravure. Printing technology, which has undergone great changes in the last quarter of a century, is still evolving to become faster, more automated and better controlled with the help of electronics, leading finally to more attractive print products of higher and more constant quality.

The industry's labour force has to be receptive to continuous training to adapt to the changing and improved techniques. The trend throughout the Community has been to move away from a situation in which the labour force had 30, 40 or more different craft skills towards one of greater flexibility, in which print workers are not limited to a single speciality.

ENVIRONMENT

The European graphic industry is an industrial branch which has only a marginal impact on the environment. Nevertheless, the industry is devoting increased resources to meeting the stricter environmental requirements. For example, it has invested large amounts of money to limit emissions caused by web-offset printing, to improve the quality of water and to encourage the recycling of waste.

In some EC-countries the graphic industries federations collaborate closely with government departments to agree on the best measures for environmental protection. At international level, the international association for the graphic industry, Intergraf, is co-operating with the EC-Commission to define appropriate directives in this area. To maintain fair competition, the Single Market requires the harmonisation of laws and directives in all EC-Member States, and this also in the field of the environment. The graphic industry considers it has a responsible role to play in safeguarding the environment and therefore our living space.

OUTLOOK

New changes will take place in the future. The main changing factor will be electronics and the automatization that goes along with it. Pre-press (composition/reproduction) will be the branch mostly affected 'by these changes. Electronics will also have a significant impact on printing and finishing machinery. Technical developments imply that customers can carry out simple pre-press operations at the printing plant. On top of this, new communication techniques are reducing the distance between the printer and his customer, facilitating and intensifying all data transfer.

Table 5: Printing
Breakdown of production by market segment, 1991

(million ECU)	DK(1)	F	UK	D
Books and brochures	140.4	246.5	363.8	1 264.4
Newspapers	624.1	N/A	360.9	2 707.3
Magazines and periodicals	466.7	651.9	570.6	2 405.4
Catalogues and directories	N/A	224.6	318.1	976.7
Packaging	490.7	690.2	188.3	1 172.7
Cards and calendars	27.3	712.1	37.1	250.2
Printed advertising	-	1 120.3	1 031.4	3 489.0
Commercial printing	528.7	1 375.0	N/A	N/A
Forms	-	N/A	128.4	2 897.0
Cartographic products	12.1	N/A	47.1	36.6
Other printed matter	24.7	328.7	644.8	425.2
Reproduction	105.3	432.8	N/A	N/A
Binding and finishing	N/A	273.9	118.4	N/A
Composing	N/A	153.4	N/A	N/A

(1) Commercial printing includes printed advertising and forms.
Source: Intergraf

Table 6: Printing
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-5.0	2.0
Production	-3.0	3.0
Extra-EC exports	-1.0	5.0

Source: LEK Partnership

Written by: Intergraf
The industry is represented at the EC level by: International Confederation for Printing and Allied Industries (Intergraf). Address: Square Marie-Louise 18, Bte 25-27, B-1040 Brussels; tel: (32 2) 230 8646; fax: (32 2) 231 1464.

Rubber products
NACE 481, 482

The rubber products industry consists of two main subsectors: the manufacture of tyres and the manufacture of industrial rubber products. EC and Japanese-owned manufacturers are dominating the industry, but the US market is the largest in the world. After a slow but positive production growth in the 1980s, the industry is now for several years in a period of stagnation. To adjust to this situation, firms are restructuring and investing in cost-reducing automation. Prospects are for slow recovery after 1993.

INDUSTRY PROFILE

Description of the sector

The rubber industry comprises two main subsectors, the tyre and inner tube industry and the manufacture of industrial rubber products (which include some products for consumers).

The tyre and inner tube industry includes the manufacture of tyres and tubes for passenger cars, trucks and buses, agricultural vehicles, earth moving and mining machinery, bicycles and motorbikes, and other applications.

Industrial rubber products are pipes, hoses, sealings, belts, profiles, foam, soles, adhesives, etc. which are manufactured for such end markets as vehicles, machinery, electrical engineering, construction, the chemical industry, the food and drink industry, the medical sector and sporting goods.

The rubber industry is to some extent connected with the plastics processing industry (NACE 483); both process polymeric material based on hydrocarbons. The bigger enterprises in the sector of rubber products are often active in the plastics processing industry too. The processing machinery for both branches is similar; the rubber industry uses mixing equipment in addition because the raw material is mixed by the manufacturers themselves.

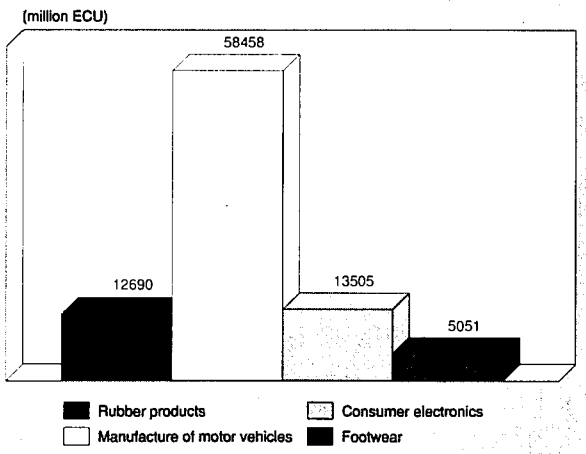
Germany is by far the largest producer of rubber products in the EC, accounting for about a third of total value added in 1992. France is the next largest producer, with about one fifth of total value added, followed by the United Kingdom and Italy, both of which account for about 15% of total value added.

Recent trends

In the 1980s the market for rubber products was effected by the pressure of competition, technological progress and environmental concerns. EC production in current prices grew by 4.5% during the 1983-1992 period. In constant prices however, total production has increased with a meagre 1.2% in the same period. Demand has increased at a slightly higher rate than production, with the result that the positive trade balance has become smaller and smaller. Due to sluggish growth and rationalisation efforts of the industry, employment in the rubber products sector has declined from 1989 onwards.

The sustained recession in most European countries, and not only in Europe, continued to depress the rubber products sector in 1993. Low growth rates in the end markets, especially the automotive markets, created a tough economic climate for the rubber products sector. The car manufacturing sector accounts for more than two thirds of the demand for rubber products.

Figure 1: Rubber products
Value added in comparison with other industries, 1992



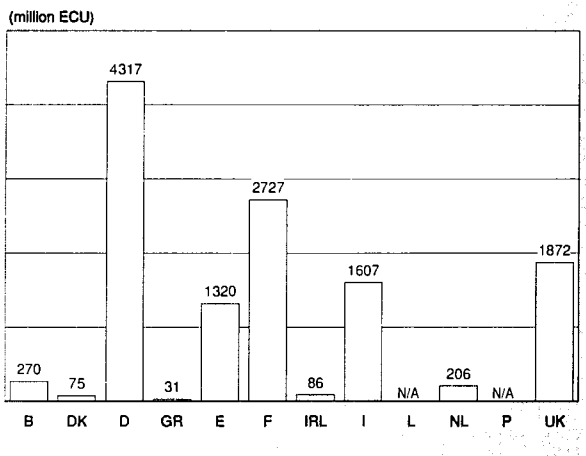
Source: DEBA

International comparison

Data from the International Rubber Study Group show that the USA have the largest tyre-production in the world. EC-owned tyre manufacturers however, are the world leaders. The same situation also holds for industrial rubber products. As far as tyre production is concerned, Japan experienced the largest percentage growth over the 1983 and 1992 period with 27%, followed by the USA and the EC, both with a percentage growth of 23%. The ranking changes however, when only the period 1985-1992 is considered: then the EC has the largest growth.

The developments in tyre production are mimicked in the real growth figures for the whole rubber products sector. During the 1985-1992 period only the EC shows an overall positive growth, whereas Japan and the USA had a production level in 1992 which was below that of 1985. All three markets however are declining since 1989.

Figure 2: Rubber products
Value added by Member State, 1992



Source: DEBA

Table 1: Rubber products
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	17 355	18 769	20 227	21 364	22 123	24 080	25 415	25 713	26 271	27 401	26 600
Production	18 851	20 627	22 182	22 974	23 560	25 354	26 728	26 708	27 044	27 964	27 100
Extra-EC exports	2 648	3 200	3 467	3 216	3 236	3 464	3 790	3 515	3 509	3 681	3 570
Trade balance	1 496	1 858	1 955	1 610	1 437	1 274	1 314	995	773	563	550
Employment (thousands)	390.3	375.4	365.7	360.8	358.3	356.6	357.6	354.8	342.1	331.2	310.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) NEI estimates.
Source: DEBA

Table 2: Rubber products
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	2.9	-1.0	1.2
Production	2.9	-1.0	1.2
Extra-EC exports	2.8	1.5	2.2
Extra-EC imports	3.1	1.9	2.5

(1) Except for trade figures, estimates are used if country data is not available especially from 1990 onwards.
Source: DEBA

Table 3: Rubber products
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	2 648	3 200	3 467	3 216	3 236	3 464	3 790	3 515	3 509	3 681
Extra-EC imports	1 152	1 342	1 513	1 607	1 799	2 190	2 477	2 520	2 736	3 118
Trade balance	1 496	1 858	1 955	1 610	1 437	1 274	1 314	995	773	563
Ratio exports/imports	2.30	2.38	2.29	2.00	1.80	1.58	1.53	1.39	1.28	1.18
Intra-EC trade	3 851	4 195	4 710	5 158	5 574	6 244	6 800	7 190	7 585	8 151
Share of total imports (%)	77.0	75.8	75.7	76.3	75.6	74.0	73.3	74.0	73.5	72.3

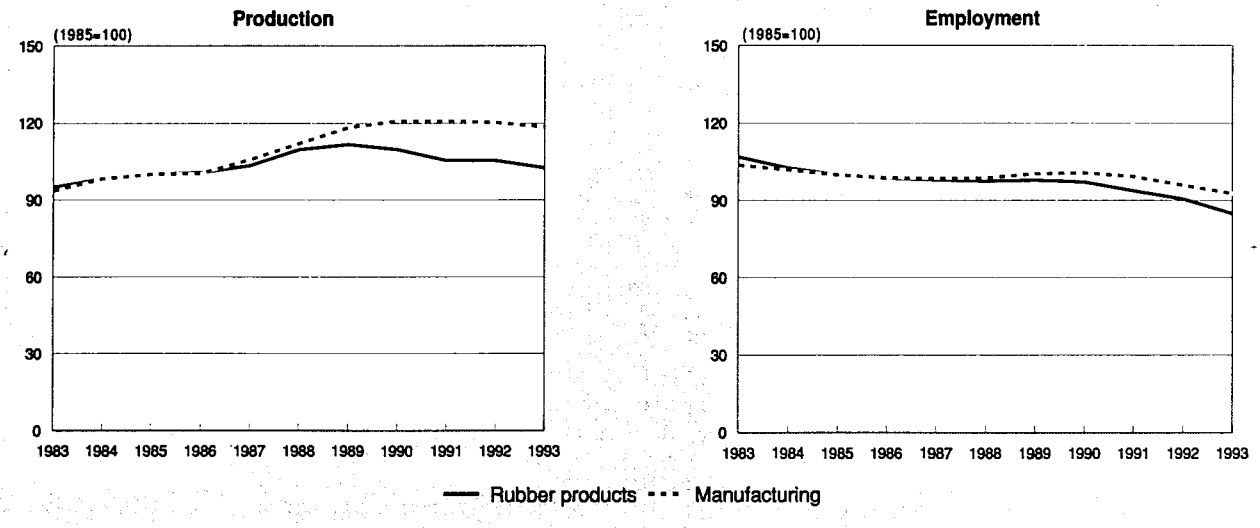
Source: DEBA

Table 4: Rubber products
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	28.7	29.5	31.6	33.6	35.7	37.3	37.2	36.7	37.5	38.3
Productivity index	91.0	93.3	100.0	106.4	113.0	118.1	117.8	116.2	118.8	121.4
Unit labour costs index (3)	87.8	93.1	100.0	106.0	112.2	118.7	124.8	132.5	140.9	151.6
Total unit costs index (4)	82.2	93.0	100.0	103.2	106.2	115.4	122.2	126.1	132.3	142.4

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Rubber products
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat and NEI estimates.
Source: DEBA

Foreign trade

Extra-EC exports show a much more cyclical pattern than extra-EC imports. In 1984 and 1985 as well as in 1988 and 1989 there were upswings in extra-EC exports, followed by downswings and recovery. Extra-EC imports, however, steadily increased every year from 1982 to 1992 by more than 10% on average. As a result the trade balance decreased. At the beginning of the 1990s the share of intra-EC trade in total imports declined a few percentage-points, whereas during the 1980s the share remained fairly constant.

Among the export markets of EC rubber products, the EFTA countries account for roughly one third of total extra-EC exports, followed by the USA and the OPEC countries. The share taken by Japan is small.

As for extra-EC imports, Japan has become the largest supplier of rubber products, as a result of a growing import share during the last 5 years. The share of the EFTA countries decreased significantly from 1987 to 1992 and became eventually lower than Japan's. The importance of Malaysia as a world rubber producer is confirmed by the fact that this country more than doubled its share of total extra-EC imports during the 1987-1992 period.

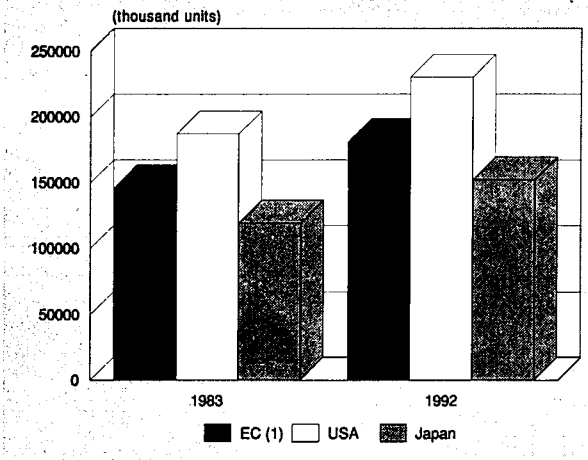
MARKET FORCES

Demand

The tyre market for original equipment (OE) is highly competitive with a limited number of customers who exert a strong market pressure on the suppliers. The replacement market is entirely different with a huge number of customers. Most of them are individual car owners, some are commercial organisations like rent-a-car firms or transport enterprises.

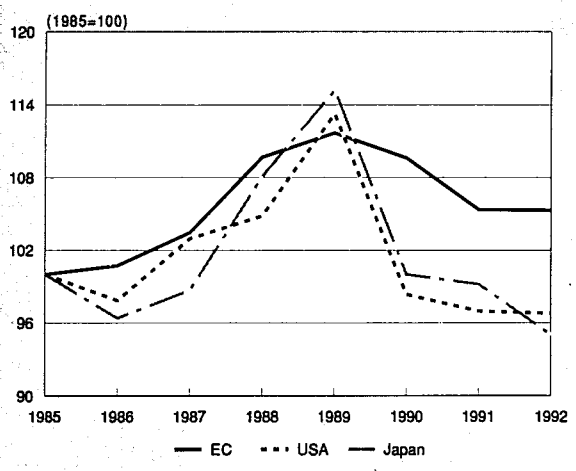
The ratio between OE tyres and replacement tyres depends on the development of car production and on the total fleet of vehicles. In periods of overall economic growth, for ex-

Figure 4: Tyres
International comparison of production



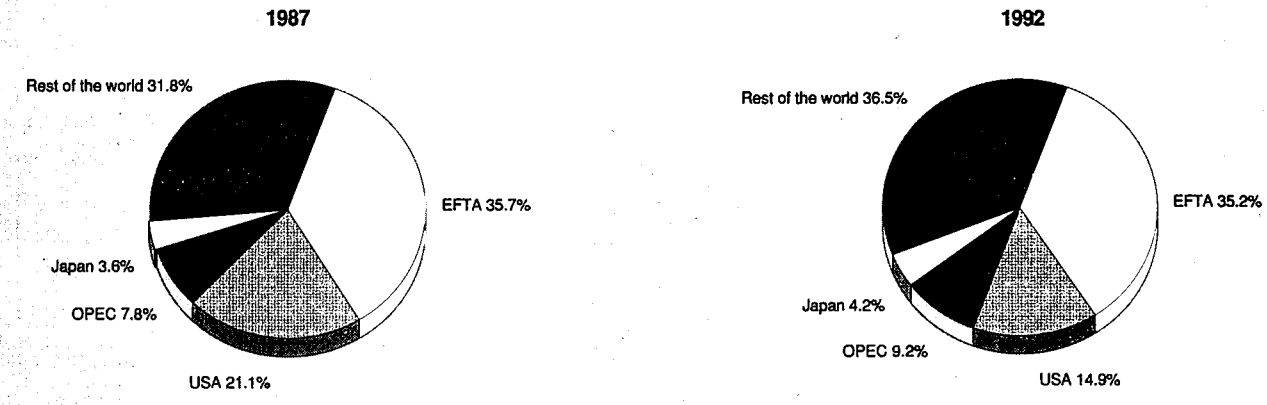
(1) EC is Belgium, Germany (including the former GDR), France Italy, Luxembourg, the Netherlands and the United Kingdom
Source: International Rubber Study Group

Figure 5: Rubber products
International comparison of production in constant prices



Source: Eurostat, International Rubber Study Group

Figure 6: Rubber products
Destination of EC exports



Source: Eurostat

ample, high car sales may boost the share of original equipment up to about one half of the total tyre sales; during periods of recession or stagnation, the ratio is about 40:60.

The problems on the car market have forced the car manufacturers, customers of the rubber products sector, to rationalise production and lower costs. Moreover, cars are more and more tailored to the wants of the end-user. The result is a production of many different types of tyres, which also last longer. Due to technological progress in materials the production of radial tyres with warranties of 80 000 miles become possible, whereas 40 000 miles was customary a few years ago.

Industrial products account for almost 40% of the volume of total EC production of rubber products, while tyres account for about 60%. Sales values are about the same for both sectors due to a higher specific value of industrial products.

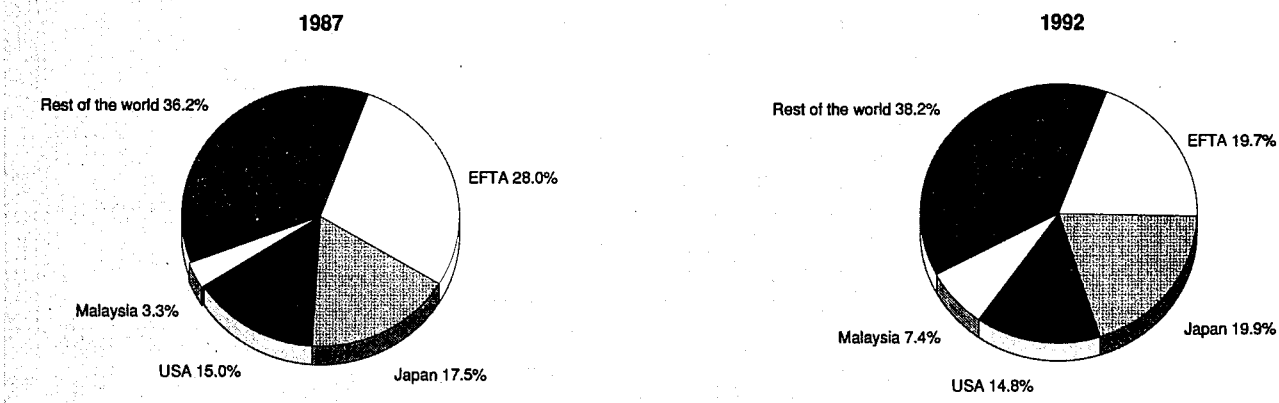
Taking tyres, tubes, and industrial products for motor vehicles together, the automotive sector covers about 70% of the rubber products market. Although tyre replacement demand is not as closely connected with income developments as the demand for new cars, in periods of recession there is a tendency to reduce the driven distance per vehicle, privately and commercially.

The rubber products industry profited from the boom in the late 1980s, but also suffered heavily from the stagnation and recession afterwards. Large companies made losses during the beginning of the 1990s. Recovery is likely to begin only in 1994/95, and at a low growth rate.

Substitution processes have taken place in some areas of industrial rubber products in the last decade. Rubber has been substituted by plastics especially in the profile, hoses, pipes, and sealings sector or in the production of toys or soles. Presently, the situation has in some cases reversed and substitution has taken place. The plastic tyre which was introduced some years ago did not achieve a breakthrough. Its application is, according to experts, limited to very specific purposes. Rubber has replaced metal in some hoses and window frames in cars.

To promote the use of rubber, intensive research and development activity was undertaken partly on raw material and partly on rubber products. Composites of rubber and metal, rubber and glass, rubber and plastic were developed and pro-

Figure 7: Rubber products
Origin of EC imports



Source: Eurostat

duced. New tyre elastomer blends make the production possible of tyres with warranties of 80 000 miles. Under pressure of car makers specialty heat tolerant elastomers are being produced.

Supply and competition

Tyres form a highly competitive market. Production capacity often exceeds demand and there is a constant pressure on prices. This is particularly true for OE tyres. Car manufacturers accept the cheapest offer under certain quality and specification conditions to reduce their own costs. Worldwide procurement of tyres is possible and acts as a permanent market discipline for the suppliers. The price-setting margins are restricted and the tyre industry complains all over the world of low prices and low profits. The replacement market does not face such stiff competition, but wholesalers and retailers also take advantage of the competitive situation as long as the demand by car owners is not restricted to specific brands.

The industrial rubber sector is a much more specialised branch with less opportunity to take advantage of economies of scale than the tyre sector. Even the supply of parts to the automobile sector involves a high degree of specialisation and differentiation. The consequence is that competition among suppliers is less strong than in the tyre sector and the globalisation of procurement is limited because of the necessary consultations between customer and supplier.

Production process

The rubber industry processes natural and synthetic rubber.

Natural rubber is imported mainly from South-East Asia, while synthetic rubber is supplied by the chemical industry. Natural rubber is especially used in truck and bus tyres because of its low heat build-up. For technical rubber products a much higher fraction of synthetic rubber is used, depending on the specifications of the product. An important raw material for the rubber industry is carbon black, besides other textile and metal components.

The unfavourable price and profit situation in the market for OE tyres leads to constant efforts to bring down costs, especially labour costs, by automation. But not only cost-reduction is a target of automation, but also better repeatability, shorter downtimes during size-changes and more flexibility.

If these technical developments can be implemented successfully and labour will be needed more and more only in controlling and supervising tasks, then a major change in productivity would follow. Currently, labour costs represent 25 to 40% of a tyre firm's turnover, depending on the data used.

INDUSTRY STRUCTURE

Companies

The tyre industry is highly concentrated. The three largest tyre companies in the world account for more than 50% of all sales. Japanese and European companies have a large portion of the market; the five largest Japanese firms account for 31% of all sales, the five largest European firms for 33%. Independent US tyre makers do not have such a position; in the top 50 only two are listed, and they account for 17% of all sales. This, together with the US market being the largest in the world, indeed reflects the fact that many US tyre manufacturers are foreign subsidiaries. All European tyre manufacturers account for 36-40% of the world market. The three largest European tyre manufacturers are Michelin (F), Pirelli (I) and Continental (D).

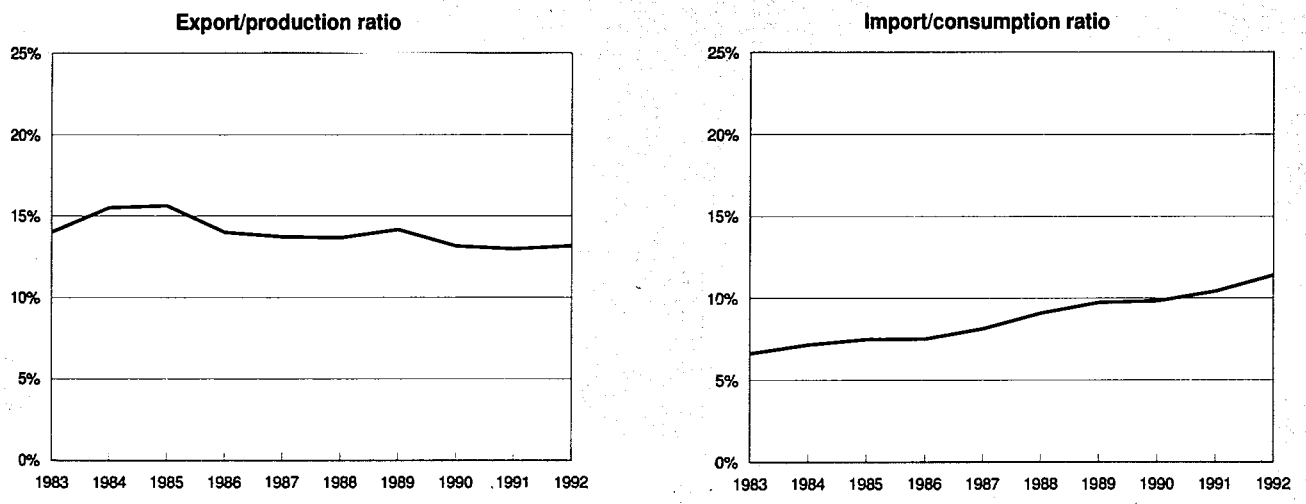
The largest tyre manufacturers normally produce industrial rubber products as well. However, small and medium-sized enterprises which produce technical products or products for end-consumers only, dominate in this part of the market.

Strategies

There are at least three ways to react to the challenges resulting from intense competition. First, higher investment in cost-reducing processes; second, increased research and development activity; third, mergers and acquisitions and/or alliances.

Investment activity in Europe is concentrated towards cost-reduction and productivity-increases, not to new capacity, whereas in Asia new plants dominate the investments. In Europe capacity has been cut in the past years in answer to slow growing, or even declining demand and to reduced expectations. New investments encompass the application of new technologies in new products and/or new processes. Diversification can be part of the strategy that a company follows; among the active tyre producers worldwide none restricts itself to making tyres.

Figure 8: Rubber products
Trade Intensities



Source: DEBA

Table 5: Rubber products
The 15 largest companies in Europe, 1992

(million ECU)	Country	Turnover	Net profit	Employees
Michelin & CIE	F	9 767	11.5	125 000
Pirelli	I	5 198	-66.0	45 726
Continental	D	4 801	62.5	51 064
Pirelli Tyre Holding	NL	2 584	-61.8	25 425
Sommer Allibert	F	1 442	24.0	12 843
Hutchison	F	1 170	55.9	13 044
British Vita	UK	1 071	45.6	9 904
Asko Oy	SF	1 058	-26.6	8 695
DLW	D	595	6.0	5 212
Pneumatiques Kleber	F	543	-19.6	7 407
Pirelli Deutschland	D	514	0.7	3 886
Neckechnei	UK	404	23.1	5 762
Wassal	UK	341	15.9	3 557
Avon Rubber	UK	325	8.6	5 124
John Waddington	UK	291	3.4	3 486

Source : DABLE

As the car market became increasingly international, tyre manufacturers have had no choice but to adopt a worldwide strategy. The concept of dominant position at both national and EC level has disappeared. Several structural changes have taken place in the recent past that have reshaped the structure of the world tyre industry, aimed at increasing the size of the largest groups. Bridgestone (JPN) took over Firestone (USA), Michelin took over Uniroyal Goodrich (USA), Pirelli acquired Armstrong (USA) and Metzeler (D). Continental took over Semperit (A), General Tire (USA), and Uniroyal-Englebert (USA). Fulda (D) was acquired by Goodyear (USA) and Dunlop (UK) by Sumitomo (JPN). Besides acquisitions firms engage in strategic alliances. Michelin is seeking influence in Asia through this strategy. Continental focuses on East Europe, as well as Mexico and South Africa.

The industrial rubber industry supplies a large number of sectors, and some rubber producers are now tailoring their production to the needs of the main local client industries. The Italian industry, for example, tends to specialise in sole components for footwear, while the German rubber industry tends to specialise in conveyor belts for the mining industry.

ENVIRONMENT

The main environmental issue for the rubber industry is the recycling, incineration or disposal of scrap tyres and rubber products. Retreading used tyres is a widespread recycling method which has many positive aspects from the ecological point of view. Also, the longer life of tyres in comparison with the past put a downward pressure on the amount of disposal. But this does not solve the problem of disposal; at the end every tyre and rubber article has to be incinerated or disposed at dumps. There have been attempts to make chemical recycling by pyrolysis in order to get hydrocarbons but so far it turned out to be too expensive and generated itself air pollution.

The EC is in a leading position worldwide in research on and development of ecological techniques. In the long run this could lead to export opportunities either in the form of machinery and plants, or in the form of licenses for ecological incineration technology. The United Kingdom has recently inaugurated a power plant fuelled by used tyres.

OUTLOOK

Table 6: Rubber products
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	2.0	3.0
Production	2.0	2.5
Extra-EC exports	2.0	2.5

Source: NEI

The recession in the European economies has a large impact on cyclical industries like car and truck manufacturers, and as a result on the rubber products industry. However, the replacement tyre market acts as a stabilising element; there is always some growth as long as the number of registered cars is increasing. Industrial rubber products grow more or less in line with general industrial growth and slightly faster than tyres. All this means that growth will be slow in the recent future, likely to be followed by a period of moderate recovery.

Written by: Netherlands Economic Institute, on the basis of the Panorama 1992 report
The industry is represented at the EC level by: Bureau de Liaison des Industries du Caoutchouc de la CEE (BLIC). Address: Avenue des Arts, Bte 12, B-1040 Brussels; tel. (32 2) 218 4940; fax: (32 2) 218 6162.

Plastics processing
NACE 483

The world wide economic recession has affected the plastics industry as a whole. Production and consumption of plastics have dropped to some extent in the EC. Traditionally extensive deliveries into the countries of Eastern Europe have almost completely failed to take place since the end of 1991. The decrease in sales has been accompanied by a dramatic drop in prices both of standard plastics and technical plastics which were relatively stable before. Faced with losses, the European plastics processors reduced their development activities giving up unprofitable business ventures and postponing capital projects.

INDUSTRY PROFILE

Description of the sector

Consumption of plastics material in the EC plastics processing industry was in 1992 approximately 28 million tonnes. The main plastics materials processed for the different plastic markets are the following: polyvinylchloride (PVC 5.0 million tonnes), High and low density polyethylene (HDPE 3.0 million tonnes/LDPE 4.7 million tonnes), polypropylene (PP 3.9 million tonnes), polystyrene (PS 1.5 million tonnes), polyurethanes (PUR 1.4 million tonnes) and fibre reinforced plastics/composites (FRP/C 0.9 million tonnes).

The industry employs around 850 000 persons and counts 20 000 companies. Sales in the plastics converting industry represented a total of 95 billion ECU in 1992. Its main business is to convert plastic resins and compounds into products. The sector operates a range of different technologies, such as injection moulding, compression and blow moulding extrusion, hand lay-up of fibre reinforced plastics and coating. It also carries out ancillary operations such as decoration by silk printing, hot stamping and a variety of subassembly operations.

Plastics converters may produce finished articles which are used by other industries like food packaging and building articles, or distributed to consumers. They may also be custom processors who produce components on a subcontract basis for other manufacturers, or inhouse operations integrated into the manufacturing process. The major markets for plastics are packaging, building materials, electrical goods and electronics, automotive components, furniture, and agriculture.

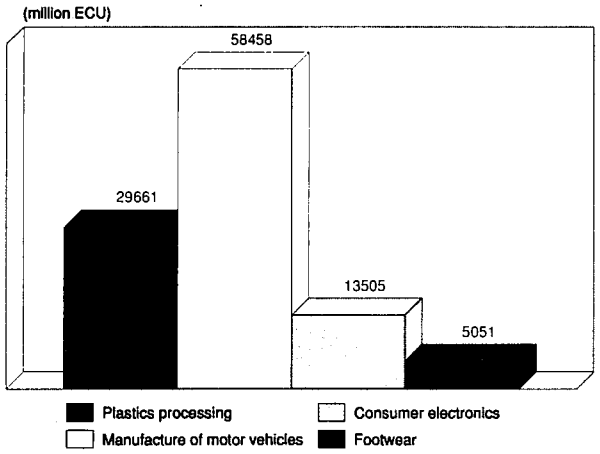
Recent trends

A growth rate of just 1.5% was forecasted for 1993 which will lead to a total processed volume of 28.5 million tonnes in Europe.

Polymer producers suffered losses as depressed general demand conditions, destocking by processors, some overcapacity in polymer production and increasing imports, particularly from Southeast Asia and Latin America (once traditional targets for European exports) combined to lower prices and margins. However, plastics processors did not reap much benefit from these low input prices. Their customers expected a supply of higher quality products at prices remaining low.

Both consumption and production strongly increased during the 1983-1992 period, respectively by 7.3% and 6.8% per year. Extra-EC imports grew at a spectacular annual rate of 10.5% during the 1983-1992, that is two times more than extra-EC exports. The trade balance remained more or less stable during the 1983-1992 period at a level of around 1.9 to 1.7 billion ECU. During the same period, employment in the plastics processing industry grew by 34.7%.

Figure 1: Plastics processing
Value added in comparison with other industries, 1992



Source: DEBA

International comparison

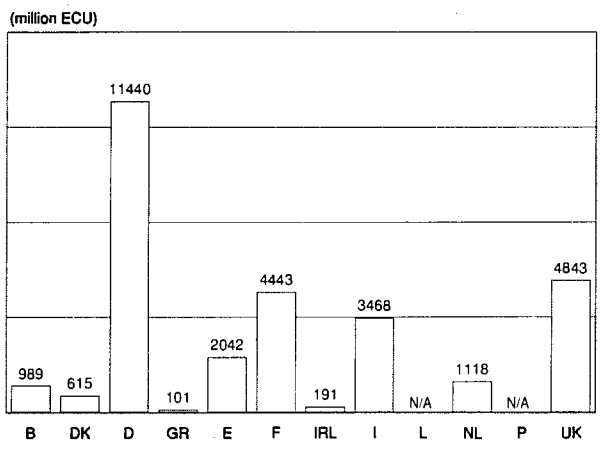
The USA, EC, and Japan remain the largest producers and consumers of plastic materials. In 1992 production and consumption (in million tonnes) amounted to: USA (30.1 and 27.7); EC (29.5 and 27.9); Japan (12.6 and 10.8).

The chemical industry and the plastics converting industries are the only technology-intensive sectors in which Europe is leading in front of Japan and the United States although a lot of Japanese firms operate in Europe or have set up joint ventures with European manufacturers. The existing capacity of polymer production incorporated in large chemical units corresponds to the demand for raw materials from processors.

USA

In 1992 the recovery of plastics processors was stronger than that of the US economy as a whole, and contrasted with the condition of its supplying industries (polymer production and the manufacture of plastics processing machinery). Developments in the sector largely depend on other industries, and the competition between plastics being intense, the situation is not expected to improve in the short term.

Figure 2: Plastics processing
Value added by Member State, 1992



Source: DEBA

Table 1: Plastics processing
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	33 168	39 027	41 783	45 705	50 807	57 875	67 069	73 330	79 504	82 525	82 300
Production	35 113	41 286	44 409	48 201	53 166	60 021	69 361	75 489	81 204	84 280	83 900
Extra-EC exports	3 811	4 600	5 203	5 189	5 378	5 981	6 786	6 981	7 222	7 575	7 780
Trade balance	1 945	2 259	2 626	2 496	2 358	2 147	2 291	2 159	1 700	1 755	1 600
Employment (thousands)	577.4	598.6	601.3	632.2	662.6	691.8	741.9	778.5	792.5	771.6	756.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) Rounded Eurostat estimates.
Source: DEBA

Table 2: Plastics processing
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	8.3	6.9	7.7
Production	7.8	6.4	7.2
Extra-EC exports	5.6	4.2	5.0
Extra-EC imports	11.3	9.6	10.5

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Plastics processing
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	3 811	4 600	5 203	5 189	5 378	5 981	6 786	6 981	7 222	7 575
Extra-EC imports	1 866	2 341	2 577	2 693	3 019	3 834	4 494	4 823	5 522	5 821
Trade balance	1 945	2 259	2 626	2 496	2 358	2 147	2 291	2 159	1 700	1 755
Ratio exports/imports	2.04	1.96	2.02	1.93	1.78	1.56	1.51	1.45	1.31	1.30
Terms of trade index	106.4	102.9	100.0	103.6	105.6	105.6	103.9	106.2	107.4	107.8
Intra-EC trade	6 798	7 974	9 136	10 106	11 248	12 703	14 668	16 373	17 440	18 080
Share of total imports (%)	78.5	77.3	78.0	79.0	78.8	76.8	76.5	77.2	76.0	75.6

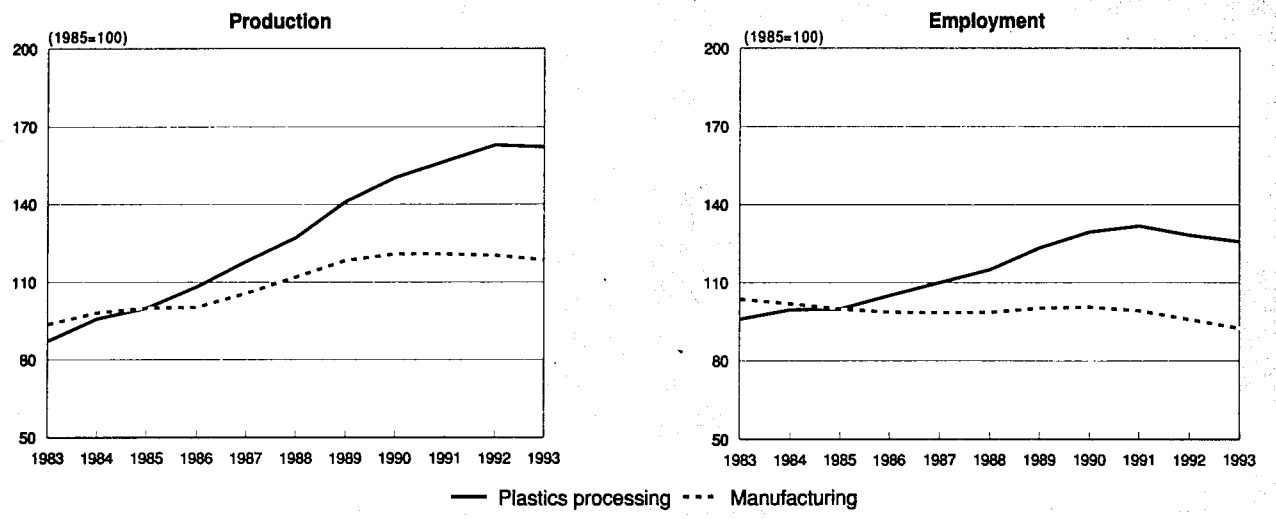
Source: DEBA

Table 4: Plastics processing
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	28.7	29.3	30.7	32.8	34.4	33.8	34.6	35.5	36.6	38.4
Productivity index	93.6	95.5	100.0	106.9	112.0	110.2	112.7	115.5	119.2	125.2
Unit labour costs index (3)	87.0	93.7	100.0	104.9	109.3	114.8	121.2	129.2	136.8	147.9
Total unit costs index (4)	83.6	94.0	100.0	101.5	106.9	117.1	125.2	130.4	138.9	150.1

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Plastics processing
Production in constant prices and employment compared to EC manufacturing



1993 are Eurostat estimates.
Source: DEBA

The American processors met the increasing quality requirements of their customers with statistical process control, total quality management and advanced technology.

Japan and Asia

The Asian economies are becoming more integrated and less dependent on the US and Europe.

Japan, Korea, Taiwan, China and Singapore are the main plastics processing countries with a production of about 25 million tonnes i.e. 25% of the world production. In terms of end-use applications market opportunities for plastics products in Asia include: blow moulded bottles for liquid detergent, milk and water, industrial drums, pharmaceutical bottles, injection moulded consumer items, packaging films, gas and water pipes; mono-layer and multi-layer insulation and packaging in wire and cable applications, and agricultural film, automotive applications, textiles for reducing soil erosion, competing closures, consumer items and packaging. China's output of plastics products has been growing at an annual rate of more than 20% during the 1990s. In 1992 plastics processors in China numbered about 17 000 and employed about 1.6 million people.

Foreign trade

The value of the plastic products exported from the EC increased less rapidly than what was imported. From 1983 to 1992 the value of the exports has been multiplied by 1.98 and the value of the imports by 3.12.

During the 1987-1992 period there has been a decrease in trade between the EC and the USA as well as a reduction of imports from EFTA countries. This was balanced by an increase of the imports from south-east Asian countries (Taiwan, Singapore) and especially from China which is becoming an important supplier of the EC. The EC imported less from USA, Japan and EFTA in 1992 than in 1987.

Trade with extra-EC countries grew more slowly than the production. On the contrary intra-EC trade increased faster than production. For the same period the share of EC imports from the rest of the world increased by approximately 10%.

MARKET FORCES

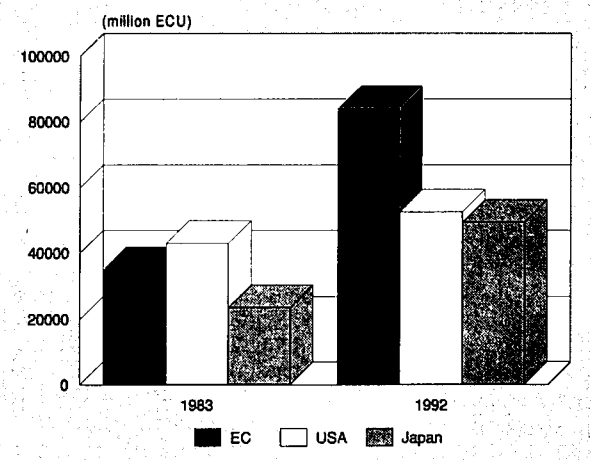
Demand

In 1992 thermoplastics consumption grew approximately 3.5% over 1991 whereas the general economic growth for Europe was only 0.5% last year. However, even this growth of demand is threatened by the economic downturn and environmental pressures.

Products made by plastic processors range from such massproduced items as small injection mouldings and continuously produced low density polyethylene packaging film to such specialised ones as composites used in spaceshuttle components. In short, virtually every product manufacturer uses, or can use, plastic components.

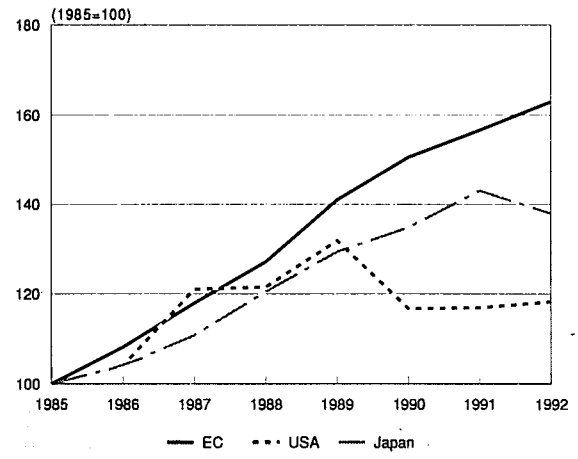
There is an extensive and diversified demand for plastics goods. Consumer goods and technical applications are characterised by continuous developments. Demand for plastics can be subdivided in six important markets: packaging (food,

Figure 4: Plastics processing
International comparison of production in current prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Plastics processing
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

beverages, etc.); building (window frames, insulation, etc.); electrical/electronics (office automation, telecommunications, etc.); automotive; other transports (railways, shipping, aircraft, etc.); other markets (agriculture, leisure, toys, household, garden, furniture etc.). The first five sectors mentioned deliver to other industries, while the last one deliver directly to consumers via distribution outlets such as department stores.

Many industries use components made of numerous types of polymers. About 5 000 types of polymers, alloys and combinations enhance the design and manufacturing of various applications (from compact disc to medical instruments). The energy crisis increased the need for low-weight materials. For example, in the automotive industry plastics have been replacing several parts previously made out of metal.

Packaging

In the packaging sector plastics have been replacing glass for bottles (mineral water, soft drink, milk) and jars (yoghurts). The food industry constitutes the major end-user followed by the distribution and beverage industries. Despite environmental concerns, the European market for plastics packaging is forecast to rise from 10.5 million ECU in 1992 to over 13.67 million ECU by the end of 1995. Nevertheless, the growth should be lower than in the 1980s reflecting the trend towards reduced packaging and refillable containers. In spite of economic downturns in the EC and the burst of legislation which could impose severe pressure, pharmaceuticals, toiletries and cosmetics are large users of packaging. Cleaning powders are starting to move away from cartons to blow-moulding plastics while cleaning fluids change blow-moulding containers to bag-in-box packaging. The motor oil business is still moving away from metal cans to plastics containers.

The greatest growth rate is expected for PET particularly in the carbonated drinks market (from 512.8 million ECU in 1992 to 940.2 million ECU by 1995).

Film should remain the most common polymer grade used in packaging (and the largest sub-sector of plastics processing industry, although losing to blow- moulding and injection moulding) until 1995.

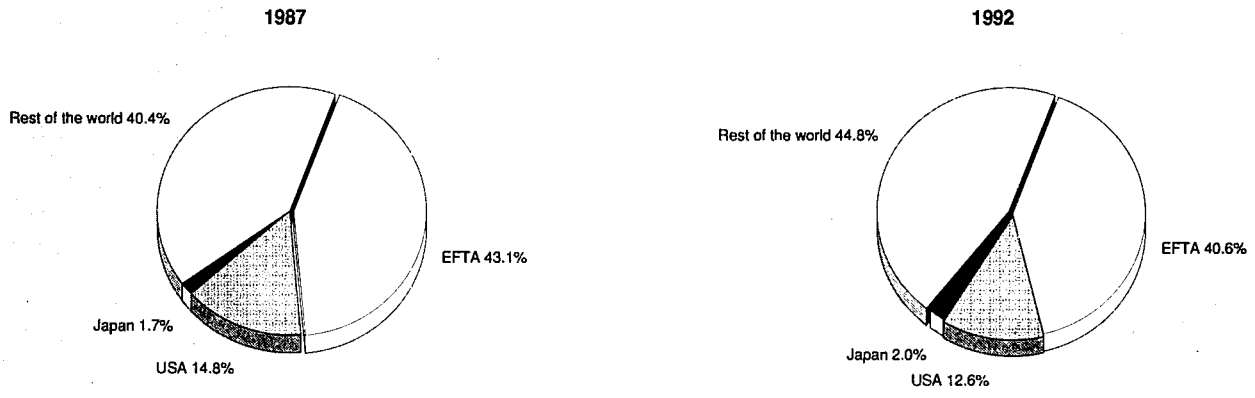
Plastic films

Production of plastic films, the largest subsector of the plastics processing industry, reached 6.2 million tonnes in 1992 in western Europe with a small decrease expected for 1993. Plastic films are mostly based on polyethylenes but also on polypropylene, PVC, PET or coextruded resins (polymides, ethylene-vinyl acetate etc.). The major end uses of plastic films are printed films for automatic packaging, shrink and stretch film for overpacking films for agriculture and horticulture (greenhouses, mulching), films for construction, for shoppers, carrier bags, refuse bags, heavy duty sacs and films for a wide range of technical applications as magnetic tapes, credit cards, hot foil stamping, cables, motor insulation, furniture films, office films, etc. A high percentage of plastic films are printed (especially in the field of packaging) or further converted to bags, laminations, metallized films and thermoformed to blisters, cups, trays, etc. PET, PP, PVC in particular can be converted to films by extruding or calandering.

Building

In the building sector, plastic window frames have a good market share in the countries of Central Europe whereas in South and Northern Europe other materials prevail. The other main applications of plastics in building are insulation materials, floor and wall coverings, roof applications and pipes.

Figure 6: Plastics processing
Destination of EC exports



Source: Eurostat

Electrical appliances

The consumption of plastics in the western European household electrical appliances sectors reached in 1992 a global tonnage of 530 000. The major polymers processed in the household electrical appliance are polystyrene (197 000 tons), polypropylene (175 000 tons) and ABS (75 000 tons). An annual growth rate in this sector is predicted of 3.5% with an exception for ABS -4% and polypropylene +6% . The main household electrical appliances are: refrigerators and freezers, washing machines/dishwashers, ovens, food processors, coffee makers and vacuum cleaners.

Automotive sector

The West European average for plastics in vehicles is 11% of total weight. In 1992, 1.35 million tonnes of plastics were used in car applications, of which 0.37 million tonnes of PP, 0.32 million tonnes of PUR and 0.16 million tonnes of PVC. PP consumption in cars is predicted to augment almost by 40% by the year 2002; at the same time, PUR consumption is set to grow by about 10%, while PVC consumption should remain stable.

Agriculture

Agriculture accounts for 3% of total plastics consumption in Europe. Plastic films for covering greenhouses have enjoyed spectacular growth over the last twenty years: from their original use a simple tunnels, they have evolved to the present sophisticated multi-span structures which offer the same advantages of traditional glass-covered structures.

The consumption of plastics materials for 1992 in the EC was about 28 million tons. Although the global increase of overall market for thermoplastic polymers, demand varied differently by individual polymers and markets. The following breakdown by material illustrates the growth rates for the total consumption in Western Europe

Consumption of plastics materials

PP (Polypropylene)

Despite the recession, polypropylene demand across Europe in 1992 grew from 3.73 million tonnes in 1991 to 4 million tonnes in 1992, a 7.5% increase. Some believe that higher growth rates will be seen in 1993 and demand will rise by about 10% during the year because the market from recycled material is less than had been expected (it is hard to find many applications for recycled polypropylene). The extrusion applications have been particularly successful (as with HDPE) with film and fibre products performing very strongly. The trend was the replacement of PVC by cast PP films especially in Germany. 1992 was the year when rigid containers in polypropylene, especially for bottle applications made advances particularly in the Italian market. The increased use of polypropylene in electrical automotive and technical applications, has also contributed to this demand growth and PP is increasingly substituting ABS in different fields.

HDPE (High Density Polyethylene)

In 1992, the most successful polymer in terms of growth of demand was high density polyethylene (HDPE): from 3.1 million tonnes to 3.365 million tonnes e.g. 8.5%. It occurred in all HDPE markets although the HDPE pipe market has been particularly strong in Germany. With film, HDPE has found favour over LDPE and PVC in certain packaging uses, and injection moulding, especially for wheeled refuse bins. Blow moulded containers also hold up better than expected. The increased demand in HDPE has also occurred across nearly all European markets with Germany and Italy having a particularly good year. It is estimated that HDPE consumption will grow by 5% in 1993 rising from 3.25 to 3.34 million tonnes. Virgin products will be increasingly vulnerable to substitution by recycled material (100 000 tonnes of recycled HDPE will most probably replace virgin material in 1993).

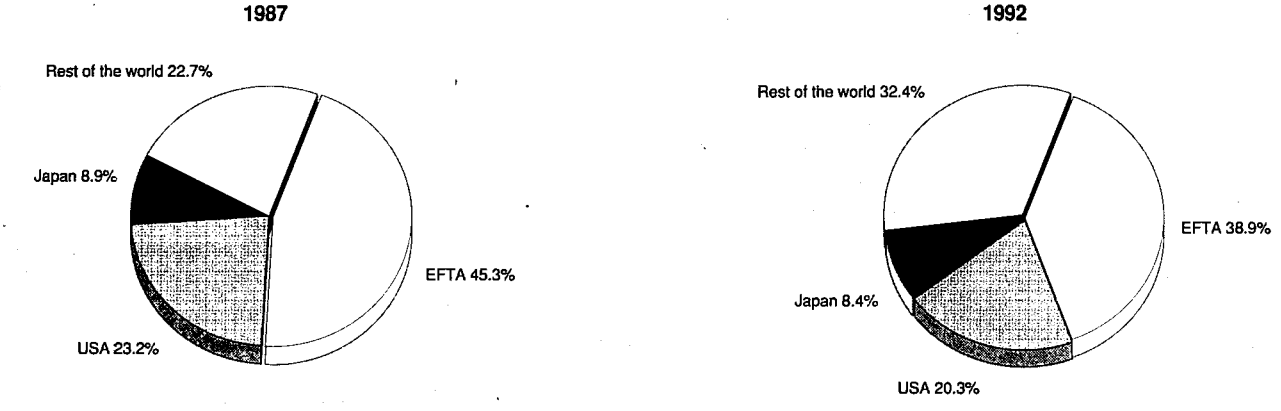
PVC (Polyvinylchloride)

This polymer continues to show modest growth despite environmental pressure. In 1992 demand increased from 5.1 million tonnes to 5.19 million tonnes, a 1.8% increase. There was some shift in the origin of the product used. Manufacturers in Western Europe lost about 2% of their market to imports, which rose by 100 000 tonnes to some 700 000 tonnes. PVC prices rose in 1993 because increased chlorine and ethylene costs were passed onto consumers. The main application area which has helped the increase in demand for PVC was building products. The window profile market has also been particularly strong in Germany while demand for pipes has been less marked. The use of PVC in packaging applications, particularly films, tended to decline partly because of substitution by PP and PET films. In 1993, demand for PVC grew by 1-1.5% after remaining static in 1992.

LDPE (Low Density Polyethylene)

The increase in demand for low density and linear polypropylenes was 0.5%, more in line with economic activity. This can partly be explained by the fact that the markets for LDPE are more mature than other polymer markets and suffer from competition from polymers such as HDPE in bottle and film

Figure 7: Plastics processing
Origin of EC imports



Source: Eurostat

Table 5: Plastics processing
Destination of output, 1992

(%)

Building	19
Packaging	29
Teletronic	5
Automotive	4
Other transports	3
Other	40

Source: EuPC

applications. For the LDPE market, recycling is also a key issue and the increasing use of recycled material will continue to limit growth for virgin polymers. Although in terms of square metre the market continues to advance rapidly, the use of LDPE will also depress overall growth in demand for resin.

PS (Polystyrene)

PS experienced a downturn in demand over 1992 when consumption has fallen from 1.75 million tonnes to 1.71 million tonnes. The polystyrene market is struggling to find any new growth applications. The traditional markets of packaging, domestic and electrical appliances are well developed and therefore offer limited growth prospects. Under unjustified threat from the environmentalists PS like PVC declined in its use for packaging. The use of OPS sheet in transparent packaging applications has increased but this growth area has not achieved the speedy success its supporters expected. Prices fell to their lowest point ever in real terms whereas serious structural problems of the market intensified (export potential slip and import penetration increase). The demand of PS is declining because of the competition from producers in South-east Asia (for teletronic products) and because of the substitution of PS by PP in some domestic and packaging applications. The future holds little prospect for growth.

PUR (Polyurethane)

In 1992 the production in western Europe reached 1.6 million tonnes, of which rigid foams accounted for 450 000 tonnes. The key end markets for polyurethane are furniture, transport and construction which together account for two-thirds of polyurethane consumption.

FRP/C (Fibre Reinforced Plastics / Composites)

The main constituents of fibre reinforced plastics/composites (FRP/C) are reinforcing fibres dispersed or imbedded in a continuous matrix (polymer). Glass fibres represent over 98% of the total tonnage of reinforcing fibres used. The remaining 2% is shared between carbon and aramid fibres. The total EC glass reinforced plastics (GRP) production in 1991 reached about 990 000 tonnes. The main resins converted are Unsaturated Polyester Resins (UP), Epoxy Resins (EP), Phenolic Resins (PF) and Melamine Resins. The most important markets are electrical engineering (wiring devices, electronics), domestic appliances (pot and pan handles, control butter, table ware), automotive industry (brake parts and other car parts), sanitary section (toilet seats, bathroom equipment), closures (caps for pharmaceutical and cosmetic use) and other markets (sliding elements, sealings).

EPS (Expanded Polystyrene)

Expanded polystyrene represented an output of 535 000 tonnes in 1991 in western Europe.

Other plastics

Demand for the other polymers, particularly some of the engineering thermoplastics, has not been as strong as for some of the commodity polymers.

From a global point of view, the remainder of the thermoplastic polymer market grew by 4.8% in 1992 which is less than had been traditionally achieved. Most polymer markets were in a similar and precarious state in the beginning of 1993 as they were in 1992. Industry observers are more cautious in predicting a brighter future after seeing last years predictions proved hopelessly optimistic. A definite credibility gap has emerged for many plastics producers.

Supply and competition

The existing capacity of polymer production, mostly in the hands of the main petrochemical groups, is in general in accordance with the demand of raw materials by processors.

The plastic processing industry is mainly composed of small and medium-sized companies. On one hand for the procurement of raw material, the medium-sized plastics processor has to deal with strong polymer producing companies, and on the other hand it has to sell his plastic products through large scale industries like carmakers, manufacturers of electrical and electronic equipment and department store chains.

The highly advanced technology in the European processing companies enables them to export 9.3% of their total production in spite of the high transportation costs for plastics products. The same happens to the imported goods where extra-EC imports account only for 7.28% of the total EC consumption.

Polymer producers need higher prices if they are to achieve decent margins. The plastics industry cannot continue to produce at a loss even though plastics converters will be hurt if it reduces output substantially. For European plastics markets, some products still experience price erosions due to overcapacity and the pursuit of market share over margins. In certain cases, costs were not being covered because of the enormous decrease of the margins. The current low price level for plastics with tonnage prices today comparable with those of 15 years ago may partly explain the situation. These low prices are encouraging processors to build up stocks and the increase in consumption is apparently being driven by genuine market demand.

Nevertheless, it is worth noting that it is increasingly difficult to assess the size and development of the European market because of the emergence of a world-wide market for polymers. In 1992, the imports came from Eastern Europe and the Middle East but resin sourced from Latin America and Southern east Asia also increased dramatically in volume.

Production process

The plastic processing industry utilises a variety of production methods and plastic materials. For every production method, a skilled labour force and important investments in numerically controlled machines are necessary. Professional training is very important for the plastics processors in the EC.

Different technologies are operated such as injection moulding, compression, extrusion, blow moulding extrusion, calandering, thermoforming, film extrusion blowing, blow moulding, hand lay up of fibre reinforced plastics and coating. Decoration by printing, hot stamping and other subassembly operations are also carried out.

During its early years in the 1950s the only technologies known for the FRP/C were manual hand lay-up and spray lay-up. The first mechanisation appeared only in the 1960s, while pultrusion and winding were introduced only in the 1970s. The breakdown of EC production of thermoset GRP by manufacturing technique shows that manual techniques still account for about 35%, followed by automated techniques

like SMC and BMC. Semi-finished products in SMC (Sheet Moulding Compound) / BMC (Bulk Moulding Compound) and finished parts (118 000 tonnes) are at the centre of new technological developments mainly linked to the requirements of the automotive industry and transport sector in general.

INDUSTRY STRUCTURE

Companies

Statistics received from the national plastics federations in EC countries show that the number of plastics converting companies in Europe adds up to 20 000 mostly small and medium sized companies. Only a dozen companies employ more than a thousand persons.

Altogether this industry employs around 850 000 persons in EC. The sector experienced a consistent growth during recent years. This was not only achieved by an extension of the sales of the existing companies, but mainly of new companies joining the sector.

In spite of being a sector of small and medium sized companies, the plastics processing industry in Europe has also large companies such as: Plastic Omnium (F); Wavin (NL); Alphacan (F); Rehau (D); CMB Packaging (F); BPI (UK); Schöller (D); Autobar (UK); Allibert (D); Klockner (D); PEGUFORM (D); Freudenberg (D); subsidiaries of Hoechst (D) and Solvay (B); Fardem (NL) and Nyborg (DK).

Strategies

The best growth opportunities may come from new markets in Eastern Europe, and new applications in leisure and health care. Plastics lead to many new applications in consumer products as well as in high tech applications. This is why the sector experienced a consistent growth during recent years.

Concentrations are expected in different fields such as subcontracting for the automotive sector and consumer electronics. The biggest companies in the field are establishing links within the EC and eastern Europe and are looking for partners.

ENVIRONMENT

The gloomy economic situation in the entire European plastics industry is related to the extensive recycling discussions. Recycling quotas imposed by national and European authorities in the packaging sector, the pending EC and national legislation for automotive waste, teletronic waste, building waste and others, are impeding new growth and are creating uncertainty in the user sectors. The plastics industry has to take up this challenge. However, there remains the question of when the necessary economic recovery will start and when will the investments required for the recycling measures be made available.

In general the plastics industry is prepared to accept its fair share of responsibility for the environmental impact of plastics but other essential partners in the process are: supply and user industries, retailers, consumers, governments, and waste disposal authorities. The plastics converters industry is very conscious that plastics have become increasingly popular because of the immense social benefits they have brought and that therefore they now constitute a prominent and durable component in the waste stream.

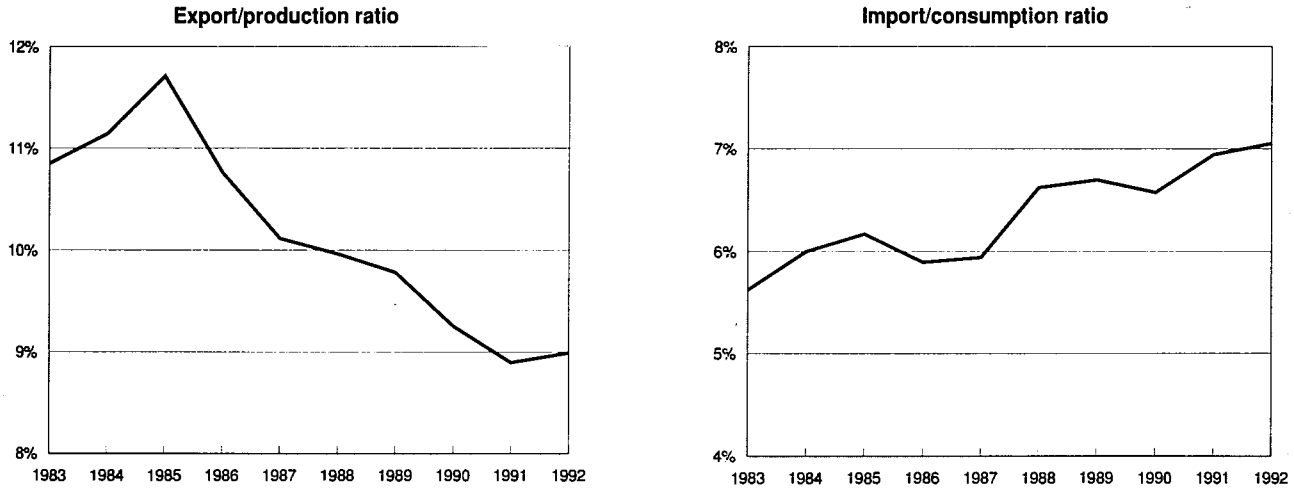
The industry wants to see common environmental policies for the EC. Unilateral legislation by individual Member States can lead to undesirable distortions in the market causing trade barriers which will delay the creation of a truly single European market. Converters wish to play a constructive role in the preparation of these policies and believe that the ensuing legislation must be objective and based on science and not on irrational reactions to imaginary situations. Such legislation must give due weight to the full 'cradle to grave' environmental impact of plastics.

The industry fully supports the preparation of eco-balance studies for both plastics materials and plastics products. Full consideration must be given to the entire life span of plastic materials and products. Recognition must be accorded to the environmental benefits they can impart from their initial conception through their service life, for example by saving energy, and to their ultimate manifestation as waste ensuring that their full potential for re-use is exploited.

There is no single solution to the problems of plastics: waste management and recycling, incineration and landfill all have their part to play to different extents and according to particular local circumstances. Possible waste management options, all of equal validity, include:

- Resource efficiency and waste avoidance;
- Material recycling/feedstock recycling;

Figure 8: Plastics processing
Trade intensities



Source: DEBA

- Energy recovery/recycling;
- Incineration;
- Landfill.

The plastics converters stand resolutely against limiting the use of any plastics material as this would constitute an unacceptable barrier to trade. To encourage the development of plastics recycling, plastics converters wish to encourage the adoption of an industry agreed, EC-wide product marking system in order to facilitate the easy identification and encourage the appropriate standards in those applications in which recycled products fulfil 'suitability for purpose' criteria.

No plastic products are made with the intention that they should be disposed of as litter. Nevertheless part of litter is plastics. The industry itself can assist by avoiding overpackaging but public discipline and education has a major part to play. Degradable plastics are for many reasons not a solution to litter problems, or indeed to plastics waste management questions in general. The products of the plastics industry should be promoted on there own technical merits. If the replacement of materials by plastics has proven advantages to the environment, the announcement of these advantages in advertising is acceptable.

REGULATIONS

The EC Commission is designing and has designed directives, decisions or regulations which are affecting the industry of plastics converters. Concerning food contact applications, the Commission is specifying positive lists for monomer, additives, colorants, etc. used in plastic products. The building sector is awaiting the pending directive for building products.

One of the major concerns in the plastic industry is the management of waste. The EC Commission developed legislation - based on the framework set by the Directive on waste (91/156/EEC) - which covers different fields touching the industry. Directives on packaging and packaging waste and other waste streams (e.g. automotive, building, hospital, teletronic) should be finalised in 1994 and are of major concern to the plastics converters industry.

Table 6: Plastics processing
Expected real annual growth rates

(%)	1993-97
Apparent consumption	4.0
Production	3.0
Extra-EC exports	3.0
Extra-EC imports	5.0

Source: EuPC

OUTLOOK

The consumption of plastics will further increase in the next years. The existing production capacities can accommodate additional consumption of most product classes. At present it is still difficult to judge to which extent recycled products can decrease the future consumption of new plastics. However it is expected that the consumption of plastics in the EC will grow by an average of 3-4% per year for the end of the decade. The best growth opportunities will come from new markets in Eastern Europe and new leisure and health care applications. The plastics industry is working at heightening public awareness of its many initiatives to contribute to a cleaner environment. Taking into consideration the efforts in developing recycled plastic products, the plastic processing industry looks to a bright future.

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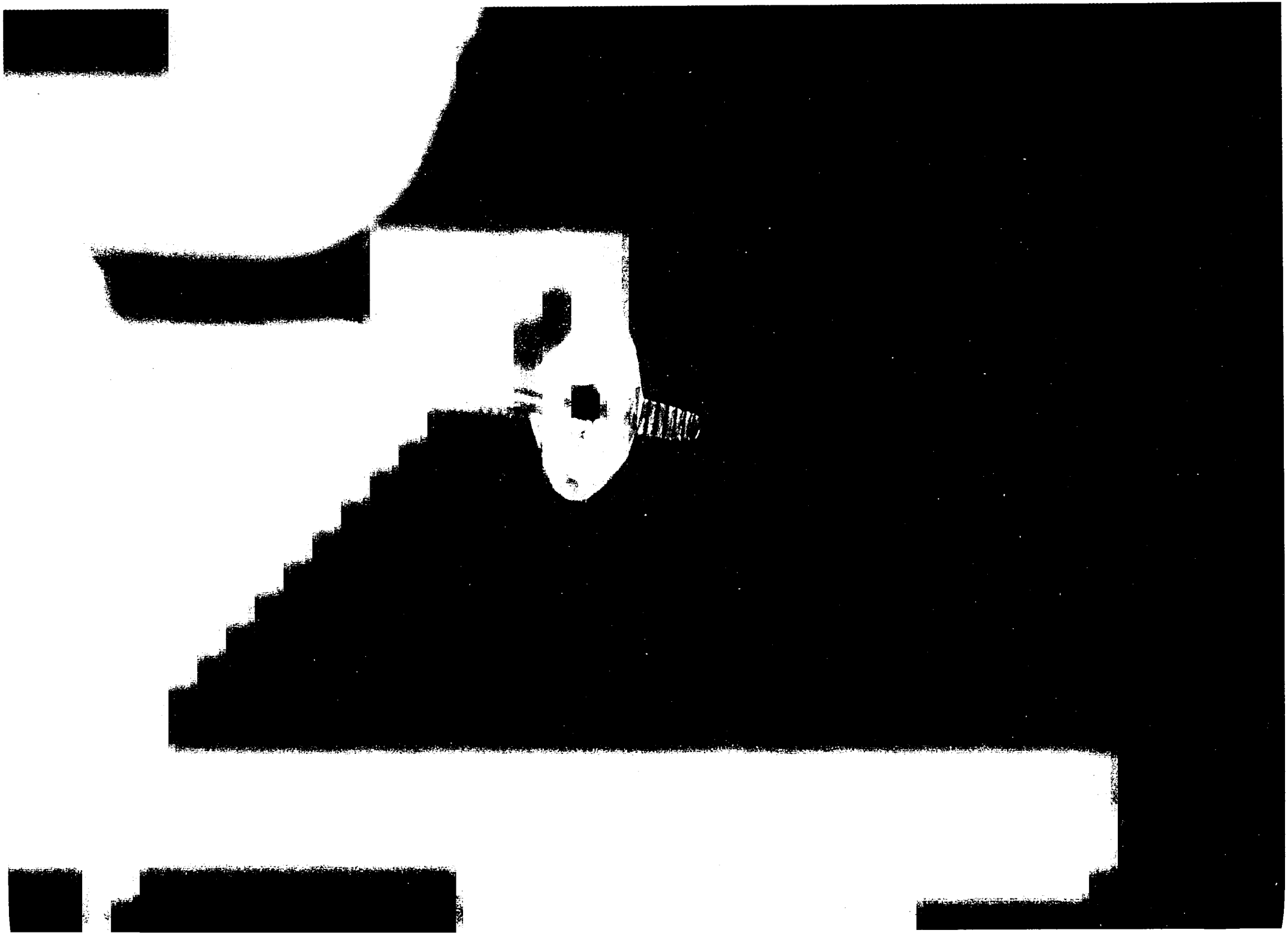


Furniture

NACE 316.6, 467

The furniture industry is fragmented and dominated by small and medium sized firms. Concentration, however, is increasing because of stiffer competition by foreign suppliers on the EC market and the increasing concentration of the retail business. Major suppliers in the EC are Germany, France, Italy and the United Kingdom.
Demand for furniture is cyclical being dependent on the general economic climate. The present economic recession in Europe is the main cause for the slowdown in the furniture industry. In the medium term, however, the economic recovery will allow growth rates to improve substantially.

INDUSTRY PROFILE

Description of the sector

Products of the furniture industry are classified according to the main composing material, with metal furniture classified under NACE 316.6 and wooden furniture under NACE 467. This last category makes up some 75% of total furniture production in the EC. However, since most products are made up of different materials, the classification according to the composing material is rather out-dated. A market-oriented classification is more appropriate.

According to such a classification, furniture for the dining and living room is the most important group in this sector. Office and shop furniture makes up some 20% of total production (wooden and metal furniture). The main product groups in office furniture are seatings, desks, tables, cupboards and cabinets.

Germany is by far the most important producer in terms of value added. Other important Member States in this sector are Italy, France and the United Kingdom. Together, these four Member States are responsible for about 80% of the total value added in the EC. Germany is more specialised in kitchen furniture, while the main product group in Italy is lounge and dining room furniture.

Recent trends

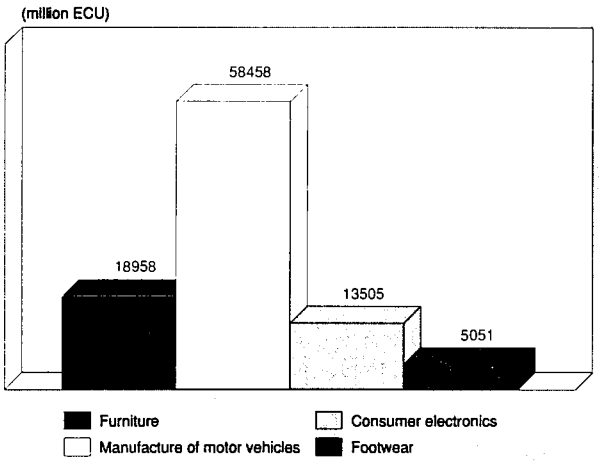
After a slowdown in the early 1980s (except for office furniture), production of furniture grew sharply, especially after 1985, with growth rates averaging 10% per annum over 1885-90. In the 1990s however, production in the EC decreased due to the economic recession, and has remained flat since.

Export growth has generally lagged behind production, particularly since 1990 when it started to register negative figures.

Apparent consumption showed even higher growth figures than production, with especially a strong increase in office and shop furniture. Another important observation is that imports account for a consistently larger part of apparent consumption every year. The combination of decreasing exports and increasing imports led to the worsening of the trade balance for the EC.

Compared with overall EC manufacturing, the furniture industry showed above average growth figures in production and employment after 1985. Fluctuations in consumer spending are exaggerated in furniture demand both during upswings and downswings. In times of economic recession like in the early 1980s and 1990s, purchases of furniture are postponed, while the reverse holds for periods of economic growth.

Figure 1: Furniture
Value added in comparison with other industries, 1992



Source: DEBA

International comparison

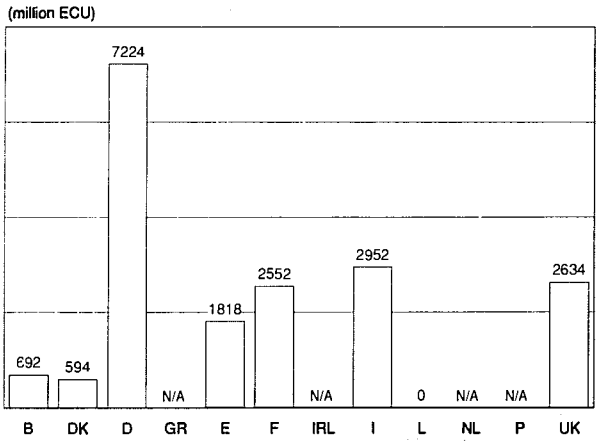
Production growth in the USA principally took place in the period before 1989. After this year, the furniture industry was hurt by the economic recession which showed up earlier in the USA than in the EC. Also before 1989 consumption in the USA had grown considerably, spurring exports from the EC to the USA since US producers did not have enough capacity to satisfy the growing demand.

Although in Japan production of furniture has grown significantly as well, both the USA and Japan are in the red as imports of furniture still exceed exports in both countries.

Foreign trade

Although the trade balance of the EC remains positive, extra-EC imports grew faster than exports since the late 1980s. A higher proportion of EC demand is satisfied by foreign imports, while EC Member States are facing stronger competition for their exports.

Figure 2: Furniture
Value added by Member State, 1992



Source: DEBA

Table 1: Furniture
Main indicators in current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	25 836	27 194	27 890	29 582	32 761	37 486	41 256	45 303	48 131	49 419	48 500
Production	27 394	29 121	30 247	31 684	34 592	39 102	43 077	46 987	49 357	50 289	49 000
Extra-EC exports	2 634	3 162	3 649	3 447	3 389	3 459	3 957	4 017	3 986	3 956	3 680
Trade balance	1 558	1 926	2 356	2 102	1 831	1 616	1 821	1 683	1 226	870	560
Employment (thousands)	599.0	585.7	563.2	556.2	563.0	581.7	601.3	610.7	607.3	589.3	574.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) NEI estimates.
Source: DEBA, Eurostat

Table 2: Furniture
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	3.4	2.9	3.2
Production	3.0	2.3	2.7
Extra-EC exports	1.3	0.4	0.9
Extra-EC imports	7.9	9.7	8.7

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA, Eurostat

Table 3: Furniture
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	2 634	3 162	3 649	3 447	3 389	3 459	3 957	4 017	3 986	3 956
Extra-EC imports	1 077	1 236	1 293	1 346	1 558	1 842	2 136	2 334	2 760	3 086
Trade balance	1 558	1 926	2 356	2 102	1 831	1 616	1 821	1 683	1 226	870
Ratio exports/imports	2.45	2.56	2.82	2.56	2.17	1.88	1.85	1.72	1.44	1.28
Terms of trade (1)	95.7	97.7	100.0	100.9	100.4	101.0	101.8	103.7	99.5	97.7
Intra-EC trade	3 103	3 348	3 627	4 158	4 618	5 421	6 275	7 085	7 638	7 880
Share of total imports (%)	74.2	73.0	73.7	75.6	74.8	74.6	74.6	75.2	73.5	71.9

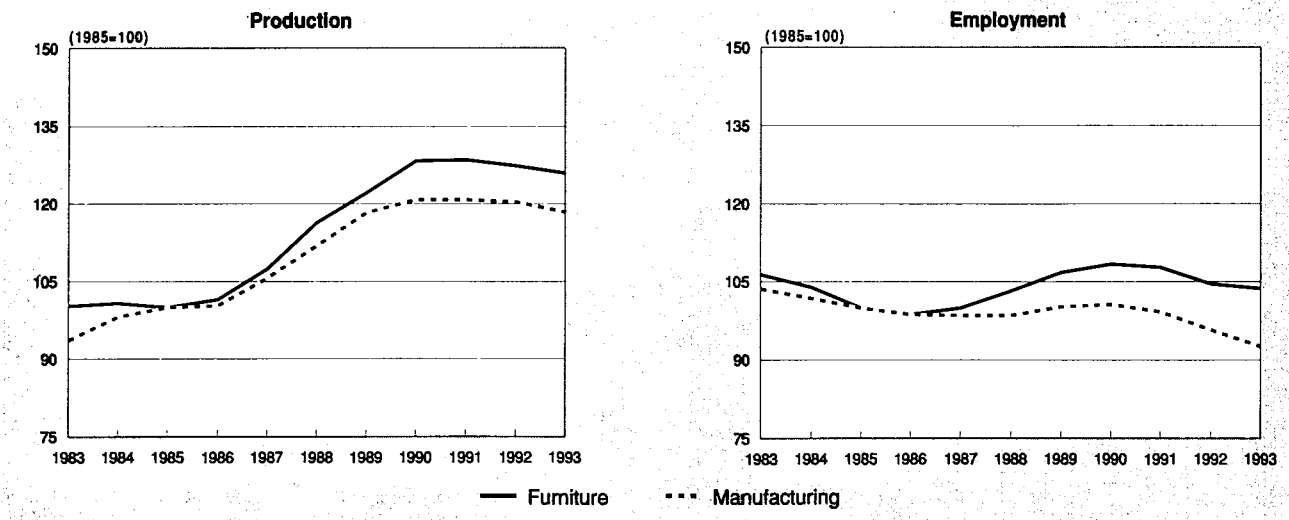
(1) Wooden furniture only (NACE 4670).
Source: DEBA, Eurostat

Table 4: Furniture
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	26.3	26.4	27.0	27.9	28.8	30.2	30.0	31.0	31.6	32.2
Productivity index	97.4	97.7	100.0	103.2	106.8	112.0	111.1	114.7	117.0	119.1
Unit labour costs index (3)	88.4	94.7	100.0	104.7	108.9	115.9	122.5	131.1	138.4	147.3
Total unit costs index (4)	83.8	92.2	100.0	105.6	115.0	126.1	135.7	145.4	154.0	163.3

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

Figure 3: Furniture
Production in constant prices and employment compared to EC manufacturing



1993 are NEI estimates for the furniture industry, Eurostat estimates for manufacturing industry.
Source: DEBA

The EFTA countries account for a large part of the external trade of furniture in the EC, both for exports and imports. Eastern Europe is also a major supplier.

Italy, Denmark and Belgium are net exporters in the EC, with Italy and Denmark mainly exporting dining/living room furniture. Germany was a net exporter until the 1990s. However, the unification caused a strong increase in exports to Germany since many foreign (EC and non-EC) producers were attracted by the large business opportunities in the former East Germany. France and the United Kingdom are net importers.

Intra-EC trade makes up some 75% of total imports, a figure which has remained fairly constant. Demand for furniture in the EC is mostly satisfied by EC production (low import/consumption ratio), although this ratio has been steadily increasing in the last years. Exports account for a larger part of EC production (high export/production ratio). However, this ratio is decreasing during the last years, which may indicate that EC producers are loosing competitiveness vis-à-vis foreign producers.

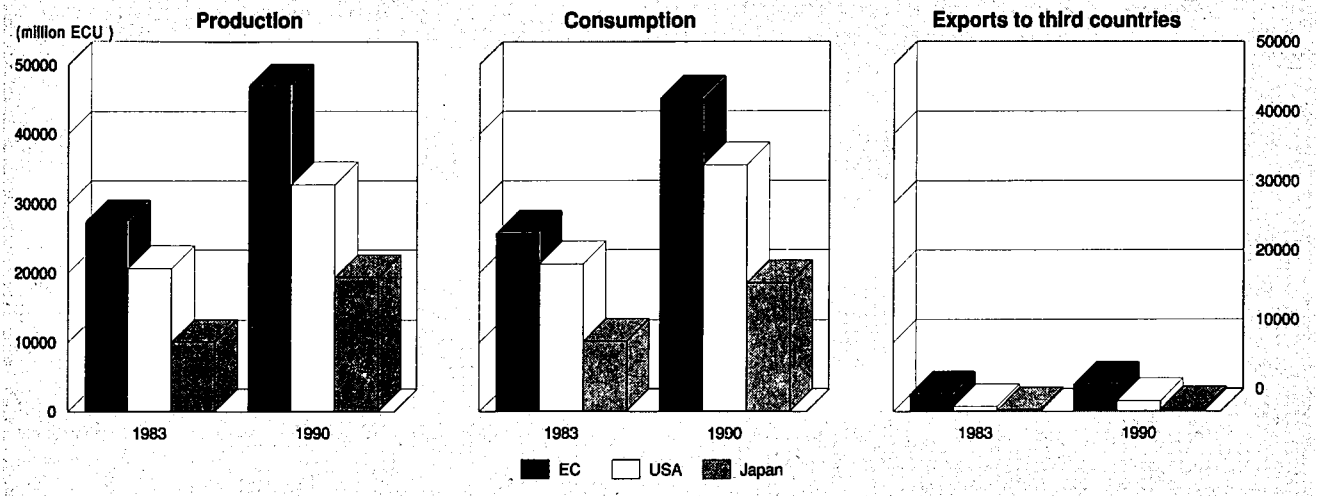
MARKET FORCES

Demand

The furniture industry is highly susceptible to cyclical fluctuations in demand. Further, demand for household furniture has a high income elasticity. The implication is that furniture demand tends to overshoot cyclical fluctuations in the economy in either directions.

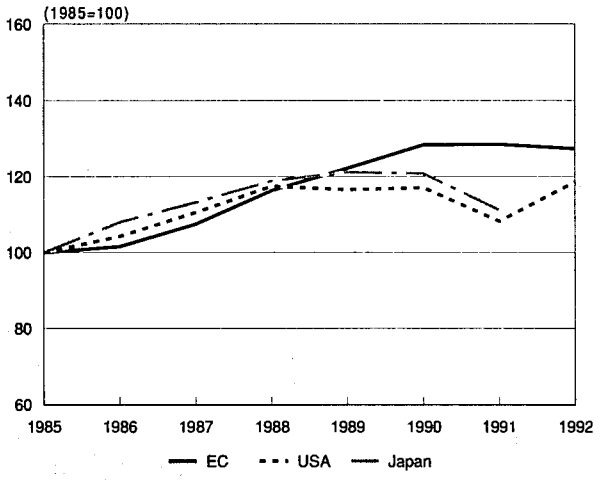
About two thirds of total demand refers to replacement. It is estimated that about one third of total demand is permanent due to births, the formation of new households and the breakdown of existing furniture.

Figure 4: Furniture
International comparison of main indicators in current prices



Source: DEBA, Eurostat, OECD

Figure 5: Furniture
International comparison of production in constant prices



Source: DEBA, Bureau of Economic Analysis (USA), Statistics Bureau (Japan)

Other factors influencing the household furniture industry relate to the demographic situation, the housing market (which, in turn, is highly influenced by the interest rate level), changing of life styles, the renewal rate of furniture and advertisement expenditures by furniture producers.

The combined negative effect of high interest rates (affecting negatively the housing market) and the economic recession has been far greater than the positive effect of the growing number of households (due to the baby boom in the 1950s and 1960s). This resulted in a slowdown in the early 1990s.

The economic recession is also the main reason for the slowdown of growth in the office furniture industry. Companies are not investing large amounts in the purchase of furniture preferring to wait for better times.

Supply and competition

The furniture industry in the EC consists primarily of relatively small companies, although differences between Member States exist. In the southern Member States, the manufacturing process is still artisan, with a subsequently high presence of small firms especially in Greece, Portugal and Spain. Also, in Italy the average company size is relatively small. However, a large number of these companies are working together under co-operation agreements. In the northern Member States, although smaller companies exist alongside larger establishments there is a trend towards denser concentration in production.

In contrast, the retail business is strongly concentrated, resulting in a strong bargaining position for the retailers vis-à-vis producers. The latter face large chains, large department stores or smaller retailers grouped together in co-operatives. In Germany retail groups and chains are responsible for more than 80% of national sales.

Internationalisation is expected to increase in the retail business because of the internationalisation of department stores and the companies divided into branches, although only one company can be said to be really international, the Swedish group IKEA.

Another trend in the retail business is the increasing importance of large superstores which are usually located in the outskirts of large urban areas. IKEA and national chains secure a larger share of the market by setting up such stores. Besides that, the success of IKEA is also due to the focus on the self-assembly part of the furniture market, which has gained importance over recent years. Furthermore, self-assembly products are more suitable for the import/export strategy of IKEA.

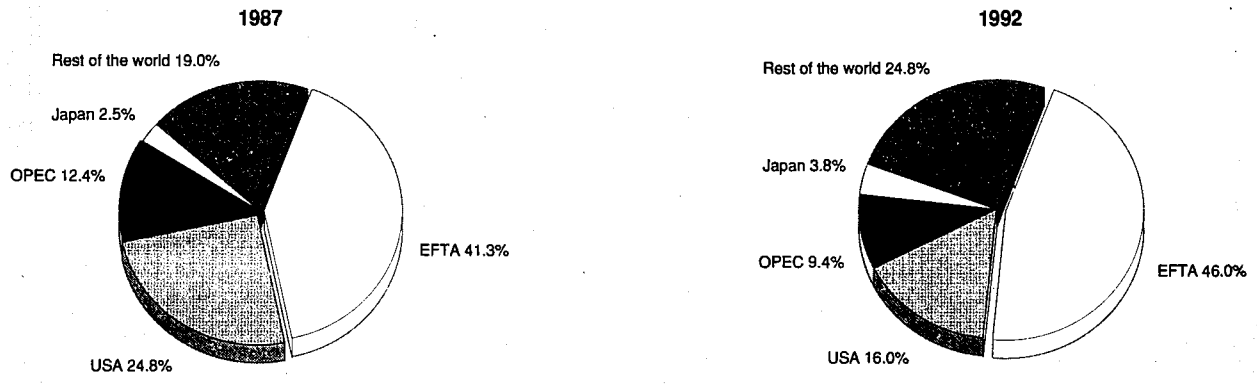
The increasing competition in the export market comes especially from Asian and East European producers. Asian producers like Taiwan and Singapore are competitive vis-à-vis EC producers because of lower wages combined with modern technology. These countries, however, are faced with an insufficient supply of wood. East European producers are (temporarily) relying on low labour costs. Their products are more focused to the cheaper end of the market.

Competition from the USA and Japan is only minor in the furniture industry. Furthermore it is expected that US exports will decrease in the longer term because the conclusion of the NAFTA agreement will divert the attention of US producers away from the EC market.

Production process

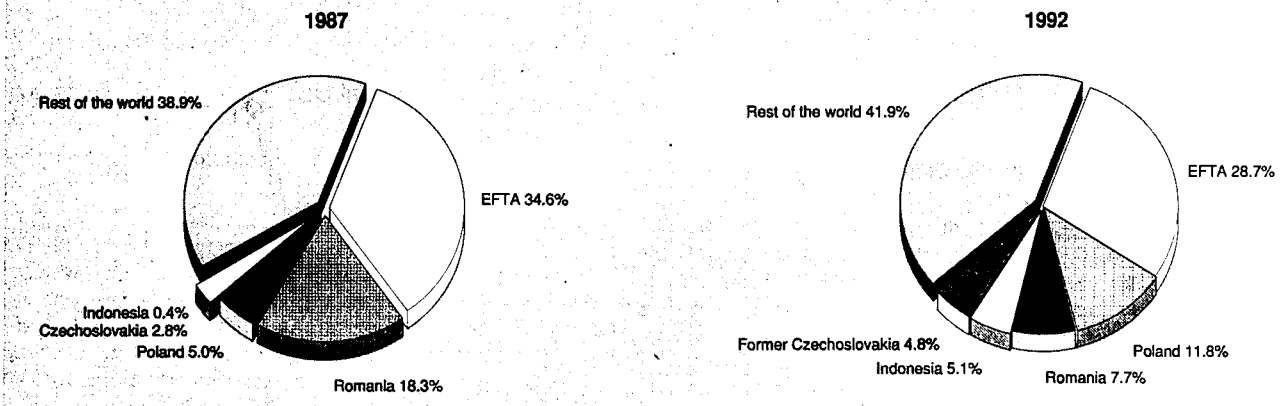
Until a decade ago the furniture industry was very labour intensive with labour productivity and unit labour cost being the most critical factors for competitiveness. Over the last decade greater capital investment in machinery and equipment has resulted in steady productivity gains. Unit labour costs,

Figure 6: Wooden furniture
Destination of EC exports



Source: Eurostat

Figure 7: Wooden furniture
Origin of EC imports



Source: Eurostat

which represents now about 30% of total unit cost, has grown at the same rate as total unit costs.

Most impressive technological improvements have taken place in the production and assembly of rectilinear furniture and coated panel boards.

INDUSTRY STRUCTURE

Companies

Technical and market related reasons force furniture producers to specialise in a limited range of products. Given this high degree of specialisation, companies in the furniture industry have a relatively small scale. However, over the years, the average size of companies has increased because of several reasons: the formation of the Single Market, the increasing market power of the retail business and the potential for economies of scale embedded in new production technology.

The number of firms varies regionally. In Spain, where the production process is largely artisan, the number of manufacturers is around 12 000 whereas in Germany the number is around 1 500.

Strategies

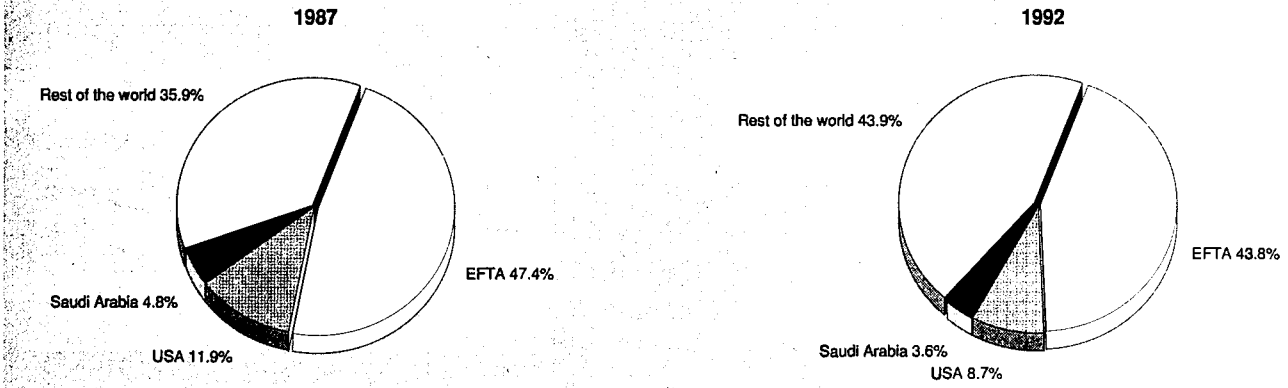
Producers are faced with a variety of risks over the coming years. On the one hand, there is the firm position of the retail business which forces downward pressure on producer prices and profit margins. Furthermore, some retailers are trying to pursue a strategy of vertical integration by becoming also producers (MFI in the United Kingdom, and IKEA in the whole EC). At the other hand, there is growing competition from foreign producers in the EC market.

The above developments are aggravated by the economic recession, which has been resulting in closures for many smaller firms (especially in former East Germany).

The strategies of furniture producers can be grouped in three broad categories. First, investment strategies where producers are spending large amounts in the purchase of modern machinery and equipment, in order to increase their competitiveness by introducing more advanced production technology.

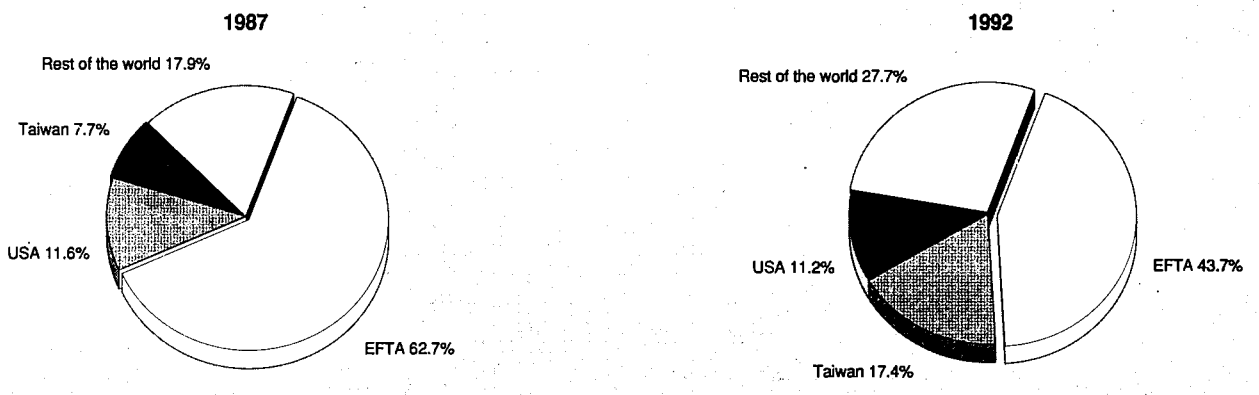
A second strategy is one of concentration in order to gain market power against the retail business. In some Member States like France and the United Kingdom this happens through mergers and take-overs. In Denmark and Italy independent companies have set up co-operation agreements in

Figure 8: Metal furniture
Destination of EC exports



Source: Eurostat

Figure 9: Metal furniture
Origin of EC imports



Source: Eurostat

order to exploit economies of scale and to acquire a stronger position vis-à-vis the retail business. In other Member States, smaller firms seek protection with larger companies, which are better armed against the economic recession because of their financial backlog, their stronger position in export markets and their large investments in technology.

Third, there is a brand strategy where furniture producers try to differentiate their brand by product development and market position, in order to strengthen their position vis-a-vis retailers.

REGIONAL DISTRIBUTION

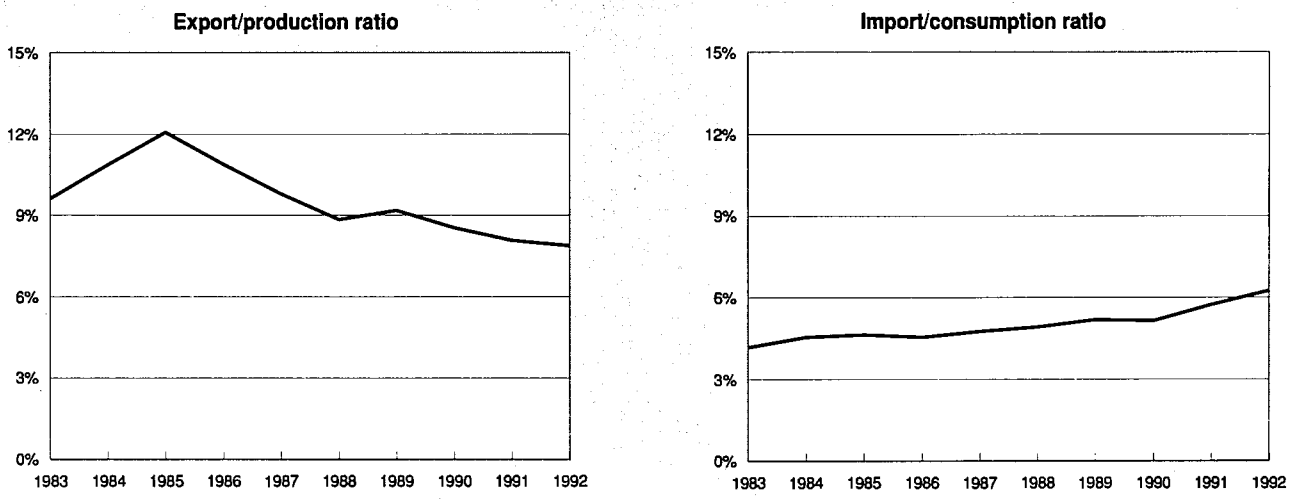
Although the furniture industry is present in every Member State, its distribution is not evenly spread over all Member States. The northern Member States account for the largest part of the production and value added. This distribution of production and value added however, is not reflected in the distribution of companies over the Member States. Because the furniture industry has a quite artisan character in the southern members states, these Member States have relatively more companies active in the furniture industry. In the northern Member States, the furniture industry is more concentrated.

ENVIRONMENT

Ecological issues for the furniture industry concern the use of specific materials and emissions in the production process. The use of some materials like plastics and polyurethane may be subject to regulations. Emissions from some materials in the production process may be affected by government directives, in the light of the increased concern for the environment and work safety.

Another concern affecting the furniture industry is the continued erosion of woodland and forested areas. Although no specific regulations are yet taken in this field, voluntary actions in some Member States are underway, which focus on management of forested areas.

Figure 10: Furniture
Trade intensities



Source: DEBA, Eurostat

REGULATIONS

The EC Commission has given a mandate to CEN organisation to develop standards concerning the fire safety of upholstered furniture. The CEN committee on Furniture (Committee 207) has two standards ready while it is working on seven others. The two standards concern upholstered furniture to be set on fire by a burning match or cigarette.

Another aspect is the protection of design and models. The services of EC Commission are working on legislation which will safeguard the interests of the industry without hampering innovation.

OUTLOOK

The outlook for the household furniture industry looks rather unfavourable in the short term. Several forces are responsible for this: the weak economic recovery over 1993-1994, the rising unemployment rates, the high interest rates which affect negatively the housing market and the saturated furniture market. After 1994, however, economic recovery will lead to increasing consumer confidence and consumer spending, and this together with the growing number of households will result in a significant recovery in production and consumption.

The office furniture industry is also negatively affected in the short term by the economic recession, with a decline of investment in office buildings. In the long term however, the investment in office automation and the growth in the service sector will result in an increasing demand for office furniture.

Table 5: Furniture
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-3.0	6.0
Production	-4.0	5.0
Extra-EC exports	-4.0	3.0

Source: NEI

The furniture industry in the EC is faced with major challenges in the near future. While increasing competition from foreign suppliers and retail business forces individual companies to become more competitive, the industry as a whole is confronted with decreasing sales. These developments will make it harder for the less competitive producers to stay in business. Strategies like co-operation, subcontracting, restructuring of production by investing in new production technologies, reorganisation of distribution facilities should therefore be considered.

Written by: Netherlands Economic Institute
The industry is represented at the EC level by: Union Européenne de l'Ameublement / European Furniture Manufacturers Association (UEA). Address: Rue Royale 109-111, B-1000 Brussels; tel: (32 2) 218 18 89; fax: (32 2) 219 27 01; and,
Fédération Européenne du Mobilier de Bureau (FEMB). Address: PO Box 190, NL-2700 AD Zoetermeer; tel: (31 79) 53 12 62/63; fax: (31 79) 53 13 65.

Jewellery
NACE 491

The jewellery sector recovered somewhat in 1992 after the difficulties it encountered in 1991. In nominal terms production was stagnant, but the volume has increased. Prices, however, continued to decrease implying increased purchases of lower valued jewellery. The outlook for 1993 and 1994 remains pessimistic in view of the economic slowdown. After 1994, however, prospects are more promising, as it is expected that general economic growth will increase again.

INDUSTRY PROFILE

Description of the sector

The jewellery sector is divided into six subgroups:

- precious metal or precious plated ware;
- goldsmiths' and silversmiths' wares;
- costume (or "fancy") jewellery;
- diamond cutting;
- precious and semi-precious stones;
- coins and medals.

The difference between precious jewellery and costume jewellery is sometimes difficult to determine. An article made of base metal and coated with precious metal set with imitation stones would be regarded as costume jewellery, but high-quality plated metals may be set with natural stones, and the designation of costume versus precious jewellery is unclear. The industry includes articles made of precious metals (particularly silver) that are not worn on the person.

At the retail level, it is customary for the industry to have close ties with the clocks and watches industry as well as with antiques not necessarily made of precious metals.

It should be noted that Eurostat data on production and employment show the relative volume of the industry in each country and the trends in production and employment. However, the absolute figures are underestimating the importance of the industry, as units employing less than 20 people are not taken into account by official statistics. Small firms can account for more than 40% of production for a country.

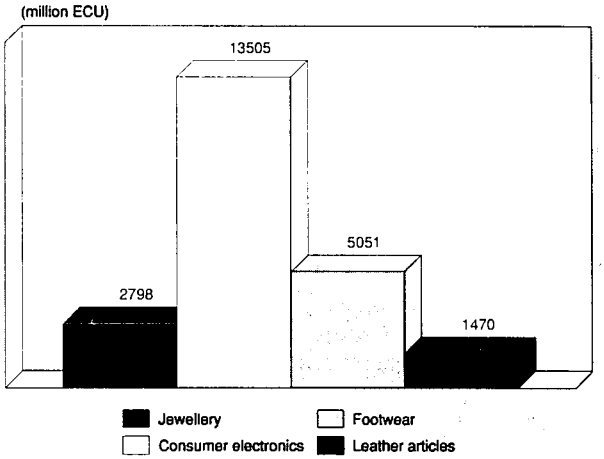
Recent trends

Production at current prices was stagnant in 1992 after the decline in 1991. In real terms production has grown by 2.8%

The demand for gold for the purpose of jewellery fabrication rose markedly, from 54% of total gold production in 1980 to 87% in 1990, which had a notable effect on the price of gold. The market for costume jewellery in particular expanded during the 1980s. On the basis of estimates at the retail level for the EC (Euromonitor) and for Japan (Japan External Trade Organisation) and at the industry level for the United States (Department of Commerce) the total value of the market for jewellery in the late 1980s was roughly divided into 80% precious jewellery and 20% costume jewellery. There are indications that the share of costume jewellery is gaining.

Gold jewellery fabrication recovered substantially in 1992. World production grew by 16.5% to 2662 million tonnes after a relatively low 7.4% growth in 1991. This recovery was especially due to the very high production growth in the Middle East, the Indian Subcontinent and the Far East. The EC benefited only marginally as production increased by only 6.5% in 1992.

Figure 1: Jewellery
Value added in comparison with other industries, 1992



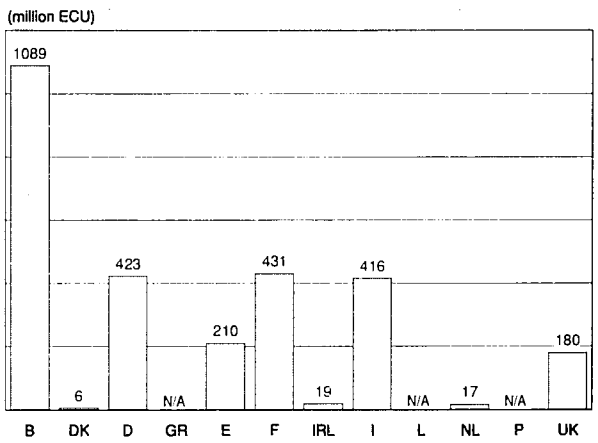
Source: DEBA

Italy, being the largest gold jewellery manufacturer in the EC, benefited to some extent: its production increased by 11.1% reaching 461 tonnes in 1992. Other EC countries of some importance are Germany, France and Spain. Germany and Spain, however, encountered a reduction, whereas France was able to increase production by only 3.5%.

Gold and silver traded at stable price levels in the beginning of the 1990s compared to more buoyant price fluctuation in the 1980s. The price of gold went down from 392 USD per ounce to about 370 USD. Silver prices fluctuate around 4.85 USD per ounce. Traditionally, instability raises gold and silver prices, but neither the Gulf war nor the attempted Soviet coup affected prices. Diamond prices, which are strongly influenced by the De Beers Central Selling Organisation (South Africa), remained fairly stable.

Apparent consumption is likely to be underestimated because the interval between production and sale is often long and stock levels fluctuate significantly. Moreover, production figures are underestimated by the exclusion of firms with less than 20 employees. Apparent consumption is derived by sub-

Figure 2: Jewellery
Value added by Member State, 1992



Source: DEBA

Table 1: Jewellery
Main indicators at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993(2)
Production	3 547	3 906	4 797	4 321	5 203	5 562	7 129	7 532	7 329	7 326	7 400
Extra-EC exports	7 566	9 655	9 397	8 740	8 757	10 054	11 855	10 716	10 733	10 744	10 800
Trade balance	2 701	2 938	3 560	2 791	4 368	4 039	4 599	4 018	4 294	4 374	4 400
Employment (thousands)	58.4	57.2	56.4	55.6	55.6	57.6	61.3	62.6	60.7	58.5	58.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) NEI estimates.
Source: DEBA

tracting exports and adding imports to production, so apparent consumption figures are highly dependant on production figures. Import and export figures, however, will cover most trade because the high value of the products involved is well above the minimum for statistical declaration.

As a result, apparent consumption for even the largest producing countries, such as Italy, could be negative. This is readily understood when one considers that the enterprises included in the production figures employed in 1988 some 12 000 people, whereas it is estimated that total industry employment in Italy is actually around 40 000.

With this in mind, the figures on apparent consumption indicate the following trend. At current prices it continued to decrease in 1992. The decrease, however, was much lower than in 1991: the decline amounted to 2.7%, whereas in 1991 consumption encountered a reduction of 13.7%.

An indication of the market can be found when looking at retail figures. Euromonitor estimates for 1991 showed a market of 6.6 billion ECU (8.2 billion USD) for diamond jewellery for the EC as a whole. Using the retail sector margins, the comparable consumption figure calculated equals 4 billion ECU, about 1 billion ECU more than was indicated for apparent consumption.

France and the United Kingdom are traditionally the major markets for costume jewellery in the EC. Germany has recently witnessed an upsurge in demand for costume jewellery which places the German market alongside the United Kingdom and French markets in importance. German consumers, more than other Europeans, had a bias towards real jewellery during the 1960s and 1970s. Costume jewellery became more fashionable at the end of the 1970s. This trend continued in the 1980s and the 1990s.

Employment figures show very little change in the numbers employed between 1985 and 1992. There was a peak in 1990 after which employment reduced again due to the economic situation.

International comparison

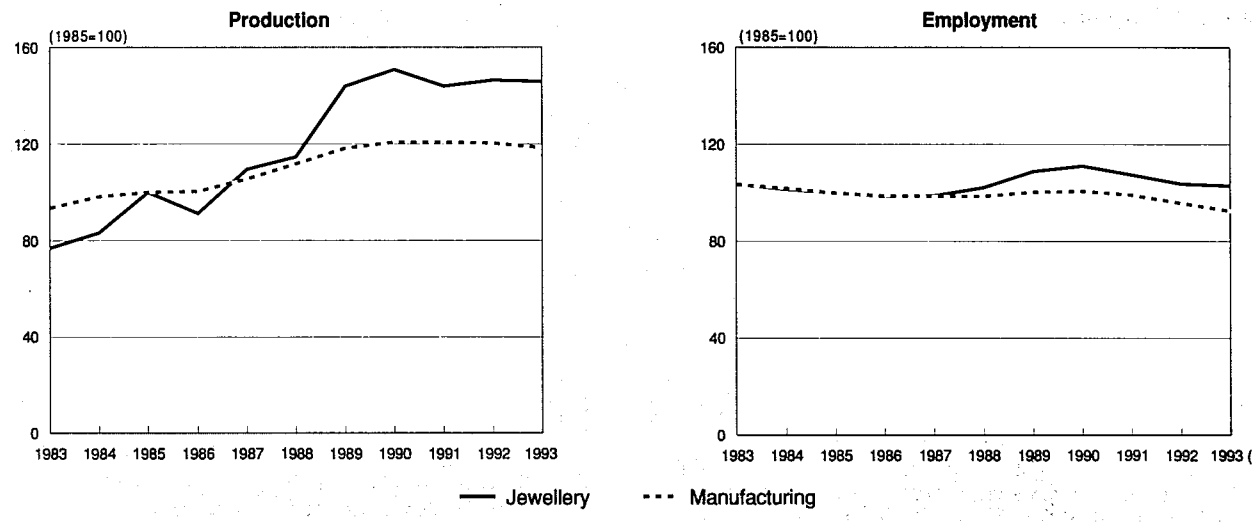
According to the World Gold Council, in 1988 around 38% of Italian adults bought at least one article of gold jewellery, compared to 34% in the United Kingdom, 18% in Germany, 14% in France and 15% in other EC countries. In Japan, a comparable figure was 33% of all female adults. In the 1980s these figures showed a rise in almost all countries, but the growth has been especially strong in Japan, where in 1986 this figure stood at 21%. In the USA, sales are under pressure, due to a 10% luxury excise tax applied on the portion of

Table 2: Jewellery
Gold fabrication in carat jewellery - production (including scrap)

(tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC (1)	263.0	311.9	356.9	344.1	336.1	395.4	498.1	554.7	583.4	621.1
Belgique/België	2.0	1.9	1.9	1.7	1.6	1.8	2.0	2.2	2.1	2.1
Danmark	0.7	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.9	1.0
BR Deutschland	28.5	28.6	29.5	30.3	33.9	38.3	44.1	49.8	51.0	45.4
Hellas	7.9	9.1	11.5	11.0	10.7	10.7	10.5	10.5	10.0	9.3
España	13.4	12.6	15.7	15.6	17.0	24.0	30.0	34.0	32.5	30.0
France	17.4	16.7	17.6	19.9	20.9	22.9	25.7	31.0	31.1	32.2
Italia	172.0	220.0	253.0	238.0	222.0	262.0	345.0	381.0	415.0	461.0
Nederland	0.8	0.8	0.8	0.9	1.0	1.1	1.3	1.5	1.6	1.6
Portugal	3.2	2.4	3.5	3.5	4.0	4.5	5.5	7.5	9.1	11.4
United Kingdom and Ireland	17.1	19.0	22.6	22.3	24.2	29.3	33.2	36.3	30.1	27.1
Rest of Europe	32.6	34.1	38.0	38.6	37.0	44.7	54.6	63.1	55.2	49.4
North America	110.0	115.3	121.9	126.3	127.5	135.7	146.2	135.7	129.9	140.7
of which, USA	99.6	104.7	111.1	116.0	117.8	125.6	135.8	126.6	121.2	132.1
Latin America	23.2	24.2	32.1	45.0	35.9	36.8	44.4	44.8	51.0	53.6
Middle East	155.8	208.7	226.4	223.4	216.4	228.5	298.8	365.9	388.7	494.4
Indian Subcontinent	121.3	170.5	199.9	175.9	190.2	222.5	258.5	277.4	268.5	338.3
Far East	122.8	215.7	201.3	198.0	253.0	442.5	571.2	556.8	607.5	715.4
of which, Japan	43.4	50.2	60.7	80.7	84.0	95.0	112.5	109.5	106.7	104.0
Africa	17.8	18.3	17.8	21.0	22.4	31.6	35.5	42.8	43.3	44.2
Australia	4.7	2.6	3.2	4.4	4.2	4.0	5.1	4.7	4.0	3.9
China and former Soviet Union	32.5	33.1	33.6	34.0	34.2	35.1	43.5	82.0	153.0	201.0
World total	883.7	1 134.4	1 231.1	1 210.7	1 256.9	1 576.8	1 955.9	2 127.9	2 284.5	2 662.0

(1) Excluding Luxembourg.
Source: Gold 1993, Gold Fields Mineral Services Ltd.

Figure 3: Jewellery
Production in constant prices and employment compared to EC manufacturing



(1) NEI estimates for the jewellery industry, Eurostat estimates for manufacturing industry.
Source: DEBA

retail sales over 10 000 USD, effective on January 1, 1991, that especially affected high end products.

US demand stagnated in 1992. Total turnover in 1992 had been estimated between 15 billion to 18 billion USD in retail prices. At the industry level, the market for precious jewellery in 1992 was estimated at 6.2 billion USD and for costume jewellery at 1.7 billion USD.

Japan is still considered a growth market. The total market in Japan has been estimated at 2 500 billion Yen at the retail level (13.7 billion ECU). Japan itself is facing competition from East Asian countries in the costume jewellery market. Japanese manufacturers are increasingly using the workforce in those areas; bullion and diamond materials are being shipped to East Asia, from which finished or semi-finished products in turn are imported.

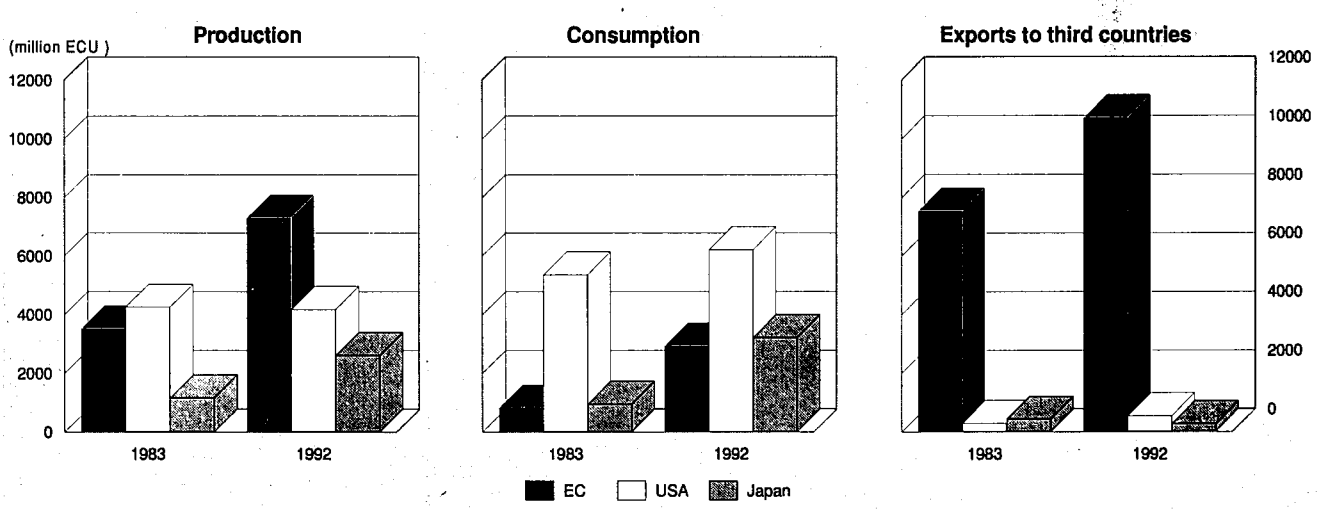
According to De Beers, world retail sales of diamonds reached 39 billion USD in 1991.

Foreign trade

The most significant general feature of the trade figures is the volatility of the figures over the years. It should be noted that all values are in ECU. As most international trade takes place in dollars, the ECU values are influenced by fluctuations in the dollar rate. The appreciation of the yen during the 1980s had an overwhelming impact on EC exports to Japan: by 1990, exports to Japan in ECU value were well over nine and a half times the 1980 figure in ECU.

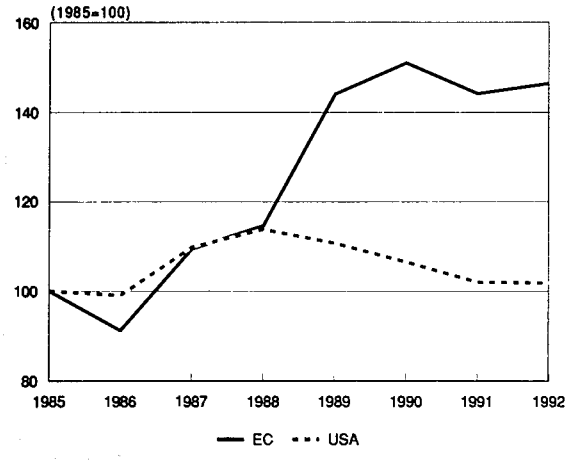
With 6.4 billion ECU in 1992 extra-EC imports were of considerable size in comparison with the 7.3 billion ECU of production. There is a declining trend in imports: since 1989 imports have decreased by 4.3% on average. Italy is a large importer of raw materials and semi-finished products, which are exported after further processing. In 1992, extra-EC suppliers were by far the developing countries.

Figure 4: Jewellery
International comparison of main indicators in current prices



Source: DEBA, Census of Manufacturers

Figure 5: Jewellery
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Extra-EC exports totalled 10.7 billion ECU in 1992. The same figure was shown for 1990 and 1991 implying stagnating export markets at current prices.

Extra-EC exports are substantially larger than extra-EC imports. The trade surplus amounted to 4.4 billion ECU in 1992, which was more or less the same as in 1991. Compared to 1990 however, imports decreased, causing the surplus to improve. The breakdown of EC imports by country of destination emphasises the importance of Italy as a producer of jewellery. For Italy itself, exports are very important, accounting for 70% of production. Italian exports mainly involve high priced products.

Exports from Thailand have been accelerating over the past ten years, placing it in the position of second largest exporter of jewellery in the world after Italy, with the potential to become the largest. Exports of polished diamonds look particularly promising for Thailand.

For intra-EC trade, the Single European Market will mean that national tariff and quota restrictions will disappear, restrictions mainly found in trade with Spain, Portugal and Greece. EC import tariffs for jewellery range from 3% of CIF (Cost, Insurance and Freight) value for types of precious jewellery to 8.5% for costume jewellery. For countries falling under the GSP (Generalised System of Preferences) of the Lomé convention there are no tariffs.

France and the United Kingdom are the most important consumers of EC exports in Europe. France is the most important intra-EC importer of costume jewellery, followed by Germany, the United Kingdom and Belgium.

MARKET FORCES

Demand

In 1992, as in previous years, demand for heavier, bulky items increased; ethnic jewellery also grew in popularity, particularly gold mixed with coloured enamel. In the EC, polished gold remains the most popular choice for general jewellery, although textured gold is gaining popularity for more 'avant garde' designs. Earrings are the most frequently bought item.

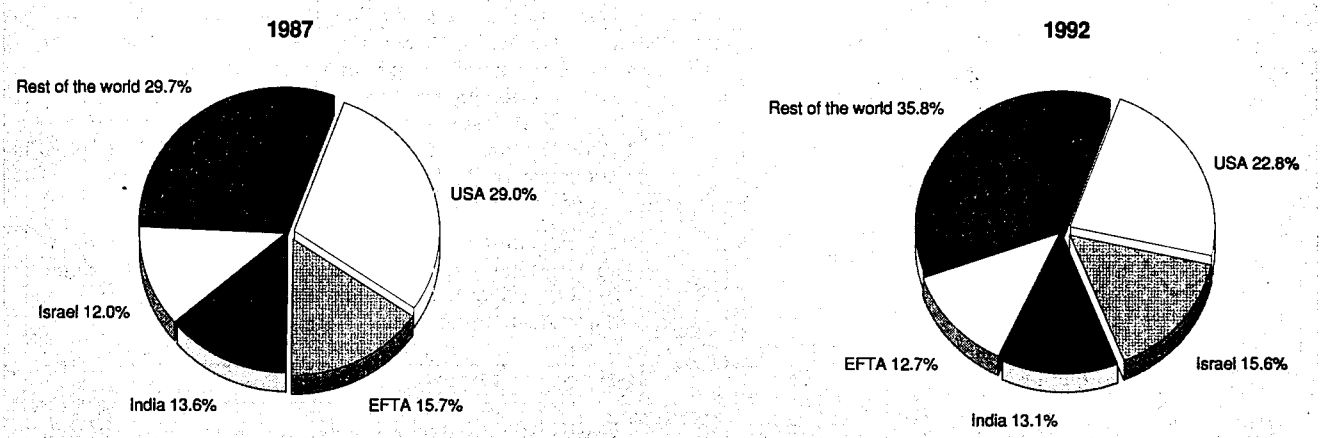
Diamond rings continued to dominate the retail sales of diamond jewellery throughout the world. This domination is pronounced especially in those countries where diamond engagement rings are traditional. For instance, in the United Kingdom, where 70% of brides receive a diamond engagement ring before their marriage, rings account for 83% of the total value of the market. In the USA, however, despite its strong tradition of diamond engagement rings, rings account for only 61% of total value. This is a result of the increasing popularity of men's diamond jewellery and of high priced diamond bracelets. In Germany and Spain, where engagement rings are not

Table 3: Jewellery
Diamond jewellery - retail sales in value and pieces

		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EC (1)	million ECU	3 055	3 387	3 542	3 989	4 443	5 232	6 340	6 058	5 802	N/A
	1000 pieces	7 066	7 137	7 528	8 140	9 123	10 345	11 108	11 258	11 561	N/A
Belgique/België	million ECU	118	118	118	130	134	151	174	130	125	N/A
	1000 pieces	250	250	250	260	268	292	321	245	231	N/A
Danmark	million ECU	27	30	22	35	37	40	44	34	31	N/A
	1000 pieces	93	86	79	72	73	76	79	69	63	N/A
BR Deutschland	million ECU	759	749	735	790	1 029	1 180	1 317	1 389	1 183	1 279
	1000 pieces	1 756	1 656	1 714	2 039	2 640	3 036	3 127	3 346	3 969	3 731
España	million ECU	334	389	435	547	607	749	816	707	718	N/A
	1000 pieces	795	827	857	919	950	1 087	1 103	1 100	1 100	N/A
France	million ECU	533	485	488	542	499	564	757	744	714	724
	1000 pieces	830	759	759	721	714	832	1 063	1 069	1 155	1 190
Italia	million ECU	834	1 065	1 139	1 347	1 489	1 676	2 283	2 187	2 233	2 074
	1000 pieces	1 898	1 974	2 239	2 390	2 377	2 543	2 871	3 081	3 012	2 892
Nederland	million ECU	63	68	73	81	84	130	142	121	118	N/A
	1000 pieces	191	194	196	233	276	325	356	338	322	N/A
United Kingdom	million ECU	367	483	532	517	564	742	807	748	679	598
	1000 pieces	1 253	1 391	1 434	1 506	1 825	2 154	2 188	2 010	1 709	1 350
USA	million ECU	5 838	6 731	7 613	8 248	9 558	9 775	10 693	8 939	9 157	9 250
	1000 pieces	15 241	16 054	17 407	18 155	19 843	18 863	17 989	16 993	17 218	17 406
Japan	million ECU	4 863	5 773	5 861	7 168	7 810	10 143	10 622	9 183	10 115	9 194
	1000 pieces	4 630	5 257	5 591	5 953	6 795	7 900	8 295	7 631	7 097	7 381

(1) Excluding Greece, Ireland, Luxembourg and Portugal.
Source: De Beers

Figure 6: Jewellery
Destination of EC exports



Source: Eurostat

a tradition, rings account for only 52% and 41% of total value, respectively. In Germany, high-value necklaces form a very important category. In Spain, earrings are particularly popular. Sales promotion by the De Beers Corporation in Japan has been very effective, firmly establishing the position of diamond jewellery in the engagement ring market. In Japan, 77% of brides receive a diamond engagement ring. As a result, rings account for approximately 76% of total value in that country.

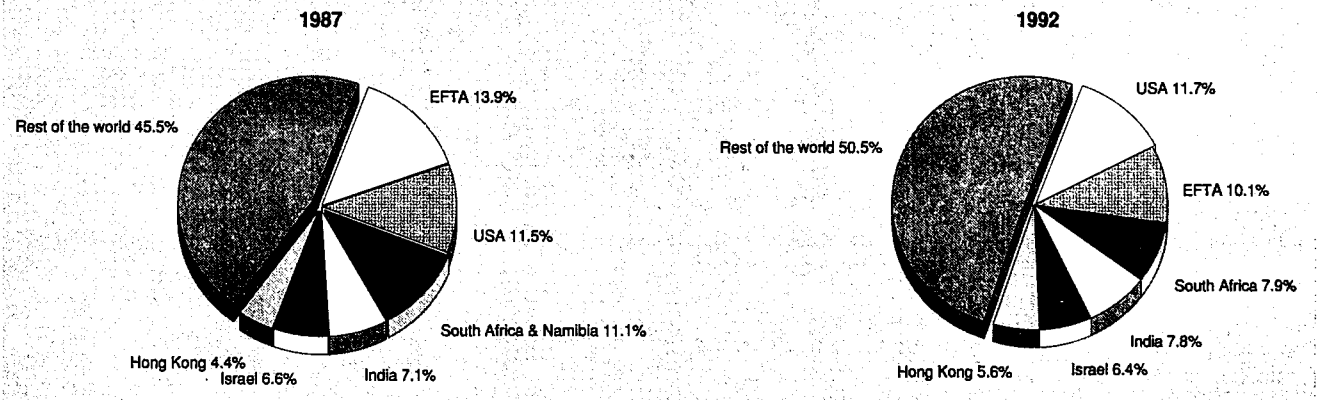
Purchasing of jewellery is highly seasonal with one-third of diamond jewellery being bought in December. The rising demand for precious jewellery is a result of growth in the standard of living and personal disposable incomes. National differences can also be quite large. These are influenced by the amount of disposable income people are prepared to pay for luxury items. For instance, Dutch consumers' spending on precious jewellery is relatively low, whereas Italian consumers' spending is high.

The majority of purchasers are women, but the percentage of men buying jewellery is rising. Much of this is for gifts, but there is also an increasing portion of men wearing jewellery. Younger groups in the population are the leading purchasers.

The ageing population and demand for unusual and natural materials stimulate demand for more costly jewellery. The percentage of people between 30 and 40 years old will rise in the 1990s. These are the people who buy costly jewellery: younger people tend to buy less expensive fashion accessories.

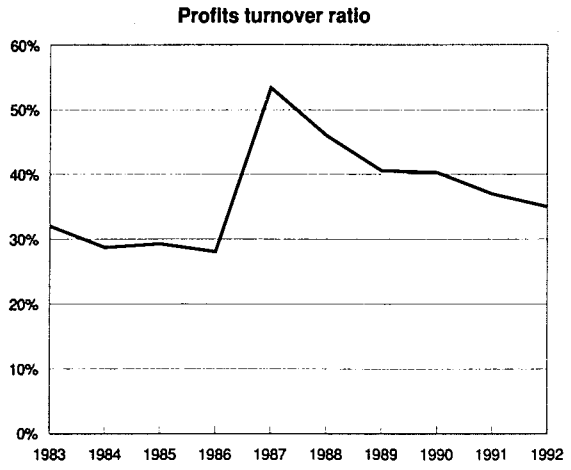
Among the discernible trends for more ornate and luxurious fashion items some interesting developments can be distinguished. There is an increased attention for Far East, Indian and African styles, for folklore, heraldic and Art Deco themes, for use of natural raw materials, and for floral and animal motifs. The last two trends emerge out of a general concern for ecology and nature.

Figure 7: Jewellery
Origin of EC imports



Source: Eurostat

Figure 8: Jewellery
Pre-tax profits to turnover of the industry (1)



(1) Estimated as a percentage of non-labour income in value-added.
Source: NEI

Supply and competition

There is little or no branding in the precious jewellery sector, which makes analysing competition at an industry level irrelevant. It is more significant to determine competition at the retail level. Manufacturing for costume jewellery as well as precious jewellery is highly fragmented, with many small, handicraft companies. At the retail level there is also fragmentation, but in the 1980s some retail chains gained importance: including Ratners (parent company of Ratners and H. Samuel) in the United Kingdom, Magic Moment and Gold Market in Italy.

Precious jewellery is sold mainly through specialist jewellers, whereas costume jewellery is sold through a variety of outlets: department stores, chemists, clothing shops, jewellers.

Competition in the costume jewellery industry is coming mainly from East Asian countries, especially Hong Kong, South Korea, Taiwan and Thailand. Usually these countries operate at the less expensive end-market, but product quality is improving. Competition from East Asia takes place mainly through price.

Since 1990 the industry's employment in the EC decreased from 62 600 to 58 500 in 1992. This implies however, that productivity in the industry is increasing.

Production process

Most of the enterprises in the precious jewellery industry are handicraft in character. Therefore it is difficult for the industry to keep up with fast growing demand, as was the case in the 1980s. In comparison with costume jewellery, however, the precious jewellery industry has the advantage of not being under the influence of fashion trends: designs last much longer.

The manufacture of costume jewellery includes a broad variety of products: brooches, earrings, necklaces, bracelets, rings, hair ornaments, hat ornaments, shoe ornaments, cuff-links, tie-clips, etc. To maintain market position, manufacturers of fashion jewellery are urged to produce up-to-date designs. In theory, new collections are introduced 2 to 4 times per year, but in practice new ranges appear much more frequently. This makes short distribution lines necessary, giving local EC producers an advantage over overseas manufacturers. Much costume jewellery is shipped by air because of the need for quick delivery. In view of the high frequency in new collections high mark-ups are necessary to compensate for the risk of goods becoming not saleable.

INDUSTRY STRUCTURE

Companies

Jewellery manufacture, for both precious and costume jewellery, is highly fragmented. For example, Italy's industry has 6 500 businesses, employing 40 000 people (estimated). The largest are all privately, generally family, owned and managed.

Primary precious jewellery firms include Lyon Alemand Louyet (France), Engelhard (France), Trattamenti Ceneri Auroargentari (Italy), Uno a Erre Italia (Italy), Rosy Blue (Belgium), Lens Diamond (Belgium), Franz Golz (Germany) and Guthmann & Wittenauer (Germany). Among the costume jewellery companies with the highest sales are Bijoux GL (France), Moranduzzo Dario (Italy), Modern Creation Muenchen Reisegepack (Germany), and Rudolf Zenner (Germany), among others.

Strategies

The use of brands is rare in the jewellery industry. The few existing brands tend to be active in the costume jewellery sector, mainly originating from enterprises with well known brand names in other industries such as cosmetics or clothing (Kenzo (F), Moschino (I), Fiorucci (I) which branch out into jewellery. Distribution, therefore, plays an important role in competition and strategy.

Precious jewellery is mainly sold through speciality jewellers, but there are a growing number of multiple and non-specialist outlets. For costume jewellery sales outlets are much more diverse, with special emphasis on the tax and duty free shops. With the Single European Market, this type of outlet will disappear for intra-EC travel, but the European Commission has given the duty free stores until the year 2000.

Most of the enterprises of the industry are too small to activate rigid strategies other than following the market. As competition with foreign industries increases, however, more emphasis could be placed on quality.

REGIONAL DISTRIBUTION

The industry has a great need for specialists and therefore remains concentrated in places where the infrastructure has

Table 4: Jewellery
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Production	8.3	6.3	7.4
Extra-EC exports	17.0	-11.0	3.6
Extra-EC imports	23.3	-0.6	12.1

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 5: Jewellery
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	7 566	9 655	9 397	8 740	8 757	10 054	11 855	10 716	10 733	10 744
Extra-EC imports	4 866	6 717	5 837	5 949	4 389	6 015	7 256	6 698	6 439	6 369
Trade balance	2 701	2 938	3 560	2 791	4 368	4 039	4 599	4 018	4 294	4 374
Ratio exports/imports	1.56	1.44	1.61	1.47	2.00	1.67	1.63	1.60	1.67	1.69
Terms of trade index	55.7	71.5	100.0	95.3	110.4	78.0	91.8	87.5	103.3	122.5
Intra-EC trade	2 339	1 752	1 867	1 635	3 419	3 288	4 075	4 071	3 974	3 606
Share of total imports (%)	32.5	20.7	24.2	21.6	43.8	35.3	36.0	37.8	38.2	36.2

Source: DEBA

Table 6: Jewellery
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	21.0	20.8	22.0	23.5	37.8	33.0	41.1	43.5	44.6	47.8
Productivity index	95.5	94.4	100.0	106.7	171.6	149.6	186.5	197.1	202.3	217.0
Unit labour costs index (3)	88.0	92.6	100.0	107.1	110.3	114.7	121.1	129.1	136.2	145.9
Total unit costs index (4)	69.6	81.0	100.0	91.1	94.9	105.4	119.6	126.2	127.9	134.4

(1) Estimates are used if country data is not available, especially from 1990 onwards."
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale."
Source: DEBA

been built over many years. By further specialised aggregation, some locations lend themselves to higher-quality jewellery, some to quantity production, and some to production of larger silver articles.

The main manufacturing centres in Italy are Arezzo, Vicenza and Piedmont. In Germany about 75% of the trade is based in Pforzheim, with Idar-Oberstein being an important centre of the gemstone industry. Other centres are Schwabisch Gmund, Hanau and Kaufbeuren. In France, Paris and Lyon account for a major part of the industry, as does St. Amand. In the United Kingdom the main centres are London, Hatton Garden, Birmingham and Sheffield (the centre for cutlery and a large portion of the table-silver industry). In Belgium, Antwerp is the centre of the jewellery industry. Belgium ranks among the major diamond cutting centres in the world, along with India, Israel and the United States.

REGULATIONS

Regulations in this industry refer only to the precious jewellery, as there are generally no specific standards or restrictions for fancy jewellery.

Currently, four systems of grading polished diamonds are in use. They are associated with the Gemological Institute of America (GIA), the International Diamond Council (IDC), the Scandinavian Diamond Nomenclature Committee (ScanDN) and the International Confederation for Jewellery, Silverware, Diamonds, Pearls and Stones (CIBJO). Proposals have been made to arrive at one international standard. Although the organisations are confident of reaching a successful solution, an agreement has still not been reached.

On October 8, 1990 the European Commission accepted the Green Paper on standardisation (published on January, 28, 1991). Early in 1992, the Commission gave a communiqué summarising the reactions on the Green Paper. All this has to lead to directives in the spirit of the "new approach" (the

Table 7: Jewellery
The five largest companies in the EC, 1992"

(million ECU)	Country	Turnover	Employment
Lyon Alemand Louyot	F	433.5	1 820
Engelhard	F	354.2	300
Trattamenti Ceneri Auroargentari	I	256.8	53
Uno a Erre Italia	I	186.1	750
Rosy Blue	B	184.5	31

Source: Dun & Bradstreet

Commission only providing general guidelines and prescriptions for a product).

Probably the most significant matter happening in the EC jewellery industry is the progress towards a Directive for Precious Metal Articles.

OUTLOOK

Demographic changes will affect the market. The proportion of persons 45 to 65 years old in the population is forecasted to grow 4% by 1995, that should stimulate demand for higher priced items. The proportion of people aged 15 to 24 years is forecasted to fall 12%, that will lead to more competition in the lower-priced end-market.

Along with the expected moderate economic growth, the gold price may move upwards. But several scenarios are possible here, including a further decline in price should the mining industry not decrease production.

The costume jewellery industry is very sensitive to developments in the world economy. As the prospects for general economic developments are for slow growth, the outlook for the costume jewellery industry is also moderate.

Furthermore, competition is expected to intensify as a result of the advent of the Single European Market and of production in East Asia. Another threat to domestic EC manufacturers is the assembly of imported pieces into products by importers. Subcontracting with manufacturers in the Far East is also growing. These developments put pressure on prices.

One possible response of manufacturers is the development of brand names. At the moment, brands are mostly absent in the sector, which increases vulnerability to imports. Developing brands could offer significant opportunities, although more for distributors than producers, due to the higher level of concentration among distributors. Brands could also differentiate between East Asian and European manufacture on the basis of quality; East Asian imports compete on a price basis, and with the demographic changes expected in the near future, price will be less important than quality.

Table 8: Jewellery
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	-1.5	2.0
Production	-1.5	2.0
Extra-EC exports	1.0	4.0

Source: NEI

All in all, after the active years of 1988 to 1990 and the successive slowdown in 1991 and 1992, it is expected that production and consumption will continue to decline by -1.5% in 1993 and 1994. Afterwards growth will recover to about 2% on average for the 1993-1997 period.

Written by: Netherlands Economic Institute
The industry is represented at the EC level by: International Confederation of Jewellery, Silverware, Diamonds, Pearls and Stones (CIBJO). Address: 78A Luke street, London EC2A 4PY United Kingdom; tel: (44 71) 613 4243; fax: (44 71) 613 4450; and
Union Européenne des Fabricants de Bijouterie Fantasie (UNEBIF). Address: Via Desenzano 8, I-20146 Milano; tel: (39 2) 404 3275/3277; fax (39 2) 487 014 19.

Musical instruments
NACE 492

There has been an increasing demand for musical instruments in the 1980s as a result of changing life styles and the development of musical culture among the general public. The market for musical instruments, however, shows signs of saturation. Asian imports account for a large portion of the supply of electronic instruments. Japan also supplies up-market, sophisticated instruments. It is expected that the decline in production and demand in the 1992-1993 period will be temporary. The growth in the years after will be moderate, fuelling competition in this market.

INDUSTRY PROFILE

Description of the sector

Musical instruments are highly diversified and can be summarised in the following groups:

- pianos (upright and grand pianos) and digital pianos;
- organs and electronic organs;
- woodwind instruments (saxophones, oboes, flutes and clarinets);
- brass wind instruments (trumpets, trombones);
- stringed instruments (violins, cellos, violas and double basses);
- fretted instruments (non-electric guitars, mandolins, banjos);
- percussion instruments (drums, cymbals);
- electric pianos, electric guitars, electric basses, portable keyboards;
- synthesisers;
- other instruments (accordions, rhythm machines, mouth organs, harpsichords, pipe organs); and
- accessories and parts (bows, strings, bridges, components for electronic music).

Musical instruments include both traditional instruments, whether early or modern, and electronic instruments. Demand for pianos, keyboards and related instruments accounts for two-third of the market.

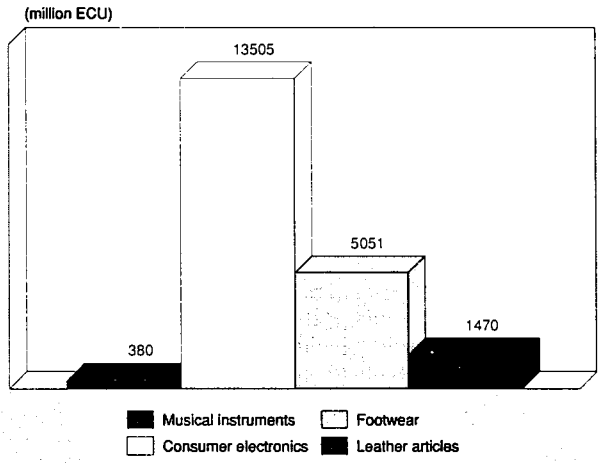
The situation varies greatly according to the type of musical instrument and the country concerned. The country with the largest production is Germany (West), accounting for almost 50% of the EC production. When taken together with Italy and France, 84% of the EC production is accounted for.

Recent trends

EC production at current prices grew by roughly 28% between 1983 and 1991. At constant prices however, total production declined by almost 9% in the same period. Germany (West) suffered a decrease in production at constant prices from 1980 onwards and experienced a temporary increase in 1989. Italian production figures are somewhat difficult to interpret due to a large difference between the figures before and after 1989. Nevertheless, Italian production at constant prices in 1992 seems to be back on the level of 1984. The same can be said for the French production, whereas British production has declined overall during the 1983-1992 period.

Consumption expenditure on musical instruments, at current prices has, on average, risen during the last ten years. This trend can be found in most EC countries. The United Kingdom,

Figure 1: Musical instruments
Value added in comparison with other industries, 1992



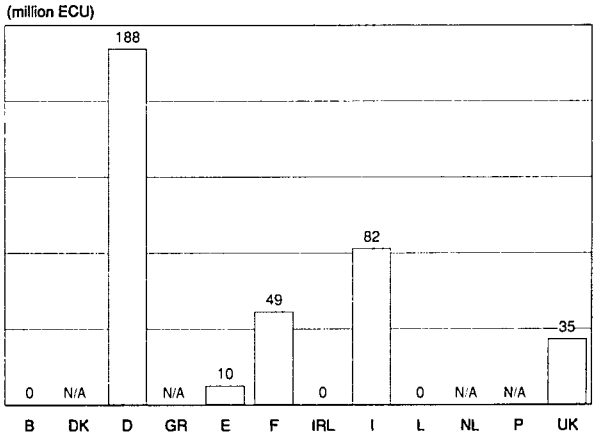
Source: DEBA

however, experienced first an increase, then a decline in the expenditure. In real terms, the growth in consumption expenditure has been modest in the EC. However that trend does not necessarily reflect a trend in private music-making, as purchasing an instrument and actually playing it are two different things. The resale of instruments and the rental market, that are significant in all European countries, must also be taken into account.

The EC is a net importer of musical instruments. Moreover, the gap between exports and imports has been widening during the last ten years. Since 1989 the trade deficit seems to be stabilising. This is due to the levelling off of exports as well as imports.

The number of people working had been rapidly declining in the first half of the 1980s, but since 1986, this trend slowed down. In 1992, employment stood at 12 800 million ECU but decreased again in 1993. The evolution varies from country to country. Reflecting the geographical location of production, employment is mainly concentrated in the Federal Republic

Figure 2: Musical instruments
Value added by Member State, 1992



Source: DEBA

Table 1: Musical Instruments
Breakdown by major product line, 1988

(thousand units)	Pianos	String instruments	Wind instruments
EC	25	96	3 025
Asia	572	1 867	274
North America	215	83	5 138

Source: UNIDO

Table 2: Musical Instruments
Main Indicators at current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Apparent consumption	797	877	871	958	1 106	1 177	1 074	1 062	1 126	1 151	1 100
Production	623.2	699.6	699.9	728.0	773.5	790.7	681.2	693.8	752.9	797.2	720.0
Extra-EC exports	198.8	222.0	255.4	234.2	231.3	231.0	269.1	281.6	288.4	286.9	275.0
Trade balance	-173.9	-177.3	-171.1	-230.1	-332.7	-386.2	-393.0	-368.5	-373.2	-353.7	-380.0
Employment (thousands)	17.4	16.8	16.1	14.7	14.5	13.8	14.0	13.9	13.6	12.8	11.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) NEI estimates.
Source: DEBA

Table 3: Musical Instruments
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	3.4	-2.7	0.7
Production	0.6	-3.1	-1.0
Extra-EC exports	3.3	7.3	5.1
Extra-EC imports	7.2	1.8	4.8

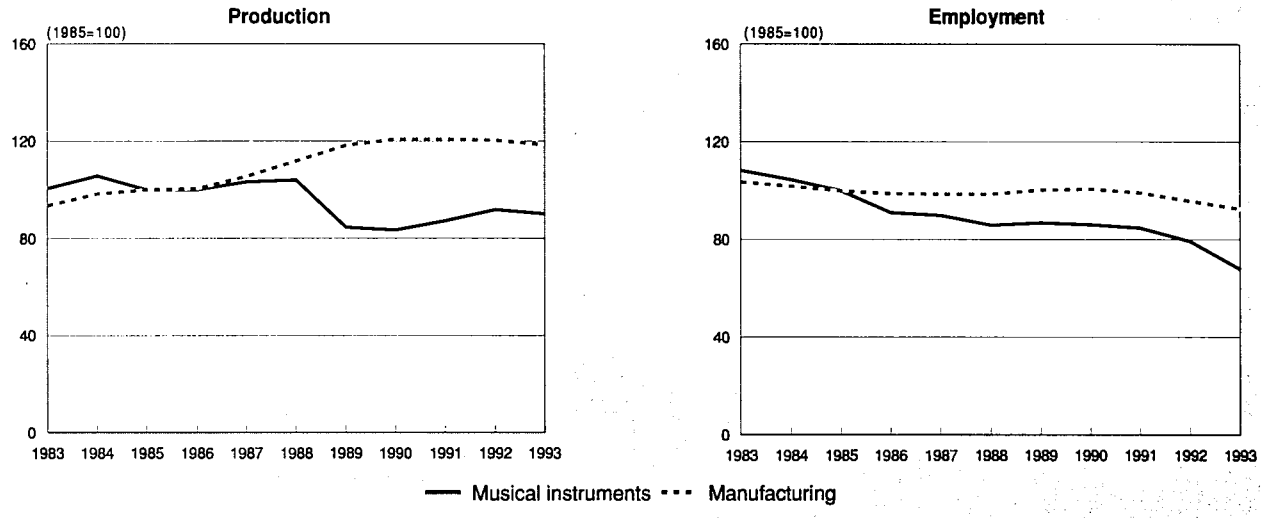
(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 4: Musical Instruments
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	198.8	222.0	255.4	234.2	231.3	231.0	269.1	281.6	288.4	286.9
Extra-EC imports	372.7	399.3	426.5	464.3	564.0	617.2	662.1	650.1	661.6	640.6
Trade balance	-173.9	-177.3	-171.1	-230.1	-332.7	-386.2	-393.0	-368.5	-373.2	-353.7
Ratio exports/imports	0.53	0.56	0.60	0.50	0.41	0.37	0.41	0.43	0.44	0.45
Terms of trade index	116.9	106.4	100.0	103.1	102.7	98.6	97.4	100.8	94.5	95.7
Intra-EC trade	209.7	203.1	201.0	209.6	223.1	232.5	255.7	294.1	309.7	297.3
Share of total imports (%)	36.0	33.7	32.0	31.1	28.3	27.4	27.9	31.1	31.9	31.7

Source: DEBA

Figure 3: Musical instruments
Production in constant prices and employment compared to EC manufacturing



NEI estimates for the musical instruments industry, Eurostat estimates for manufacturing industry.
Source: DEBA

of Germany (48% of the total), Italy (18%), the United Kingdom (13%) and France (11%). The greatest job losses since 1980 occurred in Italy, the United Kingdom and Spain. The decreasing trend was slower in Germany and France.

Many countries, however, only report employment for firms with 20 employees or more. In Germany alone, 30% of the workforce is employed in firms with less than 20 employees. When taking into account that labour force reduction is more difficult in small companies than in large ones, the decline in employment in recent years is likely to be insignificant.

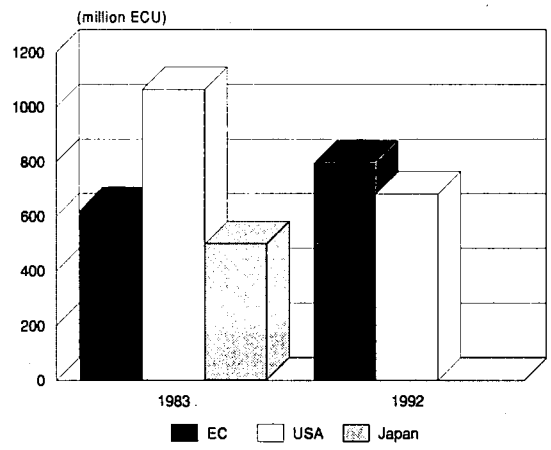
In 1992, production at current prices of musical instruments was considerably larger than in the previous year, reflecting growing consumer demand and an ameliorating trade balance. However, recent figures show that production during 1992 has begun to decline. A decline that continued in 1993. It is estimated that in 1993 production as well as consumption will be lower than in 1992.

Production growth in 1992 mainly took place in Italy, whereas in the other large countries production, at current and at constant prices has declined. The pattern of consumption expenditure on musical instruments varies also among countries. British and French expenditure declined during the 1991 and 1992 period, German and Italian expenditure, on the other hand, increased. In 1992, the trade balance ameliorated due to declining imports. The smaller trade deficit in musical instruments originates mainly from Italy, the United Kingdom and France, Germany however, experienced a larger deficit.

International comparison

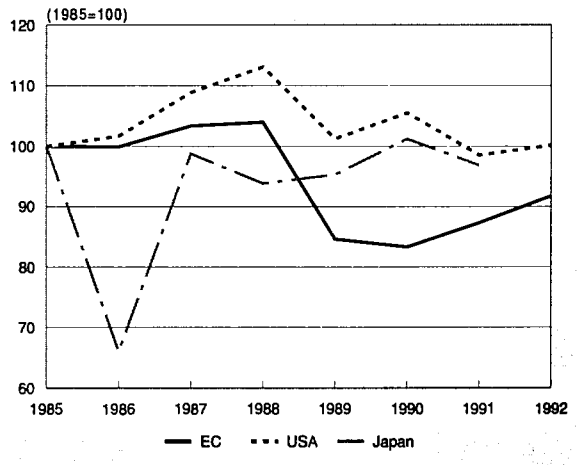
With production at 797 million ECU, the EC was among the largest world producers in 1992. The USA production recovered in 1992 after several years of decline. Most of the US demand is for acoustic guitars, grand pianos, digital pianos and school band instruments. In the US and Japan, sales of digital pianos outweigh those of acoustic uprights and grands,

Figure 4: Musical instruments
international comparison of production in current prices



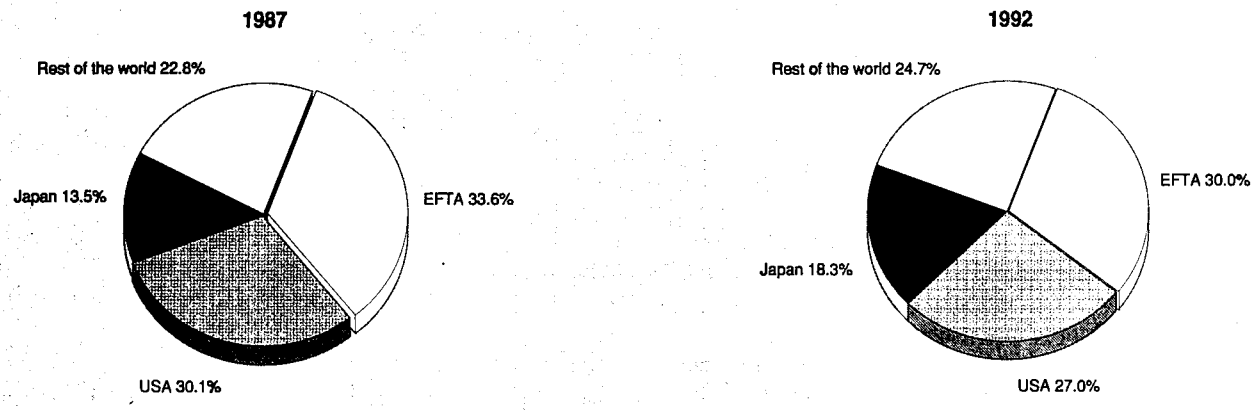
Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Musical instruments
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 6: Musical instruments
Destination of EC exports



Source: Eurostat

while in the rest of the world the opposite holds true. Worldwide, digital pianos account for 35% of the piano market.

Foreign trade

The EC faces stiff competition from Japan when it comes to up-market, sophisticated instruments and from other Asian countries as South-Korea, China and Taiwan. Japan's share in EC imports has declined, while that of other Asian countries, as well as that of the USA, has risen since 1987. In the field of traditional instruments, competition is also present from other European countries like those in Eastern Europe, Austria and Finland.

In previous years, there has been a substantial growth of imports; they are mainly composed of electronic instruments, pianos, wind instruments, and accessories and parts. EC producers are faced with an absolute decline in market share. The share of the EC market being supplied by non-EC producers has grown from 40% in 1980 to 56% in 1992.

Exports of musical instrument accounted for 36% of total production in 1992, which is more than this ratio had been during the 1980s and the beginning of the 1990s. The EC balance-of-trade figures showed an ever increasing deficit throughout the 1980s. This trend, however, has come to a halt in the beginning of the 1990s. Exports consist mainly of string instruments, accordions, organs, and accessories and parts. In 1992, extra-EC exports declined slightly in current and in constant prices. In 1992, intra-EC trade decreased at the same rate as extra-EC imports. As a result, the 1989 rising share of intra EC imports in view of total imports levelled off.

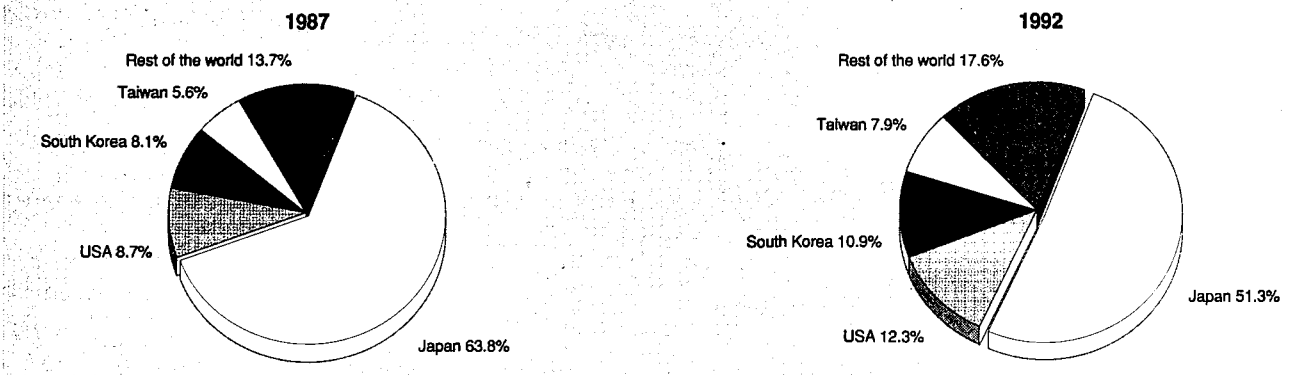
MARKET FORCES

Demand

The EC industry had a large market in 1992 and was estimated at 1 151 million ECU. The consumption of musical instruments in the EC, however, remains low compared to the United States. This is due to the fact that the market is made up of individual national markets with specific characteristics that are still very noticeable. There is, however, a trend towards greater uniformity in electronic instruments.

Demographic developments have opposing effects on the musical instrument market. The decreasing number of 5 to 20 year old people will, in the longer term, lower total demand for musical instruments and in the shorter term lower growth of demand for electronic instruments like portable keyboards.

Figure 7: Musical instruments
Origin of EC imports



Source: Eurostat

Table 5: Musical instruments
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU) (2)	25.1	25.8	25.3	27.1	27.7	27.9	26.1	26.2	27.7	29.7
Productivity index	99.3	102.0	100.0	107.1	109.8	110.3	103.2	103.8	109.6	117.6
Unit labour costs index (3)	90.0	95.0	100.0	109.8	113.5	122.3	122.7	131.2	140.3	147.0
Total unit costs index (4)	85.6	99.5	100.0	113.2	122.1	133.3	112.3	119.5	131.8	147.2

(1) Estimates are used if country data is not available, especially from 1990 onwards."
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale."
Source: DEBA

The increasing number of 30 to 40 year old people means more purchasing power and more interest in acoustic instruments in the future.

The rise in purchasing power and changing life styles have revived interest in music-making. But this trend is counteracted by the attraction of other leisure activities. The decreasing time that people can devote to music leads to an upward pressure on the demand for electronic instruments that have the reputation to be easier to learn.

According to some market reports on Germany and the United Kingdom, there is a trend to use more traditional acoustic instruments. The renewed interest in jazz that has been seen in some countries also leads to more demand for stringed, fretted and wind instruments. However, the overall market seems saturated.

Supply and competition

Despite its large home market and its increasing productivity, the EC musical instruments industry has been losing ground during the 1980s in the competition with instrument makers abroad. Increasing labour costs had a negative impact on EC competitiveness. Moreover, the depreciation of the yen during the second half of the 1980s made Japanese products relatively cheaper in the EC.

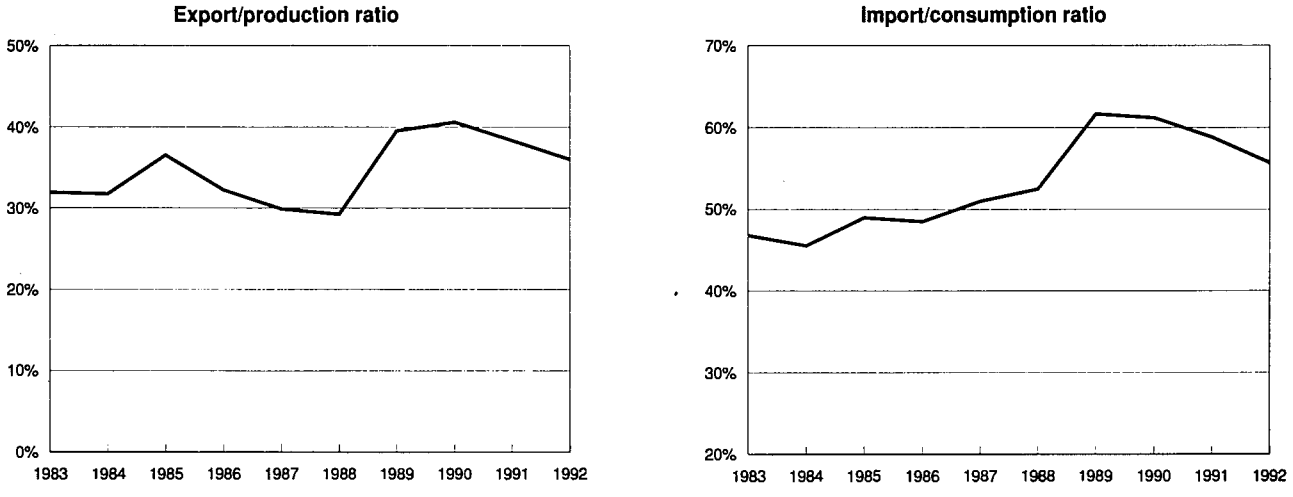
Competition in this market is stiff. EC demand in real terms has shown only a modest increase, while supply and competition from Asia, Eastern Europe and the USA has increased. Moreover, due to the differing composition of EC demand and EC supply, competition among European suppliers is also high.

Production process

European firms concentrate on products in the top of the market range. High-quality production implies smaller production runs or even single instruments being made to order, and is geared to an experienced clientele rather than the general public. The EC industry, with its specific national features, also plays an important role in transmitting European musical culture through the instruments it manufactures: all kinds of instruments in Germany, with emphasis on pianos, wind instruments and violins; woodwind instruments in France; guitars in Spain; and some piano and brass wind instrument manufacturing in Britain.

However, concentrating on top of the line products can be a dangerous game in an economy in recession and in a more or less saturated market. On the other hand, growing interest in classical music could be a countervailing power. Nonetheless, Steinway (D) has for instance introduced a piano for a lower segment of the piano market so that the gap between the low end of the market for pianos and the top is filled. Pianos are also being built by the Japanese company Kawai.

Figure 8: Musical instruments
Trade intensities



Source: DEBA

The development of electronic musical instruments has led to a wider range of products. These electronic instruments, an easier way of making music and more accessible for non-professional music makers, have the advantage over traditional musical instruments. This has not just created a larger market: a part of the market for traditional instruments has been lost, mostly in the segment of musical instruments which were designed to be played at home. In the professional market, the trend in live music towards more sophisticated shows and video clips has led to a demand for easy compatibility of instruments.

INDUSTRY STRUCTURE

Companies

The EC musical instrument industry suffers from two major structural handicaps: the industry is fragmented, with many small and medium-sized firms; the EC lacks multinational firms similar to those of the United States and Japan. That situation has led to restructuring and mergers in all EC countries.

The world leader, Yamaha, faces stiff competition from Asian rivals. It has been losing market share to its competitors in recent years. This competition is depressing operating margins. Yamaha set up localised production plants in the EC and took over several other companies during the 1980s. Overall, it strengthened its presence in the EC.

Other Asian producers are also spreading their wings over Europe. The South Korean company Daewoo is a case in point: it is operating piano assembly plants in Germany.

The shift in markets and the development of new markets has led a number of companies, mostly Japanese and South Korean ones whose core activity is outside the market for musical instruments, to enter this market. An increasing use of computers in synthesisers and public address (PA) systems facilitated the entry of computer manufacturers in this market.

The development of new electronic instruments has mostly hit the lower quality market, EC companies still having an outstanding name for the higher quality products. Steinway piano's and Selmer saxophones are still regarded as the absolute best, as well as Buffet-Crampon clarinets and Hohner accordions and mouth organs.

There are only a few large companies in the EC musical instrument industry. They include: Schreiber, Sonor, Höfner, Miraphone and VMI in Germany; GEM in Italy; Van doren in France; Marshall and Kemble in the United Kingdom.

Strategies

Several structural factors influence the industry's operations. Firstly, high and increasing labour costs are a major handicap for an industry that has to compete with foreign companies that are sometimes larger, and use more efficient and more flexible production methods. Especially the most important competitors (Japan, Korea, Taiwan and other Far East countries) produce more efficiently and/or have lower labour costs. Moreover, Asian companies, notably Yamaha, sometimes take care of their own needs for (rain forest) wood and other natural materials that gives them a competitive edge. Within the EC, however, the value added per employee increased in real terms from about 25 100 ECU in 1983 to 29 500 ECU in 1992. This is a result of increasing production and a decreasing workforce with EC manufacturers.

Secondly, with the small size of the European firms and a tendency toward national specialisation, manufacturers of musical instruments tend to be individualistic and highly independent. Therefore, investments in production and marketing are low for the sector as a whole, except for one or two larger companies that have achieved reasonable profitability levels. The case of electronic musical instruments is an illustration: investments in the EC grew initially but are still not sufficient to match the sums laid out by Japanese, Korean and American firms.

Thirdly, because of poor financial resources and of the predominantly manual production process, production automation has developed only slowly, in contrast to the persistent streamlining efforts made in Japan, South-Korea and the United States. These countries have achieved large production runs by using computer-aided design and micro-computer and software developments to produce musical instruments at lower costs. In addition, American and Japanese firms have introduced greater manufacturing flexibility by subcontracting the manufacture of electronic components. This has given them a further advantage over their European counterparts, to whom this type of flexibility is virtually unheard of.

The EC industry however, still has a few dynamic firms with good technical and human potential that is beginning to be exploited once again. The concentration on products in the top of the market range exemplifies this.

REGIONAL DISTRIBUTION

Some local regions have gained worldwide reputations. These include Paris and Mirecourt in the Vosges in France, Berlin, Bayern, Hessen, Sachsen (Vogtland) and Baden-Württemberg in Germany, and London in the United Kingdom.

ENVIRONMENT

The musical instruments industry is relatively non-polluting, when compared with the chemical industry or the transport sector. There are however a few remarks that could be made concerning the environment.

Firstly, the use of endangered materials in instruments is a case in point. For instance, guitar sound boards are made of ebony and encased in rosewood from the forests of India and Brazil, or pine and spruce from the Alps.

Secondly, modern electronic musical instruments use plastics. But this is of greater concern to the plastics processing and plastics producing industries. Given the long life of instruments, the problems are negligible. All in all, the musical instruments sector could be called a clean industry.

OUTLOOK

It is estimated that the production of musical instruments in the EC declined in 1993. This decline reflects a saturated market in recession. The recession is likely to be temporary and in the medium term a return to moderate growth rates is expected. Furthermore, demand is likely to reflect a gradual return to acoustic music and a steady development of electronic music through new applications.

In spite of certain advantages, the EC musical-instrument industry is likely to face a number of difficulties in the next few years, owing to the nature of its professional structure and its lack of flexibility in responding to the latest consumer

Table 6: Musical instruments
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	2.0	3.0
Production	0.0	2.0
Extra-EC exports	0.0	2.0

Source: NEI

trends, which favour high-quality, reasonably-priced, all-electronic products. Parallel markets, such as the second-hand piano market, which often distort competition, may also cause problems.

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Toys
NACE 494

The market for toys has grown significantly in the last years, mainly because of the strong growth recorded by video games. The European toy industry, in spite of a particularly lively international competition, is fairing relatively well and is increasing its investments in Europe, on the basis of its own main competitive advantages: quality, safety and innovation. The industry has to cope both with increasing imports from the Far East (China in particular), and unfair competition practices (imitations, price dumping, imports which do not comply with established rules, etc.) which penalise its activities.
The Internal Market is providing the opportunity for the EC toy industry to restructure further and develop companies with the appropriate size and marketing skills to compete at world level.

INDUSTRY PROFILE

Description of the sector

The industry is divided into ten subcategories as follows:

- Infant and pre-school toys;
- Dolls of all types made of plastic or other material, accessories and spare parts for dolls;
- Plush toys;
- Action toys;
- Vehicles (this includes radio controlled toys, electric trains);
- Ride-ons, such as tricycles, pedal cycles and cars, battery operated ride-ons, spring-horses, roller-skates, etc.;
- Games/Puzzles (this includes cards, non-electronic family board games, dice games, etc.)
- Activity toys (model kits, construction sets, powered appliances, die cast miniature toys, etc.);
- All other toys (including musical toys, guns, weapons, construction games).

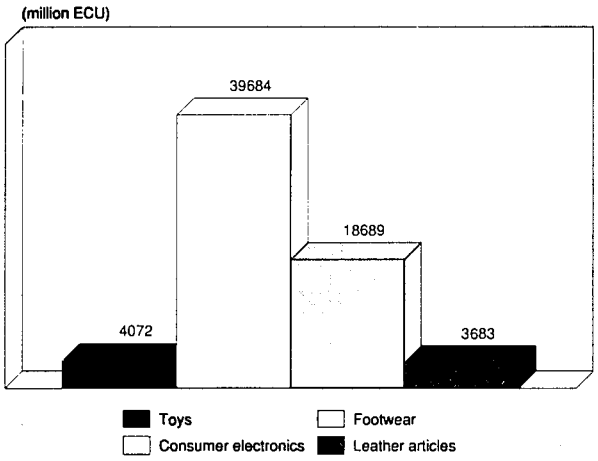
It is important to note that video games are just marketed, and not produced, in Europe. Sports equipment, playing cards, Christmas decorations or gambling machines are not included in this report.

Recent trends

Over the last five years, the toy market increased by 10% on average at current prices. Especially in 1991 and 1992, the market grew significantly. In real terms, the market growth was only 7.8% on average. This growth is not reflected in production, which in real terms has been stagnant since 1989.

The very high growth rates of the toy market in 1991 and 1992 are a result of video games' very strong increase in these years. It is estimated that the size of the video games market in 1992 was around ECU 3.5 billion at retail price, which corresponds to approximately 20-25% of the total market, according to the various countries. The rapid development of the video games market had only a minor influence on other toy sectors, without however, replacing the market for "traditional" toys. It is estimated that of the total growth of the video games market, between 50% and 70% of the volume has been incremental and between 30% and 50% has been at the expense of traditional toys, in particular higher prices games for older children but also different products targeted at similar segments in the market.

Figure 1: Toys
Production in comparison with other industries, 1992



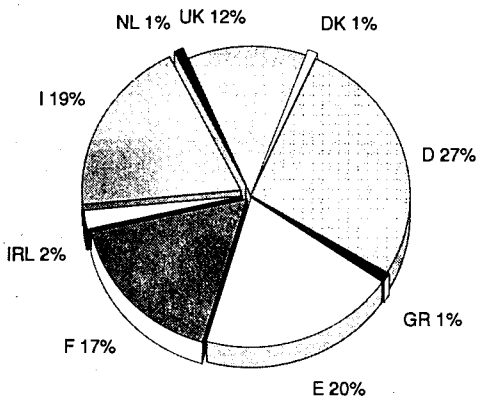
Source: TME, DEBA

The four main categories after video games in market share terms are non-electronic family board games and puzzles, dolls, activity toys and toys which reproduce objects commonly used by adults ("sit and ride" and "supershop/superstore" range). However, these are not necessarily the sectors which have showed the highest growth figures in recent years. Beyond video games, the progression has been most important for dolls, pre-school and infant toys, as well as electronic games. The growth of video games has in fact highlighted the importance of the trend to "compression" in toys whereby children move towards more sophisticated products at an earlier age. However, the slow saturation of the market is putting this trend towards video games at risk in 1993.

The effect of this "compression"-trend and the increase in the child population 0-5 years (which is due to peak in 1995) explain the growing importance of the "pre-school" market in the demand for toys.

The EC toy market is characterised by the fact that five countries account for 86% of the market (on the basis of 1991 retail price figures). In order of importance, these are: France,

Figure 2: Toys
Production by Member State, 1991



Source: TME

Table 1: Toys
Evolution of the share of the video market in the whole toy market, 1989 and 1991

(%)	1989	1991
Belgique\België\Luxembourg	3	21
Deutschland	1	8
España	1	6
Italia	1	14
Nederland	3	8
United Kingdom	2	17
Austria	2	3
Finland	3	11
Norway	3	11
Sweden	6	16
Switzerland	2	7

Source: TME

the United Kingdom, Italy, Germany and Spain. The remaining EC countries only account for between 1 and 4% each of the total EC toy sales.

These five markets are also the largest toy manufacturers. Their total production accounts for 95% of the toys produced in the EC. Germany appears to be the main EC producer with 27% of the EC production, followed by Spain (20%), Italy (19%), France (17%) and the United Kingdom (12%). There are some discrepancies among Member States: whereas the share in EC production of Germany, France, Italy have increased, the share of EC production of the United Kingdom decreased from 17% in 1988 to 12% in 1991. This may reflect the more rapid transfer of United Kingdom manufacturing to offshore production than in other countries.

The stagnation of production of toys in the EC contrasted to the growing consumption caused by video games, of which the majority comes from Far East countries, which increased steadily over the last few years.

Due to the highly competitive nature of the toy industry, there is a trend towards consolidation with major companies making international acquisitions. An inevitable consequence of these acquisitions is a reduction in employment, often due to partial or total delocalisations of production.

In fact, some EC toy manufacturers, who have the sufficient critical size to do it, have moved part of their own production facilities to the Far East, where the manufacturing activity can be achieved at a lower cost. Other European producers partially subcontract to Far East producers parts and pieces of toys, components and other finished products, which are imported to complement the range of products.

However, the production of bulky toys is generally kept within the EC, as transport from non-EC countries would be expensive. Production also takes place in the EC when a high level of automation and/or high precision manufacturing is necessary, notably in the sector of plastic toys, where important investments have been undertaken (Jura in France and Alicante in Spain).

International comparison

At retail prices, apparent consumption of toys in the EC is only slightly lower than in the US. However, per capita expenditure on toys is higher in the US, if one considers that there are less children in the US than in the EC. Furthermore, prices of toys in the US are on average lower than in the EC. In Japan, the consumption reaches a level of ECU 4.9 billion, i.e. more than one third of the EC's consumption, for a third of its children population.

The EC is the third largest producer of games and toys in the world after Japan and the United States. At the same time it has to be noted that the EC producers are acquiring stronger positions vis-à-vis the USA but loosing to Japan (only in the video segment). But it should be noted, that much of the fluctuations in the positions is due to the fluctuations of the exchange rates. The figures in real terms, however, indicate a relatively more flourishing toy manufacturing industry in the EC than in the USA.

There is an increasing convergence in terms of product requirements between these three markets. This reflects the growing internationalisation of the industry and its dominance by a relatively small number of multinational companies, essentially American and Japanese ones.

Foreign trade

During the 1989-1992 period, the import/consumption ratio of toys has increased from 42% to 59%, with imports particularly contributing to market growth. These imports are increasingly coming from the Far East: in 1988 they accounted for 49% of extra EC imports in 1988, in 1992 they accounted 63%. This big increase in imports is largely due to the boom of video games, whereas imports of traditional toys from the Far East has remained stable since 1988, apart from the case of direct imports of low-range plastic toys.

Imports from the Far East mainly come from China, via the intermediation of US and Japanese multinationals, of European manufacturers in the framework of the complementation of their range of products, and of direct imports from retailers. Here, two strategies are opposed and/or complement each other: the first one is that of the multinationals, which provokes a reduction in manufacturing employment in the toy industry which has been partly offset by job creation in sales and marketing, distribution, product design and advertising functions, as international companies have built up their organisation's capacity to handle the EC market. On the other side one finds the strategy of European manufacturers which, besides sales and marketing personnel, employs many subcontractors and skilled workers.

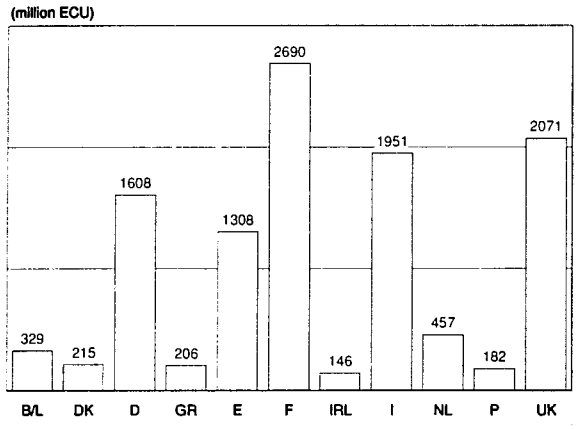
The four biggest toy markets, France, the United Kingdom Italy and Germany account for 75% of imports into the EC,

Table 2: Toys
Main indicators in current prices

(million ECU)	1988	1989	1990	1991	1992	1993 (1)
Apparent consumption	4 684	5 166	5 474	6 785	7 803	7 980
Production	3 310	3 590	3 759	3 915	4 072	4 110
Extra-EC exports	617.1	705.3	767.1	830.7	884.4	905.0
Trade balance	-1 374	-1 576	-1 715	-2 870	-3 731	-3 900

(1) NEI estimates.
Source: TME, Eurostat

Figure 3: Toys
National toy markets at retail prices by Member State, 1991



Source: TME

which corresponds to their total market share of 78%. Spain, the fifth biggest market, imports to a lesser extent than the other four. The fact that The Netherlands and Belgium receive a larger share of imports than their relative market share is due to the role of these countries as distribution centres for many major toy suppliers, combined with their very small production level.

Extra-EC exports have been increasing since 1988, but the rate of increase is diminishing, unlike extra-EC imports, for which the rate of increase has accelerated. The import-export ratio shows that imports into the EC are considerably higher than exports from the EC and this negative trade balance is aggravating.

Again, the same pattern described for imports might be applied for exports: the five largest markets in the EC account for 80% of exports, i.e. slightly more than their market share. In addition and as already mentioned, The Netherlands and Belgium account for a relatively large part of exports, this being easily attributed to their role as distributors of toys.

EFTA countries appear to be the main destination for 32.7% of toys manufactured in the EC, before the USA for 17.8% of extra-EC exports.

MARKET FORCES

Demand

Disposable income is one factor for determining the level of spending on toys per child in the EC: children in the EC receive on average toys valued at approximately ECU 190 per year, but there are discrepancies among EC countries, the GDP being the determining criteria. Children from former West Germany receive the highest amount of toys, but French children receive more toys than the re-united Germany. Spanish and Italian children receive less toys than any other EC country with an amount of ECU 160 per year. Germany, Denmark, France and the United Kingdom are the leading EC countries in terms of toy spending per child. The number of toys received per child per year and the amount spent on these toys has been increasing, as a result of the higher average age on which parents have their first child. On average, these parents have a larger disposable income than in their early twenties.

Another factor is the demographic development: the number of children in the EC has been decreasing since 1985 and this decrease is expected to continue in the future. This decline

Table 3: Toys
Average real annual growth rates

(%)	1988-92
Apparent consumption	13.9
Production	9.0
Extra-EC exports	5.0
Extra-EC imports	19.2

Source: TME, Eurostat

will be moderate due to the counter force of people in the baby boom generation who become parents in the 1990s.

TV advertising is an important factor which affects demand: quantitatively, it is particularly important for a company wishing to penetrate a market. However, only large multinationals can afford to pay the high fees necessary to buy advertising spaces to promote their products. Furthermore differences among Member States exist in access to commercial TV-time. Demand is particularly influenced by TV-advertising in the United Kingdom and Italy, and less so in Germany.

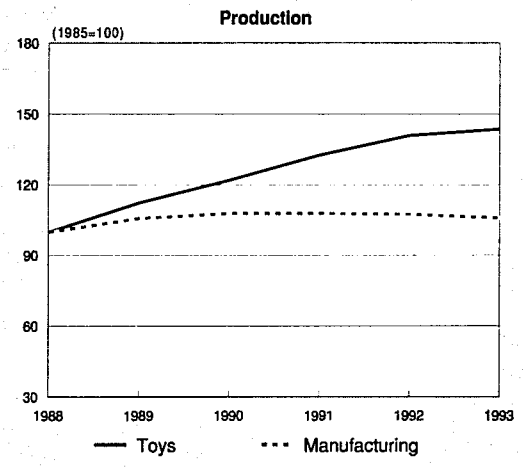
Fashion and promotional type hit products, often supported by a heavy TV campaign, also play an important role in demand. New toys can create entirely new categories resulting incremental sales for the industry as a whole. Demand however, can switch from a hit product to another one over a short period of time.

Finally, seasonality is an important characteristic of the demand for toys. The toy industry is, above all, an industry which responds to a highly cyclical demand pattern. Some 60% of the total volume of toys is sold to consumers in the last two months of the year, i.e. around the St Nicholas, Christmas period. Outside the Christmas peak season, toys are more particularly sold at Easter and similar occasions, as well as for birthdays. Finally, it is worth to note the strong development of summer toys (notably sporting toys) and open-air toys.

Supply and competition

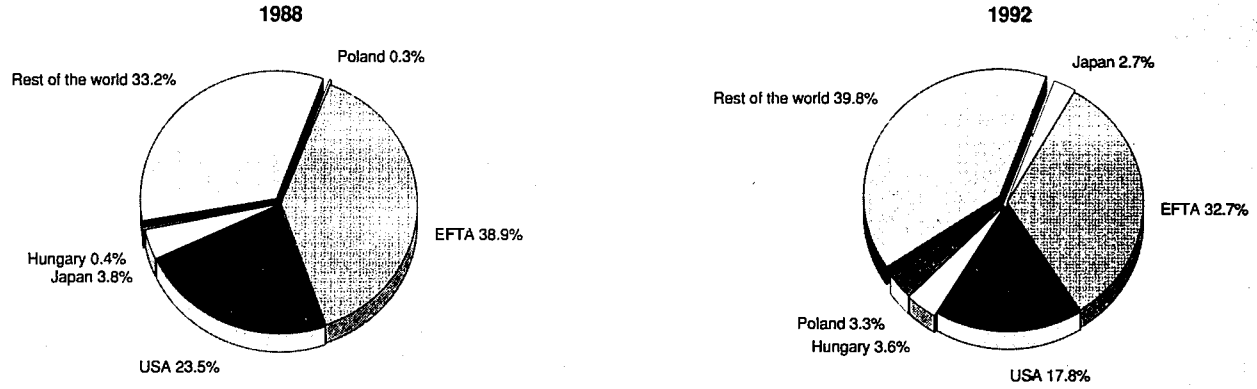
The high wage costs in Europe are a major handicap for the EC toy industry in relation to foreign competitors, with respect to products manufactured in the Far East. China has become the hub of international subcontracting because of the low

Figure 4: Toys
Production in constant prices compared to EC manufacturing



1993 are Eurostat estimates.
Source: TME, DEBA

Figure 5: Toys
Destination of EC exports



Source: Eurostat

labour cost. The handicap of high labour costs is particularly penalising in a sector where assembly operations are numerous and difficult to automate for small production runs.

The increasing sourcing of toys in the Far East, and especially in China by American multinationals have lead some EC toy manufacturers to follow the same pattern, to the extent of their ability to do it.

Smaller manufacturers tend to meet local market requirements and can not penetrate international trade markets. However, it becomes increasingly necessary to operate at an international level (e.g. by cooperation) in order to absorb the high development costs and investments required for new products. Owing to their small size, smaller EC companies have a low investment capacity. Lack of financial resources is a basic handicap in the bid to compete with other producers.

In addition, because of insufficient production runs due to the patchwork nature of the EC market and the small size of firms, no benefits can be achieved from economies of scale comparable to those made by American multinationals. The latter companies offer a single worldwide range.

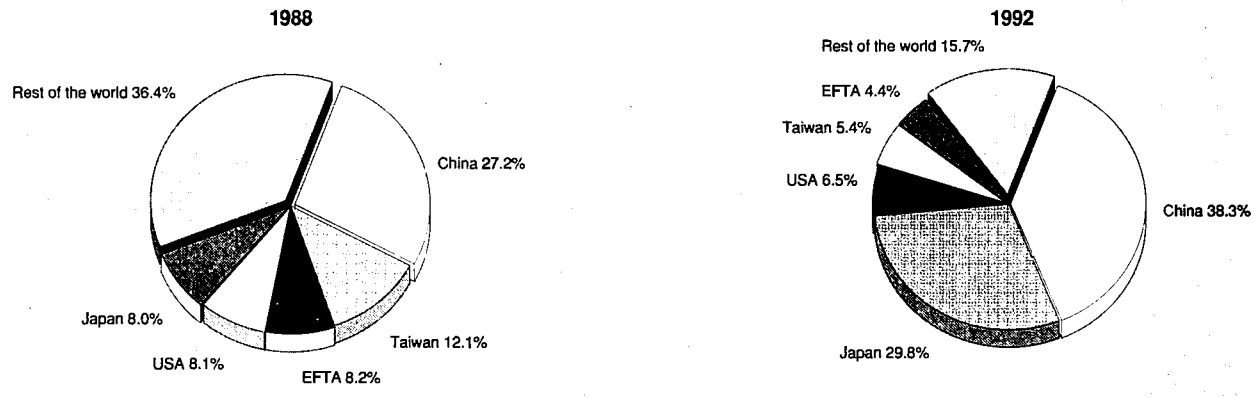
Production flexibility is a major advantage for toy multinationals, who have to deal with a cyclical market influenced by fashion trends and who often have more than 50% of their products manufactured in Taiwan and Hong Kong, and particularly in China.

The retail business is highly competitive with a strong emphasis on improved margins. At the same time, the retail market is increasingly concentrating. In the last five years the American chain Toys'R'Us has become the largest single retailer of toys within Europe and it has developed this unique position by offering a very large assortment of toys and other child related products at very competitive prices. Hypermarkets and supermarkets also have a major impact on the sales of toys but mostly during the Christmas season. Their usual strategy is to market the products themselves, using the combination of low price/limited assortment, as well as special offers which attract customers to the shops.

In certain markets such as France, hypermarkets and supermarkets control up to 65% of the market, discounting toys marginally above their cost price.

As a consequence of these developments, the number of toy retailers decreased significantly the last ten years, with many small retail shops losing market share and finally closing down. The outcome is a concentration on the supply side of toys

Figure 6: Toys
Origin of EC imports



Source: Eurostat

Table 4: Toys
External trade in current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	408.1	514.1	569.2	584.3	593.6	617.1	705.3	767.1	830.7	884.4
Extra-EC imports	1 098	1 146	1 130	1 275	1 655	1 991	2 281	2 482	3 701	4 615
Trade balance	-690	-632	-561	-691	-1 062	-1 374	-1 576	-1 715	-2 870	-3 731
Ratio exports/imports	0.37	0.45	0.50	0.46	0.36	0.31	0.31	0.31	0.22	0.19
Intra-EC trade	1 035	1 061	1 069	1 245	1 364	1 421	1 669	1 899	2 043	2 009
Share of total imports (%)	48.5	48.1	48.6	49.4	45.2	41.6	42.3	43.3	35.6	30.3

Source: Eurostat

into the hands of fewer, more professional, internationally operating companies.

The weak industrial structure has led to a fall in profitability levels in EC companies since 1980. This is mainly due to rising costs of production, marketing and advertising, which are difficult to pass on to the consumer because of the strong competitive pressure in the sector.

Toy manufacturers in Europe are also facing unfair competition, which in particular takes the form of:

- dumping practices on the prices of low-range toys, and the so-called "social" dumping due to the exploitation of workforce;
- piracy and imitation of design, trade marks and models.

Production process

Companies operate more and more on a global scale, leading to relocations of manufacturing plants from the EC to the Far East because of cost conditions. However, some successful companies still manufacture in Europe, e.g. Lego (DK), Playmobil (D), Monneret (F), Smoby (F), Berchet (F), Milton Bradley (US), Hasbro (US), Fisher Price (US), Meccano (F), Parker (US), Chicco (I), Spears (UK), Waddington (UK), Mattel (US), Majorette (F), Ravensburger (D), Steiff (D), Jeux Nathan (F), Clementoni (I), Burago (I), Märklin (D), Trudi (I), Jumbo (NL). For some of these, the European share in the production is sometimes up to 100%.

Apart from the development of manufacturing in Europe or in the Far East, the concession of licensing is also a key elements to the success of EC companies. However, only international companies, armed with appropriate distribution networks, are able to make good use of licences, with the support of important TV advertising campaigns, whereas the majority of EC firms lack a proper international system of distribution.

INDUSTRY STRUCTURE

Companies

In general, the European companies specialise in traditional toys. On the other hand, companies located outside the EC prefer to produce fashion toys, which remain however very aleatory and which require high publicity costs and have a short economic life cycle.

The EC toy industry consists of a wide spectrum of companies of different sizes: from small privately owned domestic manufacturers to large international toy companies. The top ten toy companies in terms of market shares in the EC are: Nintendo (J), Hasbro (US), Sega (J), Lego (DK), Mattel (US), Idéal Loisirs (F), Playmobil (D), Fisher-Price (US), Tomy (J), Ravensburger (D).

Other important European firms are Clementoni (I), Burago (I), Jumbo (NL), Märklin (D), Bluebird (UK), Jeux Nathan (F), Brio (S), Berchet (F), Famosa (E), Smoby (F), Chicco (I), Spears (UK), Hornsby (UK), Britains Petite (UK), Waddingtons (UK).

The EC toy industry suffers from two main structural handicaps. The first is the high fragmentation of firms in the sector, because of the vast spread of different products. It is estimated that 80% of the firms operating in the sector on a full-time basis (excluding seasonal activity) employ fewer than 20 salaried workers.

The second problem is the absence of multinational firms comparable to American and Japanese groups, with the exception of Lego. This explains also why production is so dispersed.

In the EC toy industry a concentration of resources into fewer and larger international companies has taken place, reflecting the need to meet the European consumers' demands for new products through greater investment and manufacturing skills. Furthermore, there appears a process of polarisation. At the one side, large companies gain increasing market shares mainly at the expense of the effective middle sized domestic manufacturers who are unable, because of their structure, to respond quickly to changes in the market place. At the other side smaller, niche manufacturers acquire strong positions by focusing on a particular segment of the market.

Strategies

The internationalisation on the world market has also major effects for the EC toy industry with national companies devoting more efforts towards international expansion. The European Single Market has only reinforced this process.

The EC toy industry has undergone a restructuring phase over the last decade, mainly through mergers and acquisitions, in order to face-up to international competition. An example of this process concerns the French firm Idéal Loisirs, which is now one of the big international companies in the EC, due to its alliance with the Hong Kong based Playmates company and its acquisition of the French firm Majorette.

In order to stay competitive vis-à-vis international competitors, a global manufacturing strategy is necessary in order to exploit substantial economies of scale.

With respect to labour costs, the Lego company has a somewhat exceptional position inasmuch as it produces in Denmark and Switzerland, which have especially high labour costs. The explanation is the high level of automation and the need for high precision manufacturing.

In order to create a brand image, marketing efforts have proved to be rewarding. With respect to this, it is necessary for toy companies to make use of the whole range of the marketing mix. Within this marketing mix, a good media programme is crucial, but it must rely on all forms of promotion rather than on solely TV advertising.

REGIONAL DISTRIBUTION

The industry is highly concentrated geographically. Some 95% of the firms, accounting for approximately 90% of EC production, are situated in Germany, Italy, France, the United Kingdom and Spain. Within those five countries, firms are often located in a particular region: Bavaria and Baden-Württemberg in Germany, Lombardy in Italy, the Jura and Rhône-Alps (Ain) in France, and the Alicante and Barcelona provinces in Spain. Each country has its own specialisation:

- Germany: plastic toys, model trains and board games;
- Italy: bicycles and dolls;
- France: plastic toys, board games, plush toys and small scale cars;
- United Kingdom: metal and plastic miniatures, table and board games and die-cast;
- Netherlands: board games.

Each country has a production advantage. Germany is known for technical know-how; Italy's structure allows great flexibility and high product quality; France has particular knowledge in plastics transformation.

ENVIRONMENT

The toy industry is not regarded as a polluting industry, but has proved to be pro-active in the face of the increasing environmental consciousness among consumers. There are three areas in which environmental protection is relevant to it, i.e. packaging waste, environmentally friendly production, and removal of used products.

The "Green Movement" has led national governments, followed by the EC, to prepare rules designed to ensure the reduction of packaging waste. The toy industry has taken an active part in these debates and favours a single EC system aimed at reducing packaging waste.

In terms of the products themselves, wooden toys, considered by consumers as environmentally friendly, have benefited the most from the increased public ecological awareness. However, it is difficult to assess objectively which toys are most friendly to the environment.

REGULATIONS

The first and most important EC regulatory step was taken with the adoption of the "EC Toy Safety Directive" on 3 May 1988. The Toy Safety Directive contains essential physical, mechanical, chemical, electrical and flammability requirements, which, if fulfilled by toy manufacturers, allow them to affix on their products (or packaging) the "CE" mark. This sign is designed to indicate to surveillance officers that the product conforms to relevant EC safety regulations and can therefore freely circulate within the Internal Market. The Toy Safety Directive refers to a set of harmonised standards (elaborated by CEN and CENELEC), which are being constantly revised and extended.

Advertising regulations also affect the toy industry. The 1984 Misleading Directive and the 1989 Broadcasting Directive, although not designed primarily for the toy industry, encompass within their scope advertisement to children.

Creativity is the essence of the dynamism of the toy industry, and regulations relating to intellectual property, in particular trademark protection, design protection, as well as anti-counterfeiting measures are also of great interest to toy manufacturers, who devote a lot of time and effort to the development of new designs to satisfy the rapid evolution of children's tastes.

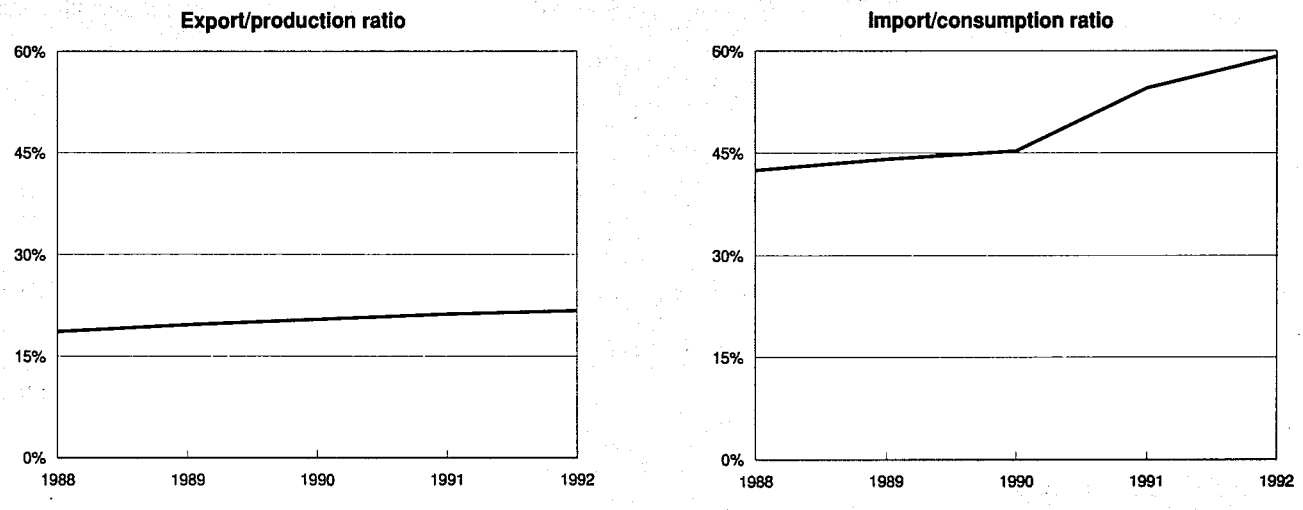
Trade measures, either included in GATT rules, or in specific EC regulations, affect greatly the European toy industry, which, as explained above, operates more and more on a global scale.

OUTLOOK

Prospects for the demand for toys in the short-term are only moderately optimistic. The economic recession, with a decrease in disposable income as a consequence, will result in a stagnation of the EC market for toys. In the longer term the economic recovery will lead to relative higher growth figures, however at a lower level than the growth figures of the 1980s.

EC manufacturers continue to be faced with stiff competition from suppliers in the Far East, and from China in particular, which risks to penalise European production in the medium term. Also EC-exports will be hurt by this fierce competition.

Figure 7: Toys
Trade intensities



Source: TME, Eurostat

Table 5: Toys
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	2.0	4.0
Production	1.0	2.0
Extra-EC exports	2.0	3.0

Source: NEI

Electronic toys, which recorded strong growth for a few years, might undergo a slowdown in the short term, due both to the possible development of a bad reputation for these games with parents, and to saturation.

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The industry is represented at the EC level by: Toy Manufacturers of Europe (TME). Address: Avenue Tervueren 13a, B-1040 Brussels; tel: (32 2) 732 7040; fax: (32 2) 736 9068; and,
Fédération Européenne du Jouet (FEJ). Address: 45 rue de Trêves, B-1040 Brussels; tel: (32 2) 231 0730; fax: (32 2) 231 0838.

Sporting goods
NACE 494.2, part of 451, 453

The EC market for sporting goods expanded significantly in the 1980s. Several factors were responsible for this evolution, under which the increased interest for sports because of health reasons and the increased leisure time of people. Moreover, the more fashion-led consumption has stimulated the industry. Demographic changes with a growing proportion of the population over 25 years old have resulted in a changing pattern in demand: year-round recreation activities, higher quality products and more individualistic sports are becoming more attractive.
Competition has become very fierce in the EC market due to the rising imports of particularly Asian products. New strategies concentrating on key products, more outsourcing, centralisation of functions and improved logistics and distribution have been applied by EC manufacturers.

INDUSTRY PROFILE

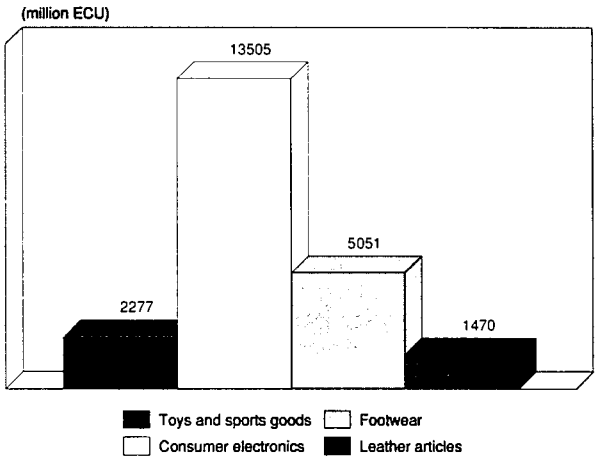
Description of the sector

Sporting goods are covered by NACE 494.2 and by parts of NACE 451 and 453 for sports footwear and sports clothing, respectively. The sporting goods sector is very heterogeneous and detailed statistics except for trade are not available. Moreover, it is difficult to give a precise definition of sporting goods because many products originally marketed as sporting goods are used only partly for sporting activities. Sports clothing and sports footwear are also worn by people in spare time or even at work. Furthermore, manufacturers of sporting goods also produce other goods such as toys and camping equipment. Most of the tables and figures in this chapter refer thus to NACE 494, toys and sporting goods.

The chief countries of origin for the main product groups are as follows (main non-European origin countries);

- gymnastic and athletic equipment: United Kingdom, France, Germany, Finland, Norway (USA, China);
- tennis rackets: Belgium, Austria, France, Germany (Taiwan, USA);
- golf equipment: United Kingdom, France, Germany (Taiwan, Japan, USA);
- table-tennis equipment: France, Germany, Sweden, United Kingdom (China, Japan);
- leather balls: Italy, United Kingdom, France, Germany (Pakistan, China);
- roller and ice skates: Austria, Switzerland (Canada, China);
- cross-country skis: Austria, Finland, Italy (Commonwealth Independent States: CIS);
- alpine skis: France, Austria, Finland, Italy, Switzerland, former Yugoslavia (USA);
- aquatic sports equipment (incl. windsurfing): France, Austria, Switzerland, Italy, Germany (USA, China);
- leather sports gloves: Italy, France, Germany, Netherlands, Hungary (Pakistan, South Korea, USA);
- track suits: Italy, France, Germany, Portugal, Turkey, former Yugoslavia, Denmark, UK, Switzerland, Poland (China, Pakistan, India);
- ski-suits (woven): Italy, France, Germany, Austria, Greece, Portugal, former Yugoslavia (China);

Figure 1: Toys and sports goods
Value added in comparison with other industries, 1992



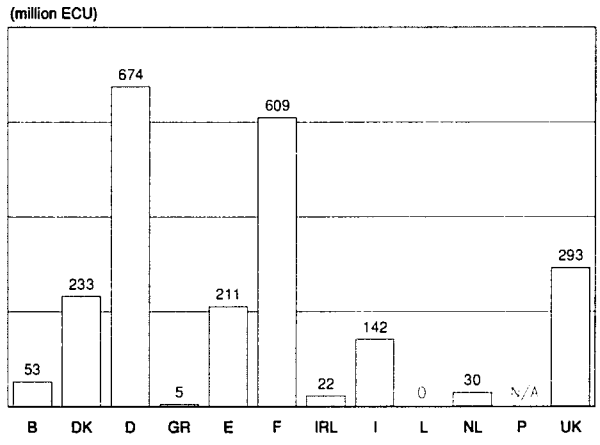
Source: DEBA

- ski-boots: Austria, Italy, Germany, France, Switzerland, former Yugoslavia (South Korea);
- sports footwear: Italy, France, Germany, United Kingdom, Austria, Portugal, Switzerland, former Yugoslavia (China, Indonesia, South Korea, Taiwan).

The largest markets for sporting goods are Germany, France and the United Kingdom, although these markets show little potential for further substantial growth. The levels of participation in sports is not as high in the south Member States. Nevertheless, these countries offer good prospects for increasing consumer expenditure on sporting goods. The reason is that the larger markets and the Member States with high purchasing power (Belgium, the Netherlands, Denmark) are highly saturated.

In 1992, Germany had the largest value added, closely followed by France.

Figure 2: Toys and sports goods
Value added by Member State, 1992



Source: DEBA

Table 1: Toys and sports goods
Main indicators at current prices (1)

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993(2)
Apparent consumption	4 646	4 879	4 875	5 167	5 896	6 704	7 657	7 908	9 403	10 260	10 300
Production	3 808	4 112	4 208	4 360	4 616	4 897	5 437	5 639	5 713	5 668	5 560
Extra-EC exports	757	953	1 068	1 067	1 075	1 127	1 332	1 421	1 469	1 577	1 390
Trade balance	-838	-766	-667	-807	-1 280	-1 807	-2 220	-2 269	-3 690	-4 592	-4 800
Employment (thousands)	81.0	78.9	75.6	70.6	71.5	69.8	73.0	72.1	69.4	67.4	66.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
(2) NEI estimates.
Source: DEBA

Table 2: Toys and sports goods
Average real annual growth rates (1)

(%)	1983-88	1988-92	1983-92
Apparent consumption	5.0	8.1	6.4
Production	2.1	0.3	1.3
Extra-EC exports	4.4	4.4	4.4
Extra-EC imports	10.2	16.3	12.9

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.
Source: DEBA

Table 3: Toys and sports goods
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	757	953	1 068	1 067	1 075	1 127	1 332	1 421	1 469	1 577
Extra-EC imports	1 594	1 719	1 735	1 874	2 355	2 934	3 552	3 690	5 160	6 169
Trade balance	-838	-766	-667	-807	-1 280	-1 807	-2 220	-2 269	-3 690	-4 592
Ratio exports/imports	0.47	0.55	0.62	0.57	0.46	0.38	0.38	0.39	0.28	0.26
Terms of trade index	104.6	99.9	100.0	109.6	113.8	110.8	107.9	115.8	109.3	113.4
Intra-EC trade	1 286	1 363	1 402	1 602	1 737	1 882	2 290	2 563	2 756	2 801
Share of total imports (%)	44.7	44.2	44.7	46.1	42.5	39.1	39.2	41.0	34.8	31.2

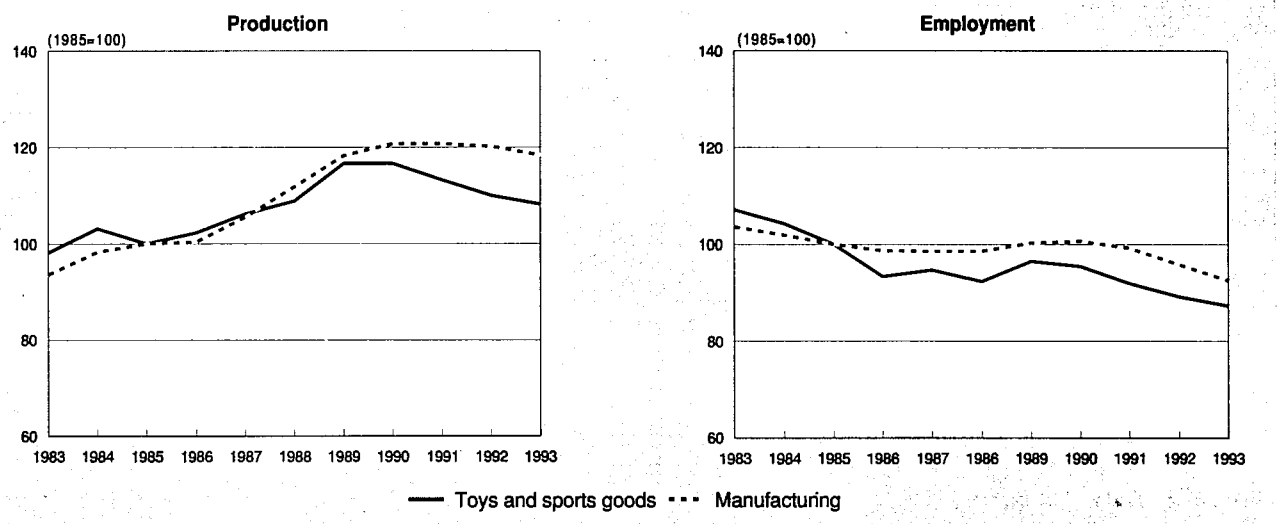
Source: DEBA

Table 4: Sporting goods
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	472.0	606.1	695.3	655.8	631.1	619.7	691.0	717.6	715.6	748.2
Extra-EC imports	569.9	654.2	674.4	701.0	816.0	1 001.6	1 142.6	1 083.4	1 268.1	1 330.2
Trade balance	-98.0	-48.1	20.9	-45.2	-184.8	-381.9	-451.6	-365.7	-552.5	-582.1
Ratio exports/imports	0.83	0.93	1.03	0.94	0.77	0.62	0.60	0.66	0.56	0.56
Intra-EC trade	428.7	491.8	524.4	574.1	606.0	607.8	667.0	705.3	753.9	808.9
Share of total imports (%)	42.9	42.9	43.7	45.0	42.6	37.8	36.9	39.4	37.3	37.8

Source: Eurostat

Figure 3: Toys and sports goods
Production in constant prices and employment compared to EC manufacturing



1993 are NEI and Eurostat estimates.
Source: DEBA

Recent trends

Several key trends have prompted increased participation in sport and hence huge growth in consumer expenditure on sporting goods.

Furthermore, sportswear has become ordinary casual wear during the 1980s and as such it has become a fashion product. The use of sports clothing and sports footwear as fashion goods, whereby people incorporate sports clothing and sports footwear in their outfit, has positively influenced the demand for sporting goods. In the 1990s however, consumption of sporting goods in the EC stagnated partly because of the economic recession.

Production has not grown at the same rate as consumption because an increasing part of production is done by outsourcing. Exports from especially East and South-East Asia have grown significantly the latest years, as low labour costs attracted production of sporting goods to these countries.

Moreover, Germany, Italy, France and the United Kingdom have sizeable manufacturing industries, but all are net importers and the share of Asian suppliers has increased steadily. This may explain the worsening of the already negative trade balance.

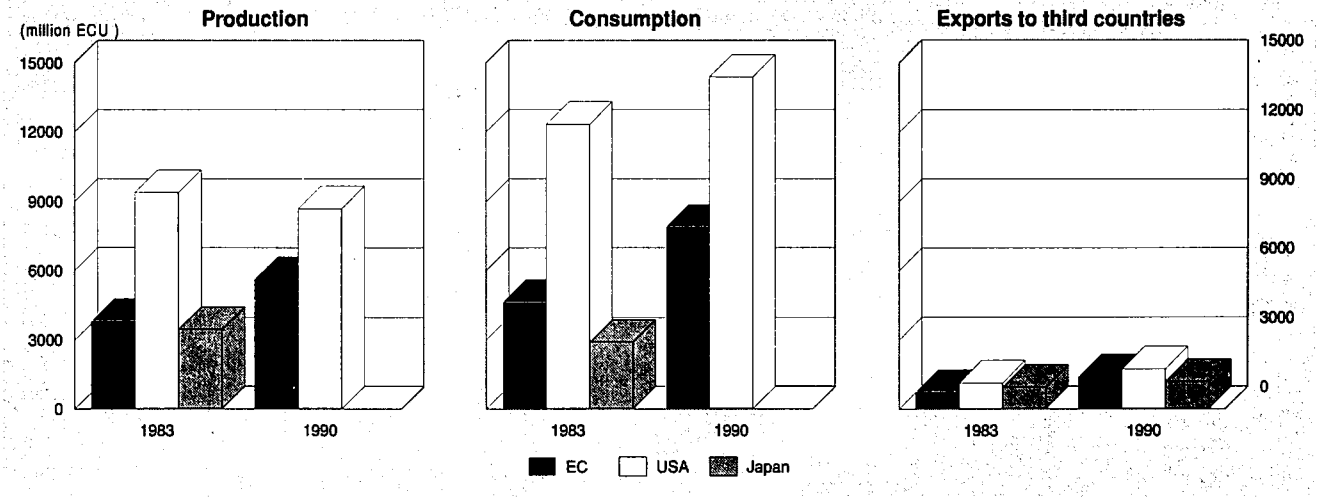
Since 1990, employment fell continuously due to high EC labour costs. This may explain the increase of productivity.

International comparison

Helped by the low value of the US Dollar in the 1986-1990 period, exports of sporting goods from the USA have risen tremendously. In line with the increasing exports, USA manufacturers expanded their production capacity in the US itself. In order to benefit from lower wages , output shifted from the US to lower labour cost markets (Asia) since 1990.

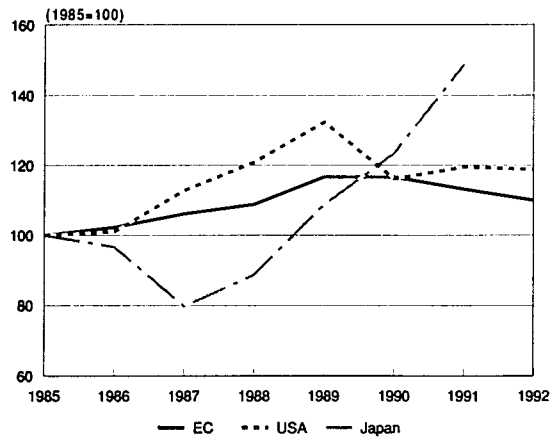
Aiming at increasing consumption, the Japanese government has taken several actions among which shortening of working

Figure 4: Toys and sports goods
International comparison of main indicators in current prices



Source: DEBA, Census of Manufacturers, Nikkei

Figure 5: Toys and sports goods
International comparison of production in constant prices



Source: DEBA, Census of Manufacturers, Nikkei

hours is one. The increase in leisure time resulted in higher consumer expenditures of sporting goods. Japanese manufacturers have benefited from this evolution in order to gain a foothold on foreign market for sporting goods.

Foreign trade

The trade deficit has been consistently growing during the 1980s, due to stagnating exports and increasing imports. Extra-EC imports rose by 20% in 1992 and tripled if compared to 1983. As a result, in 1992, extra-EC imports accounted for an increasing share of consumption: 60% of the demand in the EC was satisfied by foreign imports.

EC imports from the USA accounted for about 14% with the USA consolidating its position as a major importer of sporting goods in the EC. The shift of production to lower labour cost countries, has led to the huge growth of imports from East and South-East Asia. Another observation is that the composition of these imports is changing. In earlier years these imports mainly originated in countries like South Korea and Hong Kong, the increasing wage level in these countries however, has moved production of sporting goods to countries like Indonesia, Thailand, and China.

Because of the increasing competition from low labour cost countries, EC exports are stagnating during the last few years. Although the huge growth in the Japanese market for sporting goods resulted in growth figures in EC exports to Japan, overall EC exports have not grown significantly in the last years. The main exporters in the EC are France, Germany, Italy and the United Kingdom. These countries however are net importers, since they are also the main importers in the EC.

Intra-EC trade occurs mainly among Member States where most of sporting goods manufacturers are established and where the population has high purchasing power. These are the large countries already mentioned as the largest extra-EC importers and exporters.

MARKET FORCES

Demand

Factors affecting demand are:

- participation in sports: overall there was an increased interest and participation in sports, with especially an increasing popularity for 'new' sports like windsurfing, squash, golf and snooker;
- sporting activities are increasingly evolving from competitive team sports into recreational activities for the individual;
- demographic factors will be important: the proportion of people more than 25 years old will increase in the coming decade;
- importance of lifestyle: fashion and leisure usage of sports clothing and sports footwear.

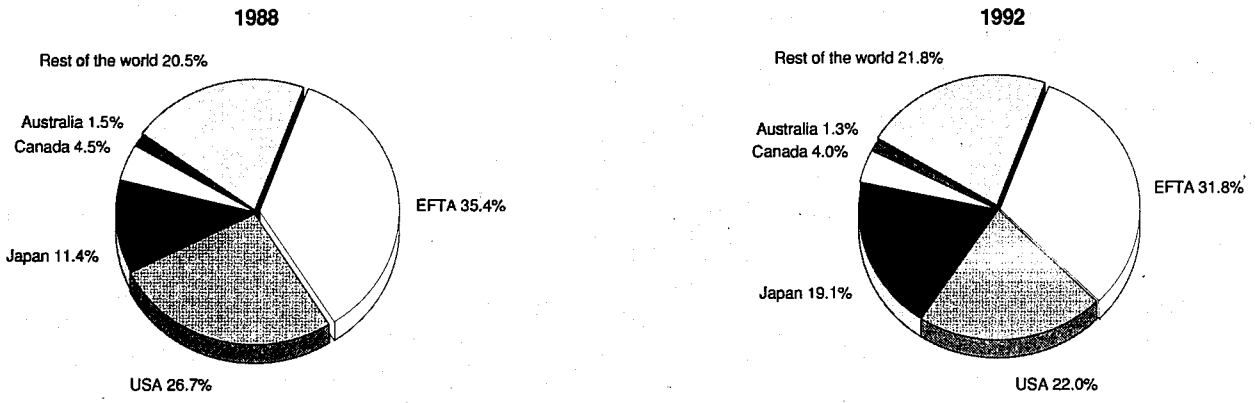
The increased interest for sports due to health reasons, the use of sports clothing and sports footwear for fashion clothing and the increased leisure time, all were positive factors in the development of the sporting goods industry in the 1980s.

The demand for sporting goods however is a discretionary demand. Therefore it is a cyclical demand because purchases of sporting goods are postponed in the recessionary period. The economic recession and the high saturation levels were the main reasons for the slowdown of the sporting goods industry in the early 1990s.

Supply and competition

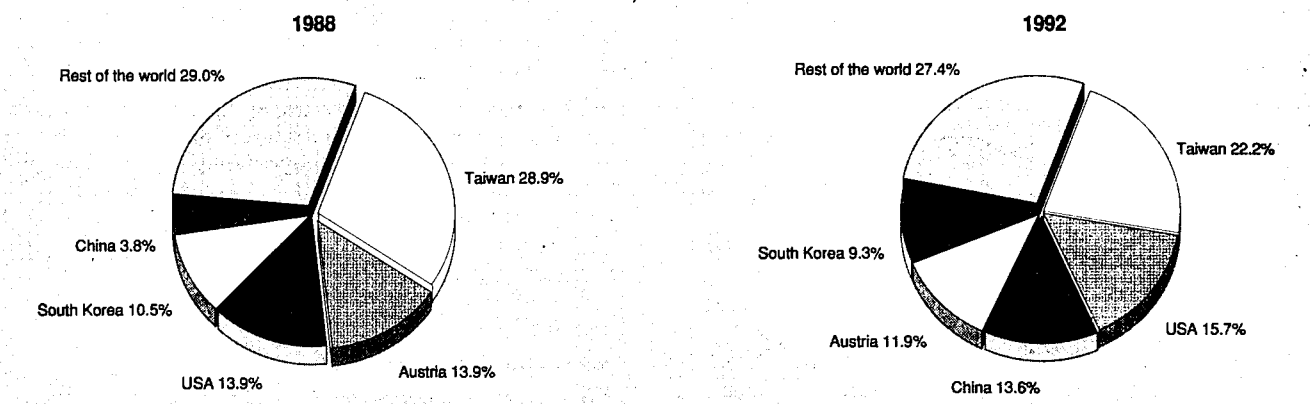
The European sporting goods industry has until now been characterised by a large number of small and medium sized

Figure 6: Sports goods
Destination of EC exports



Source: Eurostat

Figure 7: Sports goods
Origin of EC imports



Source: Eurostat

enterprises. There is however a growing concentration resulting in an increasing market power for a few multinationals. In response to the growing concentration of large companies, the smaller firms are cooperating together throughout the EC.

Furthermore, in the light of the Single Market and the abolition of the frontiers, a well developed distribution-network is a crucial factor in this highly competitive sector. In respect to this, the power of the retail business has significantly increased.

Apart from the competition of the US production, there is strong competition from manufacturers in the Far East. These suppliers can deliver large orders because of the size of their production capacity. Moreover new production technologies make it possible for them to offer relatively good quality at low prices because of the low labour cost in these countries. In order to strengthen their competitiveness, the large EC manufacturers have set up plants in this region. A lot of the smaller manufacturers have contracted out orders to suppliers in these countries. They have also expanded their buying teams in these countries in order to guarantee adequate supply.

Production process

The largest manufacturers of sporting goods in the EC rank among the world leaders in product and production technology. Through constant R&D expenditure these manufacturers endeavour to use state-of-the-art materials and technologies.

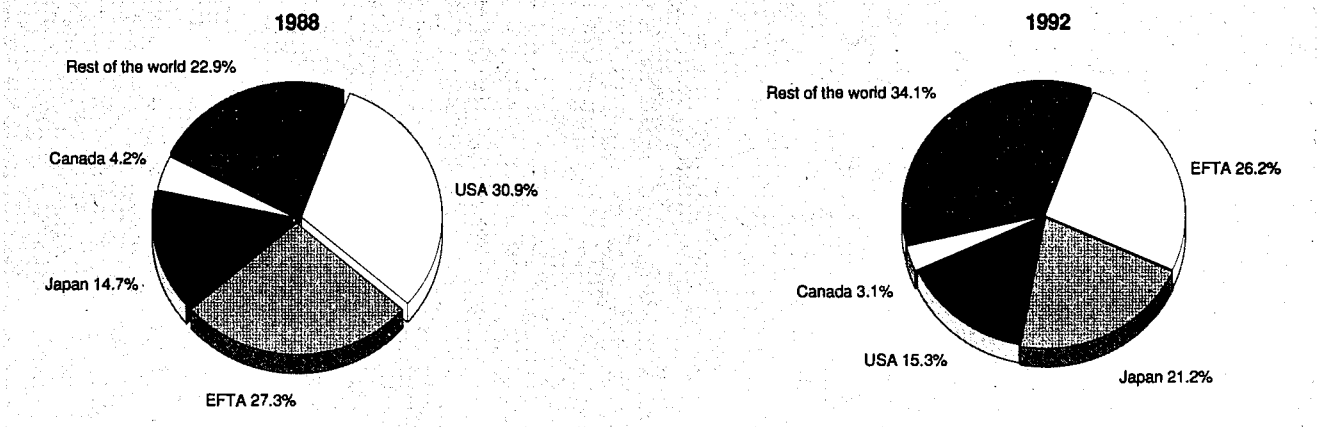
The manufacturing is usually carried out by independent companies while design, quality, control, distribution and marketing are controlled and carried out by the respective brand companies

A distinction can be made between different groupings of products, in terms of differences in positioning in the market, advertising and promotion. At the one end, there are the top international brands: they are very exclusive, have superior quality and are highly priced. Generally, they are only sold through specialist stores, mostly clothing stores.

A second group are the more mass market brands that are also heavily promoted, but are less exclusive while still fashionable. They have a high quality and are distributed through specialised independents and specialised chains.

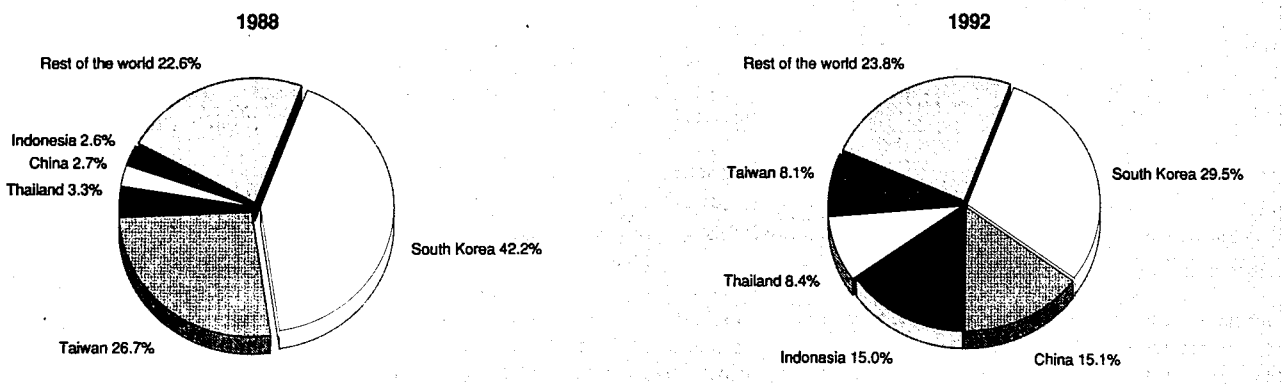
At the other end, there are the brands of middle quality with competitive prices. Advertising and promotion is far more limited and competition is directly with 'private label' merchandise offered by large retailers and department stores.

Figure 8: Sports footwear
Destination of EC exports



Source: Eurostat

Figure 9: Sports footwear
Origin of EC imports



Source: Eurostat

INDUSTRY STRUCTURE

Companies

The major product groups and brands-manufacturers in the EC are:

- Adidas/Puma (D) and Nike/Reebok (US): sports clothing and footwear
- Rossignol, Salomon:(F), Fisher (D): skiing and tennis equipment, golf clubs and equipment;
- Lacoste:(F): sport and leisure clothes,
- Bogner: (D): leisure clothing;
- Kettler:(D): sports and fitness equipment;
- Dunlop/Slazenger (UK), Donnay (B): tennis equipment and clothing.

Strategies

The increasing competition from Asian suppliers and the growing market power of the retail business make it necessary for the sporting goods industry to become more competitive. The European Single Market is only reinforcing this process.

Larger companies are mainly rationalising their activities. In the 1980s, numerous manufacturers pursued a policy of diversification and produced not only their core products but also sports and leisure clothing and footwear for highly varied activities. As such they competed directly with clothing and footwear manufacturers, who expanded their product ranges by including more sports items. Because of the competitive advantages of these clothing and footwear manufacturers, mainly in distribution and advertising, profits of the sporting goods manufacturers went down. This resulted in streamlining of the product ranges, focusing on the companies' strengths and disposing of loss-making divisions. An example is Adidas that abandoned the Adidas branded leisure wear sector and concentrated on key products.

Smaller companies are setting up cooperation agreements in order to work together in the fields of distribution, marketing and R&D. The financial resources of these smaller companies are most of the time too small to set up a European-wide distribution network or to spend large budgets on R&D for product development.

Moreover, smaller companies are focusing and specialising on segments of the market for sporting goods, thereby pursuing a niche-strategy.

Instead of diversifying into totally new product lines (such as leisure footwear or clothing), sporting goods manufacturers are nowadays diversifying into related product lines (e.g. a manufacturer of running shoes also produces golf shoes). This makes it possible to diversify away from the crowded, highly competitive markets into new less competitive areas. The recognition of higher rewards of more highly distinctive product sales and the all too high dependence on a specific part of the market, are the main drivers behind this process.

Finally, the recognition of demographic changes by manufacturers has made them consider sports where consumers other than the young (male) adults are active. This increase of the older population sections with high purchasing power and a strong interest in sport has, for example, led to a growing interest in golf. Manufacturers take into account these demographic changes in their advertising and promotion strategy by more focusing on the 'new' consumers in sports. In par-

Table 5: Sports footwear
External trade at current prices

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Extra-EC exports	351.1	417.2	485.7	489.7	439.9	453.9	575.3	551.4	520.1	532.3
Extra-EC imports	502.8	529.4	603.8	605.6	708.4	739.7	782.4	845.3	1 130.8	998.9
Trade balance	-151.8	-112.3	-118.1	-115.9	-268.5	-285.8	-207.2	-293.9	-610.7	-466.6
Ratio exports/imports	0.70	0.79	0.80	0.81	0.62	0.61	0.74	0.65	0.46	0.53
Intra-EC trade	437.8	487.5	625.9	643.1	578.0	475.4	575.7	651.3	753.6	740.1
Share of total imports (%)	46.5	47.9	50.9	51.5	44.9	39.1	42.4	43.5	40.0	42.6

Source: Eurostat

Table 6: Toys and sports goods
Labour productivity and unit costs (1)

(1985=100)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Productivity (thousand ECU)(2)	26.3	27.5	27.5	30.1	31.4	32.7	31.9	32.4	33.3	33.8
Productivity index	95.3	99.8	100.0	109.2	114.0	118.6	115.8	117.7	120.9	122.7
Unit labour costs index (3)	86.4	93.6	100.0	106.2	111.9	116.5	122.2	131.2	144.7	152.4
Total unit costs index (4)	84.3	93.0	100.0	108.5	112.7	122.4	131.6	139.4	146.2	152.9

(1) Estimates are used if country data is not available, especially from 1990 onwards.
(2) Value added in 1992 prices per person employed.
(3) Based on labour costs in current prices per person employed.
(4) Based on total costs in current prices per person employed, excluding costs of goods bought for resale.
Source: DEBA

ticular submarkets of sporting goods, advertising represents a key barrier to entry, but it also enables the major manufacturers to maintain their position and dominance within the industry.

REGIONAL DISTRIBUTION

The major producers in the EC are Germany, France, Italy and the United Kingdom. Figures about the number of manufacturers in these countries can only be indicative, since the sporting goods industry is very heterogeneous, and it depends on small differences in interpretation if a company is considered to be in the sporting goods industry or not. This is especially relevant to the clothing sportswear sector. However, most companies seem to be engaged in the sports clothing sector, and the least in the sports footwear.

Within countries the geographical pattern can be very different. In Italy, most of the manufacturers are based in Lombardy and in Spain a majority of manufacturers are located in Catalonia and in the region around Madrid. France and Germany, by contrast, have companies widely spread throughout the country.

ENVIRONMENT

Some of the outdoor activities are being opposed by environmental movements. The arguments are that some outdoor activities could have a direct effect on the environment of the sport area. Two remarks should be made relating to this observation.

First, a distinction should be made between the environmental hazards caused directly by the sporting goods industry and those hazards that tourist services are responsible for. Second, recent efforts have been made to protect the environment in the concerned areas. National sporting associations and local and/or regional authorities are involved to protect the environment by local regulations for doing sports (e.g. minimum of snow for skiing, special routes for cross-country skiing).

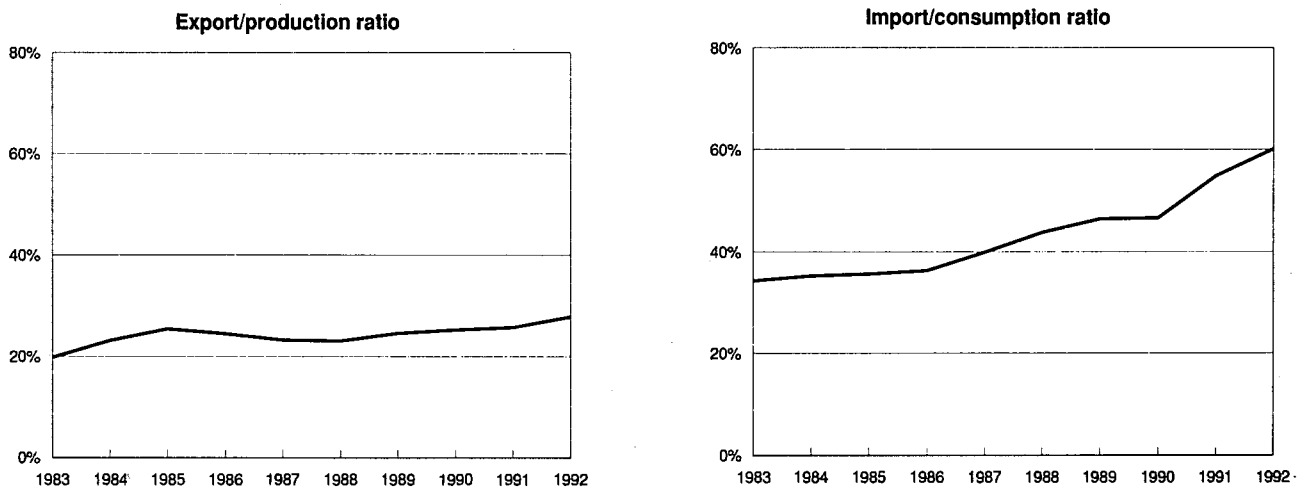
Moreover, other sports benefit from the heightened ecological awareness and to compensate for stress of overcrowded and polluted cities. Cycling, windsurfing, and trekking are just a few examples.

REGULATIONS

Under the GSP (Generalised System of Preferences) scheme of the EC, imports of sporting goods from a number of developing countries are admitted duty free within an overall ceiling. The EC can reintroduce normal customs duties when the ceiling has been reached.

The new product liability laws increase the responsibility of the producers but also the importers who introduce products in the EC market. Products can be held to be faulty because

Figure 10: Toys and sports goods
Trade intensities



Source: DEBA

of design and construction faults, production or assembly faults, presentation (strongly tied in GATT policy, e.g. packaging or advertising producing over high expectations) and misleading or in adequate instructions. The manufacturer/importer must ensure that full advice is given to the consumer regarding 'expected reasonable use of the product' through instructions for use, labelling and appropriate safety warnings.

Other fields of importance for sporting goods are the harmonisation of standards (e.g. gymnastic equipment), intellectual property rights (e.g. product-patenting in order to protect R&D) and competition policy (e.g. co-operation agreements).

OUTLOOK

In the short-term, the economic recession will have an important negative effect on the demand for sporting goods, and consequently consumption of sporting goods will be stagnating.

On the other hand, development of demand is likely to benefit from technical developments and fashion trends. In the longer term however, the combination of these factors together with the economic recovery will result in an increasing demand for sporting goods.

The fierce competition from foreign suppliers makes that production and exports will not increase significantly. Moreover, manufacturers are opting more and more for outward processing, what might lead to a contraction of production in some Member States.

Table 7: Sporting goods
Expected real annual growth rates

(%)	1993-94	1993-97
Apparent consumption	2.0	5.0
Production	-2.0	3.0
Extra-EC exports	-1.0	4.0

Source: NEI

Generally, the successful firms will be those focusing on R&D, market monitoring and on pursuing a niche strategy. Furthermore, brand images will play an ever more important role.

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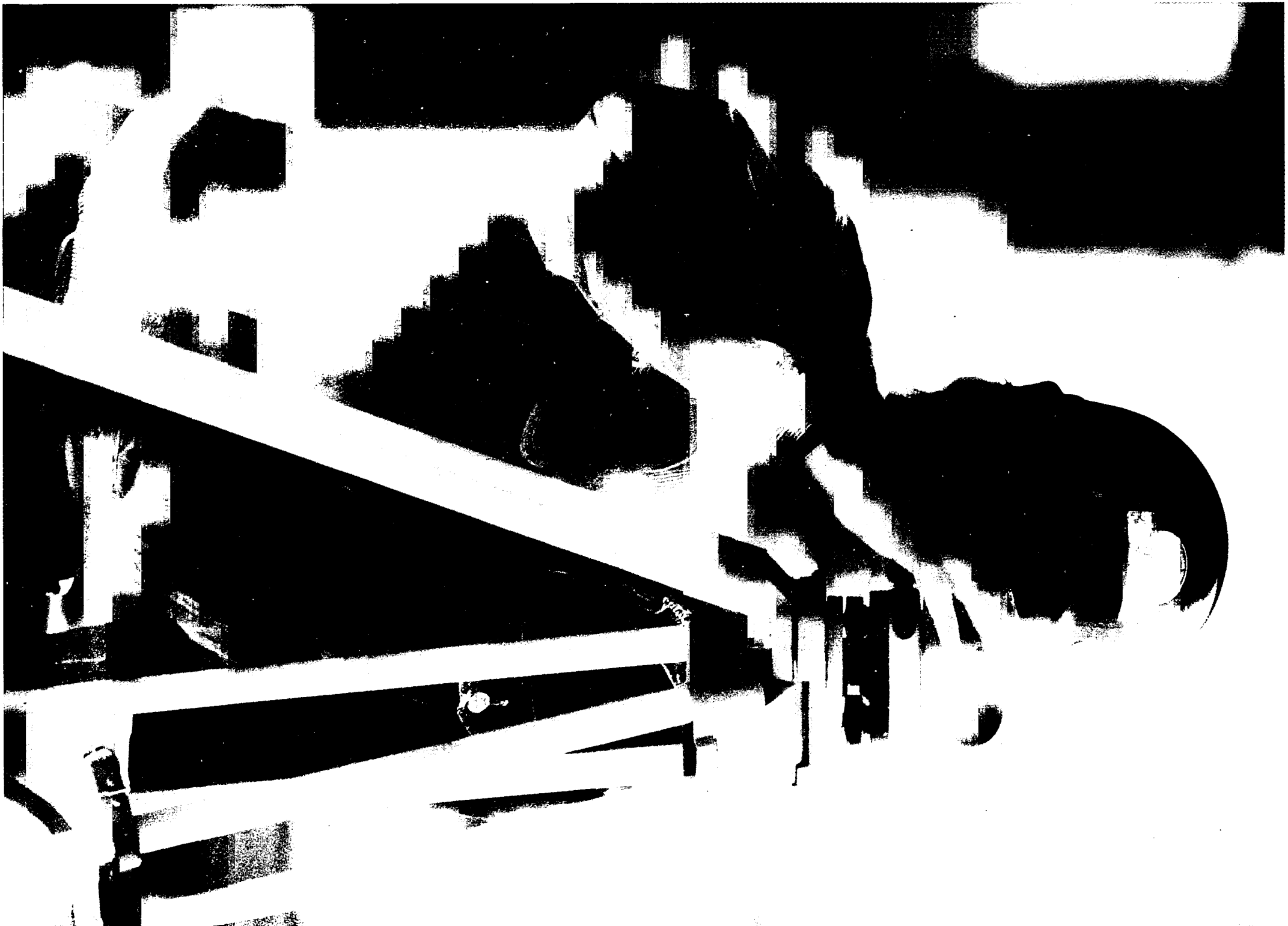


Overview
NACE 50

The gross output of the construction industry accounts for 10-12% of gross domestic product; value added is about half that. Construction also represents about 60 percent of gross fixed capital formation. The sector is a major employer, with around 9 million employed in contractors, and directly generates employment for 3 to 4 million in construction products. This is around 10% of civilian employment. It probably generates as much again in indirect employment.
Construction is mainly a local activity, with a few large firms, and little export activity. EC firms, however, are successful in world markets. Intra-EC cross-border activity is increasing on large projects, and there is extensive migrant labour.
Future markets are highly uncertain, because they depend on economic growth rates and the level of public expenditure. EC infrastructure needs are expected to boost demand. Privatisation is generally reducing the share of public sector financing, which is approximately half of total demand.
Technology and the use of materials is changing rapidly - research and development, training and quality management are key factors in the future development of the sector.

INDUSTRY PROFILE

Description of the sector

At the simplest level the construction sector has two main constituents: the constructors of works, and the suppliers and manufacturers of construction materials. These groups are not distinct, particularly because of the increasing role of specialist contractors who may both manufacture and install sub-assemblies (such as structural steelworks, curtain walling, air conditioning).

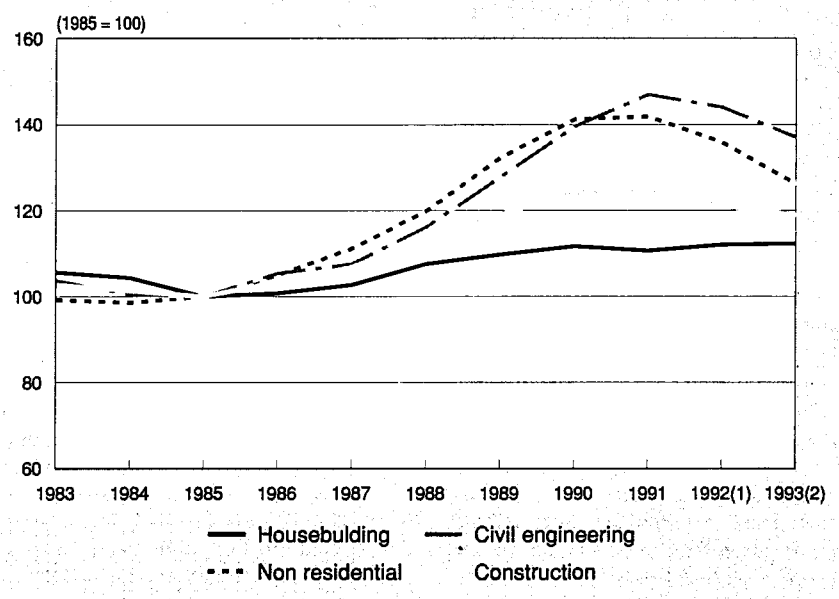
Additionally, although they are treated separately in this book (see chapter 24), architects are important players in the construction sector and, even though their economic significance is quite poor in the light of consolidated GNP, European architects as a whole have a powerful impact on the evolution of the building industry.

The classification of construction activities differs between countries. Most construction activity falls under NACE 500, but some activities by construction firms, such as construction of metallic structures (bridges, towers, industrial buildings), off-shore structures, construction of process industry and energy installations (e.g. steelworks, petrochemical plants, power stations, hydroelectric plants, pipelines) may be classified as metal products or non-electrical machinery. Suppliers and manufacturers of construction materials are mainly classified under NACE 24 (non-metallic minerals) NACE 31 (metal products), NACE 462 (semi-finished wood products) and NACE 47 (pulp, paper, printing and publishing).

Construction is traditionally divided by statistics and regulations into building (NACE 501) and civil engineering (travaux publics) (NACE 502). Some countries further subdivide building into structural works and finishing works. These distinctions are not clear-cut, however, and do not necessarily correspond to distinct types of firms. The main categories of construction firms include the following:

- general contractors (building and civil engineering);
- general building contractors;
- civil engineering (travaux publics) contractors;
- engineering construction contractors (e.g. process plant construction);
- specialist housebuilders;
- craftsmen, artisan firms and very small construction firms;
- specialist trade contractors frequently operating as subcontractors to general contractors.

Figure 1: Construction
Index of investment in construction in the EC



(1) Estimates
(2) Forecasts
Source : FIEC (12/93)

Table 1: Construction
Annual production growth in real terms by country

(%)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (2)
EC	-1.4	-1.5	3.4	3.3	6.0	5.3	4.2	0.4	-1.3	-3.4	-2.2
B	-6.1	-0.6	3.0	3.0	14.9	8.2	8.6	2.8	6.5	-4.9	-3.2
DK	7.1	6.7	16.5	1.9	-4.4	-6.1	-3.3	-8.3	0.0	-2.2	3.1
D (3)	0.6	-6.5	2.4	0.0	4.4	5.2	6.0	4.0	4.7	0.5	0.1
E	-5.5	0.5	5.0	7.0	10.0	13.0	9.0	4.0	-6.0	-5.8	0.0
F	-4.8	-0.1	2.4	3.6	5.8	4.2	2.5	1.3	-3.0	-3.6	-1.4
IRL	-9.0	-7.6	-5.3	-3.5	-4.3	7.4	17.2	-1.8	-1.7	-1.9	0.0
I	-0.8	-0.5	1.9	-0.7	2.3	3.6	3.5	1.4	-1.8	-10.0	-10.5
NL	3.9	1.6	5.1	1.8	10.4	2.9	0.6	-1.5	2.8	-2.9	-1.8
P	-9.3	-6.1	8.8	9.7	10.4	3.7	5.3	4.5	2.5	1.5	2.5
UK	3.3	1.1	3.3	7.9	7.2	4.3	0.8	-8.7	-5.3	-0.6	1.4
A	-3.9	1.6	2.6	3.3	2.5	0.7	4.8	7.5	4.5	1.0	1.0
SF	-3.0	1.5	-2.3	0.8	10.7	14.5	0.0	-13.3	-17.4	-18.5	-8.2
N	1.4	3.7	11.9	5.9	-0.8	-13.2	-10.1	-4.9	-1.2	-2.8	2.1
S	5.3	-0.9	2.8	5.2	3.8	6.6	2.1	-2.5	-6.0	-12.0	-12.0
CH	5.5	1.0	2.0	3.5	6.9	5.8	0.0	-5.6	-2.1	-1.3	-0.3

(1) Estimates.
(2) Forecast
(3) West Germany only
Source: FIEC (12/93)

Many large contractors are active in several or all of these activities and may have separate subsidiaries for each market segment. Specialist contractors have become increasingly important in the last couple of decades. These include, for example, electrical contractors, piling, tunnelling, flat roofing, heating and ventilating, drainage, and operators of specialist machinery.

The design and project management professionals (architects, engineers, surveyors) are an essential part of the construction sector, contributing 6-10% of construction output value. They are classified under 'professional services' (mainly NACE 837).

The construction sector is very fragmented. There are a number of factors that cause this, resulting from the diversity of technology, customers and market sectors.

Distinct technologies

Modern buildings and other constructed facilities make use of a multitude of specialised technologies which provide individual elements of these facilities. Many of these specialised technologies require the coordinated work of a long series of firms to transform basic raw materials into the elements of buildings and other constructed facilities. The need to repair, maintain and alter the existing built environment means that the industry needs to retain a competence in most of the technologies that were ever used in construction. Consequently, the construction industry's technologies range from traditional, labour intensive, site-based crafts to sophisticated industrialised technologies in, for example, the control systems in intelligent buildings.

Many construction firms specialise in one technology or in a small group of related technologies. Because the industry relies on one-off designs, each project brings many specialised firms together to form a unique project team. Therefore, in addition to individual specialised technologies, the industry uses general contractors, with or without independent design consultants to create an overall design and management framework for individual projects.

There are strong technology trends that are changing the character of construction. Computer-aided design (CAD) systems are gradually integrating traditionally fragmented processes. Prefabrication is moving work away from construction sites into factories. At present this is mainly 'light prefabrication' of sub-components such as building frame members and modules like toilet pods, but discredited large scale building systems may again become viable using CAD and flexible manufacturing technology. Electronic control and communication systems are providing a basis for intelligent buildings and infrastructures that are linking the industry's products with its processes in ways that were previously impossible. Environmental demands are calling into question many of the industry's established methods of manufacturing and constructing its products. For example, there are increasing demands that materials and components should be capable of being recycled.

Types of consumers

The sector is also fragmented because of the particular requirements of different types of customers.

- Most customers are small firms or individuals who have a problem that can be solved by simple construction work, e.g. repairs, maintenance or alterations. This creates an industry with many small firms serving local markets.
- A second category of customer (firms or public bodies) needs more substantial construction work but is not an expert in construction matters. They need professional advice that they can trust and they want to be involved in determining the design, the price and the schedule. They tend to use medium or large construction firms working with independent architects or consulting engineers.
- A third category of customer needs construction work and is experienced in employing an appropriate mix of consultants and contractors to provide what they want. They tend to determine contract conditions to suit their own ways of working and to buy specific services to suit the needs of individual projects. Included in this category are many clients in the public sector and utilities who are required by the Public Procurement Directives to organise competition among suppliers.

Table 2: Construction
Annual production growth in real terms by sector (1)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)	1994 (3)
Building	-1.0	-1.7	2.8	3.4	5.5	4.5	3.1	-0.7	-1.4	-2.9	-2.0
-Housebuilding	-1.3	-4.0	1.0	1.9	4.7	2.1	1.9	-0.9	1.4	-0.1	0.0
-New	-2.5	2.8	-1.9	-1.6	5.7	0.7	0.2	-2.8	1.8	-1.3	-1.7
-Rehabilitation and maintenance	2.4	16.3	6.1	6.4	2.7	3.0	2.7	0.9	1.5	1.3	1.8
-Non-residential	-0.6	1.6	4.8	5.8	7.8	10.3	6.0	0.0	-5.8	-7.3	-6.0
-Private	0.4	15.9	7.3	8.0	9.2	11.2	6.1	0.0	-7.2	-8.9	-8.0
-Public	-2.1	5.5	-0.3	-0.3	4.5	5.7	7.0	1.7	-0.1	-2.4	-0.7
Civil engineering	-3.0	-1.1	5.9	2.2	8.1	9.4	13.6	8.1	5.1	-8.1	-1.1
Construction	-1.4	-1.5	3.4	3.3	6.0	5.3	4.2	0.4	-1.3	-3.3	-1.6

(1) Excluding Greece and Luxembourg.
(2) Estimates.
(3) Forecast
Source: FIEC (12/93)

End-product sectors

Demand is differentiated also on the basis of the function of the end-product. Thus housing, general building, repairs and maintenance, civil engineering and heavy engineering all provide separate markets served, to some extent, by distinct sets of firms.

Recent trends

Construction activity in the EC countries fell an estimated 3.4% between 1992 and 1993 (Table 1), compared to a decrease of 1.3% between 1991 and 1992. Activity grew in Germany (0.5%) and Portugal (1.5%). The FIEC forecast for 1994 is -2.2% for EC countries. The decline in EFTA countries was even greater. The steepest decline in activity for the 1992-1993 period was observed in Finland (-18.5%) and Sweden (-12.0%).

Table 2 illustrates the growth in the various branches of the construction industry for EC countries. For the period 1991-1992, building output fell an estimated 3.4%, largely influenced by the collapse of non-residential private sector construction, which fell by 7.3% compared to 1992. This performance has cast a cloud over the hoped for revival in housebuilding and underlines the fragility of business and consumer confidence.

Civil engineering output grew rapidly from 1988 to 1991, but began falling in 1992 as budgetary pressures have forced cutbacks in public sector projects in most EC countries. Increased investment in infrastructure is now a priority for the EC.

International comparison

Table 3 compares the EC market with USA and Japan. These are presently the largest construction markets in the world, although construction growth may be more rapid in the future in China and later on in the former Soviet Union and central Europe. Construction output in Japan is of about the same value as the EC, but prices are generally believed to be higher than in the EC, suggesting lower physical volume of output. Deliberate government policy has pushed Japanese gross output steadily since 1985 from 15% to 19% of GDP and construction output per head of population, at around 4 500 ECU, is 2 times as high as the EC average.

There are more than ten Japanese construction companies with a substantial presence in Europe. Six key groups are present in the EC: Kajima, Obayashi, Shimizu, Taisai, Takenaka and Kumagai-Gumi. Japanese construction companies also compete with EC firms in areas including Africa, the Middle East and South East Asia where they have a strong presence. In Japan, they operate through a pyramid of subcontractors, specialists, suppliers and designers, in an industry which is dependent on an interlocking system of patronage and non-contractual relationships. Specialised construction contractors, which have to a great extent pioneered industrial manufacturing of products for construction, compete with these general construction companies, but the construction industry is characterised by complex inter-relationships between these actors.

The US market is also of similar size to that of the EC, but it has recently been overtaken in size by Japan. The US market has the benefit of a common language, currency, economic policy, culture and education system. It also benefits from significant economies of scale in the manufacture of materials and components, and common standards, although it is also true that regulations and market conditions differ in the 50 states, creating distinct local construction industries. US firms are particularly renowned for their construction management expertise. For the EC, the main competition comes from large specialist heavy engineering contractors, which are present in the EC as well as the Middle East, and in South East Asia.

Employment

Table 4 shows the total number of persons employed in construction, amounting to a little under 9 million in the EC, only slightly less than in 1983. Employment has naturally followed construction activity levels, which have been cyclical: it is too early to determine whether the decline in employment in 1992 and 1993 is the commencement of a downward trend in employment, but most countries in the EC and EFTA will register a fall in employment for the 1992-1993 period.

According to FIEC statistics on employment, which may not be very accurate, there are approximately 2.2 million self employed workers in construction in the EC (Table 6). It appears that the number of self employed persons, as a proportion of total employment is greater in 1993 (24%) than it was in 1983 (21%). The country with the largest number of self employed persons registered in the statistics is UK, with just under 600 000, (40% of total employment).

MARKET FORCES

Long term trends

Construction is a highly cyclical market. It suffers from the normal 4 to 5 year business cycle, but its own demand variability is greater than most sectors because private sector demand is dependent on investment by other sectors and it is highly sensitive to interest rates. In practice, prices are affected more than volume, because the construction permit system

acts as a rationing mechanism, and the long gestation time of most projects means that queuing and delays have the effect of smoothing output variation.

In addition to the short business cycle, there are long period fluctuations in demand which do have an obvious effect on output levels: these fluctuations are usually caused by wars and major political changes. In Europe's recent past there is a fairly clear long-cycle pattern. A peak of activity was reached in 1974, after which the oil crisis caused a slump in European construction (and a corresponding boom in OPEC countries) for a period of 10 years until about 1985. The recovery really began in 1987, coinciding with the period from the signing of the Single European Act and the accession of Spain and Portugal, and construction generally boomed until 1990/1. The downturn in 1991 is partly a cyclical reaction to the inflationary pressures of the boom, and to the stock of new empty properties. It also coincides with major structural change in world trade, caused by the end of the cold war, the break-up of CMEA (Comecon) and the collapse of the centrally planned economies. The downturn coincides with a general recession in EC economies.

The long term future is, as always in construction, uncertain. Within the EC, future growth will depend, amongst other things, on the success of EC policies to increase growth, employment and competitivity, on the speed of convergence towards monetary integration and the constraints that convergence imposes on public spending, and on the success of national governments in managing the economies in this period of transition. The greatest uncertainties arise from the influence of external factors on the EC economies. These could include, amongst other things, the economic and security situation in the former Soviet Union, consequent immigration from the east, the speed of recovery in central and eastern Europe, the success of GATT, and the effect on world trade of economic development in Japan (which is faltering) and South China (which is booming).

INDUSTRY STRUCTURE

Companies

The structure of the contractors' sector is similar in certain aspects in most countries. As a general rule, markets are strictly national, regional or local, with no truly European or multinational firms, although some of the major firms are now developing activities in several EC countries, and many have significant export activity. There is a small number (usually 5 to 10) of large firms in each country, a relatively less significant band of medium-sized firms, and then the mass of small firms which are either specialists or work in extremely local (travel-to-work) markets. Although each country has a number of well-known names, there are no dominant firms - the very largest have less than 5% of their home markets.

Some of the large firms are expanding by acquisition of medium-sized specialists or by taking interests in firms in other EC countries. Some medium- sized firms disappear either as a result of acquisition by larger firms (although the large firms are often a constellation of medium-sized firms which usually act independently) or by bankruptcy or break-up, in which case they may spawn a larger number of small specialist firms set up by individuals. The number of small firms and self-employed increased in the late 1980s, but fluctuates with the cycles, and has a high turn-over of entrants and wind-ups.

Small firms

In all countries of the EC the construction activities are dominated by a large number of SMEs, with a very long tail of very small businesses. The number of firms of contractors and employees in construction is shown in Table 6. The data also include some self-employed persons, but not all, depending upon whether these are considered to be one-person enterprises or casual employment. The table shows that 97% of enterprise units have less than 20 employees, and 93% less than 10.

These data do not present a full picture of the employment patterns, because it is difficult to record the true number of self-employed persons. Many workers in employment at any one time may in fact be temporarily employed for a short period or for the duration of a project, and then move on or become self-employed for a time, so that their employment pattern has the characteristics of self-employment. Conversely many people registered as self-employed may have long term employment relationships with a firm, but are registered as self-employed to take advantage of more favourable tax and social security terms. It is probable also that the number of self-employed varies with the business cycle. Workers made redundant in the recession phase may change to self-employment or set up a small firm to carry out repair and maintenance or short term contract work, and such enterprises may be wound up when employment conditions are better.

The statistics on the number of SMEs among contractors disguises the fact that there is a number of distinct types of small firms:

- small general contractors, in either building or civil engineering, working in a local market or a specific market sector. These are really medium-sized firms in the context of construction. They may have several or many contracts, and use a network of subcontractors and self-employed craftsmen. Such firms have a certain stability, but may be family firms which have a life limited by the active life of their managers;
- specialist trade contractors, mainly in the finishing trades but also in specialist structural work, such as roofers, piling contractors, glazing firms, painting contractors, who may operate over a wide geographical market. These if successful will grow and may become quite large, or be taken over by larger groups (and may or may not then continue to trade as independent companies);

Table 3: Construction
Construction markets in the EC, USA and Japan - 1992

	Size (ECU billion)	Average output/head (ECU)	% GDP	Recent trends
EC	520	1 600	10	declining, after 3% 1985-89
USA	510	2 000	11	-1% p.a. since 1986
Japan	520	4 200	18	Recent decline, +10% p.a. since 1985

Source: Atkins Management Consultants

Table 4: Construction
Total employment

(thousands)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)
EC (2)	9 114.7	8 741.6	8 507.2	8 476.8	8 596.6	8 895.6	9 179.0	9 352.4	9 333.3	9 066.4	8 755.5
B	212.0	198.0	197.0	198.0	198.0	208.0	219.0	229.0	235.0	237.0	233.0
DK	151.6	163.2	168.9	185.8	190.6	186.0	174.8	165.4	159.1	158.6	163.1
D (3)	2 018.0	1 984.0	1 886.0	1 812.0	1 739.0	1 843.0	1 849.0	1 913.0	1 984.0	2 012.0	2 022.0
E	936.5	818.3	776.0	831.3	925.9	1 020.3	1 133.8	1 220.4	1 273.5	1 196.3	1 112.3
F	1 712.6	1 604.0	1 579.4	1 577.2	1 587.8	1 612.3	1 649.5	1 662.2	1 651.3	1 606.9	1 606.9
IRL	85.6	82.6	75.3	72.2	71.1	69.9	70.2	75.8	78.0	78.0	78.0
I	1 778.5	1 675.0	1 651.5	1 632.2	1 615.0	1 610.0	1 598.3	1 633.5	1 673.8	1 688.4	1 553.0
NL	349.0	348.0	350.0	364.0	371.0	382.0	386.0	389.0	389.0	384.0	376.0
P	377.9	349.5	331.1	332.1	354.2	362.1	365.4	361.1	363.6	356.2	346.2
UK	1 493.0	1 519.0	1 492.0	1 472.0	1 544.0	1 602.0	1 733.0	1 703.0	1 526.0	1 349.0	1 265.0
A	130.0	127.0	128.0	124.0	124.0	122.0	124.0	130.0	134.0	136.0	134.0
SF	183.0	183.0	178.0	185.0	184.0	188.0	201.0	205.0	179.0	149.0	125.0
N	145.2	145.7	149.6	162.9	172.1	171.7	154.8	145.5	136.1	128.1	121.0
S	267.0	260.0	260.0	257.0	278.0	279.0	289.0	314.0	312.0	273.0	230.0
CH	157.6	161.7	161.7	157.5	167.6	175.8	170.8	166.4	158.0	143.2	133.6

(1) Estimate
(2) Excluding Greece and Luxembourg
(3) West Germany only
Source: FIEC (12/93)

- self-employed craftsmen who may be properly registered as small firms, and may work with family members or casual help;
- opportunistic start-ups by individuals, or partnerships, who are made redundant or seek more independence than working for a larger firm, or by craftsmen expanding their range of activities. In some countries these firms are strongly favoured by advantageous social security and other wage related costs for independent workers. Some of these may only last a short period, because they are unsuccessful, or because the owners voluntarily cease trading to go back into employment;
- one-off companies set up for tax or liability reasons by larger firms to develop a single project. There may be a very large number of these in existence which cease to have any life after the end of a project. These are not in any real sense SMEs yet may appear in statistics on the number of firms.

The fragmented nature of the industry is somewhat reduced by long-term networks of firms, or quasi-firms. This is a well developed feature in Japan, and quite significant in USA and EC. Many firms work with regular subcontractors. Some small firms collaborate to share common administration and sales services.

It is also increasingly common for major customers to develop groups of consultants, contractors and subcontractors that undertake all their work. The important point about these networks is that they provide a practical solution to the problems of small firms. The bigger central, paternal firm (either customer or contractor) ensures that the small firms with whom they work are reliable, efficient, up-to-date and innovative. Their reputations depend on this being so. Franchising is also relevant in this context, especially in repairs and maintenance. The parent franchising firm ensures the competence of the small firms who buy into the franchise.

Large contractors

The EC has some very successful big contractors. Table 8 shows Europe's top 20 in 1992. These are mainly based in the larger EC countries, France (8), the UK (6), and Germany (4). Other lists of top contractors in other publications show some differences. Nevertheless, despite contractors appearing in different positions in the various lists and some big contractors not appearing at all in some lists, the general picture is consistent. The EC has about 45 big contractors; that is firms with an annual turnover in excess of 1000 million ECU at 1992 prices. None of the big EC contractors has a turnover (which includes their payment to subcontractors - often 80 percent of their turnover) which reach 5% of their national market.

Many of the EC's biggest contractors are part of groups of companies that work in several industries of which construction is just one. In many cases these groups engage in work in several construction subsectors, e.g. manufacturing materials and components, providing various services (such as transport, water, waste treatment) and owning property-related businesses. This can make it difficult to determine the size of their construction business. This tends not to be the case in the USA and Japan, where contractors generally concentrate on direct construction work.

The EC does not have any contractors as big as the largest US and Japanese contractors, for example, Fluor Daniel (turnover 17 380 million ECU), Bechtel (14 900 million ECU) and Shimizu (25 535 million ECU). It is perhaps significant that all of the very big US contractors are super-specialists in engineering and infrastructure work and operate as turnkey contractors providing mainly the design, procurement, finance and project management services in-house (but with large number of contract staff not permanent employees). They subcontract nearly all site and manufacturing work. The EC general contractors, that is contractors engaged in both building and civil engineering site work, are bigger than their US equivalents. However, the biggest contractors of all are the Japanese, who also undertake a wide range of building and engineering work.

The EC needs some big contractors which are able to compete with the world's giants. It is expected that such firms will

Table 5: Construction
Employed workers

(thousands)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)
EC (2)	7 189.7	6 823.8	6 581.6	6 551.8	6 581.6	6 817.1	6 971.3	7 124.9	N/A	N/A	N/A
B	171.0	157.0	156.0	157.0	156.0	165.0	176.0	185.0	190.0	192.0	189.0
DK	119.3	132.3	138.9	155.4	159.7	155.8	146.1	138.7	132.5	131.4	135.9
D (3)	1 819.0	1 782.0	1 679.0	1 618.0	1 546.0	1 644.0	1 649.0	1 707.0	1 771.0	1 796.0	1 822.0
E	725.4	600.1	551.5	614.2	694.3	774.2	889.7	963.1	994.7	906.6	831.2
F	1 374.7	1 275.2	1 261.1	1 261.9	1 272.5	1 296.4	1 335.2	1 951.9	1 348.0	1 312.1	1 312.1
IRL	68.5	64.4	58.3	55.9	53.4	51.4	51.5	56.6	N/A	N/A	N/A
I	1 217.1	1 165.7	1 140.8	1 120.1	1 089.1	1 092.0	1 080.1	1 109.9	1 123.4	1 132.5	1 042.0
NL	306.0	306.0	308.0	322.0	328.0	338.0	342.0	344.0	344.0	339.0	331.0
P	304.7	286.1	266.0	262.3	280.6	291.3	290.7	283.7	277.0	262.0	250.0
UK	1 084.0	1 055.0	1 022.0	985.0	1 002.0	1 009.0	1 011.0	985.0	878.0	764.0	690.0
A	128.0	125.0	126.0	122.0	122.0	120.0	122.0	128.0	132.0	134.0	132.0
SF	163.0	163.0	159.0	164.0	159.0	160.0	169.0	171.0	149.0	121.0	99.0
N	116.0	117.2	120.4	132.2	142.1	142.8	128.7	122.6	115.4	108.5	102.5
S	237.0	230.0	232.0	232.0	233.0	234.0	242.0	266.0	266.0	225.0	180.0
CH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Estimates
(2) Excluding Greece and Luxembourg
(3) West Germany only
Source: FIEC (12/93)

play a leading role in shaping the industry and its public image, and in taking a lead in R&D. This will not however change the overall structure of the sector. It is necessary to keep an industry structure with a large number of small firms, because the supply offered by the construction industry must reflect the demand of the clients. Big contractors will never contribute more than a small share of total construction output, employment and value added (9% of employment for firms over 500 employees in 1988, see Table 7).

Within the EC it is increasingly common for several contractors to joint-venture in bids for major construction projects. For example, the construction and financing of the Channel Tunnel involves international cooperation between some 10 contractors and over 200 banks and other financial institutions. Many contractors believe that new opportunities are to be found through joint-ventures, strategic alliances, mergers, acquisitions and cooperation generally. There are several kinds of advantage from cooperating. It spreads risks, provides access to a range of technical knowledge and experience not possessed by any one contractor, may well provide access to a wide range of sources of finance, and increases the pool of labour that can be called upon.

Some contractors, in EC countries such as Germany, Spain and France, have formal links with industrial banks. This can provide important advantages in access to finance and allow contractors to take a long-term view in developing their business. (Conversely, the very large number of small and micro-firms, with very poor access to finance, hence relying largely on expensive trade credit, leads to instability and higher costs for very small firms.)

To some extent there appears to be a direct relationship between the size of the biggest contractors and the size of their home market. The Netherlands provides one exception within the EC. It has several big contractors. This may be a result of the industrial policy for construction pursued by the Dutch government. Generally, big contractors come from big countries and this suggests that as the single EC construction market becomes a reality, some of the big EC contractors will become bigger. Indeed this has already happened to a large extent, in anticipation of the completion of the single European Market. In the main, this growth in size has been achieved by international mergers and acquisitions. It is reported that there were 198 new intra-European mergers and acquisitions amongst contractors in 1991; the number fell to 86 in 1992. These are mainly acquisitions of shareholdings in other firms. There have been few outright takeovers or mergers. The countries most active in 1992 were France (17 acquisitions of foreign contractors), Germany (14) and the UK (9) (source: European International Contractors: "Mergers and Acquisitions in the European Community" September 1992).

REGIONAL PATTERNS OF DEVELOPMENT

The EC Structural Funds will be the main determinant of future regional patterns of growth and construction demand. Without such regional policy, however, it is likely that disparities would increase. As long as the Structural Funds increase, there should be rapid construction growth in the Objective 1 regions - but problems of absorption in Greece and the government deficit problem in Spain may restrict the growth in those countries for the next few years.

The total volume of financing from EC funds is very significant. For the 1994-1999 period 141 billion ECU are allocated to the Structural Funds, of which 96 billion ECU will go to Objective 1 less advantaged regions, mainly for infrastructure projects. The Edinburgh growth initiative provides a further 8 billion ECU. The Cohesion Fund agreed by Member States as part of the Maastricht Treaty has added a further facility. EIB loans within the EC, which are largely related to infrastructure, run at about 12 billion ECU/year. It can be assumed that around 100 billion ECU of EC funds will be available for infrastructure, or 20 billion ECU/year. If it is assumed that the average EC component more than 50% of total project funding, the EC funds will in effect influence about 40 billion ECU per year, or about 30% of the 125 billion ECU/year of civil engineering expenditure.

The European Commission's White Paper on Competitiveness, Employment and Growth emphasised the importance of infrastructure, and reaffirms Community priorities for trans-European networks and support for infrastructure investment. The allocation of funds to the Growth Initiative may be increased.

The changing pattern of regional growth is illustrated in Figure 1, based on analyses done by DATAR, the French regional development research agency. The main growth will be in

the Objective 1 regions; nevertheless, the absolute size of markets in Portugal, Greece, Ireland is tiny, and Spain is also relatively small. The main construction markets will continue to be in the backbone of Europe (the banana-shaped region from SE England, through western and southern Germany, to northern Italy) and the growing sunbelt region from the northern Adriatic along the Mediterranean France and Catalonia. There is some evidence of convergence of per capita incomes in the EC regions, but recent evidence shows that overall disparities have not changed much.

The current economic reform in Eastern Europe, accompanied by developments towards stable democracy, with increasing levels of aid to that region and the prospect that the Czech and Slovak republics, Hungary and Poland will join the EC in future, are raising the needs for infrastructure in those countries and transport links to them. This is pulling the focus of development towards them. In the short term the collapse of markets in the emerging democracies of east and central Europe has led to a collapse in construction. In the medium to long term, their reform programmes, and the prospect of their accession to the EC, will increasingly divert investment in industry and infrastructure away from the developing regions of the EC12. Their eventual accession would also divert Structural Funds to them. These countries have a large capacity for construction, with ample experience in managing large projects, but their technology is often outdated and the work practices of their labour force are unproductive. In the short to medium term, therefore, their integration into the western economy would tend to depress western European construction markets and increase competitive pressures in the construction sector; in the longer term they will be a large market for the better western firms who can compete on quality or technology, but also powerful new competitors in low-cost building and basic infrastructure.

The possibility of accession of Austria, Sweden, Norway and Finland to the EC, which is possible in 1995, would bring in countries which under existing rules would make a net contribution to EC funds and hence help increase regional development. These countries, however, have construction markets which have been in decline for several years, and they have powerful contractors who are strong competitors for the existing EC industry.

The regional development and cohesion effects of the Maastricht process have a strong positive impact on construction needs, but monetary integration if followed according to the Maastricht programme is likely to constrain the level of construction demand. The convergence process, by which Member States must achieve budgetary deficits, debt and inflation levels within strict limits, will restrict the ability of states to increase public spending. These restrictions are most likely to affect public building and infrastructure programmes. It may also restrict the freedom of governments to carry out an economic recovery policy, since social security payments are higher in the recession and this tends to squeeze infrastructure spending. The White Paper on "Growth, Competitiveness, Employment" sets out policies to try to remove these constraints, including principally the introduction of private capital in public-private partnerships.

ENVIRONMENT

Construction is the industry of the built environment. Environment is one of the handful of major global issues for the next few decades. The construction sector has enormous challenges and market opportunities, as well as new constraints and costs. The industry is developing new services and products to take advantage of the opportunities, and promote its image for positive contributions to the environment. The built environment is to a large extent synonymous with our cultural heritage. It is difficult to exaggerate the importance of this heritage, and conservation is a major task for the construction industry. It is also worth emphasising the importance of local building practice in creating the diversity which is such an attractive feature of Europe's towns and villages. Small firms of designers and craftsmen continue to have a valuable role in maintaining this cultural dimension.

About half of Europe's energy consumption is related to buildings. Energy conservation remains a priority issue. The designers and contractors will respond to the need for more energy efficient buildings, including the use of passive thermal principles. The existing stock of buildings has potential for refurbishment to conserve energy. There is also likely to be increased use of less energy-intensive materials. These changes will be accelerated if energy prices rise through a carbon tax or other macro-economic energy conservation measures.

Table 6: Construction
Self-employed workers

(thousands)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)
EC (2)	1 925.0	1 917.8	1 925.6	1 925.0	2 015.0	2 078.5	2 207.7	2 227.5	N/A	N/A	N/A
B	41.0	41.0	41.0	41.0	42.0	43.0	43.0	44.0	45.0	45.0	44.0
DK	32.3	30.9	30.0	30.4	30.9	30.2	28.7	26.7	26.6	27.2	27.2
D (3)	199.0	202.0	207.0	194.0	193.0	199.0	200.0	206.0	213.0	216.0	200.0
E	211.1	218.2	224.5	217.1	231.6	246.1	244.1	257.3	278.8	289.7	281.1
F	337.9	328.8	318.3	315.3	315.3	315.9	314.3	310.3	303.3	294.8	294.8
IRL	17.1	18.2	17.0	16.3	17.7	18.5	18.7	19.2	N/A	N/A	N/A
I	561.4	509.3	510.7	512.1	525.9	518.0	518.2	523.6	550.4	555.9	511.0
NL	43.0	42.0	42.0	42.0	43.0	44.0	44.0	45.0	45.0	45.0	45.0
P	73.2	63.4	65.1	69.8	73.6	70.8	74.7	77.4	86.6	94.2	96.2
UK	409.0	464.0	470.0	487.0	542.0	593.0	722.0	718.0	648.0	585.0	575.0
A	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SF	20.0	20.0	19.0	21.0	25.0	28.0	32.0	34.0	30.0	28.0	26.0
N	29.2	28.5	29.2	30.7	30.0	28.9	26.1	22.9	20.7	19.6	18.5
S	30.0	30.0	28.0	25.0	45.0	45.0	47.0	48.0	46.0	48.0	50.0
CH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Estimates
(2) Excluding Greece and Luxembourg
(3) West Germany only
Source: FIEC (12/93)

Table 7: Construction
Employment and number of construction enterprises in the EC, 1988

Size of firm	Number of firms	% of firms	Employees	% of employees	% of total turnover
0-9	1 700 797	92.8	3 512 969	43.3	36.1
10-19	76 618	4.2	1 025 263	12.7	12.4
20-99	48 695	2.7	1 820 354	22.5	24.7
100-199	3 543	0.2	492 320	6.1	7.2
200-499	1 585	0.1	483 257	6.0	7.5
500+	585	0.0 (1)	761 345	9.4	12.1
All firms	1 831 822	100.0	8 095 509	100.0	100.0

(1) 0.03
Source: Eurostat Enterprises in Europe, 1992

In some parts of the EC there is growing concern over the availability of natural resources for construction, and the consequences of meeting future demand. This focuses attention on effective use of materials, and recycling. Waste management and the recycling of construction materials need more research and development. There will need to be changes in site practice, and in design principles in order to minimise the use of materials which are damaging or are not recyclable, and to design for ultimate demolition.

The internal environment of buildings is an emerging area of concern, which requires more research and the development of standards related to air quality, microbiology of buildings, allergenic and toxic effects of materials, and emissions from land and buildings.

Energy- and eco-labelling of buildings and products is beginning to be promoted and will create a market mechanism favouring these changes. The analysis of the environmental impact of specific projects is also increasing through development of techniques and enforcement of impact assessment requirements.

REGULATIONS

The special characteristics of the construction industry have frequently been quoted by the industry itself. They mean that in many respects the construction sector is subject to different policy and legislative treatment from other sectors of the economy. In particular, market forces do not always operate in the public interest, there are many "external" effects, and long term benefits can be pre-empted by short-term decision making. All countries therefore regulate construction and government intervenes directly in a variety of ways. These include land use plans and planning controls (which affect land prices), building regulations and standards, planning permits, building inspection, registration of contractors and professions, regulated fee rates, and so on. Governments also directly control a large share of construction work, and provide research, training and information services.

Construction takes place on temporary work sites, out of doors, subject to bad weather, and can be hazardous. Labour is very mobile, and there is a high proportion of self-employment and casual work. Labour and employment legislation and regulation is therefore very important to the industry. Health and safety legislation is also very important.

Some of the major changes in EC legislation and regulations affecting the industry are:

- Public procurement directives. The Works Directive set out procedures for procurement of construction works for projects over ECU 5 million, requiring advertising of calls for tender, use of specified selection procedures, and the use of European Technical Standards. This has some effect on increasing international bidding for large contracts, particularly for very large public works projects. It also increases competition generally even in local markets, and is having an impact on many of the restrictive practices formerly used by some sectors. The Utilities Directive has brought international competition to procurement in many sectors which were previously excluded from public-purchasing rules and which tended to be reserved for national or local contractors: including water, electricity and gas, railways, airports and airlines, telecommunications.
- Construction products directive. Interpretive documents enabling the Construction Products Directive to be implemented were adopted at the end of 1993, and CEN and CENELEC (the European Standards bodies) are drawing up, under Commission mandate, new harmonised European Standards for construction products, and new procedures for technical approval of innovative products.
- Liability and guarantees. There have been changes in the legislation on liability and insurance requirements in some countries over the past decade. In the last two years committees representing various segments of the construction sector have been discussing proposals for possible harmonisation of liability law and arrangements for guarantees and insurance.
- Health and safety. A variety of health and safety measures affect the construction sector. The Temporary and Mobile Construction Sites Directive, which is being implemented, defines new responsibilities for the lead designer and the lead contractor and require a safety plan to be produced for each construction site.
- Posted workers. A proposed directive will require all workers to be employed under the labour legislation and collective agreement terms of the host country. This will have an important impact on the construction sector, which, in some EC countries, uses a lot of immigrant labour.
- Qualification. Proposals are being studied for classification of construction firms, specifically to serve as a prequalification procedure for public procurement, but it would also if adopted have an important impact on quality assurance systems and marketing by contractors, and on selection procedures by private sector clients.

OUTLOOK

Because construction is closely linked to investment, the future demand depends critically upon the success of the European Union in stimulating economic growth. European integration and socio-economic changes are generating increasing needs, but demand is constrained by public expenditure constraints and the financial capacity of the private sector and households.

There has been a fear in some countries that there might be a long-term, or a once-and-for-all drop in construction demand

as population stabilises or declines, and as major infrastructure and housing needs are satisfied. The EC's construction sector strategy study argues against that view. Social and economic changes will generate increasing construction needs and the problem will be to satisfy these needs. The share of GDP for construction needs to increase, but this will be difficult to achieve, because it implies increasing macro-economic savings rates, at the same time as public expenditure is constrained by tax and public deficit restrictions and more expenditure is needed to meet the needs of an ageing population and long-term structural unemployment.

Overall, there are enormous needs for infrastructure investment in Europe, and in most areas there is a problem of housing quality or housing stock. These must be growth areas. Commercial property needs are weaker. The needs of these sectors are dealt with in the chapters on Building and Civil Engineering.

Demand scenarios

The strategic study of the construction sector carried out for the European Commission in 1992/93 suggested three future scenarios:

- An attainable, but optimistic, high growth scenario, with successful improvements in construction performance, shows construction output doubling by the year 2005, and employment rising rapidly at first and then more steadily, to create 5 million new jobs in construction and 15 million throughout the economies of the EC by the year 2000. This scenario promises continual improvements in housing and cities, and the infrastructure to enable Europe's industry to restructure and become increasingly competitive.
- A more conservative scenario, with GDP growth and construction's share of GDP returning to historic levels of the 1980s, shows a return after about 4 years' growth to the output levels attained in the boom of 1990/1, and then steady growth in construction output, averaging 3% per year. This creates 2 million jobs in construction by 2000 and 6 million in total throughout the EC, reversing the decline in employment which took place over the 1980s.
- In a pessimistic scenario, with low growth and a low share of construction, and also low innovation and low productivity growth, the construction output continues to fall for several years, and then grows slowly, but never returning to the levels of 1992, let alone the boom levels of 1990/1. A further 2 million construction workers and 6 million total workers become unemployed, despite continuing labour intensive technology. In this scenario, the living and working environment will deteriorate, and European industry will become increasingly uncompetitive, and the standards of construction are likely to decline.

One of the sector's greatest concerns is the volatility of construction demand. This is of particular concern at present when most countries are in recession after a very rapid construction boom. The volatility is most apparent in prices, since output is smoothed by the effect of lengthening and shortening planning and construction periods. Profitability is therefore very volatile and this severely inhibits long term planning and investment in training, research and capital equipment.

Changes in industrial structures over recent decades, particularly the decline of steel, shipbuilding and coal mining, have led to new construction demand as a result of migration to new growth areas and rise in service industries, and at the same time a severe need (unsatisfied) for urban regeneration in the declining regions. Such changes will continue to occur.

Table 8: Construction
Europe's top 20 construction firms, 1992

Contractor	Country of origin	Turnover (1) (million ECU)
SGE (Générale des Eaux)	F	9 158
Philipp Holzmann	D	6 488
Eiffage	F	6 173
Trafalgar House	UK	5 428
BICC	UK	5 286
Iritecna (IRI)	I	4 644
Skanska	S	4 800
GTM-Entrepose	F	4 232
Tarmac	UK	4 097
Hochtief	D	3 978
Spie Batignolles (Schneider)	F	3 731
Bilfinger & Berger	D	3 170
FCC	E	2 975
Amec	UK	2 884
Dragados Y Construcciones	E	2 876
NCC (Nordstjernan)	S	2 731
Dumez	F	2 666
Cegelec (Alcatel Alsthom)	F	2 540
Strabag	D	2 344
Bouygues	F	2 325

(1) Turnover figures include non-contractor activities.
Source: Le Moniteur, Special Mille Entreprises - December 1993.

Possible future declining industries could include automotive and European currency dealing. In future, however, the more sophisticated regional policies of the EC (and free market industrial policies) now in place will permit more rapid and efficient responses to such changes than occurred over the past few decades, and will convert construction needs into construction demand more efficiently.

There is continuous rationalisation of industries leading to plant closures, re-investment and relocation, which will be accelerated by EC integration. The EC is also becoming a more attractive target for inward investment by global, particularly Japanese, firms. These changes in the economic structure and consequent migration stimulate new construction needs. The growth of new industries will generate these needs - IT industries and leisure and tourism have been major sources in the recent past. There will be other growth industries in future, not all of which can be predicted now.

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Building
NACE 501

The building sector is particularly influenced by the overall economic situation, by both current trends in economic activity and expectations of future trends. Government policies, directly in terms of economic policy, credit and fiscal policies, and indirectly in terms of regulations, play an important role. Competition has increased markedly in both housing and non-residential building; a fall in prices and the level of demand has been followed in some countries by a reduction in capacity. This chapter focuses on the building sector; factors affecting building are discussed in more detail in the previous chapter entitled construction.

INDUSTRY PROFILE

Description of the sector

There are two key sectors in building: housebuilding (residential) and general building (non-residential).

Housebuilding is a critical sector, with increased political recognition, as there are large housing shortages in some EC countries. These relate especially to social housing and affordable housing in urban areas. Immigration is also likely to be a source of increased demand for housing. Generally housing is expected to be a growth market in most regions of Europe.

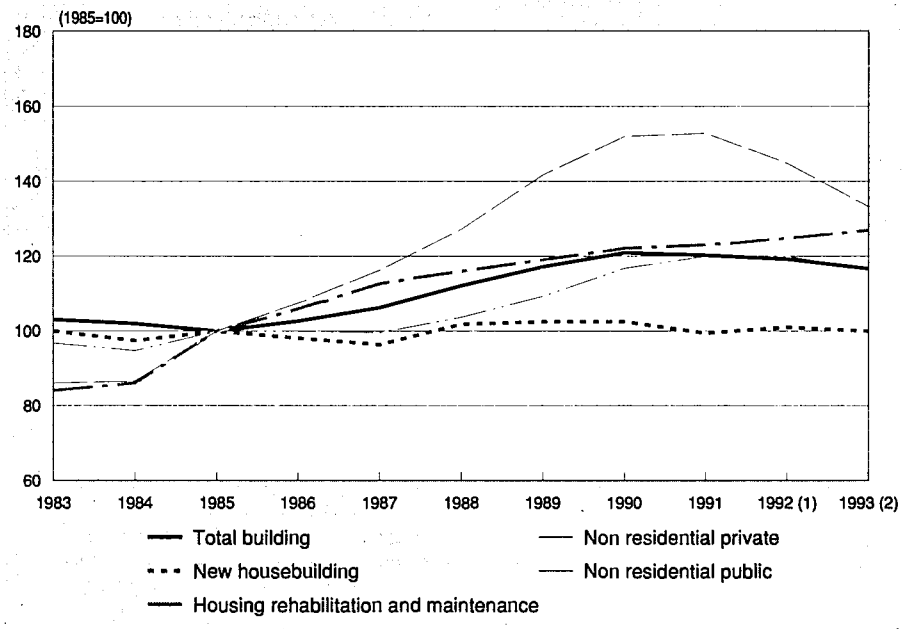
Statistics show a small excess of dwellings over households in almost all countries, but there are large numbers of households with poor housing conditions and there is a continuing concern in most countries about a housing problem. Because people's housing expectations rise in line with their ability to pay, it is to be expected that there will always be a proportion whose needs are not met. Because of population movements (inner city to commuter belt in richer areas; deindustrialising north to high-tech south in UK and France) the housing stock is not in the right place. The number of households is increasing as household size gets smaller. Large numbers of rural and inner city dwellings in the less advantaged regions are substandard. Many older houses everywhere need modernising and improvement in energy efficiency. There is a particular need perceived in most countries for affordable housing of an adequate modern standard.

The housebuilding industry is well able to respond to effective demand but it is particularly affected by variable and unpredictable demand. In the owner-occupier market, the main problem facing contractors is that potential buyers often find that because of government economic policy, the cost or availability of finance is variable.

There are significant differences in the proportion of owner-occupiers in different countries within the EC. For example, in the UK over 60% of the population have become owner-occupiers, while the proportion in Germany is much lower at about 40%. Some commentators believe that differences in the standards and cost of the houses in the two countries, low in the UK and high in Germany, account for the differences in home ownership. It is likely that relatively high inflation in UK house prices, the availability of 100% mortgages, and relatively low costs of buying and selling houses (typical costs in the UK are 4.5% of the selling price, while in Germany they are around 12%) are at least equally important factors. German costs are not the highest in the EC; in France, Italy and Belgium, estate agents, lawyers and government between them take 16-22% of a house's value when it changes hands. This is a severe handicap for the house building industry.

General building (non residential) involves a variety of commercial, industrial and social building, including very large developments. Falling commercial and industrial property prices characterise trends in this sector. In some sub-sectors of building, such as schools and hospitals as well as social housing, the influence of public expenditure constraints is significant. In most cities, there is now a surplus of office

Figure 1: Building Investment in the EC



(1) Estimates
(2) Forecasts
Source : FIEC (06/93)

Table 1: Building
Annual production growth in real terms by country

(%)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (2)
EC (3)	-1.0	-1.7	2.8	3.4	5.5	4.5	3.1	-0.7	-1.4	-2.9	-2.0
B	-3.7	2.7	4.6	5.5	17.5	11.8	9.4	1.6	5.9	-6.0	-4.2
DK	14.4	6.8	17.1	3.9	-5.8	-9.9	-6.6	-7.9	-2.1	-4.6	6.2
D (4)	0.1	-7.5	1.9	0.2	4.5	5.6	6.7	4.5	4.8	0.9	0.5
E	-5.0	1.0	6.0	8.0	6.8	9.0	5.9	1.2	-3.4	-4.7	-1.3
F	-3.8	-1.2	0.8	2.5	4.7	3.5	2.5	0.4	-2.4	-4.5	-2.5
IRL	-12.3	-6.4	-5.1	-1.1	-4.9	9.8	10.8	-3.3	-3.2	-11.7	0.0
I	-1.0	-0.8	0.6	-1.3	3.2	3.5	3.6	2.3	-1.0	-8.6	-9.6
NL	4.2	1.5	5.6	3.1	10.8	3.6	-0.1	-1.3	2.4	-4.0	-3.3
P	-11.1	-5.8	9.2	10.7	8.4	0.7	3.4	0.1	1.6	0.3	1.4
UK	4.2	1.8	3.3	8.7	7.4	3.6	-1.8	-11.5	-10.4	2.5	1.9
A	-4.6	-1.5	6.1	4.5	7.8	-0.5	5.2	10.1	9.9	0.6	0.4
SF	-3.7	0.0	-3.9	2.0	12.9	16.7	-0.8	-15.2	-20.5	-20.2	-7.0
N	1.4	6.5	15.3	3.2	-0.9	-13.4	-13.0	-7.2	-2.9	-2.6	1.0
S	5.1	1.4	3.6	7.0	5.1	6.5	1.0	-2.2	-7.3	-15.7	-13.0
CH	6.9	2.1	2.6	3.5	7.2	6.9	-0.2	-7.7	-3.7	-2.0	-0.7

(1) Estimates.
(2) Forecast
(3) Excluding Greece and Luxembourg.
(4) West Germany only
Source: FIEC (12/93)

Table 2: Non-residential building
Annual production growth in real terms by country

(%)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (2)
EC (3)	-0.6	1.6	4.8	5.8	7.8	10.3	6.0	0.0	-5.8	-7.3	-6.0
B	-4.6	0.9	6.2	5.9	12.5	6.7	8.3	3.5	0.2	-7.7	-3.5
DK	17.4	25.2	17.0	14.1	-6.6	-15.3	-6.4	-6.6	-4.4	-10.3	3.0
D (4)	-0.9	-2.3	5.6	2.3	4.6	5.9	4.5	4.0	2.7	-3.3	-3.0
E	-4.0	1.0	6.0	9.0	9.3	15.6	10.0	5.0	-5.0	-10.0	-5.0
F	-3.4	1.0	4.7	7.2	9.9	7.0	6.3	3.0	-3.8	-11.4	-13.1
IRL	-20.1	-12.5	-11.6	4.9	3.6	7.0	38.1	-6.3	-12.4	-14.1	0.0
I	-2.0	2.9	5.4	0.5	6.2	5.2	4.9	1.1	-3.4	-13.8	-12.2
NL (5)	3.9	2.9	7.3	4.3	11.2	7.0	3.0	4.6	0.3	-6.5	-5.1
P	-17.7	-4.3	17.0	13.9	12.1	8.1	8.0	1.7	2.4	0.0	1.2
UK	7.7	4.7	1.3	9.2	8.1	20.0	5.4	-8.4	-18.5	-1.5	-1.4
A	-2.5	0.8	7.7	6.3	7.5	-0.1	6.4	14.2	4.9	-2.8	-2.1
SF	-9.5	2.6	0.0	2.6	10.0	13.6	2.0	-11.8	-24.4	-29.4	-12.5
N	1.2	14.3	22.2	2.2	2.7	-16.8	-16.0	-2.8	0.4	-1.1	2.4
S	4.2	1.8	9.6	4.4	-0.5	7.5	-5.3	-9.6	-14.0	-10.0	-3.0
CH	7.1	3.8	7.7	4.8	10.5	9.3	4.7	-5.1	-3.7	-3.5	-2.5

(1) Estimate
(2) Forecast
(3) Excluding Greece and Luxembourg.
(4) West Germany only
(5) Rehabilitation and maintenance included
Source: FIEC (12/93)

Table 3: Non-residential private building
Annual production growth in real terms by country

(%)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (2)
EC (3)	0.4	15.9	7.3	8.0	9.2	11.2	6.1	0.5	-7.2	-8.9	-8.0
B	1.9	8.1	12.4	10.7	18.4	11.1	7.3	0.3	-1.2	-10.0	-5.0
DK	33.6	27.6	28.9	17.8	-11.6	-14.8	-6.8	-8.9	-9.1	-13.6	-6.3
D (4)	0.0	-2.4	5.4	2.8	5.3	7.5	6.3	5.9	3.6	-3.0	-3.0
E	N/A	N/A	5.0	14.7	11.7	12.0	6.0	5.0	-5.0	-11.0	-6.8
F	-4.0	0.1	5.0	8.7	13.0	9.0	7.6	3.9	-6.1	-14.3	-18.0
IRL	-31.2	-24.9	-22.2	14.8	21.1	22.9	59.9	-6.3	-24.0	-27.5	0.0
I	-2.9	8.3	13.0	1.6	3.8	5.5	5.6	2.6	-2.5	-12.4	-11.0
NL (5)	8.5	6.5	11.2	3.9	8.8	6.7	2.7	5.0	1.1	-8.1	-7.3
P	-12.8	-2.5	12.0	12.4	11.6	6.1	7.3	0.3	2.0	-2.1	0.5
UK	10.6	10.3	5.0	15.0	11.2	21.0	4.5	-11.5	-24.4	-4.7	-3.7
A	-5.4	8.0	12.5	12.7	12.6	1.9	6.8	13.3	7.9	-3.4	-2.9
SF	-9.1	0.0	0.0	3.3	6.5	21.2	5.0	-16.7	-25.7	-34.6	-5.9
N	10.3	30.7	28.0	-7.3	-1.7	-22.1	-21.4	-12.5	-2.1	4.2	4.1
S	12.2	7.4	20.0	10.1	-2.4	7.0	-6.6	-17.8	-16.0	-15.0	-1.0
CH	8.0	8.6	8.4	6.8	12.7	10.3	4.8	-9.3	-7.9	-7.0	-4.0

(1) Estimate
(2) Forecast
(3) Excluding Greece and Luxembourg.
(4) West Germany only
(5) Rehabilitation and maintenance included
Source: FIEC (12/93)

Table 4: Non-residential public building
Annual production growth in real terms by country

(%)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (2)
EC (3)	-2.1	5.5	-0.3	-0.3	4.5	5.7	7.0	1.7	-0.1	-2.4	-0.7
B	-14.5	-12.1	-7.5	-6.9	-6.4	-11.0	13.4	19.0	5.8	0.8	1.8
DK	2.9	11.4	-6.3	4.0	7.9	-16.6	-5.3	-0.7	6.5	-3.6	19.4
D (4)	-3.2	-2.2	6.0	0.8	2.4	1.4	-1.3	-2.4	-0.4	-4.5	-3.0
E	N/A	N/A	9.0	-10.0	0.0	28.0	30.0	6.0	-5.0	-8.0	1.0
F	-2.0	3.0	4.0	3.9	3.0	2.0	3.0	0.4	3.0	-4.0	-2.0
IRL	-9.9	-2.4	-6.8	-1.2	-16.7	-14.7	16.7	-11.6	15.8	6.6	0.0
I	-0.1	-8.4	-13.6	-3.4	14.6	4.2	2.4	-3.5	-6.5	-18.6	-17.0
NL (5)	-4.7	-4.8	-2.2	5.3	20.7	8.1	4.2	3.2	-2.9	-0.4	3.0
P	-25.4	-7.3	26.3	16.6	12.8	11.2	9.0	3.9	3.0	3.1	2.1
UK	3.4	-4.2	-5.5	-2.5	0.8	5.3	9.2	4.5	2.3	6.7	4.1
A	2.5	-10.3	-1.4	-7.3	-6.0	-6.1	5.1	17.4	-4.4	-0.5	1.0
SF	-11.1	12.5	0.0	0.0	22.2	-9.1	-10.0	11.1	-20.0	-12.5	-28.6
N	-9.1	-8.3	10.7	23.9	10.1	-9.0	-9.1	7.8	2.7	-5.5	0.8
S	-4.4	-5.3	-5.2	-6.0	3.5	8.4	-2.2	7.9	-6.0	-5.0	-5.0
CH	3.0	-3.4	6.3	1.3	6.4	7.2	4.5	3.3	3.8	2.0	-0.5

(1) Estimate
(2) Forecast
(3) Excluding Greece and Luxembourg.
(4) West Germany only
(5) Rehabilitation and maintenance included
Source: FIEC (12/93)

Table 5: Housebuilding
Annual production growth in real terms by country

(%)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (2)
EC (3)	-1.3	-4.0	1.0	1.9	4.7	2.1	1.9	-0.9	1.4	-0.1	0.0
B	-2.4	5.3	2.2	4.8	24.9	18.6	10.8	-0.6	13.1	-4.0	-5.0
DK	15.5	-1.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D (4)	0.8	-10.9	-0.7	-1.3	4.5	5.4	8.5	4.9	6.4	4.0	3.0
E	-6.0	1.0	5.0	7.0	5.4	5.0	2.8	-1.6	-2.0	-1.2	1.0
F	-4.5	-2.2	-0.9	1.1	3.5	2.3	0.6	-1.3	-3.2	-2.8	0.7
IRL	-4.9	-1.5	-0.6	-4.8	-10.8	12.0	5.8	-0.4	5.5	-3.7	0.0
I	-0.5	-2.8	-2.1	-2.4	1.3	2.4	2.8	3.1	0.6	-5.3	-8.0
NL	4.4	0.4	4.2	2.1	10.5	0.7	-2.9	-7.0	4.7	-1.5	-1.5
P	-7.9	-6.4	5.7	9.1	8.5	-3.3	0.6	-1.0	1.0	0.5	1.5
UK	0.8	-1.2	5.6	8.1	6.7	-5.9	-8.7	-15.0	-0.7	6.4	4.8
A	-7.1	-4.3	4.1	2.0	8.2	-1.1	3.4	4.0	17.7	5.4	3.7
SF	-1.9	-3.8	-7.8	2.1	14.6	20.0	-4.5	-17.5	-19.2	-16.7	-5.7
N	1.0	2.6	12.7	3.0	-4.3	-14.8	-14.8	-15.3	-8.6	-6.5	-1.0
S	5.7	1.1	-0.3	8.9	9.0	5.8	6.0	4.1	-9.0	-29.0	-16.0
CH	9.8	0.6	-1.7	2.3	4.1	4.3	-5.6	-10.6	-3.8	0.0	2.0

(1) Estimate
(2) Forecast
(3) Excluding Greece and Luxembourg
(4) West Germany only
Source: FIEC (12/93)

Table 6: New housebuilding
Annual production growth in real terms by country

(%)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (2)
EC (3)	-2.5	2.8	-1.9	-1.6	5.7	0.7	0.2	-2.8	1.8	-1.3	-1.7
B	-1.4	5.2	3.7	2.9	29.2	21.0	11.1	-0.9	13.6	-4.2	-5.2
DK	21.0	-2.2	23.6	-3.2	-9.3	-9.5	-9.7	-14.5	-5.9	-5.2	7.4
D (4)	0.1	-20.3	-10.4	-8.8	4.5	6.5	11.6	6.1	8.1	6.0	3.2
E	N/A	N/A	4.5	4.5	5.0	4.8	1.0	-7.0	-7.0	-5.0	-2.0
F	-9.2	-7.3	-3.1	1.7	5.1	3.0	-1.8	-4.2	-7.0	-7.4	-2.0
IRL	-6.4	-4.8	-15.8	-15.9	-4.1	26.5	6.2	1.6	7.5	-4.7	0.0
I	-1.5	-3.7	-5.7	-9.3	4.2	3.3	4.0	1.5	0.6	-8.8	-12.3
NL	3.1	-10.9	7.7	1.8	13.3	-1.9	-3.3	-11.6	5.3	0.7	1.0
P	-7.9	-6.6	4.2	10.2	6.0	-4.8	0.1	-2.0	0.8	0.3	1.3
UK	-4.5	-7.3	7.2	10.4	8.2	-16.8	-19.7	-16.8	12.4	13.5	6.3
A	-10.0	-3.7	2.4	3.2	9.0	-2.1	-0.5	6.6	16.0	6.7	4.9
SF	-2.5	-5.1	-10.8	0.0	18.2	25.6	-6.1	-23.9	-25.7	-23.1	-10.0
N	-1.1	2.7	12.2	3.7	-4.5	-16.4	-16.0	-23.6	-12.6	-10.1	-1.8
S	-13.1	-11.2	-11.7	25.2	40.3	20.3	13.4	5.1	-18.0	-40.0	-50.0
CH	9.2	-0.6	-3.4	1.1	2.7	3.6	-6.5	-13.0	-4.3	-1.0	N/A

(1) Estimate
(2) Forecast
(3) Excluding Greece and Luxembourg
(4) West Germany only
Source: FIEC (12/93)

Table 7: Housing rehabilitation and maintenance
Annual production growth in real terms by country

(%)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (2)
EC (3)	2.4	16.3	6.1	6.4	2.7	3.0	2.7	0.9	1.5	1.3	1.8
B	-7.2	6.0	-6.4	16.6	2.1	3.1	7.8	1.2	9.0	-2.2	-3.3
DK	5.2	-0.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D (4)	2.2	5.5	12.3	6.6	4.5	4.4	5.6	3.6	4.7	1.9	2.8
E	N/A	N/A	6.0	12.0	6.0	5.5	5.0	5.0	4.0	3.0	4.0
F	1.2	3.2	1.2	0.5	2.0	1.7	3.0	1.5	0.2	1.0	2.7
IRL	-0.4	7.4	36.6	12.0	-18.5	-7.4	5.1	-4.1	1.6	-1.7	0.0
I	1.5	-1.0	4.8	9.5	-2.8	1.0	0.9	5.6	0.6	0.0	-2.0
NL	6.3	15.9	0.6	2.5	7.1	3.9	-2.4	-1.5	4.0	-3.8	-4.3
P	-7.8	-4.7	16.5	2.2	10.1	6.6	3.8	4.5	2.4	1.5	2.6
UK	5.3	3.5	4.5	6.5	5.5	2.5	-1.9	-14.1	-7.1	2.2	3.8
A	3.1	-6.2	9.4	-1.4	5.7	2.1	15.3	-2.9	22.9	1.9	0.5
SF	0.0	0.0	0.0	7.1	6.7	6.3	0.0	0.0	-5.9	-6.3	0.0
N	10.0	2.5	14.7	0.6	-3.8	-8.9	-10.3	11.9	0.3	0.3	0.4
S	21.1	8.3	5.2	2.3	-6.5	-4.9	-13.1	1.6	4.8	-4.0	-5.0
CH	13.0	7.3	5.9	7.2	9.2	7.7	3.5	-1.8	-2.1	3.0	N/A

(1) Estimate
(2) Forecast
(3) Excluding Greece and Luxembourg
(4) West Germany only
Source: FIEC (12/93)

and commercial space, but still a large need for upgrading offices to suit modern IT-based work practices, and improving shopping areas. Many industrial and commercial buildings are energy-inefficient and need upgrading. Additional needs for new commercial building stock will be mainly in the developing regions, but there will always be new needs to meet changing business requirements and locations of economic activity.

OUTLOOK

The population of the EC has been growing slowly in the past and is projected to increase by 2% per year to 2000 and then begin to decline. The future level of migration, however, is an unknown: it is expected that there will be increasing pressure for immigration from both the third world (ex-colonies and north Africa) and from the CIS and eastern Europe. Immigration policy may well be conditioned by the ability of the housing and social infrastructure to absorb immigrants, and conversely the level of immigration will influence the pattern of demand for housing and infrastructure.

Average household size is likely to continue to fall, perhaps from the present average of 2.7 to the more typical 2.6 of rich countries, thus increasing demand for dwellings, particularly in multi-dwelling buildings and complexes for singles and childless households. More significant, however, is the changing age structure. The number of older people will increase rapidly after 2000, creating increasing demand for sheltered accommodation, and for communities which are designed around an urban structure with minimal transport needs and small local nuclei of social infrastructure (shops, medical, recreation), in amenable locations, possibly far from the main urban and industrial centres.

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Civil engineering
NACE 502

Civil engineering principally involves public infrastructure in sectors including transport, communications, energy and the environment. The level of activity depends primarily on demand from government bodies, so the sector is highly dependent on the budgetary policies of governments and public institutions. Pressures on public financing have resulted in lower investment and demand for civil engineering services. In some projects, particularly roads, communications and energy, private sector finance has provided an alternative to government financing, or an additional source of investment. This chapter focuses on the civil engineering sector; factors affecting civil engineering are discussed in more detail in the previous chapter entitled "Construction".

INDUSTRY PROFILE

Description of the sector

Civil engineering provides the basic infrastructure for transport systems and the utilities. Its traditional market has, in the past, been mainly public sector but this is changing because of the privatisation policies being pursued throughout the EC. Privatisation means that contractors will increasingly face a new style of demand. Rather than the public sector requirements for public accountability and administrative convenience, civil engineering will be faced with demands for speed and economy. This will face civil engineering contractors with new and very different management tasks from those which they are used to undertaking.

The EC's needs for infrastructure will create increasing demands for major tunnelling and bridge building. Both of these activities are very competitive on a global scale. Careful programming of these very large projects, so that demand fits the available capacity, could help EC contractors to build up distinctive strengths. On the other hand if the EC does not work closely with the big EC contractors, much of the work could well go to foreign contractors.

Although some contractors, especially in Germany, Netherlands and Denmark see environmental concerns as a major opportunity, some civil engineering contractors see environmental issues as a threat to their work e.g. the anti-roads lobby in the UK has succeeded in delaying some major road building projects. Civil engineering is faced by particularly insistent demands that account should be taken of the possibilities of recycling. Some progress has been made already, especially in road building.

Many of the factors that are shaping civil engineering, also influence heavy engineering. This particularly applies to the growth in attempts to introduce private sector funding into infrastructure projects. Generally, the financing of infrastructure projects is more complex than in earlier times and contractors are increasingly expected to help find the finance for new construction. This increases the range of the risks faced by contractors but can also provide significant additional demand for construction.

These developments have been taken further by some big contractors and represent a major change in their approach. They are taking the initiative in setting up new construction projects. Various combinations of owning, leasing from government, designing, constructing, operating, and transferring back to governments are being planned and put into practice throughout the EC. Proposals are being worked on by contractors for a great variety of schemes and types of construction. A common feature is the central importance of finance. Big contractors today need a sophisticated understanding of finance or at least joint-venture partners with this expertise.

OUTLOOK

- Transport infrastructure: There are increasing needs for investment in transport infrastructure, to cope with increasing trade and movement of people in the single market, to reduce the cost of transport to European markets from the peripheral regions, to promote development and cohesion in the less developed regions, and to reduce the increasing problems of congestion and air pollution in cities.

Table 1: Civil engineering
Annual production growth in real terms by country

(%)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (1)	1994 (2)
EC (3)	-3.0	-1.1	5.9	2.2	8.1	9.4	13.6	8.1	5.1	-8.1	-1.1
B	-13.4	-11.9	-3.1	-7.6	2.3	-12.2	2.6	11.9	10.4	1.8	2.8
DK	-8.0	6.4	15.2	-3.4	-0.4	4.2	4.5	-9.1	4.3	2.6	-2.6
D (4)	3.5	-0.4	7.3	-1.3	3.4	2.5	1.8	1.2	4.2	-2.0	-3.0
E	-7.0	-2.0	3.0	4.0	20.0	25.0	20.0	9.0	-12.0	-8.0	2.0
F	-8.7	4.4	8.3	7.4	9.8	6.5	2.5	4.0	-5.0	-1.0	2.0
IRL	3.3	-11.5	-6.1	-11.7	-2.0	-1.3	6.7	5.3	4.5	22.7	0.0
I	0.7	1.5	10.3	2.5	-2.3	4.3	2.4	-3.5	-6.5	-18.6	-17.0
NL	2.4	1.9	3.0	-4.5	8.7	-0.3	3.8	-2.5	4.6	2.1	4.4
P	-5.2	-8.7	8.0	7.5	14.8	9.9	8.9	12.5	4.0	3.4	4.2
UK	-2.5	-3.7	2.7	1.8	5.8	8.1	41.8	22.6	36.1	-16.6	-1.9
A	-3.2	5.2	-1.2	2.0	-3.8	2.3	4.4	4.1	-2.8	1.5	1.9
SF	0.0	7.1	3.3	-3.2	3.3	6.5	3.0	-5.9	-6.3	-13.3	-11.0
N	1.5	-2.0	4.3	12.4	-0.4	-12.6	-3.7	-0.5	1.8	-3.2	4.1
S	5.6	-7.0	0.5	-0.3	-0.4	7.0	4.1	-4.0	5.0	15.0	10.0
CH	1.0	-2.9	0.2	3.6	5.6	2.1	1.5	2.8	3.9	1.0	2.0

(1) Estimate
(2) Forecast
(3) Excluding Greece and Luxembourg
(4) West Germany only
Source: FIEC (12/93)

All modes of transport have urgent needs. The emphasis in the near future will be on completion of European rail networks, and the development of a high speed railway network. Nevertheless the largest volume of expenditure will be on upgrading and maintaining the road systems, and there are still major motorway programmes to be completed. There are important missing road links, particularly across the Pyrenees, Alps, and links to Portugal, Ireland and Greece. Major new road corridors are also needed to link up to Central and Eastern European centres, and the whole of Central and Eastern Europe has huge road building needs. There will also be increased air traffic, needing development of the single European system of air traffic control, and many new airport developments. Further investment in ports and inland waterways is being planned.

The European Commission is taking an active role in the strategic planning of major EC transport infrastructure, and also in planning the links with eastern Europe. There will be EC financing from the Structural Funds, the EIB and for eastern Europe from the aid funds such as PHARE and TACIS.

Car ownership continues to grow rapidly even in the richer EC states (except Denmark). The poorer states will continue to catch up in car ownership. Transport infrastructure and the superstructure of towns will have to be improved for several decades to cope with the motorcar, but for the longer term there will have to be massive investment in improved public transport and people movers. This may be supported by increasing taxation on fuel and cars and increased application of road user charging which will help finance infrastructure and public transport systems.

- Telecommunications: It is expected that there will be a rapid increase in telecommunications investment in the next two decades, both to bring the peripheral regions up to the level of the centre, and to cope with the demand for new value-added services, mobile communications and ever increasing electronic data interchange. Most of the direct investment is in equipment, but it will generate construction work in towers, cable networks, and in upgrading of buildings.
- Energy: The emphasis of energy-related investment for the next two decades will be on energy conservation, and reduction of pollution from existing energy sources. There has been a long period of little investment in new power stations in Europe: investment is likely to continue on a low but probably increasing level, particularly for replacement of older stations by cleaner energy efficient stations (including gas fired stations). The main energy investment will be in extending the networks of gas pipelines and power transmission networks and their interconnection.

A major source of new construction industry demand will come from the rebuilding or decommissioning of nuclear power stations. In western Europe many nuclear stations are now reaching the end of their useful life and will need replacement in the next decade. More importantly there is an urgent threat to public safety caused by the nuclear stations in the newly emerging democracies of eastern and central Europe. To solve this will require a major focus of western aid resources. In many respects the technology for dismantling and disposing of the materials from these stations does not exist. In addition, the size of the civil engineering problem for nuclear waste recycling and radioactive waste repositories, likely to involve deep underground construction, is enormous.

In the longer term new alternative energy sources will become important. Wind, wave, tidal and solar power have not often been viable up to now because they have very high capital costs - largely construction - but low or zero fuel and manpower costs; and because R&D which would bring down costs has not been funded on as large a scale as, for example, nuclear power.

- Water: Total water use is likely to grow, but more slowly than in the past as irrigation and industrial uses are conserved: nevertheless average household consumption varies enormously between regions and is likely to continue to increase as living and housing standards rise. Recent problems of drought and flood, and past lack of investment in several member states, will lead to increasing investment in water collection, transport and storage. Enforcement of EC water quality directives will require increasing construction for water treatment. The environment legislation and municipal waste water directives will require continuing increases in waste and effluent treatment for at least the next 20 years.
- Other environmental needs: waste disposal and contaminated land are further important sources of future construction work.

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Industrial plant construction

Like other sectors, European industrial plant construction has not emerged unscathed from the world-wide recession. In 1992 this sector, with a world market share of 51%, appears to have received new orders to the value of about ECU 56 billion. Its high proportion of exports makes it extremely sensitive to all forms of protectionist tendencies. A positive outcome of the GATT talks is therefore essential for this technically forward-looking branch of industry with its 250 000 employees, bearing in mind also the stimuli which it imparts to its supplying industries. In view of the already extremely keen international competition, the hope in this sector is that there will not be any further worsening of the political background. Basically, its assessment of the medium-term outlook is fairly optimistic.

INDUSTRY PROFILE

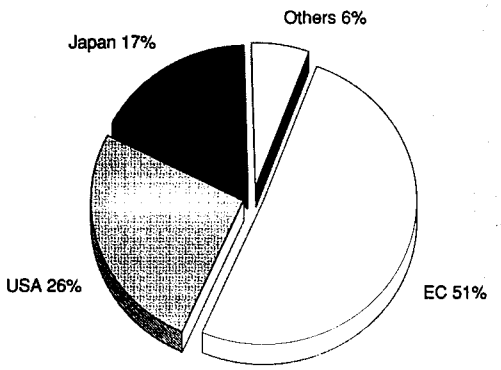
Description of the sector

The construction of industrial plant has two outstanding features: its wide production span and its international structure. Depending on the formulation of the plant contract, its range covers the supplying of a combination of often functionally independent constructional elements such as machinery, equipment, electrical drive units, control systems, connecting elements (steel framework, pipelines, electrical connecting lines) and also building and civil engineering work relating to the plant.

These components together, on the basis of technical production or operating processes, ensure the extraction and preparation of raw materials, the further processing of partially fabricated materials, the making of end-products, the production and transmission of goods and the generation and conversion of industrial energy. The provision of industrial plant is based on comprehensive knowledge of production and operating processes, planning and design, manufacture, procurement and supplying of equipment, assembly and commissioning and also project management. In addition there are important services such as financial engineering and training of the customer's operating personnel.

Important types of plant are thus, for instance, power stations, equipment for the chemical industry, electrical engineering, foundry and rolling mill plant, devices for protecting the environment and plant for the construction and building materials industry. A clear indication of the international nature of this branch of industry is the fact that the European plant construction sector exports its products to nearly 100 countries. Although this sector plays an important role as a measure of the degree of technical development attained by a country, it does not lend itself to uniform statistical recording. The European industrial nations operating in this field all define plant construction in different ways, a particularly difficult problem being where to draw the line between it and mechanical engineering. The same applies to competitors in Japan and the United States. However, regular exchange of experience within the framework of the European Plantmakers Committee (Europlant) does provide an overview of the world-wide trend of business.

Figure 1: Industrial plant construction
The world market for plant-makers



Source: Europlant

Recent trends

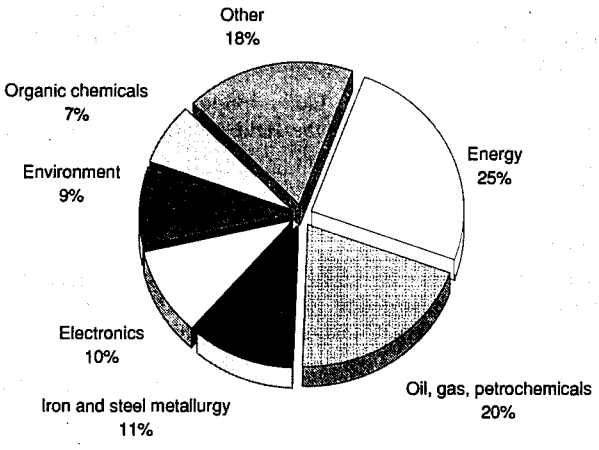
At the beginning of the 1980s plant construction companies were still benefiting from an investment boom chiefly stemming from the surplus oil revenues of a few developing countries. The subsequent collapse to an all-time low was followed by a generally very steady rise of about 10% per year in the volume of orders. The European plant construction industry survived the severe recession in the capital goods industry in 1991 and 1992 relatively unscathed. Experience has shown, however, that the repercussions of recessive trends in the customer industries affect industrial plant construction with a certain time-lag, so that the slumps currently occurring in other branches of industry might still in some cases be just about to affect plant construction.

International comparison

According to various rough estimates, the annual amount of major industrial engineering projects put out to tender is probably between ECU 100 and 125 billion.

Owing to the shortage of statistics, the distribution of world market shares in industrial plant construction is chiefly based

Figure 2: Industrial plant construction
Breakdown of contracts by industrial sector



Source: Europlant

on estimates. The reliable data available for mechanical engineering, however, can to some extent provide a reference point. On the other hand, an industrial nation will be more capable of winning a world market position in general mechanical engineering than in plant construction. That is why the number of potential suppliers of industrial plant to be reckoned with worldwide is confined mainly to three groups: tenderers from the European Community, the United States and Japan. While newly industrialised countries such as South Korea, India and Mexico are already appearing as serious competitors in individual cases, they do not as yet have a wide and continuing range of products to offer. European plant construction would appear to have just over half the world market. The United States, because of its huge domestic market, has over a quarter. Japan's share is 17%.

MARKET FORCES

Demand

Perception of the sectoral breakdown of orders is distorted because the various European suppliers concentrate on different fields of operation. As a generalisation it can, however, be said that the largest proportion of orders - 25% - is accounted for by power stations and 20% by plant in the oil, gas and petrochemicals sectors. On the other hand, the shares in the categories of steel mill construction, protection of the environment and electrical engineering equipment was considerably smaller.

Exports account for 45% of the volume of orders, and a quarter of the latter come from within the European Community. The leading importers during the past decade have been the United States, the People's Republic of China, the former Soviet Union, Iran and India.

From the technical angle, there is less demand than formerly for new industrial complexes on a turnkey basis. Instead, customers are displaying greater interest in modernisation and rationalisation measures, with more importance attached to energy saving and protection of the environment.

Supply and competition

World competition is characterised by a merciless price war. This is forcing suppliers in the European Community with a high domestic cost level, in particular, to seek to obtain the supplies they need from trading partners situated in less expensive places. While this trend has remained confined to hardware in recent years, European plant constructors have recently begun, under the pressure of costs, to offer engineering services also from countries where costs are lower. This has led to the loss of a considerable number of jobs in the European Community. In addition to the price war, a point worthy of mention is the increasingly observable failure to fulfil conditions. The hunger for orders on the part of many competitors has made them willing to make irresponsible promises with regard to guarantee periods, performance undertakings, penalties or the provision of additional items or services.

Finally, another important factor influencing competition in the sector can be found in the field of financial conditions.

INDUSTRY STRUCTURE

Companies

During the last twenty years the great demands made in industrial plant construction have led to an appreciable thinning-out of suppliers. Constant participation in protracted and expensive tendering procedures is nowadays possible only for major companies, which endeavour to cut costs and reduce risks by strategic alliances and international co-operation arrangements. This can adversely affect mobility and creativity, which tend to be the characteristics of small and medium-sized firms. On the other hand, European industrial plant construction still has the advantage of a high technical standard which, if maintained, will enable this industry to continue to play a leading role internationally.

ENVIRONMENT

Considerations of environmental protection are playing an increasingly important role in the engineering business, although, unfortunately, many customers have still not realised that the necessary investment in the plant under this heading is liable to increase the price considerably. Customers are not automatically willing to pay this higher price, because they feel that additional expenditure on environment-friendly plant does not contribute to productivity.

Another important problem is the difference in standards of environmental protection in the countries of the European Community, which has a distorting effect on costs. Suppliers in countries with a propensity (albeit concealed) to environmental dumping are gaining unjustified competitive advantages in this field.

REGULATIONS

Whereas, owing to national assertions of competence and selfish attitudes, there is no hope of seeing, in the foreseeable future, any genuine harmonisation of the different systems of export financing and export credit insurance, which is a matter of paramount importance for competition, the Commission is working on a Council Directive on the sending of personnel to other countries for the performance of services. If these plans materialise, they will push up costs substantially.

OUTLOOK

The course of the European plant construction industry's business in 1993-1994 will depend on how investors in the major branches of industry cope with the recession. The tendencies now prevailing in Europe's chemical, steel and automobile industries give few grounds for optimism. This situation will force European competitors to resort to the international markets, where, as in the past, they will encounter competition from Japan and the United States. The hopes of market opportunities in Eastern Europe following the collapse of the former political systems have not been fulfilled. There is undoubtedly a huge pent-up demand here, but one which, as far as can be seen, cannot be financed without great joint efforts. In the Far East many hopes are pinned on the People's Republic of China, which, after the political opening-up, offers chances especially to major plant construction companies which are prepared to commit themselves in the form of co-operation and joint ventures.

Despite the present state of the world economy, the European plant construction industry is not without optimism for the medium and long term. It will continue in the future to be one of the forward-looking branches of industry in the European Community.

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Overview
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The EC distribution sector is undergoing considerable restructuring. Changes include concentration, reduction in the number of traditional wholesalers, transformations in the retail sector and a tendency towards diversification and internationalisation. Moreover, the future of the distributive trade sector will be influenced by the completion of the internal market and the opening-up of Eastern Europe.
The sector represents about 14% of output and employment in the European Community. These figures have remained relatively constant over the last ten years, showing that the distribution sector has grown in line with economy.

INDUSTRY PROFILE

Description of the sector

The industry is divided into two subsectors: wholesale distribution and retail trade.

Wholesale distribution (NACE 61) is defined as "units exclusively or primarily engaged in the resale of goods in their own name to retailers or other wholesalers, to manufacturers and others for further processing, to professional users, including craftsmen, or to other major users".

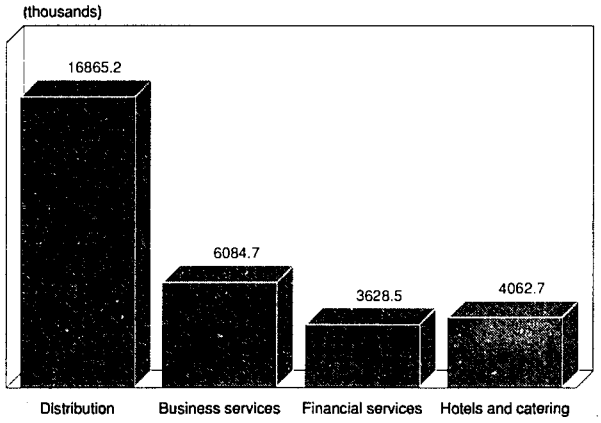
Retail distribution (NACE 64 and 65) is defined as the distribution to final consumers of:

- food, drink and tobacco;
- dispensing chemicals;
- medical goods, cosmetics and cleaning materials;
- clothing;
- footwear and leather goods;
- furnishing fabrics and other household textiles;
- household equipment, fittings, appliances, hardware and ironmongery;
- motor vehicles and cycles;
- motor fuels and lubricating oils;
- books, newspapers, stationery and office supplies;
- photographic, optical, jewellery and other retail distribution.

These definitions describe the function and product areas characterising wholesalers and retailers. They do not cover the fact that many organisations perform both functions, or that the ownership of wholesalers and/or retailers may reside in operators from another subsector of the supply chain (such as manufacturers), or that manufacturers in some areas carry out their own wholesaling and retailing and are not thus covered by the statistics for the latter sector.

A further important point is that the definition of wholesalers ignores the increasingly wider role that many operators within the sector are playing. For example, the change in manufacturing to tightly-managed production techniques (such as Just-In-Time) means that the whole distribution chain is becoming more sophisticated, and that wholesalers are also taking on functions such as packaging, quality control and administration. None of these is included in the NACE definition, but they nevertheless affect the contribution to the economy of the sector as well as the profile of the wholesaler.

Figure 1: Distribution
Employment compared to selected sectors, 1991 (1)



(1) Excluding Italia
Source: Eurostat (Labour Force Survey)

INDUSTRY STRUCTURE

There is great change occurring within and between the subsectors of the distribution industry. This change can be summarised as:

- concentration, expressed in terms of a reduced number of larger operators, and closer vertical links between manufacturers, wholesalers and retailers;
- a general reduction in the number of traditional wholesalers, bearing in mind the fact that the concept of wholesaling seems to have different meanings within different Member States;
- a series of transformations in the retail sector, with significant differences between Member States. Overall a slower increase than before in hypermarkets, a rise in franchising and a proliferation of forms of distance selling are prominent features;
- a tendency towards diversification of activities into other service areas and some specific moves towards internationalisation.

The concentration phenomenon is more evident in northern Member States, with not only a rationalisation in the direct retail sector, but also the emergence of purchasing groups and voluntary chains to benefit from economies of scale.

Wholesaling is often thought of as an activity of the past, in that the traditional operator now often finds himself squeezed out either through a manufacturer's wish to control distribution himself or through the large retailer's practice of upstream extension.

However, some forms of wholesaling are on the increase, such as wholesaler-owned voluntary chains and specialist operators who focus on specific end-users (such as schools and hospitals). "Traditional" wholesaling does survive in raw materials and bulk products because of the logistics involved.

Geographic variance remains of great importance in the structure of the distribution industry. The structure of retailing continues to evolve, with marked differences between the north and the south of the Community. In the north, concentration

Table 1: Distribution
Volume index of gross value added at market prices (1)

	1985	1986	1987	1988	1989	1990
Belgique/België	100.0	102.7	102.6	105.6	102.8	104.8
Danmark	100.0	106.3	106.3	105.8	104.5	104.6
BR Deutschland	100.0	95.0	97.0	102.0	105.7	112.7
Hellas	100.0	102.7	102.8	108.1	112.3	113.3
España	100.0	103.5	107.9	112.9	N/A	N/A
France	100.0	102.7	104.7	108.3	111.5	113.8
Ireland	N/A	N/A	N/A	N/A	N/A	N/A
Italia	100.0	102.4	106.5	111.5	115.1	118.3
Luxembourg	100.0	103.8	110.2	118.1	128.5	130.2
Nederland	100.0	N/A	N/A	N/A	N/A	N/A
Portugal	100.0	105.5	112.4	117.9	121.3	124.5
United Kingdom	100.0	104.7	112.0	118.7	122.7	122.9

(1) Includes recovery and repair services
Source: Eurostat (National Accounts)

Table 2: Distribution
Gross value added at market prices (1)

(million ECU)	1985	1986	1987	1988	1989	1990
Belgique/België	14 199	16 785	18 250	18 874	19 642	22 089
Danmark	10 682	11 934	12 059	11 639	12 044	12 631
BR Deutschland	85 582	86 464	92 597	98 952	104 655	114 438
Hellas	5 110	4 778	4 640	5 091	5 576	5 660
España	31 024	33 173	35 242	40 320	N/A	N/A
France	85 688	93 278	97 226	103 765	112 152	119 763
Ireland	2 172	2 029	2 099	2 113	2 736	N/A
Italia	89 813	98 507	105 603	112 417	124 003	134 191
Luxembourg	643	628	737	795	890	947
Nederland	19 806	20 768	22 356	23 134	N/A	N/A
Portugal	5 455	5 625	5 756	6 304	7 136	8 061
United Kingdom	68 319	67 540	70 309	85 974	93 488	96 174
EC	419 020	441 562	466 874	509 377	546 648	588 432

(1) Includes recovery and repair services
Source: Eurostat (National Accounts)

Table 3: Distribution
Number of persons employed by sector, 1991

(thousands)	Total distributive trade	Wholesale distribution	Dealing in scrap and waste materials	Agents	Retail distribution	Repair of consumer goods and vehicles
Belgique/België	552.3	147.9	3.3	13.3	341.4	46.6
Danmark	343.9	131.2	2.4	3.3	179.0	28.0
BR Deutschland	4 105.9	832.9	15.4	126.8	2 786.7	350.7
Hellas	563.7	90.4	1.1	21.4	382.0	68.8
España	2 143.0	436.8	11.5	41.2	1 417.7	235.7
France	3 083.8	934.2	23.0	61.3	1 918.3	147.1
Ireland	159.7	39.8	0.0	1.1	108.9	9.9
Italia	N/A	N/A	N/A	N/A	N/A	N/A
Luxembourg	25.5	6.9	0.0	0.0	18.4	0.1
Nederland	1 054.3	395.6	7.6	N/A	572.7	78.4
Portugal	685.1	100.1	N/A	N/A	479.4	105.6
United Kingdom	4 143.1	820.3	32.6	72.5	2 909.8	308.0
EC (1)	16 865.2	3 936.1	97.1	340.9	11 114.3	1 376.9

(1) Excluding Italy
Source: Eurostat (Labour force survey)

Table 4: Distribution
Structure of employment, 1991

	Total employment (thousands)	Share of wage and salary earners (%)	Share of female workers (%)	Share of part-time workers (%)
Belgique/België	552.5	62.8	45.4	15.7
Danmark	343.9	83.7	42.2	25.8
BR Deutschland	4 105.9	84.4	53.2	23.1
Hellas	563.7	39.3	33.5	2.9
España	2 143.0	56.7	39.6	4.2
France	3 083.8	79.0	45.8	12.6
Ireland	159.7	75.1	38.3	10.8
Italia	N/A	N/A	N/A	N/A
Luxembourg	25.5	82.7	45.4	7.8
Nederland	1 054.3	84.3	41.1	34.2
Portugal	685.1	54.0	37.9	4.1
United Kingdom	4 143.1	84.7	49.2	33.3
EC (1)	16 865.2	76.4	46.5	20.2

(1) Excluding Italy
Source: Eurostat (Labour Force Survey)

and larger outlets are the new trends. In the south, smaller shops remain very prominent.

An interesting trend is emerging within the retail sector, whereby,

- retail groups are the typical operators in food retailing;
- voluntary chains feature in non-food retailing; and,
- franchises are moving into services (travel, financial services etc.) as well as goods.

Diversification of activities is occurring, whereby producers (typically non-food) set up retail operations, or where retailers offer services such as travel, financial services, restaurants, etc.

Internationalisation tends to occur towards neighbouring Member States at first, because of cultural similarities. Non-food retailers are the operators most prone to internationalise, with great attention having to be paid to national consumer tastes. The Euro-consumer does not yet exist, even if consumption patterns are moving closer together.

REGIONAL DISTRIBUTION

The most obvious influence of geography on the sector is in the different definitions of what a wholesaler is, and in the role of the small retail outlet.

In Germany, for example, wholesaling tends to be thought of as the distribution and procurement activity of manufacturers. In France, the tendency of manufacturers to subcontract sales activities and of retailers to subcontract buying, results in wholesaling being seen as a large growth sector. The Dutch import-export agencies, which are major economic operators, contribute to that country having the feeling that the sector is dynamic, while in the United Kingdom, a more restrictive view is taken, namely that of the old-style "middle man" between manufacturer and retailer, now in decline.

Taking these differences of perception into account, the major feature of geographical variance in wholesaling is that the northern Member States exhibit much more evidence of a blurring of activities between manufacturer, wholesaler and retailer then do those in the south.

For retailing, countries in the two main groups - Mediterranean and Northern Europe - may have similar sales formats, but these may not be at the same stage: concentration in retailing is thus correlated with the level of economic development of the Member State, except for Italy, which retains its high number of small shops. Franchising, cooperation networks in general, discount shops and non-shop retailing are also notable for some geographic variance, explained in the monograph on retail distribution.

ENVIRONMENT

Traditionally, the distributive trades have been seen as pure intermediation functions, only operating in response to supply impulses, and therefore not at all involved in the environmental debate. This view, however, is set to change. Distributors, especially purchasing centres in the retail sector, are increasingly playing a pivotal role in translating trends in consumer preference into final demand and are thus able to boost the sales and the production of so-called "eco-goods".

Moreover, more and more distributors are taking on new functions, including packaging. This activity entails a series of environmental issues which has to be taken into account by the sector.

OUTLOOK

The changes inherent to the sector itself (concentration, increased used of technology, vertical integration and diversification) must be seen together with extraneous developments such as the creation of the Internal Market by 1 January 1993 and the potential opening-up of East European markets.

While the achievement of an integrated EC market will require a European distributive systems (and the Community's actions in the transport, competition, investment, structural funds and enterprise policy areas are helping this to come about), operators in the distributive sector face two conflicting pressures in seeking to meet the challenge. The first is the increased competition from other Member States as the concentration and integration in the sector, encouraged further by cost reductions following the completion of the Internal Market, forces them to broaden their horizons and seek cross-border opportunities. The second feature is the continuing requirement to respect local culture in delivery of services, a feature which reduces the scope for rationalisation and internationalisation.

The key may thus be effective streamlining of operations through technology, enabling the operator to carry out more activities at an overall higher level of sophistication. Electronic

Data interchange (EDI), Electronic Point-of-Sale (EPOS), and Direct Product Profitability (DPP) techniques are used widely as essential tools in upgrading activities.

The problem is, of course, for smaller players, who may find that the required investment in technology is too great for them to support.

The opportunities created for logistics planning and management by the abolition of internal frontiers should contribute to expansion in physical distribution activities. Taken together with the liberalisation in road transport, this area should see major change. This will in turn produce a situation where distribution strategies will influence consumption patterns and where marketing activities typically performed by manufacturers may be taken on by distributors and traders.

Lastly, reduced consumer spending on retail goods will reinforce the battle for market shares and therefore influence the present structure of the industry.

Written by: Commission of the European Communities, DGXXIII

Wholesale distribution
NACE 61

Wholesale trade is a hidden force in the European economic process. It employs more than five million people (4% of the EC working population) and consists of approximately 700 000 businesses. It provides the integration of different added value functions that have to be performed to distribute products from manufacturer to users such as catalogue composition, sourcing, storage, assembly, re packaging, distribution, support and financial services. The position and power of wholesalers in the distribution chain depend on their ability to create unique added value for suppliers or buyers. Based on the distribution dynamics wholesalers have three strategic options: distribution partner for suppliers; sourcing partner for buyers; and integrative wholesaling. The single European market and the opening of the Eastern European market create many opportunities among which are the need for European wide distribution networks, integrated chain management to create total quality for buyers and alternative distribution modes. The European wholesale trade has a strong base to face this challenging future.

INDUSTRY PROFILE

Description of the sector

Wholesaling is a difficult activity to define. Its function has evolved over time and different types of wholesale organisations still coexist in various phases of development stages. There is still, according to the NACE 61 code , a definition of wholesale distribution. This class includes units exclusively or primarily engaged in the resale of goods in their own name to retailers or other wholesalers, to manufacturers and others for further processing, to professional users, including craftsmen, or to other major users. The goods can either be resold in the same condition or after undergoing the kind of processing, treatment, packing or repackaging to which they are usually subjected by the wholesale dealer. Generally speaking, the latter's role involves, on one hand, the storing of goods and, on the other hand, taking title to and/or having the right to dispose of the goods in question. In addition to a breakdown according to range of goods, there are classifications based on other criteria which are also useful for the wholesale trade, e.g.: breakdowns according to economic links and geographical area of activity (import export, transit and domestic trade).

Wholesale trade provides the integration of different added value functions that have to be performed to distribute products from manufacturers to users.

Increasingly, wholesaling is focusing on the flawless execution of integrative management because many of the functions, especially those with capacity-like characteristics, can be contracted out to specialised third parties. The wholesaler will always perform the most critical functions which truly create the added value for the buyers by himself. Transport and distribution, for instance, are outsourced while the composition of the assortment is performed in house. Storage could also be outsourced, but is rarely done. The position and power of wholesalers depend more and more on their ability to create unique added value for suppliers and buyers in the distribution chain.

Throughout the distribution chain the functions necessary for the economic process can either be found within independent wholesale businesses or upstream and downstream in the distribution chain with sales companies of suppliers or purchasing departments of buyers.

The function of the wholesale trade is focused on the transformation of processes surrounding purchasing (creation of large volumes, sourcing, storage, catalogue composition and inbound logistics) into those surrounding sales (market oriented assortments and services, commercial support, distribution, customer service and training). Wholesale trade is, therefore, bridging differences in the distribution chain between place, time period, quantities, capacities and price requirements.

Wholesale trade is a very diverse service industry. It performs its intermediate role throughout the total economic process from raw materials to final end user products. The sector's divisions, therefore, can be very diverse. Orientation by product would produce divisions like raw materials, semi finished goods and non-food and food consumer products. Geographic orientation results in subsectors such as international trading houses, importers, exporters and, for the domestic markets, distributors and cash and carries can be distinguished. A functional orientation will produce sections such as logistics service providers (physical distributors), commercial traders (agents), financial brokers and the full service wholesaler. The sector

Table 1: Wholesale distribution
Main indicators, 1991 (1)

	Number of enterprises (thousands)	Number of persons employed (thousands)	Turnover (billion ECU)
Belgique/België	50	164	111
Danmark	25	137	60
BR Deutschland	110	1 095	559
Hellas	23	113	N/A
España	46	490	65
France	103	1 006	330 (3)
Ireland	4	41	N/A
Italia (2)	109	1 058	192
Luxembourg	2	10	5
Nederland	48	403	152
Portuga	49	100	9
United Kingdom	119	925	330

(1) All figures include agents and scrap/waste wholesalers.
(2) Data for 1988.
(3) INSEE figure for 1992
Source: Eurostat (Labour force survey, Mercure), BGA, INSEE, CBS

can be partitioned by types of ownership like integrated wholesalers (sales companies and purchasing departments/companies) and independent wholesalers.

International comparison

All Member States have their own distribution (infra)structures and trade history. Therefore, we cannot speak of one EC wholesale service industry. The scope of this monograph does not permit an in-depth analysis of the differences, but in the following paragraphs, some characteristics are described.

France

The wholesale trade holds a strong position in the French economy, especially in the international trade business. Concentrations have taken place resulting in the emergence of large, multi dimensional trading houses with specialised divisions. These international trading houses are strong in food and capital goods. In the domestic market, cooperative structures have emerged between regional wholesalers to share resources. Typical for France are also the wholesale centres where a variety of wholesale companies work together and present themselves together to the market. The French wholesale trade is especially strong in non-food consumer goods and industrial supplies. In the French food market, wholesale trade has decreased.

Germany

The wholesale trade position in Germany is comparable to France. A strong concentration has recently taken place and is the reason why the average wholesale company in Germany is larger than in the other EC Member States. The German wholesale trade is especially strong in industrial supplies. In food, its the wholesale trade position has been taken over by the strongly concentrated retail sector. Large parts of the national imports and exports are organised by international trading houses. Often, these trading houses have historical links with the steel industry. The concentration and the links with powerful industries have made of the German wholesale trade a professional service industry with a respected reputation in the labour market; professional in the sense that substantial investments are made in systems and procedures to create new added value services.

United Kingdom

The wholesale trade in the United Kingdom is especially strong in non-food consumer goods. The concentration in the retail business has limited their role in the food market. Contrary to the other Member States, food wholesalers in the United Kingdom started voluntary retail chains to counterbalance the power of the retail giants. In the exports and imports business, independent merchants play an important role as well as the international trading houses. These trading houses are important namely for the imports of machines, means of transport and agricultural products. Exports merchants and trading houses are involved in approximately 40 50%. For imports this is much less (15%).

Italy

Most wholesale companies are of medium to small size: 93% of them employ less than 10 people. Traditional, family-owned companies are still mainly located in the southern regions.

There is a big difference between food and non-food wholesale: the former has been stable during the 1980s due to the rapid concentration of food points of sale and to the stronger concentration of the volume of goods dealt with by large distributors. The latter, on the other hand, has been developing in all the non-food marketable goods, following the trend towards fragmentation and specialisation of non-food retail.

The Netherlands

The Netherlands has a strong wholesale sector just like Germany and France. They are very internationally oriented and offer overseas producers European distribution. They also play an important role for the imports and exports; approximately 60-70% of the imports are organised by the wholesalers as well as 30% of the exports. There are some large international trading houses with strong Asiatic links. Strong wholesale sectors are capital goods and agricultural products.

Belgium

The majority of the Belgian wholesalers are small or medium sized and often family-owned firms with a local area of operation. In international trade, larger cooperative organised wholesalers play an important role.

Denmark

Denmark probably has the highest concentration in wholesale trade. A few large wholesalers and trading houses (for international trade) dominate the primary distribution level. Food and non food consumer goods are their main markets.

Ireland

Ireland has, like the South European countries, a fragmented distribution structure. Therefore, the wholesale trade in Ireland is also an important linking pin. The international trade is dominated by the English trading houses.

Southern Europe

Spain, Portugal and Greece are characterised by a very fragmented distribution structure. Retail and wholesale trade are small scaled and have a traditional orientation. In all sectors, wholesaling plays an important role. Wholesale trade holds an especially strong position in imports of capital goods. In exports, the wholesale trade in these countries maintains a strong position in the textile and agricultural product markets. In Spain, the concentration process has started, initiated by foreign investments.

Eastern Europe

Eastern Europe does not have a specific wholesale culture. Large state owned departments had taken and still do take care of the distribution of goods and materials. The larger European wholesale companies invest in Eastern Europe to build up a wholesale market for foreign products. They possess the international trade and distribution logistics know-how that the state-owned companies lack to a large extent. Wholesalers who open up subsidiaries in Eastern Europe have to face the limitations of poor infrastructures and an almost non-existent communication networks. Eastern Europe is, for many wholesalers and trading houses, a challenging market.

Japan

The distribution of machinery in Japan is influenced by history and social structure. The large trading houses, "sogo shosha", are economically and politically powerful business entities. Their primary role is providing links between various industrial activities and parties, benefiting from their own global information network and their financial ties. Although the Japanese multi level distribution structure is very effective, the EC distribution structure tends to be more cost efficient. In Japan, distribution fulfils a strategic function, perceived as being as important as technology. This makes Japanese producers more powerful (and threatening) in the market.

USA

The distribution structure for machinery in the USA is more or less similar to the EC, although distributors in the USA focus more on satisfying customer needs and service requirements. The market focus makes producers and distributors organise distribution according to the grouping of client's needs. Distribution in the USA is used as a strategic tool to realise corporate objectives.

Supply and competition

Wholesaler functions are performed at different stages in the process from raw materials to end use. This process can be divided among the supply and distribution chain. Raw materials and semifinished products typically apply to the supply chain, while capital goods and consumer goods apply to the distribution chain. In both chains, different requirements exist for logistics, commerce and finance. The customer service requirements in the distribution chain, for instance, differ greatly among the three distribution options.

The structure of the supply and distribution chain is based on the efficiency and effectiveness of distribution rules. The smaller and more numerous the buyers, the more distribution levels are necessary for effective distribution. The price levels depend on the multiplier which is determined by the distribution flows in the total market. These price levels are more or less balanced and justify the lines of supply. Therefore, a wholesaler will not, in the long run, supply large buyers because the margin is too small and suppliers will not distribute to the medium sized buyers because this will ask too much sales effort. The wholesale trade is influential in the distribution chain because it gives direction to the lower levels and distributes directly to end users and industries. By this very fact, the wholesale trade influences direct deliveries from suppliers to end-users.

The European economy is going through a change process that largely can effect the distribution chain and the position of the wholesaler. Many important changes are the integration of the value chain, direct delivery from supplier to retailer and an increase in product range. The integrated value added chain is dismantled so that shifts take place down-stream and up-stream leading to concentration and specialisation of European production units. For example, assembly or customisation of packaging will be outsourced to third parties near the customer base. This creates added value opportunities for wholesalers. More and more, fast moving products are delivered directly from supplier to the retail outlets or the end users. This trend is strongly initiated by the decreased transport lead times and improved information technology. The value of a wholesaler being located close to the market becomes less important. Suppliers are still increasing their product ranges to satisfy the demanding customer. Numerous articles will not be delivered directly because turnover volumes are too little. The logistic role of the wholesaler, therefore, will focus more and more on storage and consolidation.

For many industries, distribution is becoming a key factor for success. Especially in mature businesses where product quality and specifications very quickly become standards. The only discriminating factor will be the variable features of the products (customer service and availability) provided by distributors.

The industry focuses more on core business and searches for specialised partners to take care of distribution and customer services.

New parties enter the market for distribution services such as specialists in warehousing and physical distribution that provide European distribution services to large manufacturers. These logistics service providers do not interfere with the commercial process (like wholesalers do) but often, these suppliers take care of marketing and sales, or plan to do so. These specialists are ready to take over the logistics activities of industry and wholesalers because they have their information systems in place and have locations throughout Europe. They are often part of large transportation companies willing to invest in the creation of these services. Their margins are substantially lower compared to the wholesale trade, but do not include the full range of additional services wholesalers offer.

Table 2: Wholesale distribution
Largest wholesale companies by country

	Company	Number of employees	Turnover (million ECU)
Belgique/België	Fina	504	1 214
	Makro	2 600	937
Danmark	N/A	N/A	N/A
BR Deutschland	Stinnes AG	34 687	12 500
	Haniel & Cie	32 989	9 200
	Thyssen Handelsunion	28 701	7 200
Hellas	N/A	N/A	N/A
España	Coop. Farmaceutica	576	836
	Makro Mayorista	2 065	637
France	Pinault	N/A	5 990
	Sonepar	N/A	3 317
Ireland	Musgrave Ltd	660	539
	Walsh & Sons Ltd	15	497
Italia	RHIAG	272	79
	Melchioni	222	110
Luxembourg	Trade Arbed	212	57
	Aral	14	56
Nederland	Otra N.V.	5 183	1 450
	Hagemeyer	5 254	1 650
Portugal	Makro	80	413
	EPAC	1 101	335
United Kingdom	Booker Belmont	9 382	2 130
	Makro Selfservice	8 362	780
	Palmer & Harvey	3 007	1 410

Source: Gathered by A.T. Kearney from various sources

Although wholesaling is local business, internationalisation and concentration through mergers and acquisition will continue for reasons of economies of scale in sourcing, warehousing and formula exploitation. Large European suppliers ask for distribution partners that can supply European distribution services.

Professionalisation of management techniques, profiling and market approach will continue on all levels such as commercial profiling, formula development, and the use of managerial techniques which are already used in other business sectors (direct product profitability, market segmentation and private labelling).

Suppliers and buyers require improved integration of business processes in order to realise higher levels of customer service at reduced cost. The developments in electronic data interchange (EDI) provide excellent opportunities to link the business processes of the different players in the distribution chain. The use of bar-coding and scanning techniques and on line computer links will, to a large extent, impact cost efficiency, human resource policies and the need for large investments (in the initial phase).

INDUSTRY STRUCTURE

Companies

The wholesale trade employs approximately 5.5 million people, which is 4% of the EC working population. The differences between the Member States are minor. Female employees account for approximately 30% of the EC wholesale trade work force. For the individual Member States, these percentages vary between 23% (Ireland) and 38% (Germany).

The turnover generated by the wholesale trade in the EC is around ECU 1 750 billion. Turnover has grown during the last years in most Member States by 2% to 3% annually. Important growth sectors were capital goods and agricultural products.

Almost 700 000 businesses are involved in wholesaling in the EC. The majority of these businesses are small scale with about 75% employing less than 10 persons. Only 5% of the businesses are responsible for 30% to 40% of the total turnover. Most of these large businesses can be found in the steel and electrical sectors. The wholesale trade in the southern countries, in particular, operate on a very small scale. In Germany and France, one can see a trend towards concentration.

The structure of the wholesale trade is largely due to the rather low entry barriers for new businesses such as minimal legal requirements, no specialist education required and relatively low start up investments. Therefore, many wholesale businesses start every year and many also fail after a while. Research has shown that half of all new wholesale businesses fail within the first five years of their existence.

Strategies

In the distribution chain a power struggle is going on. The four areas where the relative power position of the players in the distribution chain differ are the areas of the large brand suppliers, the large purchasing chains, the wholesalers and where large brand suppliers share margins with large purchasing chains.

The situation in many markets differs largely. In the food market for example, the big brand suppliers and large retail stores struggle for dominance, which has caused a repositioning of wholesale trade. In the electrical materials market, the independent wholesalers are dominant although the brand suppliers become stronger and stronger. Another example is the toy market where chains have taken over the position of the wholesalers. In capital goods it is still the wholesalers/importer (which can also be the sales companies of the manufacturers) that directs the distribution chain.

In this power struggle, wholesale trade has the largest added value for medium and small sized buyers who do not have the facilities and volumes to buy, import and export directly from suppliers.

The strategic options of the wholesale trade depend on the market situation. In a market situation where many buyers exist as well as many suppliers of 'me too' (or non unique) products, the role of the wholesaler is typically the 'independent specialised' one. This market situation requires the typical wholesaler, who has a complete catalogue, to perform the requested logistics services well and have good sourcing channels to more or less cover all its clients' needs.

If, however, the market situation is different in the sense that only a few unique suppliers exist with many small buyers, the wholesaler should be a distribution partner for these suppliers. In this case, the wholesaler is specialising in logistics services such as storage, distribution, information (EDI) and customisation.

In the third case, when there are a few large buyers and many 'me too' suppliers, the opposite happens. The wholesaler is a sourcing partner for the buyers, taking care of the well organised supply, product selection and efficient sourcing.

These three market situations require three different strategies.

Option I: Distribution partner for suppliers

Based on the market situation with many buyers and a few unique suppliers, the wholesalers provide distribution services to the European manufacturers. These services are usually geared towards: making available products as 'wide spread' as possible (European distribution), offering customer services throughout Europe to the buyers, having up to date EDI systems with on line links in the suppliers information system, providing inventory management and providing market information to suppliers. The suppliers often have branded products and take care of marketing themselves. They often need a partner to take care of the logistics operations and distribution, however.

Option II: Sourcing partners for buyers

When many 'me too' suppliers share the market and only a few large buyers dominate the demand, the strategy calls for a sourcing partnership with these buyers. On a tailor made basis, these sourcing partnerships can offer: global sourcing of products, account management, storage facilities and inventory management and integration of supply with the buyers' just in time needs. The wholesaler in this case becomes an integrated part of the (reduced) purchasing department of a selected number of buyers.

Option III: Integrative wholesaling

In the many buyers-many suppliers situation, the wholesaler fulfils the total range of consolidating and integrating functions in the field of commerce, logistics and finance. The critical functions are: the creation of catalogues and their actualisation, effective usage of direct product profitability mechanisms to know the profitability of products and client groups, high quality EDI systems to create quick response services and creative and innovative power to actualise services offered, add new products and services and to professionalise the organisation on a permanent basis. In real life, these three strategic options can be implemented within one wholesale company for its different market segments. The organisation has to fit the implementation of the three different strategies in the organisational principles which means separate management procedures and systems.

REGULATIONS

The EC regulations will also effect, directly or indirectly, wholesale trade in Europe. The sector will be directly influenced by a set of previously adopted measures concerning VAT harmonisation, product liability, the status of trade agents, exclusive agreements, safety, technical standardisation and competition.

Regarding VAT harmonisation, under the terms of the agreement of June 25, 1992 (Directive 92/680/EEC), from January 1, 1993 the Member States must have a standard VAT rate of at least 15% and abolish the higher VAT rates. They will be allowed to maintain the zero rate and the extra low rate (1% and 4%) which were existing on January 1, 1991, but will not be allowed to introduce new reduced rates except for Spain and Luxembourg who will be able to apply new extra low rates. The VAT will be collected in the country of destination. This means that pre-financing is no longer necessary for companies selling products in other Member States. Definite decisions on this part have not yet been made.

The internal market will also entail harmonisation of the rules regarding product liability. The regulation (Directive 85/374/EEC) speaks of a reversal of the burden of proof. The plaintiff will no longer have to prove fault on the part of the defendant. Another change is that not only is the manufacturer considered the producer, but the importer of products from outside the EC is deemed to fulfil the same role. This regulation will lead to increased costs (supplementary insurance premiums, higher claims for damages, increased number of claims) for wholesale companies which import products from non EC countries, wholesale companies that market goods whereby the consumer cannot discover the identity of the producer, wholesale companies selling goods under their own brand name and wholesale companies which change some part of the goods.

Directive 86/653/EEC regulates the position of the independent trade agent. The purpose of this regulation is to stimulate freedom of establishment of agents within the EC. This directive regulates the relationship between the principal (i.e. machinery producer) and agent including their mutual rights and obligations, such as providing each other with appropriate information and compensation and the ending of the agreement.

Contrary to agents and producers, distributors are not very well protected in the EC. Only in Belgium and Finland are distributors actually protected and entitled to legal indemnity. Although a more positive jurisprudence towards legal indemnity for distributors is developing, the distributors are still at a disadvantage as compared to the producers with respect to legal protection.

Exclusive agreements between producer and distributor are not allowed in the EC because protection of territory is prohibited. The EC council directive 83/83/EEC lists some conditions under which an exclusive agreement between supplier and distributor is exempted. There are bilateral agreements between one supplier and one distributor, concerning the resale of goods (not services).

Directive 89/655/EEC requires that all existing, new and second hand work machinery and equipment comply with the minimum on safety and health. The consequences of this directive are a simplified inter-community trade, decreased costs and therefore increased exports. The harmonisation of the safety requirements is visualised through the introduction of the EC label.

In 1992, the European Commission published a Green Paper on reform of the Community's efforts in the field of standardisation. The aim is the creation of uniform standards in sizes and weight, qualifications, safety, hygiene and veterinary requirements and all other technical standards which are specific to certain sectors. This harmonisation will simplify and stimulate international trade. The European Commission has now proposed the creation of a European Standardisation Forum, increased participation of interest groups and advocates greater visibility and implementation of European technical standards.

The European Commission stimulates free competition. Concentration of industries creates economic advantages but should not limit free competition. The EC therefore prohibits mergers leading to possible unfair competitive positions (Directive 89/4064/EEC). Mergers between companies that have to be examined by the Commission have two characteristics. These are: the aggregate worldwide turnover is more than ECU 5 billion and the aggregate community wide turnover of at least two of the companies concerned is more than ECU 250 million.

Besides controlling the wholesale service industry through directives the EC acts as a stimulator of alliances to share know-how and cooperate on technological innovations. The European Interest Grouping is the first EC legal entity that enables European companies to cooperate on a legal and European basis.

In addition, the EC works indirectly as a catalyst for the wholesale service industry through the liberalisation and harmonisation of transportation and financial services, making international trade easier and financially more attractive. Cost advantages because of the liberalisation and harmonisation could be partly counter balanced through increased preliminary controls and certification.

OUTLOOK

The European wholesale trade has a strong base for the future. It performs functions that have to be performed at some stage in the supply and distribution process. In some market sectors, it holds a strong position while in others, its functions have been integrated with suppliers or buyers. For the coming years the European wholesale trade faces some interesting challenges.

The single European market is expected to boost the European economy. Also, manufacturers are concentrating on their core business while leaving the other business processes to specialists with local, technical and logistics knowledge. Both facts are developments that can contribute to a strong future position in the wholesale trade.

The single European market and the opening of the East European market will require European distribution networks. Logistics service companies are building up these networks which include sophisticated communications networks. Wholesalers have to take part in the creation of these European distribution networks through alliances, mergers or acquisitions.

The integration of the levels in the supply and distribution chain means that the borders between companies become fluent. Systems have to be integrated and procedures and commercial policies coordinated in order to improve the total quality for the buyers. Suppliers and buyers will, therefore, reduce the number of business partners they are working with. The intensified relationships will require investments and management time which will force a reduction of business relations.

The dynamics in the supply and distribution chain will force wholesalers to make strategic choices for logistics partners, sourcing partners or integrative wholesaling. The European wholesale trade has challenging opportunities but these require specialisation on a market segment with specific wholesale functions for a selected number of business partners. Focus on the business process of the customer and find ways to add value to this process will be the key factor for success.

Concentration will continue in retailing. Euro-retail chains will emerge that integrate wholesale functions in their own organisation. Alternative distribution forms will arise with the help of the continuing developments in EDI. Direct computer links between buyers and suppliers or public sales information systems will make the representatives of the wholesale companies redundant. The wholesale trade will be forced to innovate its services on a continuous basis focusing on adding value to the business process of its buyers or suppliers.

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Retail trade
NACE 64, 65

Retailing is an important and significant force in the European economy. About 3.3 million enterprises in the EC are involved in retail trade, offering a point of sale where manufacturers are able to display their products and where the final customers make a choice. Through this choice, the end user strongly influences the success or failure of numerous marketing strategies and campaigns of manufacturers, retailers and their advertising agencies. Campaigns are focused on creating customer preference. Although the retail trade in Europe strongly reflect national characteristics, a number of common themes can be identified. Core market development has occurred alongside diversification into other retail and service sectors and geographical markets. At the operational level, retailers have increasingly adopted the marketing concept as they seek to increase sales. Consequently, these developments lead to investments in ways to control costs and to manage the operation more efficiently.

INDUSTRY PROFILE

Description of the sector

Retailing is a dynamic and complex sector involving a range of company types of varying scale. Its structure reflects the cultural characteristics of the society it serves, and any sociological, economic and technological developments have an impact on retail trade. Prominent among these factors are population patterns and associated social trends (e.g. ageing, mobility and urban development). This dynamism and the traditional lack of attention paid to the retail sector makes national comparison of statistics relating to the retail trade difficult. Despite the existence of NACE classifications, national statistic offices and major trade associations produce data based on a range of different definition criteria.

Data is commonly collected on the basis of a variety of definition aspects which mix features such as type of business (independent, multiple chain), type of establishment (department store, hypermarket), selling technique (mail order, self-service) and product range (food, clothes).

The NACE 1970 classification of 'Retail Distribution' encompasses classes 64/65 and is essentially based on the product groups sold, namely: food, drink and tobacco (641/642); dispensing chemists (643); medical goods, cosmetics and cleansing materials (644); clothing (645); footwear and leather (646); furnishing fabrics and other household textiles (647); households equipment, fittings and appliances, hardware and ironmongery (648/649); motor vehicles and cycles (651); motor fuels and lubricating oils (652); books, newspapers, stationery and office supplies (653); and other "non-food products" (654/655, 656).

Under the new scheme of NACE Rev 1, "Retail Trade, except for motor vehicles and motorcycles; repair of personal and household goods" is found in Division 52 of Group G and is due to come into operation in 1993/1994. This classification has moved the motor trade to a new category, defined more detailed products groups, and incorporated second-hand good retailing and repair businesses into the retail trade category. The NACE Rev 1 involves the retail sale of: non-specialised stores (521); food, beverages and tobacco in specialised stores (522); pharmaceutical and medical goods, cosmetic and toilet articles (523); new goods in specialised stores (524); second-hand goods in stores (525); non-store sales (526);and repair of personal and household goods (527).

Retailing is the final link in the distribution channel between the customer and the product manufacturer for the majority of consumer goods. In its simplest form, retailing is the activity which makes goods and services available for purchase and consumption by consumers. The role of retailers in the distribution channel varies with such factors as the characteristics of the products and service concerned and the type and nature of business relationships with others involved in the channel. Traditionally, retailing does not in itself create goods and services, and, consequently, the activities performed by retailers reflect this role. Increasingly, retail activity now adds value to products and services and enhances them in the eyes of consumers. More and more food retail chains offer all types of products under their own private labels, thus offering

Table 1: Retail trade
Contribution of retailing in the national economies, 1990

(%)	Share of total number of companies	Share of total number of persons employed	Share of total gross value added
Belgique/België	14.8	7.4	15.4
Danmark	11.1	7.5	13.4
BR Deutschland	19.0	8.3	10.1
Hellas (2)	34.5	9.5	12.4
España (2)	30.2	11.7	13.8
France	21.4	9.4 (3)	13.2
Ireland (2)	25.5	11.7	10.4
Italia	30.3 (3)	10.3	15.8
Luxembourg (3)	19.5	9.9	13.5
Nederland	15.2	10.0	13.7
Portugal	34.0	7.7 (1)	17.3
United Kingdom (4)	19.4	12.9	12.8
EC	26.1	10.0	12.9

(1) 1987
(2) 1988
(3) 1989
(4) 1991
Source: Eurostat (Retailing in the European Single Market 1993)

articles of high (A-brand) quality with lower prices than the A-brands of manufacturers. They can also try to create a brand out of their outlets. In Western European countries, we see more upstream integration meaning that an increasing amount of fast moving products are delivered directly from suppliers to the retail outlets or the end users. This trend is strongly initiated by the decreased transport lead-times and improved information technology.

Recent trends

Notwithstanding the problems of comparative data in this sector, the retail trades are a significant contributor to the European economy. Best estimates from Eurostat suggest that retail sales in the twelve Member States amount to around 1 335 billion ECU. This turnover is generated by almost 3.3 million businesses and over 13 million persons employed.

Although more and more manufacturers offer 'Eurobrands', products that are available in all European countries under the same label, and retail chains are increasingly undertaking cross-border activities, it is naive to view the retail trades as a single homogeneous international entity. The saying 'retail is local business' is still correct, not only because of its geographically determined cultural differences, but also because of its organisation and selling techniques. The following types of businesses in the retail trade are distinguished: independent retailers with one outlet, retail chains, multiple chains, franchisees and consumer cooperatives.

The independent retailer with one outlet may chose where to buy, but often is associated in a purchasing association for reasons of economies of scale. The owner typically is directly involved with the day to day management of the operation and hardly has any opportunity of managing several outlets.

A multiple chain tries to get control over a broad assortment of consumer products through exploiting several chains with different formulas for different assortments, ranging from products for end users to offering products and services to professional and/or corporate users.

Franchisees are dependent retailers, committed to the franchiser who offers them a complete programme, including the shop formula, the assortment, marketing programs and sales actions. The franchisee can be characterised as a dependent independent entrepreneur.

Consumer cooperatives are organisations owned by consumers operating under specific national legislation defining a cooperative. This ownership pattern provides cooperatives with a distinct, highly democratic, administrative, structure. The fortunes of consumer cooperatives within the EC have fluctuated. Major difficulties have occurred in France and Germany, while these organisations remain significant forces in Denmark and Italy.

A second, yet distinct, dimension of retailing is the selling technique employed. This dimension has several aspects, the importance of which again varies from country to country and with retail product sector. Aspects of selling techniques include: nature of sales point, sales method, scale of outlet, product range and location.

Nature of sales point

The majority of retail sales occur via fixed retail outlets or stores. However, for certain product groups and in certain markets, itinerant outlets and non-store retailing should not be discounted. Non-store retailing involves mail order, door-to-door selling, vending machines and home selling and is more important for non-food lines.

Sales method

In fixed retail outlets, traditional counter service has been replaced in many cases by self-service sales techniques. This has implications for store layouts, staffing and customer service.

Scale of outlet

For fixed retail outlets, statistical distinctions are often made on the basis of size, particularly in the food trades. In spite of a broad international consensus that supermarkets are self-

Table 2: Retail trade
Main indicators, 1990

	Number of businesses (thousands)	Number of persons employed (thousands)	Turnover (billion ECU)
Belgique/België	127.8	247.7	35
Danmark	48.1	199.7	24
BR Deutschland	439.0	2 353.0	322
Hellas	175.0 (2)	338.2 (2)	20
España (2)	454.9	1434.0	85
France	461.8	2 090 (3)	260
Ireland (2)	29.3	131.4	11
Italia	929.7 (3)	2401.0	230
Luxembourg (3)	3.5	18.1	3
Nederland	95.0	637.5	45
Portugal	73.3 (2)	366.3 (1)	20
United Kingdom	348.2 (4)	3 030 (4)	280
EC	3 285.6	13 273.9	1 335
USA	1 503.6	19 085.0	1 335
Japan	1 619.8	6 851.0	682
EFTA	196.0	1 239.5	170

(1) 1987
(2) 1988
(3) 1989
(4) 1991
Source: Eurostat (Retailing in the European Single Market 1993)

Table 3: Retail trade
Changes in retail sales volume

	Index 1992 (1985=100)	Annual change (%) 1989	1990	1991	1992
Belgique/België	116.5	5.0	3.3	-1.2	0.9
Danmark	101.0	-0.7	0.5	2.3	-1.0
BR Deutschland (1)	128.6	1.8	8.9	5.1	-0.8
Hellas	109.8	-0.7	-2.1	-6.2	0.0
France	117.5	2.9	1.9	0.3	0.2
Ireland	110.7	4.8	2.7	-0.2	3.1
Italia (2)	136.1	N/A	N/A	N/A	4.0
Luxembourg	111.0	2.4	1.7	2.3	-2.5
Nederland	121.0	4.3	4.9	2.0	0.7
United Kingdom	119.7	2.0	0.8	-1.0	0.5
EC (3)	120.8	2.3	3.8	1.4	0.0
USA	116.1	2.6	-0.9	-1.4	4.9
Japan	N/A	5.5	6.6	0.6	N/A

(1) Data covers former West-Germany.
(2) Includes only enterprises with at least 10 wage and salary earners.
(3) Weighted average of countries with comparable indices.
Source: Eurostat (monthly bulletin on Services and transport)

service stores with a sales area in excess of 400 m^2, conflicting definitions arise for larger units. For example, while the French define hypermarkets as stores of over 2 500 m^2 with a high proportion of floor space devoted to non-food, German definitions distinguish between self-service warehouses in excess of 5 000 m^2 and consumer markets of 1 500 m^2 and above, while the British superstore definition of over 25 00 ft^2 (2 323 m^2) does not take into account any expected proportion of non-food floor space.

Product range

Distinctions are also drawn between specialists (retailing a single product group), niche players (retailing very narrow product lines) and mixed retailers (retailing a number of product groups, often referred to as 'scrambled merchandising').

Location

Distinctions in location may involve both the physical location such as in-town, edge-of-town or out-of-town sites, and also location features such as controlled environments like shopping centres, for example.

Organisational form and selling technique are two separate features of retailing which are often confused in statistical series. Independents and retail chains may both operate self-service and counter service stores of different sizes in different locations.

International comparison

Within all markets of the EC, regional differences in consumer tastes, particularly for food products, necessitate some product range adaptation by retailers. Also, there are differences in access to certain types of retail facilities between rural and urban areas throughout the Community. The scope of this monograph does not permit an in-depth analysis of the differences, but some characteristics are described in the following paragraphs.

France

France was one of the first countries in Europe to introduce large scale distribution. Despite the expansion of modern large scale store formats (hypermarkets and large area specialists), French consumers remain attached to the traditional neighbourhood stores and street markets. However, the proportion of small businesses is increasing, particularly in food retailing. Hypermarkets and large supermarkets that are mainly food retailers also sell significant quantities of non-food products. To face competition from large scale retailing, small businesses have organised themselves into franchise chains or buying groups. Meanwhile, major retail groups have launched operations in foreign markets to widen their base for further growth.

Germany

Germany has shifted to the centre of attention since its recent unification. The fall of the Iron Curtain has given it the opportunity to act as a 'trade bridge' between Eastern and Western Europe. The entry of the Eastern Länder into the commercial scene was marked by a considerable increase in demand for customer goods. West German distributors, especially large groups, are encouraged to adapt their strategies to the needs of the new regions and their consumers and, thus, benefit from this expansion. They have set up many new outlets, particularly hypermarkets, DIY chains and department stores. In Western Germany, increased purchasing power has made consumers more quality-oriented but also more price-conscious; it is important to note, however, that purchasing power in Germany is set to decrease as a consequence of the economic recession and increasing tax burden. As in France and the United Kingdom, the German distribution sector has sought to diversify and globalise its operations in recent years. There is a growing concentration in the food sector and in other areas (e.g. mail-order houses, DIY chains and department stores). In certain sectors, these developments will lead to a clear reduction in the number of businesses and local units, although total sales area and productivity will increase.

United Kingdom

During the 1980s, British retailing was regarded as one of the most efficient in Europe with major retail groups experiencing a rapid growth in sales and high net margins. Leading British retail companies performed strongly due to favourable economic circumstances and farsighted management. Economies of scale and scope were achieved as market concentration rose and multiple chains grew to dominate most product sectors. One important feature of British retailing reflecting many of the trends and structural changes within the industry during the 1980s is the growth and changing nature of 'own' brands. The immediate issues facing British retailing in the short term arise from the current recession and corresponding stagnation and fall in retail sales.

Netherlands

The Netherlands belong to those countries where cooperation between retailers is well developed. About one quarter of all Dutch retail businesses (excluding motor trades) joined some form of affiliation, mostly buyer's cooperatives, franchising and voluntary chains with wholesalers. Other links include voluntary cooperation between manufacturers and retailers and horizontal sales organisations among retailers. Small and medium sized retail firms continue to be an important feature of Dutch retailing. Frequently, they are turning to cooperation to confront competition from multiples. Within 10 years, affiliated small and medium sized retailers increased their market share from 29% to 40%. This is quite a unique development in Northern Europe where integrated groups have been gaining importance over the past few years.

Belgium

The distribution system in Belgium is midway between the highly concentrated system in Germany or the United Kingdom and the fragmented system in the Mediterranean countries. Today, independent retailing retains a dominant position with approximately 78% of retail sales. On average, Belgian retailing is rather concentrated; about 20% of the companies contribute almost 80 % of total retail turnover. Most hypermarkets are controlled by highly diversified enterprises with several branches. The international dimension is an important characteristic of Belgian retail trade. It is evidenced by presence of foreign retailers on the national market, growing investments of Belgian enterprises in foreign countries, purchasing policies based on international sources and transborder trade.

Luxembourg

As in other Member States of the European Community, small firms are finding it increasingly difficult to cope with the growing competition of hypermarkets and large scale non-food specialists. The number of firms involved in grocery has steadily decreased. The outlet density in the larger municipalities is above the European average.

Denmark

The 1980s saw a continuous fall in the number of enterprises. Small food shops suffered most because of strong competition from large supermarkets and discount chains. Concentration in Danish retailing is still quite low. The food sector is the most concentrated and has the highest share of local outlets. Competition in the high growth discount sector is expected to intensify and bring about changes in Danish retailing behaviour.

Italy

The retail structure and commercial methods have changed radically over the past ten years. The 1980s were marked by an increase in the number of self-service outlets, especially in food retailing (opening of large stores and shopping centres and expansion of cooperative links) and an increase in the number of small independent shops and franchise outlets in non-food retailing. Transformation of the Italian distribution system was often hindered by administrative entry barriers. Opening large supermarkets and hypermarkets is still difficult. The current concentration trend, especially in food retailing, will improve service standards for modern forms of retailing, but it will also reduce average outlet density with possible supply problems for remote areas.

Ireland

Similar to the situation in other EC countries, the principal Irish retail groups mainly operate in grocery retailing but are increasingly diversifying into other sectors. The largest Irish retail group has an interest in the hardware business, while another large retail group owns a number of clothing outlets in addition to its supermarket chains.

Spain

One of the most relevant issues of Spain's modernisation process is the struggle between traditional and modern traders in the domestic market. This dichotomy between traditional and modern outlets has subsisted over the past two decades and still explains the behaviour and performance of the sector. Intense competition for market shares between large groups operating modern formats has introduced a new phenomenon in Spanish retailing.

Portugal

Over the past few years the retail landscape in Portugal has been profoundly modified in both the food and the non-food sector. The appearance of large food stores and the introduction of specialised foreign chain stores (very often under franchising arrangements) have helped to diversify supplies and have brought about a modernisation process.

Greece

The performance of Greek distribution has fluctuated over the past years. Most recently, the political upheavals in former Yugoslavia have started preventing a free flow of goods by road and rail from the rest of Europe. The retail sector is already feeling the impact.

Table 4: Retail trade
Large food stores - Number of hypermarkets and superstores of 2500 m^2

	1975	1981	1986	1987	1988	1989	1990	1991	1992
Belgique/België	70	79	88	88	N/A	98	N/A	N/A	N/A
Danmark	5	N/A	13	13	14	13	14	14	N/A
BR Deutschland	627	821	952	956	N/A	982	996	1 004	1 006
España	4	31	59	69	79	86	102	116	N/A
France	291	433	599	651	687	743	790	849	N/A
Ireland	3	3	N/A	4	N/A	5	N/A	N/A	N/A
Italia	3	12	N/A	43	49	64	86	103	N/A
Luxembourg	30	39	35	N/A	36	N/A	40	N/A	N/A
Nederland	4	4	6	7	8	16	18	20	N/A
United Kingdom	102	279	432	457	500	578	644	733	N/A

Source: Eurostat, Institute for Retail Studies

Supply and competition

The demand and supply issues in retailing may be addressed by making reference to trends in retail sales volume and the operational strategies of retailers. At the operational level the emphasis has been placed on both enhancing sales and controlling costs. Both of these have been aided by the application of technology and the development of management skills in the retail sector.

Customer demand for the services provided by retailers is shown in part by changes in retail sales volume. Indexed sales figures for the 1989-1992 period reveal national differences in growth in total retail sales volume. Such figures alone, however, disguise fluctuations from year to year and between retail product groups. Annual changes in retail sales volume of two or three percentage points are not uncommon as retail sales are very vulnerable to changes in consumer confidence. Britain is a case in point where strong credit-driven growth in the mid 1980s disappeared at the turn of the decade. Similarly, differential demand is observed between retail product groups. Food, as the largest retail sector, tends to mirror the overall changes in retail sales volume and is less prone to dramatic swings in sales volume. Other non food sectors such as clothing and household goods are more prone to fluctuations in volume since, as non essentials, they are more dependent upon customer confidence, and disposable income. Purchases of these products can be postponed or eliminated more readily than those of food products. During times of recession, however, pricing strategies for food retailers also become increasingly important and discount enterprises become more favourable to the customer from every profile type.

The adoption of the marketing concept has been fundamental to the drive to enhance sales. The retailer is the closest of all the institutions in the distribution channel to the consumer and is increasingly using the knowledge derived from this position to develop activities more suited to consumer needs. Companies in the sector have recognised that consumers' perceptions of organisations and store formats are central to the retailing business and have responded accordingly. In general terms, one observes a trend from a mass or generalist retail offer to a specialist retail offer. For example, in mail order retailing this is reflected in the trend towards "specialogues" at the expense of general mail order catalogues. The aim is simply to apply basic marketing principles of segmenting the market, identifying target customers, their motives and values and providing a retail offer to meet these needs.

This does not mean that the mass or generalist retail offer is totally inappropriate. For some consumer groups and purchasing decisions, and in certain environments, this type of offer meets consumer needs. The growth and spread of the large scale food store (whether hypermarket or superstore) shown in Table 4 is testament to this. In the large store sector, which is commonly associated with mass retailing, specialisation is taking place. Large store specialists are developing in most retail product line areas (furniture, DIY, garden centres, clothing, shoes, records and toys), and many department store companies are adjusting their product ranges, effectively becoming large textile specialists.

The targeting of consumer groups and the development of specialist retail offers is particularly visible in smaller store formats. A number of consumer values have been identified and specific formats have emerged to serve these needs. A selection of values and corresponding retail formats are discussed further. The limited line discount store meets customer requirements for low prices via stores retailing limited, low priced product ranges that consist of a few lines and are sold in sparsely decorated and staffed outlets. The convenience store provides for customers seeking to conserve time in their shopping habits. These stores carry relatively wide product ranges with limited lines that usually consist of a single major brand per line. Store decor typically stresses efficiency; accessibility is a premium characteristic and is achieved via store location and long opening hours. The specialist store provides for choice through narrow product ranges but with considerable depth of lines and brands. Staff are generally capable of providing expert advice on the products carried as the customer motive for visiting these stores is to make a choice within a predetermined product group. A style shop provides exclusivity or design originality via quality products in stores which carry few lines. Store fittings are of high quality and customer service in its various forms is also high. The branded goods store supplies assurance to consumers who value the reputation of a single brand. These stores only carry the single brand valued by the customer. Service shops provide the customer with a skill or service usually within a short period of time period. Locally specific shops respond to the consumer's wish for impulse or emotionbased purchases following a particular experience. The product range, theme

Table 5: Retail trade
Employment structures in European retailing, 1991

	Number of persons employed (thousands)	Share of female workers (%)	Share of wage and salary earners (%)	Share of part-time workers (%)
Belgique/België	341.4	55.3	54.9	19.0
Danmark	179.0	54.5	81.2	38.3
BR Deutschland	2 786.7	63.6	83.5	28.5
Hellas	382.0	41.6	30.4	3.2
España	1 417.7	50.4	48.8	5.1
France	1 918.2	54.8	74.0	16.5
Ireland	108.9	47.2	73.4	13.9
Italia	N/A	N/A	N/A	N/A
Luxembourg	18.4	52.7	80.4	9.2
Nederland	572.7	55.3	79.0	47.3
Portugal	479.4	47.8	48.5	5.2
United Kingdom	2 909.8	58.5	85.2	42.1
EC (1)	11 114.2	56.6	73.5	25.8

(1) Excluding Italy
Source: Eurostat (Labour force survey)

Table 6: Retail trade
Number of EAN scanning stores, 1981 - 1992

	1981	1983	1985	1987	1989	1991	1992
Belgique/België	0	12	115	278	648	1 147	N/A
Danmark	0	0	14	107	530	1 300	N/A
BR Deutschland	23	69	290	966	2 252	7 260	8 390
Hellas	N/A	N/A	N/A	N/A	N/A	N/A	N/A
España	0	2	36	188	912	5 039	N/A
France	2	37	420	1 626	3 471	6 650	N/A
Ireland	N/A	N/A	N/A	10	30	101	N/A
Italia	9	13	20	550	1 250	3 690	N/A
Luxembourg	N/A	N/A	N/A	17	18	20	N/A
Nederland	1	36	137	386	740	1 100	N/A
Portugal	0	0	0	0	83	269	N/A
United Kingdom	7	42	160	793	2 792	6 043	N/A

Source: EAN

and location of these stores are closely linked to a particular experience. In all these store formats, the product range, store ambience and customer service levels are specifically tailored to meet the needs of identified consumer values.

Each type of outlet (e.g. department store, hypermarket and large scale specialist) can be compared to a product with a specific life cycle. In countries with a modern retail system (Germany, France, the Netherlands and the United Kingdom), variety stores and conventional self-service outlets (supermarkets and mini-markets) are experiencing a decline in growth. Large scale specialists in the suburbs and discount stores, specialist chains and convenience stores in the inner cities are in their growth stage.

As certain traditional retail formats disappear, they are replaced by others that then start their life cycle. The new formats are usually more modern and better suited to local requirements. The stage reached by a given outlet format is not the same in all countries. The hypermarket format is expanding rapidly in southern Europe (Spain, Italy, Greece and Portugal), but its growth has slowed down in northern Europe because the phenomenon first appeared in the 1960s and as a consequence of restrictive government measures. Southern Europe has not only caught up in terms of modernisation: indeed, the hypermarkets being opened nowadays are of the most up to date technological standards. A great effort is needed to modernise northern European hypermarkets.

Beside marketing as a main factor for increasing sales, retail management focuses on managing cost structures. The largest element is the cost of purchasing the product for resale. For that reason great emphasis is placed upon maximising buying power benefits through scale or efficiency. Scale is related to the volume of products sold within a product range, sales growth via internal development, acquisition or collaboration. The breadth of product ranges and number of brands stocked also influences power as sales volume is concentrated or dispersed over the lines or brands. Finally, efficiencies in decision-making, preliminary through centralisation or the coordination of purchasing, provides for greater buying power. Food retail outlets particularly optimise shelf-space management, which is a determining factor in buying decisions.

Closely associated to the cost of buying, particularly for retailers with a high stock turnover, is management of the delivery and distribution of products to stores and customers. A clear trend in Europe is a move towards the centralisation of physical distribution, where suppliers deliver to a central point for redistribution rather than direct to the store. Often this process may involve the subcontracting of this activity to a specialist third party distribution companies.

A third element of cost structure which has changed significantly over time is employment structures. Retailing is a major employer, particularly of women, and increasingly of part-time employees. Employment ratios however vary from nation to nation as do hourly labour costs. The trend towards part-time employment allows greater control over labour scheduling by matching staff levels with peak trading times, and also aids in the control and management of labour costs.

Supply chain management is increasingly important to improve both marketing and control. Buying terms and conditions are still the subject of debate between suppliers and retailers; however, the nature of these discussions becomes more and more collaborative. Coordination of the supply chain has grown, enhanced by improved information on product movement and the increasing power of retailers who regard the outlets as a brand. The combination of activities, products and services offered by the retailers "add value" to the basic product offering and provide a means of differentiation from competitors. The growth in retailer advertising reflects this trend, as does the development of retailer brand product ranges. Especially in the food sector, the role of the retailer brand has changed. The original market position of these food brands was a low price/lower quality alternative to manufacturer brands; but, as these brands carry the retailer's name and are unique to the store, they have been repositioned, their quality improved and are increasingly associated with new product launches. In some food retail chains, private labels already take 30% of the fast moving product assortment. This forces the supplier to emphasise quality control, product development and a soundly perceived quality/price ratio.

All of these operational issues have been aided by the introduction of technology in retailing and the development of management skills. Initially, technology investment was driven by the desire for better management of assets and the associated productivity improvements. Increasingly, a number of retail businesses are appreciating the potential for information technology to aid marketing and strategic management decisions. The acceptance of universal standards that allow item identification, data transmission and electronic processing have been central to the adoption of technology in retailing. For example, without agreements on bar-code standards, investment in item identification equipment such as scanning could not take place.

Investment in such technologies has provided the information infrastructure upon which application technologies such as electronic funds transfer at the point of sale (EFT-POS) and electronic data interchange (EDI) are based. These application technologies provide the information basis for improved management of the company. Technology alone, however, will

not manage a business. Managers must still make decisions based on the information provided by technology. As the information available to managers has increased and changed in nature, management styles and structures have evolved to maximise the benefits. Although management styles differ, there is some evidence of a trend towards centralised decision making, whether at regional of national level. One could argue that the growth of franchising and the changing membership conditions of buying groups and voluntary chains represents a similar step among independent businesses to create a more uniform image and benefit from economies of scale and replication.

INDUSTRY STRUCTURE

Companies

The largest retail companies in Europe are now of significant size in terms of turnover to be ranked alongside businesses in the production sector of the economy. Given the size of the food sector, the majority of the largest companies are predominantly food retailers, although mail order companies such as Otto Versand (D) and Schickedanz-Quelle are featured in any listing of major companies, along with a few department stores as well. In the Fortune ranking of the world's largest retail based organisations, 20 EC companies rank in the top 50.

Of these major companies, the vast majority have either diversified operations or have made important international contributions to turnover. The exceptions to this observation are the British food retailers. Tesco and Argyll which are essentially domestically based 'core' business operations; however, they cooperate in international retail associations and show a tendency towards internationalisation.

The retail sector is accustomed to rapid change. Companies which were on top in the early 1980s, like department stores, have declined and have been replaced by food retailers. Companies like Carrefour (F), Asko (D), Argyll (UK) and Ahold (NL) have effectively been formed since the 1960s. These companies have grown rapidly through the introduction of new forms of retailing (e.g. the hypermarket and large store discount outlets) and growth through acquisition and collaboration.

Strategies

The power struggle in the supply chain continues. The four areas where the relative power position of the players in the supply chain differ are: large brand suppliers, large purchasing chains, wholesalers and where large brand suppliers share margins with large purchasing chains. As they grow in size, retailers have increasingly developed clear strategies to maintain growth and service within the market place. We distinguish four strategic options: seek product market dominance, diversify beyond the original activities, integrate upstream and diversify geographically

One basic strategy has been to seek product market dominance. Growth is sought within the existing 'core' product market as companies seek to increase their share of sales through new outlet development, or through cooperation with, or acquisition of, others operating in the market. Within every country and retail product market in the EC, examples may be found of companies employing this route to growth. The clear consequence of this strategy is product market concentration with a greater share of sales attributed to single organisations or collaborative groups.

An alternative strategy is to diversify beyond the original activities of the business into related or new product markets. This may involve a redefinition of the existing retail product market as existing ranges are widened to encompass related products or services. Similarly, other segments within a known product market may warrant attention. An established hypermarket operator, for example, may develop smaller formats such as discount or convenience stores. Possibly the most risky option is to diversify into new unrelated retail products or service markets of which the company has no experience or knowledge. Generally the diversifying business will have management expertise in one retail sector which is felt appropriate to the new sector. The consequence of this option is that the organisation develops a portfolio of different retail businesses. For example the seven largest DIY retailers in

Table 7: Retail trade
Largest retail based organisations in the EC by turnover, 1992

Company	Country	Turnover (million ECU)	Change 1991/92 (%)	Sector
Tengelmann	D	21 568	1.2	Food
Rewe-Handelsgruppe	D	18 485	1.6	
Carrefour	F	17 838	24.3	Food
E. Leclerc	F	15 533	20.7	
J. Sainsbury	UK	13 213	20.9	Food
Promodès	F	12 822	17.4	Food
Groupe Pinault-Printemps	F	10 695	106.0	Dept. store
Tesco	UK	10 475	17.4	Food
Koninklijke Ahold	NL	9 899	14.0	Food
Karstadt	D	9 548	14.6	Dept. store
Groupe Casino	F	9 378	54.6	Food
Kaufhof	D	9 028	19.7	Dept. store
Delhaize 'Le Lion'	B	8 191	11.9	Food
Marks & Spencers	UK	8 149	0.9	Dept. store
Asko Deutsche Kaufhaus	D	7 368	-15.7	Dept. store
Corte Ingles	E	7 176	8.5	Food
Argyll Group	UK	7 089	12.7	Food
Quelle Group	D	6 995	9.1	Mail order
Otto Versand	D	6 924	23.2	Mail order
Spar Handels	D	6 512	13.6	Food

Source: Fortune, August 1993

Europe are now subsidiaries of retail organisations with their main activities in other retail product markets.

Upstream integration is another option for the retailer, and may include activities like wholesale functions. This enables the retailer to become a more powerful purchasing partner for the supplier.

A further type of diversification is geographical diversification that involves activities outside the domestic market. Internationalisation in retailing takes a number of forms. At one level, there is technology transfer where a retail format or innovation - such as the limited line discount store, the convenience store or hypermarket - is developed in a number of national markets. This transfer may or may not be directly linked to a single company. In addition, certain retail activities such as purchasing and management systems may involve an international dimension. The formation of international buying groups in the late 1980s reflects this trend. Large retailers generate a significant proportion of sales from overseas activities. The management involvement in international operations will range from a financial stake in existing companies, to franchising and everyday management control.

The changing retail environment further reinforces the importance of management information systems and management skills. While some of these organisations remain private businesses and finance expansion through cash flow and bank loans, an increasing number are turning to the stock market for funds. This is particularly true of British and Dutch companies, and increasingly true of French corporate chains.

ENVIRONMENT

The concern over ecological issues in Europe generally has some impact on the retail sector. First, the growing demand for 'green' or environmentally sound products (such as cosmetics, washing powders and paper products) has been taken into account in product range selection. A potentially greater impact, however, is in the area of packaging and packaging waste. This issue has come to the forefront in Germany with legislation placing the responsibility for the recycling of packaging materials on manufacturers and retailers, and is also on the political agenda in a number of other countries. In Germany, the Netherlands and France, a number of leading retailers have already begun to take an active role in waste disposal. Another trend is the responsibility of material in electric household appliances that might cause environmental pollution when disposed of (e.g. appliances containing chlorofluorocarbons). Legislation is in preparation in Germany to require the producer, wholesaler and retailer to take the material back for remanufacturing.

REGULATIONS

The regulatory framework affecting retailing in the EC largely takes place at the national level. The scope and range of policies specifically directed at the retail sector varies from country to country, and broad legislative activity to regulate industry, in general, affects retailing (e.g. taxation and social protection legislation). Retail-specific legislation has tended to be reactive rather than proactive in most countries, formulated in response to particular problems and political pressures rather than forming part of an overall strategic approach to the retail sector. In general, legislation exists to control unfair competition (whether through monopoly control policies or the regulation of discriminatory and restrictive practices), to monitor establishment of retail business and premises and to protect consumers.

The scope and effect of legislation is varied across the EC. Legislation to control the growth of large stores exists in a number of markets, with the effect of slowing growth (France) or preventing growth (Belgium). Differences in sales tax and excise duties have lead to cross-border shopping in a number of markets, such as on the Danish-German border and the Irish-Northern Ireland border. Competition policy has prevented proposed mergers in the United Kingdom and Germany.

At EC level, various aspects of the single market will influence the retail trade. The mutual recognition of national product safety standards, along with the removal of border controls, will influence the sourcing, transport and movement of product. Fiscal harmonisation (particularly of VAT) will potentially affect the final transfer process to consumers; aspects of the social charter will influence employment structures.

OUTLOOK

Retailing is an important sector of any national economy and will remain so in the foreseeable future. The total retail sales in the EC declined significantly throughout 1992 and continued to fall in the first half of 1993; a recovery, however, is still foreseen.

As retail internationalisation in its various forms increases over the next decade, similarities in the retail formats and management techniques seen in different countries will grow. This will be particularly noticeable in Southern Europe as the retail trade 'learns' from the northern countries.

The ongoing struggle for power between the manufacturers and retail chains will lead to an increase in product quality for the consumer, while a decline in the number of products offered is foreseen. Despite these trends, retailing will however retain distinct national characteristics. In most countries and retail product markets, the dominance of large organisations is growing. Scale will remain a key issue in retailing; contractual chains will provide an important means of achieving some of the scale benefits for independent businesses.

For many of the larger organisations, national market shares in their retail product sectors are approaching limits which may attract the attention of public policy agencies. Continued growth through acquisition in these sectors may also be limited by a dearth of target companies. Attention will be increasingly focused not only on diversification and internationalisation as a strategic route to growth, but also on marketing and management control activities to increase the return from existing operations.

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MENU

Overview

NACE 665, 667, 771, 661

The tourism industry in Europe is in a constant state of evolution. This is in direct response to the changing demands being placed on suppliers by tourism consumers who are becoming ever more sophisticated in their tourism expectations in terms of quality of service, diversity of tourism products, and improved provision of accommodation, restauration, entertainment and travel services. With more disposable income and leisure time to devote to leisure, traveller are bringing about increases in both the taking short-break and long haul holidays segments of the tourism market.

Thus far, the European tourism industry, in the main, has responded to the current challenges put before it by developing appropriate tourism products to satisfy the new demands. Rapid changes in demands means that analysis of this constantly evolving market continues to be necessary. Tourism is an extremely horizontal industry which comprises a wide variety of services and industries. The performance of the industry to date on the world market and home markets has continued to grow and to improve.

Analysis of market forces, trends and the regulations which impact on the development of tourism in Europe, all indicate a positive outlook for the future development of the industry. However, in order to improve the performance of the European industry, future strategies should incorporate greater diversification of tourist products, bearing in mind the "value-for-money" aspects.

INDUSTRY PROFILE

Description of the sector

Tourism represents a complex economic and social phenomenon which affects millions of citizens in Europe as well as all over the world. The impact of tourism on these citizens is felt both as beneficiaries of tourism products and services and as providers of a variety of services which seek to meet the various needs of tourists. The pervasive power of tourism throughout the world on local communities is matched by very few other industries. It entails a complex network of businesses engaged in the provision of accommodation, restauration, travel facilities and services and entertainment for the tourist.

According to the World Tourism Organisation (WTO) definition adopted by the United Nations Statistical Commission in March 1993, a tourist is defined as a visitor staying at least one night and for no more than one consecutive year in a place other than that corresponding to his usual environment. However, when considering the nature of travellers engaged in the various forms of tourism, the term "visitor" represents the basic concept of tourism statistics: there are visitors making pleasure trips for purely tourist purposes or in order to visit friends and relatives as well; and then there are those who make business trips. Another important and growing segment of the market is that of the excursionist or same-day visitor who does not stay overnight away from his usual environment.

The tourism industry is thus, better viewed as a market rather than as a sector given the wide range of related industries

Table 1: Tourism
International tourist arrivals in Europe

(thousands)	1987	1988	1989	1990	1991	1992	Share (%)
EC, total	152 920	159 014	176 372	180 815	181 566	188 361	65.5
Belgique/België	2 516	2 700	3 007	3 164	2 944	3 200	1.1
Danmark	1 171	1 150	1 218	1 275	1 429	1 543	0.5
BR Deutschland	16 147	16 732	19 217	17 045	15 648	15 950	5.5
Hellas	7 564	7 923	8 082	8 873	8 036	9 000	3.1
España	32 900	35 000	35 350	34 300	35 347	36 054	12.5
France	36 974	38 288	49 544	53 157	55 731	58 500	20.3
Ireland	2 664	3 007	3 484	3 666	3 566	3 600	1.3
Italia	25 749	26 155	25 935	26 679	26 840	26 974	9.4
Luxembourg	645	760	875	820	861	865	0.3
Nederland	4 922	4 876	5 206	5 795	5 843	5 950	2.1
Portugal	6 102	6 624	7 116	8 020	8 657	8 870	3.1
United Kingdom	15 566	15 799	17 338	18 021	16 664	17 855	6.2
EFTA, total	30 984	31 883	34 596	35 983	35 429	35 822	12.5
Austria	15 761	16 571	18 202	19 011	19 092	19 098	6.6
Finland	823	877	882	866	786	790	0.3
Iceland	129	129	131	142	143	143	0.0
Liechtenstein	75	72	77	78	71	71	0.0
Norway	1 782	1 704	1 867	1 955	2 114	2 120	0.7
Sweden	814	830	837	731	623	650	0.2
Switzerland	11 600	11 700	12 600	13 200	12 600	12 950	4.5
Other Europe (1)	49 719	52 123	59 580	67 380	60 909	63 346	22.0
Europe, total	233 623	243 020	270 548	284 178	277 904	287 529	100.0
Share of world total (%)	63.7	61.7	63.2	62.4	61.1	60.5	

(1) Includes Cyprus, Gibraltar, Israel, Malta, Monaco, San Marino, Turkey, former Yugoslavia, Bulgaria, former Czechoslovakia, Hungary, Poland, Romania and former USSR.
Source: WTO

Table 2: Tourism
International tourism receipts in Europe (1)

(million ECU)	1987	1988	1989	1990	1991	1992	Share (%)
EC, total	60 682	65 231	71 422	79 709	82 812	83 766	73.9
Belgique/België	2 581	2 907	2 781	2 807	2 799	2 889	2.5
Danmark	1 922	2 057	2 099	2 609	2 804	2 696	2.4
BR Deutschland	6 651	7 145	7 858	8 389	8 834	8 551	7.5
Hellas	1 965	2 026	1 794	2 032	2 071	2 003	1.8
España	12 785	14 111	14 680	14 601	15 336	16 409	14.5
France	10 282	11 659	14 745	15 851	17 189	17 094	15.1
Ireland	727	843	971	1 136	1 206	1 190	1.0
Italia	10 545	10 489	10 877	15 503	15 872	15 417	13.6
Luxembourg	174	201	260	228	230	221	0.2
Nederland	2 334	2 452	2 770	2 839	3 288	3 826	3.4
Portugal	1 858	2 031	2 437	2 792	2 986	2 993	2.6
United Kingdom	8 857	9 309	10 149	10 923	10 196	10 477	9.2
EFTA, total	15 943	17 517	19 300	20 349	21 488	21 209	18.7
Austria	7 677	8 533	9 727	10 531	11 262	10 966	9.7
Finland	713	831	923	919	961	924	0.8
Iceland	74	91	98	96	94	90	0.1
Norway	1 087	1 240	1 213	1 191	1 270	1 224	1.1
Sweden	1 761	1 984	2 308	2 281	2 200	2 157	1.9
Switzerland	4 630	4 837	5 031	5 331	5 701	5 847	5.2
Other Europe	6 903	7 843	9 138	9 295	7 255	8 425	7.4
Europe, total	83 528	90 590	99 860	109 353	111 555	113 400	100.0
Share of world total (%)	56.2	54.2	52.2	54.6	52.9	52.8	

(1) Excluding international transport.
Source: WTO

and services involved right across the economy, the most important of which being the lodging subsector, catering, sports and entertainment, travel services and the transport and crafts industries.

The aim of this chapter is to focus on the following sub-sectors:

- Hotels (NACE 665);
- Other accommodation (NACE 667);
- Travel services (NACE 771);
- Restaurants (NACE 661);
- Recreation parks;

The diversity and fragmented nature of the tourism industry is a disadvantage when collecting and aggregating statistics particularly when making comparisons at the international level. The current work developed by the European Commission in co-operation with EC and EFTA Member States and international organisations such as OECD and WTO aims to harmonise methods and definitions used on tourism statistics in order to gather reliable and coherent figures at the international level.

Recent trends

According to WTO estimates for 1992, over 188 millions of international tourist arrivals were estimated in 1992 in all EC Member States, representing 40% of the world market share.

For the same year international tourism receipts, excluding transport expenditure, represented 84 billion ECU which constitute 39% of the world market share. In order of importance the principal international tourist destinations in the Community, are France, Spain and Italy which together receive 66% of all international arrivals and 58% of receipts.

These figures exclude domestic tourism as well as same-day visitors. The volume of domestic tourism - overnight stays in the country of residence - exceeds outbound tourism considerably. It is estimated that about 2/3 of all holidays generated by the EC population can be classified as "domestic"; 22% is related to international tourism between the EC member States and 13% of all holidays are spent at destinations outside the Community. Domestic tourism is even more important in the Mediterranean countries (84-87%) and in Portugal where the rate (90%) is the highest of the Community.

Same-day visits are confirming their growing importance as part of tourism in many industrialised countries. At the international level, day trips to neighbouring countries, constituted in Europe one out of every two trips in 1992. It is a segment of the market which has doubled between 1980 and 1992.

The fact that tourism constitutes an important source of revenue for EC Member States is confirmed by Eurostat's estimate that tourism contributed 5.5% of the Community's GNP in 1992. In Spain and France the relative importance of tourism activities in their economy. is approximately double that of the Community average, Greece, Portugal and Ireland are also above average.

International comparison

According to WTO estimates for 1992 and 1993, the world travel and tourism industry has maintained its rate of growth, despite a general economic recession. In 1993, international tourist arrivals increased by 3.8% in respect of the previous year, reaching 500 million worldwide. Even if the rate of growth of arrivals was lower than in 92 (4.5%) the increase in receipts has been important, reaching 9%.

In 1993 Europe registered 300 millions internationals arrivals (4.3% more than in 1992). Europe, with a world market share

Table 3: Tourism
International tourist nights in Europe

(thousands)	1989	1990	1991	1992	Share (%)
EC, total	365 145	363 903	361 586	362 759	69.2
Belgique/België	6 575	6 873	6 508	6 800	1.3
Danmark	4 887	5 429	5 963	6 142	1.2
BR Deutschland	29 638	30 954	29 871	28 529	5.4
Hellas	32 938	35 012	29 865	33 927	6.5
España	78 301	64 627	73 978	76 493	14.6
France	51 025	55 322	51 871	54 450	10.4
Ireland	7 434	8 277	9 423	10 017	1.9
Italia	68 139	66 012	65 843	57 942	11.1
Luxembourg	1 188	1 085	1 182	1 185	0.2
Nederland	7 352	8 102	7 993	8 712	1.7
Portugal	15 468	16 710	19 089	17 562	3.3
United Kingdom	62 200	65 500	60 000	61 000	11.6
EFTA, total	95 767	97 412	99 419	100 026	19.1
Austria	61 428	61 894	64 062	64 190	12.2
Finland	2 517	2 468	2 201	2 241	0.4
Iceland	380	390	400	400	0.1
Liechtenstein	152	149	142	142	0.0
Norway	7 434	8 277	9 423	10 017	1.9
Sweden	3 367	3 193	2 826	2 834	0.5
Switzerland	20 489	21 041	20 365	20 202	3.9
Other Europe (1)	98 170	92 941	57 646	61 472	11.7
Europe, total	559 082	554 256	518 651	524 257	100.0

(1) Excluding former USSR.
Source: WTO

of 60% of all international arrivals, still represents the principal force of impulsion of international tourism. Between 1970 and 1992, Europe has lost 10% of its world market share to new destinations located in third countries particularly in South East Asia and the Pacific area. Even though in 1992 and in 1993 Europe enjoyed an annual increase of over 10 million tourists, thus reversing the negative trend experienced in 1991 as a result of the Gulf Crisis, the rate of growth is the lowest recorded among all the regions of the world.

At world level in 1993, East Asia and the Pacific area have experienced the most significant progress, with an increase of 12% in terms of arrivals and 15% in terms of receipts.

The United States continued to lead the world in terms of tourism expenditure (37.7 billions ECU) and tourism receipts (41.5 billions ECU) in 1992. WTO's preliminary estimates indicate for 1993 an increase of the receipts of 15%, the greatest recorded for a single country in one year.

With regard to long-haul travel, the United States also represents the principal tourist destination for Japanese visitors - 20% of all Japanese travelling abroad visit the United States - as well as for European tourists outside of Europe: the USA received 3.4 million European arrivals in 1992.

According to the Travel Industry Association, travel and tourism is the America's largest export and America's second largest employer. Employment has grown twice as fast as total US employment.

In 1992, Japan received 2.3 million international tourists, 24% of whom came from Europe. With 18 million Japanese travelling abroad, 53% of whom visited East Asian and Pacific countries. over the last decade, Japan has become the third most important spender in the world on travel abroad. It has been estimated that Japanese tourists spend on average four times more than the European tourists and twice as much as American tourists travelling abroad.

France continues to maintain its position as the world's leading tourist destination, receiving 59.6 million international tourists in 1993. After the United States, France maintains also second place as a top earner of international tourist receipts, followed by Spain and Italy.

Foreign trade

According to WTO, international tourism receipts represent 1.72 of the total GNP of the European Union in 1991. The contribution of tourism receipts to GNP is substantially higher in Portugal, Greece, Ireland and Spain . More than 50% of tourism receipts finance the trade deficit of France, and more than 4O% in Italy and Spain. In Austria , the fifth top earner country in the world in terms of tourism receipts, tourism finances the 2/3 of the trade deficit.

As a positive contribution to the balance of payments, tourism represents 1/4 of the services exported by the Community to third countries.

France, Italy and Spain collect 58% of international receipts in the Community. For the EFTA Countries, Austria alone collect over 50 % of the receipts and Switzerland 28%.

Even though European long-haul travel almost doubled between 1980 and 1992, Intra-Community flows still dominate the market. The most important markets for tourism into the EC are the EFTA countries, United States and Japan.

Europe is also important as a source market for most regions: to South Asia: 39% of international arrivals are originated from Europe, to the Middle East, the proportion was 32% and to Africa, 25%, mainly to Tunisia and Morocco.

Table 4: Tourism
World tourism performance, 1992

Destination	Arrivals (million)	Change (%) 1991/92	Change (%) 1990/91	Tourism receipts (million ECU)	Change (%) 1991/92	Change (%) 1990/91
Africa	17.0	7.2	5.8	3 980	12.5	-9.5
America	102.1	4.7	4.3	58 984	6.3	10.5
East Asia/Pacific	58.3	8.2	3.1	33 350	7.5	4.5
Europe	287.5	3.5	-2.2	113 400	6.5	-0.7
Middle East	7.2	6.9	-10.3	3 356	9.7	-21.0
South Asia	3.5	7.6	2.0	1 632	8.1	-1.4
World	475.6	4.5	-0.1	214 702	6.8	2.4

Source: WTO

With 28.6 billion ECU, Germany is the main European spender, at world level it is second only to the United States. Other main European spenders, between the top eight at world level, include United Kingdom, Italy, France and Netherlands. These five countries represent 36% of the world tourism expenditure abroad.

MARKET FORCES

Demand

The demand for holidays is influenced by a variety of factors which affect the decision whether to take a holiday, what type or length of holiday and where to take it. The most important of these factors include: income, available free time, age and family circumstances, comparative price level , environmental conditions.

One of the indicators used for describing the demand patterns is the level of "trip taking". It is measured by the proportion of the adult population taking a trip of at least one night out of their place of residence. According to estimates by the European Travel Intelligence Centre, the ratio is comprised of between 55% and 87% with reference to the EU and EFTA countries. The latter, and in particular the Nordic countries (Iceland, Finland, Norway and Sweden) show the highest propensity in Europe to travel. The largest proportion of trips abroad made by Europeans are to neighbouring countries, as confirmed by the high share of foreign trips made by Belgian, Luxembourg's and German residents.

Income, linked with education and social status, in particular affect the level of trips-taking. Those with high disposable income tend to travel more frequently. In addition, business travel, which is becoming increasingly important, is usually much more frequent than leisure travel.

According to a recent study carried out by the French Tourism Directorate, France occupies second place, after the United States, in international business tourism market. It has been estimated that in 1991, foreign business tourism, represented for France 20% of total nights spent and 40% of the receipts in foreign currency generating a turnover of 1/5 of total tourist activities. Despite a slowing down due to the overall economic situation, business tourism market is forecasted by the majority of professionals to become a major tourism product which is expected to further grow.

Focusing on holidays (four and more overnight stays) the proportion of the EU population that takes at least one on a yearly basis is estimated at about 55 to 60% of the adult population. The total number of holidays yearly undertaken by EU residents is estimated between 250-300 million in 1991 and 1992. Remarkable differences still occur between Member States: in France and the northern EU countries more than six out of ten people take a holiday, the level is significantly lower in Mediterranean countries. As far as cross-national flows among EU countries are concerned, north-south flows have dominated since the start of mass tourism in Europe. About 70% of tourism where the origin and destination are the EU can be classified as following the direction north-south.

Over 71% of nights spent by international tourists in hotel and similar establishments of the EU are concentrated in four countries, with Spain taking the lead, followed in the order by the United Kingdom, Italy and France. Recovery in the North American and Japanese markets in 1992 has given rise to a slight up ward movement in tourist nights for Europe after two year of negative trends.

In terms of nights spent by international tourist, Austria, which is in second place in the whole of Europe, receives 64% of the total for EFTA countries.

There are a number of new trends which are characterising tourism demand in Europe: the expansion of the short-breaks market and second holidays as well as growth in outbound travel from the southern European markets.

Changes in population age structure also strongly influence the nature, incidence and timing of holidays during the last decade of the century. An emerging fast growing segment market is the "senior travel market" which constitutes the 20% of the trips taken by the Europeans. The European Travel Commission estimates 200 million trips were made in 1991 by the Europeans over 55 years old, 80% of which were made in the country of residence. Between 1988 and 1991, the senior market share has already grown 10% and considerable prospects for future development.

More mobility holiday-makers in terms of changing destinations, seasonality and more active behaviour is increasing. Even though traditional tourist products associated with sun, sea and beach resorts still dominate the market, the interest for cultural activities, in a broad sense, when taking holidays, is growing and may contribute to the staggering of holidays.

Another important factor which may strongly influences tourist flows is the emphasis placed on the value-for-money. As tourists continue to become more sophisticated they demonstrate willingness to receive higher standards of quality and services without being ready to accept a significant increase of the expenses.

Supply and competition

The tourism industry comprises booth a wide range of economic activities and a supply of products which come from a whole range of different types of enterprise. Their common characteristic is the variety of the existing enterprise structures as well as of the huge number of services made available. For this reason in this domain there co-exists various forms of ownership from small sole proprietor to multinational cor-

Table 5: Tourism
Market share of tourist arrivals by region

(%) Destination	1960	1970	1980	1990	1991	1992
Africa	1.1	1.5	2.5	3.3	3.5	3.6
America	24.1	23.0	21.3	20.5	21.4	21.5
East Asia/Pacific	1.0	3.0	7.3	11.5	11.8	12.3
Europe	72.5	70.5	66.0	62.4	61.1	60.5
Middle East	1.0	1.4	2.1	1.6	1.5	1.5
South Asia	0.3	0.6	0.8	0.7	0.7	0.7
World	100.0	100.0	100.0	100.0	100.0	100.0

Source: WTO

porations. Supply reflects demand, both in terms of structure, and in terms of trends. According to this hypothesis, concentration of the industry within a country will only occur in a sustainable manner, if the aspects of demand encourage and justify it economically in the long-term. The basic factors of demand are very asymmetric across the European market, as they vary significantly from country to country. Government regulation together with the number and size of enterprises determines the degree of competition which in the main tourist activities seems to be relatively high.

Production process

According to Eurostat of over 1.2 million enterprises involved in hotel and restaurant activities in the Community, 95% are made up of micro-enterprises (less than 9 employees). Europe confirm its leadership at world level in terms of accommodation capacity. For Hotel and similar establishments, the trend in the Community is towards a reduction in the number of enterprises and a gradual increase in the accommodation capacity in absolute terms as well as on average per establishment. Even though the average size in the Community went up from 43 to 45 beds, the rate is still lower in relation to areas outside the Community. Nevertheless, in this case also, the situation varies from one individual Member State to another:

- lower than EC average in United Kingdom (25 beds per establishment), Germany (34) and Luxembourg (38);
- higher in Denmark (170 beds), Portugal (106), Spain (101) where the boom in package tourism has led to investment in large hotels.

In spite of the difficulty of evaluating the impact of tourism on employment, it is certain that all sectors of the tourism industry are labour intensive. Jobs in tourism activities in the Community number some 9 million. Tourism represents about 6% of total jobs in the Community, taking into account only jobs directly linked with tourism products and services. Besides these direct jobs, it is also necessary to consider the indirect or spin-off jobs created in sectors outside tourism in the strict sense. The structural flexibility and, in some cases, the weakness of this segment of the market may explain the degree of attraction which the sector has for women and young people, often constituting their first employment. Moreover in the services sector, which employs six people out of ten in the Community, tourism also has a high proportion of female employment which varies from 45 to 65% from one Member State to another. The seasonality of employment, another particular feature of tourism, is moreover very variable in different branches: low in cafes and restaurants and in travel agencies, medium in hotels and high in holiday camps and open air facilities.

Considerable new technologies have been introduced into all segments of the tourism industry in recent years. However, the general impact has been on improved quality of service rather than on labour content reduction.

INDUSTRY STRUCTURE

Companies and strategies

Estimates by the World Travel and Tourism Council indicate that investments in these domains in the Member States reached 196 billion USD in 1991, equivalent to 15.3% of total investments and 31% of world investment in transport and tourism industries. By 1994 despite the growth of new capital investments forecasted on a world basis of about 10%, the European Union is expected to register a certain stagnation.

In 1994, in terms of capital investment envisaged for all the industries, the largest investors in travel and Tourism are expected to be Ireland (37%), Spain (24%), Belgium (21%) and Portugal (20%)

The structure of the tourism industry is moving towards rationalisation:

- gradual withdrawal from the market of tiny marginal establishments;
- reinforcement of partnerships in various forms (integrated chains, franchising etc.).

In Europe also, as was the case in the United States, the main trends of the market strategies are:

- concentration on niche markets on a world-wide scale;
- differentiation and segmentation.

In the hotel industry, this approach is being applied: on the one hand, the major European groups through mergers and acquisitions are trying to compete with US groups which are the leaders in the market worldwide; on the other hand, the early 1990s saw the emergence of associations of small hotel groups and consortia whose aim is to improve market awareness.

The performance of the tourism industry can be better achieved through:

- wider integration between the tourism sector and the other economic activities, especially through planned regional development;
- improved balance between price and quality of services provided;
- rapid response to changing tourist behaviour;
- the further application of new technologies in marketing and managing businesses;
- the improvement of the so called "internal marketing".

Table 6: Tourism
Market share of international tourism receipts by region

(%) Destination	1960	1970	1980	1990	1991	1992
Africa	2.6	2.2	2.7	2.0	1.8	1.8
America	35.7	26.8	23.7	25.5	27.6	27.5
East Asia/Pacific	2.9	6.1	8.3	15.1	15.4	15.5
Europe	56.8	62.0	60.4	54.6	52.9	52.8
Middle East	1.5	2.3	3.4	2.0	1.5	1.6
South Asia	0.5	0.6	1.5	0.8	0.8	0.8
World	100.0	100.0	100.0	100.0	100.0	100.0

Source: WTO

Human resources are a key factor to success in the process of change being experienced in the sector. The cross frontier mobility of manpower is higher than in other sectors; The full implementation of the internal market encourages mobility and offers reinforced guarantees for employees and their families. The mutual recognition of diplomas also contributes also to this mobility. Conscious of the importance of vocational training, the European Union will continue to support this field in order to improve the quality and performance of labour in the sector and stimulate exchange of experiences at international level between the major actors involved.

REGIONAL DISTRIBUTION

The tourism industry continues to be concentrated in certain regions, generally in seaside and mountain locations. 44% of overnight stays in Greece are concentrated in the Southern Aegean Islands and Crete. In Spain, the Balearic and Canaries Islands with Andalucia accommodate 50% of overnight stays. In Germany, 30% of overnight stays in the country are spent in Bavarian region and in Italy, the Northeast regions take 30% of all overnight stays. Urban tourism, which comprises tourism in the cities of art, is another relevant segment of the tourism market that still continuing to expand. Among the European capital cities, London, Paris and Rome are the principal destinations.

ENVIRONMENT

The success of tourism relies to a great extent on the quality of the environment where it takes place. While tourism activity is influenced by the environment, the environment is greatly influenced by tourism. Without proper planning and management the industry may damage the resources it depends on for its success. Over the last 20 years the European tourism industry has been characterised by sustained growth which has led to development pressures, both in established tourism resorts and previously unexploited areas, particularly coastlines. This has led to resource management problems, both in terms of physical tourism development and management of facilities and visitors.

The growth in general consumer awareness of environmental problems has led to actions by both the public and private tourism sectors to combat the problems which can be caused by tourism. Development related issues can cause substantial impacts on physical and built environments; and tourism in general may cause air, noise and water pollution; congestion; erosion; and various social impacts. The importance of particular locations and seasonal factors may also aggravate these problems while historically the diversity of tourism has made it a difficult industry to plan and regulate. The industry has responded to the call for better environmental practice in a number of ways. These include:

- the development of sustainable tourism strategies in the public sector and the setting up of environmental associations in the private sector;
- the development of various codes of conduct and self-regulation measures by the private sector;
- a range of joint partnerships at European, national and local level related to research on sustainable tourism and pilot projects which test its applicability;
- the development of new holiday products for certain environmentally conscious market segments.

Alongside these activities broader environment policy at European and national level continues to influence the development of tourism. The increasing (on occasions mandatory) use of Environmental Impact Assessment in tourism may signal a first step towards greater legislative intervention in the industry, particularly in the form of taxation related to energy use and anti-pollution laws. Tighter planning regimes at a regional level are already in evidence in many parts of the EU. Often environment focused activity enables parts of the industry to come together to tackle a common and fundamental interest. It is likely that the improved protection of the environment will remain one of the main challenges facing the industry during the next decade.

REGULATIONS

Given the horizontal nature of the tourism industry, a wide range of local, national and EC regulations impact on the tourism industry, although few are prepared with the specific intention of regulating the sector.

Within the framework of the European Union, many measures have had either a direct or indirect impact on the tourism industry because of the sheer number of activities that it comprises. A preliminary assessment of these measures has been made by the Commission in its two communications of May 1992 (SEC (92) 701,702); a wider report on all community actions affecting tourism will be presented by 1994.

The legislation relevant to tourism can be considered in four main groups:

- measures associated with the completion and functioning of the Internal Market associated with the removal of physical, technical and financial barriers;
- measures aimed at protecting the environment;
- measures intending to bring about social and economic cohesion among all the Member States;
- measures included in the Community Action Plan to Assist Tourism.

Of most interest to tourism firms within the Union, are those Community measures affecting the removal of technical and

Table 7: Tourism
Top destinations for international tourism, 1992

World ranking 1980	World ranking 1992	Country	1992 arrivals, (thousands)	Average annual growth rate 1980-92 (%)
1	1	France	58 500	5.7
3	2	USA	45 500	6.0
2	3	España	36 054	3.7
4	4	Italia	26 974	1.7
10	5	Hungary	22 500	7.5
5	6	Austria	19 098	2.7
7	7	United Kingdom	17 655	3.1
8	8	Mexico	17 587	3.3
6	9	Canada	16 322	2.0
9	10	BR Deutschland	15 950	3.1
16	11	China	14 209	12.4
11	12	Switzerland	12 950	3.2
15	13	Hellas	9 000	5.4
18	14	Portugal	8 870	10.3
14	15	Czechoslovakia (1)	8 000	3.9
24	16	Hong Kong	6 986	12.2
29	17	Turkey	6 675	18.0
12	18	Romania	6 280	-0.6
21	19	Malaysia	6 100	9.3
17	20	Nederland	5 950	6.5
19	21	Singapore	5 247	6.2
22	22	Thailand	5 136	8.9
27	23	Marocco	4 874	10.8
13	24	Bulgaria	3 750	-3.1
20	25	Ireland	3 600	4.0
26	26	Tunisia	3 417	6.5
28	27	Korea	3 231	10.5
25	28	Macau	3 215	5.7
23	29	Belgique/België	3 200	5.0
30	30	Indonesia	3 064	15.8
Total Europe (60.5%)			287 529	3.5

(1) Now the two separate states of the Czech Republic and Slovakia.
Source: WTO

legal barriers, employment, the promotion of fair competition, the development of a business environment which in particular is more conducive to encouraging small and medium sized enterprises (SMEs) to succeed by promoting transnational co-operation and the use of new technologies and the development of a comprehensive, environmentally sensitive European transport network linking even the peripheral regions.

Enterprise policy within the European Union has been established on two main themes: improvement of the environment in which they operate and support for the development of practical tools to assist them, such as information services and services which facilitate transnational co-operation in the main. The Decision of 18 June 1989 (89/490/EEC) to establish a Community policy to assist enterprises, the Council Recommendation of 28.05.90 on the simplification of administrative procedures and the subsequent report to the Council (SEC (92) 1867, of 27.10.92) which recommended even greater transparency, have been prepared with a view to creating an environment in which SMEs in particular can compete effectively and efficiently. The multi-annual action programme adopted by the Council in 1993, serves to reinforce the main lines of action of Community enterprise policy.

The abolition of tax frontiers and the introduction of minimum rates for VAT and excise duties across the Member States from January 1993 are expected to let market forces pull VAT rates closer together. In the interest of consumers and enterprises much effort (particularly on the part of industry lobbyists) continues to be put in to achieving a greater level of harmonisation.

The Directive 92/77/EEC on the approximation of VAT rates, modifying the 6th VAT Directive (77/388/EEC) set the minimum standard rate of VAT at not less than 15%. However, on products or services of a social or cultural nature - a list of items which includes passenger transport, tourist accommodation provided by hotels and similar establishments, sports and entertainment - the Member States can introduce one or two rates of at least 5%.

Another aspect of the VAT which is under consideration is a simplification of the system with a view to reducing the administrative burden placed on enterprises. With regard to passenger transport, with the removal of border controls which were formally used as a means of levying VAT, proposed legislation is being considered to levy VAT on passenger transport by road or inland waterway in the country of departure of a journey rather than according to all the countries passed through during a journey.

The White Paper on Employment in Europe is a major initiative to tackle the long term underlying presence of unemployment in the Community and stimulate new job creation, growth and employment intensity. The nature of tourism as an employment sector lends itself well to the issues addressed in this initiative and the potential of tourism in this context has

Table 8: Tourism
Top earners from international tourism, 1992

World ranking 1980	World ranking 1992	Country	1992 tourism receipts, (million ECU)	Average annual growth rate 1980-92 (%)
1	1	USA	37 747	14.1
2	2	France	17 094	8.6
4	3	España	16 204	9.6
3	4	Italia	15 417	7.7
7	5	Austria	11 404	7.2
5	6	United Kingdom	10 477	5.8
6	7	BR Deutschland	8 551	4.5
9	8	Switzerland	5 847	7.6
15	9	Singapore	4 454	12.3
10	10	Canada	4 430	8.0
17	11	Hong Kong	4 064	12.3
14	12	Nederland	3 826	9.5
8	13	Mexico	3 505	1.0
20	14	Australia	3 259	13.1
24	15	Thailand	3 125	13.7
29	16	Turkey	3 081	23.2
18	17	Portugal	2 839	10.7
11	18	Belgium	2 889	6.3
25	19	Japan	2 703	15.2
16	20	Danmark	2 696	8.4
27	21	Korea	2 511	19.9
26	22	China	2 427	15.6
21	23	Sweden	2 157	9.3
30	24	Indonesia	2 098	22.2
13	25	Hellas	2 003	3.4
23	26	Egypt	1 849	9.5
28	27	Argentina	1 843	17.5
19	28	Taiwan	1 722	7.0
22	29	Israel	1 464	6.4
12	30	Brazil	1 464	0.5
Total Europe (52.8%)			113 400	7.5

Source: WTO

been recognised within the framework of the social dimension. Proposed legislation concerning the regulation of working time and young workers which still under consideration has implications for the Tourism industry.

Supporting tourism development represents an important way of promoting in collaboration with the Member States. With the implementation of the new structural funds for 1994-1999 and the new cohesion fund 1993-99, tourism continues to be an important tool for regional development and the reduction of social and economic disparities between the regions. Within the previous Community Structural Frameworks (1989-93), measures concerning tourism were focused on improving the supply and geographic spread of tourism, reducing the seasonality of the industry, full exploitation of the cultural and environmental heritage, developing rural tourism and developing tourism training for employees. The reforms of the objective areas 1-5, taking place with the implementation of the new structural funds are likely to continue to favour tourism development.

With the creation of the Cohesion fund, an extra 15 billion ECU has been made available to assist Ireland, Spain, Portugal and Greece and those regions which are largely rural or suffering industrial decline and thus lagging far behind the richer regions of the Union. This assistance and investment is intended to enable them to achieve a comparable level of development in terms of communications networks while at the same time ensuring the protection of the environment: both items clearly benefit the tourism industry.

Following the adoption of the Treaty on European Union, consumer policy has been given clear recognition of its role in establishing the internal market. The removal of barriers to freedom of movement offers fantastic opportunities for the development and exploitation of Tourism in Europe. Tourism by its very nature, enables tourists to move outside of their usual environment both in order to purchase and take their holiday. This phenomenon can also make tourism consumers very vulnerable and in special need of information and also legal and economic protection. While the provision of information about products and services, and the provision of assurances of quality and/or of compensation, in the event of a faulty product or service, may seem burdensome for the entrepreneur, in the long term, these measures are necessary for the full functioning of the internal market. Fully informed consumers, safe in the knowledge that wherever they make purchases in the Union they will have access to justice are more likely to take advantage of the opportunities afforded by the internal market, which should in turn lead to increased enterprise activity and competition. In the third Consumer Policy Programme adopted by the Commission in 1993, there is a fair amount of proposed legislation that will safeguard the interests of the tourist but also help to establish a level playing field on which firms can compete fairly with each other.

In the field of Central Reservation Systems, the Council adopted a regulation (3089/93/EEC) on 29 October 1993, modifying the original of 24.07.89 (2299/89) on the imple-

Table 9: Tourism
Top spenders on International tourism, 1992

World ranking 1980	1992	Country	1992 tourism expenditure (million ECU)	Average annual growth rate 1980-92 (%)
2	1	USA	33 637	14.1
1	2	BR Deutschland	28 631	5.0
6	3	Japan	20 786	15.9
3	4	United Kingdom	15 010	9.1
11	5	Italia	12 480	19.5
4	6	France	10 682	7.2
8	7	Canada	8 949	11.6
5	8	Nederland	7 108	5.9
9	9	Austria	6 426	9.5
7	10	Belgique/België	5 161	6.2
17	11	Sweden	4 830	14.5
10	12	Switzerland	4 708	8.3
20	13	Taiwan	4 680	18.2
18	14	España	3 658	11.9
13	15	Australia	3 110	7.2
16	16	Norway	3 019	9.6
15	17	Danmark	2 920	7.7
27	18	Korea	2 899	21.9
25	19	Israel	1 999	14.1
28	20	Singapore	1 877	18.4
23	21	Finland	1 849	13.2
14	22	Mexico	1 843	3.0
12	23	Argentina	1 400	0.1
30	24	Thailand	1 298	17.5
26	25	Malaysia	1 221	10.7
24	26	New Zealand	1 154	9.0
22	27	Ireland	1 021	5.0
19	28	Brazil	970	0.7
21	29	South Africa	914	3.8
29	30	Portugal	890	12.2
Total Europe (56.4%)		117 221	8.5	

Source: WTO

mentation and operation of a code of conduct for air transporters and air passengers using central reservation systems. The scope of the regulation has been extended to non-scheduled services and bundled products. Also the ranking criteria for the display of information on air transport services have been strengthened and clarified. The aims of the code are to ensure the non-discriminatory and transparent use of such systems and improved competition between air transporters coupled with improved information for air passengers.

The proposed consumer measures being considered by the institutions of the Union in January 1994, covers the sale of Timesharing properties, distance selling, abusive clauses in advertising and access to justice for consumers. The Package Travel Directive entered into force 1.1.93 when it was expected that the members of the European Union would have transposed the directive into national legislation. However, to date only the UK, France, Netherlands and Portugal have notified the European Commission of having implemented legislation. The legislation covers various aspects : it seeks to ensure that the consumer is provided with full and accurate information, that the tour operator is able to compensate the consumer and if necessary able to guarantee the safety and security of the tourist. Non-implementation of the directive has at present led to a certain degree of unfair competition since operators in some countries are obliged to satisfy stringent and costly regulations while others do not.

While protection of the tourist as consumer is an essential consideration a balance has to be struck whereby the industry can still function without being overburdened by excessive regulation. This is a key element in the current development of the timeshare and distance selling legislation.

Since January 1993, the first Community Action Plan to assist tourism has been in operation. The three year action programme, with a budget of 18 million ECU aims to ensure the coherency of the Tourism Plan with actions being implemented under other Community measures and policies. This will be achieved by focusing on three main lines of action:

- ensuring that tourism is taken more into account in Community and Member States' policies;
- co-operation between representatives of the sector and its various professional associations;
- support and development of specific actions.

The first objective seeks to achieve greater coherency in the initiatives taken within the Commission, with other bodies implementing policies or taking measures that might have an influence on tourism; with Member States, to complement their actions in certain fields of tourism, develop actions allowing the broadest possible rapprochement of their policies, or provide them with the overall information necessary about the activity, in order to direct their actions better, and encourage all forms of international exchanges on tourism.

The second objective will be implemented basically by means of consultation and co-ordination activities with tourism professionals in order to convey the importance of this business

in economic and social terms, ensure better representation of its interests, and develop information within the industry itself about the policies and measures by the Community with direct repercussions on its business.

The third objective is mainly concerned with actions to guide future policy: to provide better information regarding tourists and those working within the industry; for supporting projects which could serve as examples, and which could be transposed to various regions of the Community; for a general improvement in the quality of tourism services.

Promotion is the subject of various pilot projects, which will enable distant markets to be explored and tested, and the numbers of tourists from those markets to be increased, on the basis of an overall image of European Tourism.

The scope of specific measures will be rather broad, in a very varied number of fields (cultural, rural or social tourism, environmental tourism; vocational training). These actions are directly aimed at the public authorities, industry decision-makers and tourists themselves.

OUTLOOK

The World Tourism Organisation forecasts a growth of 50% in international tourist arrivals by the year 2000. An annual growth rate of 3.5%. is envisaged for the first decade of the XXIst century: by the year 2010 there will be an estimated 937 million arrivals. The generating regions, expected to show the fastest rate of growth include Central and South America, Asia and Africa. Those host tourist regions, which may experience above average growth include the Caribbean, East and South Asia as well as the Pacific area. Even if Europe will still be the main tourist destination, it will continue to lose market shares, mainly to East Asia and the Pacific area.

Written by: European Commission - DG XXIII - Tourism Unit

Restaurants
NACE 661

The restaurant sector includes a diverse range of establishments from fast food take-away to haute cuisine. Throughout the 1980s, changing tastes, rising levels of disposable incomes, greater female labour force participation and increases in tourism expenditures contributed to a steady increase in restaurant revenues. The industry is very susceptible to economic conditions and growth slowed significantly during between 1991 and 1993. Entry and exit barriers are very low. As a result the industry is predominantly populated by small independent establishments, although rapid growth of fast-food chains, particularly franchise outlets, has provided a high degree of uniformity in that sub-sector. While the use of new technology, mainly in food preparation, has been increasing attraction and retention of workers is a growing problem in many Member States. Despite the recent slowdown, the outlook for the industry is relatively buoyant and the factors which drove growth during the 1980s should continue to operate over the remainder of the 1990s.

INDUSTRY PROFILE

Description of the sector

Among the most vibrant and visible commercial sectors of the EC, restaurants are present in virtually every local community. As a sector, restaurants are important to the European economy and to the economies of Member States and regions, but they play their most significant role in their contribution to the local economy of almost every village, town and city in the EC.

There is substantial variation within the restaurant sector, from fast food outlets to high class restaurants, providing very different markets with a variation of the same service, the provision of ready to eat food. Most restaurants are stand alone operations, although some are an integral part of the services provided within other sectors, principally hotels but also including recreation parks, public houses, railways, ferries and night-clubs. There are also other service branches specialising in the provision of food including contract caterers, work canteens and messes and convalescent homes. However, while the type of operations are diverse, the sector is dominated by family restaurants.

There is a fine distinction at the margin between sub-segments of the restaurant industry. Unlike hotels, most grading of restaurants is unofficial, often relatively subjective and generally only applies to the top end of the market.

Recent trends

Eurostat statistics on restaurant turnover varies in content and timeliness across Member States. It is particularly dated in the cases of Greece and Denmark.

Available data indicates that the number of restaurants and cafe-restaurants increased in all EC Member States over the 1986-90 period. A decline in the number of establishments in 1991 in Denmark and in Luxembourg points towards the impact of the slowdown in economic activity which was beginning to emerge at that time.

Restaurant turnover has grown along a well established upward trend over the last decade although there are variations across different Member States and growth has slowed over the last two years reflecting both the onset of economic recession in Member States and the slower growth in tourism expenditures. Within the overall trend increase, turnover in the fast food and take-away sector has been growing most rapidly, although again there are substantial variations across countries with meals in bars and public houses showing the fastest growth in both the United Kingdom and Ireland.

Official employment in the restaurant industry is also available for only a limited number of EC Member States. The evidence indicates that the trend in employment is upward but increasing much less rapidly than turnover. While no official data is available it is likely that employment grew little, if at all over the 1991 to 1992 period.

Restaurant services are not internationally traded although an important market for their services are foreign visitors on holidays or business trips. Estimates for expenditure by tourists on food vary from 20% to 25% of their total expenditure.

Table 1: Restaurants, snack-bars, cafes and other eating places
Main indicators

		Number of enterprises	Turnover (excl. VAT) (million ECU)	Gross value added at market prices (excl. VAT) (million ECU)	Number of persons employed
Belgique/België	1991	21 445	1 966 (1)	N/A	43 878 (2)
Danmark	1985	11 027	1 459	606	32 440 (2)
BR Deutschland	1990	85 391	13 146	7 020 (3)	312 887
Hellas	1978	N/A	N/A	N/A	33 425
España	1989	118 524	11 619	7 303	458 948
France	1988	68 667	10 423	4 800	292 591
Ireland	1988	N/A	N/A	N/A	14 044
Italia	1988	N/A	N/A	N/A	170 724
Luxembourg	1991	475	116 (4)	51 (4)	3 707
Nederland	1990	16 728	3 060	1 250	96 221
Portugal	1989	17 484	N/A	N/A	N/A
United Kingdom	1990	48 764	11 302	N/A	N/A

(1) 1990
(2) Number of wage and salary earners
(3) 1989
(4) 1987
Source: Eurostat

Table 2: Restaurants, snack-bars, cafes and other eating places
Number of establishments, 1986-1991

	1986	1987	1988	1989	1990	1991
Belgique/België	15 327	15 605	16 282	16 922	17 656	18 231
Danmark	12 314	12 584	13 036	13 266	12 809	11 555
BR Deutschland	80 959	N/A	85 810	N/A	90 326	N/A
España	39 220	40 038	43 985	49 167	54 047	51 154
France	65 935	61 743	68 667	71 223	N/A	N/A
Italia	89 424	88 990	88 119	88 713	90 049	N/A
Luxembourg	420	426	438	459	463	430
Nederland	17 204	17 533	18 044	18 798	19 154	20 120
Portugal	2 693	2 889	2 916	3 016	3 504	4 078

Source: Eurostat

Table 3: Restaurants, snack bars, cafes and other eating places
Turnover at current prices

(million ECU)	1985	1986	1987	1988	1989	1990
Belgique/België	1 124	1 245	1 368	1 506	1 707	1 966
Danmark	1 459	1 582	N/A	245	258	N/A
BR Deutschland	N/A	9 262	8 766	10 637	9 377	13 146
España	N/A	N/A	N/A	N/A	211 619	N/A
France	8 088	8 663	8 714	10 423	N/A	N/A
Luxembourg	91	102	116	125	142	N/A
Nederland	2 135	2 276	2 396	2 545	2 811	3 060
United Kingdom	7 228	6 992	8 358	9 887	10 798	11 302

Source: Eurostat

Table 4: Restaurants, snack-bars, cafes and other eating places
Number of persons employed, 1986-1991

	1986	1987	1988	1989	1990	1991
BR Deutschland	300 236	309 068	311 345	318 617	312 887	N/A
France	264 692	258 697	292 591	N/A	N/A	N/A
Luxembourg	2 800	3 009	3 180	3 444	3 580	3 707
Nederland	75 104	79 758	86 900	92 200	96 221	N/A

Source: Eurostat

MARKET FORCES

Demand

The demand for restaurant services is influenced by a variety of factors including disposable incomes, demographic factors, changing consumer tastes and the level of tourist activity. Restaurants also compete with other leisure activities including cinema, theatre, home video and sports for the discretionary spending of the consumer. The propensity to eat outside the home is most strongly, and positively, linked to increases in disposable income. As a result the general trend in demand for restaurant services has been upwards. Private expenditure on eating out is, however, seen as a luxury in most Member States and is vulnerable to dips in disposable income. Similarly, corporate entertainment, an important factor at the upper end of the restaurant market, is also closely linked to the level of economic activity. Thus, the restaurant sector has shown little growth over the 1991-93 period.

Overall, however, and reflecting this linkage the proportion of total consumer spending on eating out has risen over the second half of the 1980s and it is estimated that the EC average is around 5%. The estimate hides substantial variations among Member States. In some cases these differences reflect the importance of the tourism sector, the proportion is above average in Spain and Portugal, while in others it reflects traditional attitudes to eating out.

If the EC catering industry is to follow the USA, where it is often cheaper to dine in a fast food or family restaurant than to buy equivalent ingredients and cook at home, then the tendency for locals to choose to eat out on the basis of

Table 5: Restaurants, snack bars, cafes and other eating places
Ten leading restaurant groups in Europe, 1992

Rank (Country of origin)	Group	Branded outlets	Turnover (million ECU) 1992 (1991)	Number of outlets 1992 (1991)
1	Mc Donald's	Mc Donald's	2 528	1 360
(USA)	B, D, DK, E, F, UK, GR, IRL, I, L, NL, P		(1 946)	(1 187)
2	Accor	L'Arche, Courte-Paille,	834	480
(F)	(of which Wagons-Lits) F, B, D, E, I, L, NL	Pizza del Arte, Boeuf Jardinier Cafe Route, Cesario, L'Ecluse, Relais, Meda's, Actair, Arhos, divers fast-food, concessions, Lenotre, Rosell, Van der Heyden (traiteurs), Aerien, aeroport, ferroviair, maritime	(-)	(-)
3	Whitbread	Beefeater, Berni, Churrasco	715	667
(UK)	UK, D, F, NL	Pizza Hut, TGI Fridays	(565)	(676)
4	Autogrill, SME/Sirea	Allemagna, Amico, Arabesque,	657	350
(I)	I	Autogrill, Cia Motta, Down Town La Pergola, La Terraza, Magic	(-)	(-)
5	Forte	Happy Eater, Harvester KFC,	624	1 015
(UK)	UK, D	Le Dome, Little Chef, Sbarro, Welcome Break, Wheelers Aeroports (traiteur)	(-)	(1 081)
6	GIB Group	Family Buffets, Lunch Garden,	447	298
(UK)	B, F, L	Quick	(186)	(135)
7	Grand Metropolitan	Burger King, Country Carvery,	468	534
(D)	UK, D, DK, E, F, NL	Country Grill, Old Orleans	(457)	(437)
8	Bab Raststatten und	Erfrischungadienste,	426	284
(D)	Erfrischungadienste GFN D	Raststatten	(416)	(280)
9	Lufthansa Service GmbH	LSA Airline catering,	414	13
(D)	D	Partyservice, Restaurants d'aeroports	(449)	(16)
10	Casino	Caf'Casino, Marest, Blue Grill	378	234
(F)	F		(574)	(323)

Source: Néo Restauration

cost and convenience will become more established. Already in the EC eating out has become both more commonplace and relatively less expensive.

The growth of tourism is clearly a major source of business for the consumer catering industry in the EC. Even when staying in self-catering accommodation the tourist tends to eat out rather than cook for himself; when staying in hotels and similar establishments there may be little choice but to frequent restaurants and cafes. In common with many other companies who deal in the totems of popular culture, the large fast food firms view the relatively young and increasingly affluent populations of southern European Member States as providing the best prospects for continued growth in Europe in the 1990s. The ageing of the EC population will, however, dampen the growth of fast food outlets in the medium term. In addition the "saturation point" for fast food restaurants is approaching in a number of northern Member States and is thought to have already been reached in the United Kingdom. Relatively rapid growth in demand for ethnic restaurants, particularly those with cuisine's which are not well represented at present, is also expected across the EC.

The increasingly rapid spread of communications media, through satellite Television for example, aided by the growth of international tourism flows have accelerated the trend towards greater internationalisation of the restaurant market and aided the growth of US-type food outlets serving hamburgers and pizza. There are significant trends also towards, e.g. health foods, pasta and the replacement of red meat and red wine by their white counterparts and by fish. In addition the number of ethnic restaurants in many European cities is growing reflecting internationalisation trends and the increased confidence and sense of experimentation among consumers. Conventional food service styles, products and concepts are being rendered obsolete by 1990s lifestyles. An exception to these trends is the resurgence of regional cuisine, especially in France, Spain and Germany.

Family restaurants relying usually on local business may also benefit from the growth in tourism. When a slump occurs in international tourism, smaller restaurants in remote places can gain as EC nationals spend their holidays exploring their own countryside. Transport restaurants are also susceptible to fluctuations in tourism.

Supply and competition

The key competitive factors in the restaurant industry are food quality, price and decor. Entry and exits barriers in the restaurant sector are negligible at most levels of the industry and small, often family-run, firms predominated. As a result, and because of the localised nature of competition, there is little danger of monopolistic practices emerging and strong competition is evident both within and across segments of the industry.

Take-away and fast food have been the main growth areas in the European restaurant sector in recent years. US firms are providing the driving force behind this growth. Having expanded initially in the United Kingdom, they are now spread-

ing throughout mainland Europe where they are facing increasing competition from indigenous companies. Theme restaurants are also spreading very rapidly. This spread is not simply driven by "ethnic" entrepreneurs but also by the larger restaurant chains who are increasingly using sophisticated market research techniques to examine concepts, test pilot operations and are utilising Epos (Electronic point of sales) information and geo-demographic databases to determine suitable locations. Like fast food outlets before them a new set of US-based theme restaurants are now well established in the UK - Tex-Mex, Cajun, and 1950s nostalgia themes - and expanding elsewhere in north Europe.

One of the critical issues facing the restaurant sector within the EC over the coming decade will be the availability of labour and the ability of the sector to compete with other industries in offering a worthwhile career to staff. Because it is dominated by family owned enterprises the concept of "employment" in much of the European restaurant sector is blurred. Very frequently husband and wife will work together in a restaurant and they may be helped by grandparents, children and other family members whose remuneration may be "in kind" rather than through cash payment. Throughout the Community, however, owners of family restaurants are discovering that their sons and daughters are being attracted into other areas of employment.

Where employment is regulated, pay and conditions in EC restaurants tends to be towards the minimum for each Member State. There are of course exceptions, but generally employment conditions in restaurants involve long and unsociable hours, relatively low levels of basic pay and a reliance by employees on gratuities and service charges. Pay and conditions tend to be the best where agreements have been reached between employers and trade unions but these agreements also tend to be confined to the larger and more structured employers. Staff turnover in restaurants is high and there is a lack of structured training in several countries.

As demographic patterns develop and family sizes decrease particularly in the north Member States and turnover continues to grow, the restaurant sector will experience staff and skill shortages. This is already evident in the United Kingdom, Germany, Benelux, France and Denmark where restaurant chains are seeking to recruit part time workers, students and senior citizens as well as immigrants from outside of the EC. The problem is not as serious in south Member States. However, tourist authorities in these Member States have expressed concern that there will be migration of restaurant (and other hotel) workers from Greece, Spain, Portugal and south Italy to fill vacancies in north Europe. Such migration is likely to add to pressures to improve wage and other working conditions in the less developed Member States.

Competition in the restaurant sector is similar to that in other services which are dominated by small individually-owned enterprises. The cost of entry to the business is relatively low and this encourages entrepreneurs to enter a local market, particularly when restaurant business is seen to be growing. The establishment of restaurants is however governed by regulations in all Member States. These include the granting of planning permission, the certification of the premises by the local health authority and in some Member States the granting of a license to sell alcohol. Generally different regulations governing restaurants are not a barrier to competition. Future mergers to create national or supranational chains are also unlikely to distort competition in the sector.

Competition within the sector is complex and differs across market segments and locations. Price elasticity tends to be lower at the top end of the market where competition is based on reputation, image and a perceived high quality of food and service. These competitive criteria also exist in the broad segment of family restaurants in which marketing and advertising is rarely undertaken. Location is a key factor but ambience, quality of food and personality of the proprietor are also important. Price assumes greater importance when the reputation of the restaurant is largely confined to the local community. Price as a key factor is also particularly evident in "in store" cafeterias and restaurants, in coffee shops and in the fast food sector. Overall the trend has been for prices to move in line with inflation but strong local competition has kept price increases below inflation in larger cities throughout the EC.

The relatively minor position of corporations and chains in the European restaurant sector and the American base of some major players make it difficult to comment on profitability. Statements from Hotrec, the EC hotel and restaurant lobby organisation, and from national associations of restaurant owners indicate a relatively high level of business failures among EC restaurants over the past decade and that the lack of expansion by the vast majority of restaurants reflects lack of profitability. For nine out of ten European restaurant owners the business is a "way of life" which is sufficient to provide a modest standard of living for a family. In the case of some of the major players such as the retail stores, restaurants provide a service that attracts customers and make a contribution to the overall profitability of the enterprise.

Contract catering

In addition to public catering, the contract catering sector is a fast growing segment in the restoration business (15% a year, according to FERCO). The number of meals served by the EC contract catering industry grew from 1.1 billion in 1980 to 2.1 billion in 1990, it is forecasted that 3.3 billion meals will be served by the year 2000.

The market segmentation in the contract catering business sees the predominance of business, industry and State institutions which account together for 66% of the market. The remaining third is shared by healthcare (14%) and Education (19%).

Contract catering, provides quality food at an economic price. In 1990, sales reached 1 982 million ECU in France, 1884 million ECU in the United Kingdom and 1708 million ECU in Italy. By contrast, sales in the German market did not exceed 445 million ECU.

The future of the contract catering industry looks optimistic: as it expands from offices and factories into schools, clinics and military establishments, the growth projection continues on its steep curve.

Production process

The preparation and service of food has traditionally been a labour intensive exercise and this is still largely true. In most restaurants the raw materials tend to be supplied in a fresh state, prepared by hand, cooked by traditional methods and served to diners at their tables. Fast-food outlets differ from this categorisation in that the raw materials are often semi-prepared and take-away business is of considerable importance. It should be noted that some restaurants have reacted to the recession by moving into the "home deliveries" market.

Some machinery may be used in the chopping and mixing of raw materials and some foods may be stored under frozen or chilled conditions, but these are often the limits of technology in a European family restaurant.

Pressures on the availability of skilled staff as well as high labour costs are however forcing the industry to look towards technology to help reduce unit costs. Automation and technology are playing an increasingly significant role in the preparation of restaurant meals.

While progress in introducing new technologies is relatively slow in the small independent restaurants, use of new technologies are very evident among restaurant chains and larger enterprises. Fast food restaurants and contract caterers have

Table 6: Restaurants, snack bars, cafes and other eating places
Ten leading fast food restaurants in Europe, 1992

Rahk (Country of origin)	Group	Countries established	Turnover (million ECU) 1992 (1991)	Number of outlets 1992 (1991)
1	Mc Donald's	B, D, DK, E, F, UK, GR,	2 528	1 360
(USA)	(Mc Donald's)	IRL, I, L, NL, P	(1 946)	(1 187)
2	Burger King	D, DK, E, F, UK, IRL ,NL	412	376
(UK)	(Grand Metropolitan)		(389)	(362)
3	Quick	B, F, L	377	221
(B)	(GIB Group)		(328)	(203)
4	Kentucky Fried Chicken	D, DK, E, F, UK, IRL, NL	257	351
(USA)	KFC (Pepsico)		(217)	(336)
5	Burghy/Italy & Italy	I	81	64
(I)	(Food Service System Italia) (Cremonini)		(63)	(58)
6	Goody's Restaurants	GR	57	63
(GR)	(Goody's SA)		(39)	(48)
7	La Brioche Doree	F, E, UK, NL	45	121
(F)	(Groupe Le Duff)		(42)	(126)
8	La Croissanterie	F, E, GR, IRL, I, P	41	150
(F)	(La Croissanterie)		(41)	(155)
9	La Viennoisiere	F, E	27	82
(F)	(Paul Restauration Rapide) Au Bon Feuillete (Group Holder)		(23)	(85)
10	Pomme de Pain	F	24	43
(D)	(Bretonniere SA)		(21)	(34)

Source: Néo Restauration

practised bulk preparation of food and its storage under frozen or chilled conditions for many years. Such methods are also used in hospital catering and in the provision of meals in industry and institutions. Frozen product, including meat, fish, potatoes and vegetables is used extensively in the fast food and "quick service" sectors and there has been widespread development of freezers and regeneration cookers. The refrigeration industry has however been subject to criticism because of its use of CFC gasses in refrigeration units and a new generation of "environmentally friendly" refrigerators and freezers which are "CFC free" is now appearing on the market.

Worries about meal "quality" is a key consideration limiting the spread of bulk preparation methods throughout the restaurant industry. New technologies used in "cook chill" and "sous vide" systems have helped reduce the importance of this barrier. The principal advantage of the "cook chill" system is that food can be prepared in batches to tight specifications and these "batches" can be used to compile meal menus. The ability to cook food in bulk and to "hold" it for several days has enabled restaurants using this system to reduce their staff requirement particularly at night or over week-ends. "Sous vide" originated in France and is growing in popularity at all levels of the market. Under this system dishes, delicate sauces are cooked and preserved in a plastic pouch which is chilled, for regeneration prior to serving. The system has enabled caterers to expand their menu by having additional dishes under storage.

Electronic technology has offered greater control over traditional cooking media such as ovens and gas or electric ranges. The "combination oven" which can cook foods in several ways, is a product of this technology and enables designers to add "cooking cycle programmes" and electronic probes that measure temperature and moisture content of the food during the cooking cycle. Microwave ovens which are now widely used at all levels of the market are also enhanced by electronic controls. Energy costs in restaurants are relatively high and this has led to greater emphasis on energy efficient cooking with the advent of halogen elements in electric ranges and induction cookers providing the most promising developments.

The principal "stock in trade" of restaurants is food in a raw or semi prepared state. At all levels of the industry there is increasing demand for conformity to specification and continuity of supply. The "Quality" system has been employed informally by the vast majority of restaurateurs over the centuries and still works effectively today.

Among corporate-owned restaurants, however, quality is achieved through more formal structures. Detailed specifications are drawn for each food item and there is a greater emphasis on partially processed or prepared foods which are frequently supplied in a frozen state. A growing number of corporately-owned restaurants now operate just in time systems similar to those operated by manufacturing industry.

INDUSTRY STRUCTURE

Companies

While becoming increasingly dominated by big chains, as the growth in the fast food and take-away sector outpaces average growth, all EC countries continue to offer an enormous range of family run restaurants and cafes that are central to the appeal and character of the industry. The increase in market share of the chains has, however, been at the expense of the traditional independently-run operations in addition to capturing overall market growth. A recent Economist Intelligence Report, "Eating Out in the United Kingdom" estimated that the restaurant market was becoming increasingly concentrated.

The sector includes chains of restaurants, often owned and operated by conglomerates, and also embraces the fast food subsector which is largely controlled by American companies operating in Europe through local franchises. The largest ca-

tering group in the EC, McDonalds, fits this profile perfectly. Fast food restaurant chains are both multiple retailers and a production enterprise. In both the facets of their activities they have similarities with multinational multiple retailers and with multinational manufacturing enterprises. Like the retailers, expansion across national borders has occurred first and most substantially in the wealthiest EC Member States.

The most significant group of restaurants, which represent more than 90% of the sector across the EC, are family-owned and employ less than ten people, some of whom may be casual or part time employees. Family-owned restaurants span the full spectrum of dining out in Europe from simple take-away "fish and chips" shops in the United Kingdom to the award-winning restaurants of the famous French chef-patrons. The local family restaurant often offers dishes based on local or regional cuisine. More and more this cuisine is offered outside its country or region of origin. It is no longer unusual to find, for instance, restaurants serving Italian cuisine in France, Greek restaurants in the United Kingdom or French restaurants in Germany. A trend throughout Europe has also been the success of restaurants offering regional cuisine outside of their own regions, for instance Tuscany dishes in Veneto or the cuisine of Andalucia in Catalonia. Similar, many upmarket French and Italian restaurants are adopting more adventurous menus featuring regional dishes and their influence is filtering down to more mainstream European restaurants.

The gourmet segment of the market is dominated by family-owned restaurants and in most Member States it is the personality, reputation and skill of the patron who may be the chef or the maitre d' hotel on which the success of the enterprise is based. Many such family-owned restaurants at the top end of the market are relatively large concerns employing up to 100 people and some, like the Roux Brothers in the United Kingdom and Paul Bocuse in France, have developed ancillary enterprises. More typical even at this level, however, is the restaurant serving 50 dinners each evening, owned and operated by a single proprietor and employing a staff of around 20.

Corporations and chains are rare in gourmet dining, except in the context of hotels. Many four and five star hotels of Europe offer at least one restaurant serving gourmet food. The scale and variety of the food offer in hotels is also expanding. More hotels are now operating ethnic restaurants in addition to the cuisine of their region, an international menu and informal dining in brasserie and coffee shop styles.

Strategies

Investment by corporations has been most obvious towards the lower end of the market, particularly in the areas of popular catering, transport catering and fast food. Groups like Forte's Little Chef (United Kingdom), GIB (DK), Quick (F), GfnBAB (D) and Autogrill (I) have developed successful chains of restaurants close to motorways and associated restaurants can also be found in towns and cities. These chains tend to be national rather than transnational and a dominant EC-wide restaurant chain has yet to emerge.

A transnational restaurant chain may emerge through activities in other sectors such as retailing or hotels. Forte's "Little Chef" is expanding alongside the hotel group's hotel joint ventures in Spain and Ireland. Supermarkets and department stores already operate large chains of cafeteria style restaurants in France, Germany, Benelux, United Kingdom and Italy. The expansion of these stores within the Community would lead to the expansion of their restaurants also. Karstadt, Hertie and Kaufhof operate large restaurant chains in Germany and the Casino supermarket chain operates the largest group of restaurants in France with 238 outlets. Other large scale retailers involved in restaurants include GB Inno-BM of Belgium. In addition individual restaurateurs have opened restaurants offering their own national or regional cuisine in

Table 7: Restaurants, snack bars, cafes and other eating places
Top 20 companies in the EC, 1992

Rank in the EC	Name of the enterprise	Country	Turnover in (million ECU)	Number of units
1	Mc Donald's (1)	USA	2 598.4	1 360
2	Accor	F	856.6	480
3	Whitbread	UK	735.1	667
4	Autogrill/SME Sirea	I	675.1	350
5	Forte	UK	641.8	1 015
6	GIB Groupe	B	490.6	298
7	Grand Metropolitan	UK	481.3	534
8	Bad Raststatten & ERF GFN	D	438.1	284
9	Luftahnsa Service	D	425.3	13
10	Casino	F	388.0	234
11	AGAPES	F	360.1	160
12	DSG Deutsche Service der Bahn	D	294.1	320
13	Servais/Saresco	F	269.0	30
14	Karstadt AG	D	178.5	136
15	Cremonini Restauration	I	174.9	208
16	Nordsee GmBH	D	170.0	280
17	Groupe Flo	F	162.0	30
18	City Centre	UK	138.2	159
19	Allied Breweries	UK	128.3	145
20	Kaufhof Gastronomie (KGSG)	D	124.5	150

(1) Non-European enterprise
Source: HOTREC, 1993

larger cities of Member States. The EC capitals for instance are the location for restaurants in the style of virtually all Member States.

Investment by corporations from outside of the EC has been an increasingly important phenomenon since the early 1980s. This has been confined almost entirely to the fast food sector and has been spearheaded by the American chain McDonalds which had around 1,360 outlets in the Community at the end of 1992, growth of over 30% since 1990. Other chains which originated in the US like Burger King (376 outlets), Kentucky Fried Chicken (351 outlets) and Pizza Hut (over 300 outlets) have also been making an impact on this segment of the market - Burger King and Pizza Hut are now owned by United Kingdom companies, Grand Metropolitan and Whitbread respectively.

Popularity of fast food and fast service can be attributed to the European acceptance of American dining culture particularly among young people, to the expertise of the American chains in the areas of product development, location of outlets, staff training, consistency in quality, and to changing living patterns in Europe. The principal food products served in this sector include hamburgers, chicken, pizza, pastry, fish and potatoes. Entrepreneurs in each Member State have established national and regional fast food chains which compete with the US-originating franchised outlets. In this area France, for example, has achieved considerable success with groups like Quick, La Brioche dorée, La Croissanterie and Pomme de Pain.

Investment in the EC restaurant sector has also come from entrepreneurs from outside of the EC opening "ethnic" restaurants. Thousands of restaurants owned by immigrants and offering Chinese, Indian, Thai, Vietnamese, Argentinean, Indonesian and other cuisine's scattered throughout the Community, are seeing their market share increase.

REGIONAL DISTRIBUTION

Restaurants are ubiquitous in Europe. Many restaurants at the upper end of the market are often found in relatively remote rural areas, an aspect which may serve to improve their "charm". In many cases location is a key factor, both in terms of the ambience it may lend to the overall "dining" experience, as in high quality restaurants or in terms of the throughput it helps generate.

In general, concentration and level of competition is related to population densities. Cities and larger towns have more restaurants per head of population than do villages and rural areas. An exception lies in areas of tourism interest that tend to have a large number of restaurants competing for tourism business, although some may operate on a seasonal basis.

ENVIRONMENT

The challenge of increasing interest in health foods is already been met by many caterers, with greater emphasis on appropriate ingredients appearing in an increasing number of middle- and upper-range restaurants. Similarly, choices catering for vegetarians are increasingly common in non-vegetarian restaurants. On the other hand there is less evidence that the demographic shift to an older population which, to-date, has not been a target of the large catering chains, is being addressed.

Restaurants tend to be kind to the environment, and are becoming even more so. Waste is largely biodegradable and recyclable. It is also easily sorted for recycling or other methods of disposal, although the extent to which this occurs varies across Member State. Cooking systems are also generally environmentally friendly. Some concern has been expressed regarding CFC gasses used in refrigeration but this issue is being addressed by refrigeration manufacturers. On the other hand, packaging from the fast food sector is perceived to be a major contributor to litter problems in many Member States. Some chains have taken steps to ameliorate litter problems - McDonalds, for example, now use biodegradable packaging rather than expanded polystyrene.

Some restaurant clientele have also expressed concern about production methods used in the food raw material but this has not as adversely affected the sector to any great extent. Nevertheless, some restaurants are winning popularity by guaranteeing customers that all dishes are prepared from organically-grown produce and that poultry and fish are not the product of intensive growing systems. Consumers are also showing preference for foods that are perceived to promote health and this demand has led to the creation of new style cuisine based on a healthy diet. Eurotoque, the EC association of chefs, has been active in promoting a positive approach by restaurant owners to the environment.

REGULATIONS

There are a wide variety of national and EC regulations impacting on the restaurant trade. The most important include compliance with hygiene regulations and certification by local health authorities, regulations relating to working conditions, and in some cases the granting of a licence to sell alcohol. Hygiene regulations across the EC are in the process of being harmonised, EC labour legislation is constantly impacting on conditions of work, particularly in the less developed states and on-going proposals for a directive on packaging will also affect the industry. Harmonisation of VAT rates (and excise duties on alcohol) will also have differential impacts on restaurants across the Community over the next five years.

The Directive on the hygiene of foodstuffs (93/43/EEC) was adopted in June 1993. Standards of hygiene are set out in the annex to the Directive and a number of ways in which Member States can assist firms in achieving these standards is suggested. Firstly, it is recommended that ISO 9000 quality standards be promoted within the EC. Secondly, it is recommended that codes of practice for food hygiene be drawn up for particular sectors, in order to assist firms and individuals in fulfilling their legal obligations, as set out in the annex. It is envisaged that these codes of practice may eventually be harmonised at an EC level. Thirdly, the use of the HACCP (Hazard Analysis and Critical Control Points) system is to be encouraged among those who have legal obligations in relation to food hygiene.

Restaurants services are not included in the list of goods and services to which Member States may apply a reduced rate of VAT. However, the Member States that were applying a reduced rate to restaurant services at 1 January 1991 are allowed to continue to do so at least until the end of 1996.

OUTLOOK

The restaurant sector in the EC has been growing throughout the 1980s and despite a slowdown in recent years this overall growth is likely to continue during the 1990s.

Growth in intra-EC travel and in the number of visitors from outside the Community will increase demand for restaurant facilities. Having seen their share of tourism growth falter in recent years, Mediterranean Member States should experience more rapid growth over in the medium term, both in volume and value terms. Poor quality was a major contributor to loss of market share in south Europe. Reflecting an increase emphasis on quality and higher value-added tourism, restaurant expenditure per tourist should increase. More short-breaks and second holidays should contribute to increase trips and restaurant expenditure among domestic tourists in north Member States.

Table 8: Restaurants, snack bars, cafes and other eating places
Expected average annual growth rates

(%)	1993-94	1994-97
Turnover	2.0	3.0
Employment	1.0	2.0

Source: Fitzpatrick Associates, Economic Consultants

An important consideration in estimating when growth in restaurant turnover will accelerate depends on when Member State economies emerge from recession. While a growing share of household expenditure was devoted to eating out during the 1980s, this trend may have run its course in some of the more developed Member States. Disparities in Grosso domestic Product (GDP) and private consumption expenditure growth rates will create higher levels of demand for restaurant services in those Member States whose economies grow fastest. With the outlook to the mid 1990s for a recovery in GDP growth across most EC Member States, the Economist Intelligence Unit forecast average GDP growth across the EC at around 1.5% per annum over 1993 to 1997, from zero growth in 1993 and accelerating throughout the period. Increased spending on eating out somewhat above this level is expected.

Employment growth is expected to be below that of turnover. The level of automation will increase, motivated by cost-cutting, service improvement and problems with attracting staff. Restaurateurs are also likely to seek other service innovations reducing labour usage.

National growth rates will also be affected by the prevailing tradition of dining in restaurants, which varies widely across EC Member States. Social attitudes towards eating out are changing and as the EC becomes more integrated, the dining tradition is likely to spread throughout the Community. Although the degree which entrenched national characteristics will be affected over the next three years. Different segments will also grow to varying extents across Member States. For example, in relation to the size and wealth of Germany, France and Spain and the present under-representation of international chains there are good opportunities for expansion by these companies, while continued economic austerity will constrain growth of eating out in Greece. Gira-Sic, quoted in the French trade magazine Néo Restauration, estimate growth of 147% in the number of enterprises belonging to chains in Germany during the 1990s. The corresponding estimates for France and the United Kingdom were 80% and 55%.

Countries with an emerging youth population will also see more rapid growth in fast service and fast food restaurants and those with an ageing population will see more growth in health food and leisure style restaurants. Changing demographics, social patterns and tastes will also offer opportunities for restaurants to increase sales for home deliveries, although this may have some impact on traditional sales. As more people move into urban areas there will be fewer family meals, greater consumption of snacks and small meals and more dining in restaurants as a leisure activity.

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Hotels
NACE 665

The hotel sector comprises a disparate variety of establishments in terms of size and range of services provided. Demand for hotel services is predominantly from tourists, with business travellers accounting for a substantial proportion. Fragmentation of demand in recent years has resulted in growth of both affiliated hotels providing a uniform product at different price/quality levels, and of hotels striving to differentiate their product. Concentration in the industry is growing as large hotel chains increase market share, although this increase should not be a source of concern to Competition Authorities. In response smaller hotels are increasingly joining voluntary associations. The industry has experienced a slowdown during 1991 and 1992. This reflects ongoing economic difficulties in major EC and to a lesser extent extra-EC, economies and is expected to be temporary. The outlook is for modest growth during the mid-1990s.

INDUSTRY PROFILE

Description of the sector

The hotel sector comprises establishments which vary widely both in terms of size and services provided. At one end of the scale there are small, single location, family run enterprises providing accommodation services and at the other are large hotels, frequently part of a chain, operated in a highly professional manner and providing a wide range of services. Such services might include restaurant and banqueting, public bar services, health and leisure facilities, bureau de change, shopping facilities, business secretarial services and conference facilities. The number of hotels supplying accommodation only is now relatively small, with a discernible trend towards larger establishments providing a broader range of services. As a result the extent to which the business of hotels impinges on other service sectors is increasing.

Official statistics on hotel turnover and value-added in different EC countries do not exist. Nor are there consistent definitions of hotels and similar establishments across countries, making aggregations and inter-country comparisons difficult.

Eurostat data indicates that the hotel industry is most important in Italy and the United Kingdom. These two countries have considerably more hotels than the other Member States, although the United Kingdom estimate includes inns and guest houses. Definition differences are reflected when beds are used as an indicator of capacity. Italy had an estimated 1.7 million beds in 1991 compared to 1.1 million in France, 0.9 million in Western Germany and 0.8 million in Spain.

Recent trends

Despite definition differences, a trend increase in the volume of turnover in the accommodation services of hotels is evident from guest flows, with an increase in guest nights each year from 1985 to 1992, with the exception of 1991. In value terms, however, turnover is unlikely to have risen since 1990 as many hotels have been forced to reduce tariffs to maintain occupancy levels.

Over the period 1986 to 1991 guest flows through hotels and similar establishments also rose in most Member States. The only exception was the United Kingdom where a sharp decline in bed nights from domestic residents was recorded. Increases of 20-27% were recorded in most northern European Member States.

Analysis of available bed nights indicates an increase in the supply capacity of the industry. The number of bed places increased in most Member States over the 1986 to 1991 period, this shows a continuation of the trend in the first half of the decade. The increase in available capacity was least evident in Italy where growth over the five years to 1991 was only 6%. Denmark, West Germany, Greece, Spain and Portugal all experienced increases in the number of bed places in excess of 20%.

While the number of foreign guest nights fell in some countries, most notably some southern Member States, this was more than compensated for by rises in domestic guest nights. A decline in both business and tourist demand led to some contraction in 1991, with a return to modest growth in 1992.

The increase in the number of beds and bedrooms was against a background of a slight decline in the number of hotels and similar establishments. This reflects the industry trend towards larger units. Occupancy rates in the hotel industry fell sharply in 1991. They were above 60% in 1990 in each of the eleven EC Member States surveyed by Pannell Kerr Foster (PKF), ranging from 62% in Spain to 75% in Denmark. However, in 1991 they fell in all Member States. Low occupancy rates are particularly evident in Southern Member States and in 1991 were 53% in Spain, 57% in Greece and 60% in Portugal.

Data collected by PKF on average room rates across different European countries places France's hotels as the most expensive, closely followed by Spain. Prices in EFTA countries tended in general to be higher than in the EC with particularly high average rates in Austria, Norway and Switzerland. On average, room rates were lowest in the Netherlands and Greece.

Price levels and changes in the EC's capital cities, however, reflect local supply and demand imbalances and local property prices. Analysis by the Economist Intelligence Unit (EIU) indicates that the prices of hotels, fell in response to lower demand between 1990 and 1992. Reflecting lower prices and falling occupancy rates profit levels also declined in 1991 and 1992.

Official employment in the hotel industry is only available for the accommodation sector as a whole and then only for seven of the twelve Member States. The trend in overall employment is upward reflecting industry growth and the limited possibilities for capital substitution. The overall growth in total employment masks a decline in the number of self-employed persons, again reflecting growth rates of larger chain operations at the expense of smaller traditional hotels. However, the high level of employment in the United Kingdom relative to its low number of bed places highlights the problems of comparability using official data. These data problems are currently being addressed by Eurostat.

International comparison

Horwath International's analysis of the overall performance of hotels by global region indicates that income per available room before fixed costs and revenue per room were relatively high in Europe in 1991. However, Horwath data is most pertinent to chains.

Foreign trade

Available data on hotel nights does not facilitate a breakdown into intra-EC and extra-EC "exports" and "imports" of hotel bed nights. Most Member States distinguish between resident and non-resident guest nights. Over the second half of the 1980s the strongest growth, in most Member States, was non-resident guest nights. A slowdown in international tourism growth in 1991, however, has contributed to a decrease in non-resident guest nights in a number of Member States.

Table 1: Hotels
Main Indicators

	1985	1986	1987	1988	1989	1990	1991	1992
Guest nights (million)	731	753	770	694	797	801	N/A	N/A
Number of hotels (thousand)	162	162	162	161	159	157	158	160

Source : Eurostat, Tourism 1991

Table 2: Hotels
Guest nights by Member State

(thousand)	1980	1985	1986	1987	1988	1989	1990	1991
Belgique/België	6 472	7 908	7 712	7 735	7 847	9 185	9 580	9 211
Danmark	8 194	87 448	8 781	9 017	9 034	9 837	10 635	11 231
BR Deutschland	131 235	128 509	131 299	134 800	140 260	146 980	155 387	160 457
Hellas	38 081	44 558	43 690	43 754	44 075	44 709	44 037	N/A
España	96 438	121 016	129 514	138 721	137 338	131 425	119 880	134 499
France	N/A	117 862	120 001	120 034	125 799	139 390	145 803	N/A
Ireland	5 471	5 540	5 268	5 005	6 417	7 434	8 277	9 423
Italia	165 498	170 689	176 660	183 121	188 371	187 301	191 065	195 707
Luxembourg	906	974	995	997	1 039	1 188	1 194	1 182
Nederland	11 504	12 240	12 240	11 596	12 233	13 233	14 498	14 752
Portugal	16 684	18 657	19 700	20 272	21 269	22 053	23 814	26 261
United Kingdom	97 000	95 000	97 000	95 000	N/A	84 000	74 000	70 000
EC	577 483	731 697	752 860	770 052	693 682	796 735	801 170	632 723

Source : Eurostat, Tourism 1991

Table 3: Hotels
Bed places

	1980	1985	1986	1987	1988	1989	1990	1991
Belgique/België	87 785	87 863	86 766	89 137	87 175	92 543	93 710	86 472
Danmark	68 574	70 960	73 588	79 004	83 973	85 014	88 468	92 524
BR Deutschland	568 038	750 595	748 892	739 258	795 244	811 025	824 546	919 727
Hellas	261 105	316 033	324 301	336 506	350 833	370 648	378 421	393 305
España	596 874	622 428	637 073	658 569	683 152	707 974	735 749	781 607
France	663 440	974 728	993 334	1 012 750	1 033 910	1 082 138	1 104 616	1 134 902
Ireland	42 484	39 351	39 583	40 147	40 783	41 260	41 318	43 924
Italia	1 550 168	1 617 211	1 608 360	1 646 513	1 665 319	1 670 451	1 678 910	1 708 033
Nederland	88 658	96 359	96 888	101 993	100 700	104 043	107 200	108 952
Portugal	47 495	54 634	58 060	61 050	62 632	64 606	68 045	71 883
EC 7	3 974 621	4 630 162	4 666 845	4 764 927	4 903 811	5 029 702	5 120 923	5 341 329

Source : Eurostat, Tourism 1991

MARKET FORCES

Demand

The most important consumers of hotel services are tourists, although their importance varies across Member States. Horwath International's hotel sample survey indicates, that business travellers are of much greater importance in Germany and the United Kingdom.

The period from the commencement of the Gulf War in mid-1990 to the end of 1992 has been one of the most difficult periods in the recent history of the European hotel industry. In addition to the war and its impact on international travel, recession in Europe and the United States have all combined to depress the tourist and business accommodation markets.

The distinction between tourist and business market demand is important as they are affected by different factors. While both are affected by the general level of economic activity, business travellers, and in particular the conference market, are more sensitive to economic downturns than tourists are. International and domestic business demand is higher in northern European Member States reflecting higher GNP levels.

Recent analysis by stockbrokers, Kleinwort Benson Securities in the EIU's Travel and Tourism Analyst suggests the importance of service industry and the level of concentration are important components of the demand for domestic business travel. Large service firms tend to have a greater number of branches than their manufacturing counterparts and thus, generate substantial travel.

Closer integration of the EC Internal Market, and subsequent cross-border expansions will continue to increase the importance of inter-EC business travel. Traditionally, business travellers have been less price sensitive than tourists and while this is still true, the ongoing economic slowdown has made firms more conscious of their travel budgets and costs.

Table 4: Hotels
Room occupancy and average rates

	Room occupancy (%)		Average room rate, ECU	
	1990	1991	1990	1991
Belgique/België	72.7	66.5	73.9	80.5
Danmark	75.0	66.4	80.9	80.1
BR Deutschland	70.7	67.8	87.0	93.3
Hellas	71.5	56.9	69.8	72.4
España	61.7	52.6	123.5	129.6
France	73.8	64.9	120.2	130.5
Italia	69.8	63.2	101.2	103.7
Luxembourg	63.4	61.8	73.0	79.4
Nederland	68.8	68.3	72.4	71.9
Portugal	64.6	60.2	92.3	100.7
United Kingdom	69.4	61.4	87.4	86.2

Source: Pannell Kerr Foster, Eurotrends 1992

Income levels are an important determinant of overall tourism demand. In more prosperous northern Member States second annual holidays are now commonplace, while in the southern Member States international tourism has recently grown, reflecting rising incomes and increased leisure time arising from shorter working hours. Increased frequency of holiday-taking spreads seasonal tourist flows and favours hotels relative to the other popular forms of accommodation. In addition, with increasing female participation in the workforce and a tendency towards smaller families a growing proportion of European households have two incomes and higher levels of disposable income.

The relative importance of international versus domestic demand varies widely across Member States. The tourist attractions of France, Greece, Italy, Portugal, Spain and to a lesser extent the United Kingdom and Ireland attract substantial numbers of foreign hotel guests. Traditional factors, such as climate and income levels affect the habits of domestic holiday-makers across Member States with relatively greater usage of hotel accommodation in northern Europe. A slight reversal of the traditional north to south tourism flows has been evident in recent years reflecting increased international holiday-taking by southern Europeans and the declining relative importance of sun and beach holidays. Both trends should boost hotel demand somewhat at the expense of other types of accommodation.

Trends towards cheaper and independently organised holidays will adversely affect hotels at the upper end of the market although lower grade hotels will also face competition from non-hotel accommodation. On the other hand, the ageing of the European population and continued growth in the importance of long distance and business travel augur well for hotels at the upper end of the price-quality range. Not all independent tourists seek budget accommodation and many hotels at the upper end of the market are cooperating with other suppliers and adapting their product to attract the more lucrative segments of this market. Thus, many hotels have increased average occupancy rates through the promotion of off-season short breaks, particularly at weekends.

International tourism is highly vulnerable to economic conditions. The number of US visitors to Europe fell substantially in 1991 with little sign of recovery in 1992. The fall was initiated by the Gulf War but the extension of the downturn into 1992 also reflects the downturn in the United States economy and the weakness of the dollar. However, the North American market began recovery in 1993. Visitor numbers from Japan, after doubling in the preceding five years, fell reflecting nervousness about political developments and the wealth effect of stock market falls on potential travellers. Long distance travellers are also much more likely to use hotel accommodation and in particular hotels at the upper end of the market. Long distance origin markets are particularly important to higher end hotels. Tourists from EFTA countries are more likely to use budget or non-hotel accommodation than their long distance counterparts, while initial flows from Eastern Europe may also favour non-hotel accommodation.

Supply and competition

Economic power is important in negotiations between the industry and upstream suppliers, such as major tour operators, but the need to maintain goodwill and quality standards generally tempers excessive exercising of power. Similarly, the emergence of anti-competitive practices through increasing vertical integration are less likely because of the volatility of the tourism demand, the "contestable" nature of the industry and the high degree of inter-dependence between its various segments.

The nature of the hotel industry is such that imbalances between supply and demand are generally localised in either time or space and invariably lead to variations in prices and in profit levels. Surpluses and shortages in "time" are most common. Thus, the downturn in tourism demand over the last two years resulted in good deals for consumers but substantial losses for many hotels. This was particularly evident in the United Kingdom, during 1991 hotel re-possessions reached a record high during 1991 and in 1993 two high profile quoted companies, Queens Moat Houses (UK) and Resort Hotels (UK), both had their share quotations suspended.

Characteristics of the hotel industry affecting competition include: ease of entry and exit, the often localised nature of competition and competition between segments within the industry and non-hotel establishments supplying similar services. These factors ensure that, in general, monopolistic positions are rarely attained; exceptional hotels at specific locations, such as The Gleneagles in Scotland, can maintain excess margins. In addition, in 1992 only 14% of hotel rooms in the EC were publicly traded companies, indicating concentration remains low despite the recent growth of chains. Thus, increasing competition through mergers of large chains in the European market is not a cause for significant concern for Competition Authorities.

Seasonal variations in demand for hotel rooms typically result in generally lower prices (or additional value-added in terms of special incentives) in many rural and resort hotels in the off-season. Many urban hotels are also capitalising on the growing short break market to boost overall occupancy in hotels which are filled during the week by business travellers. Capacity imbalances in some locations may also result in

Table 5: Hotels Employment

(thousand)	1988	1989	1990	1991
Belgique/België	13.3	14.1	N/A	N/A
España	117.5	126.3	129.9	140.3
France	172.3	184.0	N/A	N/A
Luxembourg	2.9	2.8	N/A	N/A
Nederland	22.1	23.8	25.3	27.1
Portugal	37.0	37.8	39.4	40.3
United Kingdom	281.0	301.0	323.0	326.0
EC 7	646.1	689.9	N/A	N/A

Source: Eurostat, Tourism 1991

profit variations around normal margins. In other cases, for example major sporting fixtures such as the Olympic Games, both time and location supply constraints put a strong upward pressure on prices.

Reflecting weak demand, hotel prices, particularly in the moderate/comfortable category, fell during 1991 and 1992. The increases in price vary widely across cities reflecting different supply and demand conditions. Data collected by the Economist Intelligence Unit indicates that the price of a single room in the moderate/comfortable category in Madrid rose nearly fourfold between 1985 and 1992 while the average tariff for a room in a similar hotel in Greece actually fell (in current ECU). In absolute terms, London hotels were the most expensive in 1992 in the "luxury" category, while Madrid was most expensive in the moderate/comparable category. Price levels and price changes in cities reflect local supply and demand imbalances. Local property prices, have the greatest affect on hotel prices.

In recent years, operating profits have generally been higher in chains, i.e. affiliated hotels, than in their independent counterparts. This gap is expected to widen. Analysis by Kleinwort Benson in the United Kingdom indicates very substantial differences in trading margins and profits per room between affiliated and unaffiliated hotels. The importance of scale, particularly in marketing-based economies, is recognised by many small hotels and increasing numbers are becoming affiliated to voluntary associations or franchising. Profit levels expanded alongside demand in European hotels during the second half of the 1980s. However, over the last three years difficult economic circumstances has led to falling profits and trading difficulties for many hotels.

EC hotels cannot compete with most extra-EC counterparts on price alone. The labour intensive nature of the industry ensures that hotels in developing countries have a strong competitive advantage. EC hotels are often reliant on the tourism strengths of their location and other quality factors. For example, the cheaper prices of East European countries are generally counter-balanced by lesser quality, not only in hotels but also in other local facilities and in the absence of flanking attractions. Improvements stemming from ongoing investments by the major chains will remedy some of the hotel specific deficiencies.

The cost of travel to many non-EC destinations is also a prohibitive factor, as demonstrated by the increasing popularity of Asian locations. Reductions in the cost of long distance travel can be expected to divert more tourists from competing EC resorts in the medium term.

Production process

The services provided by hotels vary widely across the industry. At one extreme hotels may simply provide accommodation, although this is relatively rare. More common place is a mixture of accommodation, restaurant food and retailing of alcoholic beverages. However, the variety of services being provided is wide and includes banqueting, health and leisure facilities, a variety of business services, shopping, bureau de change, conference facilities, laundry facilities and touring services.

The hotel industry is a service industry where most of the service offered is based on labour intensive methods. In particular it involves substantial use of part-time and female workers. This labour intensity is creating problems on two fronts. Firstly, labour is a major and increasingly expensive cost item, and secondly, attraction plus retention of labour is a problem. As a result, increased automation is apparent, mostly in northern Member States where problems with labour retention and the attraction of new workers are sharpest. The introduction of the 5 day or 40 hour week, night shift compensation, with weekends and holidays to enjoy, lure people away from labour intensive jobs with unsociable hours. Many hotels and chains have introduced innovative programmes to tackle recruitment and retention problems. Their intent is to enable personnel to move within the industry with clear career paths. They also entail improved cooperation with schools in terms of curricula and their selection of candidates. While the Single Market process will increase the reservoir of labour available to the hotel industry, greater mobility and higher expectations may accentuate staff retention problems.

Increased use of technology, yield management and CRS, front office systems, in-house entertainment, and improved kitchen equipment is contributing to greater skill requirements for hotel staff rather than displacing labour. Among the most important of these is yield management, which applies basic economic principles to pricing and controlling room inventory to maximise revenues. What makes contemporary yield management different from traditional pricing practices is the frequency and scope of the decision making process. These techniques make it possible to update prices for early and late arrival dates, and to match the market's demands each day to more profitable prices. Leisure traffic is normally price sensitive and books early, while business travellers are less price (but more quality) sensitive and tend to book late. Yield management enables the anticipation of late demand and the offer of an appropriate number of rooms at the higher rates these guests are willing to pay. These systems are also useful for market information, identifying clients, and deducing crucial factors affecting decisions.

Driven by economic developments, the spread of large chains, the growing complexity of the industry's market and the availability of sophisticated management information systems, is a growing trend towards more professional management in the industry. This is reflected in strategies for labour saving, such as the increasing number of hotels offering buffet breakfasts.

Table 6: Hotels
Regional comparisons of performance, 1991

	Occupancy rate (%)	Average daily rate (ECU)	Total revenue (ECU)	Income before fixed charges (ECU)
Africa and Middle East	59.7	52.2	22 708	8 295
Asia & Australasia	67.3	60.0	24 597	6 110
North America	63.0	56.7	18 748	4 799
Europe	62.3	61.1	29 114	7 471
Latin America	53.8	33.6	10 835	1 730

Source: Horwath International

INDUSTRY STRUCTURE

Companies

Overall the hotel industry is fragmented but the importance of large hotel chains has increased considerably over the last decade. While these chains have brought a degree of homogeneity to the industry in many European countries, the structure and importance of the industry differs across Member States.

In terms of bed places offered, there is considerable concentration among the chains. The top ten chains operating in Europe provide as much capacity as the next forty chains combined. It should be noted however, that while the incidence of branded chain hotels is increasing, in some cases these are run by independent hoteliers on a franchise basis. Pressure for increased size comes from economies of scale in marketing, greater ability to meet the trend toward market segmentation with a complete range of differentiated services and advantages in covering a range of major destinations in any specific area. The strength of the chain to invest in CRS is another factor which will shape the industry in the coming decade, although advances in technology will increasingly enable smaller hotels to avail of CRS.

In identifying the world's top hotels the magazine "Hotels" distinguishes between three different types of hotel companies: corporate chains, with a strong brand identification, professional hotel management companies (HMCs), and voluntary chains and associations. There is overlap between these categories. For example, Best Western, a voluntary group is included among the corporate chains because of strong brand image while many of the larger corporate chains have their own HMCs which may run the hotels of other groups in certain locations. For example, Queens Moat Houses also run Holiday Inns, while the five top HMCs in the world have Hilton (USA), Sheraton (USA), Days Inn (USA), Radisson (USA), Marriott (USA) and Days Inn (USA) among their portfolios.

Other forms of affiliation such as leasing and joint ventures are currently being explored as a means of expansion by several chains, including Accor (F) and Forte (UK). Forte, for example, currently have joint ventures in Ireland (with Aer Lingus), in Italy (with Agip) and in Spain (with Repsol).

By global standards the top EC hotel companies are not as large as North American-based chains, but are larger than their Asian counterparts. The 1993 listing of the world's top corporate chains in 1992 by the magazine "Hotels" included eight North American-based chains in the top ten, although the second largest corporate chain, Holiday Inns, is owned by a United Kingdom brewing conglomerate, Bass Plc. Similarly, the top ten second tier management companies listed by "Hotels" included only one EC company, the troubled Queens Moat Houses Plc. However, reflecting the continued importance of small hotels in Europe the "Hotels" listing of voluntary chains and associations had seven EC-based companies, among the top ten in the world.

Strategies

The most important developments in the hotel industry in recent years have been the expansion of the chains/voluntary associations and segmentation of hotel properties into branded products each aimed at specific clientele. While different levels of service and quality across hotels has always been a feature of the industry, segmentation within the major hotel chains has resulted in increasingly distinctive products. It is also argued that too many brands within some chains may lead to customer confusion. Segmentation in Europe is not as ad-

Table 7: Hotels
Non-resident guest nights

	1980	1985	1986	1987	1988	1989	1990	1991
Belgique/België	4 379	5 536	5 292	5 316	5 424	6 575	6 874	6 549
BR Deutschland	19 003	23 895	23 473	24 314	25 226	28 389	29 766	27 768
Hellas	27 665	34 045	33 708	33 960	33 341	33 320	35 612	N/A
España	58 654	78 919	87 698	92 444	88 351	78 301	71 741	74 439
France	N/A	41 115	35 981	36 941	40 378	51 705	55 934	53 045
Ireland	5 471	5 540	5 268	5 005	6 417	7 434	8 277	9 423
Italia	66 188	63 978	65 150	70 194	70 406	68 139	66 012	65 843
Luxembourg	860	932	934	941	969	1 092	1 085	1 066
Nederland	6 250	6 926	6 808	6 521	6 762	7 316	8 102	7 993
Portugal	9 580	12 941	14 284	14 522	15 005	15 467	16 710	19 089
EC 10	N/A	273 827	278 596	290 158	292 279	297 738	300 113	N/A

Source: Eurostat Tourism 1991

Table 8: Hotels
Analysis of guest types, 1992

(%)	B	NL	F	D	GR (1)	IRL	P	U K
Business travellers	60.1	39.2	30.0	57.5	14.0	28.0	40.4	41.6
Holiday tourists	25.0	36.7	43.7	17.9	68.3	63.0	42.1	19.0
Conference delegates	6.9	15.7	9.0	17.4	6.8	5.8	6.9	17.9
Government officials	0.3	N/A	4.2	1.4	0.7	0.3	0.9	1.3
Other categories	7.7	8.4	13.1	5.8	10.2	2.9	9.7	20.3

(1) 1991
Source: Horwath International

vanced as in the United States but has increased substantially, to the extent that nearly all major hotel chains now have a range of differently specified products. For example, the French-based Accor, Europe's largest chain with a presence in nine Member States, has a highly-developed set of branded products, ranging from the four-star Sofitel (F) to the one-star Formule 1 (F) and budget chain Primo 99 (F).

The fastest growing segment of the market is the budget and "no-frills" establishments. All of Accor's expansion in 1992 took place within the budget brands sector. Similarly, Forte's joint ventures have all been aimed at expansion in budget brands. Greater economic cohesion within the EC, and demand from Eastern Europe, are expected to contribute to increased demand for low-cost no-frills establishments. Along with as Formule 1, other budget and no-frills chains include the French sister companies Campanile and Premiere Classe, Forte's Travelodges and Holiday Inn's Garden Court. Segmentation is not solely based on simple price/quality features, resort hotels and hotels specialising in the growing conference market are also considerations.

Consistent delivery of good service, particularly for business travellers, is the key element to maintaining loyalty as repeat business is the most cost-effective way of generating profits. Marketing, sometimes in partnership with other hotels or upstream services is a key strategy element in generating new business, but as articulated by Thomas W Storey, Executive vice-president of Radisson Hotels International "We've calculated it costs 15 USD to get a new trial guest and 2.50 USD to get a repeat guest".

Due to different travelling objectives, business travellers and long distance travellers are distinct from the leisure traveller. The discussion on demand trends in the industry suggest that there is need for a wide range of products to keep pace with the increasingly diverse forms of demand. The more a hotel can differentiate itself from its neighbour, for example by reflecting the special character of its surroundings, the more it is likely to appeal to the discerning guest. Similarly, with the growing importance of short break holidays many hotels are becoming the central element in a package of accommodation and leisure activities designed to attract short-break guests, particularly in the off-season. Many resort and medium sized hotels are also adding attractions such as fitness centres and other forms of all-weather entertainment.

Catering for new and complementary forms of tourism, such as activity holidays, also requires many hotels to re-think their strategy vis-à-vis non-hotel accommodation. Evolving packages to attract these new tourism market segments may involve coordination with other tourism and leisure facilities in the locality and other forms of accommodation. Cooperation between hotel groups is also a feature. For example, in order to improve its marketing in Europe Radisson has co-operated with SAS (S) hotels, Mövenpick Hotels (D) and Concorde Hotels (F). Similarly, cooperation between smaller hotels has resulted in segmentation, generally with a stronger leisure dimension, through the formation, or expansion of existing, voluntary chains.

While the top hotel groups in the EC are predominantly EC owned, in general, large hotel chains are international in character and two of the top chains, Hilton and Holiday Inns, originated in the US having recently been purchased by United Kingdom companies. The political and economic changes related to 1992 and German re-unification should have a positive "ripple" effect on hotel investment although the ongoing recession has dampened investment at the present time. A less buoyant demand outlook than during the late 1980s and the effects of the recent downturn in demand, suggest many investments will be in existing premises. In addition there is probably already a sufficient number of hotels in most major EC locations to cater for increases in demand, supporting the argument that most investment will be in the form of conversions and extensions of existing properties. While the flow of tourists to less well-recognised "tourist areas", particularly rural areas is expected to grow, much of the increased capacity required will be met by non-hotel accommodation.

Discernible trends indicate take-overs are the preferred expansion mode, as current players seek further economies of scale and/or expansion into new markets. There have been a number of high profile mergers over the last year such as Accor and Wagon-Lits (B), although the economic downturn has resulted in a slowdown in these activities. Extra-EC hotel chains particularly from the US and Japan, are seeking to expand in Europe. These chains include the US-based Marriott Corporation, ITT Sheraton, Hilton Hotels Corporation and Radisson and Far Eastern chains such as Nikko (JPN), Seibu Saison (JPN) and Aoki (JPN). Encouraged by saturation in their domestic market, US chains are also likely to increase investment in the EC to improve their share in a market which does not include them in the leadership. The nature of the European hotel market and its "modus operandi" is a major constraining factor for US chains, and to date they have been most successful in gateway cities through which most international travellers pass than in locations which attract mainly domestic business. In general and with a view to the longer term, Japanese investment has tended to aim for vertical expansion - hotels, restaurants, leisure facilities etc. - rather than a significant market share in a particular subsector, although the slump in stock market prices in Japan has slowed the flow of investment to Europe.

EC-based chains rapidly expanded across national borders during the second half of the 1980s in anticipation of increasing integration of the EC. For example, the United Kingdom hotel and hotel management company Queens Moat Houses expanded from its domestic base to the extent that almost half its business is now in continental Europe. More recently, economic slowdown is postponing investment decisions although this is likely to be a temporary lull. Increasing investment from large chains is unlikely to threaten the competitive position of the many small, independent hotels and restaurants that create the uniqueness of the European tourism product.

Table 9: Hotels
Prices in European capitals

	Luxury price (ECU) 1992	Change (%) 1985-92	Moderate price (ECU) 1992	Change (%) 1985-92
Amsterdam	227	49.5	199	161.0
Athens	243	87.0	45	-34.9
Berlin	234	N/A	120	N/A
Brussels	319	176.4	136	99.2
Copenhagen	147	24.9	122	N/A
Dublin	152	34.8	110	67.3
Lisbon	202	146.7	172	191.1
London	324	76.1	206	56.8
Luxembourg	207	141.3	88	102.1
Madrid	247	206.0	221	276.2
Paris	250	63.6	196	153.1
Rome	207	34.4	169	119.0

Source: Economist Intelligence Unit, Cost of Living Survey (BICOL)

Such fears may be misplaced and smaller independent and efficiently run hotels should be able to establish themselves in their own profitable niche. Retaining traditional ambience and intimacy with their clientele are important marketing characteristics, but small hotels should pay adequate regard to modern marketing, technological and management practices. These practices may include investment to upgrade quality, and cooperation with other tourism enterprises and other hotels in promotion, reservations systems and information systems.

Airport locations provide prime locations for both expansion and the development of new hotels, although increasing emphasis on high-speed rail links should draw both business and leisure travel from the airlines, suggesting that railhead locations will also see new investment. Continued growth in business and leisure travel will also stimulate new investment in hotels at large business parks and in resort areas. Even Spanish resorts which have suffered from stagnant demand during the second half of the 1980s may see further investment as new demand from Eastern Europe materialises - Iberotel (E), for example are concentrating on development in the Mediterranean rather than the Caribbean and the Far East. Increased investment in budget hotels may also see traditional European heavy construction giving way to prefabricated units.

Investment funds are being funnelled to Eastern Europe where there is a substantial supply deficiency, particularly of three star hotels. Some investment may be diverted from EC countries although it is expected that the bulk of the diversion will be from developing countries with the exception of Asia. Another concern is that although freer mobility of capital may encourage the large-scale investors, small operators may well continue to be hampered by the reluctance of banks and other financiers. This will add to the concentration of the industry and the weakening of the independents.

REGIONAL DISTRIBUTION

Venue availability has traditionally been considered the most important element governing the supply of hotel services. In general, hotel location follows demand rather than stimulating it, although there are exceptions. Thus, hotels are predominantly located in cities, specialising in business travellers, and in resort areas, specialising in tourist traffic. These factors, particularly the latter have led to significant variations in the distribution of hotels across Member States and within Member States. For example, the largest hotel in the EC is located in the Canary Islands.

ENVIRONMENT

To date, regulatory pressure on the hotel industry in relation to environmental issues has not been extensive. There are three major pieces of environmental legislation which are, or will when they are adopted, affect the hotel industry: the requirement for an environmental impact assessment which is required for large projects, liability for damage caused by waste and the obligation to clean up contaminated land. The latter two are not yet in effect and in general their impact will not be excessive. However, there is an expectation that regulatory pressure may increase with requirements for improved waste management and more consideration to how well hotel structures blend in with their surroundings.

The IHA has identified the environment as a key tourism asset and warn of stringent regulations if hoteliers did not work to improve their environmental records. They also point out that hotels may save on costs and gain in consumer goodwill by improving their environmental awareness. An annual "environmental award" is presented each year in association with

Table 10: Hotels
Composition of sales, 1992

(%)	B	NL	F	D	GR (1)	IRL	P	UK
Rooms	64.8	47.9	63.5	53.8	41.6	33.4	60.4	47.9
Food	20.7	30.1	22.1	26.9	40.0	36.8	23.3	31.7
Beverage	5.3	12.8	8.0	13.0	9.0	25.2	7.6	13.5
Other operational departments	7.4	5.1	4.9	5.1	6.6	3.9	7.4	6.1
Rental and other income	1.9	4.1	1.5	1.2	2.8	0.7	1.3	0.8

(1) 1991
Source: Horwath International

Table 11: Hotels
Operating statistics, 1992

	B	NL	F	D	GR (1)	IRL	P	U K
Cost of sales/deptl. revenue (%)								
- Food	26.2	28.2	32.2	33.4	27.2	39.7	33.4	35.2
- Beverage	22.1	22.0	20.7	22.3	18.5	53.1	21.4	33.6
Operating profit/deptl. revenue (%)								
- Rooms	68.4	68.6	70.4	70.5	52.6	72.6	75.7	69.9
- Food+beverage	13.2	32.2	8.5	14.2	26.0	26.1	14.7	27.8
Gross operating profit/total sales (%)	31.2	29.5	30.0	24.4	11.0	18.4	31.0	29.4
Sales per employee(ECU)	73 216	52 224	63 965	49 367	28 763	32 707	35 014	44 051
Cost per employee (ECU)	25 879	20 149	23 436	18 599	11 027	9 641	10 952	14 096
Labour costs/total sales (%)	36.3	38.8	36.8	38.2	53.4	28.1	34.8	31.2

(1) 1991
Source: Horwath International

American Express, while twelve environmental resolutions were drawn up in 1992. These resolutions cover the spectrum of environmental issues affecting hotels including care in planning and designing new projects, energy conservation, waste management, emission of pollutants and sensitivity towards ecological habitats, local populations and culture/heritage issues.

Environmental policies can be improved, in particular, the construction of new hotels in terms of energy conserving design, materials chosen, location and blending with surroundings. With hotels already designed there is also considerable scope for improved waste management both through recycling and energy conservation. Computer-based management systems are contributing to better control of costs including those with environmental implications. Demand size management (DSM), for example, is increasingly being used to control expenditure on energy costs and to extract more out of existing facilities. Attention to such details has been motivated by escalating power plant construction costs, excessive lead time to build new plants as well as the public's increasing environmental concerns. With regard to such aspects the IHA is working on an environment code for existing hotels and for new construction. Hotels groups are also cooperating to promote good environmental practice. Hilton (USA), Inter-Continental Hotels, Marriott (USA), Meridien (USA), Ramada (USA) and Sheraton (USA) are among a number of groups

Table 12: Hotels
World's top companies

Corporate chains (1)

Company	Headquarters	Parent HQ	Rooms	Hotels
Hospitality Franchise System	USA	USA	354 997	3 413
Holiday Inns Worldwide	USA	UK	328 679	1 692
Best Western International	USA	USA	273 804	3 351
Accor	F	France	238 990	2 098
Choice Hotels International	USA	USA	230 430	2 502

Second tier management companies (2)

Company	Headquarters	Parent HQ	Rooms	Hotels
Richfield Hotel Management Inc	USA	--	33 351	164
Queens Moat Houses plc	UK	--	22 121	191
Interstate Hotels Corporation	USA	--	18 431	54
The Continental Cos. (TCC)	USA	--	16 000	56
Larken Inc.	USA	--	14 400	70

Voluntary chains/associations (3)

Company	Headquarters	Parent HQ	Rooms	Hotels
Utell International	UK	--	1 360 000	6 800
JAL World Hotels	JPN	--	154 547	421
Supranational Hotels	UK	--	123 000	610
LRI/Grande Collection of Hotels	USA	--	90 000	422
Logis de France	F	--	79 966	4 615

(1) Companies with a strong brand identification.
(2) Professional management companies, often multiple franchisees, managing different brands as well as their own brands and independent hotels.
(3) Groups offering marketing and reservations services to independent hotels and corporate chains.
Source: International Hotel Association, Hotels, July 1993.

Table 13: Hotels
Top 20 companies in the EC, 1992

Rank in the EC	Rank Worldwide	Name of the enterprise	Country	Number of rooms	Number of establishments
1	4	Accor	F	238 990	2 098
2	9	Forte PLC	UK	79 309	871
3	13	Club Mediterranée SA	F	63 097	261
4	14	Hilton International	UK	52 979	160
5	15	Sol Group	E	40 163	156
6	16	Inter-Continental	UK	39 000	104
7	20	Societé du Louvre	F	27 427	398
8	25	Husa Hotels Group	E	21 500	98
9	28	Meridien Hotels	F	18 261	58
10	30	SAS Intl Hotels/Sunwing	B	16 507	46
11	34	Queens Moat Houses Hotels	UK	14 697	126
12	35	Mount Charlotte/Thistle	UK	14 320	114
13	42	Interhotels	D	11 668	31
14	46	Maritim Hotels	D	10 900	41
15	54	Occidental Hotels	E	9 468	44
16	55	Climat de France SA	F	8 989	175
17	62	Steigenberger Hotels	D	7 563	44
18	65	Fiesta Hotels	E	7 000	27
19	67	Lonrho PLC	UK	6 803	14
20	71	Penta Hotels Resorts	D	6 399	17

Source: HOTREC, 1993

which recently signed an environmental charter for the industry covering areas such as waste management, product purchasing, air quality, energy conservation and noise pollution.

REGULATIONS

Hotels are affected by a wide variety of regulations (local, national and EC) relating to health and safety, hygiene, sale of alcohol, planning permission and consumer protection. At an EC level a range of regulations affect the hotel industry indirectly. These include the Directive on Package Travel, Package Holidays and Package Tours (90/314/EEC), a body of measures covering the protection of workers, workers' residences permits, environmental regulations and data protection legislation. The industry is more directly affected by the 1986 Council Recommendations on fire safety in hotels (86/666/EEC). The Package Holiday Directive stipulates in article 5 that the package tours organiser is liable to the consumer for the proper performance of the contract, in all aspects including hotel safety (without prejudice to the right of the organiser to pursue other supplies of services). The result is that those in the industry responsible for organising tours are applying pressure and calling for more binding regulations on hotel safety.

Regulations on competition policy, particularly on abuse of a dominant position and state aids also potentially affect the hotel industry. However, the hotel sector is generally regarded as relatively competitive and has not been the subject of attention from competition authorities. With regard to state aids, the hotel industry in quite a number of Member States, most notably southern Member States, received state aid for infrastructural investment. This has not been contested by other sectors or hotel interests in other Member States who are often partly funded by the EC 's European Regional Development Fund. This financial support is generally regarded as regional aid and as such allowable under existing regulations.

Initially, proposed changes on VAT harmonisation would have increased hotel prices and reduced competitiveness relative to extra-EC destinations. This was a particularly worrying prospect for Mediterranean Member States whose hotel prices were also under pressure from prospective EC legislation on other areas, particularly in relation to working conditions. Furthermore, these Member States faced direct competition from non-EC Mediterranean destinations such as Cyprus, Turkey, Malta and north African countries. Swayed, by these and other factors, hotel services are now included among a list of goods and services to which the Member States can apply a reduced rate of VAT.

OUTLOOK

The hotel industry has experienced relatively steady growth over the last decade, slowing sharply in 1991 and 1992. This slowdown is likely to be temporary and reflects the underlying volatility of their demand base. Over the next decade global demand for both tourist and business accommodation will continue to grow at a relatively rapid pace. The factors contributing to growth over the next three years are: a recovery in most EC economies from 1994, increased trip frequency and improved seasonal spread, pushing up room-occupancy, capacity utilisation and profits; more active retired people with high levels of disposable income increase demand for hotel accommodation; increased business travel as a result of both closer European integration and more service-oriented industries in mainland Europe.

However, the EC's share of global tourism revenue is likely to decline slightly, although growing tourism expenditure by southern and eastern Europeans and arrivals from the emerging tourism markets of Southeast Asia will help counterbalance the drift to extra-EC destinations. The EC hotel industry will

Table 14: Hotels
Expected real annual growth rates

(%)	1993-94	1993-97
Turnover	3.0	3.0
Employment	1.0	2.0

Source : Fitzpatrick Associates

also face stiff competition from alternative forms of accommodation and from more adventurous and more demanding tourists. The industry has the capacity and the flexibility to tailor its products to suit changing demand, as evidenced by the substantial changes which have occurred over the last decade. Value for money is another emerging criteria among EC tourists but adoption of new technology should enable hotels to provide better service and more targeted marketing while keeping costs from rising, although there will be pressure on labour costs from both a regulatory end and from dwindling supply. Growth in guest nights in 1993 should pick up on 1992 and remain steady, at 3% per annum over the following three years.

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Other accommodation
NACE 667

The other accommodation sector is made up of numerous types and sizes of establishments, dominated by the smaller operator. The demand for this type of accommodation is predominantly from tourists and is dependent on tourists' tendencies towards seasonality, domestic travel and less travel during times of recession. Growth slowed in 1992 and 1993, reflecting these trends. Concentration within the industry is very low and the range of products in terms of cost and quality is diverse. There is little regulatory pressure and many smaller establishments are unrecorded and operate without constraints. Overall relatively slow growth is expected during the 1990s, although two significant changes, a shift away from traditional package holidays towards more independent holidays, and the increasing demand for short break holidays, will benefit some subsectors. Areas where new products have been developed will fare better than more traditional establishments.

INDUSTRY PROFILE

Description of the sector

The non-hotel accommodation sector encompasses a wide variety of establishments in terms of type, size and services provided. This sector includes camping-sites, caravan parks, hostels, guest houses, bed & breakfast, social tourism establishments, rural tourism establishments, apartments, second homes, time-shares and integrated resort developments. Services offered by this sector range from simple accommodation with basic amenities at the lower end, to integrated resorts with restaurants, bars, shopping malls and health and leisure facilities at the higher end. The former overlaps with the hotel sector at the lower end of the market while the latter competes with high and mid-range hotels. The services and facilities provided within the sector of the non-hotel sector vary widely. Thus, for example, camp-sites may provide restaurants, bars, swimming pools and other leisure amenities or just the basic facilities.

Recent trends

Due to the diversity and size of the sector official statistics on the turnover and value-added in different EC countries do not exist. The use of different definitions of other accommodation throughout the EC make it difficult to make comparisons and obtain main indicators for this sector. Eurostat data on other accommodation provides detailed information on camping and tourist village accommodation establishments. However, data on other categories such as holiday dwellings and social tourism establishments are far from complete. Much of the data on camping and tourist villages is based on classified camp-sites and, therefore, underestimates the number of establishments and bed places. Furthermore, available data mainly relating to the supply of establishments provides very little official statistics on realised demand.

Data that are available show that the different Member States reflect varying tendencies of non-hotel accommodation availability and preferences. France, followed by the United Kingdom and Italy, have the largest number of camping and tourist village establishments (see Table 1). However, the figure for Germany is based on tourist villages. Research by GFK Marktforschung Gmbh "Camping and caravanning 1989" indicates that Germany is also a main market and has an additional 2 000 camp-sites. Spain has the largest number of holiday dwellings, but this figure must be treated with caution as it includes a large number of small establishments.

While the paucity of the data hinders cross sector comparisons, Eurostat data indicates that most of the bed places provided by the non-hotel accommodation sector are located in camp-sites and tourist villages. France provides the largest number of bed places followed by the United Kingdom and Italy. While Spain has a very large number of holiday dwelling establishments it provides only slightly more bed places than the United Kingdom (see Table 2).

Incomplete and slightly dated data on overnight stays in camp-sites coming from a GFK report on camping and caravanning, indicates that this sub-category of the other accommodation industry is most important for France, followed by Italy and Germany. Comparable information for the United Kingdom and the Netherlands is not available and the data for Portugal, Greece and Ireland are seriously under-recorded.

Self-catering accommodation, which includes rented flats, villas, chalets, cottages and single rooms completely furnished, is reported to represent the largest subsector of non-hotel accommodation. Since a large proportion, perhaps 50%, of self- catering accommodation is let unofficially. The data that does exist suggests that France, Spain, Italy, Greece and Portugal lead in the provision of such accommodation.

Approximately 460 000 European families, constituting 1.5 million holidaymakers, own their own time-shares in over 700 holiday resorts. The greatest number of time-shares are situated in Spain followed by France, Portugal and the United Kingdom/Ireland (see Table 4). This category also includes gîtes which are generally rural properties let as holiday homes. France has the greatest number of gîtes followed by Germany and Italy (see Table 5). While Spain has a relatively small number of gîtes it has over 90 000 officially classified furnished flats. In the United Kingdom, Ireland and Germany bed and breakfast accommodation is very popular. Often their existence is unrecorded.

Integrated resort developments are common in a number of EC Member States, but the most popular formats differ significantly. In Spain and Portugal, most integrated resorts are aimed at the upper end of the market. They have a high quality finish and have associated activities such as golf courses or tennis courts. In some cases accommodation in these resorts is hotel based, although apartments are more common. In the United Kingdom, "holiday camps" such as those run by Butlins (UK) and Pontins (UK) are popular among families and provide a wide range of appropriate activities and leisure pursuits. Similarly, in northern EC countries resort complexes such as those run by Centre Parcs (NL), Sun Parks (B), Dorent and Gran Dorado are very popular short holiday destinations for families, although they also have a wider appeal, including corporate and incentive travel. Club Med (F) resorts mainly cater to for people in their twenties and thirties, generally without children although this is changing., They look to provide activities for the targeted age group.

Hostel accommodation is popular among youth travellers, particularly students. These travellers can be found all across the EC, especially in northern Member States. The International Youth Hostel Federation (IYHF) estimates there were 7.3 million overnight stays by foreign visitors across its hostels in Germany, the United Kingdom, France, Denmark, the Netherlands and Italy in 1991.

It is difficult to gauge developments on an EC wide scale due to the lack of accurate information. Eurostat figures on the growth in the number of bed places provided by camping and tourist villages indicates that the number in Spain increased by almost 50% between 1985 and 1991 while the number in Greece rose by 22%. Over the same period the number in the Netherlands fell by 68%.

Social tourism accommodation increased between 1985 and 1991. Under social tourism schemes accommodation is made available for people who are unable, generally for financial

Table 1: Other accommodation
Number of establishments, 1991

	Camping & tourist	Holiday dwellings	Social tourism villages	Other establishments	Total
Belgique/België	701	N/A	395	143	1239
Danmark	398	N/A	105	N/A	503
BR Deutschland	105	7 229	4 232	1 020	12 586
Hellas	330	N/A	N/A	16	346
España	954	122 995	N/A	N/A	123 949
France (1)	8 193	715	N/A	N/A	8 908
Ireland (1)	7	46	N/A	N/A	53
Italia	2 299	N/A	1 030	19 349	22 678
Luxembourg	127	N/A	12	N/A	139
Nederland	1 051	519	513	N/A	1 568
Portugal	168	N/A	57	N/A	225
United Kingdom (2)	4 231	17 203	822	366	22 622
Total	18 564	148 707	7 166	20 894	195 331

(1) 1987
(2) 1988
Source: Eurostat

reasons e.g. pensioners, large families and the handicapped, to go on holidays. The number of bed places in Germany grew strongly in 1991. In Belgium there has been steady growth, although growth did not occur in 1991, in Italy strong growth in the mid 1980s was followed by a steady decline, however, there was a return to growth in 1991. The limited data for the United Kingdom indicates strong growth.

The time-share sector has also shown strong growth with the number of households owning time-share holidays increasing. For example in Spain, time-share households increased by a factor of four and the number for the Benelux countries increasing by over 50%. Moreover, the United Kingdom, the traditional market for time-share, has continued to show a growth in ownership, increasing by ten percent between 1990 and 1992. Student travellers, invariably users of non-hotel accommodation, has been among the biggest growth areas of recent years and is relatively recession proof. Sales of SATA (Student Air Travel Association) tickets almost doubled between 1988/89 and 1991/92 from 634 000 to 1 243 000 tickets. The number of student travel (ISIC) cards issued has also increased.

International comparison

Usage patterns of non-serviced accommodation in the EFTA countries are comparable to those of the EC states; EFTA countries generally have high standards of accommodation with Scandinavian countries, particularly Sweden, noted for chalet style accommodation located in forest surroundings. Though no EC comparable data are available for the US, the US touring market is very large. Americans have pioneered the recreational vehicle market and standards and levels of provision for mobile tourists in the US are very high.

One in five time-share properties in the world are located in Europe, although only 14% of time-share owners are European. This form of holiday accommodation is most popular in North

Table 2: Other accommodation
Bed places, 1991

(thousand)	Camping & tourist	Holiday dwellings villages	Social tourism	Other establishments	Total
Belgique/België	352	N/A	67	26	444
Danmark	N/A	N/A	N/A	N/A	N/A
BR Deutschland	35	243	312	142	732
Hellas	82	N/A	N/A	9	91
España	575	403	N/A	N/A	978
France (1)	2 471	201	20	N/A	2 692
Ireland (1)	0	2	N/A	N/A	2
Italia	1 227	N/A	78	243	1 548
Luxembourg	12	N/A	1	N/A	13
Nederland	500	123	50	N/A	673
Portugal	266	N/A	11	N/A	276
United Kingdom (2)	1 230	392	123	1	1 746
Total	6 750	1 364	662	421	9 195

(1) 1986
(2) 1988
Source: Eurostat

America and Australia and almost non-existent in the less developed areas of the world.

Foreign trade

There is insufficient data to ascertain a breakdown of non-hotel bed nights in terms of "imports" and "exports". Even if this data were available the large number of establishments that are unrecorded would undermine its accuracy. The proportion of "camping tourists" from outside each Member State is typically in the range 30% to 40%. The ratio in Greece and Luxembourg is believed to be considerably higher.

Excluding youth travellers and those visiting friends and relatives (VFR), long distance tourists to Europe are infrequent users of non-hotel accommodation. The same applies to European tourists travelling to far away destinations. Non-hotel accommodation is popular with East European tourists visiting EC Member States, although it is not as common as might be expected given their income restraints. Over half of visitors to Austria, from Poland, Hungary and Czechoslovakia used hotel accommodation, albeit mainly 2-star hotels according to a recent report on outbound east European travel in the Economist Intelligence Unit's "Travel and Tourism Analyst".

MARKET FORCES

Demand

The demand for non-hotel accommodation is strongly linked to tourism demand. Most of the non-hotel accommodation users are leisure travellers, with business travellers using this type of accommodation only when hotel accommodation is unavailable. The low level of business demand results from the nature of the accommodation which is generally booked well in advance, by the week rather than the day, and is the lower end of the accommodation market.

Increasing incomes and increasing discretionary leisure time are predominant factors in determining the amount and type of travel and use of other accommodation. Both disposable income and available leisure time increased in the EC Member States during the 1980s stimulating the demand for other accommodation. Available leisure time has been expanding over the last two decades as improvements in working conditions have led to longer holidays and shorter working weeks, although this trend has decreased in recent years. Much of the demand for other accommodation, particularly camp-sites and rented accommodation, comes from family groups and tends to be linked to domestic tourism. In other cases, family based demand may relate to budgetary constraints which preclude the use of hotels.

There is a large domestic component in the demand for other accommodation. For a variety of reasons including income levels, the weather and the attractiveness of their own country as a tourist destination, the nationals of southern Member States of Greece, Portugal, Spain, Italy, and France are more likely to holiday in their own country. In the higher income northern European countries, particularly Germany, the United Kingdom and the Benelux countries there is higher demand for foreign holidays as travellers seek better climates and cheaper holidays.

The demand for other accommodation tends to be highly seasonal in nature. It is essentially limited to the warmer months, although winter sports generate demand for self-catering accommodation, particularly in the French Alps. Increased awareness in leisure, health and fitness of Europeans has encouraged growth in activity and sporting holidays. Approximately 10% of all holidays taken in Europe are built around a specific activity or sport. This seasonality results partly from the nature of the product, thus camping and caravanning holidays are more suited to the summer months. Institutional factors such as school holidays are also responsible for seasonality. Holiday parks of the style developed by Sun Parks and Centre Parcs have proved to be highly successful formula by providing facilities such as subtropical swimming pools, saunas and high standards of catering able to generate high occupancy levels throughout the year. Such parks are also tailored to the growing popularity of short break holidays.

The independent traveller and the trend away from package holidays towards the "go as you please" holidays bodes well for many subsectors for the other accommodation sector. While this sector faltered slightly in 1992 and 1993, it is expected to be a temporary slowdown as a result of economic recession. A significant component of this sector highlighting the importance of the independent traveller is the youth hostel market. There were over 8 570 151 overnight stays in European International Youth Federation hostels in 1991, with Germany, the United Kingdom, Austria and France collectively accounting for over one third of these stays. A useful indicator of the major origin markets for youth travel is the sales of ISIC student cards. Demand for these cards is consistently greatest from Germany, the United Kingdom, Spain and Ireland.

The demand for camp-site accommodation is strongly correlated with the use of cars as the transport mode. A survey by the European Travel Monitor considering the mode of transport used for international trips. This indicated that international tourism from Luxembourg, the Netherlands, Germany and Belgium tends to be car based and, therefore, more likely to use other accommodation. Very few international tourists from Ireland, Greece and the United Kingdom use car for even part of their travel, which indicates a lower demand for other accommodation. The opening of the channel tunnel is likely to stimulate international car travel between the United Kingdom and mainland Europe, which should in turn increase demand for the non-hotel accommodation industry.

Use of other accommodation often depends on traveller's national tendencies. At present, British tourists typically do not use non-hotel accommodation when travelling abroad. Holiday villas and apartments are the exception. An article in the Economist Intelligence Unit's "Travel and Tourism Analyst" indicated only 3% of UK holidaymakers travelling abroad used caravan or camping-sites in 1992, while 48% seek hotel and 24% seek villas/apartments accommodations and a further 18% visit homes of relatives. In contrast, only a third of West German holidaymakers in 1991/92 used hotels, while nearly 10% used camping or caravan sites. Similarly, the rapid growth in the share of continental European tourists in Ireland has resulted in very substantial growth in demand for non-hotel accommodation; total visitors to non-hotel accommodation by overseas tourists increased by 50% between 1987 and 1992. Similarly, citizens of Denmark, The Netherlands, France, Belgium and Luxembourg tend to have higher caravan ownership and would therefore tend to have a greater demand for campsite and caravan park accommodation.

The demand for social tourism accommodation is most prevalent in France and Belgium. This subsidised travel works by either providing holiday vouchers or aid for constructing tourist facilities. In France vouchers are distributed by the Agence Nationale pour les Chèques-Vacances (ANCV). These vouchers are accepted by 30 000 establishments and more than 2.5 million French people benefited from the programme. In 1990, 190 million French francs or two fifths of the expenditure was spent on other accommodation with the majority spent at social tourism establishments and rural gîtes. There is still potential for growth in social tourism since there is latent demand for this type of holiday and the associated accommodation. Unlike demand for other non-hotel accommodation, social tourism holidays demand is less dependent on the factors determining growth and trends in tourism expenditures and more dependent on institutional factors.

The rapid growth in short break and weekend holidays may be positive for some subsectors while the same growth may have negative repercussions for the other subsectors of the

Table 3: Other accommodation
Overnight stays in camping sites, 1986

	Number of overnight stays (thousands)	Of which foreigners (%)
Belgique/België	9.8	21.0
Danmark	10.6	36.0
BR Deutschland	16.5	24.0
Hellas	2.4	73.0
España	4.7	46.0
France	130.6	31.0
Ireland	2.7	28.0
Italia	39.8	36.0
Luxembourg	1.1	89.0
Nederland	N/A	N/A
Portugal	7.6	31.0
United Kingdom	N/A	N/A

Source: Gfk Marktforschung, Camping and caravanning survey 1989

other accommodation industry. Generally this sector will not benefit to the same extent as the hotel sector since many of the establishments are not suited for short breaks, and would not attract the higher income groups that can afford second holidays. In addition, growth in short breaks is generally in the off-peak, unsuitable for many "weather dependent" forms of non-hotel accommodation. If anything, growth in short breaks has contributed to a shortening of the duration of main summer holidays. Thus, the demand for caravan parks, camp-sites, chalets and holiday apartments is likely to fall as a result of the trend towards more frequent holiday breaks. Integrated resorts and bed and breakfast style accommodation are more suited for short breaks and demand for this type of accommodation has increased as a result of the growth in the short break market.

The demand from East European countries for other accommodation is low, but increasing. Tourism flows from these countries are likely to increase rapidly as their economies improve. The low income levels in these countries will lead to a higher proportion of holiday makers using budget accommodation such as camp-sites. In addition, the demand for time-share accommodation by East European countries is expected to increase as exchange organisations enable the purchase to be made in the native currencies.

The majority of EC holidaymakers travel to the seaside but these holidays are weather dependent and often seasonal. While many traditional resorts have tried to extend the season by improving their all-weather facilities, it is the hotels who have been the main beneficiaries. Nearly a quarter of all Europeans spend their holiday in the countryside. These holidays tend to be less weather dependent. Rural tourism has shown stronger growth than sun and beach tourism. In France where rural tourism has been promoted by the government, 80% of visitors are travelling independently, 20% are foreigners, and 30% are on short breaks.

The demand for non-hotel accommodation among long distance travellers is generally very low. Therefore, the industry has not suffered as much as the hotel industry from the decline in US visitors associated with the Gulf War and the recession. The growth in long distance tourism originating in the Member States is unlikely to have much impact on the non-hotel accommodation sector since many of these tourists would not use this type of accommodation.

Supply and competition

The supply of other accommodation varies dramatically within segments of the industry. Integrated resorts and time-share developments tend to be capital intensive with organised management structures. Similarly apartments and villa based establishments tend to be capital intensive and many of them are marketed through travel agents and as part of package holidays. At the lower end of the scale camp-sites and caravan parks tend to be less capital intensive while temporary accommodation in bed and breakfast establishment may be provided by altering the use of existing buildings rather than constructing new ones. Barriers to entry in the integrated resort and time-share markets exist in terms of the high set up costs and the long lead time associated with purposely built resorts. At the lower end of the market, especially camp-sites and caravan parks, the set up costs are much lower.

The supply of other accommodation tends to be seasonal in nature and a number of caravan sites and non-hotel accommodation establishments operate at full capacity in the summer while providing limited or no accommodation in the winter. This results in over capacity for much of the year and shortages at peak times. In contrast integrated resorts, theme parks and some time-share accommodation are provided all year round

Table 4: Other accommodation
European timeshare industry

	Timeshare owner's residence		Where they own their timeshare		
(thousand households)	1990	1992	1987	1990	1992
Benelux	9	14	N/A	N/A	0.5
BR Deutschland/Austria	42	32			
España	3	14	107	200	225
France	60	N/A	45	55	N/A
Italia	40	N/A	30	40	N/A
Portugal	15	20	10	50	53
United Kingdom/Ireland	220	244	35	50	48
Switzerland	70	N/A	20	30	N/A
Scandinavia	40	37	15	20	5
Other	3	N/A	5	15	N/A
Total	460	N/A	267	460	N/A

Source: RCI/Hapmimag/Holiday Property Board (HPB)/Ragatz Associates. 1992 data from Ragatz Associates, Annual Report of the World-wide Resort Timesharing Industry

Table 5: Other accommodation
Number of gites, 1988

	Gites
Belgique/België	166
Danmark	145
BR Deutschland	20 000
Hellas	45
España (1)	71
France	35 000
Ireland	N/A
Italia	6 744
Luxembourg	N/A
Nederland	292
Portugal	N/A
United Kingdom	320
Total	62 783

(1) Galicia, Basque Province and Baleares only
Source: Gfk Marktforschung "'Camping and caravanning survey 1989"'

and significant price differentials are used in order to spread the demand.

The supply of social tourism accommodation is dependent upon state funding and many of these establishments are in need of modernisation and upgrading. To the extent this segment competes with the commercial accommodation sector it may be seen as unfair subsidised competition. However, the degree of competitive overlap is marginal as this type of accommodation is aimed at a particular market segment and is designed to stimulate latent demand rather than divert existing holidaymakers.

A number of non-hotel establishments provide similar services to hotels and compete with hotels at the lower end of the market. Thus tourists might be faced with the choice of a hotel or self-catering apartments. Competition within the bed and breakfast market has lead to improved quality and more direct competition with hotels.

Tourists in the non-hotel accommodation sector are clearly becoming more demanding and expect higher standards of comfort and facilities e.g. sanitation, catering and sports facilities. In France, for example, around a fifth of camping-sites have a swimming pool and/or at least one tennis court. The trend is therefore to improve the quality of the facilities and services supplied by the industry. However there is still considerable divergence both within and between Member States.

Competition within the non-hotel accommodation varies between Member States. In some Member States the market tends to be mainly domestic and the consumers choose between different regions, while southern Member States tend to attract a higher proportion of foreign visitors. It is estimated that nearly 70% of camp-site users in Greece are from abroad. There is, therefore, an element of intra-sector competition, particularly between other accommodation situated in coastal areas where the foreign tourists are sun seekers and less concerned by the cultural and heritage aspects of their holiday. There is also direct competition between hotels and apartments in the package holiday market to Mediterranean resort destinations.

The opening of borders with East Europe has increased the competition for non-EC accommodation. This new market appears to be diverting visitor flows away from EC Member States. ETIC data indicates that nearly 7 million international trips were made to East European countries in 1990. A recent report for the Commission of the European Communities by IPK Munchen found that eastern European countries such as Hungary, Poland, Romania, Czechoslovakia, and Bulgaria generate a healthy balance of payments surplus on their tourism accounts.

Production process

The services provided by non-hotel accommodation vary widely across the industry. At one extreme, camp-sites and caravan parks may provide a pitch or area of land as well as basic amenities, while integrated resorts often have restaurants, bars, shops and health and leisure facilities. The variety of facilities and services being provided means that the production process differs significantly throughout the industry.

Camp-sites and caravan parks tend to be the most land intensive. Generally the industry is not as labour intensive as the hotel industry, since there are fewer services, often coming with an element of self-catering. Many of the workers tend to be part-time, for example at camp-sites and ski resorts, and in the smaller establishments, such as bed and breakfasts, family and female labour is used. The integrated resorts tend to be more labour intensive and the skills are similar to those in the hotel industry.

The majority of the establishments are not technology intensive. Some sectors such as integrated resorts and theme parks which provide other accommodation use computer reservation systems (CRS), as do the apartments and villas which are marketed as part of a package holiday. Many small operators rely on local advertising or links through tourist agencies. Smaller pensions and bed and breakfasts rely upon guide books and literature, rather than depending on travel agents.

INDUSTRY STRUCTURE

Companies

The ownership pattern of camp-site and caravan park ownership varies within the EC. In France, municipal authorities have traditionally been a major force in the ownership of camping-sites but more recently the private sector has increased its presence and in 1991 owned 54% of sites and 60% of pitches. Privately owned sites are overwhelmingly in the hands of small businessmen typically running just one facility, although some of these may operate a number of facilities within a region. The industry is fragmented and dominated by a large number of small enterprises. There are a number of larger players who run organised camp-sites where the camping equipment is provided on site. For example, Haven Spain and France holidays, a subsidiary of the Rank Organisation which also owns the Butlins holiday resorts, offers 37 parks in Spain and France varying in size from under 250 to over 500 pitches. Similarly Keycamp holidays offers 75 camp-sites throughout Europe including mobile homes.

The integrated resort sector of the non-hotel accommodation industry has developed over the last 10 to 15 years. This

Table 6: Other accommodation
Overnight stays by foreign visitors at IYHF hostels (thousands), 1991

BR Deutschland	1 166
Danmark	526
France	658
Italia	506
Nederland	513
United Kingdom	967
Austria	726
Switzerland	556
Total	5 618

Source: IYHF in Economist Intelligence Unit, Travel and Tourism Analyst 3/1993

Table 7: Other accommodation
Camping and tourist villages, 1985-91

(thousand bed places)	1985	1986	1987	1988	1989	1990	1991
Belgique/België	340	357	358	354	378	373	352
Danmark	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BR Deutschland	34	34	32	25	24	23	35
Hellas	67	65	69	77	78	78	82
España	385	406	438	457	470	571	575
France	2 407	2 471	2 446	2 451	N/A	N/A	2670
Ireland	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Italia	1 055	1 095	1 142	1 145	1 173	1 181	1 227
Luxembourg	N/A	N/A	13	12	12	12	13
Nederland	1 568	1 600	N/A	517	500	494	500
Portugal	215	231	246	248	257	261	266
United Kingdom	N/A	1 129	1 204	1 230	N/A	N/A	N/A

Source: Eurostat

represents a much more concentrated sector. The leading developers of health and leisure centres have been Dorent in Germany, Gran Dorado, Sun Parks and Centre Parcs in France and Benelux and Pontins and Butlins in the United Kingdom. The concept is highly developed in the Netherlands where the market is dominated by Centre Parcs. In 1990 there were over 400 000 villa rentals and nearly 2.1 million visitors in the Benelux properties. Demand is also expected to grow; Sun Parks, for example, is seeking funds to double the number of their parks from four to eight.

Club Med is an upmarket tourism product designed for those who enjoy activity holidays. It is based on a system of holiday villages and Club Med currently has around 105 holiday villages with a capacity of close to 68 000 beds in 34 countries around the world. Europe accounts for 55 villages and 39 000 beds.

The new Euro Disney resort in France is the largest theme park in Europe and offers non-hotel accommodation including 14 rustic lodge sites with over 1 000 rooms and 400 wooden cabins. France has a further 35 recreational parks and 30 aqua parks. Most European theme parks are geared to the day trip market and generally don't include accommodation. The arrival of Euro Disney has focusing the attention of some theme parks on the short break market as a supplement to their traditional day trip customers. For example, Efteling, the largest theme park in the Netherlands, has plans to add on self-catering accommodation.

Social tourism initiatives tend to be concentrated in Belgium and France. The VVF (Villages Vacances Familles) in France provide subsidised accommodation and has a capacity of 186 villages with a total of 67 000 beds and an annual turnover of 190 million FF. VVF was largely instrumental in setting up Euro-villages, which now has members in France, Belgium, Germany, Switzerland, Italy, Spain and Portugal.

Strategies

The general strategy within the other accommodation industry has been to improve the quality of the accommodation and facilities. Camp-sites now offer swimming pools, sporting facilities and even cinemas and discos.

The concept in the more sophisticated integrated resorts has been to transfer the ambience and environment of tropical resorts to northern European locations. These resorts also tend to be of a higher quality than the traditional resorts with swimming pools, tennis courts, restaurants and comfortable accommodation. These resorts also tend to be more activity based with numerous sporting and leisure facilities, and most importantly of all a guaranteed environment all year round. The primary target group is families with small children.

The success of the time-share establishments is largely due to their ability to offer exchange location. This initiative means that the owner does not have to return to the same resort every year. They are able to exchange their accommodation for another resort by using the services of the exchange companies. Thus, the owner of a time-share in Tenerife may choose a holiday in France.

REGIONAL DISTRIBUTION

Location of other accommodation establishments has followed demand rather than leading it. Unlike hotels, other accommodation tends not to be concentrated in major cities but is located away from these centres. This reflects the close ties with tourism traffic and in some cases the industry's dependence on climatic factors. The distribution of other accommodation establishments varies from country to country and depends upon the nature of demand and the type of establishment. Camping and caravan sites, and to a lesser extent second homes and time-share accommodation are generally located in coastal areas.

Non-hotel accommodation not located near the coast is generally in rural, rather than urban, areas. These include caravan and camp-sites as well as farmhouse accommodation. Integrated resorts in northern Europe are not as dependent on natural features for their location since they are activity based and are generally self contained. An exception is Centre Parcs which tends to be located in rural and forest areas. Northern European integrated resorts do, however, take account of local population structures in planning their locations. In southern Europe, integrated resorts tend to be mainly situated in coastal areas.

ENVIRONMENT

In general the non-hotel accommodation sector has developed without major damage to the environment. Many of the subsectors such as rural tourism, camping and caravanning depend upon their location and environment as a major selling point, although litter problems associated with camping and caravan sites are a continual source of concern. As most forms of non-hotel accommodation, gîtes, farmhouses, camp-sites and small hostels, although land intrusive, tend to be less intrusive on the landscape than hotels. Environmental considerations favour development of non-hotel accommodation.

Table 8: Other accommodation
Sales of ISIC cards, 1987 and 1992

(thousand)	1987	1992
BR Deutschland	115 (1)	214
United Kingdom	153	218
España	97	138
Ireland	88	111
Italia	39	57
Total	492	738

(1) Excluding the former East Germany
Source: ISTC in Economist Intelligence Unit, Travel and Tourism Analyst, No 3, 1993

Since many other accommodation users are independent travellers there tends to be a high proportion of car usage associated with this type of accommodation. A green paper from the EC indicates that the use of car as opposed to rail or bus increases congestion, produces more pollution and is a less efficient use of energy. At 25% occupancy levels railway use less than half as much energy per passenger kilometre as small engine cars. There may be scope to develop alternative modes of transport or to spread the peak season so that some of the negative environmental impacts associated with the car are reduced.

Under new EC legislation an environmental impact assessment is required for large infrastructure projects. Since many of the non-hotel accommodation establishments are either small in nature or not capital intensive this is unlikely to have an impact on these areas of the industry. There may be a need to increase environmental awareness in the development of integrated resorts and time-share resorts. These resorts benefit from a clean environment and it is in the interest of the developers to ensure that any new developments blend in with their surroundings. The construction of new establishments might be controlled in terms of density, materials chosen, location and more sensitivity to the regions heritage and natural/historic environment.

One area where the non-hotel sector has had a detrimental impact on the environment is the overcrowded holiday resorts where a large number of apartment blocks have been crammed into coastal locations. These types of resorts are often linked to package tours, examples can be found on the Costa del Sol in Spain, in the Algarve in Portugal as well as on a number of Greek Islands.

REGULATIONS

Other accommodation establishments are governed by national regulations covering sanitary services, fire services and safety, food hygiene, and where appropriate licensing regulations related to the sale of alcoholic beverages. As well as these national regulations there may be a number of local regulations with which the establishments must comply. Examples of these include government planning and development acts, and local by-laws on access roads, and sewage disposal. Caravan parks and camp-sites are affected by a number of regulations both locally and nationally. These regulations vary across Member States but tend to cover many of the parks' facilities like: maximum number of pitches, minimum size of the site, adequate drainage of the site, access to and within the site, car parking provision associated with the site and toilet and water facilities. In Spain the camping regulations are under the authority of the autonomous region, in Italy there are some common requirements nation-wide as well as regional legislation on the camp-sites within each region.

Regulations generally limit the proportion of fixed facilities that may be allocated to holiday parks, 15-20% is a typical ratio. It is attractive to the operator to develop fixed facilities, since they bring higher rent and profits. There are a large number of parks which cater to fixed facilities market, like caravan and mobile home owners who usually pay an annual rent for the site. These parks are not operated in the same way as touring or tourist parks since they are not open to tourists, they are, however, subject to similar regulations.

Some of the larger accommodation providers within the other accommodation industry are affected indirectly by EC regulations. The recent EC Package Holiday Directive will affect suppliers of apartments, villas, chalets or other accommodation as part of inclusive tour packages. The package holiday Directive makes tour operators liable if customers are not satisfied with their accommodation or if facilities are not a true reflection of those advertised. The threat of liability faced by tour operators will lead to the imposition of stricter safety criteria on providers of activity holidays and a consequent increase in the prices of these types of holidays.

Table 9: Other accommodation
International tourist trips from EC Member States by mode of travel (1)

	Car %	Plane %	Coach %	Train %	Total trips (million)
Belgique/België	52	23	14	9	16.5
Danmark	37	38	15	12	5.9
BR Deutschland	55	27	25	11	65.2
Hellas	18	54	23	5	2.3
España	35	35	25	8	7.2
France	38	49	18	13	14.8
Ireland	14	73	8	5	1.2
Luxembourg	62	12	19	7	0.4
Nederland	59	24	13	9	16.7
Portugal	45	28	24	8	1.8
United Kingdom	25	67	14	5	26.7
Total					158.7

(1) The percentages may not sum to 100 as two answers are possible.
Figures for Italia were not available.
Source: European Travel Monitor (ETM), 1990

Table 10: Other accommodation
Number of touring caravans per 1 000 passenger cars, 1986

Belgique/Luxembourg	54
Danmark	62
BR Deutschland	26
Hellas (1)	15
España (1)	10
France	56
Ireland	19
Italia (1)	12
Nederland	71
United Kingdom	28

(1) Estimates
Source: European Caravan Federation

OUTLOOK

It is difficult to provide an outlook for the non-hotel industry as a whole. While the demand for other accommodation in some Member States has experienced relatively steady growth over the last decade, such as France, Spain, Greece and Italy and others, while in markets like Germany and the Netherlands growth has been more static.

There is also variation within different sectors, for example, lower growth and, in some cases a decline, in the traditional holiday resorts of Spain and Portugal, against the strong growth in integrated resorts in northern Europe. While the development of time-share accommodation slowed towards the end of the 1980s the number of owners is forecast to grow from approximately half a million in the early 1990s to around 1.5 million by the year 2000.

Table 11: Other accommodation
Social tourism accommodation establishments, 1985-91

(thousand bed places)	1985	1986	1987	1988	1989	1990	1991
Belgique/België	48	53	55	62	71	69	67
Danmark	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BR Deutschland	240	241	251	254	255	253	312
Ellas	N/A	N/A	N/A	N/A	N/A	N/A	N/A
España	N/A	N/A	N/A	N/A	N/A	N/A	N/A
France	20	20	N/A	N/A	N/A	N/A	N/A
Ireland	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Italia	8	149	95	92	69	73	78
Luxembourg	1	1	1	1	1	1	1
Nederland	9	9	N/A	48	49	50	50
Portugal	9	9	1	11	12	11	11
United Kingdom	N/A	102	107	123	N/A	128	N/A

Source: Eurostat

Consumer legislation on the access to computer reservation systems (CRS) will involve the tightening of advertising standards and may affect the way in which package holidays incorporating other accommodation products are sold. One of the fundamental problems is that national legislation cannot cover sales practices in another jurisdiction. The time-share industry has been awaiting the instigation of an EC council directive on the sale of time-share accommodation for a number of years. The single most important aspect of this directive is the "cooling-off period" which is the time that the purchaser has to withdraw from their agreement. In the United Kingdom, as a result of an Office of Fair Trading (OFT) investigation, this period is fourteen days if the contract is concluded in the United Kingdom. Recommendations before the EC Council of Ministers are for periods of up to twenty-eight days which, if implemented, this would have a considerably adverse impact on the time-share industry.

Generally the non-hotel accommodation is regulated in terms of the amount it may charge for the facilities it provides. The scale of charges for different types and sizes of accommodation are normally regulated at a national level. Regulations on the harmonisation of VAT, may increase the price of non-hotel accommodation and reduce competitiveness relative to extra-EC destinations in the medium term. In the short term this is not a major issue because like the hotel sector the rate of VAT applied over the transitional period can be at a reduced rate fixed by national authorities. Although the non-hotel accommodation sector is not particularly labour intensive, the seasonal nature of this sector suggests that EC employment legislation introducing greater protection for temporary, or seasonal, workers will push up costs.

Over the next decade global demand for tourist accommodation will continue to grow at a relatively rapid pace. Increased leisure time and disposable income coupled with more diverse products will lead to an overall increase in demand. How all non-hotel subsectors will fare is less easy to predict. Growth in short breaks will adversely affect accommodation primarily designed for good weather conditions (camping, caravanning,

Table 12: Other accommodation
Distribution of Club-Med villages in Europe, 1991

Country	Number of villages (1)	Number of beds (1)
EC	37	26 555
France	17	8 414
Italia	7	7 883
Hellas	6	5 094
España	5	4 241
Portugal	1	751
Ireland	1	172
Other Europe	18	11 835
Switzerland	10	4 661
Turkey	5	4 164
Yugoslavia	2	2 080
Bulgaria	1	930
Total	55	38 390

(1) As at October 1, 1991
Source: Club Med

Table 13: Other accommodation
Expected real annual growth rates

(%)	1993-94	1993-97
Turnover	4.0	5.0
Employment	1.0	2.0

Source: Fitzpatrick Associates, Economic Consultants

chalets etc.) but, will boost integrated resort developments. Growing demand from East Europe will favour less costly forms of accommodation, trends towards rural and mountain tourism will make a positive impact, and student travel will continue to grow. The general movement away from traditional resort holidays may adversely affect some subsectors of the industry but generally increased growth will result from the shift towards more independent holidays and the demand for more adventurous holidays.

The shift towards new, higher quality and year round products is likely to continue. The use of CRS and the development of activity and theme holidays around non-hotel accommodation packages will attract new clientele and ensure that value for money is maintained without a loss in quality. Growth in guest nights in 1992 and 1993 will be constrained by adverse economic conditions, but should pick up in the medium term.

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Recreation parks

The recreation parks sector covers a wide range of tourist and leisure attractions. Overlap between subsectors is increasing and many amusement parks are increasing their share of nature and culture based attractions, joining education and entertainment as an important feature of the recreation parks sector. This monograph mainly applies to amusement parks. Based on comparisons with North America, the European market for amusement parks has not yet reached maturity and there is considerable growth potential. The arrival of Euro Disney in 1992 has tapped a high proportion of any latent demand which existed in northern Europe. The strongest prospects for growth are now in southern Member States where large amusement parks remain relatively scarce. Ownership of large parks is consolidating as a number some major firms expand through acquisition, although private single parks owners will remain important in most Member States. Large parks may harm the environment in a variety of ways, from noise pollution and scenic intrusion to attracting a high volume of motorised transport.

INDUSTRY PROFILE

Description of the sector

The recreation parks sector is fast moving and highly varied, it includes a wide variety of establishments in terms of size, style and services offered. It is difficult to define exactly what constitutes a recreation park, taken literally, municipal parks and nature reserves would be included within the definition. Even excluding these, the sector still includes a wide range of different types of operations. These operations vary from theme parks, other amusement parks and water parks, through holiday camps, to zoological gardens and safari parks. An important element of the recreation parks sector are non-permanent or travelling "enterprises" which often offer many of the same attractions as those available at permanent sites. In general, these are not discussed in this chapter, while holiday camps, such as those operated by Pontins in the United Kingdom, and indoor resorts, like Center Parcs, are regarded as more appropriately discussed under NACE 667, "other accommodation".

This variety in scale and orientation among individual operations reflects the constant evolution which takes place within the industry due to changing technology and consumer tastes. A number of key characteristics can be identified which distinguish recreation parks from other facilities. A recreation park constitutes a visitor destination in its own right. It offers a range of attractions to the visitor, often but not always for a single standard admission fee. Many parks close in off-peak periods, although this is becoming less the norm than has historically been the case. Most zoos, on the other hand, are open all year round.

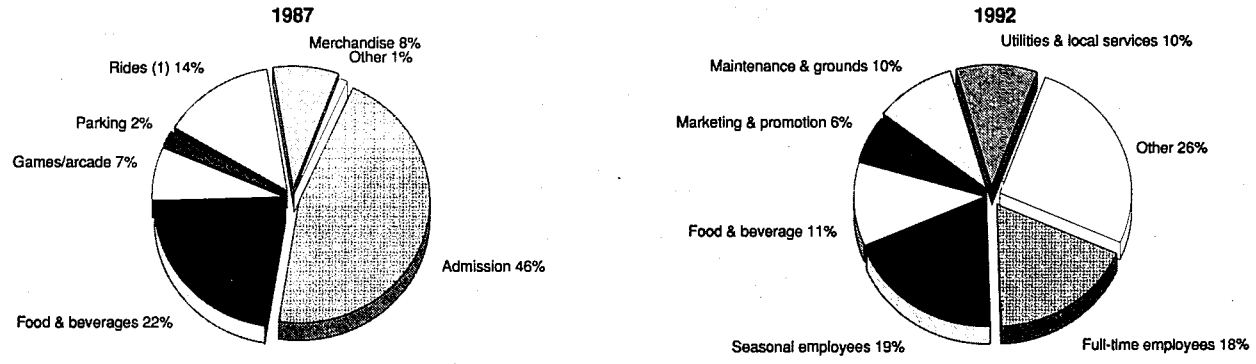
The level of overlap with other tourism sectors depends on the size of the operation. Non-admission revenue sources such as restaurants and retail outlets are estimated to account for approximately 45% of the total revenue of large theme parks and amusement parks. Only a few larger parks operate hotels or other forms of accommodation (caravan parks, self-catering, etc.). At the other end of the market, smaller parks do not provide accommodation and generate a smaller proportion of revenue from non-admission sources. Nevertheless, receipts from restaurants and retailing, particularly of park related merchandise, are still important to the smaller parks. Considerable overlap is evident, however, in the case of Euro Disney. Euro Disney is now the largest restaurant owner in France, with sales of over 30 million meals a year and if developed as planned the site will have a third as many hotel rooms as area surrounding Paris.

The geographic distribution of the industry is influenced by park size, with large parks generally located at a relatively small distance from major urban concentrations. While recreation parks are to be found in all EC Member States, the largest parks are situated in France, Germany, Belgium, the Netherlands and the United Kingdom. Smaller parks often provide an important part of the flanking attractions which are increasingly required in traditional resorts, particularly seaside destinations.

It is difficult to obtain reliable data on the recreation parks sector and, as yet, no official statistics exist, even though recreation parks generate very substantial levels of turnover and employment. The information that does exist is patchy, and is unlikely to cover more than a particular segment of the recreation parks sector.

In 1991, approximately 300 zoos and aquaria were members of regional and/or national zoo associations in Europe (including non-EC states and some former Soviet Union states)

Figure 1: Recreation parks
Revenue sources and operating expenses at European amusement parks, 1991



(1) Not including admission fees
Source: IAAPA Business Managers Survey

Table 1: Recreation parks
Paid attendance at EAZA member zoos and aquaria, 1990

	Total attendance (1) (million)
Belgique/ België	1.4
Danmark	1.6
BR Deutschland	24.5
España	2.6
France	5.5
Ireland	0.5
Italia	0.7
Nederland	5.2
Portugal	0.9
United Kingdom	9.8

(1) Does not include those who paid an annual membership fee
Source: European Association of Zoos and Aquaria (EAZA)

and zoo attendance was estimated at 125 million, approximately one fifth of total global attendance. Of the EC Member States, zoo attendance is much more popular in Germany than in the other eleven countries.

The International Association of Amusement Parks and Attractions (IAAPA) estimated that there were 63 major theme parks, with annual attendance of over 0.5 million, in operation throughout Europe in 1990, attracting around 60 million paying customers. No data exists regarding smaller theme, amusement or other recreation parks, but the European Federation of Leisure Parks (Europarks) estimates that inclusion of smaller parks would roughly double the annual attendance figure to about 120 million. Employment is estimated to be between 30 000 and 50 000. These estimates pre-date the opening of Euro Disney which is likely to have added a further 10% to these figures. Including Euro Disney and the smaller parks, total revenue is likely to have been nearly ECU 1.5 billion in 1992.

Recent trends

The popularity of zoos and safari parks among day trippers has fallen considerably in most EC countries over the past decade. Some are experiencing financial difficulties and closed down (particularly in the UK and to a lesser extent in Germany) or diversified. In the United Kingdom, for example, Windsor Safari Park (UK) is being rescued from receivership by Legoland (DK) and London Zoo's financial difficulties are well documented, while Chessington World of Adventure (UK) and Flamingoland (UK) have both developed from zoo-based attractions into theme parks.

In general the number of major amusement parks in the EC has increased over the last five years. In particular, American style theme parks enjoyed a boom period in the EC during the latter half of the 1980's. Large scale amusement parks have existed in Europe for many years. Tivoli Gardens (DK) in Copenhagen, for instance, was opened in 1843 and remains one of Europe's largest recreation parks. The opening of Disneyland in California in 1955, however, marked a fresh departure in the kind of product on offer. Since that time, theme parks have spread rapidly throughout the developed world. In Europe, a number of new developments have come on stream in the late 1980's, particularly in France, the most prominent of which is Euro Disney (USA), whose advent has had a considerable impact on the size and structure of the sector.

Surveys by the Economist Intelligence Unit (EIU) indicate that attendance and employment at major parks rose significantly between 1985 and 1992 coupled with the increase in the number of parks, it is evident that there has been sharp growth. The arrival of Euro Disney was expected to substantially boost overall attendance at recreation parks within the EC during the first half of the 1990s. Although, this expectation has been dampened by the economic slowdown in EC Member State economies. The IAAPA estimated that growth in attendance in Europe in both 1990 and 1991 was 2.0%, and while zero growth was estimated for 1992, this latter figure excludes attendance at Euro Disney. Analysis of attendance data of a range of major parks indicates a rather mixed performance during 1992 and is generally supportive of the IAAPA estimate.

International comparison

The standard reference point for international comparisons of recreational parks and, especially theme parks, is the North American market, which is the largest in the world. There was a major boom in theme park attendance in the United States during the 1970's, with the market stabilising in the following decade. During this latter period a number of major operating companies moved out of the market, with control of major theme parks passing to a smaller number of large companies. As a result of this stabilisation, fewer new large-scale investments were undertaken in what is essentially a mature market. Rather, new initiatives have tended to either concentrate on smaller parks serving niche markets, such as waterparks, or on extensions or variations to existing products.

Theme parks are a very important element of the US domestic and international tourism product. Analysis of the US market by Travel and Tourism Research Association (TTRA) estimates well over half of the US population visits theme parks between March and September with an average frequency of visit of 1.9 times a year. Among holiday makers, the existence of a theme park was important or very important in destination choice. The corresponding proportions in Europe are likely to be much lower as is expenditure per capita in the amusement parks. Growth in attendance in the US has remained relatively strong in the 1990s despite economic slowdown and was estimated by the IAAPA to be 3.9% in 1991 and 3.3% in 1992.

Revenue per park is much higher in the US, reflecting their greater importance as a short break, or longer, holiday destination. In addition, according to the IAAPA Business Managers Survey, admission revenues accounted for close to half of all revenues, excluding accommodation, in major European

Table 2: Recreation parks
Attendance and revenues at major European amusement and recreation parks, 1990 (1)

Parks	Number of parks	Estimated annual attendance (million)	Estimated annual revenues (ECU million)
Large	18	31	470
Small	45	29	270
Total	63	60	740

(1) Includes only those parks with over 0.5 million visitors per annum
Source: Economic Research Associates/IAAPA

Table 3: Recreation parks
Attendance at leading parks in the EC, 1991 and 1992 (1)

Attendance (thousand)	1991	1992
Belgique/België		
- Bellewaerde	970	870
- Bobbejaanland	900	980
- Walibi	1 600	1 450
Danmark		
- Legoland	1 200	1 200
- Tivoli	4 000	4 000
BR Deutschland		
- Hansapark	1 100	1 300
- Tripsdrill	500	500
España		
- Marineland	1 100	1 200
Fance		
- Bagatelle	300	320
- Futuroscope	1 000	1 300
- Parc Asterix	1 400	1 000
Italia		
- Edenlandia	1 450	1 600
Nederland		
- Duinrell	1 080	1 180
- De Efteling	2 700	2 500
- Noorden Dierenpark	1 500	1 700
- Ponypark Slagharen	1 000	1 000
United Kingdom		
- Alton Towers	1 980	2 490
- Blackgang Chine	371	340
- Chessington	1 410	1 170
- Flamingoland	1 687	991
- Great Yarmouth	2 500	2 250

(1) Survey based, therefore it excludes some major parks
Source: Park World

amusement parks in 1991, compared to just 30% in the United States. This difference does not necessarily reflect higher admission charges in Europe, because while full admission prices are higher than in they are in the US, there is much stronger price differentiation in off-peak periods. Rather, it indicates lower expenditure on ancillary products. This feature of European theme parks, combined with the deflationary impact of economic slowdown on expenditures is a major reason why Euro Disney is not reaching its revenue targets, despite visitor numbers being up on expectations.

The Japanese experience closely reflects that of Europe, with large growth occurring in the 1980's. Disney, for example, opened a park in Tokyo in 1983, and a number of major theme parks were opened in the late 1980's. As in Europe, some of these parks have had financial difficulties. Nevertheless, the Japanese and other Pacific Rim markets are not yet regarded as having matured. Reflecting this, growth in attendance remained very strong in the early 1990s; IAAPA estimates a 9.4% growth in 1991, followed by a more modest, but still strong, 4.0% in 1992. Continued strong growth is expected in the Pacific Rim countries over the remainder of the 1990's.

Foreign trade

Recreation parks are primarily a tourist product, where domestic tourists are more important than their international counterparts. The international attraction potential of recreation parks differs significantly. A number of such parks, Euro Disney being the most obvious example, are international attractions which generate substantial cross-border tourism in their own right. Other major recreation parks could be classified as flagship attractions meaning that they form an integral part of a group of tourism products which attract tourists to a particular country or area. In many cases these recreation parks also attract international excursionists, particularly in northern Europe. Consumers are increasingly willing to make cross-border trips to attend recreation parks, a trend enhanced by the abolition of border controls in 1993. Smaller types of recreation parks are more common as flanking attractions become more important at traditional seaside resorts frequented by international tourists.

US theme parks are important in attracting European tourists. In particular, utilising the major flagship attraction of Disneyworld (USA), Florida has developed a critical mass of theme park and other attractions to draw visitors. Many holiday packages to Florida include a week at a beach resort and a week in Orlando where many of Florida's main attractions are centred. Disneyworld estimates that United Kingdom visitors to Disneyworld out numbered those from the state of Florida in 1991. Anheuser-Busch (USA) also plans to expand their reach into Europe with sales missions to Germany and the United Kingdom during 1993. Similarly, anchored by two major theme parks, San Antonio in Texas is making strong inroads into European markets and these were a central feature of the major Texas promotion in Frankfurt in early 1993.

The majority of park owners in the European recreation parks industry operate a single park. There has been some change in investment activity recently; a small number of firms beginning to open parks, usually theme parks or amusement parks, in other European countries. Reflecting the popularity of US-style theme parks, the largest inward investment to the EC of recent years has been Walt Disney's Euro Disney theme park outside of Paris.

MARKET FORCES

Demand

Consumer demand for recreation parks is volatile. Major factors contributing to this volatility are changing consumer tastes, the weather and economic conditions. Consumer tastes in particular have changed substantially since the beginning of the 1980s. Although demand has stabilised, and in some cases has grown, zoos have lost considerable market share in recent decades. Similarly, attendance at safari parks has plunged since the 1970s when they were very popular. Pleasant weather is generally good news for recreation parks as most of their attractions are outdoors, even though good weather also increases the pulling power of beaches, scenic areas, public monuments and other less expensive leisure pursuits. Poor economic conditions adversely affect all leisure expenditure, and within overall leisure expenditure the larger and more highly priced amusement parks are hit hard, competing with much cheaper, and often free competitors such as beaches and scenery. In addition, ancillary expenditures within the "pay-one-price" parks fall during recessions.

Traditionally amusement parks are either a day trip attraction or part of an overall package of attractions for visitors at resort destinations, particular seaside resorts. However, over the last twenty years demand has broadened considerably and in the US a high number of theme parks have become short break destinations. This phenomena is in its infancy in Europe with Euro Disney being the primary example, although companies such as, Center Parks (NL), Dorent (D), Sun Parks (B), and Gran Dorado (NL) were attracting overnight visitors long before the arrival of Euro Disney. Whether these facilities can be classified as recreation parks is not clear. Similarly holiday camps such as Butlins and Pontins in the United Kingdom have traditionally relied heavily on overnight visitors.

There are several factors influencing demand in the day trip market segment such as: the distance which the customer has to travel, the availability of other destinations such as seaside resorts and national monuments, consumer preferences, chil-

Table 4: Recreation parks
Comparison of European, USA and Japanese theme parks industries, 1990 (1)

	Europe	USA	Japan
Number of parks	63	95	58
Estimated annual attendance (million)	60	159	75
Estimated annual revenues (ECU million)	746	3 377	1 139
Average attendance per park (million)	1.05	1.67	1.29
Average revenue per attendee (ECU)	12.56	21.20	14.92
Average annual revenue per park (ECU million)	11.78	35.34	19.63

(1) Refers only to theme parks with annual attendance over 0.5 million.
Source: Economic Research Associates/IAAPA

dren's desire to visit a park, climate and cost. The distance factor is of particular importance. The catchment area of a park is usually considered to lie within a 150-200 kilometres (or maximum 2 hours travel) radius of the park itself. Major theme park developments in recent years have tended to be located at non-resort destinations, where the key ingredient in location choice has been the catchment population within a certain radius. The rule of thumb suggested by the English tourist board for a park hoping to attract around 1 million visitors annually is "two hours drive of 12 million residents or one hour drive of a major holiday destination and also two hours of 5-6 million residents". The private car is by far the most significant mode of transport in this sector and the abolition of border controls in 1993 has increased the willingness of consumers to take day trips outside their own Member State.

The central element of any amusement park is the number, quality and variety of attractions, e.g. shows and rides, which it offers, these attractions are generally united by a common theme or set of themes. Variety is important as clients vary from young children to adolescents through to senior citizens, and there must be a sufficient range to hold the attention of each category throughout the day. The proportion of children to adults varies widely across different parks. The average stay at a European park tends to be around 6 hours although this figure also varies widely. In the case of Euro Disney the aim is to provide sufficient attractions to entertain for more than a day and hence attract short break and repeat visitors.

Statistical analysis of the demand for amusement and theme parks by Luiz Moutinho in "Tourism Management" found that the most important factors for choosing an amusement park were, the existence of desirable, fun-rides, little waiting time, the weather, followed closely by overall prices, proximity and family atmosphere. Ancillary factors contributing to visitor satisfaction are becoming increasingly important as tourists become more sophisticated and more demanding in relation to quality. These include, landscaping of sites, absence of litter and cleanliness of toilets and other facilities, maintenance of gardens and green areas, simplicity and clarity of information provision, attitudes and friendliness of staff and ample provision of rest and picnic areas. With the advent of Euro Disney, whose international operations are renowned for due attention to quality factors, there will be increasing pressure on major European parks to do likewise.

As demographics change and more of the European population is older, the emphasis is shifting away from white-knuckle (meaning frightening) rides towards more family oriented entertainment. A leading analyst of the recreation parks sector, Chris Gratton of Tilburg University in the Netherlands, argues that the future of theme parks will depend on increasing the "skill level" of attractions. He postulates that theme parks can be seen as a form of "unskilled consumption", which have the potential for a rapidly expanding market when first introduced, but that maintaining increases in attendance is more difficult over time. Constantly updating rides and attractions with more recent and more thrilling replacements is one, increasingly costly, method of freshening the appeal of theme parks. Another, following Grattan's logic, is to increase skill levels by introducing greater customer participation, for example through educational themes. This is already evident in the increasing emphasis on education and in the choice of themes. In the US there is a move away from white-knuckle rides towards experiences such as simulated earthquakes and tidal waves, which while equally scary may also have an educational element. The educational value is more evident, however, in the increase in the number of shows, and even rides, involving audience, or selected audience member participation. Customer participation and education are two major themes where zoos have been focusing upon in recent years. Hence they have become important centres for environmental education, which helps distinguishing them from other recreation or theme parks.

European amusement parks experience sharp seasonal variations in demand, although they are still among the most visited of tourist attractions. Euro Disney attracted substantially more visitors than any other attraction in the EC during 1992. Similarly, in the United Kingdom Alton Towers (UK) and Blackpool Pleasure Beach (UK) were among the most visited attractions. Given the perceived importance of weather, a string of poor summers could financially cripple a park heavily dependent on outdoor rides, emphasising the need for incorporating weather-independent facilities in future resort plans. Thus, while most amusement parks still feature a high proportion of outdoor attractions, many recent investments in northern Europe have involved covered all-weather attractions. Euro Disney, incorporates a substantial covered element to sustain year round opening. While the requirement for theme and amusement parks to remain open all-year-round is theoretically prudent, in practice it adds considerably to capital costs and many theme park proposals have remained on the drawing board as a result.

A 1990 report in the EIU's "Travel and Tourism Analyst" suggested that the pricing policy of large amusement parks goes through various stages of development. Initially entrance prices are set low to entice first-time visitors and to allow the new concept of large pay-one-price amusement parks to establish themselves. Admission prices are progressively increased as demand increases, and as parks approach their planned market share and as capacity constraints become more evident. This logic is reflected in the argument that other European theme parks would benefit from the arrival of Euro Disney in that it would allow them to charge higher admission prices not only because Euro Disney's admission price is very high relative to most parks. but also because it would speed the education process of consumers regarding the attractiveness of recreation parks. Whether this works in practice remains to be seen.

Supply and competition

The number of recreation parks in Europe expanded over the last decade. Expansion has not been uniform and amusement parks have enjoyed far greater growth than attractions such as zoos, aquaria and safari parks. Indeed, there have been a small number of closures in the latter subsectors, although their prospects have improved with better marketing and by improving the infrastructure, such as restaurants, shops, and in particular the presentation of animals. A number of new amusement parks have opened in recent years, especially in France, with most incorporating specific themes. The advent of Euro Disney is expected to raise the profile of amusement parks and to encourage better product quality, particularly in presentation. In the light of these expectations, several parks are switching investment strategies towards enhancing quality and presentation during the early 1990's. This is particularly the case in the United Kingdom, Germany, Denmark and the Benelux countries, where reflecting an already high concentration of parks there is little room for greenfield investment.

Greenfield investment in amusement parks is a relatively high risk activity. The capital costs of investment are high and demand is uncertain and difficult to predict. Factors which contribute to this demand uncertainty include: the specialised nature of the amusement park business, the wide range of lower priced competitor leisure attractions, seasonality and weather sensitivity of demand along with the varied range, and age profile, of consumers to whom it must appeal. A more recent addition to the associated risks is environmental pressures which increase difficulties and delays, in obtaining planning permission.

Reflecting these risks there have been a number of high-profile failures in recent years. The financial difficulties of Euro Disney are well publicised. Operating performance in many of the recently opened French Parks has been below expectations and a number have been forced to close down or go into liquidation or change hands. Part of the problem is that the operation of these parks is seasonal with little consideration in their design for all-weather attractions. Weather proofing amusement parks is very costly. Thus, investments both from private sources and from financial institutions have been difficult to attract and may become more difficult for the next few years. In the United Kingdom, for example, major investments planned in the recreation parks sector at Corby and Battersea failed to attract the necessary funds. Mintel in a recent study of United Kingdom theme parks point out that environment-related pressures will also favour the expansion of older and dated parks, rather than building new ones.

The capital costs of building new parks from scratch also make the acquisition and expansion of existing parks more attractive for companies seeking to enter the market or to expand their base of operations. This is already leading to mergers and take-overs with older operators selling out to the new theme park owners. The Belgian group Walibi has expanded considerably in recent years through the acquisition of new parks in France and the Netherlands, while the Tussaud (UK) group has grown substantially in the United Kingdom and Lego recently acquired Windsor Safari Park in the United Kingdom. Overall, there is a trend towards consolidation, although the strength and tight ownership control of many parks suggest that consolidation will not reach the levels currently pertaining in the US.

Production process

Given the diversity of packages offered to the consumer, the production process varies greatly, depending on the type of park involved. As such there are a wide variety of different ride types, varying from kiddie rides through roller coasters to simulators, live entertainment and mini golf. The majority of parks rely on a high rate of return visits, and there is a constant need to update and renew the attractions available. Parks whose main focus is white-knuckle rides and similar attractions, are generally obliged to invest in new equipment on a regular basis, usually every two to three years. Another approach is to bring in attractions from other operators for a limited period. Companies such as Walibi or Bembom Brothers who have parks in a number of European countries are able to move attractions from one park to another, thereby reducing the level of innovation and investment required per park.

Technological progress is likely to effect major changes in the production process in the mid to late 1990's, as virtual-reality based products become more widely distributed. These products are considerably cheaper than conventional rides and, once installed, can be readily changed and developed at an even lower cost to the park. This could conceivably lead to more parks being built at a lower cost, or the addition of high quality excitement to attractions offered by smaller parks who have previously been precluded from doing so by the cost involved.

The recreation park sector is both land and capital intensive. In addition to the land required for the recreation park itself, space is required for parking. Thorpe Park in the United Kingdom, for example has space for 9 000 cars and 250 coaches. Recreation parks are also important employers of both skilled and unskilled workers. Permanent core staff are generally well qualified. They include administrative and marketing staff and skilled workers such as carpenters, painters, electricians, mechanics and specialised designers. In the case of zoos and aquaria the requisite qualifications are even higher. A high proportion of seasonal staff are, however, relatively unskilled. According to a recent report in the German trade magazine, "Amusement Industrie", the ratio of permanent to seasonal staff is around 1:4 to 1:5, a limited 1993 survey conducted for the Economist Intelligence Unit indicates a variation around a similar ratio. IAAPA estimates for all world regions indicates a slightly lower ratio with the average park in its survey employing 265 seasonal staff compared to 84 full-time. Reflecting capital intensity of leisure park operations, the "Amusement Industrie" report suggested that in 1989, the average capital spent per full-time employee worker was around ECU 70 000.

Professionalism and good park management are also very important elements in the overall mix of factors which produce the recreation park service. With increase emphasis on satisfying more demanding and sophisticated customers the need for an appropriately good management response will increase.

INDUSTRY STRUCTURE

Companies

In the European recreation parks sector, unlike the US, comparatively few park owners control more than one park and most companies are family-owned and controlled. This is less true in the United Kingdom where a number of major companies, the Tussaud (Pearson) Group, Granada Group and Ready Mixed Concrete are all involved in the sector. Even the large amusement parks have generally been controlled by family firms. This ownership model appears to be changing. The investments of theme park in France in the late 1980s were primarily financed and driven by conglomerates of large leisure companies. In addition, a number of firms are expanding through the acquisition of existing parks or through building additional ones. Examples include, Walibi, Bembom Brothers, Tivoli and the Tussaud Group. While Tivoli Gardens in Copenhagen differs from most theme parks through the absence of neon and plastic and the emphasis on music and flowers, the company has expanded across Europe using a mixture of more traditional amusement attractions and its original formula. Tivoli is involved in: a Rhine side Park near Düsseldorf, a Hans Christen Andersen fairy tale theme park in Odense Denmark and a project in Japan.

It is still uncertain whether Europe will follow the US where, although there are a large number of smaller parks, the large theme parks are controlled by approximately four large firms, Disney, Anheuser-Busch, KECO, and Six Flags. With the North American market regarded as saturated, three of these US companies are now focusing on Europe. Euro Disney is already in operation with ambitious and well publicised expansion plans. Anheuser-Busch is involved in a joint venture to build a new theme park near Barcelona, while Six Flags is said to be considering a theme park in Marbella in southern Spain.

All-weather leisure facilities developed for tourism purposes such as those in indoor resort concepts such as Dorent in Germany, Gran Dorado, Sun Parks and Center Parc in France and Benelux and the Sandcastle Centre in the United Kingdom have become commonplace in EC during the last 10 to 15 years. The concept has a number of elements in common with recreation parks and the more sophisticated of these indoor resorts transfers the ambience and environment of tropical resorts to northern European locations on a year round basis. With the short break leisure market in Europe growing rapidly, some amusement parks are beginning to focus greater attention on this market segment. In the US, Disney parks are primarily a short breaks destination, with other large theme parks relying on the day trip market. This is a pattern which may develop in Europe with only the largest of existing parks attempting to compete with Euro Disney for short break customers. The Dutch theme park, Efteling, for example, is planning a major expansion which includes provision of accommodation. The French theme park Futuroscope is exploring capitalising on its proximity to Euro Disney to boost its own short break business, while Episodes, a tour operator specialising in short-breaks, offers Parc Asterix (F) and Euro Disney as an integrated holiday break.

The availability of European Regional Development Fund (ERDF) money through the Structural Funds is boosting investments in smaller scale recreation parks in some of the less well-developed areas of the EC. Countries such as Greece, Portugal and Ireland do not have the population density or the required transport infra-structures to justify major theme parks, but have made considerable use of ERDF money to leverage investment for small scale recreation park developments. For example, Celtworld in the seaside resort of Tramore in the south of Ireland is regarded as a flagship attraction but is very small by comparison to the major theme parks discussed in this report.

Strategies

As with the European tourism market in general, the recreation parks industry in post-war Europe has been shaped by advances in communications and changes in consumer tastes. Some of the older recreation park types such as zoos, safari parks and traditional holiday camps have experienced mixed fortunes during the post-war period. These attractions have adapted to changed circumstances and are currently retaining their market share. Many zoos, for example, are currently expanding their marketing activities and enjoying improved visitor numbers as a result. Others have diversified their appeal through the addition of shows and rides, while a number have gone further and re-emerged as fully-fledged amusement parks.

At present most parks are idle throughout the winter, although the increasing popularity of indoor and water-based attractions has widened the possibilities for extending the season. This development is both demand and supply driven. Increased demand for short breaks in the off-season is a recent feature of the tourism sector, coinciding with the aim of park operators to increase levels of utilisation of their investment. In addition to extending the season, some parks have tested the market with Christmas and New Year opening periods. Also, many recreation parks are increasingly turning to the corporate sector to boost demand during off-peak periods.

The advent of Euro Disney and the impact which it is likely to have on raising standards will require investment in software areas such as staff training and presentation formats. Theme parks will need to concentrate on improving the less desirable aspects of their product like: adverse environmental effects, misinformation or confused facts relating to themes and staff attitudes to customers.

REGIONAL DISTRIBUTION

While smaller operations are located throughout the EC the larger parks are located in northern Europe, near the major population centres. Unlike the US, European parks are rarely located in traditional holiday areas, although this is less true of the United Kingdom where traditional resorts such as Blackpool, Margate, Skegness, Southsea and Great Yarmouth have large recreation parks, although major parks such as Alton Towers, Thorpe Park and Chessington World of Adventure are all located in non-resort sites.

Attempts have been made to capitalise on the more suitable climate of southern Europe, with the development of a number of smaller parks, especially water parks, in this area. The use of ERDF money is contributing to such developments. With the exception of Euro Disney, recent and planned major greenfield investments in amusement parks are in southern Member States. Some rural areas are also attracting smaller, often culture-based theme parks often with relatively less stress on rides and relatively more emphasis on shows or activities with audience participation.

ENVIRONMENT

The size of most large theme parks and the volume of car visitors which they attract has negative environmental consequences for the areas in which they locate. With large land areas generally required there is a trade-off between sites which impact on residential areas and those which are located in green belt areas and may have an adverse impact on natural habitats, local woodlands etc. Following EC regulations, such developments require Environmental Impact Assessments, although it is also in the interests of major parks to consider the relationship between their park and the local environment. In a market which is increasingly sensitive to quality and to environmental factors, the advantage of a sympathetic landscape in surrounding areas and on approach roads is important. The parks themselves, and their representative organisation, Europarks, are very aware of the adverse impact which heavy reliance on car based visitors can have on the environment. Thus, Europarks have endeavoured to cooperate with national governments to improve accessibility by public transport to their member parks.

While nature themes are common among theme parks in Europe, in particular those which have evolved from zoos or safari parks, strict ecological or environment themes are not common in major theme parks. This may be an area for future developments. It is already evident in the indoor resort sector, with environmental friendliness and harmony with nature being an important feature of Center Parcs' resorts.

Greater concern for the environmental impact of major theme parks, particularly greenfield operations has pushed outward the time required to move from planning to completion. Extensions of existing theme parks can also be delayed. Indeed, to the extent that some theme parks have evolved through a sequence of smaller planning applications, the environmental problems they present may be sharper in that an increases in the volume of intrusive noise and traffic congestion may impose themselves on residential areas which were unthreatened by the initial development plans.

REGULATIONS

All theme parks are the subject of national legislation in relation to safety and local planning laws. As all major parks are also involved in ancillary activities such as food service they are also subject to relevant legislation in the areas of hygiene, certification by health authorities and in some cases licences to sell alcohol. Employment legislation is also particularly important. Developments at an EC level in a number of these areas and in the areas of environmental policy, consumer protection and competition policy are also relevant. In the area of food hygiene, the EC adopted the Directive on the Hygiene of Foodstuffs (93/43 EEC) in June 1993 and Member States are required to incorporate its provisions by January 1996.

Concerning zoos, there exists a Commission proposal for husbandry standards in zoos (COM (91) 0177 final) laying down minimum standards for the accommodation and care of animals in zoos.

EC regulations in relation to employment are viewed as particularly important. The general thrust of EC-based proposals in this area has been to improve conditions of work for employees and in particular to equalise the entitlements of part-time and temporary workers with those of their full-time counterparts. In a number of northern European Member States' work conditions for recreation park employees are already relatively high and there is little concern about the impact of existing and proposed EC legislation, or the principles of the Social Chapter of the Treaty of Maastricht. This is not the case in all Member States, particularly in southern Europe and also in the United Kingdom.

The Directive on Package Travel, Package Holidays and Package Tours (90/314/EEC) which came into effect in January 1993, but has not yet been implemented by all Member States, is of considerable relevance to those recreation parks which rely on coach tours and other forms of organised travel. This Directive is also significant to Euro Disney and those recreation parks whose expansion plans include addition of accommodation facilities. However, with most recreation parks relying on independently organised day trips the impact of the Package Holiday Directive is not likely to be as far-reaching as it is for hotels, travel agents and tour operators.

The recreation parks sector is relatively concentrated and in a number of Member States is dominated by a few major players, the subsector is unlikely to attract considerable attention from national or European competition authorities on the basis of anti-competitive practices. On the other hand, there is dissatisfaction among a number of recreation park operators regarding the high levels of state aid and preferential treatment received by Euro Disney from the French government to entice the company to locate in the Paris area.

Recreation parks is included in the list of products and services on which Member States can levy a reduced rate of VAT. French and Belgian theme parks also benefit from relatively low rates of VAT, 5.5% and 6% respectively, by comparison with competitors in Germany, the Netherlands and the United Kingdom, all over 15%. Rates in Spain, Portugal, Greece and Italy are also relatively low, but their distance from the high VAT northern European Member States reduce distortionary trade impacts.

Safety regulations are dealt with at state or regional level, although the EC had considered introducing a Directive in this area. Member States such as The Netherlands, France and Belgium generally follow German standards, particularly in the manufacture of machinery, and so reasonably uniform standards already exist in northern Europe. Recreation parks will be affected if the draft Directive on product liability in services, which shifts the burden of proof in "service" liability cases from the consumer to the producer, is adopted. The dispute arises when it will be up to the supplier of services to ensure that reasonable precautions had been taken so as to prevent damage or injury to the consumer or his or her property.

OUTLOOK

Given the diversity of the recreation parks sector its prospects for growth are best analysed in terms of its constituent subsectors. As suggested above, the outlook for zoos and safari parks has improved, at least in the sense that it is no longer declining rapidly and that operators are coming up with fresh ideas to enhance their product and making good use of ancillary attractions and shows to enhance their appeal. In addition the combination of environmental education and recreation has stimulated public interest in zoos.

The amusement park market in Europe is generally regarded as not having yet matured. Visits to amusement parks per capita in the US are estimated to be over twice that of Europe. Some of the optimism regarding growth is based on the belief that Euro Disney will benefit other recreation parks by highlighting the attractiveness of amusement parks. This view is particularly prevalent among recreation park operators located a comfortable distance from Euro Disney. Attendance data during 1992, when allowance is made for poor economic conditions, supports the argument that the arrival of Euro Disney has not had an adverse impact on other amusement parks. While weak economic conditions and relatively poor summer weather adversely affected demand in 1993, 1994 should see a return to strong growth in attendance, with even more rapid expansion in the medium term.

The overlap between zoos, aquaria, safari parks and theme parks is likely to increase. While the trend in recent years has been for such recreation parks to expand or re-orient their operations into theme parks, over the medium term changes are likely to occur in the other direction. Nature themes in attractions will increase alongside the emphasis on education and customer participation and will be apparent through growth in "shows" featuring animals and more children zoos and botanical gardens. However, EAZA and its members do not support this trend as they require high husbandry standards for zoological collections. A report on theme parks in the 21st Century in "Parkworld" magazine suggests that as competition for theme parks visitors will come from zoos, aquaria and museums, parks will adopt these types of attraction as an integral part of their product. Thus, exhibits of art, live craft demonstrations, dance theatres and other cultural-based attractions will also become more common. These changes in emphasis will help attract a greater proportion of older visitors, an important consideration in the EC where family sizes have contracted and the population structure is ageing.

Extending opening hours and incorporating more evening and night time attractions is also likely to become more common as parks tailor their product to suit demographic trends. Increased awareness of environmental considerations and attitudes of staff towards customers are also likely to occur, reflecting changes in the demand base. However, while theme parks will increasingly educate as well as entertain, the latter will remain the primary function.

How technological changes will impact on the future of theme parks is more difficult to envisage. There is little doubt that technology currently exists to provide experiences which assault nearly all human senses in a variety of different ways. How technology will manifest itself in terms of attractions is less unclear, but the potential for revamping the appeal of theme parks through improved attractions will continue to expand. Increased attractiveness is also likely to reinforce the trend growth in demand in the amusement parks market. In addition some new technologies may contribute to equally thrilling but cheaper attractions, such as those based on virtual

Table 5: Recreation parks
Admission charges at amusement parks by world regions, 1990

(ECU) General admission charge	Adult	Child
Europe (1)	9.50	7.48
United States	7.07	5.59
Canada	7.92	5.24
Pacific Rim	5.79	3.20
All regions	7.34	5.56

(1) Off-season discounting is, however, more prevalent in Europe.
Source: IAAPA Business Managers Survey

reality. Some of the existing appeal of the larger theme parks is based on the high capital cost of the most thrilling rides and there is a danger that falling prices for major attractions as a result of technological advances may reduce this competitive advantage.

Integration of theme parks into wider retail developments has been mooted for a number of years and the associated costs have precluded such a development to date. Nevertheless, the popularity of US-style shopping malls has increased considerably within the EC, with retail outlets supplemented by the catering facilities, cinemas, amusement arcades, and various forms of small rides and attractions also growing. Few European malls have theme park scale attractions at present but it may only be a matter of time before comprehensive retail/leisure development comprising a wider range of amusement park attractions are built in Europe.

The cost of admission to parks already varies widely across the EC and also differs within Member States, depending on the overall quality of particular theme parks. Various strategies are likely to be employed over the medium term. While some parks will be encouraged by high admission prices at Euro Disney to move up both the quality and admission price of their product, others will concentrate on increasing revenues through ancillary activities. Still others are likely to maintain or reduce existing prices to provide affordable family entertainment. This will be especially true at resort areas where competition from other lower price attractions is keenest.

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Travel services
NACE 771

Like 1991, 1992 was a difficult year for many companies involved in the travel services branch of the travel and tourism industry, mainly as a result of economic downturns in major European markets. There are also signs that 1993 may not be the hoped for turning point. On the positive side, however, there are indications that the public is turning more towards travel services to book travel arrangements. Travellers are becoming more sophisticated in their demands and the inclusive tour package (IT) is losing favour to individually tailored products although value for money remains an important criterion. The future success of individual companies in the sector will depend largely on their ability to meet these changing demands and this, in turn, is likely to be linked to their ability to stay ahead of technological developments in the field and strengthen their presence throughout the EC by acquisitions, mergers and other collaborative ventures.

INDUSTRY PROFILE

Description of the sector

The distinction between the various activities of the travel and tourism industry is often blurred. Operations and activities of the travel services branch are indistinguishable from other related sectors of the industry, e.g. retail travel agencies, tour operators, ground handling services and even car rental. As car rental is covered in another monograph, it is only briefly discussed in this chapter. There is considerable vertical integration in the European travel industry. Hotels, airlines and other transportation companies can and do have their own tour operating subsidiaries, developing either fully inclusive tour packages or partial package arrangements to help fill airline seats or hotel rooms.

Moreover, the majority of travellers whether business or leisure do not use the services of tour operators or travel agents to make their travel arrangements. They either book their transportation direct with airlines and other suppliers, or travel by private car, the dominant mode of transportation in Europe. A significant share of hotel and other accommodation reservations are also made directly by the consumer. In addition, other organisations provide part of the services available from companies in the travel services branch. These include motoring associations, tourist offices and non-profit bodies such as trade unions, clubs, company staff associations and media groups. Some EC countries offer "social tourism" organisations which provide low cost holidays.

The difficulties in evaluating the importance of even the core sector activities are compounded by the fact that relatively few companies release operating figures, let alone consolidated results. The industry can be measured in terms of number of sales passengers/clients or volume of sales. The latter terminology is also confusing, since there is frequently no distinction made between real turnover and sales volume. Passenger figures in relation to travel agency sales cannot be readily equated with the number of holidays sold by travel agents, since the real value of the agent's sale is only the commission. Employment poses further problems, since employment in the tour operating and ground handling service sectors is highly seasonal and, therefore, fluctuates widely with no common conversion factors for part-time to full-time jobs.

The distinction between business and leisure travellers, has always been difficult to identify and is becoming increasingly muted with the disappearance of border controls. Balance of payments data, are generally used to measure the currency flows generated by travel and tourism, provide an inaccurate measure since data collection methodology and analysis vary widely from country to country. With ongoing liberalisation of exchange controls, it is even less useful.

Table 1: Travel services
West European outbound, 1991

	Absolute volume	% change 1992/91
Trips (million)	201.0	-0.7
Overnights (billion)	1 962.0	0.6
Average length of trip (nights)	9.8	1.0
Spending on travel abroa (ECU billion)	152.0	3.1

Source: European Travel Intelligence Center, European Travel Monitor

Profiles of the leading travel and tourism groups in the travel services branch illustrates that the industry is not built on a combination of the three sectors (tour operating, retail travel and ground handling) nor even with an emphasis on one or two of them. In fact, only one of the top ten groups in the industry in the EC is wholly focused on this sector. On a Member State basis the density of travel agencies is highest in Germany and lowest in France.

The only comparable data on the economic contribution of travel and tourism in the different EC Member States, and other European and non-European countries, concerns the travel and tourism industry as a whole. The 1992 WTTC Report "Travel & Tourism in the World Economy" estimated there were 14 million people employed in the travel and tourism industry in the EC in 1990, generating gross output of 590 million ECU of which 290 million ECU was value-added.

Recent trends

According to the European Travel Monitor there were over 200 million outbound trips in 1992, over half of which involved some kind of bookings through the travel trade. About 30% are fully inclusive tour packages (ITs) usually off-the-shelf programmes developed by tour operators and 23% of trips involve either part package arrangements, transportation and/or accommodation booked through a retail travel agent. An additional 12% or so concern arrangements for transportation or accommodation booked directly with suppliers, and the remainder are fully independent trips, which have no prebooked arrangements.

Relative market shares vary widely but, in general the share of fully inclusive package tour arrangements have been declining slowly since the late 1980s and up to very recently, in favour of partly booked trips. This trend appears to have been arrested. The Mediterranean Member States are regaining market share, as are inclusive package tour holidays. This could well be a blip in long-term trends as people return to tried and tested destinations closer to home in times of economic recession, rather than travelling further afield for their holidays.

Airline ticket sales channelled through International Air Transport Association's (IATA) Bank Settlement Plan (BSP) also provide an indication of the use of travel agents. The net sales volume of airline tickets issued by the BSP around the world in 1991 was 50.7 billion USD. In Europe the corresponding value was 25.3 billion USD. Countries in Europe generating the highest sales volume through BSP were the United Kingdom, Germany and France. However, the decision by IATA to broaden the customer base of the BSPs and to encourage participation by other travel industry service suppliers such as railways, shipping lines, car rental companies,

Table 2: Travel services
Sales through IATA's BSP in Europe, 1991

	Number of approved locations	Number of participating airlines	Net sales volume (ECU million)
Belgique/Luxembourg	401	66	633
BR Deutschland	2 811	96	3 995
Hellas	296	43	291
España	3 188 (1)	52	1 839
France	2 543 (1)	81	2 426
Ireland	271	27	213
Italia	1 935 (1)	71	1 992
Nederland	361	66	901
Portugal	420	29	295
United Kingdom	4 620 (1)	93	5 618
Austria	196	57	365
Finland	234	30	279
Scandinavia/Iceland	938	53	2 317
Switzerland/Liechtenstein	584	69	972
Turkey	133	36	136

(1) Includes only domestic agents
Source: IATA (International Air Transport Association)

etc. means the figures are not totally reflective of travel agency sales.

Data on turnover in travel agencies and tour operating enterprises is available from the European Community Travel Agency Association (ECTAA) for a limited number of EC states. This indicates that turnover is highest in the United Kingdom, although the relatively low level indicated for West Germany casts some doubt on comparability.

Data on travel agency operations do not always distinguish between wholesaling and retailing activities. In a number of EC countries, there is little difference between a tour operator and a retail agent. Figures released by the ECTAA, indicate that the retail travel agency sector is expanding slowly, although this evidence is not conclusive and may reflect increasing membership of national organisations.

Analysis of travel agency sales of airline tickets indicates significant growth both in the value and the number of locations in the majority of EC Member States. The United Kingdom and Italy are exceptions, in that significant growth in sales was accompanied by a decline in the number of locations in both countries. France and Ireland both recorded falls in sales.

The apparent increase in number of travel agencies in the EC has been accompanied by growth in employment in some Member States, particularly the southern Member States of Spain, Italy and Portugal.

Overall, 1992 was another difficult year for the travel and tourism industry. Most sectors continued to suffer from sluggish demand initiated by the Gulf War. Economic uncertainties coupled with a loss of buying power in many major source markets largely due to currency fluctuations, and asset devaluation are important reasons for the drop in consumer confidence and consequent fall in spending on leisure and business travel. Although international visitor arrivals and receipts for the year exceeded 1990's level, performance varied sharply from one market and one destination to another. There are also signs that 1993 may not be the turning point for which the industry was hoping.

International comparison

Europe attracted 60.5% of worldwide international visitor arrivals in 1992, or 287.5 million, down 3.5% in 1991. International tourist receipts rose by 7.5% over the same period to 147 billion USD, equivalent to 53% of the world total. Despite continued growth in arrivals and revenues, Europe's relative share of world tourism has been declining since the early 1960s. Data from the World Tourism Organisation (WTO) indicates that Western Europe's share had an overall decrease in the latter half of the 1980s. Six EC countries are among the top ten spenders on international travel and tourism with Germany number two in the world after the USA.

Foreign trade

European inbound tour operators, handling incoming business from overseas markets, claimed increases in revenues and client numbers of up to 30% from 1987 to 1990. Although the Gulf War and economic recession in major markets like Japan and the USA resulted in a 1991 decline of inbound visitor arrivals in Europe.

EC countries generated about 70% of the total international trip volume of 224 million from all European countries in 1992. This was up 8% over the previous year. The other West European countries (EFTA) and East Europe accounted for 44 million and 23 million respectively. Foreign travel accounted for an estimated 20% of total trips, although the relative share of foreign trips varied sharply from market to market. In terms of destination share of travel and tourism, EC countries attracted an estimated 60% share of all European trips.

Table 3: Travel services
Turnover at current prices, 1991-92

(million ECU)	1991	1992
Belgique/België	2 476	2 371
Danmark	528	1 087
BR Deutschland	8 048	14 742
Hellas	N/A	N/A
España	8 449	7 429
France	8 683	9 993
Ireland	N/A	696
Italia	8 600	N/A
Luxembourg	N/A	N/A
Nederland	N/A	2 163
Portugal	933	1 667
United Kingdom	16 901	15 815

Source: ECTAA

Table 4: Travel services
Number of enterprises, 1989-92

	Number of enterprises				Of which in 1992	
	1989	1990	1991	1992	Travel agencies	Tour operators
Belgique/België	1 030	1 050	1 068	1 700	1 600	100
Danmark	400	360	400	479	120	359
BR Deutschland	9 250	9 800	9 500	7 200	6 000	1 200
Hellas	N/A	N/A	N/A	N/A	N/A	N/A
España	1 900	1 800	2 270	2 435	2 364	71
France	2 157	2 300	2 316	2 587 (1)	4 900	340
Ireland	318	330	N/A	277	252	25
Italia	4 682	4 890	4 980	N/A	N/A	N/A
Luxembourg	25	25	N/A	45	43	2
Nederland	647	672	N/A	600	450	150
Portugal (2)	N/A	666	683	691	N/A	N/A
United Kingdom	N/A	4 302	6 093	5 271	4 600 (3)	671 (3)

(1) The number of licensed enterprises does not have to be identical with the number of travel agency/tour operator outlets.
(2) A difference between travel agencies and tour operators is not made.
(3) Estimation
Source: ECTAA

Although there has been a decline in Europe's share of world-wide international tourism, the region's importance as a tourist destination for travellers from outside Europe has continued to grow year by year In the majority of cases, global estimates of travel to Europe can only be extrapolated from national visitor arrivals and outbound travel statistics. Most visitors to Europe cover more than one country on their trip and are often counted twice in some Member States. Airline statistics, where available, cover all passengers and not just those resident in the respective source markets.

MARKET FORCES

Demand

The final consumers of the travel services are all those who take holidays or who travel on business (although there can be intermediaries, such as clubs and associations, or corporations). Private sector sources of statistical information do exist, but these data are generally confidential, reserved for paying clients.

Each year, 60% of Europeans take at least one trip away from home. The level of trip-taking varies widely from country to country, ranging from as high as 87% in Iceland to 51% in Portugal, and still lower in the countries of Eastern Europe. The proportion of Europeans who take a leisure or business trip abroad (inter-EC) tends to be considerably lower. The average share of all Europeans who travel abroad is around 26%, although the level of travel abroad is actually higher than domestic travel in some markets, notably Belgium, Luxembourg, the Netherlands and Germany. Domestic travel tends to decline in favour of foreign travel as the market becomes more travel experienced.

The level of trip taking is very much affected by income, age, education and social status. When incomes rise travel is no longer limited to just one trip per year. In addition, business travel is usually much more frequent than leisure travel. In the less mature European markets, the cost of travel is also an important deterrent to foreign holidays, especially for markets located at great distances from the popular holiday destinations, like Greece and Portugal.

Most business travellers use travel services, at least for airline travel, though it is fairly common for corporations to deal directly with hotel chains when they can get a better deal for room accommodation, and with the railways and car rental companies for ground transportation. New technology is opening up the tourism industry, as well as improving communications. This has both negative and positive effects. For the negative, it is easier for people to book their own travel directly with airlines, hotels and other suppliers. For the positive, travel agents are better able to respond to the increasing demand for more tailor-made products. While dedicated software enables access to information on travel and accommodation to the travel section of large corporations, only travel agents and airlines can issue tickets. This has helped maintain the role of travel agents in the face of technological developments. In the medium term there may be pressure for allowing large corporations access to blank tickets. Similar constraints have lessened the impact of information systems such as, the French Minitel on travel agency sales, although Air France flights can be booked direct with ticket purchased at airports.

Use of a travel agent depends heavily on how clients plan to travel, what type of accommodation they will use and whether they speak the language and/or are familiar with the destination country. The majority of domestic holidays bypass the travel services branch completely, with people travelling by car to their destinations and staying with family, friends, or in their own or rented holiday accommodation.

The different factors affecting demand for travel and for travel services are: price and political factors, the most significant, different taxes on travel, notably on air travel and exchange rate fluctuations. Most recently, the impact of economic slowdown has been crucially important in influencing both expenditure and destination choice.

Increased airline liberalisation theoretically allows greater access to markets by a greater number of carriers and should put downward pressure on fares. However, on many routes it is difficult to see fares falling substantially. The increasing liberalisation of air transport in Europe, preceding and up to the early months of 1993, generated increased competition. This was reflected in sharp passenger traffic growth since the mid1980s. The effects of this growth, and the competitive fares which helped drive it, has created a financial strain in some airlines that is felt by severe capacity constraints and delays at airports. However, it must be noted that current indications are that flight delays are reducing.

Health risks and environmental damage are also examples of factors affecting tourism demand. There have been increasing concerns over dirty beaches and polluted bathing waters in

Table 5: Travel services
Airline ticket sales through travel agencies

	Agency locations					Net sales (ECU million)				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
Belgique/Luxembourg	300	375	338	348	401	467	413	539	595	784
BR Deutschland	1 605	1 764	2 051	2 153	2 811	980	1 499	2 989	3 489	4 950
Hellas	147	246	283	289	296	10	211	266	277	360
España	2 260	2 587	2 932	2 987	3 188	1 231	1 198	1 559	1 806	2 279
France	1 659	1 721	1 980	2 207	2 543	1 107	1 697	2 069	2 618	3 006
Ireland	204	228	245	256	N/A	142	153	203	220	N/A
Italia	1 821	2 003	2 266	2 262	1 935	1 693	1 395	1 626	1 848	2 468
Nederland	264	294	315	328	361	590	637	786	868	1 116
Portugal	219	318	365	380	420	10	163	207	255	385
United Kingdom	5 004	5 263	4 904	4 812	4 620	3 452	3 236	4 502	5 216	6 961

Source: IATA as quoted in Travel Business Analyst

the Mediterranean and other popular tourist resort areas. Some travellers (particularly in Germany, where environmental sensitivity is high) have shunned tour operators and destinations that have received bad publicity over their environmental record. Heavy investment in water and sanitary services in Mediterranean Member States (coming from the Community's Structural Funds and the Cohesion Fund) should help improve matters. The importance of "quality" factors in general and the environment in particular has increased considerably in recent years.

There has been a wide range of new products and programmes introduced on the market over the last few years in Europe. These have both helped to stimulate travel and tourism to less developed regions and to encourage a better off-season utilisation of facilities. Most of these new products have been targeted at people who already travel at least once a year away from home for holidays or other leisure purposes. Few have addressed the issue of people not travelling at all. The result has been an increase in number of trips per person travelling and notably, an increase in trips abroad. But the share of Europe's population that does not travel has changed very little. It is important to note that a major reason for not travelling is price: the price wars in the UK and now in other parts of the EC clearly address this problem. One of the fastest growing sectors is the short break market or trips of one to three nights. The bulk of short break travel does not use the travel services' branch, but there has been strong growth in the commercial sector. Not just tour operators, but also airlines and hotel groups have launched their own programmes. Rural and urban tourism have also registered above average growth in the last couple of years, both in domestic and international markets. And in general, travellers are becoming more adventurous and activity oriented.

Supply and competition

Supply is in general more than adequate to meet demand. The suppliers of the travel and tourism industry, e.g. airlines, hotels, etc., are cyclical industries and this can have repercussions on the availability of seats and rooms, particularly at peak seasons. Consumers are in a buyer's market and this is reflected in price-setting and margins.

Travel services for corporate travellers on business trips can cover a wide range of products, not just transportation tickets and hotel reservations. Car rental, theatre and restaurant bookings, visas, the provision of travellers' cheques and foreign currency are all part of the package of services offered. There are also increasing expectations for these services, in terms of price advantages and quality, since corporate travellers provide frequent high yield business. Travel and tourism companies also handle demand for travel to conferences, trade exhibitions and fairs, and incentive travel.

Demand for travel services from leisure travellers is met by tour operators and/or retail travel agents. Car rental bookings are either handled by travel agents, or direct by suppliers. The tour operator is effectively a wholesaler combining travel, accommodation and ground handling services in a single package. The increasing independence and sophistication of leisure travellers are reflected in the product range.

The travel and tourism industry is highly price sensitive in most EC states, though this appears to be less true in countries where the industry is more fragmented. The price/quality trade-offs are also not the same for all groups and all nationalities. Pressure on prices comes from the nature of the demand, but also from the nature of the production process. The industry gains pricing advantages from bulk buying. But it has to ensure that once it has factored in its own operational costs staffing, catalogue production, advertising, computer reservation systems, travel agents' commissions the end result is a product which is still competitive with the product the consumer could put together himself.

Foreign competition is not really an issue, although there are an increasing number of examples of tour operators establishing themselves in the traveller's destination country. The Japanese in Europe are one example. Asian airlines have also introduced competitively priced products in European markets to their own destinations, but these are not a major source of competition.

There is an attempt by all operators to keep price increases to a minimum in a highly competitive market. They achieve this through bulk buying of seats and rooms, in some cases owning several stages in the production process, and by switching more capacity to and promoting more heavily lower cost destinations.

Production process

The main capital employed is access to computerised reservation systems (CRS), except in cases where the travel company owns its own aircraft or accommodation. The cost of these can range from a few thousand ECU to tens of millions, depending on the solution adopted. There is constant pressure to upgrade technology. Leading operators aim to provide real time connections with the consumer through travel agents (or their own sales outlets) with instant confirmation of bookings. In addition to the costs of CRS access, hardware costs and expenses for dedicated data lines, travel agencies in some Member States also require substantial finance for government "loading" schemes.

The industry requires no particular technical skills, though quality management is as crucial as in other industries. It is characteristic of the travel agency industry EC-wide that counter staff are generally relatively unskilled and badly paid.

Table 6: Travel services
Number of persons employed, 1989-92

	1989	1990	1991	1992
Belgique/België	5 500	5 600	4 800	6 000
Danmark	5 000	4 900	4 800	4 600
BR Deutschland	45 000	47 000	48 000	53 000
Hellas	N/A	N/A	N/A	N/A
España	29 000	31 500	34 650	32 650
France	N/A	24 700	26 300	26 920
Ireland	N/A	2 500	N/A	2 600
Italia	23 878	24 920	29 400	N/A
Luxembourg	100	100	N/A	320
Nederland	7 500	7 500	N/A	7 000
Portugal	5 100	5 490	5 560	5 023
United Kingdom	30 000	N/A	N/A	80 000
EC (11)	179 078 (1)	159 210 (2)	N/A	N/A

(1) Total excluding Ireland.
(2) Total excluding United Kingdom.
Source: ECTAA

The industry attracts labour because of its glamorous image and the perceived possibility of free or low cost foreign travel. Labour turnover tends to be high as this perception is frequently not realised, or the realisation is not sufficient to compensate for the disadvantages of the job. Major travel agencies train their own staff, but much training is on the job, or through familiarisation trips to destinations or on courses run by tour operators. The tour operator sector and ground handling companies require seasonal workers, generally with human relations and language skills, to work at destinations during the season. No labour cost data are available and value added concepts do not apply.

Product innovation in the business travel sector takes the form of products which, above all, improve comfort, speed of service and of travel, and flexibility at competitive prices. One significant new development in the industry in the last five years has been the merger of networks among business travel agents as an alternative route to international expansion. EC travel agents are prominent members of these. The two largest are Business Travel International (BTI), incorporated in the Netherlands, and Internet. The EC members of BTI at mid 1992 were Holland International (NL) and its Belgium subsidiary Transintra, El Corte/Ingles (E), Hogg Robinson (UK), Havas Tourisme (F), Hapag-Lloyd (D), International Travel Bureau (IRL) and Kuoni Travel (CH). The European members of Internet are ABR, DER and Rominger of Germany and Gastaldi Tours of Italy.

Innovations in the travel agency sector for the leisure traveller are primarily in improved computerisation. For the tour operator, there is constant innovation through the addition of new accommodation, new destinations and new products like short breaks, one-day plane trips, visits to recreation parks, and to sporting and cultural events.

INDUSTRY STRUCTURE

Companies

There are no composite figures on the turnover of the travel services branch, nor on employment or number of companies. It is clear, however, that the sector is growing in the EC. Recession in some of the major origin markets has been offset by new opportunities in former East Germany and southern EC countries, where levels of holiday travel, and outbound travel in particular, are still catching up with patterns in northern Europe. Travel agencies and many tour operators are members of trade associations, but travel agency membership may be by branch or by parent company, so the figures are not homogenous. The EC travel agents association, ECTAA, is formed by national associations. The European Tour Operators Association (ETOA) represents mainly inbound interests, and the International Federation of Tour Operators (IFTO), represents essentially outbound interests.

Major changes among the leading European travel and tourism groups in the last few years suggest that there has been increased concentration in the tour operating and retail agency sectors. The pace of mergers and acquisitions has been rapid in virtually every EC country. This has not necessarily meant increased concentration in individual market segments. Frequently, it is the result of creating an integrated business. On the basis of figures in an Economist Intelligence Unit (EIU) Special Report, The European Tour Operator Industry, the top ten groups, primarily tour operators, accounted for 63% of the estimated 18.65 million ECU turnover of the top 50.

While there are many examples of expansion within the market segment, it often is part of a strategy to create a horizontally or vertically integrated business across a number of European countries. Companies select their core businesses in one of two directions, business or leisure travel, and from four components, tour operating, travel agencies in their origin and/or in their destination markets, airlines and hotels. Additionally an increasing number of strategic alliances which do not show up in the figures on sales. These include an alliance between LTU (D) and Owners Abroad (UK) through a minority shareholding held by Thomas Cook (UK) and the Business Travel International group in which are number of the leading companies are shareholders.

The leading companies generally sell all types of travel and destinations, subject to their chosen specialisation in business or leisure. But there are a number of specialists in the middle reaches of the industry selling solely to specific markets, e.g. third age, young people and student, religious travel, short breaks or cultural travel.

There are also a number of non-profit organisations which are significant players in package travel and as owners of holiday accommodation. The largest of these is Villages Vacances Familles (VVF) in France. Others are the Deutsches Familienwerk in Germany, Loisirs et Vacances in Belgium and IGS in Spain.

A number of the major travel companies are owned or controlled directly or ultimately by public sector enterprises. The largest are DER (owned by the German railways) and CIT

Table 7: Travel services
Leading travel and tourism companies in the EC, 1992

(million ECU)	Country	Turnover (1)
TUI	D	3 152
Wagons-Lits Travel	B	3 120
Karstadt (NUR+Karstadt Travel)	D	1 892
Thomson	UK	1 599
LTU (2)	D	1 470
Kaufhof - ITS	D	1 465
- Kuoni (3)	CH	1 374
DER	D	1 304
Club Méditerranée	F	1 230
Nordisk (4)	S	1 019
Havas Tourisme	F	1 015
Owners Abroad	UK	927
Hapag-Lloyd	D	842
Nyman & Schultz	S	828
Selectour (5)	F	800
Nouvelles Frontières	F	750
Hotelplan	CH	691
SAS Leisure	S	522
Airtours	UK	520
Spies	DK	509

(") 1991
(1) Worldwide sales of all companies in group. The groups' own consolidation practices are used. These in some instances include associates in which the group has a minority stake, but management control. It should be noted that sales figures in the travel and tourism industry are in any event not strictly comparable as accounting" practices vary. Some companies include VAT in their total sales figure;"" some do not. Some travel agencies report the volume of business; others" only include the commission they receive on the sale. A number of travel agency businesses are run largely or partly as franchises and these are accounted for in different ways. Country is in each case country of incorporation of parent company.
(2) Exclusive of Thomas Cook, acquired in 1992.
(3) Kaufhof acquired 50.1% of Kuoni capital in 1992, but control of voting stock remains in Swiss hands.
(4) 1991
(5) Sum total of volume of business of an essentially franchised operation.
Source: Fitzpatrick Associates

in Italy (owned by the Italian Railways). As most European airlines are still state controlled, the public sector ultimately has an interest in leisure tourism through these as well. Air France (F), Iberia (E), Lufthansa (D), Sabena (B), Luxair (L), Olympic (GR) and Alitalia (I) all have significant tour operating interests.

Strategies

Despite the relatively constant pattern of concentration overall, there has been considerable change at the top of the travel industry over the last five years. This has largely been as a result of acquisitions, many of them cross-border. DER is the only company in the top twenty not to have been involved in a major acquisition or merger since the late eighties and this is a question of time as the German railways move to rationalise their travel agency holdings.

Outside of Germany and southern Europe, leading company growth in the domestic markets of the leading companies has been slowing, particularly for tour operators. This has been only partially compensated by an increase in the number of short break holidays. The showdown has been both growth in tourist numbers and in spending. Both business and leisure travellers have become more cost-conscious. Companies have been looking for productivity gains, synergies and for opportunities in the growth markets, particularly Spain. Concentration on the Italian market has largely been from within. Northern European companies have been moving south, but several companies in southern Europe have been expanding so rapidly that they seem likely to number among the leading European companies in the near future. Grupo Viajes Iberia of Spain and Alpitour of Italy are among them. The industry remains dominated by European companies. American Express (USA) is the key exception to the rule.

In the travel service industry there is no consistent division of business activities or strategies for growth. A company by company analysis of the top 20 tour operators in Table 8 will highlight some of the different strategies. Swiss and Danish firms are included because they are major player in EC markets. The only feature these listed companies have in common is the travel agency business. Seventeen of the firms listed have a tour operating business, even though it may not be a core activity. Examples are Hapag-Lloyd and Wagon-Lits Travel (B), although there are some exceptions to this tendency with Ventana (I) and Viajes Ecuador (E).

Thomas Cook's purchase of LTU in 1992 broke the ground for other collaborative efforts such as: a strategic alliance between Thomas Cook and Owners Abroad; the purchase of Pickfords (UK) and Hogg Robinson (UK), both leisure travel agencies, by Airtours (UK); moves by ITS in the early 1990s to expand its travel agency connections. Now all the leading tour operating groups have travel agency tie-ins. An exception is TUI (D) who operates travel agencies only at its major destinations.

A number have in-house hotel and holiday club chains, e.g. TUI, LTU, ITS, SAS (S) Leisure (?) and Nouvelles Frontières (F) while Club Méditerranée (F) is as much hotel company as it is a travel and tourism business. Wagons-Lits and Nordisk (S), on the other hand are owned by hotel chains. Eight own, or have interests in, an airline. This includes the three United Kingdom companies which all have their own carrier. In no cases do the United Kingdom companies own any hotels or have any investment outside their domestic market. The only other company among the leaders not to have major cross-border interests is Selectour.

The largest cross-border travel agency and tour operating investments have been: TUI investment in Arke Reizen of the Netherlands and in Chorus of France which in 1992 teamed up with Sotair (Jet Tours) of France (and therefore with Havas and Air France); NUR-Neckermann in the Netherlands and in Belgium (under its own name and Sunsnacks); ITS parent Kaufhof either by direct investment or through ITS in Holland International of the Netherlands, Travelplan of Spain, Sun International of Belgium (which in turn has investments in the United Kingdom short break market) and in 1992 in Kuoni; LTU, who already owned travel agencies in a number of destination countries, and in 1992 bought most of the Thomas Cook operations worldwide, including Germany's; Kuoni investment in the United Kingdom, France and Austria; and finally, Nouvelles Frontières in most European countries. Few sell worldwide: Wagons-Lits and Club Méditerranée are the obvious exceptions. LTU is moving in that direction.

Investors in this sector of the industry are varied. TUI is controlled by a group of travel agencies (including DER); Wagons-Lits is owned by hotel group Accor (F); Thomson and Havas Tourisme are owned by media-related operations; NUR is owned by retailing chain Karstadt (which has its own travel agency chain in addition). ITS is also owned by a retailer, Kaufhof; Hotelplan is owned by retailer Migros. Retailers find synergies through the travel agency side of the tourism business. Public companies are few. Club Méditerranée is the main exception.

The fact that there are a number of companies operating both as tour operators and retail travel agencies, incoming and outbound, in several EC Member States highlights the fact that regulation is not a barrier to entry on other EC markets. The difficulties of cross-border expansion typically come from cultural barriers of transplanting their products. Significantly travel agencies, who allow the consumer to select their product

Table 8: Travel services
Travel agencies per 100 000 inhabitants in the EC, 1991-92

	1991	1992
Belgique/België	10.7	17.0
Danmark	7.8	9.3
BR Deutschland	11.9	9.0
Hellas	N/A	N/A
España	5.8	6.2
France	4.1	4.5
Ireland	N/A	7.8
Italia	8.6	N/A
Luxembourg	N/A	11.5
Nederland	N/A	4.0
Portugal	6.9	7.0
United Kingdom	10.6	9.1

Source: ECTAA/Eurostat

of choice, have expanded into other countries much faster than tour operators. Local preferences to be considered are: language , tastes in food, eating hours, accommodation type, transport mix and quality. These are highly variable from country to country.

REGIONAL DISTRIBUTION

Travel agencies are invariably located in urban areas, both small and large but with a higher density in larger cities. On the other hand inbound tour operators are generally only found in major cities, while ground handling operations tend to be located at gateway cities and major tourist resorts.

Many of the medium sized firms only have a regional attachment area. Specialists in some segments, such as coach holidays, can operate profitably from a local base. Products of the industry are available throughout the EC. Although there are areas where the density of travel agencies is lower, this is not a major issue. Many tour operator products are available by mail and bookings can be made direct by phone and through view data systems. This method of distribution is especially popular in France and notably, for last minute sales bargains and is expected to become more widespread as view data ownership expands throughout the EC.

ENVIRONMENT

There is evidence that the final consumer is becoming increasingly sensitive to the impact of travel and tourism on the environment, although this is not yet true in all countries. In Germany and the United Kingdom, where the package travel markets are the most developed, it is now common for large companies to appoint executives responsible for the company's environment policy and for the monitoring of destination hotel's energy conservation and other environmental practices. Hotels which do not comply with basic minimum standards can be struck off a tour operator's hotel listing. In addition the pressure on a number of Mediterranean resorts to improve their ancillary services and infra-structure represented a mixture of direct pressure from stagnating demand and encouragement from tour operators.

Travellers are more and more aware of the impact of tourism on the destinations they visit, but this concern has not yet translated into apparent concern over chosen mode of transportation. Tour operators may also issue clients with guidelines on preserving and protecting the local environment at holiday destinations.

Major tour operators also work behind the scenes, particularly in developing countries, to help local authorities plan sustainable resort development. Thomson has also been heavily involved in encouraging the recycling of some of the Balearic islands' mature resorts. The main specific regulatory pressures inside the EC come from environmental impact assessment or land use requirements for tourism developments. Regulations on night flying also affect the industry.

REGULATIONS

There are major regulatory differences in areas such as consumer protection, conditions of market access, competition policy, availability of state aids, and attitudes to monopolies and mergers. The EC is addressing a number of these issues, through the Directive on Package Travel, Package Holidays and Package Tours (90/314/EEC). This Directive came into force on January 1, 1993. However, it has not yet been implemented by most Member States. It will impact individual EC companies differently, reflecting considerable variation in national laws at present. It is intended as a start towards harmonising the varying national situations, while still leaving discretion to the Member States in the implementation process.

Other potentially important issues are the future of duty-free sales on intra-EC flights and ships, and the imposition of VAT on the industry's products. Implementation of the former has been postponed until July 1999 and it is still not clear what the eventual outcome will be in relation to the indirect taxes, in particular in relation to VAT on intra-EC travel. Airline deregulation/liberalisation has a potential beneficial impact, at least in theory. However, practical problems exist including the issue of capacity constraints at some major airports and the weak financial position of many of Europe's major airlines. An array of other regulations ranging from environmental limits on resort developments to other aspects of transport policy also have implications for the travel trade.

OUTLOOK

The average holidaymaker's yearning for sunshine, and an inexpensive vacation, will ensure that the traditional Mediterranean's favourite resorts continue to top the popularity lists. Yet, the two-week inclusive package holiday (IT) geared to lying on a beach in the sun will not be enough to satisfy the market's increasingly sophisticated demands in the medium term. This has been recognised by most resorts and there is considerable ongoing investment aimed at raising "quality" both through improving ancillary infrastructures and services and through the addition of flanking attractions.

While the slowdown in IT sales halted in 1992 this form of holiday is still expected to stagnate, or decline, for short distance travel. On the other hand, long distance travel could become more and more organised since it is often less expensive to purchase a long distance package than to try to organise such a trip independently. Choice of destination could increasingly be determined not simply by market demand or tour operator programme availability, but by capacity restraints and bottlenecks in destination countries and on airline routes.

Changing demographics will also have an impact on travel demand and growth in organised "activity" holidays is increasingly including "passive" as well as "active" pursuits. But some of the greatest changes in the market are likely to be not so much demographic as psychological in nature. Personal values, such as having fun, relaxation and self-fulfilment, are becoming more important. New products and programmes introduced in response to changing demographics, social patterns and tastes may stimulate travel to less developed regions and encourage better off-season utilisation of facilities. Member States, helped by the European Regional Development Funds (ERDF) and the European Fund Agriculture Orientation

and Guidance (FEOGA), are increasingly developing the tourism potential of non-traditional tourism areas.

Increasing leisure time due to a shorter work week, more part-time employment and more flexible working hours, is likely to stimulate demand for travel and use of the travel services sector. Increased traffic through Europe's regional airports shows that air travel is finally starting to filter down to the masses. There is still an estimated 40% of Europeans who do not travel at all. A significant share of non-travellers probably would like to travel if there were no economic or timetable constraints. A number of new products need to be developed and measures taken, either by local or national governments, to stimulate this sector of the population.

The future success of individual companies in the sector will depend largely on their ability to meet this need for new products, as well as changing demands from increasingly sophisticated European travellers. This, in turn is likely to be linked to their ability to stay ahead of technological developments in the field and strengthen their presence throughout the EC by acquisitions, mergers and other collaborative ventures.

Market demand is becoming more difficult for the travel services sector to meet, and well-informed travellers seeking greater value for money, more variety and greater flexibility expect travel agents to significantly improve on what they can package together themselves. Technological advancements are increasingly enabling consumers to bypass travel agents and book their holidays directly with airlines or large suppliers of tourism services.

The European car rental market remains highly fragmented in terms of the customer base. Opportunities exist for expansion through both increased penetration in established markets and expansion into East Europe. However, in the short-term the focus is likely to be on improving customer service and brand loyalty, particularly with business travellers.

Table 9: Travel services
Expected real annual growth rates

(%)	1993-97
Turnover	4.0
Employment	3.0

Source: Fitzpatrick Associates

Growth in 1993, despite continued recession in many Member States, should be reasonably strong. It was boosted by relatively poor summer weather in northern Europe and recovery in the United Kingdom, one of the most important IT markets. An expected recovery in the international economic environment during 1993 should lead to further growth in tourism expenditure in the medium term. Overall, average annual growth of 4% in turnover is expected over the 1994-97 period. Employment growth will be somewhat lower, because like other tourism sectors travel service workers are relatively badly paid, and new inducements to retain and attract quality staff are required.

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Overview
NACE 7

Transport is a crucial sector for the economy, it provides every citizen with mobility. Freight transport has become part of the whole production process from input to delivery to the customer. Increasing European integration will lead to more interaction and thus to more demand for transport services. Common policies for transport will help create and maintain a competitive environment with sustained mobility, but at the same time will encourage an increasing number of merger and alliances as firms strive to maintain their competitive positions. Expansion of various networks is underway as public and private interests make huge investments in transport infrastructure. This will create the conditions and opportunities for integration and growth in the future and the emergence of new services, including value added services based on transport telematics. However, the competition between privately owned mobility and public transport will continue in the short term to favour private owned vehicles and companies.

INDUSTRY PROFILE

Description of the sector

The transport services industry is primarily engaged in the conveyance of goods and passengers either directly or indirectly. Direct involvement relates to the actual conveyance of goods and passengers by various modes of transport. Indirect involvement relates to such services as handling when changing modes, traffic guidance, travel arrangement, freight brokerage, storage, etc.

NACE 7, the transport and communications industry, comprises the following two-digit classes:

- NACE 71: railway transport;
- NACE 72: other land transport, including urban transport, road transport and pipeline transport;
- NACE 73: inland waterway transport;
- NACE 74: sea transport and coastal shipping;
- NACE 75: air transport;
- NACE 76: supporting services to transport, including inland waterway ports, sea ports and airports;
- NACE 77: travel agents, freight brokers, storage and warehousing;
- NACE 79: communications, including postal and telecommunication services.

It should be noted that the categories above, apart from NACE 79, relate to companies which have as their primary activity transport services. Apart from these companies, however, transport also takes place in other economic units (own account transport) which is not captured in value added and employment statistics for NACE 7. When measuring physical transport activity (e.g. in passenger-km or tonne-km), however, transport in these non-NACE 7 units is included. For example, companies active in manufacturing regularly transport on their own account, as they do not want to rely on external transport services. Similarly, in family households, the use of the private car is not in itself an economic activity.

This leads to a situation where economic transport statistics only relate to companies with transport as their primary activity (excluding own account transport), whereas physical transport statistics relate to total transport (including own account transport). Interpretation of statistics can lead to paradoxical results, and this should be kept in mind.

Of the subsector telecommunications and postal services (NACE 79), only postal and express services are covered in this chapter, telecommunications being covered in another chapter.

Recent trends

Total gross value added at market prices generated by the EC transport industry amounted to 196 billion ECU in 1991, which is approximately 4% of EC GDP (communications and own account transport not included). This value is more than two and a quarter times greater than the result for 1980, since, during the 1980s, nominal value added grew by an average 8% per year (Table 1). However, real growth has averaged just under 2% over the last few years. Also, during the late 1980s and early 1990s, transport contribution to GDP has remained stable at 4%, which gives a good picture of the importance of its contribution to the Community's economy.

On a country by country comparison the importance of transport in economic activity varies considerably by Member State (Table 2). In Germany, France, Ireland and Portugal transport's share of GDP is below the EC average, whilst for Belgium, Denmark and Greece the share in national GDP is substantially larger than the EC average.

In terms of direct employment, the transport services sector is an important employer, with almost 7.9 million employees in 1991 (including communication services), which is approximately 4.0% of total EC employment. Since the mid to late 1980s, the trend in employment has tended upward, from a total of 7.4 million to 7.9 million in 1990. However, due to weakening economic conditions in 1991, the trend reversed as employment as whole declined (Table 1).

Inland transport services, the total of rail, road and inland waterways, accounts for over 45% of total employment in transport and communications (Table 4). Sea and air transport take a share of 6.7%. Transport services, thus, are directly responsible for 52% of employment in the sector total. Indirect transport services, the supporting services and other auxiliary services have a share in the sector's total employment of just

Table 1: Transport services
Main indicators of the EC transport sector

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Value added (billion ECU)	90	99	106	111	121	129	136	142	156	170	181	196
Investments (billion ECU)	30	31	32	33	36	39	42	46	49	52	57	N/A
Employees (thousands) (1)	4 462	4 415	4 342	4 267	4 243	4 262	4 483	7 346	7 514	7 724	7 894	7 883

(1) Figures from 1980-1986 excluded D + F + NL + UK
Source: Eurostat (National accounts, Labour force survey)

Table 2: Transport services
Share of transport of GDP at market prices

(%)	1980	1985	1990	1991
Belgique/België	6.6	6.5	6.6	6.8
Danmark	6.6	6.3	6.8	7.0
BR Deutschland	3.5	3.4	3.2	N/A
Hellas	6.1	5.6	5.3	5.2
España	4.2	3.7	N/A	N/A
France	4.2	4.1	3.9	3.9
Ireland	3.5	3.0	2.7	N/A
Italia	4.1	4.0	4.3	4.3
Luxembourg	3.5	3.1	4.0	4.1
Nederland	4.7	4.5	N/A	N/A
Portugal	3.8	5.2	3.3	N/A
United Kingdom	4.4	3.9	4.0	4.0
EC	4.2	4.0	4.0	4.0

Source: Eurostat (National accounts)

under 20%. The remainder is employment in communication services (NACE 79).

The trend in national and urban/suburban passenger transport has favoured the private car, which has become the primary mode of transport. This type of transport is estimated to take a share of about 79% of the total passenger market, leaving the balance to railways and buses and coaches (estimates derived from Table 5). Over the last two decades rail and bus have lost market share to private cars, which is presenting a number of problems for the environment, particularly congestion and atmospheric pollution. Public transport - rail and bus - tends to compete poorly with the mobility advantages of the private car (except in densely populated and congested areas), nonetheless state and local authorities maintain public service obligations as it is in the public interest and also in order to encourage "would be" private drivers to use public transport instead.

For international long distance passenger transport, air transport has become the most important mode for both business travel and tourism, particularly as the time wasted on travel represents a very real opportunity cost to the business traveller and as the demand for leisure has favoured longer distance for the 'long break' and shorter distance for the 'short break', where in the case of the latter time is again a premium. The impact of the growth in passenger air transport demand over the last two decades has caused congestion problems in the airways and at airports, which are currently being addressed Community-wide within the EC. However high speed rail services are becoming very competitive for medium range distances (around 300-500 kilometres).

The bulk of freight transport is road haulage. This mode takes a share of about 70% in total freight transport activity (excluding air transport and maritime shipping). Rail and inland waterway take about the balance, which is about evenly divided (Table 5). Road haulage has benefited significantly from increasing integration within the Community, since as it is highly flexible, it can quickly take advantage of changing and new demand requirements. Furthermore, growth in the transport of bulk goods, the core business of rail and inland shipping, remains low. Rail and inland shipping do have opportunities, however, in unitised cargo (containers).

Another trend is the increasing importance of air freight transport services. Especially in the field of high value goods and perishable goods, air transport has a competitive advantage with its high speed of conveyance. This service is currently being integrated more and more with express service companies.

International comparison

The share of transport and communication in GDP in the EC is slightly lower than that of the USA and Japan, which have a share of about 6% of GDP each, including communications services. In actual value contribution, the EC transport and communications sector is the largest at just ECU 300 billion, although the figures presented in Table 3 are somewhat dated for the USA. The Japanese transport and communications industry, with 175 billion ECU, is relatively small when compared with the USA or the EC. Contrary to the experience of the EC of constant contributory share to GDP from the sector, the trend in the USA and Japan appears to have been declining.

MARKET FORCES

Demand

The demand for transport depends on economic and social development within the Community. Trends of growth in transport demand tends to depend on growth in GDP, albeit disproportionately, hence accelerating GDP growth does have a more than proportionate effect on transport activity and vice versa for decelerating GDP growth rates.

Demand for transport also depends on other factors, which although may impact changes in GDP, have a direct effect on changes in transport activity. These factors include structural change in the manufacturing sector, which has lead to relocation of manufacturing (usually to non-urban areas) and hence to a dispersal of economic activity with a concomitant effect on both good and passenger movements. The trend towards very flexible production methods (JIT) have lead to lower stocks which in turn have required more frequent deliveries and lower volumes. The very rapid growth in the services sector has multiplied the demand for professional mobility over all distances. Increases in real disposable incomes and the continuing lessening of barriers to mobility in the Community have lead to higher rates of demand for personal mobility and leisure.

Demand for transport is usually separated into passenger and freight/cargo/goods movements and although transport activity over the last twenty years has grown by over 50%, the effect on individual modes has not been uniform. Passenger activity has grown by over 3% a year, whereas goods movements has grown by about 2.3%. The changes in share amongst the various modes for passenger activities between 1970 and 1990 has resulted in an increase in private car use, from 76.1% to 79%, an increase in air travel, 2.2% to 5.6%, and declines for rail (10% to 6.6%) and buses and coaches (11.7% to 8.9%).

For freight transport (excluding maritime transport - which accounts for about 30% of goods movements between Member States), the growth in the share of road transport has been phenomenal, from 51% in 1970 to 70% in 1990, taking share from all the other modes where declines have been profound: rail's share declined from 28% to 15%, inland waterway from 14% to 9%, and pipeline from 8 to 5.5%.

The demand for private road transport, both passenger and freight, has been dramatically affected by the demand for increased mobility and flexibility where the door to door concept has acted as competitive edge unmatched over shorter distances by any of the other modes. On longer distances, road transport for freight still allows for door to door delivery without transhipment that is usually required for rail and inland waterway freight.

Increasingly transport is viewed as a part of the production process, where this concept is more usually applied to freight. "Just-In-Time" delivery is such an example of how transport can be part of the production process. Transport and communication plays a crucial role in maximising the benefits of European integration, as they facilitate interaction and trade between Member States.

Supply and competition

The major impacts on aggregate supply are changes in infrastructure, changes in equipment technology and policy measures to encourage one mode over another or with another.

Infrastructure has impacts on all the various modes. For road transport, freight and passenger, quality and availability of roads are crucial, particularly on intercity routes for freight and on inner city and urban congestion for both freight and passengers. For all rail, improvements in the network, including both network additions and the viability of high speed networks are key components. For air transport, congestion at some airports at peak loads is a serious problem, which coupled with an air traffic control system that requires substantial investment to operate efficiently, causes a real problem for the sector to supply services efficiently and cost effectively. For inland waterway, there is a real limit to infrastructure investment, although links to eastern Europe are slated for improvement.

Changes in equipment technology and infrastructures have had the most impact on air, road and rail transport. In air transport, vast strides have been made in supplying efficient air transport at a cost that has in real terms declined on aggregate over the last few years. For road freight, improvements in truck design and efficiency have allowed a real reduction in operating costs and higher volume per load movements. For passengers, the effect has been less noticeable as changes in technology have allowed some efficiency gains, but these latter have been outweighed by larger numbers of single occupancy movements. Investment in higher quality track and rolling stock for rail has allowed efficiency gains and also in some cases induced additional traffic, both passenger and freight - the drawback to freight still remains inflexibility and transhipment at point of loading and unloading.

These issues are covered in greater detail in the relevant following monographs.

Competition between modes has meant that overall road transport, specifically passenger cars and road freight, has gained share at the expense of its competing modes. In particular, cars have taken share from rail for short to medium length journeys and share from urban/suburban public transport for short journeys in and between urban and inner city areas. Road freight has taken share from rail, and to a lesser extent from inland waterway. Air travel for leisure and business has gained share from rail and coach for medium to long distances within the Community. Competition issues within the sectors and between sectors are covered in greater detail in the relevant following monographs.

INDUSTRY STRUCTURE

Profile

The industry structure of the transport services industry can be broadly broken into public and privately owned, where particular sectors tend to be dominated by one or the other. Road freight and private cars (including taxi services) are completely dominated by private ownership, with only isolated case of concentration - typically in a geographical area - and by definition private cars are privately owned. Rail, including urban/suburban services, is dominated by public ownership.

Table 3: Transport services
International comparison of value added in transport and communication, 1980-91

Area	Year	Value added (billion ECU)	Share of GDP (%)
	1980	131	4.2
	1985	197	4.0
EC	1987	218	4.0
	1989	256	4.0
	1990	273	4.0
	1991	296	4.0
	1980	124	6.4
	1985	327	6.3
USA	1987	238	6.1
	1989	N/A	N/A
	1990	N/A	N/A
	1991	N/A	N/A
	1980	47	6.2
	1985	108	6.6
Japan	1987	128	6.6
	1989	173	6.6
	1990	148	6.4
	1991	175	6.5

Source: Eurostat (National accounts), OECD National accounts statistics

Table 4: Transport services
Employment by type of transport activity,1991

(thousands)	Rail	Other land transport	Inland Waterways	Sea	Air	Support activities	Agents	Commu-nications	Total	in % of total employment
Belgique/België	47.2	75.1	4.9	6.7	14.3	25.3	28.4	76.4	278.3	7.7
Danmark	20.1	52.1	0.0	16.6	9.1	15.0	15.3	53.5	181.7	6.8
BR Deutschland	268.8	279.5	6.4	22.0	43.5	82.6	410.0	557.8	1 670.6	5.8
Hellas	14.2	106.8	0.1	33.4	5.3	17.3	29.5	46.0	252.6	6.8
España	54.3	379.8	0.0	22.9	28.2	36.6	40.1	151.2	713.1	5.7
France	196.1	418.5	2.1	14.6	51.9	41.1	135.2	460.7	1 320.2	6.0
Italia (1)	185.0	490.0	(2)	27.0	21.0	(3)	225.0	374.0	1 322.0	5.9
Ireland	4.4	19.1	0.0	2.2	5.1	4.1	5.2	19.4	59.5	0.3
Luxembourg	3.8	3.0	0.0	0.0	1.4	0.0	0.3	2.7	11.2	7.1
Nederland	26.3	150.0	6.4	7.1	29.5	27.2	59.8	95.7	225.7	3.6
Portugal	13.9	86.7	0.0	13.1	17.4	45.2	N/A	51.7	228.0	4.9
United Kingdom	100.0	563.7	0.0	47.0	91.5	88.8	224.7	504.6	1 620.3	6.0
EC Total	934.1	2 624.3	17.9	212.6	318.2	380.2	1 173.5	2 393.7	7 883.2	

(1) DRI estimates based on 1989 data
(2) Included in other land transport
(3) Included in agents
Source: Eurostat (Labour Force Survey)

Air transport has been dominated by 'flag carrying' airlines that have tended to be owned by the state, and on balance most of the major airlines in the Community still remain in the hands of the state. However, there are numerous medium to small sized airlines that are privately (this includes quoted companies) owned and within this sub-sector there is a low degree of concentration. Inland waterways are dominated by small privately owned firms, often of one barge or ship. Maritime transport is largely privately owned.

Strategies

The major strategies in the Community are to move more of the publicly owned firms into the private sector and allow increased competition. The degree of these two strategies varies according to sector. In road transport, particularly road freight, the move has been to increase competition between firms in different Member States by gradually allowing cabotage. In air transport, the liberalisation of the market within the Community in 1993 has meant that the flag carriers that still remain state owned will gradually be moved into the private sector and competition will force more alliances and mergers and acquisitions as companies seek to minimise costs and maximise revenues, and expand their access to markets of critical size in order to compete effectively. Although the United Kingdom is leading the field in privatising rail and encouraging competition, in general changes in the structure of the rail industry will take place slowly as rail tends to be viewed as a quasi-public good as the supply of rail services is in the public interest; moreover, the heavy front-end investment that characterises rail and the continued substantial investment required to maintain the investment are considered to be serious drawbacks to privatisation. The impacts of privatisation and increased competition will have the least impact on inland waterway and maritime services, except from competition from other modes, as these are already internally competitive and typically privately owned.

TECHNOLOGICAL PROGRESS

In all subsectors of the transport and communications industry, progress in technology and possible economic and social benefits are substantial. It relates to the following items:

- the development of new information and communications technology ("telematics"), leading to new communication and value added services;
- the application of telematics enables considerable improvements in transport service quality. Key quality items such as vehicle monitoring, goods and parcel tracking, container handling, traffic management, travel information, route guidance, automatic fee collection, fleet management, driver assistance, etc. have improved due to advanced applications of information and communication technology and Electronic Data Interchange (EDI);
- several research programs, such as DRIVE/ATT (Dedicated Road Infrastructure for Vehicle safety in Europe / Advanced Transport Telematics), IRIS (Integrated Safety Information and Navigation System), EURET (Research and Technological Development Programme in the field of Transport) and EATCHIP (European Air Traffic Control Harmonisation and Integration Programme) have been carried out with the purpose of improving traffic safety, the impact on the environment and integrating approaches to increase transport efficiency on an European basis;
- energy efficiency and reduction of exhaust emissions and to a lesser extent other forms of nuisance such as noise.

The potential of the application of these emerging innovative technologies on the creation of value added services and on the stimulation of economic growth is significant.

ENVIRONMENT

Transport is the dominant source for certain types of air pollutants: in particular, transport is estimated to be responsible for about 80% of carbon monoxide emissions in the EC. For nitrogen oxides and hydrocarbons, estimates indicate that transport causes between 50% and 60% of all man-made emissions, and furthermore it produces 40% of all emitted particulates. Another major pollutant is lead, which is discharged by internal combustion engines using leaded gasoline (dominated by cars and light vans).

In 1992 the European Commission published a Green Paper on The Impact of Transport on the Environment - a community strategy for sustainable mobility. This Green Paper was a milestone in attempting to look at the issues of the impact of transport on the environment from a global perspective taking into account the inter-relationship of transport within the Community and economic welfare and the relationship between the various transport modes. Although the Paper focused on atmospheric pollution, it also covered in some depth

Table 5: Transport services
Community goods transport by mode of transport, 1987-1991 (1)

	1987	1990	1991	Change 1990/87 (%)	Change 1991/90 (%)
Road	65.7	68.8	70.2	3.1	1.4
Rail	16.9	15.1	14.9	-1.8	-0.2
Inland waterways	17.3	16.1	14.9	-1.2	-1.2

(1) Based on total transport activity in million tonnes-Km; data for EC (4)
Source: IRF (World Road Statistics 1987-1991)

the other forms of pollution or nuisance that are often skated over in considerations of transport. In particular, it discussed the impact of noise on the environment, water pollution (inland and maritime) from the effects of transport, soil impacts, vibration, land use and intrusion, congestion and the risks inherent in transporting dangerous goods.

In assessing the impacts of transport on the environment, the Paper concludes that operational pollution is the critical issue for all transport sectors, with the main culprits being the road, sea and air sectors. Land use and intrusion was ranked second in importance (particularly the one caused by the road and rail sectors). Congestion interestingly was ranked third although it contributes to atmospheric pollution and sometimes exceed infrastructure limits. This third place was largely due to congestion tending to be prevalent only in inner-city and densely populated urban areas and in terms of the whole picture had less impact. Bottom of the ranking was the transport of dangerous goods, although politically sensitive, due largely to the small quantities moved within the EC compared to the volumes of other goods.

The Paper also sought to provide possible measures and research programmes for discussion on a common strategy based on a global approach requiring different types of initiatives. The essence of the Paper is to ensure that transport continues to fulfil expectations in terms of its contribution to social welfare, economic cohesion and growth whilst minimising its impact on all aspects of the environment. Within this global approach to strategy were outlines of various approaches that could be made or adopted to achieve these ends.

REGULATIONS

Most of the EC transport market is currently regulated on a national basis and therefore relatively fragmented. In 1985, a ruling of the European Court obliged the Council to work out a common transport policy along the same liberal lines that hold for the rest of the economy under the rules of the EC.

The implementation of the common transport policy involves two elements:

- freedom to provide services and eliminate competition distortions;
- improvement of infrastructure and production means.

The latter element relates to large investments in infrastructure and new innovations in means of transport as the Community contributes to a number of infrastructure-related projects, which are dominated by the high-speed rail network. However, the Community programme has limited funds, and there are a number of projects important to the Community that are not funded by the Community: e.g. the Channel Tunnel, the Trans-European Motorway, the construction of the Rhine-Main-Danube Canal and the Bælt Link in Denmark.

Innovation in transport is dominated by European R&D programmes aimed at traffic safety, reductions in energy consumption and in exhaust emissions and at adding new telematics-based services. Also, the harmonisation of technical standards continues as part of general harmonisation in the Single Market.

In terms of broad policy issues on transport in the Community, the Commission published a White Paper on The Future Development of the Common Transport Policy at the end of 1992 (COM(92)494). This communication from the Commission is a crucial tool in setting out the issues that need to be discussed as it seeks to set out a global approach to transport issues enabling due consideration of all views before the launch of particular initiatives. It recognises the importance of each transport mode in the global picture, and seeks to balance transport policy in terms of its impact on the environment with sustainable mobility for the Community as a whole. The communication enlarges on the major issues of modal disequilibria, capacity constraints, system and network developments, environmental issues, safety, and social issues.

Whilst the desire to create a Common Transport Policy that maximises all requirements is existent, there are a number of regulations and policies that are mode specific and in general these are designed to tie into the master plan. The important regulations by mode are entered into more detail in the following relevant monographs. However some of the more important ones are summarised below. The major changes in regulations have been aimed at stimulating competition by removing artificial and regulatory barriers.

In terms of freedom to provide services and eliminate distortions of competition, the Commission has produced several communications on the establishment of the conditions for cabotage, with the most progress being achieved on intra-EC road transport. Bilateral authorisations for transport between countries were replaced by EC permits at the beginning of 1993 with an elimination of all quotas.

In inland shipping, there is relatively unhindered competition on the Rhine River, but initiatives are being taken to extend this to other waterways. Initiatives have also been taken to allow cabotage: each ship with an EC-flag is allowed to provide services within other Member States. This will increase competition on the European waterways.

The railway directive of June 1991 (91/440) is aimed at giving limited access to the national railway networks, which commenced at the beginning of 1993. The directive was designed to encourage the national railway companies to form international alliances for both passenger and freight services under single management structures, and allow a measure of free access to the entire EC railway system for private companies involved in combined transport. However, in rail transport, cabotage is not practicable as rail companies often transfer transport responsibility to another company at the border due to differences in the technical aspects of the national networks. New infrastructure with harmonised technical standards will enhance the introduction of rail cabotage in the distant future.

Table 6: Transport services
Evolution of passenger transport in Europe, 1980 - 1991 (1)

	Private cars			Railways			Buses and coaches		
	1980	1991	1991/80 (%)	1980	1991	1991/80 (%)	1980	1991	1991/80 (%)
Belgique/België	3 159	3 970	25.7	6 963	6 771	-2.8	9 100	N/A	N/A
Danmark	1 390	N/A	N/A	3 803	4 797	26.1	7 300	9 200	26.0
BR Deutschland	23 192	31 322	35.1	40 499	45 639	12.7	65 600	72 200	10.1
Hellas	863	N/A	N/A	1 464	1 995	36.3	5 800	N/A	N/A
España	7 557	12 537	65.9	13 527	15 022	11.1	28 100	40 600	44.5
France	19 130	23 810	24.5	54 261	62 101	14.4	38 000	42 900	12.9
Ireland	736	838	13.9	1 032	1 290	25.0	N/A	N/A	N/A
Italia	17 686	N/A	N/A	39 587	48 361	22.2	57 800	84 700	46.5
Luxembourg	133	201	50.6	246	220	-10.6	N/A	N/A	N/A
Nederland	4 548	5 569	22.5	8 910	15 117	69.7	13 200	14 000	6.1
Portugal	1 269	2 775	18.7	6 077	5 688	-6.4	7 800	10 700	37.2
United Kingdom	15 619	21 515	37.2	31 700	31 875	0.6	52 000	45 000	-13.5

(1) Based on million passengers-km
Source: UIC, UN transport statistics, ECMT

As regards the shipping market, in June 1992 the transport ministers decided to deregulate the market in four stages between 1993 and 1999. The first three stages refer to the deregulation of the EC sea freight market. The fourth and last stage concerns the deregulation of the EC market of passenger traffic by sea. There are however some exceptions concerning Greece (temporarily) and strategic goods.

Since 1987, European airlines have been subject to a process of deregulation, which has taken place in three stages. The third stage became operational on the 1st January 1993. Although it is the most far-reaching package so far, the programme did not bring about a totally deregulated EC air transport market in 1993. It still includes some safeguards on issues such as free settlement of fares and also a transition period for the introduction of cabotage. Cabotage will only be introduced in April 1997. In the meantime conditional cabotage is allowed.

In the field of regulation aimed at environmental protection, measures concentrate on emissions of exhaust gases and particulates. The general aim is to reduce the burden for the environment caused by the transport sector. The standards for carbon monoxide (established in 1985) depend on engine size and became effective during the 1988 to 1993 period. One of the consequences of this policy is the use of three-way catalytic converters in gasoline-fuelled automobiles. Also, aeroplane engines will have to conform to Stage III regulations on noise and emissions by early next century.

Policies in passenger transport aim at reducing private car use to the benefit of public transport. This is being done to alleviate congestion problems on the networks in and between major conurbations in the EC. Additionally, it is beneficial to environmental protection initiatives.

OUTLOOK

The prospects for the EC transport industry remain positive. With increasing European integration, transport demand is likely to grow both in terms of the volumes of goods and passengers and in terms of the distances to be covered. This growth will tend to follow the trends in economic growth, however there will potentially be a number of spurs adding to the momentum. Industries externalising their of transport and logistic services in order to minimise costs will act as a fillip to the growth in professional transport services. The opening up of the East European economies will also contribute, although, during the initial period of economic restructuring, only marginal growth in transport demand may occur. Also, transport services suppliers from these countries will be limited in their ability to compete with EC companies.

The growth prospects will differ for the different modes of transport. In the longer term, the investment cycle in rail transport will tend to moderate annual growth rates and freight transport by rail is expected to grow slower than passenger transport. Road passenger transport is likely to exceed average growth rates as private car use and ownership has not yet reached a maximum. Road freight transport will grow much faster due to the liberalised market and new opportunities, although tighter environmental regulations will act as a counter force. Inland waterways transport will maintain its upward trend with small rates of growth. Seaborne trade is expected to grow slowly in the short term, but faster in the medium to long term: recovery in long-term depressed markets such as steel and iron will be very gradual. The outlook for air transport is very positive as advances in managing congestion through improvements in air traffic control and investment in additional airport capacity at the more congested airports takes place. Also the upward trend in real personal disposable incomes will act to buoy the trend.

Large investments in infrastructure that are currently being undertaken to extend the network capacity of the various transport modes, as some existing networks are operating at or above capacity levels, will create new transport possibilities which are necessary for the growing integration of the EC market. This effect can be increased by the deployment of transport telematics tolls and services.

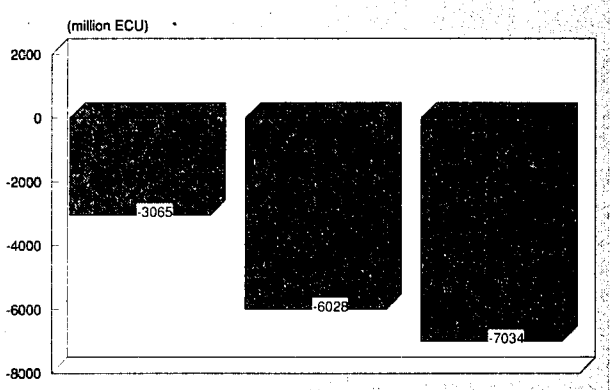
The Common Transport Policy, which aims at liberalising and harmonising the EC transport market, will improve the industry's efficiency. This will enhance competition and improve the quality of service offered under the condition of further economic growth.

Written by: DRI Europe

Railway transport
NACE 71

Railway companies are controlled by single national operators, which precludes competition between individual railway companies and between railway companies and private firms. To increase competition and profitability some countries intend to privatise their railway. In the framework of the Common Transport Policy, the competitiveness of the railway sector should be improved by the possibility of more accurate reflection of the real cost burdens the various modes impose. Also competitiveness will be enhanced by continuing investment in high-speed rail services, and which, ultimately, may result in an integrated European high-speed rail network.

Figure 1: Railways
Development of financial result in EC railways



Source: UIC

INDUSTRY PROFILE

Description of the sector

This sector includes units that are exclusively or primarily engaged in the transport of passengers and goods by rail. It also includes the equipment and facilities required to provide this transport, including private branch railway lines.

However, it does not include: railway networks solely or primarily serving a single town or city (NACE 721.1); locomotive, carriage and wagon repair workshops (NACE 362.3); local units of railway enterprises which operate regular bus or motor coach services (NACE 721.2); and the operation of sleeping-car and dining-car services (NACE 666).

Recent trends

Rail passenger traffic has remained relatively constant over the last decade, growing at an average of 0.7% since 1980 to reach the 1992 level of 241 billion passenger-kilometres. The recessionary pressure emanating from the weakened EC economy in 1991 ensured that passenger traffic stagnated compared to the previous year, and the results for 1992, although an improvement, are only just over 3% higher than the 1990 level.

For the individual Member States, the strongest growth in 1992 came from Spain (+8.8%) and Italy (+4.2%), whilst passenger traffic in Ireland (-5.0%), Denmark (-2.4%) and the United Kingdom (-1.1%) declined. The remaining Member States all had positive but very marginal growth in the order of 0.1-1%.

Aggregate EC freight traffic has declined over the same period by an annual average of 2.6% per year to the 1992 level of 166 billion tonne-kilometres. The major part of this decline has occurred since 1989, as freight declined by over 3% per year, whereas in the early to mid 1980s rail freight remained almost constant. However, there has been a partial structural shift in cargo carried away from low value added dense products to higher value products, often carried in containers or on road units (combined road/rail traffic). Estimates put the recent growth of this latter type of traffic at around 7.5% per year; with its share in total rail freight transport increased from 7.5% in 1985 to about 13% in 1992.

The only Member States to record strong freight traffic growth in 1992 were Portugal (+6.4%) and Ireland (+5%). Freight traffic declined in seven Member States, the worst being Spain (-10.5%), followed closely by western Germany (-9.9%). Intra-EC rail freight traffic is dominated by four Member States, Belgium, Germany, France and Italy which between them account for over 80% of intra-EC rail freight. The major intra-EC flows are between Italy and France, Belgium and Luxembourg, Belgium and Germany, Germany and France, Germany and the Netherlands and between France and Belgium. These flows account for one-third of total intra-EC rail freight traffic.

The most recent estimate for employment (1991) shows that the number of employees has continued to decline. Current levels are just over 900 000, which is a decline of almost 20% since 1985. However, the rate of decline in unemployment has slowed recently: employment in the late 1980s was declining at rate of 3.2% per year, whereas at the turn of the decade this rate had come down to 2.8%.

International comparison

Table 6 reveals the significant differences between the railways in the EC, Japan and the USA. Although the data for comparison is somewhat dated, it does enable a useful comparison. The US railway is heavily dominated by freight traffic, with only a relative small number of passenger-kilometres, as freight is moved over long distances in a country which is sparsely populated between the major cities or population centres. Japan by contrast is dominated by passenger traffic, due to the heavy population concentrations in many parts of the country and extreme road traffic congestion. Falling between the two is the EC with a fairly even divide between

Table 1: Railway transport
Development total railway traffic and employment in the EC

	1985	1986	1987	1988	1989	1990	1991	1992
Passenger-kms (million)	217 005	216 774	218 575	227 530	228 455	233 029	237 097	241 375
Tonne-kms (million)	178 771	171 188	171 081	173 721	176 461	174 613	176 386	165 993
Employment	1 146 429	1 117 968	1 077 817	1 022 579	987 575	966 005	933 100	N/A

Source: UIC; Eurostat (Labour force survey) for employment

Table 2: Railway transport
Average yearly rates of change in traffic and employment in the EC

(%)	1985-1990	1989-1990	1985-1991	1989-1991	1985-1992	1989-1992
Passenger-kms	1.3	1.2	1.4	1.8	1.5	2.0
Tonne-kms	-0.4	0.3	-0.5	-1.2	-1.0	-2.2
Employment	-3.2	-2.8	-3.4	-2.8	N/A	N/A

Source: UIC

freight and passenger. However, railway density is very similar between Japan and the EC at around 54 kilometres of line to every 1 000 square kilometres. The USA is less than half of this at 22.

The approximate length of railway line available in the EC (excluding eastern Germany) is 121 000 kilometres, which is substantially more than Japan at 20 000 kilometres and half that of the USA at 243 000 kilometres. Given the different nature of the railways in these three countries, it is difficult to use a labour productivity measure, however, the comparison of number employed per kilometre of track shows that the differences in structure are enormous. The USA employs almost 4 worker per kilometre, Japan almost 10 and the EC 12.5. This confirms the strong correlation between employment and the type of traffic, i.e. the higher the passenger share of total traffic the more staff required.

MARKET FORCES

Demand

Demand for rail services is divided into passenger and freight. Passenger demand is composed by leisure travel and business travel. The substantial portion of business demand is daily commuting between the workplace and home. The demand for commuting places peak load strains on the network services at the start and end of the working day, often placing networks with a substantial logistics load in terms of equipment positioning. Leisure demand does not have the same daily peak impact, but does have seasonal peak impacts, for instance at Easter or Christmas. Within the two passenger demand segments are sub-segments that depend on the distance travelled. Typically, these subdivisions are split into three: intra-urban, inter-urban/city domestic and inter-urban/city international.

Freight demand does not have the same time sensitive profile as passenger, as freight trains can be run to meet demand during non-passenger peak times, which is often at night.

The industry in the EC has undergone a structural change away from the traditional transport-intensive industries such as coal and steel, on which rail was particularly dependant; this has affected the rail freight industry severely. Also, part of the changing structure has meant that technical and organisational developments in other industries (just-in-time stock management and sophisticated distribution networks) has accelerated demand for quick, flexible and predictable deliveries of relatively small quantities of cargoes. These developments have been detrimental to rail transport, because of its perceived relative inflexibility and high transhipment costs. Moreover, lack of integrated, inter-border co-ordination has not helped the demand for international rail transport, although, the advent of the Single Market has eased much of intra-EC border delays.

Supply and competition

Rail competes with all other transport modes, road (car, truck and bus) for both long and short haul freight and passenger journeys, air for some passenger routes and inland waterway for some bulk freight. Increased private car ownership with the concomitant ability of car drivers and passengers being able to travel door to door without changing mode has affected passenger rail traffic negatively. Surveys of travellers have indicated that for business commuting, travelling speed and convenience are rated the most important factors in the mode

Table 3: Railway transport
Traffic and employment in rail sector in the EC Member States, 1992

Country	Company	Passenger- transport (million pass.-kms)	Freight transport (million tonne-kms)	Employment (2)
Belgique/België	SNCB/NMBS	6 798	8 089	47 200
Danmark	DSB	4 600	1 870	20 100
BR Deutschland	DB	46 407	55 848	268 000
Hellas	CH	2 004	527	14 000
España	RENFE (1)	16 350	8 966	54 300
France	SNCF	62 647	49 536	196 100
Ireland	CIE	1 226	633	4 400
Italia	FS (1,3)	48 361	19 879	185 000
Luxembourg	CFL (1,2)	220 (2)	597	3 800 (2)
Nederland	NS	15 350	2 764	26 300
Portugal	CP	5 694	1 767	13 900
United Kingdom	BR	31 718	15 509	100 000
EC		241 375	165 985	933 100

(1) Included empty wagons of private individuals
(2) 1991
(3) Employment estimated
Source: UIC, Eurostat (Labour force survey), DRI

Table 4: Railway transport
International freight traffic by Member States, 1990

	Intra-EC (million tonnes)		Other (million tonnes)		Total (million tonnes)	International (%)	
	From	To	From	To		Total	EC
Belgique/België	11.50	17.70	0.63	2.26	32.09	51.46	46.82
Danmark	1.09	0.87	0.76	0.29	3.01	58.10	37.84
BR Deutschland	14.53	19.93	22.40	18.00	74.83	25.62	11.79
Hellas	0.10	0.03	0.70	1.80	2.63	73.44	0.00
España	1.66	1.10	0.09	0.16	3.01	11.82	0.01
France	13.55	16.08	1.70	2.30	33.63	25.45	22.43
Ireland	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Italia	18.30	7.50	9.10	2.90	37.80	64.02	43.69
Luxembourg	6.68	3.50	0.0 (a)	0.16	10.34	0.07	77.20
Nederland	4.80	6.60	0.50	1.20	13.10	0.07	62.67
Portugal	0.26	0.20	0.0 (a)	0.0 (a)	0.46	7.80	7.80
United Kingdom	0.39	0.28	0.12	0.04	0.83	0.59	0.40

(a) 0.004 millions tonnes
Source: Eurostat: (Carriage of goods 1990)

choice decision. This priority is much less important for shorter distance (50 to 300 kilometres) leisure travel, where price comes higher up the list. Rail tends to win share in instances where it can compliment other modes by providing almost seamless travel, for instance rail to metro, and where road traffic congestion is bad enough to negate the convenience factor of door to door travel.

In competing with air travel, the development of high-speed rail services has provided an opportunity to divert traffic from air to rail. Air traffic's comparative advantage over rail transport i.e. speed, is under pressure on some routes in the EC as over shorter distances the flight time is only a minor portion of total journey time which is compounded by increasing congestion in airports and air corridors. The train, which is traditionally less expensive than flying, can become particularly attractive for journeys between 300 and 600 kilometres. For example, on the stretch Paris-Lyon, air traffic's share of passenger traffic on that route declined from 30% to 9% after the introduction of the TGV. Moreover, in some EC countries, policy is aimed at positively influencing the demand for rail transport. Current concern with congested roads, airports and airspace, as well as with pollution due to road and air traffic, are underlying this change in policy.

Passenger pricing for rail travel is usually worked on a per-kilometre basis and tends to be uniform in mainland EC, hence the longer the journey, the higher the price. However, prices from BR in the United Kingdom are not uniform, especially for the captive commuter belt surrounding London where prices are much higher than proportionate travel elsewhere in the UK.

For cargo, rail has the distinct advantage in its ability to move large volumes of freight in a single unit between specific points over short, medium and long distances. However, rail's share of freight traffic has declined over the last two decades. In the early 1970s the share of freight moved by rail was around 30%, but by the end of the 1980s it had declined to just over 16%. This loss of share is attributable to the increase in movement of freight by road, as road can move cargo from point to point, whereas rail freight requires modal symbiosis as the many cargoes need to be transported to and from rail freight terminals.

Table 5: Railway transport
Financial situation EC railway companies, 1991

Country	Company	Operating cost		Operating revenue		Operating result
		Total (million ECU)	Personnel (%)	Total (million ECU)	Subsidies (%)	(million ECU)
Belgique/België	SNCB/NMBS	2 808.5	71.3	2 776.4	50.4	-32.1
Danmark	DSB	1 319.6	50.9	1 319.6	40.3	0.0
BR Deutschland	DB	18 261.5	66.1	15 047.2	31.4	-3 214.3
Hellas	CH	326.9	66.7	153.5	32.4	-173.4
España	RENFE	3 276.9	52.0	2 849.3	40.7	-427.6
France	SNCF	10 946.8	56.7	10 351.0	29.1	-595.8
Ireland	CIE	492.3	52.9	511.8	27.3	19.5
Italia	FS	14 318.7	59.9	12 097.1	70.8	-2 221.6
Luxembourg	CFL	256.2	80.5	245.7	77.9	-10.5
Nederland	NS	1 636.9	52.2	1 678.9	39.7	42.0
Portugal	CP	467.9	62.7	298.6	29.0	-169.3
United Kingdom	BR	6 350.8	56.0	6 099.7	18.6	-251.1
EC		60 463.0	60.7	53 428.8	40.6	-7 034.2

Source: UIC

Table 6: Railway transport
International comparison of railway industry

	1990					1991			
	Pass.-kms (million)	Tonne-kms (million)	Employment	Railway density (1)	Electrified kms (%)	Pass.-kms (million)	Tonne-kms (million)	Employment	Electrified kms (%)
EC	233 029	174 613	966 005	54.3	41.0	236 942	176 386	748200 (2)	37.7
USA (AAR)	21 145	1 509 592	279 800	21.9	0.8	21 979	N/A	N/A	0.9
Japan (JR)	237 551	24 752	193 763	54.6	57.0	247 031	26 770	193 251	N/A

(1) kms line/1000 km2
(2) Eurostat estimate
Source: UIC, UN transport statistics, Eurostat

In 1991, the aggregate for labour costs in rail were over 60% of total operating costs and subsidies came to more than 40% of the operating revenue of the EC railways. At the same time, the EC railway companies suffered a joint loss of 7 billion ECU. The dominant contributors to this deficit was the German (west) and Italian railways with a loss of ECU 5.4 billion, or more than three quarters. This is no improvement on 1990, when these two railways combined contributed ECU 4.8 billion to the aggregate loss of ECU 6 billion.

INDUSTRY STRUCTURE

Companies

The top four rail companies in terms of network length are the SNCF in France (33 000 kilometres of track), DB in western Germany (27 000 kilometres), BR in the United Kingdom (17 000) and FS in Italy (16 000). These four combined have 75% of the available track in the EC. At the other end of the scale is CFL in Luxembourg with 275 kilometres and the next smallest is CIE in Ireland with just under 2 000 kilometres.

The national EC railway networks are controlled by single national operators. Rail transport services in the Member States can be characterised, to varying extents, by state regulation, the importance of non-commercial obligations and political objectives. Large subsidies from the state generally cover operating losses and/or investment (see Table 5). The single nature of the rail transport system largely precludes competition between railway companies or free market across national boundaries.

Strategies

The various railway companies in the EC have been collaborating to improve both international passenger and freight services. The strategy for international passenger services has been to provide day-train services under the brand name of 'EuroCity" in order to harmonise the service provided by the participating companies, and night services under the "EuroNight" banner, which are designed to provide uniform services with three categories of comfort. International freight services in containers (refrigerated and non-refrigerated) have come under the auspices of Intercontainer-Interfrigo (ICF), which provides the logistics and networks to move containers throughout Europe. ICF is owned by 27 railway companies in Europe.

In order to increase competition and profitability some Member States - Germany, the Netherlands and the UK - are in varying stages in the process of privatising their railways. In the UK, the law required to privatise British Rail was passed recently by the UK government. The break-up of the rail monopoly is expected to create seven private rail companies by 1995, and about 35 key rail routes will come under tender in 1994. The new rail companies will rent rail infrastructure from Railtrack - a new body that will be formed to operate the infrastructure.

In the Netherlands, the plan is to privatise the Dutch Railways in 2000. The Dutch railways expect passenger traffic to double by the year 2010 and have been investing in equipment and infrastructure improvements to meet the current growth in demand and future requirements.

Apart from efforts from individual Member States, the European Commission is seeking to liberalise the EC railway industry. In June 1991, the EC Transport Ministers opened the door to liberalisation when they agreed upon the Directive aimed at increasing access to the EC railway market.

One of the major pressures on most of the EC rail companies is their historic debt burdens. Huge debts have been incurred as railways have invested in the infrastructure and equipment required to provide the levels of service demanded by both customers and the fulfilment of a public service obligation. High interest rates coupled with steep competition that reduced revenues has compounded the problems. Some of the EC railways have had their debt burdens substantially reduced (BR in the UK) and/or rescheduled. However, the companies and their associations are lobbying for government commitment and assistance to reduce the debt burdens as there is still a long way to go in the EC before many of the rail companies could be considered as 'going concerns'.

ENVIRONMENT

Rail impacts the environment principally through air pollution, noise and land-use. Pollution into the atmosphere is both direct caused by emissions from diesel engines, and indirect from the power stations that generate electricity for trains using electrified track. The impact of noise is particularly acute in urban areas, although track tends to be placed in areas of lowest population density; in addition, track that is forced to go through densely populated areas is often placed in a way that minimises the noise, for instance in cuttings.

Although rail does cause atmospheric pollution, it is the most environmental-friendly form of transport. At full capacity both rail and buses have the lowest consumption of energy per passenger-kilometre than other forms of transport. Intercity and urban trains consume in the region of 0.3 MJ of primary energy per passenger-kilometre at 100% occupancy compared to between 0.6-1.1 MJ for cars. High speed trains consume around 0.7 MJ compared to almost 1.5 MJ for a Boeing 727. Even at low occupancy rates rail consumes less energy per passenger kilometre than most other forms of transport (the exception being bus). The difference for freight is not so marked, as bulk rail freight traffics estimated to consume 0.6 MJ per tonne-kilometre, whereas the equivalent figure for an articulated truck at 100% capacity utilisation is about 0.7 MJ. However, trucks rarely have 100% capacity utilisation as this implies that both the outbound and inbound journeys are full, hence, assuming a capacity utilisation for trucks of around 50-75%, then energy consumption is around 1-1.5 MJ per tonne-kilometre for an articulated vehicle.

Table 7: Railway transport
Total and electrified kilometrage by EC country

Country	Company	Total kilometrage 1990	Electrified, 1991 (%)	km	Current supplied by: catenary, 1990 25000 v. 50 cycl.	15000 v. 16 2/3 cycl.	3000 volts	1500 volts	Other	Third rail
Belgique/België	SNCB/NMBS	3 479	66.1	2 291	N/A	N/A	2 294	N/A	N/A	N/A
Danmark	DSB	2 344	12.3	253	77	N/A	N/A	153	N/A	N/A
BR Deutschland	DB	26 949	44.5	12 048	1	11 555	7	20	N/A	110
Hellas	CH	2 484	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
España	RENFE	12 560	51.1	6 426	N/A	N/A	6 368	48	N/A	N/A
France	SNCF	34 070	38.4	12 829	6 626	1	N/A	5 869	N/A	113
Ireland	CIE	1 944	1.9	37	N/A	N/A	N/A	37	N/A	N/A
Italia	FS	16 066	N/A	9 701	N/A	N/A	9 512	N/A	N/A	N/A
Luxembourg	CFL	271	81.2	220	178	N/A	19	N/A	N/A	N/A
Nederland	NS	2 798	69.7	1 939	N/A	3	13	1 923	18	N/A
Portugal	CP	3 064	14.8	462	435	N/A	N/A	26	N/A	N/A
United Kingdom	BR	16 584	28.9	4 912	2 953	N/A	N/A	N/A	N/A	1 959
EC		122 613	40.9	51 118	10 270	11 559	18 213	8 076	18	2 182

Source: UIC, UN transport statistics

Electric traction could also allow different energy sources to be used, for instance gas generation rather than coal, which would further reduce the impact of rail. In practice, however, railways tend to buy their electricity form national grids and hence cannot choose the method of generation.

REGULATIONS

In July 1991, the EC Transport Ministers agreed upon a directive (91/440) aimed at improving the efficiency of the railways and encourage their adaptation to market conditions by widening access and separating infrastructure management from infrastructure usage as much as possible, which became effective in January 1993. The directive allowed certain possibilities of access to the rail network for new categories of railway operators, but free access to the entire EC railway system, however, is limited in general only to private companies involved in combined transport, which accounts for only about 5% total freight transport by rail. Consequently, the accessibility for private newcomers is at present marginal and passenger traffic is totally excluded.

Existing national railways from different countries have been able to link up under the agreement, giving them access to each others' network and to the networks of railways in countries separating them. This applies to both freight and passenger traffic. In addition, national railway monopolies have to account separately for infrastructure and operating cost.

The Commission's White Paper on The Future Development of the Common Transport Policy (COM(92)494), that was adopted by the Council in December 1992, has important implications for the rail industry, as one of its cornerstones is the ability to stimulate modal shifts. Policy instruments that encourage modal shifts tend to favour modes that are viewed as having the most favourable balance between positive economic development and minimal environmental impact. Rail is considered to be the most serious contender for meeting both objectives within a global transport plan. By 1st January 1995 the Commission has to report to the Council on further measures needed to develop railways in the Community.

In late 1989, the Union Internationale de Chemins de fer (UIC) launched the P.A.R.I.S. (Pricing, Accounting and Rolling Stock Interchange Simplification) in order to set about increasing international rail competitiveness and revenues in passenger traffic. Within the recommendations was the possibility to revamp the prevailing price structure. It is deemed as rigid, complex and unable to respond to specific market conditions and it also makes revenue accounting and settlement slow and inefficient. Further rolling stock interchange rules would be simplified and more geared to market conditions. The programme consisted of two stages. The first stage ended in September 1990. Recommendations on pricing, accounting and international route management were submitted and ratified in October 1990. Then the second phase was launched, including the implementation of the recommendations from the first stage and to come to further recommendations.

THE EUROPEAN HIGH-SPEED RAILWAY NETWORK

In 1989, the Community of European Railways (CER), comprising the Railway Authorities of the EC countries and those of Austria and Switzerland, published a blueprint for an integrated continent-wide high-speed network across all European countries to enable rail to compete more effectively against airlines on many major intercity routes. In December 1990, the EC Commission adopted the proposals and the Transport Ministers gave the scheme a favourable welcome. The creation of an optimal Community railway network hinges on new or upgraded infrastructure in 14 key rail corridors, covering a total of 30 000 route-km (30% new 250-350 km/h infrastructure and the rest upgraded tracks for at least 200 km/h). It was thought that the recommended system could be operational by 2010. This seems optimistic considering the time taken to activate and finish current projects. In addition to the infrastructure investments, technical harmonisation is a prerequisite to maximising the potential of the high-speed train in the next century's European passenger market. Standardisation, for example, will be required for:

- the electrification system (currently four different systems are operational in the EC: see Table 7);
- the signalling system (virtually each country has at present its own signalling system);
- rolling stock (very different technical concepts are underlying the rolling stock, momentarily in use in the various EC countries.

There is still a long way to go before a fully integrated European high-speed network will be operational. Nevertheless, the projects currently carried out on a national basis, such as the construction of high-speed lines (e.g. in France, Germany and Spain) and the upgrading of existing lines for higher

speed offer prospects for the realisation of such a network. In 1993, France completed the TGV Nord line of 333 kilometres, and in 1994 the Channel Tunnel will open, linking the United Kingdom with France. Also, in 1994, the French TGV South-East line to Valence (83 kilometres) and North/South-East link (70 kilometres) are expected to be completed. In the period 1994 to 2000, an additional 564 kilometres of new line is expected, with an additional 3 496 added in the first few years of the 21st century.

OUTLOOK

Rail's future share in the (growing) European transport services market will depend on its ability to meet customers requirements concerning speed and flexibility and the effects of the Common Transport Policy.

The prospects for rail passenger traffic are for positive growth of 3% in the short to medium term. Improved railway services and increasing congestion in other modes will help favour rail transport. The high-profile high-speed rail services will continue to contribute to positive customer awareness as well as continuing to compete with air traffic on distances between 300 and 600 kilometres.

In the short and medium term, rail freight will continue to lose market share to road due to its relative inflexibility and as the modal relative cost structure favours road haulage, but in terms of volumes moved, rail will see some marginal growth. In the longer term, the integration of the European railway system and deregulation of the EC railway market will help garner some of the share back onto rail. Also, within the framework of the Common Transport Policy, measures that genuinely reflect the real costs of each mode will act as fillip to rail.

Cost and debt pressures will continue to force rationalisation within the industry, which will have further negative implications for employment. The planned privatisations of the railways in Germany, the Netherlands and the UK will exacerbate the decline. Privatisation of the Bundesbahn is estimated to cause over 30 000 job losses.

The industry is represented at the EC level by: Community of European Railways (CER). Address: Rue des Colonies 2, B-1000 Brussels; tel: (32 2) 525 3050; fax: (32 2) 512 5231.

Public transport
NACE 721

Public transport has become the target solution to alleviating traffic congestion and pollution, especially in urban areas. Substantial investments continue to be made to improve public transport services, both in the provision of new equipment and infrastructure and in modernising and improving existing stock and infrastructure. The tendency to privatise particular segments of public transport will continue, improving competition between operators and modes, but with the possible drawback of a reduction in frequency, geographic coverage and network integration.

INDUSTRY PROFILE

Description of the sector

Public transport (NACE 721) consists of city underground, surface and elevated railways; tramways, regular bus and motor coach services. There are two subgroups; city underground, surface and elevated railways (NACE 721.1) includes units exclusively or primarily engaged in the transport of passengers by electric rail services - mainly underground and overhead - solely or primarily serving a single city or town. Tramway, regular bus and motor coach services (NACE 721.2) includes units exclusively or primarily engaged in the operation of city, suburban and inter-city tramways, bus and motor coach services insofar as they are operated as regular or special services. Regular services provide for the regular transport of passengers on scheduled routes and follow a fixed timetable; they pick up and set down passengers at stops marked on their routes. Special regular services cater for specific categories of persons to the exclusion of other passengers (e.g. workers, school children and air line passengers).

Recent trends

Reliable statistics for the sector are sparse, but an estimate produced by the OECD indicates that on average the importance of whole sector in terms of revenue or numbers employed is between one third and one half of the significance of the freight sector. On average the sector has seen growth of over 50% in the last twenty years, however, the share in total transport has declined. This is particularly true for buses and coaches, which had a share of 10% in 1985 and which had declined to less than 9% by 1990.

Use of urban transport has declined substantially between 1989 and 1991. In 1989 total passenger journeys in major urban areas in the EC exceeded 21 billion, but this had fallen to less than 15 billion in 1991. The impact on vehicle kilometres was similar. Declines were recorded for nearly all the Member States - the only exception being Luxembourg. In size, Germany is the largest country in terms of passenger journeys (4.2 billion in 1991). The next most important countries are France and the United Kingdom with 2.3 billion each followed by Italy (1.9 billion). Also in terms of vehicle kilometres, Germany is the biggest next to the United Kingdom. Both countries account for about 1 billion vehicle kilometres.

National bus and coach services fared better than urban transport, managing a growth between 1989 and 1991 of almost 50 billion passenger kilometres to reach just 350 billion. Amongst the Member States, the results were mixed despite the aggregate growth. Germany, Spain, Italy, the Netherlands, Portugal and the United Kingdom all showed some growth. In Belgium, Denmark and Greece passenger kilometres stagnated, whilst the remaining countries recorded declines. Italy has the most passenger kilometres for national bus and coach services, with 85 billion, followed closely by Germany with 78.5 billion, and some way behind are the United Kingdom, France and Spain with passenger kilometres in the 40 billion range.

Bus services are the most widespread mode in public transport in the EC. Estimates provided in 1993 indicate that in urban and suburban public transport buses account for about 60% of passenger trips, 59% of vehicle fleets and about 90% of all transport systems. Measured in terms of fleet size, route length and number of routes, the larger operating bus systems are to be found in the large European cities like Paris, Athens, Rome, Madrid, and London. Commuter rail or local train services follows far behind with 18% of passenger trips and 28% of vehicle stocks. Underground railway ranks third with 13% of passenger trips and only 8% of total vehicle stock. Light rail is the smallest of the usual modes in the EC, accounting for about 7% of passenger trips. The least significant public transport mode is trolley buses with only a tiny share in total passenger trips.

Table 1: Public transport
Main indicators, 1990

	Number of enterprises	Turnover (million ECU)	Number of persons employed
Belgique/België	271	N/A	N/A
Danmark	N/A	N/A	N/A
BR Deutschland	3 066	2 808	N/A
Hellas	N/A	N/A	N/A
España	935	N/A	32 055
France	180	884	33 846
Ireland	N/A	N/A	N/A
Italia (1)	1 150	2 653	117 129
Luxembourg	3	N/A	581
Nederland	37	376	26 730
Portugal (1)	104	374	N/A
United Kingdom	N/A	N/A	N/A

(1) 1989
Source: Eurostat (MERCURE)

Table 2: Public transport
Production indicators of public transportation, 1991

	All modes in major urban areas		National bus and coach services	
	Passenger journeys (million)	Vehicle kilometers (million)	Passenger kilometers (billion)	Vehicle kilometers (billion)
Belgique/België	260	80	10.0	0.4
Danmark	270	90	8.9	0.5
BR Deutschland	4 200	950	78.5	3.6
Hellas	560	120	5.0	N/A
España	1 500	240	40.6	1.5
France	2 300	380	41.3	2.2
Ireland	170	50	N/A	0.3
Italia	1 900	280	85.0	5.0
Luxembourg	14	4	N/A	0.1
Nederland	430	90	13.1	0.6
Portugal	660	70	10.3	0.1
United Kingdom	2 300	580	46.0	4.6
EC	14 564	2 934	349 (1)	19.4 (1)

(1) DRI estimate
Source: UITP/TMG

MARKET FORCES

Demand

As discussed in the monograph on road passenger transport, the demand for extensive private mobility, arising from the desire to travel door to door with maximum flexibility, the absence in some countries of adequate alternative public transport and rising real personal disposable incomes have been the main factors behind the extensive growth in private car ownership and use. This has meant that growth in passenger travel has been largely in private cars at the expense of public transport, both for urban areas and for national bus and coach services. Although this is the observable aggregate trend, the impact has not been uniform. Substantial excise duties on fuel prices have barely influenced car ownership and car use as the user perceives the additional incremental cost as minuscule compared to the improvement in mobile efficiency.

In most EC countries, transport by private cars has been increasing faster than overall mobility, in part fuelled by households owning more than one vehicle. The highest share of private cars in total passenger transport has been reached in the United Kingdom, where it is close to 90%. In the traditionally lower car density countries in the EC, car ownership and use will continue to grow and outpace demand for public transport, as the use of buses and coaches within these countries has increased less than total passenger transport. However, with increasing congestion in major cities as local car densities exceed the limits of the road infrastructure, it is likely that a threshold will be reached where the negative effect of congestion on the efficiency of the private car will outweigh the inconvenience of using public road transport, especially in zones where there are dedicated lanes and zones for bus and coach movements. This is particularly true for users of metro, light rail and urban rail services, which tend to be very cost and time efficient where the total journey only requires the use of one mode. However, often the total journey requires more than one mode in varying combinations for instance bus-metro-bus or car-urban rail-bus, and it is where these combinations remain prevalent that the substantial flexibility of the private car will continue to compete effectively with a non integrated public transport system.

As indicators of demand, Table 3 presents the number of passenger journeys and the population served for the major urban areas. The 107 million people living in the EC's largest cities completed 15 billion journeys in 1991. In providing an estimate for service coverage, Table 3 shows the ratio of passenger kilometres per head of population served in the various EC countries. These ratios should be viewed with some caution as local or national circumstances can influence the indicators substantially, but at the same time provide a useful broad overview of the level of demand. The ratios indicate that broadly the number of passenger kilometres per head of population is fairly even in the EC, the exceptions being Belgium (low) and the Netherlands and Portugal (high).

Table 3 provides similar statistics for the number of passenger kilometres and the population served for national bus and coach services. For these services some 349 billion passenger-kilometres were made in 1991, serving 342 million people. As national bus and coach services by definition tend to involve journeys of longer length than urban transport, the ratios provided are much larger than for urban movements.

Supply and competition

The supply of public transport is usually separated into national bus and coach services and urban rail services. Within national bus and coach services, there are two distinct subsets, inter-city services and urban/suburban services. The equipment for these two is significantly different due to the different operational nature of the services. The long distance services typically use luxury coaches with a high level of interior furnishing and amenities, and tend to stop infrequently on a journey. The urban/suburban services have a lower grade interior and are designed for high volume-short distance passenger use, hence access to the buses is designed to allow large flows on and off. This service is also characterised by frequent stops to load and unload passengers.

Urban rail services are usually separated into metro, light rail and urban/suburban services. These services usually have different equipment that is not compatible. Metro is designed to run underground and also over ground - sometimes on elevated levels - and the length of an individual trainset is determined by the length of the shortest station platform on a route. This is often one of the underground stations as building underground stations has had and continues to have a high cost, hence planner have opted for high frequency services rather than long train sets. Light rail is similar to metro in

that it has shorter trainsets and frequency services than urban/suburban rail services. The latter traditionally have been designed to match inter-city and other rail services, hence the trainsets tend to be longer, there is a greater compatibility of equipment and services tend to have a lower but well-defined frequency.

Entry of new operators into national bus and coach services has historically been regulated, thus reducing competition but usually ensuring a broad geographic coverage. In inter-city/international operations cost barriers to entry are low - typically the purchase of equipment and insurance - but due to the continued existence of regulations the number of new entrants is still limited in most EC countries. The cost barriers to urban/suburban services tend to be higher as typically an entrant would need to provide a network of services and this reduces the possibility for small owner-driver operators. Except in the United Kingdom, there is minimal competition between firms providing similar services due to the low number of competitors for particular routes or geographical areas. The major competition comes from other modes of transport, typically the private car.

Over longer distances, added competition from improvements in domestic rail networks and the introduction (and extension) of high-speed trains in some Member States threatens the inter-city national bus and coach transporters. However, the experience of the TGV in France, where the TGV has operated for over ten years, indicates that high-speed trains do not necessarily stimulate overall demand for public transport services; additionally, high-speed trains have tended to take market share from regional air services rather than from the passenger transport by buses and coaches. Nonetheless, international coach services from the United Kingdom to mainland Europe will come under increasing competitive pressure from rail due to the Channel Tunnel link.

In urban/suburban services the main competitor to buses (apart from the private car) is metro/light urban rail services (and vice versa); however, as mentioned above, there is a degree of complementarity between the services, and supplying services that involve using more than one mode combined with a fare structure that easily allows mode combinations provides significant competition to the private car.

One major hurdle that operators face in providing services, is communicating schedules/timetables and fares to potential and existing users of public transport services. A regular user of the service will know the schedule and route for the usual route used but may be ignorant of other opportunities, and this is particularly acute for the casual user of the service, for whom the need to find the correct route and estimate the potential cost is a substantial barrier to use.

One of the issues in executing public transportation policies is the principle for fare collection. This relates to the extent of cost recovery from fares and to the system of fare levels. In general, fare systems are based on zonal rates.

Certain modern fare collection systems operate by using modern micro-electronics. This requires the sales of so-called smart cards (i.e. cards with magnetic strips or micro-chips on which a number of "units" are stored). Customers consume units while using the network. Such modern systems are already in use in Hong Kong and Singapore and are currently being tested or slated for testing in various EC cities. Berlin is currently running trials, London and Manchester will introduce a limited trials. The advantage of such systems is that the use of electronics enables a good tracking of transport demand, as data on each trip can be stored on computer, and reducing fraud and administrative costs. Such tracking opens possibilities for in-depth analysis of traffic demand to improve the service quality and to identify bottlenecks very quickly. It can also enable proper division of fare revenues in case of multi-operator fare collection (e.g. cards valid for more network systems). Smart cards will only be added gradually as the investment required is substantial.

Large investments continue to be made in public transportation. Estimates indicate that expenditure on new rolling stock and vehicles in Western Europe are in the region of 4 billion ECU per year with replacement rates averaging about 5%, but ranging from 2% in Belgium and the United Kingdom to 8% in the Netherlands.

Total investments in urban rail systems (both underground and light rail) through the 1990s is expected to be around 31 billion ECU. Large programmes exist in France (e.g. extension of the RER network in Paris, new systems in Strasbourg and Rouen), Germany (integrating eastern German networks), United Kingdom (e.g. extension of the Jubilee Line in London

Table 3: Public transport
Demand indicators of public transportation, 1991

	All modes in major urban areas			National bus and coach service		
	Passenger journeys (million)	Population served (million)	Ratio	Passenger kilometers (billion)	Population served (million)	Ratio
Belgique/België	260	3.9	67.0	10.0	9.9	1 010
Danmark	270	2.0	135.0	8.9	5.1	1 750
BR Deutschland	4 200	34.4	122.0	78.5	78.4	1 000
Hellas	560	3.6	156.0	5.0	10.0	500
España	1 500	9.7	155.0	40.6	38.9	1 040
France	2 300	16.1	143.0	41.3	56.2	730
Ireland	170	1.1	155.0	N/A	3.5	N/A
Italia	1 900	12.0	158.0	85.0	57.6	1 480
Luxembourg	14	0.1	140.0	N/A	0.4	N/A
Nederland	430	2.2	195.0	13.1	14.8	890
Portugal	660	3.6	189.0	10.3	10.3	1 000
United Kingdom	2 300	18.0	128.0	46.0	57.2	800
EC	14 564	106.7	136.5	349.0 (1)	342.3	1 020

(1) DRI estimate
Source: UITP/TMG

Table 4: Public transport
Supply indicators of public transportation, 1991

	All modes in major urban areas		National bus and coach service	
	(million)	Vehicle kilometers (1)	(billion)	Vehicle kilometers (1)
Belgique/België	80.0	21	0.4	40.4
Danmark	90.0	45	0.5	98.0
BR Deutschland	950.0	28	3.6	45.9
Hellas	120.0	33	N/A	N/A
España	240.0	25	1.5	38.5
France	380.0	24	2.2	39.1
Ireland	50.0	45	0.3	85.7
Italia	280.0	23	5.0	86.8
Luxembourg	3.8	38	0.1	250.0
Nederland	90.0	41	0.6	405.0
Portugal	70.0	19	0.1	9.7
United Kingdom	580.0	32	4.6	80.4
EC	2 933.8	374	N/A	N/A

(1) Per head of population served
Source: UITP/TMG

and the Metrolink in Manchester, light rails in Birmingham, Sheffield and Bristol) and Italy (e.g. underground in Naples).

Table 4 presents some indications of supply of public transportation in the EC Member States. For all modes in major urban areas, the number of vehicle-kilometres per capita served indicates a relatively high service provision in countries like Denmark, Ireland and the Netherlands. The figures indicate that populations in major urban areas in these countries have over 40 vehicle-kilometres per person. Relatively low service levels per capita occur in Belgium, Portugal (the lowest), Italy, Spain and France. These figure do to some degree reflect differing population densities and should be viewed cautiously. Similarly for national bus and coach services, the ratios are even more distorted by country size vis-à-vis population, however the figures indicate a high service supply in the Netherlands (dense population, small geographical area) and Luxembourg (very small geographic area), whereas it is very low in Portugal (accurately reflecting the actual level of available vehicle-kilometres).

INDUSTRY STRUCTURE

Usually both rail and bus urban/suburban services are dominated by public services provided by the city or local borough. The rationale behind this ownership concentration is that providing the service is deemed to be in the public interest. This is particularly the case for low volume routes where commercial private sector operations would be expected to reduce service obligations. On some low volume routes operated by private enterprises there is often an element of subsidy provided by local authorities to maintain the route in the public interest.

Intercity national bus and coach services tend to be dominated by one national firm, which is usually state owned, the major exception being the United Kingdom where services are deregulated and there are many private bus companies.

ENVIRONMENT

Strategies of public transport operators are very much dominated by public transport policies of national governments and the European Commission. These strategies are aimed at stimulating the use of public transport and discouraging private transportation (cars). These policies relate are aimed at alleviating road congestion and particularly air pollution. In large urban and inner-city areas, congestion and pollution from motorised transport have become an especially serious problem which could be alleviated by increased use of public transport over private cars. Policies to discourage private transport use include increasing the tax burden on cars and fuel, whose revenues could be used for subsidising public transportation operations and investments, providing park-and-ride schemes, charging increased premiums for parking in inner-city areas and allowing only residential parking in suburban areas.

Although a comparison on a vehicle to vehicle basis between buses and private cars shows that a bus produces more NOx, HC, CO2, SO2 and particulates (but less CO) than the average petrol-engined car, in terms of emissions and energy consumption per passenger and per passenger kilometre the bus is considered the most environmentally friendly transport mode. On average for both urban and non-urban utilisation, the bus requires 15 passengers to one passenger in a car to equate NOx emission, 2 passengers to equate HC emission and 4 passengers to equate CO2 emission. This simple arithmetic, which is based on the data provided in the European Commission's Green Paper on Transport and the Environment, ignores the added benefit that a passenger in a bus may mean one less car on the road. Suburban electrical rail services are estimated to consume less primary energy per passenger-kilometre, at any occupancy over 25%, than private cars but marginally more than a bus. In emissions of CO2, bus and coaches are estimated to contribute only 1.6% of the total in the Community and rail (all passenger services) 2.8%, compared to 55.4 % for private cars. Additionally, as buses generally contribute to less traffic congestion, journeys are more efficient and consume less fuel with a concomitant effect on reducing emissions. The Green Paper also indicates that at a minimum occupancy of 25%, bus and rail services are very similar in primary energy consumption per passenger kilometre and substantially less than cars (diesel or petrol) and aeroplanes. Clearly the benefits increase as the occupancy rate increases.

In its Green Paper on the Urban Environment the European Commission has suggested the following actions:

Table 5: Public transport
Local bus transport, 1991

Country	City	Vehicle km (million)	Passenger (million)	Staff	Fleet journeys	Route length (km)	Number of routes
Belgique/België	Antwerp (MVA)	6.8	17.3	N/A	124	228	22
	Brussels (STIB)	19.5	53.0	N/A	532	295	41
	Brussels (VVM)	N/A	N/A	N/A	275	2 194	51
	Charleroi (STIC)	N/A	N/A	N/A	230	109	22
	Charleroi (SNCV)	N/A	N/A	N/A	N/A	N/A	N/A
Danmark	Copenhagen (HT)	86.3	176.0	N/A	852	4 400	251
France	Lyon (TCL)	N/A	N/A	N/A	763	899	72
	Marseille (RMT)	N/A	N/A	N/A	534	600	69
	Paris (RATP)	152.4	838.0	11 800	4 022	2 900	269
BR Deutschland	Berlin (BUB)	111.2	585.1	N/A	2 078	1 867	155
	Berlin (BUG)	N/A	N/A	N/A	N/A	N/A	N/A
	Bonn (SWB/SSB)	11.4	27.5	491	189	450	34
	Frankfurt (SF)	12.0	36.5	642	226	346	45
	Frankfurt (DB)	N/A	N/A	N/A	N/A	N/A	N/A
	Frankfurt (FKE)	2.6	3.2	N/A	63	345	19
	Hamburg (HHA)	49.4	219.4	2 257	N/A	N/A	N/A
	Hamburg (VHH)	16.2	36.6	890	323	1 335	65
	Hamburg (PVG)	1.4	5.5	421	144	59	7
	Hamburg (KVG)	1.1	2.3	N/A	26	N/A	7
	München (SM)	30.5	178.6	N/A	593	418	73
Hellas	Athens (EAS)	N/A	N/A	8 796	1 842	4 143	326
	Athens (ILPAP)	10.6	91.0	2 126	403	193	21
	Athens (ISAP)	N/A	N/A	330	67	N/A	7
Ireland	Dublin	46.2	172.6	3 832	837	845	130
Italia	Milan (ATM) (urb)	32.7	305.2	N/A	736	353	58
	Milan (ATM) (sub)	21.4	51.8	N/A	487	633	43
	Naples (ATAN)	N/A	N/A	N/A	728	520	142
	Naples (CTP)	N/A	N/A	N/A	N/A	N/A	N/A
	Rome (ATAC)	120.0	696.0	12 700	2 612	2 005	229
	Rome (ACOTRAL)	N/A	N/A	N/A	1 762	N/A	N/A
Luxembourg	Luxembourg	3.8	13.9	463	150	153	22
Nederland	Amsterdam (GUBA)	21.5	N/A	2 065 (1)	370	395	41
	Rotterdam (RET)	16.9	42.4	973	277	435	39
Portugal	Lisbon (Carris)	46.1	406.0	4 318	811	570	92
	Lisbon (RN)	N/A	40.0	N/A	N/A	N/A	N/A
	Lisbon (TCB)	N/A	N/A	324	N/A	N/A	N/A
España	Barcelona (TMB)	N/A	199.9	2 820	835	629	77
	Madrid (EMT)	91.9	498.0	N/A	1 773	1 258	158
United Kingdom	Birmingham (WMT)	107.0	365.4	N/A	1 734	5 394	469
	Liverpool (Mersey)	48.0	138.0	N/A	886	651	110
	Liverpool (NW)	N/A	N/A	800	383	N/A	120
	London	265.0	745.0	19 100	5 001	N/A	509
	Manchester (GMB)	97.6	206.0	5 300	1 754	2 350	720

(1) Includes tramway
Source: UITP

- encourage city authorities to incorporate public transport and road construction into their plans for land use and transportation;
- promote innovation in public transport, environmental-friendly vehicles and advanced traffic management systems by way of contributing to the cost of pilot projects and monitoring their effects;
- encourage EC-wide exchange of information in urban traffic management to maximise the benefits of a wide range of experiences;

Table 6: Public transport
Urban rail systems in the EC (4), 1993

Country	City	Metro	Tram & light	Railcommuter/rail
Belgique/België	Antwerpen		X (1)	X
	Brussels	X	X (1)	X
	Charleroi		X (1)	X
	Gent		X (1)	X
	Oostende		X (1)	
Danmark	Copenhagen			X
France	Bordeaux	UC		
	Grenoble		X (2)	
	Lille-Roubaix	X	X	X
	Tourcoing			
	Lyon	X		X
	Marseille	X	X	X
	Nantes		X (2)	
	Paris	X	X (2)	X
	Saint Etienne		X (1)	
	Strasbourg	UC		
	Toulouse	X		X
BR Deutschland	Aachen			X
	Augsburg		X (1)	X
	Berlin	X	X (1)	
	Bielefeld		X (1)	
	Bochum-Gelsenkirchen		X (1)	
	Bonn		X (1)	
	Braunschweig		X (1)	
	Bremen		X	X
	Bad Schandau		X (T)	
	Brandenburg		X (1)	
	Chemnitz		X (1)	
	Cottbus		X (1)	
	Darmstadt		X	
	Dessau		X (1)	
	Dresden		X (1)	X
	Dortmund		X (1)	
	Duisburg		X (1)	X
	Düsseldorf		X (1)	X
	Erfurt		X (1)	
	Essen		X (1)	X
	Frankfurt-am-Main	X	X (1)	X
	Frankfurt-am-Oder		X (1)	
	Freiburg-Breisgau		X (1)	
	Gera		X (1)	
	Gorlitz		X (1)	
	Gotha		X	
	Halberstadt		X (3)	
	Halle		X (1)	
	Hamburg	X		X
	Hannover		X (1)	X
	Heidelberg		X (1)	
	Jena		X (3)	
	Karlsruhe		X (1)	X
	Kassel		X (1)	
	Köln		X (1)	X
	Krefeld		X (1)	X
	Leipzig		X	
	Ludwigshafen		X	
	Mainz		X (1)	
	Mannheim		X (1)	
	Mulheil-Ruhr		X (1)	
	München	X	X (1)	
	Naumburg		X (3)	
	Nordhausen		X (1)	
	Nürnberg-Fürth	X	X	X
	Plauen		X (1)	
	Potsdam		X (1)	
	Rhein-Ruhr	X		X
	Rostock		X (1)	

Country	City	Metro	Tram & light	Railcommuter/rail
BR Deutschland	Schoneiche		X	
	Schwerin		X	
	Strausberg		X	
	Stuttgart		X (1)	X
	Ulm		X	
	Wiesbaden			X
	Woltersdorf		X (3)	
	Wuppertal			X
	Würzburg		X (1)	
	Zwickau		X (1)	
Hellas	Athens	X		X
Ireland	Dublin			X
Italia	Bologna		X	X
	Florence			X
	Genova		X (2)	X
	Milan	X	X (1)	X
	Naples	UC	X (1)	X
	Rome	X	X (1)	X
	Turin		X (1)	X
	Venice			X
Nederland	Amsterdam	X	X (1)	X
	Den Haag		X (1)	X
	Rotterdam	X	X (1)	X
	Utrecht		X (2)	X
Portugal	Lisboa	X	X (3)	X
	Porto		X (3)	X
	Sintra		X	
España	Barcelona	X	X (T)	X
	Bilbao	UC		X
	Madrid	X		X
	Malaga			X
	Soller		X	
	Valencia		X (2)	X
United Kingdom	Aberdeen			X
	Belfast			X
	Birmingham			X
	Blackpool		X	
	Bristol			X
	Cardiff			X
	Douglas		X (T)	
	Edinburgh			X
	Glasgow	X		X
	Leeds/Bradford			X
	Liverpool			X
	London	X	X (2)	X
	Manchester		X (2)	X
	Newcastle-Upon-Tyne	X	X (2)	
	Nottingham			X
	Sheffield			X
	Stoke-on-trent			X

(1) Indicates a system extending or extended (includes subways)
(2) Indicates a system built new since 1978
(3) Indicates a system with no light rail features
(4) List of systems in major EC cities not comprehensive
(x) In operation
UC under construction or in design
(T) Indicates a heritage tramway operated for tourist purposes
Source: Jane's/UITP 1992

- consider in detail the potentials for using economic instruments in private car transport such as road pricing and pay-tolls for the right to enter city centres.

REGULATIONS

The White Paper produced by the Commission at the end of 1992 on The Future Development of the Common Transport Policy (COM 92/494) has started the ball rolling in terms of a global approach to viewing all modes of transport simultaneously and hence providing a frame work for policy that integrates all modes. The White Paper is one of the most important documents from the Commission on transport issues and the discussions and negotiations that it has started will have far reaching impact on all modes of transport in the Community. One result the White Paper is likely provide in

the long run is to substantially encourage public road transport, however, the approach will be cautious so as to minimise the effects of sudden changes in policy and hence mobility.

Competition between operators in public transportation is rare. This is particularly the case for urban/suburban rail systems and most urban/suburban bus services. This is due to the regulatory environment in which they operate. The regulatory environment varies from one Member State to another. In the next paragraphs the main features in the various countries are summarised.

Belgium

The responsibility for public transportation by bus is with the three regional governments of Flanders, Brussels and Wallonia. The national bus company and the urban public transport companies are reorganised into quasi-commercial regional companies owned by the regional government. Five local subsidiaries are created, which operate under "contrats de gestion" for four to six years providing monopoly power within the area. The regional public transport company decides on fare levels and the allocation of subsidies to operating companies. It also co-ordinates various activities such as ordering vehicles, a common statute for personnel, common services between operating companies, etc. Operating companies determine timetables and can decide on subcontracting operations externally.

Denmark

Danish county councils (except Aarhus and Fyn where the local authority is responsible) have created regional transport companies for the management of all regular public transport within the area. In general, these companies organise, plan and market the services offered. Operations are generally licensed out to (mostly private) companies. Revenues go to the regional transport company; deficits are financed by the county council.

In the Capital Region (Copenhagen and surroundings) the situation is different. A new law came into force on January 1st, 1990 engaging the Capital Region Public Transport Company in general transport planning, network preservation and integration of fare structures with those of the railways. Currently it is licensing out bus services in long term contracts by way of competitive tender procedures. By April 1st, 1994, 45% of all bus services should be licensed out in this way.

Other local rail services are operated under agreements with local governments. Agreements related to service levels to be provided and fares and subsidies to finance the services. A particular example is the metro service in Copenhagen.

Germany

Local and regional authorities in Germany control and co-ordinate public transportation solely by determining routes and fare systems and deciding on the licensing of services to private companies. In practice companies active in this field cooperate extensively with each other. Licenses can apply to all modes of transport, but the period of validity can vary. Subcontracting to other operators is allowed. In principle, fares must be set at a cost covering level. Where this is not possible, subsidisation will be defined by the authorities. The State Government investigates the possibilities for deregulation.

Competition between bus and railway has always been strictly avoided. The Deutsche Bundesbahn itself operates various rural bus services through its subsidiary Geschäftsbereich Bahnbus (GBB; split in 25 regional companies) as a replacement for former rail services.

In former East Germany, the old situation was a very heavy involvement of public authorities in public transport operations. The situation is currently changing towards the present system in the western part of Germany.

France

In the Ile de France area (Paris and surroundings) the Syndicat des Transport Parisiens governs the main operators (RATP and SNCF) plus another 80 small operators belonging to professional associations. The STP defines policies, route coverage and revenue structure (fares versus subsidisation). Existing services cannot be moved from one operator to another. For new services, an operator can be chosen. Operators are allowed to subcontract service operations to others.

In the rest of France, the "départements" are responsible for regional bus transport. Usually bus services are provided under monopoly franchise contracts guided by administrative coordination of these services. In urban areas the "autorité organisatrice" controls local transport. This body determines itself service structures and fare levels and grants single area monopoly contracts for a limited time period. Three major groupings (Transexel, Transcet and CGFTE) control most of the operators in the market.

Greece

Prefectures govern Greek regional and local bus transportation. They grant public transport licences to co-operative associations in the regions. A co-operative consists of individual bus owners providing buses and drivers, and revenue collection staff for fare collection. In Athens, three government owned bus companies run the public transportation services within the city under the control of the separate public body OAS. Thessaloniki and Rhodes have systems slightly different from the prevailing system in the country. In Thessaloniki, a private operator has a license for 21 years duration to operate services; in Rhodes city a municipal operator runs the services in the city proper under the guidance of the prefecture.

Spain

Spanish authorities, usually the municipal council, grant concessions of between 8 and at maximum 20 years for the operation of a network of scheduled local bus services. The authorities determine the route structure and fare levels. Special regular services are allowed on condition that they do not compete with scheduled services.

Urban transport is provided by 185 companies, of which 28 are municipally owned and three are labour co-operatives. Private companies also operate in 129 of the 134 small sized towns (less than 100 000 inhabitants). In four of the five large cities (population above 0.5 million) the municipalities take charge of public transport themselves.

In inter-urban bus services, regional authorities grant concession rights to private operators. In case the service crosses the regional boundary, the concession is granted by the national government. Concession conditions are generally the same as those for urban transport.

Passenger services by rail are mainly provided by the state railways RENFE. In some regions, however, the regional government owns the network. Sometimes services are provided by way of a concession to a private operator using this network. Metro services (Barcelona, Madrid and Valencia) are provided by either state owned or municipality-owned organisations.

Ireland

Irish public transport is operated by the state-owned holding company CIE. This company owns three subsidiaries: Dublin Buses for bus services in the Dublin city region, Provincial Buses (Bus Eireann) for inter-urban and rural services and local services in the two major towns outside Dublin, and the Railways for all rail services including the rapid transit line in Dublin. The government is currently considering to introduce competition in the provision of transport services. A new authority is likely to be created for putting out to tender particular services and issuing licenses.

Italy

Public transport in Italy is governed by a concession system. In general, concessions are granted for long periods under monopoly conditions. In larger cities, the concession usually goes to the (generally municipally owned) local public transport company. Regional authorities provide long term franchises for longer-distance services and services in rural areas. In some cases, national authorities issue concessions for inter-regional and other long-distance services. These concessions can be granted to any operator, either private or publicly owned. The body issuing the concession usually determines services, timetables and fares.

Luxembourg

In Luxembourg four networks exist in public transportation. These are:

- Luxembourg City Buses (AVL) for local and out of town services in the city of Luxembourg under the control of the city government;
- RGTR: a number of private operators providing bus services under the control of the Ministry of Transport;
- bus networks in the cantons of Esch-sur-Alzette under the control of a syndicate of cantonal authorities;
- CFL: the railway company provides not only rail services but also bus services on formerly existing railroad links and on routes determined by the Ministry of Transport.

The core body is the Ministry of Transport. It determines fares, timetables and services, co-ordinates the provision of services throughout the country and it grants 10-year concessions to operators with automatic renewal.

Portugal

Most public transport in Portugal is provided by public sector companies. Some local and regional bus services are in private hands under a concession agreement granted by the national or local government. In 1990, a law was passed to deregulate public transportation.

In Lisbon, Oporto and Coimbra, services are provided by companies owned by the municipality. For Lisbon and Oporto commissions have been established to control the implementation of a public transport plan. This plan should regulate the public transport system in the area.

In the rest of the country, the government strives for complete deregulation by imposing only qualitative restrictions in licenses for operators. Control over maximum fares is retained. Local authorities are authorised to supplement the network with subsidised services.

Netherlands

Dutch public transport is a fully monopolised system via a licensing procedure under the Passenger Transport Act. In urban transportation municipalities grant licenses to either the local public transport company (nine largest cities) or the regional public transport company (45 cities). Licensing in inter-urban and regional transport is governed by the Ministry of Transport. Licenses are granted to 16 regional bus companies, which are all 80% subsidiaries of the state-owned holding company "Aandelenbezit Streekvervoer" since 1982.

Since 1988, private operators have the possibility to compete with the regional transport operators. Measures are taken to privatise bus companies. As a result, these companies engage in coach services and road passenger services. The Ministry of Transport continues its policy to stimulate public transportation, but more and more requires efficient cost-based operations and limitations to subsidies.

United Kingdom

British public bus transport on long distances has been privatised to a great extent. The then National Bus Company and Scottish Bus Group were split into 71 separate companies in order to get smaller more flexible entities offering long distance coach services. These companies should be able to compete with each other by way of pricing and service provision. While this has led to improvements in efficiency and quality, it has also resulted in a reduction in service frequency.

In local areas, services are also run on a commercial basis in which the operator determines fares, routes and timetables. In addition there exist subsidised services on certain routes. For London however, subsidisation prevails as London Regional Transport (LRT) compensates losses incurred by the bus and underground companies. Some services are provided by other bus operators under concession agreements with LRT.

Train services are generally provided by British Rail under a legal monopoly. In some local areas, however, a local network is operated by separate institutions.

OUTLOOK

Traffic congestion and environmental problems have initiated a new attention for public transportation. Especially in urban and suburban areas, public transportation has become an important issue and this importance will increase. There is also a tendency to privatise public transportation activities to some extent. In this respect, private capital could become important next to publicly available capital.

Large investments will be needed in constructing new and modernising old infrastructure, similarly fleets, modern fare collection systems and service quality.

Investment in railways, light rail and tramway systems has the added spur as these are perceived to minimise damage to the environment. However, continuing research and development in buses is increasingly aimed at minimising gaseous pollutants and will benefit this mode. In addition, combination modal facilities, such as park-and-ride, will continue to gather pace, and passenger information facilities will continue to improve.

As the tendency towards privatising public transport systems gather pace in some areas, the burden on authorities will be reduced as the private companies seek to provide more cost-based pricing and efficiency improvements in order to be profitable. This may however, have a negative impact on service frequency and services to low populated areas. A two-pronged policy approach to encourage people to use public transport rather than cars by providing low fares and improving the quality and quantity of the service, and at the same time increasing the costs of private car transport, will act in favour of public transport.

Further integration of public urban transport systems with other modes of transport will continue as witnessed over the last few years with improvements in connections with the railways network and local railway networks with important airports.

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Road passenger transport
NACE 722

The road passenger transport sector is primarily composed of regular bus services, charter coach services and taxi services. The private car remains the most important competitor for this mode for short and long distances, followed by all public transport for taxis, and rail and air for medium to long distances for coaches. Enterprises in the coach sector are continuing to invest in upgrading equipment in order to attract new business and maintain existing business.

INDUSTRY PROFILE

Description of the sector

The road passenger transport sector includes companies exclusively or primarily engaged in the operation of taxi-cabs, chauffeur-driven hire cars, occasional motor coach services, horse drawn cabs, etc. The sector does not include regular bus and shuttle services (NACE 721.2) and self-drive car hire (NACE 844). The major part of the sector consists of taxi and mini-cab firms and coach services for tourism.

Recent trends

Reliable statistics for the sector are scarce, but recent trends in the sector have remained broadly flat over the last few years. The only Member States to have seen reasonable growth rates since 1988 have been Portugal and Italy, and Table 1 shows how important the sector is to Italy compared to the other Member States. Italy has had the largest number of passengers-km over the last seven years. The importance of bus transport (including regular services) in Italy is also reflected in the high number of enterprises which are involved in road passenger transport. However, the Italian enterprises are relatively small when comparing the average number employed per enterprise. During the 1980s the development of all bus/coach transport differed significantly from country to country: the transport mode has lost importance in the United Kingdom, whilst, in other Member States small growth rates have been achieved.

The stagnation of growth in the use of this transport mode is reflected in the weak growth of the overall stock of buses and coaches.

International comparison

According to last year's estimates, the USA and Japan development's of the stock of buses and coaches - with annual growth rates of 1.4% and 1% respectively - also reflects a limited growth of this transport mode. In the USA, among other factors, the intense price competition among American airlines has caused people to favour air transport instead of coach services, and in Japan high-speed inter-city rail services provide a competitive edge over coach services.

MARKET FORCES

Demand

The demand for extensive private mobility, arising from the desire to travel door to door with maximum flexibility, the absence in some countries of adequate alternative public transport and rising real personal disposable incomes have been the main factors behind the extensive growth in private car ownership and use. This has meant that growth in passenger road use has been largely in private cars. Substantial excise duties on fuel prices have barely influenced car ownership and car use as the user perceives the additional incremental cost as minuscule compared to the improvement in mobile efficiency.

In most EC countries, transport by private cars has been increasing faster than overall mobility, in part fuelled by households owning more than one vehicle. The highest share of private cars in total passenger transport has been reached in the United Kingdom. In the traditionally lower car density countries in southern EC, Greece, Portugal and Spain, car ownership and use will continue to grow and outpace demand for public transport. In particular, the use of taxi services within these countries has increased, but possibly less than total passenger transport. A continuation of this trend is expected for the near future within these countries. However, with increasing congestion in major cities as local car densities exceed the limits of the road infrastructure and the availability of parking, it is likely that a threshold will be reached where the negative effect of congestion on the efficiency of the private car will outweigh the cost of using taxi services, especially

Table 1: Road passenger transport
Passenger transport by buses and coaches

(billion passengers-km)	1975	1980	1986	1987	1988	1989	1990	1991	1992
Belgique/België	9.6	9.1	9.5	10.0	10.2	10.5	N/A	N/A	N/A
Danmark	5.7	7.3	9.1	9.2	9.2	9.2	9.3	9.2	9.2
BR Deutschland	58.7	65.6	53.1	53.0	53.2	53.0	56.7	72.2	N/A
Hellas	4.8	5.8	5.0	4.8	5.1	5.1 (1)	N/A	N/A	N/A
España	26.9	28.1	33.5	35.2	37.5	37.5	40.2	40.6	41.2
France	28.9	38.0	39.4	42.0	41.8	40.2	41.3	42.9	41.1
Italia	42.3	57.8	70.5	72.7	77.2	79.8	84.0	84.7	87.7
Nederland	11.8	13.2	12.1	12.8	12.8	12.8	13.0	14.0	14.5
Portugal	5.2	7.8	8.3	10.0	10.0	10.1	10.3	10.7	11.4
United Kingdom	60.0	52.0	47.0	47.0	46.0	47.0	46.0	45.0	44.0
EC 10	248.9	277.7	287.5	296.7	296.0	299.0	N/A	N/A	N/A
Japan (2)	110.1	110.4	101.6	102.9	107.2	109.1	N/A	N/A	N/A

(1) 1988 data used again for 1989
(2) Only buses
Source: European Conference of Ministers of Transport, Japanese Ministry of Transport

Table 2: Road passenger transport
Stock of buses and coaches

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique/België	18 948	18 744	17 866	17 170	16 817	16 449	16 095	14 212(1)	14 329(1)	15 644	N/A
Danmark	7 620	7 785	7 762	7 836	8 010	8 105	8 110	8 093	7 500	8 109	N/A
BR Deutschland (2)	71 152	71 331	71 259	69 314	69 207	69 325	70 037	70 186	70 478	70 370	69 590
Hellas	18 493	17 701	17 591	17 841	18 237	18 485	18 011	19 465	N/A	N/A	N/A
España	43 303	42 996	43 759	41 161	41 593	41 874	43 002	43 991	45 166	45 767	46 604
France	66 000	69 000	68 000	62 000	64 000	65 000	65 000	65 000	68 000	75 000	44 122
Ireland (3)	2 844	2 955	2 949	3 107	3 295	3 422	3 521	3 701	N/A	4 047	4 388
Italia	62 168	66 688	71 017	71 981	76 296	77 891	82 100	N/A	N/A	N/A	N/A
Luxembourg (4)	670	696	687	704	695	693	701	717	705	734	777
Nederland	11 400	11 500	11 600	11 500	11 600	11 400	11 600	11 677	11 892	12 113	12 427
Portugal	9 022	9 847	10 217	10 355	10 439	N/A	N/A	11 031	11 572	12 099	12 348
United Kingdom	76 593	74 963	74 928	74 992	74 743	76 268	78 200	80 700	80 700	80 800	79 800
EC (5)	388 213	394 206	397 635	387 961	394 932	399 412	407 377	411 773	417 644	N/A	N/A
USA	N/A	N/A	N/A	583 671	593 527	593 728	602 055	615 669	625 040	N/A	N/A
Japan	N/A	N/A	230 000	230 063	231 228	232 516	234 137	238 021	241 842	N/A	N/A

(1) Vehicles which have undergone a technical inspection
(2) 1st of July
(3) 30th of September. Motor coach and bus seating 9 persons and over with a current licence
(4) Only with current licence
(5) Estimate for 1987, 1988, 1989
Source: Eurostat (Transport Yearbook), UN (Transport statistics)

in zones where there are dedicated lanes, primarily for bus and coach movements but also used by taxis.

A significant proportion of the sector is coach services for tourism. Tourist coach services in combination with accommodation arrangements (inclusive tours) is popular among lower and medium income households and among senior citizens. Operators, however, are trying to attract other market segments by offering high quality services on long-haul routes. This aspect of public road transport is important for the tourist industry as it provides a convenient and predictable leisure schedule that is extremely cost efficient.

Supply and competition

The supply of road passenger transport is usually separated into coach services and taxi services. The equipment for these two is significantly different due to the different operational nature of the services. The long distance services typically use luxury coaches with a high level of interior furnishing and amenities, and tend to stop infrequently on a journey. The taxi sector is characterised by semi-luxury vehicles, often the lower luxury segment of the major car manufacturers, usually with diesel engines as these are very efficient and long lasting for the extreme number of average kilometres driven.

The cost of entry of new operators into coach services has historically been low - typically the purchase of equipment and insurance - but due to regulation overhang, the number of new entrants is still limited in some EC countries. The lowest cost barriers to entry is in taxi services, however, this is still regulated to some degree in most Member States. The regulations usually only govern the type of service and fares offered, while the number of licences is limited in many cities. For coach services competition between firms is muted as they provide similar services and also due to the low number of competitors for particular holiday schedules. The major competition comes from other modes of transport, typically the private car, rail and air. Competition amongst taxi services tends to be is acute, usually not based on price but more on location and fleet availability.

Over longer distances added competition from improvements in domestic rail networks and the introduction (and extension) of high-speed trains in some Member States threatens the road transporters. However, the experience of the TGV in France over the last ten years indicates that high-speed trains slightly stimulate overall demand for transport services and have tended to take market share from regional air services rather than from the passenger transport by buses and coaches. In urban/suburban taxi services the main competitor (apart form the private car) is availability of metro/light urban rail services; however, given the vast investment required to develop or expand these services, the degree of competition already existing will not change much in the near future.

Taxi services provide an excellent point to point service, with in-built efficiency as the taxi driver tends to know the layout of the area of operation hence usually taking most efficient route, avoiding congestion where possible, and saving time and fuel by not having to locate parking. One fillip for taxi services has been the increasingly tough stance Member States are taking on drink-driving. In the United Kingdom, which has one of the better records for improvements to reduce drink-driving via publicity awareness campaigns and a stronger police presence, a proliferation of mini-cab firms, typically servicing a local area, has occurred.

In terms of passenger safety, buses and coaches have significantly less passengers and drivers killed or seriously injured (KSI) per passenger-kilometre compared to cars. On average, it works out at about 1 to 18. Nonetheless there are still demands to improve safety for coaches, including such measures as compulsory wearing of seat-belts and in some Member States improvements in the road worthiness of the vehicles.

INDUSTRY STRUCTURE

The public road passenger transport sector varies considerably from one Member State to the other. In general the sector is fragmented with a large number of operators with fleets of varying size and although some very large operators exist, the majority of the enterprises are small-sized. Hence the sector is generally considered unconcentrated. In the coach sub-sector, the variance between Member States is significant, with

some Member States having a dominant carrier, whilst in the others the reverse is true. In taxi services the picture is different, as typically there are large numbers of small taxi firms serving local markets: many are owner-operators or have small fleets of around 5 to 10 vehicles. In the major cities, there is a tendency for large taxi firms; however, this does not preclude small operators as fares tend to be regulated. Medium and large sized operators tend to work more in the international market, in contrast with smaller companies which operate in national and regional markets.

Amongst the larger operators in the EC markets are National Express in the United Kingdom, De Jong Intratours and Beuk in the Netherlands, Iberbus in Spain, GTI in France and Deutsche Touring (subsidiary of the German railways) in Germany. Most of these firms also offer regular services. Also, for international European coach operations some 40 operators of international regular services are members of Eurolines. This consortium allows co-operation and efficiency in arranging and pooling service schedules as well as sharing the costs of marketing. Another such organisation is Europabus, which operates in Germany.

The greater part of the investments made by enterprises is for replacement of depreciated vehicles. Particularly in the longer distance market, the intensifying competition and customer expectations on quality standards forces enterprises to operate with high-quality buses and coaches with a broad variety of modern features (e.g. air conditioning, air pressure suspension systems, video facilities, catering etc.).

ENVIRONMENT

Although a comparison on a vehicle to vehicle basis between coaches and private cars shows that a bus produces more NOx, HC, CO2, SO2 and particulates (but less CO) than the average petrol-engined car, in terms of emissions and energy consumption per passenger and per passenger kilometre the bus is considered the most environmentally friendly transport mode. On average for both urban and non-urban utilisation, the bus requires 15 passengers to one passenger in a car to equate NOx emission, 2 passengers to equate HC emission and 4 passengers to equate CO2 emission. In emissions of CO2, buses and coaches are estimated to contribute only 1.6% of the total in the Community, compared to 55.4% for private cars. Additionally, taxis contribute to less traffic pollution, as cars are generally recent models which incorporate the latest technologies, and because journeys are more efficient and consume less fuel with a concomitant effect on reducing emissions. The Green Paper also indicates that at a minimum occupancy of 25%, bus and rail services are very similar in primary energy consumption per passenger kilometre and substantially less than cars (diesel or petrol) and aeroplanes. Clearly the benefits increase as the occupancy rate increases. A taxi carrying passengers, by default, always has an occupancy of two or more and with less time spent finding adequate parking will contribute to lower aggregate emissions.

REGULATIONS

The EC legislation has established three types of international coach services: occasional, shuttle and regular services. Occasional and shuttle services are basically tourist services. International regular services are subject to similar rules for national services (timetables, set routes and prices).

There is also a category known as special regular services, which mainly consists of the carriage of employees to their place of work and carriage of school children.

As far as national coach transport is concerned, the categories of service vary from country to country and within certain States there is no category of shuttle services.

The EC Council of Transport Ministers has adopted in 1992 the regulation on the freedom to provide intra-EC services for road transport by coach and bus. Under this regulation, an authorisation is no longer required for most occasional services and for shuttle services if accommodation is included (inclusive tours). For regular services and shuttle services without accommodation, however, authorisation is still required.

A proposal for a regulation on the conditions under which non-resident carriers may operate national road passenger transport within a Member State, has recently been adopted. The new freedom allows operators to provide certain non-regular services under the same conditions as resident carriers as from January 1, 1993 and all such services as from January 1, 1996.

The degree of regulation of coach services varies greatly between Member States. Certain Member States, such as the United Kingdom, have a very liberal system, where basically only qualitative controls govern the operation of a service (Transport Act). The Netherlands also have a relatively free system (Passenger Transport Law) for coach operations. Regular bus services (public transport) is strictly regulated. On the other hand, in Spain the 1987 LOTT legislation prescribes very detailed provisions governing all road passenger transport.

Furthermore, a Directive has come into force on 1 January 1990, strengthening the existing provisions for becoming a passenger transport operator. In particular, it specifies precise minimum financial requirements to ensure the viability of existing and potential operators and it makes the passing of a written examination compulsory for new entrants.

The White Paper produced by the Commission at the end of 1992 on The Future Development of the Common Transport Policy (COM 92/494) has started the ball rolling in terms of a global approach to viewing all modes of transport simultaneously and hence providing a frame work for policy that integrates all modes. One result the White Paper may provide in the long run is to favour public road transport; however, the approach will be cautious so as to minimise the effects of sudden changes in policy and hence mobility.

OUTLOOK

The growth rate of passenger road transport, however, will be lower than overall mobility growth, as private car use is yet to reach its maximum. Policy instruments from national governments, local authorities and potentially the European Commission to discourage private car traffic in order to reduce road congestion and air pollution by cars, are not likely to have significant consequences for the ownership and use of private cars in the short term. This is especially the case, as mentioned earlier, for habitual car owners and users who have a substantial tolerance for mechanisms involving increase taxes and fuel excise. However, Member States that increase pressure on drink-drivers are likely to see additional demand for taxi services. The opening up of Eastern Europe has and will further expand tourist destinations for coaches. Investments in high-speed trains is not expected to threaten the road passenger transport in the short term, however, improvements in ordinary rail services will have some negative impact coach services.

Written by: DRI Europe

Road freight transport
NACE 723

Road freight is the dominant sector in the movement of cargoes within the Community, taking a share of 70% of all modes, and is a major contributor to economic growth. The single market will help improve capacity utilisation of the European road goods transport industry and drive further growth of intra-EC traffic. Community policy aims at eliminating physical barriers and harmonising taxes within the EC. In close connection with the EC policy on infrastructure and pollution the European Commission will give special attention to the less developed areas in the EC. The Commission's White Paper on The Future Development of the Common Transport Policy is ensuring that road freight is considered in detail in discussions of a global policy, and it is a major step forward in looking at the future of road freight within this global framework. The opening up of Eastern and Central Europe will tend to favour both passenger and freight traffic by road, and its impact on the EC road transport sector is expected to be substantial already in the short-term.

INDUSTRY PROFILE

Description of the sector

The goods transport sector includes units exclusively or primarily engaged in the transportation of goods - regular or otherwise - by trucks and vans or similar vehicles e.g. trailers, semi-trailers, road tankers, removal vans, articulated vehicles and truck-trailer combinations.

The market for merchandise road transport is organised by a national regulatory framework and Community measures.

Recent trends

Estimates for total road freight indicate that it increased by 7% in 1991, to around 800 billion tonne-kilometres. This particularly strong growth was due to the inclusion of ex-DDR data in German traffic, and represents a reversal in the slower 4% trend observed in 1990. In terms of volumes, 1991 domestic road freight continued the downward trend observed in 1989 and 1990, falling some 2%. However, international traffic bounced back from the major decline of 1989 and the stagnation in 1990 to record growth of close to 10%.

In 1992, for which preliminary estimates exist for the individual Member States, freight traffic growth was rather limited. The star performers were Ireland (+7.8%) and the Netherlands (+5.2%), followed by Portugal and Greece with around 5%. The balance of the Member States saw growth in 1-4% band with the exception of Belgium and Luxembourg, both flat, and the United Kingdom, which had a decline of 3%.

In 1990, the Netherlands and Belgium were the dominant countries for international road freight, with 40% of international freight between them. Germany and France also have large shares of international road freight, 19% and 15% respectively. On most recent estimates, these shares of international freight appear to be stable. In domestic road freight, Germany is by far the largest with 2.7 billion tonnes, followed by the United Kingdom with 1.5 billion tonnes and France with 1.4 billion tonnes. With the exception of the Benelux, all the EC countries have comparable market shares for international and domestic road freight operations, averaging just over 1% for intentional volumes moved.

Total road traffic between the Netherlands and Germany is very intense at 7.9 billion tonnes/km from the Netherlands to Germany and 7.4 billion tonnes/km in the opposite direction. The same intense road traffic can be observed between Belgium and France, as well as between Germany and northern Italy.

Transport growth has been exceptional in Spain and Portugal. In 1989 total international road traffic increased by 9%, whilst transport to the Iberian peninsula grew by more than 20%.

The EC total fleet of 15.6 million vehicles is smaller than that of the USA and Japan, respectively 43.6 and 22.2 million vehicles.

MARKET FORCES

Demand

Road freight generally offers an efficient and facile method of transporting and distributing goods to wholesalers, retailers and consumers. The level of economic activity is a major component in the demand for road freight, and there is a strong correlation between growth in economic development and growth in the demand for road freight, both internationally and domestically. As well as being dependant on the level of activity, the road freight industry plays a crucial role in assisting economic development. Road goods transport is usually divided into two segments, short-haul and long-haul. Although there is no precise haul length to divide these two, short-haul is predominately intra-urban and long-haul is inter-urban/city including international.

The recent advent of the Single Market should act favourably for the road goods transport industry through the reduction of trade barriers. This reduction will allow more intra-EC trade for a given amount of EC output, as international freight movement is an intensive user of road freight. The increase in competitiveness between EC countries and industries will lead to a degree of industry and sectoral rationalisation around larger producing units. These will tend to be further from both consumers and suppliers, hence increasing transport demand - similarly for retail distribution networks. Historically, low-value goods have faced cost obstacles to long distance transportation. However, fewer trade barriers will reduce costs, hence promoting the movement of lower value commodities over long distances which may also translate into heavier unit loads. Also, the Single Market improves competition in the EC road goods transport industry and encourages it to innovate and upgrade its services in order to meet develop-

Table 1: Road freight transport
Trends In national and international EC traffic (1)

(thousand tonnes)	Growth rate 1988/89 (%)	Growth rate 1989/90 (%)	Growth rate 1990/91 (%)
National	-3.8	-2.8	-2.2
International	-9.1	-1.4	9.7

(1) Annual changes 1988/89, 1989/90 exclude I and L, and 1990/91 also DK, E and IRL. In addition, D is excluded from national traffic 1990/91.
Source: Eurostat (Carriage of goods 1988-1990, regional database for 1991)

Table 2: Road freight transport
Trends in total international EC traffic (1)

(thousand tonnes) From	To other EC countries 1988	1989	1990	1991	To total third countries 1988	1989	1990	1991
Belgique/België	27 952	29 665	31 851	(2)	423	446	477	34 342
Danmark	2 797	3 165	3 653	N/A	1 839	2 013	2 223	N/A
BR Deutschland	23 119	22 831	23 234	24 441	7 751	8 061	8 776	9 796
Hellas	656	695	695	(2)	95	102	158	743
España	6 883	7 272	5 729	N/A	735	175	1 479	N/A
France	20 679	22 164	22 379	23 730	2 049	3 394	2 440	1 630
Ireland	914	1 072	1 040	N/A	4	11	10	N/A
Italia	N/A	8 738	10 185	N/A	N/A	N/A	3 176	N/A
Luxembourg	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nederland	32 605	35 062	37 126	39 261	1 478	1 615	2 188	2 039
Portugal	769	2 163	1 572	2 287	38	54	83	80
United Kingdom	3 263	3 487	4 332	4 542	167	219	294	292

(1) Includes transport by hire, reward and own account
(2) Data included in "to total third countries"
Source: Eurostat (Carriage of goods 1988-1990, regional database for 1991)

ments in demand, by shifting from general goods transport to a wide range of specialised and sophisticated transport services. Hauliers will be engaged more in distribution than just in physical transport. Increased competition and the pressure to innovate will entail a process of concentration and co-operation. On the other hand an increase in the demand for specific services offers prospects for specialisation.

The major extra-EC market to use the road goods transport service from the EC is Eastern and Central Europe. However, eastern European countries have been unable to cope with the resulting substantial increase in road traffic. Estimates put the average additional time required to travel a specific distance in Eastern and Central Europe compared to the equivalent A road in western Europe at 20%. Road maintenance, upgrading and the construction of new motorways will be required to ease congestion and to ensure rapid flows of goods and passengers. Implementation of these measures require both considerable investment and time. The TEM (Trans-European Motorway), prepared and carried out under supervision of UNO, has the objective of ensuring the construction of an integrated Pan European road system. However, the TEM-project is not expected to be realised before the turn of the century.

The use of information and communication technologies, e.g. Electronic Data Interchange, Tracking and Tracing systems, will act as a fillip for market growth, as the services offered by the players in the road goods transport market can provide better quality (e.g. Just In Time, reliability, flexibility and probability of damage) and/or cover a far wider range of destinations thanks to efficiency improvements.

Supply and competition

Road goods transport is able to supply a flexible range of services that moves a wide range of products over a very broad geographic area. One of the cornerstones of road goods transport's competitive position vis-à-vis rail and inland waterways is this geographic flexibility. For short haul movement of goods, road goods transport has a distinct advantage. It is typically on long haul point to point bulk services, where rail can collect from point of initial loading and delivers to point of final discharge, that rail offers its most competitive threat to road goods transport.

In the road goods transport industry, a distinction can be drawn between 'Own-account', which is a company transporting its own products in its own fleet, and 'hire and reward', where a company transports good on behalf of a third party. It is possible for an own-account operator to make up load by selling part of its space on a hire and reward basis. In the last few years there has been a marginal but noticeable trend for companies that used to use own-account transport to downsize their fleets and move to using third party transportation. The decision to do so rests on the relative efficiencies between owning and maintaining a fleet with the relevant labour force and just paying on a per load or load contract basis.

Increasing trends towards specialised cargoes have required investment in specialised vehicles, such as trucks/trailers capable of carrying hazardous chemicals or gas. However, specialisation often means that the return journey is empty.

The enforcement of regulations on working hours have still to be improved in the Community. This, coupled with variations on hours kept at loading and discharge areas can severely affect the logistics and scheduling of road freight movement. Additionally, permissible weights for particular truck and trailer types, which vary from country to country in Europe, have an indirect impact on cross-border movements, although there is now conformity in the Community.

On the supply side the trend in the 1980s has been one of steady growth, accelerating in the last few years. Liberalisation and harmonisation will affect the supply side in several ways. Firstly, as discussed above, trade between Member States and thus intra-EC road traffic will continue to increase. Secondly, as cabotage is liberalised, competition between hauliers from different EC countries will intensify, pushing freight rates downwards, which in turn will benefit the industry as more cargo will be diverted to road.

Comparison of market shares confirms the strong competitive position which the Netherlands hold in intra-EC road freight, in relative as well as in absolute terms. Belgium also is well placed on the intra-EC market. The intra-EC market shares of Germany and France are also high, but compared to their national traffic their contribution to intra-EC traffic is of minor importance. Spain is the only other country where intra-EC traffic is significant to the sector.

Production process

The production process is relatively straightforward. Cargo is collected en masse at point of origin, or it is consolidated by a transport firm. The consolidation may involve collecting small parcels of freight from many different locations using smaller vehicles before transhipment for the major stage of the journey. Delivery of a large single cargo is to point of

Table 3: Road freight transport
Trends in national EC traffic

(thousand tonnes)	1988	1989	1990	1991
Belgique/België	287 611	287 078	276 870	298 589
Danmark	220 030	215 949	194 452	N/A
BR Deutschland	2 464 162	2 594 829	2 715 148	N/A
Hellas	140 906	203 918	176 596	187 379
España	1 108 849	1 207 972	973 708	N/A
France	1 442 648	1 419 899	1 404 051	1 394 915
Ireland	80 130	80 801	78 955	N/A
Italia	N/A	1 964 521	889 065	900 034
Luxembourg	N/A	N/A	N/A	N/A
Nederland	394 190	378 049	386 940	384 191
Portugal	209 305	228 015	237 946	267 000
United Kingdom	1 691 256	1 743 260	1 687 000	1 547 373

Source: Eurostat (Carriage of goods 1988-1990, regional database for 1991)

destination, where it may be used in its entirety or broken down into smaller parcels for onward delivery. A consolidated cargo is delivered to a point where it can be distributed or it is distributed on by the vehicle used for the major journey leg.

The average carrying capacity of semi-trailers (based on Germany, France and Belgium) has increased from 22.7 to 23.7 tonnes between 1986 and 1989, whereas the average carrying capacity of lorries and trailers has remained unchanged at 1.8 and 7.0 tonnes respectively. These low figures are of course due to the large number of smaller vehicles. Based on seven countries of the EC, approximately 7% of trucks have a carrying capacity of 7.0 tonnes or more and these larger trucks account for 45% of the aggregate carrying capacity. However, the EC average of tonne-km per vehicle in 1989 was 51 200. Greece, France (due to the large number of vans) and Ireland and Portugal tend to have lower than average utilisation-rates. Denmark, Spain, and Italy are operating close to the average, whilst the other EC countries operate above average. Germany, Belgium and the Netherlands have all utilisation rates of approximately 100 000 tonne-km per vehicle.

INDUSTRY STRUCTURE

Companies

The market is fragmented into many small transport companies. However, in some EC countries, the number of road transport firms is gradually declining, indicating a tendency towards some co-operation between companies or concentration in the sector. However, the barriers to entry in road freight are minimal due to low initial capital requirement and also minimal product differentiation, hence, substantial concentration is very unlikely. The only area for potential concentration of monopoly is in the very specialised sectors, such as hazardous cargoes, which require a more substantial investment in equipment and particularly in expertise in order to comply with regulations.

Member States differ considerably in the number of hauliers, the evolution of this number, and the distinction made between own account transport and transport for hire and reward. However, broadly, there is a degree of inter-relation between country size and number of companies. The main exception are Spain and Italy, which have an unusually high number of enterprises. Traditionally, Member States have had different market access rules for long distance and short distance goods transport respectively, however, as harmonisation progresses this will be less apparent.

Strategies

Investment in expanding road infrastructure has not matched the development in the road freight industry. The growth in the number of trucks and vans coupled with increases in the dimensions and weights of trucks and containers have exceeded the capabilities of some road networks. This in turn is causing serious problems for road maintenance, congestion, and technical and operational logistics. The lack of sufficient investments in road infrastructures becomes a serious threat to the goods transport sector. Governments are essentially monopoly suppliers of roads, and this is reflected in their investment decisions. Competition from rail may increase due to additional investment in railway transport, particularly investment in high-speed trains as well as in the improvement of the overall quality of railroad transport. The major investment of the Channel tunnel and the link between Sweden and Denmark will lead to changes in transport flows and logistic locations. Since, token first ground was broken in September 1993 on one of the largest European transport infrastructure engineering projects this decade - the link between Sweden and Denmark. The Øresund Link crosses some 16 kilometres of open sea, and is slated to be 11 km on a high span bridge and the balance in tunnel. The final decisions on the exact nature of the infrastructure has not yet been finalised, as it is waiting on final contractor bids. The investment is slated to exceed ECU 4.5 billion and will be largely privately financed through a public share holding in the Holding company. The Link is expected to open in 2000 and is expected to draw some 6.2 million passengers per year.

ENVIRONMENT

Road goods transport is coming under substantial pressure from concerns over the environment. Road traffic is responsible for a large contribution to air pollution. Among the major air pollutants are: Sulphur dioxide (SO_2), Nitrogen oxides (NO_x), Carbon monoxide (CO), Particulates (Aerosols), Lead (Pb) and Carbon dioxide (CO_2). Both gasoline-driven and diesel vehicles emit carbon monoxide, hydrocarbons, nitrogen oxides and carbon dioxide, though diesel vehicles emit CO and NO_x at lower rates. Furthermore, gasoline vehicles emit lead, and diesel vehicles emit SO_2 and particulates.

Whilst most emissions are produced by private cars, the emission of particulates originate mainly from diesel engines - important for freight traffic. New EC standards for heavy vehicle emissions, Euro I and Euro II, will reduce emissions by these vehicles by 55-65%, except for CO_2. In the short term, there is no expected major technological revolution in engine design that will substantially reduce emissions. Hence,

Table 4: Road freight transport
International EC traffic by hire and reward, 1990 (1)

(thousand tonnes) From	To other EC countries	To other European countries	To total third countries
Belgique/België	22 183	N/A	330
Danmark	3 346	19	2 041
BR Deutschland	18 711	1	5 733
Hellas	617	14	158
España	5 660	4	1 474
France	21 514	34	1 753
Ireland	782	N/A	10
Italia	9 952	N/A	3 047
Luxembourg	N/A	N/A	N/A
Nederland	32 631	6	2 118
Portugal	1 572	N/A	83
United Kingdom	4 064	N/A	283
EC	121 033	78	17 029

(1) The carriage for remuneration, of persons or goods, on behalf of third parties.
Source: Eurostat (Carriage of goods 1990)

a major option is to ensure that the effect on the environment is costed correctly. The Commission is reviewing options on how to cost this effect, for instance through a combined tax on energy and carbon. This could be used to stabilise the emissions of the greenhouse gas CO_2 over the coming decade, with emissions in 2000 remaining at the level recorded in 1990. Such a tax could increase operators costs on fuel by between 6% and 10%. However, the external costs of road freight are yet to be quantified objectively, as the many studies undertaken have produced a wide discrepancies in results, and hence there appears to be no straightforward method of costing the externalities.

REGULATIONS

The issue of authorisations, the fixing of tariffs and driving times, the imposing of technical standards and taxes on motor vehicles, are actions that can affect the supply side of the market, for instance, the number of vehicles on the road. From January 1st 1993 onwards, all bilateral authorisations, transit and Community quotas have been replaced by Community authorisations, but these will not be subject to quantitative restrictions. From then on permission to enter the market will depend on qualitative criteria. On January 1, 1990, the old tariff system for international journeys within the EC was replaced with free price fixing.

By improved co-ordination, the EC is trying to improve the observance of social measures, i.e. to extend its span of control, to prevent drivers from neglecting the measure dating from November 1985 which regulates their hours of driving.

Other EC measures that may affect the road transport of goods are associated with the EC policy concerning environment and infrastructure. Other measures are especially aimed at improving the infrastructures of the economically less developed areas.

Another important aspect of goods transport is cabotage, which was not permitted in road goods transport by any host state in Europe until recently. EC ministers have approved plans for motorway tolls on trucks, in the form of windscreen vignettes, to proceed. This is seen as a method of harmonising road transport operating costs and will be introduced in Germany, Denmark and the Benelux States from 1 January 1995. Additionally, gradual road transport cabotage liberalisation has been approved, with measures starting on 1 January 1994. This will take the form of a substantial increase in the number of cabotage licenses issued in the Community and by 1998 will allow complete cabotage freedom. There still remains some opposition to the general introduction of cabotage, partly related to the differences in taxes and tolls.

The Communication from the Commission in the form of a white paper entitled The Future Development of the Common Transport Policy (COM(92)494), of December 1992 seeks to set out a global approach to transport issues enabling due consideration of all views before the launch of particular initiatives. It recognises the importance of road transport in the global picture, and seeks to balance transport policy in terms of its impact on the environment with sustainable mobility for the Community as a whole. The communication enlarges on the major issues of modal disequilibria, capacity constraints, system and network developments, environmental issues, safety, and social issues.

Table 5: Road freight transport
Origin and destination of road freight traffic, 1989-1990

(1000 tonnes) From	To	1989	1990
EC	EC	256.1	270.1
EC	non-EC	20.5	21.3
non-EC	EC	11.8	12.2

Source: Eurostat (Transport Annual Statistics 1970-1990)

OUTLOOK

The liberalisation and harmonisation of the EC transport market, the resumption of positive economic growth and the continuing move towards fast and flexible transport will affect both the volume of total transport and modal choice. Environmental regulation, Eastern and Central Europe, investments in road transport and other modes of transport and information and communication technology are other important aspects.

For road transport operators, the European integration may produce some general advantages such as an increased transport volume, more third-country transport, less empty return loads, simplified foreign settlement, and co-operation with foreign transport operators. Intra-EC traffic will grow significantly faster than national traffic, as the effects of the Single Market act as boost to the sector. Meagre investment

in infrastructure will, in some cases, act as brake on the efficient expansion of road goods transport. However, investment in infrastructure in some areas of congestion will do little to relieve the problem.

The use of new information and communication technologies will act as fillip for the transport companies as developments in this field have undergone rapid improvements in recent years.

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Inland waterways transport
NACE 73

About 40% of all goods moved between EC Member States is transported by inland waterway. Following the crisis of the early 1980s, demand picked up momentum during the latter part of the decade. However, overcapacity has hampered the development of an equilibrium between demand and supply in the sector. Scrapping and modernisation policies at the Community level have made some progress in improving the situation, which, if extended in 1994, will further these gains. Together with increasing demand (especially in the transport of hazardous goods and unitised cargoes) the prospects for inland shipping are moderately positive.

INDUSTRY PROFILE

Description of the sector

NACE 73 includes units exclusively or primarily engaged in the transportation of passengers and goods on rivers, canals, lakes, lagoons and within river ports. Tugs and push boats operating on inland waterways also belong to this NACE group.

The largest portion of inland waterway transport consists of companies operating ships of various sizes to convey goods throughout Europe on the available inland waterway network. As passenger transportation is limited to a few ferry boats across rivers and boats for river cruises, this part of the sector is very small and beyond the scope of this monograph. Most inland shipping operates with unscheduled services for operations using fixed schedules are very rare.

Inland waterways goods transport is usually divided into liquid or dry cargo on the North/South route or Rhine, with an additional separation of free/market/bourse or not.

Next to companies operating ships as their primary activity (professional transport), there are companies active in manufacturing that operate ships on their own account (own account transport).

Recent trends

In terms of tonnage transported in 1990, the country with the largest volume is the Netherlands with over 2.5 million tonnes. Germany ranks second with a total tonnage of 216 million. Belgium follows in third place with 96 million tonnes and France is in fourth position with 64 million tonnes. In the other countries of the EC, inland shipping is a marginal activity. In the United Kingdom and Italy, only domestic shipping takes place; in Greece, Portugal, Spain and Denmark, inland shipping is virtually non-existent.

When measuring transport activity of inland shipping in terms of tonne-kilometres, the ranking changes. Germany takes first position followed by the Netherlands. France ranks third and Belgium fourth. Although, the Netherlands has a greater length of navigable waterways in use than Germany, these comprise mostly of canals, whereas Germany has substantial lengths of arterial navigable rivers in use (3 000 kilometres). Also, the majority of inland shipping activity is accounted for by goods transported on the Rhine River (622 navigable kilometres in Germany). Nearly 300 million tonnes are transported annually on this main artery of inland transportation for the European continent. Hence, the combination of the traffic density on the Rhine and Germany's greater stretches of arterial waterways provide the higher tonne-kilometre result for Germany. The river is the most important connection between the large ports in the Le Havre-Hamburg range (e.g. Rotterdam and Antwerp) and the European hinterland. Dutch and German inland shipping operators benefit from this advantageous situation.

National differences occur when looking at the distribution of goods traffic. In some countries, domestic transport is important, particularly for France, where half of inland shipping is domestic. In the Netherlands, exports dominate inland waterway transport with 41% of inland shipping, whereas only 19% is imports. In Germany, the situation is reversed, with 43% of inland shipping due to imports and only 24% is exports. In Belgium, imports are close to half of its total inland shipping (measured in tonnes) and exports account for 29%.

Total tonnage in transit on inland waterways in the EC amounted to some 62.5 million tonnes in 1990. The Netherlands with over 32 million tonnes is the most important transit country, followed by Germany with another 15.8 million tonnes. In Luxembourg, transit traffic is the most important traffic category: in terms of tonnage 80% is in transit (8.7 million tonnes); in terms of tonne-kilometres it amounts to 97%.

Table 1: Inland waterways transport
Total volume transported on Community network, 1987-1990 (1)

(1000 tonnes)	1987	1988	1989	1990	Growth rate 1990/87 (%)
Belgique/België	90 956	95 398	94 672	96 287	6.0
BR Deutschland	207 548	218 564	219 484	215 790	3.9
France	56 968	60 340	50 300	63 563	11.6
Italia (2)	1 133	899	869	740	-34.7
Luxembourg	1 922	2 173	2 055	2 132	10.9
Nederland	240 671	249 532	259 491	253 784	5.4
United Kingdom (2,3)	6 855	7 219	7 195	6 600	-1.3
Total (3)	403 050	427 411	422 008	425 000	1.8
Growth rate (%)	-0.8	6.0	-1.3	0.7	

(1) For each country, the figures include: import + export + national transport
For total, the figures include: total national transport + total export
(2) Domestic traffic only
(3) 1990 Estimates
Source: Eurostat (Transport Yearbook), DRI

Table 2: Inland waterways transport
Total, excluding transit, volume transported on major 4 EC Member States' inland waterways, 1987-1990

(million tonne-kilometres)	1987	1988	1989	1990	Growth rate 1990/87 (%)	Length of navigable waterway in use (1)
Belgique/België	4 678	4 938	4 853	4 974	2.1	1 515
BR Deutschland	42 143	44 711	45 636	46 086	3.0	4 350
France	6 801	6 645	5 624	7 165	1.8	N/A
Nederland	27 868	29 313	30 154	29 646	2.1	5 046
Total EC4	81 490	85 607	86 267	87 871	2.5	N/A
Growth rate (%)	N/A	5.1	0.8	1.9		

(1) Situation in 1990 & includes a small amount of double counting
Source: Eurostat (Transport Annual Statistics 1970-1990)

Inland shipping specialises in the transport of large quantities of bulk products, such as sand, ores, coal, chemicals, and oil. These are clearly divided into dry and liquid bulks. The larger volumes of goods transported are petroleum products (16%), iron ore, iron and steel waste, etc. (13%) and the largest group, crude and manufactured minerals, (33%). In practically all countries, crude and manufactured minerals are the most important cargoes. In 1990 just over 26% of total German inland shipping was crude and manufactured minerals (61 million tonnes), in France 54% (35 million), in the Netherlands 35% (99 million), in Belgium 25% (25 million), in Luxembourg 17% (1.8 million) and in Italy 19% (140 thousand).

Most of inland waterways transport throughout Europe takes place within the EC. Transport to and from non-EC countries mainly relates to transport links with Switzerland (Rhine) and the East European countries along the Danube and the Elbe rivers.

The average annual growth of total tonnage transported throughout the EC during the period 1987 and 1990 was just under 2% per annum. This has meant a partial recovery from the very depressed situation that existed at the beginning of the 1980s. Annual rates, however, fluctuate considerably. In 1987, a drop in tonnage transported of about 0.8% occurred, whereas in 1988 growth recovered and soared to 6%; this was then followed a slight decline in 1989, which was marginally compensated by some positive growth in 1990. Growth rates by Member State also provide an inconsistent picture, with Germany averaging growth of 4% between 1987 and 1990, the Netherlands 5.4%, Belgium 6%, whilst the United Kingdom and Italy recorded average negative growth, -1.3% and -34.7% respectively. However, the base volumes for these countries are very small, hence the impact on the EC aggregate is minuscule.

Comparing the tonne-kilometres results for the Member States with major inland waterway cargo traffic, the average annual growth rates for Belgium, Germany, France and the Netherlands have remained relatively stable at around 2.5%, with Germany having the greatest growth at 3% and France the lowest at 1.8%. The total tonne kilometres for these four countries was 88 billion in 1990.

MARKET FORCES

Demand

Over the years, demand growth in inland shipping had been fairly limited. In other types of transportation, growth rates of demand have been much higher. The major factor underlying this disparity in demand for inland waterway compared to other modes is that demand has been dominated by types of cargoes such as traditional bulk products used as inputs for traditional industries (e.g. refineries, steel industries, chemical plants), where growth rates of industrial activity have been either moderate or in decline.

Table 3: Inland waterways transport
Distribution of goods traffic, 1990

(%)		National traffic	Imports	Exports	Transit
Belgique/België	(1)	21.3	46.9	28.6	3.2
	(2)	31.5	38.2	22.6	7.7
BR Deutschland	(1)	27.0	42.6	23.5	6.8
	(2)	25.7	39.0	19.3	15.9
France	(1)	49.7	18.4	28.1	3.8
	(2)	56.3	17.0	21.3	5.5
Italia	(1)	100.0	0.0	0.0	0.0
	(2)	100.0	0.0	0.0	0.0
Luxembourg	(1)	0.4	10.5	8.7	80.3
	(2)	0.3	1.8	0.9	97.0
Nederland	(1)	29.4	18.5	40.9	11.3
	(2)	19.3	20.0	43.8	16.9
United Kingdom	(1)	100.0	0.0	0.0	0.0
	(2)	100.0	0.0	0.0	0.0

(1) Based on tonnes transported
(2) Based on tonne-kilometers
Source: Eurostat (Transport Yearbook), DRI

Table 4: Inland waterways transport
Distribution of products transported by inland waterways, 1990

(1000 tonnes) Type of goods	Domestic	International Export	International Import	Total
Cereals	4 152	8 683	8 530	21 365
Foodstuff and animal fodder	8 323	9 435	8 356	26 114
Oil seeds and oleaginous fruits and fats	4 061	5 272	5 200	14 533
Solid mineral fuels	20 613	13 731	14 173	48 517
Crude petroleum	997	136	414	1 547
Petroleum products	30 429	38 348	34 140	102 917
Iron ore, iron and steel waste, etc.	3 502	39 378	38 445	81 325
Non-ferrous ores and waste	1 041	3 794	3 737	8 572
Metal products	3 278	11 883	11 511	26 672
Cement, lime, manufacturing building materials	3 972	3 356	3 378	10 706
Crude and manufactured minerals	102 682	54 813	54 274	211 769
Natural and chemical fertilizers	4 812	7 429	7 741	19 982
Coal chemicals, tar	1 197	801	1 634	3 632
Chemicals other than coal chemicals and tar	7 629	12 817	11 164	31 610
Other goods	4 694	9 412	8 894	23 000
Total (1)	201 382	219 288	211 591	632 261

(1) Total includes BR Deutschland, France, Italia, Nederland, Belgique and Luxembourg
Source: Eurostat (Carriage of goods 1990: Inland waterways)

The cost structures of these industries have supported the requirement for inexpensive transportation for bulk goods, where the transportation costs can sometimes exceed the raw material costs. Speed has not been an important factor, but continuity has been crucial as interruptions of cargo flows would distort the production process in the plants.

There has been a structural tendency to reduce the volumes of goods to be transported. This has been done by transferring the initial processing of raw materials to the origin. As a result, total tonnage of raw materials has declined and the tonnage of processed materials increased. However, this increase of semi-processed and processed cargo has not fully compensated for the decrease in raw materials.

Another problem on the demand side is that there is a tendency for monopsony power: demand is with a limited number of large industries, which are able to exchange information on the inland shipping market. In the Netherlands, for example, the transport of sand and gravel has been controlled by a cartel of sand and gravel traders and producers. Furthermore, some industries have arranged long-term transport contracts with shipping companies at guaranteed prices. In addition, some industries have their own vessels (own account shipping). They only need to employ additional (independent) vessels to meet peaks in their transport demand.

In the last five to ten years, unit cargoes like containers and roll-on roll-off (e.g. equipment for agriculture, cars and trucks) have become increasingly important for inland shipping. These form the less time-sensitive portion of unit and ro-ro cargoes, and shippers have gained from the relative reduction in costs that, although movement of these cargoes by inland waterway is slower than other major modes, is time reliable. Also unit cargoes can be easily handled in multi-modal (combined) transport concepts: a combination of rail, road and inland waterway transport. Such packaging of non-bulk goods is likely to continue and allow inland shipping to diversify away from traditional bulk tonnage.

Another tendency is that inland shipping has become important for the transportation of dangerous cargoes, such as highly poisonous or explosive chemical products. These substances require a high level of safety and safety standards from the transportation service providers.

Supply and competition

Inland shipping is capable of meeting the industry's requirements for bulk transportation which is cheap, energy-efficient, safe and reliable. The application of information and communication technology allows modern transportation that is cost efficient and compliments concepts such as just-in-time delivery and door-to-door transport. A key advantage offered by inland waterways in comparison to other modes of transport is the relatively low burden for the environment since both the energy use per tonne is very low and there are no severe bottlenecks in the network.

The EC inland waterway fleet in 1990 had a carrying capacity of 12.2 million tonnes. The Dutch fleet accounted for 49% of the total capacity, while the German fleet held second po-

Table 5: Inland waterways transport
Comparison of modes of goods transport within the EC, 1990 (1)

(%)	Inland waterways	Road	Railways
Hydrocarbons transport	91.7	2.9	5.4
Total transport	48.7	33.8	17.8

(1) Based on tonnes and dispatch figures.
Source: Eurostat (Carriage of goods 1990)

sition with 25%. The key fleets all declined in 1990 in both vessels numbers and carrying capacity, with the exception of the Dutch fleet which although declined in numbers increased it carrying capacity. Overall, the EC fleet carrying capacity fell in 1990 compared to 1989 and partial observations for 1991 and 1992 indicate the fleet is continuing to decline, but at a much reduced rate.

The fleet is characterised by the existence of a large number of private owners mostly operating only one vessel with the owner's family living on board. In general these vessels are old and relatively small in size and not in line with the latest technological standards. These ships are not demolished as the owners operate at or below economic cost prices, accepting very little or even negative returns. Large shipping companies exploiting fleets of 20 to 100 vessels mainly operate on the Rhine and its branches. Their fleets are generally large modern units capable of high productivity and short turnaround times.

The existence of small family-owned vessels which have not yet been scrapped and the introduction of modern large sized vessels has caused a structural imbalance between supply and demand. Overcapacity, therefore, has become a structural phenomenon in inland shipping. During the 1980s overcapacity was estimated at some 20% of the EC fleet.

Overcapacity has been blamed for its negative impact on the evolution of prices on the free market. Price regulating and cargo sharing systems were introduced, basically to guarantee ship owners a minimum income. This social policy exacerbated the problem of excess capacity.

Minimum price tariffs currently operate under official systems in some Member States. Germany's plan to liberalise the German market on 1 January 1994 has been met with fierce action from German operators, who blockaded the Rhine and ports in protest in September 1993. This followed a similar protest by Dutch operators when the Dutch government set about liberalising the Tour-de-Role tariff and freight sharing system.

REGULATIONS

To remedy overcapacity problems, Council Regulation (EEC) No. 1101/89 of 27 April 1989 was introduced to remove the structural imbalance between demand and supply in the inland waterways market. This established principles for an EC-wide capacity-regulation policy which also applies to Switzerland. It created two set of measures:

- the granting of premiums to reduce the capacity of the active inland waterways fleet; and
- curbs on investment in extra vessels in the course of the co-ordinated scrapping scheme.

The main elements of the EC scrapping scheme for inland waterways are:

- It applies to Member States that have inland waterways linked to other Member States and whose tonnage of inland fleet exceeds 100 000 tonnes. Vessels from other Member States that operate on the shared network have to adhere to one of the scrapping schemes.
- The total active fleet registered and operating in the Member States is subject to the scrapping scheme. There are a limited number of detailed exceptions.
- The initial target was to reduce 10% of the dry cargo fleet and 15% of the tanker fleet in 1990.
- New tonnage was only allowed on one of two conditions; (a) equivalent old tonnage was scrapped to match the new tonnage; or (b) a premium was required equivalent to the scrapping premium for the type of vessel brought into operation, which was paid into the scrapping fund.
- Vessel owners paid annual contributions to the scrapping fund based on the tonnage and types of their vessels. The fund would be used by governments to provide interest free loans to the inland navigation industry, repayable over a number of years. All states ensured that the loan details would be identical.
- The Swiss authorities introduced simultaneous and parallel measures.

On November 1993 a report from the Commission on the effect of the structural improvement in inland waterway transport as introduced by the Council Regulation was published as COM(93) 553 final - SYN 475. This report notes that scrapping activity in 1990-1992 took 2 000 dry cargo vessels

Table 6: Inland waterways transport
EC fleet in number of vessels and carrying capacity (1)

	Fleet	1980	1990	1991	Growth 1991/90 (%)	Growth 1990/80 (%)	Fleet share 1991 (%)
Belgique/België	Vessels	3 297	1 942	1 796	-7.5	-41.1	35.4
	Carrying capacity	1 844	1 523	1 465	-3.8	-17.4	45.6
BR Deutschland	Vessels	4 153	3 077	N/A	N/A	-25.9	N/A
	Carrying capacity	3 672	3 056	N/A	N/A	-16.8	N/A
France	Vessels	5 465	3 293	3 251	-1.3	-39.7	64.1
	Carrying capacity	2 537	1 653	1 719	4.0	-34.8	53.5
Luxembourg	Vessels	18	25	26	4.0	38.9	0.5
	Carrying capacity	12	29	25	-13.8	145.8	0.7
Nederland	Vessels	7 891	6 998	N/A	N/A	-11.3	N/A
	Carrying capacity	4 960	5 969	N/A	N/A	20.3	N/A
Total	Vessels	20 824	15 335	N/A	N/A	-26.4	100.0
	Carrying capacity	13 025	12 230	N/A	N/A	-6.1	100.0

(1) 1 000 tonnes
Source: Eurostat: UN, Transport Statistics for Europe 1993

Table 7: Inland waterways transport
Origin and destination of inland waterways transport

From	To	1989 (1000 tonnes)	1990 (1000 tonnes)
EC	EC	205.9	205.0
EC	non-EC	13.9	13.2
non-EC	EC	7.0	6.5

Source: Eurostat (Annual statistics of transport 1970-1990)

out of the fleet with a carrying capacity of 1.1 million tonnes, 260 tanker vessels were removed with a carrying capacity of 260 000 tonnes and 30 000 kilowatts of push boat capacity was removed. Total expenditure to achieve this is estimated to be 104 million ECU. In general, the conclusion is that the scrapping scheme has achieved a measure of stability between demand and supply, but needs to be extended beyond the original five year life for another five years.

On the Rhine River, a free market situation prevails. The Act of Mannheim of 1868 guarantees free shipping on the Rhine and its arteries for all ships with flags belonging to countries signatory to the Act (Germany, France, the Netherlands, Switzerland, Belgium, and the United Kingdom). The Commission is in favour of including the Rhine-regime in the EC Transport Policy. However, a complicating issue is that Switzerland is not a Member State.

In view of the aims of the Single Market, initiatives will be expanded to allow cabotage with each ship with an EC flag is allowed to provide services within other Member States. This will increase competition on the European waterways. Also the tour-de-role system is under investigation by the Commission as it reserves and allocates cargo at specific tariffs, which may be construed as anti-competitive.

THE NETWORK

The Rhine, being navigable over a distance of 1 000 km from Basle in Switzerland to the North Sea at Rotterdam is clearly the backbone of the EC waterway system. Other rivers like the Meuse, the Schelde and the Elbe are interconnected with the Rhine by means of canals navigable for vessels of at least 1 350 tonnes, (classified as a Europe, class IV, standard vessel). Furthermore, a coherent network has been created by waterways navigable for units with a loading capacity from 1 350 to 10 000 tonnes (pushed convoys on the Rhine and certain other sections) which covers most of Germany, the Netherlands, Belgium, Luxembourg and the northern and eastern frontier zones of France.

This network will be extended to Eastern Europe in 1990s if the capacity of the Rhine-Main-Danube Canal can support the large size vessels. Since its opening in 1992, this canal has exceeded initial expectations on volumes, and reached 4.2 million tonnes of cargo in its first year of operation. This was achieved despite the blockade of exports to Serbia. Except for this route, a northerly transit to Eastern Europe between the Netherlands and Germany is also possible through the Mittelland canal. It is not yet clear what measures will be taken to improve its capacity.

In the French hinterland, the rivers Seine and Rhône, being navigable for pushed convoys of 5,000 tonnes, play an important role. However, to date, these rivers are only connected with the main European network by narrow canals. Networks in Italy and the United Kingdom basically relate to the Po River in Northern Italy and navigable rivers and canals in the UK (e.g. Thames, Humber, Clyde).

Table 8: Inland waterways transport
Share of craft in operation at end of year, 1991 (1)

(%)	Share of number of ships	Share of carrying capacity
Belgique/België	11.9	11.9
BR Deutschland	21.4	14.0
France	20.3	24.9
Luxembourg	0.2	0.2
Nederland	46.2	48.8
Total	100.0	100.0

(1) Based on tonnes
Source: UN (Transport Statistics)

Although no major bottlenecks exist, investments in new infrastructure continue to be necessary. Increasing ship size requires enlargement of locks and canals, the deepening of waterways and adaptation of inland water ports. Modern navigation facilities are also needed along the waterways.

OUTLOOK

Demand for inland waterway transport is likely to maintain an upward trend at moderate growth rates. In view of economic integration, transport demand among Member States will increase in terms of both volume and distance to the benefit also of inland waterways. In the field of hazardous goods transport and unitised cargoes, inland waterways are likely to gain.

The developments in Eastern Europe will affect traffic in two ways. Firstly, positive developments will emanate from German unification and the opening up of the Eastern European economies. New market opportunities and intensifying trade will occur, but in the short term these effects will be limited. Secondly, negative developments may occur as fleets from East European countries enter West European markets, especially via the Rhine-Main-Danube canal. This canal is slated for privatisation, and expectations are for 6 million tonnes of traffic per year by the end of 1995. However, ship sizes are small and service standards are not expected to meet Western requirements, although the low-priced Polish operators have almost driven out German competition on the Polish-German trades. In this case the German Transport Ministry has been negotiating with Poland to seek a 50:50 cargo share with minimum freight rates.

Concerning capacity, the EC scrapping system is likely to continue its initial successes. Together with the present trends in demand, equilibrium between demand and supply will closer to realisation. This will allow improved incomes and capacity utilisation.

Written by: DRI Europe

Shipping
NACE 74

The EC shipping industry is moving into a stage of advanced maturity, where the number of players will be dominated by increasing concentration in the top ranks, supported by a number of smaller niche players in specialised trades. Hence expectations are for the current largest companies to continue to expand by acquisition and alliances, with fewer operators around by the end of the century. In the global liner industry, an EC company has moved into pole position, while the EC liner industry continues to maintain five places in the top twenty ranking.
The gradual recovery of some of the major trading power houses and developments within the EC will contribute to a further improvement of trade with the EC, although the impact on the EC shipping industry is potentially mixed. Developments within the EC concern further deregulation of the EC shipping market and the effects of an EC shipping policy aimed at achieving an efficient and competitive EC shipping industry. European liner companies are increasingly becoming multi-modal operators and expanding European distribution networks via purchase or alliance to meet customer requirements for inter-modal transport and value added services. The tanker and dry bulk fleets are continuing to be dominated by older tonnage and will have to undergo significant renewal in the 1990s if scrapping accelerates. The EC cruise industry is growing and looks to expand significantly over the next few years as real disposable incomes increase.

INDUSTRY PROFILE

Description of the sector

The sector includes units exclusively or primarily engaged in the transportation of passengers and goods in sea-going and coastal vessels. Also classified under this heading are units exclusively or primarily engaged in the operation of sea-going tugs. Deep-sea transport refers to shipping on long sea routes; coastal shipping or short-sea shipping refers to the conveyance of passengers and goods between national or European ports, including those on the Black Sea, the Mediterranean and Moroccan Atlantic.

Within the merchant shipping industry, cargo is usually analysed in sectors, which are dry bulk, tanker (also known as liquid bulk) and liner (typically scheduled services with consolidated cargo from many shippers). These sectors are usually further subdivided: dry into major dry bulks, such as grain, and minor dry bulks, such as bauxite; tanker is usually divided into crude and products (or dirty and clean) and gas carriers; liner into container and non-container (or general cargo). Usually tanker and dry bulk is dominated by tramp (non-scheduled) services. There are also specialised vessels that do not necessarily fit into any of these categories, such as refrigerated ships, forest product carriers, car carriers, steel product carriers and combination carriers. This situation is further complicated by non-standard operations, as for instance it is possible to have a tramp operator moving containers, or a scheduled operator moving bulk coal, and some vessels can be used for conveying more than one commodity type, for instance a gas carrier could be used for 'clean' oil products.

Recent trends

Growth rates derived from Table 2 indicate that, during the period 1986 and 1992, world seaborne trade achieved an average annual growth rate of 4.7% in tonne-miles; however, the growth rate has decelerated over the last three years to average 3.3%. The various sectors of seaborne trade have shown a similar development pattern over 1986 to 1992, although their pace of development varied widely. During this period, most of the sectors averaged rates of around 4% per year; the two exceptions being iron ore (averaging only 2.1%) and crude oil (7.3%). The picture for the sectors' rates of growth for the period 1990-92 is not so rosy, with both iron ore (-2.3%) and oil products (-0.6%) recording declines but, despite a slowdown in its development, crude oil managed to maintain strong growth at 6.3%.

Dry bulk and tanker

The dry bulk and tanker sectors form the largest part of seaborne trade in volume terms. In 1992, liquid bulk's (crude and products) share was 47%; the three main dry bulk commodities (coal, grain and iron ore) accounted for 27.5%. Hence the three major dry bulks and tanker account for almost three quarters of world trade in tonne-miles. In terms of tonnes, SS&Y Research estimates that out of total dry bulk trade, the major three account for about 55%, whilst the remaining 45% is the intermediate and minor bulks (these estimates cannot be related to the tonne-mile figures in Table 2 due to differences in collation methodology). Estimates put about one-third of the world's bulk traffic (in tonnes) as originating

Table 1: Shipping
Main indicators, 1990

	Number of enterprises	Turnover (million ECU)	Number of persons employed
Belgique/België	196	2 081	N/A
Danmark	362 (1)	1 226	2 149 (1)
BR Deutschland	570	944 (2)	13 040 (2)
Hellas	N/A	N/A	N/A
España	N/A	N/A	30 000
France	N/A	N/A	N/A
Ireland	N/A	N/A	N/A
Italia	N/A	N/A	N/A
Nederland	439	2 232	12 180
Portugal	28	435	N/A
United Kingdom	N/A	N/A	N/A

(1) 1989
(2) 1988
Source: Eurostat (MERCURE)

Table 2: Shipping
Development of world seaborne trade

(tonne-miles)	1986	1987	1988	1989	1990	1991	1992 (1)
Crude oil	4 640	4 671	5 065	5 736	6 261	6 757	7 070
Oil products	1 265	1 345	1 445	1 540	1 560	1 530	1 540
Iron ore	1 671	1 728	1 919	1 983	1 978	2 008	1 890
Coal	1 586	1 653	1 719	1 798	1 849	1 999	2 000
Grain	914	1 061	1 117	1 095	1 073	1 069	1 130
Other goods	3 780	3 840	4 040	4 250	4 400	4 510	4 650
Total	13 856	14 298	15 305	16 402	17 121	17 873	18 280

(1) Estimate
Source: Fearnleys Review 1992

from or arriving in Europe and the overwhelming portion of these flows (90%) is inbound.

The iron ore trade depends predominately either directly or indirectly on the steel industry, and to a lesser extent so does the coal trade. In 1992 world steel production fell to its lowest level since 1986, due to lower production from the EC, Japan, the CIS and Eastern Europe (competition from these latter two is presently weakening). In the Community, crude steel production declined by 3.6% in 1992, to its lowest level for nine years and the latest estimates from DRI's Industry Consulting Group indicates that 1993 is not providing an upturn, due to the continuing weakness in the market exacerbated by competition from Eastern Europe. This had concomitant effects on iron ore shipments. Preliminary estimates for iron ore into the EC indicate that the trade declined by more than 2% in 1992. Exports from the EC's two main external supplier of iron ore by sea, Brazil and Australia, which account for 60%, recorded export declines of 8.5%. Coal has fared substantially better, as domestically produced coal has declined and been substituted by imports. These imports from non-EC countries are estimated to be between 135-140 million tonnes in 1992, compared to 132 million tonnes in 1991.

Grain trades (wheat and coarse grain) rose by about 13% in 1991-92 (grain years are often reported July to June) to reach a seven year peak of just under 200 million tonnes. The primary exporters of grain in 1991-92 were, the US (44%), Canada (14%), the EC (13%), Argentina (7%) and Australia (4%) where the figures in brackets are the approximate world export shares.

Intermediate dry bulks (bauxite, alumina and phosphate rock) have had mixed fortunes over the last few years. Aluminium production in the EC has declined in recent years, with volumes falling by 7% since 1989. There are three major factors causing this decline in production: first, aluminium production has been shifting to lower energy priced producing countries; second, the recent recessionary pressures in the EC; and third, low-priced imports from the CIS and Eastern Europe. This has meant a slowdown in imports of the raw products for aluminium production, but a boost for imports of smelted aluminium and products. Phosphate rock imports into the EC have fallen consistently since 1987. In western Europe, last year's imports were only 50% of the volume achieved in 1985.

Minor bulks, amongst which are steel products, pig iron, ferrous scrap, fertilisers (sulphur and potash), agricultural products (soya, rice and sugar), coke and cement, have witnessed some weakness in trade in 1992. EC imports of steel products rose by close to 15% last year to approximately 12 million tonnes (the bulk of the increase coming from eastern Europe), whilst exports fell some 5% to around 19 million tonnes. This trade has been dominated by various trade disputes, the most important of which is the anti-dumping duties imposed by the US, which threaten some 1 million tonnes of EC exports. The latest data for pig iron indicates that imports into Western Europe fell by almost 40% in 1991, but that ferrous scrap imports increased marginally to 21 million tonnes from just over 20 million tonnes in 1990. The EC trade (dominated by imports) of fertilisers fared badly in 1992, as sulphur imports into the EC declined, and this decline was compounded by a decline in potash imports. Soya trade was buoyant in 1992, increasing from 27.5 million tonnes in 1991 to just over 30 million tonnes in 1992, the major exporter being Brazil (30%), Argentine (21%) and the US (20%). The EC is the major importer of soya, and account for almost 50% of world imports. The global sugar trades have remained almost flat in recent years, with a small decline of around 3% in 1992. Exports of sugar from the EC declined quite dramatically in 1992, by just over half a million tonnes from just under 5 million tonnes in 1991. Western Europe imported 6.7 million tonnes

Table 3: Shipping
Average yearly rate of change of tonne-miles in seaborne trade

(%)	1986-1991	1989-1991	1987-1992	1990-1992
- Crude oil	7.0	6.5	8.6	6.3
- Oil products	3.5	-1.3	2.7	-0.6
Total oil products	6.3	4.9	7.4	4.9
- Iron ore	3.3	-0.5	1.4	-2.2
- Coal	3.8	3.0	4.3	4.0
- Grain	2.0	-3.9	1.3	2.6
Total main bulk products	3.2	0.0 (1)	2.5	1.2
Other goods	3.6	3.0	3.9	2.8
Total seaborne trade	4.7	3.0	5.0	3.3

(1) Less than 0.05%
Source: Fearnleys Review 1992

Table 4: Shipping
Development of the world fleet by type of vessel (1)

	1987			1990			1992			1993		
	Nr. of ships	DWT ('000)	TEU ('000)	Nr. of ships	DWT ('000)	TEU ('000)	Nr. of ships	DWT ('000)	TEU ('000)	Nr. of ships	DWT ('000)	TEU ('000)
Oil tankers	5 723	240 744	N/A	5 753	248 483	N/A	6 035	263 482	N/A	6 137	267 491	N/A
Other tankers	1 629	16 489	N/A	1 693	16 391	N/A	1 896	18 729	N/A	2 004	19 651	N/A
Total tankers	7 352	257 233	N/A	7 446	264 874	N/A	7 931	282 211	N/A	8 141	287 142	N/A
Bulk/OBO carriers	4 967	223 185	323	4 915	228 601	393	5 043	240 590	413	4 952	237 423	391
Container vessels	1 027	21 105	1 142	1 147	25 026	1 435	1 273	29 595	1 734	1 339	31 578	1 875
General cargo vessels	18 108	108 174	1 032	16 899	100 621	1 125	17 165	101 741	1 240	17 313	102 430	1 342
Passenger vessels/ferries	2 614	3 445	9	2 785	3 621	14	2 918	3 875	16	2 998	3 980	17
Total fleet	34 068	613 142	2 506	33 192	622 743	2 967	34 330	658 012	3 403	34 743	662 553	3 626

(1) Ships of 300 gt/grt and over, 1st of January.
Source: ISL Bremen

of coke in 1992, with Luxembourg taking the lion's share with 17% (it has no coke ovens). Imports to Europe of petroleum coke declined sharply in 1992 following strong growth in 1991, largely due to declining economic activity, the major EC destination is Italy, which accounts for over 10%.

In the tanker trades, imports of crude oil and products averaged 10.8 million barrels per day in 1992, an increase of 2% on 1991. Of these, OPEC accounted for 55% (6 mb/d). The major crude oil tanker trades were in general positive, with the Near/Middle East supplying 3.3 mb/d, Africa declining slightly to 2.73 mb/d, while "other", excluding intra-EC and the Warsaw Pact, reached 1.95 mb/d. The largest portion of total EC imports of products is intra-EC trade (1.8 mb/d in 1992). However, total products imports recorded a decline in 1992 as EC refinery capacity utilisation continued to be high (a trend caused by the Gulf War) as imported crudes were refined within the Community.

In the gas carrier segment, the major sources of LNG for the EC are Algeria and Libya to the EC. In 1992, Algeria's exports of LNG to the EC are estimated to have been almost 14 million tonnes, the major importers (in quantity) being France, Belgium, Spain and Italy. Libya exported 1.23 million tonnes to its major trading EC LNG trading partner Spain in 1992. The EC is the second largest importer of LPG after Japan, followed closely by South Korea. Extra-EC imports of LPG are estimated to have dropped by some 15% in 1992, reflecting increased intra-EC trade.

Liner trades

The liner trades are dominated by movements of goods in containers. An analysis of the container trades is an excellent indicator for overall liner trades, with the proviso that there is a trend in the industry to move more liner-propensive commodities into container. Hence, although liner trades are already dominated by containers, container penetration is increasing. In 1992, the total volume moved in containers on the major trades was 29.4 million twenty-foot equivalent units (TEUs), and of these trades Europe-Far East accounted for 11.2%, and the transatlantic trade (Europe-US/Canada) accounted for 8.4%.

The growth in demand for liner shipping averaged around 9 percent in 1980 to 1985, slipping slightly to around 6% in 1985 to 1990, and around 4.5% on average in the last three years. In recent years, the major growth has been in the intra-Asian market which now accounts for about 12% of world trade. Deep-sea liner trade into Northern Europe grew by about 4% in 1992, after a minor set-back in 1991, and initial indications for 1993 indicate that growth has stagnated. On outbound trade, growth in 1992 was fairly strong at about 5% and 1993 estimates indicate that this pattern is continuing. The pattern for Southern Europe is somewhat similar, with inbound liner trades falling in 1991, recovering in 1992 but with stronger growth in 1993, and the outbound trades maintaining growth of around 5% in 1992 and 1993.

Cruise shipping

Cruise shipping has grown considerably in the last ten years, predominately fuelled by the demand in the United States. However, cruise shipping in Europe has been expanding too, albeit at a slower pace, with more cruises available to places previously difficult to enter - for instance the territorial water of the Warsaw Pact.

MARKET FORCES

Demand

In general terms, both manufacturers and retailers need a reliable and continuous flow of products at a reasonable price. Regarding major bulk commodities, which are inputs in the oil refineries (crude oil), the iron and steel industry (iron ore, coal and petroleum coke) and electric power plants (steam coal), the customers are largely in control of the flows to secure their regular supplies. They operate on a global scale.

In general and containerised cargo, customers are moving increasingly toward a global strategy, particularly with just-in-time inventory control, and global purchasing options that mean that purchase can be made from suppliers providing the lowest unit cost for similar goods. Additionally, there is increasing pressure from shippers on the shipping companies as these customers require door-to-door delivery at prices usually associated with port-to-port deliveries. Shippers are under significant pressure to reduce costs and improve time-to-market product delivery, hence it is becoming much more important for shipping companies to provide responsive, flexible, cost efficient and dependable services.

Supply and competition

The shipping industry is very fragmented: it ranges from major diversified shipping companies with liner, dry bulk and tanker operations and hundreds of vessels to one-vessel captain-owners. There are large producers who carry their own cargoes, for instance in the banana and car trades, and there are owners specialised in bulk shipping or solely in the rental or leasing of ships.

Short sea trades

The European short-sea trades, including the intra-EC seaborne trade, still have the characteristics of regional markets. Mediterranean trade comprises largely national traffic, which is in

Table 5: Shipping
Average yearly rate of change of world fleet by type of vessel (1)

(%)	1987-1992			1990-1992			1991-1993		
	Nr. of ships	DWT	TEU	Nr. of ships	DWT	TEU	Nr. of ships	DWT	TEU
Oil tankers	1.1	1.8	N/A	2.4	3.0	N/A	1.5	2.2	N/A
Other tankers	3.1	2.6	N/A	5.8	6.9	N/A	6.4	6.7	N/A
Total tankers	1.5	1.9	N/A	3.2	3.2	N/A	2.6	2.5	N/A
Bulk/OBO carriers	0.3	1.5	5.0	1.3	2.6	2.5	-0.6	0.2	-0.1
Container vessels	4.4	7.0	8.7	5.3	8.7	9.9	6.1	8.2	9.7
General cargo vessels	-1.0	-1.2	3.8	0.8	0.5	5.0	0.4	0.2	7.4
Passenger vessels/ferries	2.2	2.4	13.1	2.4	3.4	6.7	2.4	2.7	4.4
Total fleet	0.1	1.4	6.0	1.7	2.8	7.1	1.1	1.5	7.7

(1) Ships of 300 gt/grt and over, 1st of January.
Source: ISL Bremen

own- national flagged vessels, and international traffic between the Mediterranean and North African countries. Therefore, in these trades there is imperfect competition. By contrast, in and around the North Sea, there is fierce competition between short-sea carriers due to the trade being open to all flags. Germany, the Netherlands and Denmark dominate international short-sea trades.

Short-sea owners dominate specialised trades under European flags, many owners of larger vessels having opted out of the trade under these flags. Specialised trades include chemical vessels, liquid-gas tankers, reefer trade, car carriers, the carriage of heavy lifts, and chartered containers. Markets for liquid-gas and reefer trades are much less volatile than those for tankers and bulk carriers, because owners either charter their vessels to the traders or join freight pools.

Deep sea trades

Regarding general cargo North-South trades with many developing countries (particularly those in Africa and Latin America), conference trade has often been divided in accordance with the 40:40:20 formula of the Unctad Code, whereby the national carriers in the trade between two countries each have a share of 40%, the remaining 20% to be divided among cross traders. The UNCTAD Code applies to conference cargoes only, but some developing countries have striven to bring their whole liner trade within the scope of the Code, which would enable them to regulate the share of non-conference lines, generally referred to as outsiders. As far as the EC is concerned, the shares obtained by EC lines within a conference on basis of the UNCTAD code are redistributed on the terms of the Regulation no 954/79, the 'so-called Brussels package.

Many liner companies, both conference members and outsiders, are operating on the principal East-West routes and although the world's largest container operators are involved in this, trade market shares of more than 10% are rarely achieved. Most of the shares are in the range of 2% to 9%. Furthermore, in the (for the companies) relevant North-South trade, the shares vary from 10% to 20%. Consequently, no single liner company is dominating the trade; the market is very competitive, which is enhanced by the prevailing excess capacity in the liner industry.

To cope with the fierce competition as well as to meet the ever increasing needs of the clients, some carriers are aiming at providing global operations. The creation of the Single EC Market has further encouraged the concept of globalisation as a spur for greater penetration. Globalisation involves "one-stop shopping" (i.e. door-to-door transport) and "no sweat arrangements". One-stop shopping refers to geographical coverage of the transport service; no sweat arrangements refer to the so-called value added services (i.e. integrated transport and ancillary services).

Fleet and capacity developments

A comparison of the development of the various fleets with the development of the relevant commodities shows differences in the fleet development compared to cargo growth. Between 1987 and 1992 the average world development of crude and product dedicated tankers increased by 1.9% in dead-weight (DWT) and 1.5% in numbers of vessels, i.e. slower than the growth of trade (7.4% in tonne-miles). For dry bulk products, particularly over the period 1990 to 1992, the opposite was the case, as the dry bulk and combination carrier fleet average 2.6% in DWT and 1.3% in number of vessels compared to cargo growth of around 1.2% in tonne-miles. The relative increase in the capacity of the dry bulk fleet, together with the decline in cargoes for these vessels due in part to the world-wide decline in the iron and steel industry, has put substantial downward pressure on freight rates in 1992. Indications for 1993 are for a positive improvement in these rates, but they are still below the levels of 1991. The rates in the liner trade have also been under pressure from excess capacity. The rapid increase in container capacity in relation to the development of "other commodities" has enhanced rather than relieved the pressure on the rates. Excess capacity is expected to continue in the liner industry with no let up in container over-capacity. The liner fleet is relatively young and active, so there are no extensive scrapping programmes. Instead, replacement of first and second-generation container vessels will not entail significant withdrawals from the market. Although the older liner vessels are considered too small and inefficient for the main east/west arterial trades, they are useful in feeder trades and in supporting secondary services.

Between the end of 1986 and the end of 1992, the number of vessels over 300 grt in the world's merchant fleet increased by 675 vessels, which is an average annual growth rate of 0.3% . However, the relative growth of its carrying capacity (cwt) and container capacity (TEU) was higher. In particular, the growth of container capacity was quite significant, averaging 6.3% per year. During the past two years, the development of both the world fleet and capacity have accelerated and although their development varied considerably, the container fleet increased fastest.

In mid-1992, the world container fleet stood at 7.3 million TEU, of which 3.6 million was owned by the carriers and 3.4 million by container lessors. The EC portion of the world fleet is approximately 1.8 million TEU. Container production in 1992 reached 1.15 million TEU (910 000 in 1991), of which approximately 85 000 were manufactured in the EC. Companies adopted an expansive approach as they ordered significant numbers of containers in early 1992 in anticipation of accelerating demand for trade in containerised commodities. Much of the addition of capacity came from the leasing in-

Table 6: Shipping
Development of the EC fleet in world perspective (1)

	1990			1991			1992			1993		
	Nr. of ships	DWT ('000)	TEU ('000)	Nr. of ships	DWT ('000)	TEU ('000)	Nr. of ships	DWT ('000)	TEU ('000)	Nr. of ships	DWT ('000)	TEU ('000)
World fleet	33 192	622 743	2 967	33 964	642 651	3 129	34 330	658 012	3 409	34 743	662 553	3 626
OECD (2)	12 282	198 205	1 180	12 485	213 485	1 286	12 436	212 547	1 360	12 079	205 564	1 376
- EC (2)	5 414	91 657	726	5 421	94 499	788	5 391	94 805	848	5 121	93 826	860
- USA	544	22 365	222	531	23 571	227	514	23 668	233	502	22 435	234
- Japan	3 844	39 915	82	3 825	38 796	85	3 833	36 968	93	3 792	36 336	88
Open registry	7 045	220 183	700	7 015	220 743	720	7 345	237 981	849	7 731	248 639	950
Other	13 865	204 355	1 087	14 464	208 420	1 120	14 549	207 484	1 194	14 933	208 350	1 300

(1) Ships of 300 gt/grt and over, 1st of January.
(2) Including former DDR
Source: ISL Bremen

dustry, which added about 15% to its capacity, compared to the figure for the industry of 6-7%. The slowdown in container demand towards the end of 1992 forced price reduction in some container types, with dry containers averaging a 7% drop in prices. The average in Europe was a 5% fall for 20 foot containers and almost 11% for 40 foot containers.

The development EC fleet has not kept pace with the world fleet. Unlike the world fleet, the number of vessels in the EC fleet declined over the past five years, although the capacity has increased marginally. The EC registered fleet decreased by almost three hundred vessels between 1989 and 1992. The US and Japan have faced similar declines in their merchant fleet over this period. For example, in the USA, the number of ships declined by almost 8%, while container capacity increased by 5.4%. Contrary to the developments in the EC, the USA and Japan, the "open registry" and "other" (countries) flag categories showed significant growth in both their fleets and their fleet capacity. Part of the explanation for these figures is the move of some EC carriers to flag out their vessels in order to reduce costs.

With the exception of Denmark, France, Luxembourg and the Netherlands the merchant fleet as well as the carrying capacity of all Member States declined over the period 1989 to 1992. The substantial increases in the Danish and Luxembourg fleets are due largely to formation of a second Danish register - the Danish International Register (DIS) - and the introduction of the Luxembourg register that have allowed cost-effective movements from other flags into these registers. In particular, Belgium's fleet declined substantially as most of its private fleet was transferred to Luxembourg. Other countries facing considerable reduction in their fleets were Spain and the United Kingdom. Spain's fleet was reduced by almost a quarter and the United Kingdom's by 21%. Only two countries, Spain and the United Kingdom, had a decline in their container capacity. In the remaining Member States, container capacity increased with the major increases in container capacity occurring in Denmark (52%), the Netherlands (41%) and Germany (18%). However, aggregate container capacity in the EC registered fleet has increased over 1989 to 1992 by nearly 200 thousand TEU.

Greece has the largest share in the EC fleet, 27.5% of the vessels and 49.5% of the DWT, due to the large number of bulkers and tanker owned and operated by Greek concerns. Greece is followed at some distance by Italy with 15.4% of the vessels but only 10.8% of DWT, due to a large number of smaller vessels on the Italian registry. In liner shipping, Germany accounts for the largest share in the EC's container capacity (31%), followed by Denmark (18%) and the Netherlands (14%). The differences in the fleet structure of the Member States are clearly presented in Table 8, since the composition of the fleet varies widely by Member State. The fleets of Belgium and Greece consist for the greater part of tankers and bulk carriers; by contrast in Denmark, Germany, Spain and Ireland, general cargo and container vessels account for more than half of the fleet. For the EC as a whole, general cargo vessels hold the greater share. The same is true for Japan, where general cargo vessels account for more than half of the fleet. In the US, tankers are the main vessel type.

National governments and the European Commission want to maintain an EC fleet not only for strategic and commercial reasons but also because of its contribution to Member States' economics in terms of income, employment and balance of payments. Employment of EC nationals has decreased from about 250 000 crew members in 1980 to about 120 000 in 1992. The decrease has been mainly due to the movement of owners and operators away from EC flags to open registers where there are stringent manning conditions and costs tend to be lower. In 1992, EC nationals made up 84% of the total employed in the EC shipping industry. This share varies considerably by Member State, e.g. it is relatively low in the Netherlands, where it is 61%; for France and Italy these percentages are much higher, at 93 and 96% respectively. In Spain and Portugal, no foreigners are employed at all.

INDUSTRY STRUCTURE

Companies

Tanker and bulk

In the EC, the tanker trades are dominated by time charters of tankers plying specific routes and ships owned and managed by the major oil conglomerates. The bulk trades are formed of three distinct groups, time charters, the single cargo same route and tramp vessels, where the vessel location and voyage depends on cargo availability. The latest and substantive details on the major players in these two sectors were not available at the time of publication of this chapter.

Liner

The liner industry is moving from the product life cycle stage of maturity to advanced maturity, where customer sophistication is the highest, product differentiation is low and concentration substantially increases. Hence, in this final stage of the life cycle, the two types of carrier that will survive tend to be the first tier carriers with established multi-modal presence and the niche operators that trade in speciality trades. Most companies in-between these two extremes are likely either to disappear or merge over the coming decade.

Towards the end of the third quarter of 1993 the aggregate capacity in service of the top 20 container carriers totalled 1.6 million TEU, representing 43.7% of the world's total available slots. The share of the top 20 liner companies has been

Table 7: Shipping
Development of the EC fleet by Member State (1)

	1990			1991			1992			1993		
	Nr. of ships	DWT ('000)	TEU ('000)	Nr. of ships	DWT ('000)	TEU ('000)	Nr. of ships	DWT ('000)	TEU ('000)	Nr. of ships	DWT ('000)	TEU ('000)
Belgique/België	82	3 017	23	80	2 931	23	31	50	N/A	27	47	N/A
Danmark	435	6 890	103	466	7 390	128	494	7 868	145	499	6 739	156
BR Deutschland	843	6 400	226	850	6 771	260	832	6 937	288	720	6 206	268
Hellas	1 417	37 621	68	1 398	41 039	62	1 423	43 531	70	1 407	46 354	79
España	424	5 838	16	399	5 639	16	368	5 059	17	322	3 977	15
France	207	6 214	59	202	5 531	53	199	5 378	56	210	5 553	59
Ireland	63	161	3	66	176	3	67	195	4	62	189	4
Italia	814	11 373	52	850	11 852	57	828	10 672	60	791	10 132	58
Luxembourg	2	6	0	1	3	N/A	48	2 624	20	52	2 608	17
Nederland	484	3 956	86	495	4 154	96	518	4 368	107	515	4 506	122
Portugal	70	1 015	3	78	1 232	5	75	1 342	6	69	897	5
United Kingdom	574	9 166	88	536	7 781	87	508	6 781	76	447	6 618	78
EC	5 415	91 657	726	5 421	94 499	788	5 391	94 805	848	5 121	93 826	860

(1) Ships of 300 gt/grt and over, 1st of January.
Source: ISL Bremen

increasing steadily: it was 41.9% in 1992, against 32% in 1982.

Traditionally the Asian carriers have dominated the rankings. However, although this situation continued in 1993, an EC line, Maersk Line, has moved into first place. The Asian carriers dominate the top 20 with 10 carriers, of which 5 are in the top 10. These carriers together accounted for 782 000 slots, or very nearly half of the top 20 operating capacity. Sea-Land and APL are representing the US in the top 20 with an aggregated operating capacity of 217 000 TEU or 13.6% of capacity (in 1992 it was 14.4%). Apart from ZIM Israel Navigation, UASC and the Mediterranean Shipping Company, the remaining operators are from the EC. The EC lines occupy five places amongst the top 20 and their aggregate operating capacity was 437 000 TEU or 27% of capacity, which is substantial gain in share from the 1992 result of 23%.

With regard to the individual top 20 carriers, the change in ranking of the leading firms is remarkable; in 1993 Maersk's take-over of EACBen in April 1993 boosted Maersk's capacity by almost 30 000 TEU. Amongst the other EC carriers CGM dropped out of the rankings this year due to the suspension of its Europe/US East, Gulf and West Coast services and selling two 1,060 TEU vessels from its Indian Ocean service, whilst DSR Lines joined at the twentieth place. The other EC operator with a significant increase in operating capacity is P&O Containers, which increased capacity by about 60% to move from fifteenth place to sixth.

Cruise shipping

Cruise shipping is dominated by the US, which accounts for some 85% of the world cruise industry. The US industry has expanded by almost 10% per year for the last few years, with passengers up from 1.43 million in 1980 to 3.86 million in 1991. However, as the industry comes under increasing pressure to advance safety standards, it will see some structural change in the major players. At least half of the fleet is over 20 years old, and the latest regulations from the IMO will accelerate the division between the major groups with modern tonnage and the 'others'. Also, the demand for cruises has undergone a shift away from longer cruises to those of 3 to

Table 8: Shipping
Structure of the EC fleet by Member State, 1992 (1)

(in % of total)	Tankers	Bulk/OBO carriers	General cargo vessels	Container vessels	Passenger ships	Total number ships
Belgique/België	45.2	N/A	16.1	N/A	38.7	31
Danmark	21.3	2.6	52.6	8.3	15.2	494
BR Deutschland	7.6	3.5	64.3	15.5	9.1	832
Hellas	23.0	30.4	28.7	1.3	16.6	1 423
España	20.1	7.3	59.0	5.2	8.4	368
France	28.6	6.0	33.2	9.0	23.1	199
Ireland	10.4	3.0	64.2	11.9	10.4	67
Italia	37.6	6.8	29.6	2.5	23.6	828
Luxembourg	37.5	35.4	12.5	14.6	N/A	48
Nederland	13.1	2.5	74.7	4.4	5.2	518
Portugal	25.3	8.0	57.3	4.0	5.3	75
United Kingdom	29.1	6.3	38.4	6.3	19.9	508
EC	22.5	11.9	44.7	5.9	15.0	5 391
USA	41.6	7.2	26.3	16.1	8.8	514
Japan	33.8	3.1	50.7	1.2	11.3	3 833

(1) Ships of 300 gt/grt and over, 1st of January.
Source: ISL Bremen

Table 9: Shipping
EC shipping industry employment

	1990 Nationals	Total national and no national	1992 National abs
Belgique/België	1 799	2 167	1 553
Danmark	8 800	12 800	10 800
BR Deutschland	11 778	18 747	14 446
Hellas	22 600 (1)	30 704 (2)	24 554 (2)
España	13 000	11 000	11 000
France	10 700	10 750	10 300
Ireland	1 200	1 581	1 259
Italia	26 090	27 000	25 000
Nederland	5 794	10 034	6 137
Portugal	1 711	1 711 (2)	1 711 (2)
United Kingdom	14 651	17 848	14 495
EC 11	118 123	144 342	121 255

(1) Estimate
(2) 1990 figures
Source: European Community Shipowners Associations

5 days, which should act as fillip to the EC cruise industry which has tended to specialise in short-sea cruises. Increasing concentration in the industry will mean a bipolar orientation towards the major players and the much smaller specialist operators.

Strategies

In the last two to three years, there has been a shift in the operations structure of the major liner carriers. Historically, there have been a small number of global carriers, with many companies operating in just one or two of the three major trades and niche operators filling the smaller trades. However, increased globalisation has led to acquisitions and alliances.

The response of the major EC liner carriers to the global and European challenge has been very different. Nedlloyd and P&O have built up large transport networks and restructured them in line with the growing importance of intra-European trade. Container logistics on a world-wide scale and inland activities (storage, distribution and transport) on a European scale are underlying Nedlloyd's policy, which aims at being present throughout the whole transport chain with the view to providing a full logistic package. In 1988, therefore, Nedlloyd Road Cargo, Nedlloyd Air Cargo and Nedlloyd Lines Agencies were established. In addition, acquisitions were obtained in countries like Germany and the United Kingdom. However, due to financial difficulties, Nedlloyd has re-scaled and re-organised some of its inter-modal capabilities and divested some of its non-core business.

P&O has followed a similar multi-modal policy. It has invested in key areas of surface transport industries and follows a strategy of acquisition. Furthermore, it developed P&O European Transport Services (POETS), grouping together European haulage and distribution activities. It has also been investing substantially in Chinese ports. Unlike P&O and Nedlloyd, CMBT, Bolore and Hapag-Lloyd continued to focus on their core transport activity and enhanced operations for their deep-sea service clients. CMBT (largely owned by SafMarine) has taken steps to become a leading door-to-door operator for the European market. Its deep-sea strategy is concentrated on North-South traffic. Hapag-Lloyd concentrates on inter-continental door-to door transport, although they currently provide some distribution in Europe for Far Eastern clients and have continued to sub-contract many inland modal movements for cost-efficiency reasons.

Table 10: Shipping
World merchant fleet by type and area shares, 1993 (1)

	Thousand dead weight ton (dwt)					Percentage dwt-share of country groups				
Type of vessel	Total fleet	EC	Other OECD	Open registry	Others (2)	Total fleet	EC	Other OECD	Open registry	Others (2)
Oil tankers	267 490.8	39 586.7	52 851.4	118 948.5	56 404.2	100.0	14.8	19.6	44.5	21.1
Chemical carriers	7 291.6	973.3	2 048.5	2 604.4	1 665.4	100.0	13.3	28.2	35.7	22.8
Liquid gas tankers	12 358.9	1 809.6	6 964.9	5 410.0	3 512.9	100.0	10.2	39.4	30.6	19.8
Bulk carriers	201 493.1	25 998.7	29 941.8	66 892.3	78 660.3	100.0	12.9	14.9	33.2	39.0
Oil/bulk/ore carriers	35 930.2	6 368.5	4 871.5	17 065.2	7 625.1	100.0	17.7	13.6	47.5	21.2
General cargo										
Multi-deck	45 557.6	4 290.0	2 476.7	11 915.9	26 875.0	100.0	9.4	5.4	26.2	59.0
Single-deck	25 787.8	1 942.6	2 749.7	7 763.6	13 331.9	100.0	7.5	10.7	30.1	51.7
Cellular container	31 577.9	8 394.0	3 393.4	7 711.8	12 078.7	100.0	26.6	10.7	24.4	38.3
Ferries	3 075.0	999.3	998.5	322.6	754.6	100.0	32.5	32.5	10.5	24.5
Passenger vessels	905.2	205.3	146.1	402.1	151.7	100.0	22.7	16.1	44.4	16.8

(1) Ships of 300 gt/grt and over, 1st of January.
(2) Including state trading
Source: ISL Bremen

Table 11: Shipping
Fleet by major types and area, 1993 (1)

	Total fleet Oil tankers 1 000 dwt	Share of 0-9 years (%)	Total fleet Bulk Carriers 1 000 dwt	Share of 0-9 years (%)	Total fleet Container ships 1 000 TEU	Share of 0-9 years (%)
EC	39 586.7	15.0	25 998.7	29.8	503.5	57.8
Other OECD	52 551.4	28.1	29 941.8	47.8	287.5	55.4
Open Registry (major)	118 948.5	32.6	66 892.3	30.0	450.2	57.4
Others	56 404.2	24.0	78 660.3	42.1	634.2	53.1

(1) Ships of 300 gt/grt and over, 1st of January.
Source: ISL Bremen

As for non-European carriers, Sea-Land's activities have acquired a truly European dimension, for haulage on European roads, Sea-Land used a joint venture with Frans Maas as part of a policy of forming alliances to enter the EC market. 'K' Line announced an agreement with McGregor Cory in 1992 to combine its deep-sea movements with inland distribution.

The number of conferences, capacity sharing agreements and alliances continues to grow as companies try to come to terms with over-capacity.

ENVIRONMENT

Increasing pressure is being brought to bear on EC (and non-EC) shipping companies in the areas of environment and safety. In its Communication "A Common Policy on Safe Seas", the commission expressed the main points of its future policy in this field, and the Council, in its resolution of 8 June 1993, fully supports the objectives of the Commission and the measures outlined in its action programme. Starting from the observation that although adequate international rules exist to cover many aspects, often ships are not constructed, maintained or operated up to those standards, the action programme from the Commission is based upon a coherent package of measures including:

- measures to establish a convergent implementation of existing international rules in the Community;
- measures to ensure a tighter and more effective control of ships, regardless of their flag, by the State of the port;
- measures to promote coherent and harmonised development of navigational aids and traffic surveillance infrastructure, bringing maritime safety into the electronic age;
- measures to support international organisations enabling them to strengthen their primary role in international standard-setting.

The Council has adopted the Commissions first proposal on mandatory reporting by ships, and is close to adopting proposals on common criteria for ship inspection and certification bodies and for the training of seafarers. Many other proposals will follow regarding port State control, marine equipment, non-convention vessels, fishing vessels, segregated ballast tankers, traffic surveillance and aid, and the establishment of a "Committee on Safe Seas".

Estimates put pollution from maritime transport at 12% of the total pollution entering the sea and the average loss of life at sea is around 1000 per year. The major problem has been and will continue to be one of enforcement.

CFCs continue to be an issue in the refrigerated industry, as production of the more damaging ones is phased out globally and replacements have yet to be fully proved. This is impacting the industry for refrigerated containers and the purpose built refrigerated vessels, as equipment needs to be changed over the next few years to allow for the use of the CFC substitutes.

REGULATIONS

Governments have offered throughout the years incentives to owners to keep their vessels under national flags. Nevertheless, an increasing number of vessels owned by EC nationals have been transferred to open registers. Initially, these registers were used to avoid tax liability but, in the last few years, cost reduction (particularly of manning costs) has been the main motive. The main open registers are those of Liberia, Panama and Cyprus. Some cost-saving measures have been made by governments, such as investment allowances and government-supported research to advance automation and innovation, to help EC owners with high labour costs under national flags.

Some countries have tried to mitigate the owners' plight further by creating offshore registers or similar schemes which may allow wider employment of foreigners at lower wages and of nationals at reduced levels of taxation. Denmark introduced a separate international register for Danish vessels, and Germany authorised a similar scheme in 1989.

These initiatives have now been followed with a proposal from the European Commission to introduce positive measures through EUROS as a Community ship register. EUROS would operate in parallel to the existing national registers (i.e. certain vessels already entered on national registers could as an option of the ship owner also be registered in EUROS), in which case such ship owners may be entitled to financial and fiscal benefits with a view to improving their competitive position.

The decline of tonnage under EC flags due to the relative high cost position vis-à-vis more liberal registers (resulting in a drop in EC employment), external relations to remedy protectionist practices and other distortions underlie the development of an EC shipping policy. A start on such a policy was made in 1986, when the Council adopted four major shipping regulations: 4055/86, 4056/86, 4057/86 and 4058/86. These regulations focus on liberalisation, protectionist and competition practices, which refers both to non-EC countries and EC Member States. The principles underlying these regulations are fair and free competition.

The main purpose of regulation 4056/86/EEC was to lay down rules for the application of the competition rules in international maritime transport and aims to ensure that competition in international maritime transport services from or to one or more Community ports is not unduly distorted through restrictive practices, while avoiding excessive regulation of the market. It applies to international maritime transport services other than tramp vessels. The regulation granting a group exemption to liner conferences vis-à-vis the EC competition rules was aimed at stability, guaranteeing regular and reliable services to transport users.

Regulation 4057/86/EEC is designed to deter unfair pricing practices in maritime transport; caused by unfair pricing (continuous under-pricing) practices of some non-EC countries. These practices are detrimental to the competitiveness of EC

Table 12: Shipping
EC fleet by principal types, 1992 (1)

	Number	Thousand gross tonnage	% of total EC	Fleet structure as % of total per country: Oil Tankers	Ore & Bulk Carriers	General Cargo	Miscel-laneous
Belgique/België	232	255.6	0.4	4.1	N/A	2.1	93.8
Danmark	1 276	5 780.6	9.0	29.6	9.1	4.8	56.5
BR Deutschland	1 375	5 552.1	8.7	4.4	10.7	22.2	62.7
Hellas	1 872	24 542.1	38.3	41.4	47.3	4.4	6.9
España	2 190	3 224.6	5.0	41.7	17.2	6.7	34.4
France	890	4 205.3	6.6	42.8	11.8	1.2	44.2
Ireland	189	197.6	0.3	10.4	4.6	30.5	54.5
Italia	1 636	7 730.1	12.1	29.3	29.6	3.6	37.5
Luxembourg	54	1 580.1	2.5	16.8	55.6	1.1	26.5
Nederland	1 230	4 250.5	6.6	14.4	8.9	18.9	57.8
Portugal	332	717.7	1.1	53.3	12.3	7.9	26.5
United Kingdom	1 747	6 016.9	9.4	36.5	7.0	2.7	53.8
EC	13 023	64 053.8	100.0	32.8	27.9	6.7	32.6
USA	5 737	18 228.5	N/A	36.8	8.1	9.7	45.4
Japan	10 091	25 403.3	N/A	27.7	31.1	4.0	37.2

(1) Merchant ships of 100 GT and above, excluding non-propelled craft, including overseas territories.
Source: Lloyd's Register of Shipping

ship owners in international liner shipping. The regulation allows for a redressive duty to be imposed on the foreign ship owners concerned.

Regulation 4058/86/EEC is aimed at safeguarding free access to cargoes in ocean trade. The regulation provides for a procedure to be applied when certain trade practices by a non-EC country threaten to restrict free market access by Member States' shipping companies.

Regulation 4055/86/EEC applies the principle of freedom to provide services to maritime transport both between Member States and between Member States and non-EC countries. This regulation provides for the phasing out or adaptation to Community legislation of agreements between a Member State and a non-EC country containing cargo sharing clauses and of unilateral national restrictions on the carriage of goods wholly, or partly, preserved to the national flag. This practice could seriously affect the trading interests of all countries by substantially increasing transport costs. Adjustment to Community law of agreements concerning trades not governed by the United Nations code of conduct was to be completed by 1 January 1993.

Further mention should be made of the deregulation of the EC shipping market, implying the freedom of cabotage (i.e. the freedom of a shipping company established in one Member State to operate on the domestic market of all the other Member States). In December 1992, the EC Transport Ministers adopted the regulation applying freedom to provide services to maritime transport within Member States. The text provides for a series of derogations for different trades in certain areas of the Community.

The following maritime transport services carried out in the Mediterranean and along the coast of Spain, Portugal and France are temporarily exempted from the implementation of the regulation:

- cruise services, until 1 January 1995;
- the transport of strategic goods (oil, oil products and drinking water), until 1 January 1997;
- services by ships smaller than 650 GT, until 1 January 1998;
- regular passenger and ferry services, until 1999.

Island cabotage in the Mediterranean and cabotage with regard to the Canary, Azores and Madeira archipelagos, Ceuta and Melilla, the French islands along the Atlantic coast and the French overseas departments is also exempted until 1 January 1999. This derogation extends for Greece until 1 January 2004 for regular passenger and ferry services and services provided by vessels less than 650 GT. In those areas outside the geographical scope of the above mentioned derogations, liberalisation was completed as from 1 January 1993.

An issue that has gained significant prominence in the last twelve months has been the application of the EC competition rules to maritime transport. Investigations by the Directorate for Competition (DG IV) have found that some EC lines have been acting uncompetitively, particularly in the North-South trades. The Commission imposed substantial fines on some EC lines offering services between Europe and West and Central Africa under the accusation that they were breaching Articles 85 and 86 of the Treaty of Rome and regulation 4056/86.

Finally, the new EC banana policy which came into effect on 1 July 1993 has imposed a new set of quotas on banana imports into the EC. Bananas are estimated to have about a 40% share of refrigerated trade; hence there are dedicated operators, terminals and distribution services for bananas, and the impact of the tariffs may be significant on EC consumers, as producer and shippers pass on the tariffs to consumers in the form of higher prices. It is too early to assess the impact of the new tariff regime on the banana shippers, except to note that the new regulations, as much as the previously preferred status of some exporters, cause distortions in the market.

OUTLOOK

Global developments will continue to fuel growth in global sea-borne trade. However, although developments within the EC will improve trading conditions, the outlook for the EC shipping industry is mixed. "Europe 1992" and the resulting gradual deregulation of the EC shipping market coupled with improving economic growth in the EC will provide an increase in the Community's share of world trade. The four regulations adopted by the Council of Ministers at the end of 1986 and

Table 13: Shipping
Top 20 container service operators as of September 1, 1993

(TEU)	Country	less than 1000	1000-1499	1500-1999	2000-2499	2500-2999	3000-3499	3500+	Total
Maersk Line	Danmark	15 526	16 074	9 214	14 760	22 202	40 312	56 000	174 088
- ships (number)		31	14	5	7	8	13	14	92
Sea-Land Service	USA	15 051	23 229	10 553	14 452	32 232	-	52 248	147 765
- ships (number)		25	19	6	7	12	-	12	81
Evergreen Line/									
Uniglory Marine Corp	Taiwan	15 044	17 510	10 860	-	54 560	37 708	8 458	144 140
- ships (number)		19	15	6	-	20	11	2	73
NYK Line/TSK Line	Japan	18 156	12 628	19 847	13 422	24 717	15 270	18 090	122 130
- ships (number)		29	10	11	6	9	5	5	75
Mitsui OSK Lines	Japan	20 632	4 080	12 154	6 826	32 750	-	14 573	91 015
- ships (number)		33	4	7	3	12	-	4	63
P&O Containers	United Kingdom	4 318	9 281	10 153	15 289	5 945	12 224	23 774	80 984
- ships (number)		9	7	6	7	2	4	6	41
K-Line	Japan	9 678	5 570	3 193	11 274	22 805	27 648	-	80 168
- ships (number)		18	5	2	5	8	8	-	46
Hanjin Shipping Co	South Korea	1 172	6 958	4 982	-	48 190	-	16 096	77 398
- ships (number)		2	6	3	-	18	-	4	33
Nedlloyd Lines	Nederland	5 191	17 845	16 214	2 224	16 624	-	17 840	75 938
- ships (number)		10	15	10	1	6	-	5	47
Zim Israel Navigation	Israel	14 342	15 223	7 136	4 924	8 562	21 210	-	71 397
- ships (number)		24	13	4	2	3	7	-	53
American President Lines	USA	8 847	3 740	-	8 000	5 676	21 764	21 500	69 527
- ships (number)		18	3	-	4	2	7	5	39
Hapag-Lloyd	BR Deutschland	3 374	3 970	1 685	2 181	22 076	3 430	26 506	63 222
- ships (number)		9	3	1	1	8	1	6	29
Neptune Orient Lines	Singapore	6 006	1 414	11 069	10 996	8 888	9 981	10 854	59 208
- ships (number)		13	1	6	5	3	3	3	34
Casco Shanghai	China	14 632	19 258	8 435	-	16 251	-	-	58 576
- ships (number)		32	15	5	-	6	-	-	58
Yangming Marine Transport	Taiwan	1 534	-	17 856	-	-	26 128	10 812	56 330
- ships (number)		3	-	9	-	-	8	3	23
Orient Overseas									
Container Line	Hong Kong	2 306	1 061	5 103	-	18 593	26 011	-	53 074
- ships (number)		3	1	3	-	7	8	-	22
United Arab									
Shipping Co	United Arab Emirates	16 154	4 960	10 103	19 154	-	-	-	50 371
- ships (number)		32	4	6	9	-	-	-	51
Mediterranean Shipping Co	Switzerland	10 892	19 399	11 700	2 000	-	-	-	43 991
- ships (number)		19	16	7	1	-	-	-	43
Hyundai Merchant Marine	South Korea	400	-	-	-	17 904	-	22 055	40 359
- ships (number)		1	-	-	-	6	-	5	12
DSR Lines	BR Deutschland	9 273	6 037	1 706	-	20 372	-	-	37 388
- ships (number)		20	5	1	-	8	-	-	34

Source: Containerisation International Yearbook data

recent discussions on the future of the Common Transport Policy, aimed at increasing the competitiveness of the EC shipping industry towards non-EC countries which apply unfair trading practices, may contribute to less protectionism. The aim of the Commission to achieve an efficient and competitive EC shipping industry should also enable EC ship owners to regain a major role in world shipping using ships registered in the EC. The proposed EUROS register should contribute to that end. However, the downside is that the EC shipping companies are facing and will face increasing competition from lower unit cost carriers such as those from the Far East. This may result in a reduction in the EC shipping industry and more global alliances, as the export of cargo is viewed as more important to the growth of the Community on the world stage rather than the growth of the shipping industry per se. Increased competition should reduce the price of traded goods through lower transport costs and hence EC exports and imports will have lower wholesale prices.

A large part of the tanker and bulker fleets will have to be renewed in the 1990s as the existing fleet becomes increasingly aged, which may entail problems in private financing, given the risks and the huge amounts involved. The availability of both finance and reputable ship owners in Europe will help the EC to play a larger role in bulk transport. The vessels involved in merchant shipping will be of proven design, with the exception of double-hulled tankers and hatchless container ships, but there will be a tendency towards larger container vessels.

The development of the world economy and implementation of the measures aimed at increasing the competitiveness of the EC fleet are expected to have the greater impact in the medium-term. Total carrying capacity is expected to increase at a much slower pace than container capacity: container penetration in the liner trades continues to grow and most of the prospective growth is expected in the liner sector.

Employment of EC nationals in the EC shipping industry is expected to continue to decline as shipping companies continue to flag out, although the EUROS register, if and when approved by the Council of Ministers, may contribute to halting or even reversing this trend.

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Air transport
NACE 75

Air transport is starting to move out of the doldrums caused by the recent economic weakness of some of the major trading blocs and the Gulf War. Deregulation has spurred competition within existing airlines in the EC and will prompt both an increasing number of privatisations of the traditional EC state carriers and allow airlines to consolidate operations through mergers and alliances. These will act as a spur for the globally oriented airlines to improve their competitive position vis-à-vis the airlines from the other major geographical blocs. Hence, although in the short term the pain of the adjustment process will continue, a leaner, fitter and aggressive industry will emerge. New entrants to the industry will find that the major barrier will be a lack of the availability of capital investment from market sources, which will act as a partial brake to improving competitiveness.

INDUSTRY PROFILE

Description of the sector

The air transport industry comprises enterprises which are exclusively or primarily engaged in the transport of passengers and goods by air on scheduled or chartered services as well as helicopter and air taxi services, local pleasure flight operators, etc. Air transport also includes the town offices of airline companies.

Air traffic (excluding military) is usually divided into commercial and general aviation. Commercial aviation consists of passenger travel, both charter and scheduled, and air freight, which includes air freight on freighter aircraft, combination passenger/freight aircraft and freight in the hold of passenger aircraft, and air courier and mail services. General aviation includes private use of planes and air taxi services.

This monograph will focus on the commercial aviation subsector, with particular emphasis on the major airlines of the EC Member States.

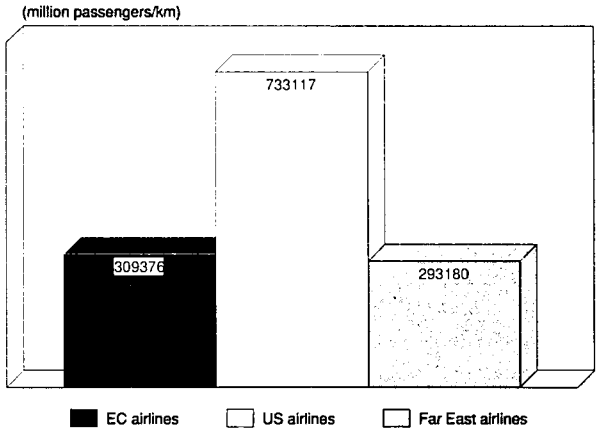
Recent trends

Average growth rates in demand for air transport during the latter period of the last decade were healthy, with an average annual growth rate of 6.85% for passenger-kilometres and 8.4% for tonne-kilometres (freight) for the period 1985 to 1990. During the same period employment grew by some 3.2% per year. This rate of growth was due to the positive economic growth experienced by the countries, both within the EC and externally, that the EC airlines served. However, the industry experienced a severe and unexpected downturn in 1991. This downturn was due to recessionary pressures emanating from the United Kingdom, the USA and Japan, and the weakening of economic growth in other major countries in the EC, in particular Germany and France. In addition, the downturn was exacerbated by the effects of the Gulf War with the result that between 1990 and 1991 passenger-kilometres declined by 4.6%, and tonne-kilometres by 2.7%. The downturn had negative implications for the labour force, which fell by 3.3%. EC air transport staged a recovery in 1992, driven largely by the improving economic environment of the United Kingdom, Japan and the USA. Growth on 1991 was 14.6% for passenger-kilometres and 3.4% for tonne-kilometres. However, comparing the out-turn with 1990, the growth rate for passengers was a healthy 9.4%, whilst freight only managed 0.6%. Despite this improved performance, the financial pressure put on the EC airlines during the downturn, whilst capacity was accelerating, has meant that the aggregate financial results of the airlines have continued to be in large deficit.

Recent indicators for 1993, issued by the Association of European Airlines for year-to-date August 1993, underscore the continuation of the recovery in air transport, with passenger traffic up some 8% on the same period of 1992, and a major improvement in freight, up some 6%. These figure should only be used as broad indicators, as there are definitional differences to those shown in Table 2.

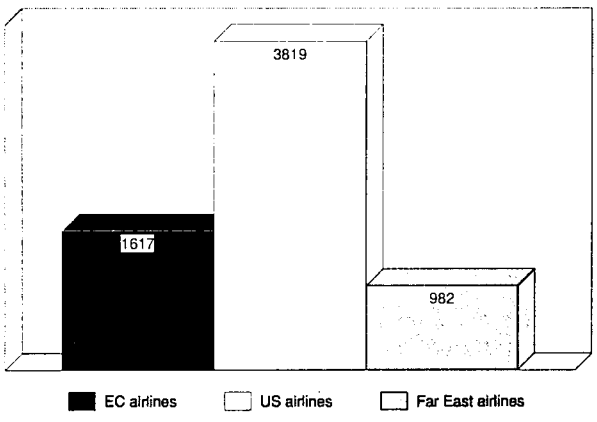
Growth in the EC's regional airlines' traffic has been over 2 time greater than the industry average over the last six years, and indications for 1993 show a growth of 12.3% for the first six months. The regionals fleets have also been under going a change, with more of the larger regional aircraft (40+ seats) being added to fleets, and more 50% of the regional fleet is under six years old giving it one of the younger aggregate fleets.

Figure 1: Air transport
International comparison of airlines, 1992



Source: IATA Yearbook 1992

Figure 2: Air transport
International comparison of number of planes, 1992



Source: IATA Yearbook 1992

Table 1: Air transport
Main indicators, 1990

	Number of enterprises	Turnover (million ECU)	Gross value added at market prices (million ECU)	Number of persons employed
Belgique/België	183	3 976	N/A	7 320 (3)
Danmark (3)	182	983	733 (1)	12 405
BR Deutschland	305	4 536	N/A	72 701 (4)
Hellas	N/A	N/A	N/A	N/A
España	111	2 259 (2)	1 263 (2)	18 900
France	151	9 250	3 032	58 966
Ireland	N/A	N/A	N/A	N/A
Italia (3)	76	5 210	2 789	20 659
Luxembourg	54	N/A	N/A	2 187
Nederland	96	3 274	1 197	29 780
Portugal	N/A	N/A	N/A	N/A
United Kingdom	N/A	N/A	N/A	64 800

(1) 1986 figure
(2) 1988 figure
(3) 1989 figure
(4) Number of wage and salary earners
Source: Eurostat (MERCURE)

Table 2: Air transport
Production indicators

(%)	1985	1986	1987	1988	1989	1990	1991	1992
Passenger-kms (million)	176 412	177 645	201 356	213 271	227 892	245 695	234 451	268 721
Tonne-kms (million)	10 302	11 262	12 465	13 642	14 678	15 394	14 974	15 481
Employment	223 083	226 774	233 591	239 014	251 155	261 056	252 580	247 449

Source: AEA Statistical Yearbook

Table 3: Air transport
AEA scheduled passenger traffic and revenue by carrier of Member States, 1992

Carrier	Passenger-kms (million)			Revenue (million ECU)			Revenue/Pass.-kms (ECU)		
		International			International			International	
	Total	Total	Europe, (%)	Total	Total	Europe, (%)	Total	Total	Europe
Aer Lingus	4 010.7	3 950.0	45.5	469.4	452.5	76.0	0.117	0.115	0.191
Air France	37 034.2	29 745.7	19.6	3 399.5	2 994.1	41.6	0.092	0.101	0.214
Alitalia	23 586.0	21 556.9	25.9	2 373.3	1 961.1	50.6	0.101	0.091	0.178
British Airways	72 491.4	67 870.2	16.3	5 953.0	5 285.4	34.6	0.082	0.078	0.166
Iberia	23 857.3	17 773.8	30.5	2 278.1	1 484.5	53.0	0.095	0.084	0.145
KLM	31 695.4	31 695.4	10.7	2 495.8	2 495.8	26.4	0.079	0.078	0.194
Lufthansa	48 660.5	44 070.0	20.9	5 548.0	4 284.8	44.9	0.114	0.097	0.208
Luxair	286.1	286.1	100.0	71.0	71.0	100.0	0.248	0.248	0.248
Olympic Airways	7 262.4	6 263.0	41.3	631.7	469.1	59.2	0.087	0.075	0.107
Sabena	6 202.6	6 202.6	29.7	813.6	813.6	57.3	0.131	0.131	0.253
TAP Air Portugal	7 671.4	6 792.6	41.8	640.8	567.8	55.8	0.084	0.084	0.112
UTA	5 962.5	5 962.5	100.0	484.7	484.7	0.0	0.081	0.081	0.000
EC	268 720.5	242 168.8	20.6	25 158.9	21 364.2	41.7	0.094	0.088	0.179

Source: AEA Statistical Yearbook 1993

Table 4: Air transport
Country to country scheduled intra-European passenger traffic on AEA airlines, 1992

(thousands) To From	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK	EC
Belgique/België	-	88.4	313.3	57.6	234.6	265.0	33.4	296.5	11.8	98.7	92.3	561.7	2 053.2
Danmark	90.3	-	426.1	36.0	98.4	182.5	26.5	130.0	0.0	141.6	42.9	372.6	1 547.0
BR Deutschland	320.3	423.6	-	410.7	710.2	1 160.9	107.1	1 100.1	0.0	488.1	187.2	2 238.9	7 146.9
Hellas	61.5	38.3	438.5	-	56.3	128.4	0.0	316.9	0.0	88.4	9.8	206.9	1 345.0
España	237.8	105.8	701.7	56.4	-	733.1	22.9	668.3	11.1	269.0	227.6	878.4	3 912.1
France	265.8	192.3	1 212.8	125.4	730.1	-	117.6	1 239.2	0.0	422.9	318.6	2 093.4	6 718.0
Ireland	34.8	25.6	109.2	0.0	23.3	116.3	-	36.8	0.0	62.9	5.4	1 278.2	1 692.4
Italia	294.2	128.9	1 098.2	303.5	666.7	1 260.6	37.4	-	0.1	325.0	128.6	1 074.9	5 318.4
Luxembourg	13.1	0.0	0.0	0.0	12.1	0.0	0.0	0.0	-	0.0	10.5	26.4	62.0
Nederland	100.9	145.1	487.7	83.6	279.3	396.1	62.6	325.6	0.0	-	168.8	687.4	2 737.0
Portugal	96.0	43.3	193.3	9.7	229.9	310.2	5.2	128.2	10.8	77.3	-	370.9	1 474.7
United Kingdom	516.3	374.5	2 261.1	204.2	871.5	1 986.7	1 269.1	1 119.5	30.4	682.0	365.5	-	9 680.9
EC	2 030.9	1 565.8	7 242.3	1 287.2	3 912.4	6 539.7	1 681.6	5 361.1	64.2	2 655.9	1 557.1	9 789.7	43 687.7

Source: AEA, Intra-European Country-to-Country Traffic, Annual 1992

International comparison

Figure 1 shows the relative sizes of the aggregates of the EC, US and Far East airlines. It includes domestic traffic, and hence the US airlines account for more passenger-kilometres than the EC and the Far East combined, and also more than double the EC.

Looking at the most recent individual results of the carriers for aggregated domestic and international, as in Table 6, there are only two EC airlines in the top ten world airlines, one Far Eastern Carrier, whilst the balance is dominated by 6 US airlines. However, the ranking changes dramatically when only the international portion of the passenger-kilometres is reviewed. In this situation, 4 EC airlines make the top ten, with British Airways in pole position, with only 3 US airlines, but given the average distances for the Far East it is not surprising that 3 Far Eastern airlines have joined the top ten. Table 6 also provides a clear picture of the level of dependence the EC airlines have on international travel demand, as their markets for domestic air travel are much too small to support the airlines. Looking at the international top ten, the proportion of international travel for the top EC airlines is 91.2%, compared to 35% for the US airlines, the corresponding figure for the Far East airlines is similar to the EC at 89.3%.

MARKET FORCES

Demand

At the aggregate level, changes in the demand for air travel are highly dependent on the growth prospects for the world economy. There is a very strong relationship between air transport demand and trade, which in turn is driven by the level of economic activity. However, the major components of air travel (i.e. business, leisure and cargo) respond to different pressures. Air travel for business purposes is primarily driven by activities that require face-to-face contact. Leisure travel is dependant on the levels and growth of real personal disposable income and available leisure time, whilst air freight depends largely on international trade. Hence periods of economic growth or recession can impact air travel significantly:

Table 5: Air transport
AEA scheduled freight (1) traffic and revenue by carrier of Member State, 1992

Carrier	Tonne-kms (million)			Revenue (million ECU)			Revenue/Tonne-kms (ECU)		
		International			International			International	
	Total	Total	Europe, (%)	Total	Total	Europe, (%)	Total	Total	Europe
Aer Lingus	109.5	109.4	12.3	41.5	40.1	37.2	0.4	0.4	1.1
Air France	3 284.0	3 193.9	1.5	688.3	663.7	3.9	0.2	0.2	0.5
Alitalia	1 261.6	1 252.2	3.7	305.8	299.4	9.4	0.2	0.2	0.6
British Airways	2 461.0	2 402.1	2.6	458.4	443.8	7.9	0.2	0.2	0.5
Iberia	578.0	514.9	8.3	176.7	139.4	23.9	0.3	0.3	0.7
KLM	2 394.3	2 394.3	2.6	792.2	792.2	6.0	0.3	0.3	0.8
Lufthansa	4 284.1	4 261.6	3.5	1 311.8	1 286.6	9.7	0.3	0.3	0.8
Luxair	0.6	0.6	100.0	1.2	1.2	100.0	2.0	2.0	2.0
Olympic Airways	107.0	99.1	33.4	54.8	49.5	49.9	0.5	0.5	0.7
Sabena	386.4	386.4	4.5	103.6	103.6	14.0	0.3	0.3	0.8
TAP Air Portugal	166.5	153.2	20.6	59.0	52.4	37.2	0.4	0.3	0.6
UTA	447.6	447.6	8.1	144.1	144.1	0.0	0.3	0.3	0.0
EC	15 480.8	15 215.4	3.4	4 137.3	4 015.9	9.2	0.3	0.3	0.7

(1) Excluding mail
Source: AEA Statistical Yearbook 1993

Table 6: Air transport
IATA members' ranking - Top 20 scheduled passengers carriers, 1992

Rank	Carrier	Passenger-kms (million) Total	International Total	International %	International Rank
1	American Airlines	156 737	42 599	27.2	5
2	United Airlines	148 841	54 560	36.7	2
3	Delta Airlines	129 541	3 311	25.6	20
4	Aeroflot-Russian Int'l Airlines	116 347	12 747	11.0	17
5	Northwest Airlines	94 345	42 808	45.4	4
6	British Airways	72 491	67 870	93.6	1
7	Continental Airlines	69 317	18 176	26.2	14
8	USAir	56 482	3 648	6.5	19
9	Japan Airlines	55 090	41 918	76.1	6
10	Lufthansa	48 661	43 895	90.2	3
11	TWA-Trans World Airlines	46 689	15 721	33.7	16
12	All Nippon Airways	38 310	10 120	26.4	18
13	Singapore Airlines	37 105	37 105	100.0	7
14	Air France	37 034	29 746	80.3	10
15	KLM (1)	31 054	31 054	100.0	8
16	Qantas	30 843	30 843	100.0	9
17	Cathay Pacific	27 466	24 994	91.0	11
18	Alitalia (1)	27 390	21 560	78.7	12
19	Iberia	23 857	16 129	67.6	15
20	Korean Airlines	21 995	18 634	84.7	13

(1) Figures deviate from the corresponding AEA data.
Source: IATA Yearbook 1992 (WATS')

for instance, in a period of strong economic growth business expands generating more business travel, real incomes increase generating growth in leisure travel and trade improvements generate more air freight. In addition, patterns of leisure travel have changed due to increasing available leisure time and income allowing for a greater proportion of major holidays to involve long distance travel, as well as short breaks that require flights.

Supply and competition

Most of the EC 'flag carriers' provide global services, whilst the small to medium sized EC airlines concentrate on predominately intra-European services (British Midland and Luxair), specific inter-continental services (Virgin Atlantic Airways) or niche point to point routes. However the SMEs do have alliances and equity partnerships that allow them access to much larger and global route structures. Within the EC the scheduled airlines are increasingly competing on a level playing field due to de-regulation. However, as many of these airlines are providing some form or other of global offering to passengers they face severe competition from the major airlines of other geographic regions that are also global in nature. The main competition comes from the US 'megas' and the Far Eastern airlines. In addition, EC schedule services continue to face competition from the EC charter carriers.

However, one longer term direct effect that European de-regulation may have is on the charter industry. Prior to de-regulation the charter industry was able to offer point to point services for leisure travel at a substantially lower unit price and cost than the scheduled carriers. On the price issue, it was the double approval regime that helped the scheduled airlines to maintain potentially artificially high fares, whilst the charter airlines were pricing on cost equated levels. The charters were able to do this as they were in essence wholesaler's offering direct flights, whilst scheduled service were typically retailers, also, charters could match supply to the seasonal peaks and troughs of demand that was typically leisure dominated. Under the new regime, intra-EC scheduled traffic can almost be charged at a price that an airline desires to attract traffic while remaining 'profitable'. This means that some of the intra-EC charter traffic may decline as the scheduled carriers take some of the traditional leisure traffic away from the charterers. The point is somewhat moot as charter services are now allowed to be retailers by appearing on Computer Reservation Systems (CRS) and tickets can be purchased by the public in the same manner as scheduled services.

One could argue that this makes the charter airlines operations into scheduled services, except that charter operators affirm their commitment to remaining the major suppliers of wholesale passenger air services meeting point to point seasonal demand. Presently, the charters do not have the same liability to passengers as a scheduled service. There is, however, pressure within the scheduled industry to force charters to conform to the same liability as scheduled carriers. This in turn will force up the charter carrier costs. The end result is that within the Community there may be a decline in intra-EC charter traffic, but that charter traffic from within the EC to destinations outside the EC, where the current bilateral agreements continue, will strengthen. It is, however, also possible that as charter carriers are forced to compete with the scheduled carriers for intra-EC traffic with a more similar cost base than currently, the charterers will start to use quality as an argument to woo customers. If the charter's traffic in the EC declines, the partial vacuum created by the demand for leisure travel will be filled by increased use of scheduled services by leisure travellers. In which case, the load factors and hence productivity of scheduled services will improve. However, the charter is likely to remain essentially a wholesale supplier matching seasonal patterns. In some cases, one fillip the charter offers passengers is a time saving due to the point to point nature of the operations.

A number of studies undertaken in the late 1980s comparing the efficiencies of the European airlines with those of the USA (and, in some cases, with the Eastern carriers) highlighted some interesting conclusions. Three inter-related factors have stood out as crucial to the relative efficiencies of airlines, namely the operating regulatory environment, the structure

Table 7: Air transport
IATA members' ranking - Top 20 freight carriers, 1992

Rank	Carrier	Tonne-kms (million) Total	International Total	%	Rank
1	Federal Express	5 768	2 415	41.9	5
2	Lufthansa	4 284	4 260	99.4	1
3	Air France	3 284	3 194	97.3	2
4	Japan Airlines	3 229	2 996	92.8	3
5	Northwest Airlines	2 694	1 720	63.8	9
6	Korean Airlines	2 656	2 605	98.1	4
7	British Airways	2 461	2 402	97.6	6
8	KLM	2 392	2 392	100.0	7
9	Singapore Airlines	2 306	2 306	100.0	8
10	United Airlines	1 930	1 139	59.0	13
11	Cathay Pacific	1 670	1 600	95.8	10
12	American Airlines	1 636	992	60.6	16
13	Alitalia	1 268	1 245	98.2	11
14	Quantas	1 226	1 226	100.0	12
15	Delta Air Lines	1 197	580	48.5	20
16	Nippon Cargo	1 105	1 105	100.0	14
17	Swissair	1 063	1 056	99.3	15
18	Thai Airways	926	911	98.4	17
19	Varic	899	705	78.4	19
20	EL AL	843	843	100.0	18

Source: IATA Yearbook 1992 (WATS')

of airline operations and labour costs. Issues such as fuel costs or scale economies do not appear to highly relevant. Many of the large airlines are active in the spot oil market, and hence fuel costs are more or less an even field. Scale economies tend to bring some benefits but also incur cost penalties: for instance, size confers the ability to benefit from large scale marketing, with particular emphasis on frequent flyer programmes, and allows better co-ordination of schedules and airport capacity utilisation. However, scale economies do not confer some magic status on cost management, as the demise of some of the largest airlines has shown, i.e. Pan Am and TWA.

Some of the Far Eastern carriers fare well in efficiency comparisons as they operate in capacity constrained markets with long stage lengths and a low-cost workforce. In comparisons between the US megas and major European carriers, the US ones appear to fare better on transatlantic traffic, however there is some question as to whether the US airlines are using revenues from the huge domestic market to partially subsidise their transatlantic routes.

The studies also looked at competitive issues for labour, as this is presently the most controllable cost and typically the European airline staff, in particular cabin and cockpit crew, are more highly paid than their US and Eastern counterparts. This higher wage burden on the European airlines is not offset by higher productivity. In fact, the US and Eastern airlines appear to have a higher average degree of productivity than their European counterparts. This is one indication that the European carriers still have a long way to go before they match the productivity levels of their major competitors.

Table 8: Air transport
Employment and fleet of AEA's scheduled carriers by Member State, 1992

	Employees	Fleet	Aircraft on order	Employees/ airplane	Total revenue/ employee (1 000 ECU)
Aer Lingus	5 600	30	2	187	91.5
Air France (+ UTA)	42 756	160	29	267	96.9
Alitalia	18 828	95	(AZ + ATI) 78	198	143.3
British Airways	47 025	226	76	208	137.5
Iberia	26 000	121	33	215	95.5
KLM	25 787	90	18	287	128.9
Lufthansa	48 351	219	12	221	144.9
Luxair	1 093	12	-	91	66.1
Olympic Airways	10 861	53	4	205	63.6
Sabena	10 359	45	-	230	89.4
TAP Air Portugal	10 789	32	4	337	59.4
Total	247 449	1 083	256	228	119.9

Source: AEA Statistical Yearbook 1993

In particular, a study undertaken in 1987 found that in the United States productivity improvements increased by 3.0% per annum for US airlines prior to deregulation, compared to 4.5% for non US airlines. Post regulation, the US airlines productivity was improving by 3.3% per annum compared to 2.8% for non-US carriers.

Production process

The production process is intensive in both its use of high technology (CRS, airlines, air traffic control, etc.) and human resources. A passenger purchases a ticket, which is then presented at check-in. The passenger then passes through two set of controls, customs and passport control and baggage and security screening. The passenger then boards the aeroplane through boarding control and is served on board with meals, snacks and drinks at a level of cabin crew to passenger only usually found in restaurants. On landing the passenger again goes through additional screening before leaving the arrivals area. In addition, any baggage not considered as hand-luggage has to follow a similar process. Hence the amount of interaction with staff of the airlines and the airports is extraordinary.

INDUSTRY STRUCTURE

Companies

Scheduled passenger services

In the EC there is typically a three tier structure in scheduled air passenger transport defined by numbers of routes and age of operation. The first tier includes those carriers that have been and still are the so-called "flag carriers", the second tier consists of the carriers that operate reasonably large networks, either within in the EC or internationally or both (for instance British Midland and Virgin Atlantic Airways) and the third tier comprises the regional carriers, i.e. Manx Airlines which operates an number of regional routes in the UK, Ireland, Channel Islands and the continent and the tiny niche point-to-point airlines, i.e. Orient Air, which operates from Waterford, Ireland to Gloucester, England via Dublin. However, in scheduled international and domestic services, the EC air transport industry is dominated by the small number of flag carriers. The ownership structure for the flag carriers in 1992 is presented in Table 11. The dominant four flag carriers share more than 70% of the services operated by the EC flag carriers in terms of passenger-kilometres (including domestic scheduled services) (Table 3).

This would indicate that the scheduled EC carriers are dominated by the 'flag' carriers , however, although the figures indicate that the industry could be considered concentrated, the number of EC airlines actually in operation is substantial. IATA lists 35 airlines operating scheduled passenger services. The European Regional Airlines Association (ERA) lists another 20 regional airlines that are not included in the IATA list. The regional airlines account for 1 in 7 of intra-Community passengers on scheduled services with 32 million passengers per annum. Also, the regionals operate a fleet of over 600 aircraft in the Community. There are also a number of much smaller regional airlines operating that are not members of either organisation. Hence, excluding freight only operators

Table 9: Air transport
Ownership of European Community airlines, 1992

Airline	Member State	Ownership-share in %	Owner
Sabena	Belgique/België	61.8	Government
		37.5	Regional investment companies and state-owned financial institutions
		0.7	Private shareholders
SAS	DK (+ S and	50.0	Government
	N, ratio 2:3:2)	50.0	Private
Lufthansa	BR Deutschland	51.4	Government
		5.5	Public sector institutions (state bank, postal service, railways, land North-Rhine-Westphalie)
		43.7	Private
Olympic Airways	Hellas	100.0	Government
Iberia	España	99.8	SEAK - State-owned holding c INI
Air France/UTA	France	98.6	Government
Aer Lingus	Ireland	100.0	Government
Alitalia	Italia	86.4	State-owned holding company IRI
Luxair	Luxembourg	36.5	Government (incl. share of state-owned bank, 13.4 %)
		25.9	Luxair Group and others
		37.6	Private companies
KLM	Nederland	38.2	Government
		61.8	Private shareholders
TAP Air Portugal	Portugal	100.0	Government
British Airways	United Kingdom	100.0	Private (no major shareholders)

Source: AEA Yearbook 1993

Table 10: Air transport
Development of AEA's total scheduled passenger traffic (1), 1987-1992

	Passenger-kms (millions)						Average annual growth rates (%)		
	1987	1988	1989	1990	1991	1992	1987/91	1991/92	1987/92
Aer Lingus	2 738	3 284	3 970	4 190	3 786	4 011	9.7	5.9	9.3
Air France	31 440	34 333	36 734	36 653	33 711	37 034	1.8	9.9	3.6
Alitalia	15 343	15 634	17 619	19 126	18 187	23 586	4.6	29.7	10.7
British Airways	55 133	56 940	60 758	66 795	62 835	72 491	3.5	15.4	6.3
Iberia	19 402	20 495	21 035	22 112	20 473	23 857	1.4	16.5	4.6
KLM	21 800	23 270	24 931	26 390	27 307	31 695	6.3	16.1	9.1
Lufthansa	31 771	34 033	36 133	41 903	42 685	48 661	8.6	14.0	10.6
Luxair	128	151	138	253	258	286	25.4	10.9	24.7
Olympic Airways	7 122	7 530	8 015	7 764	6 193	7 262	-3.3	17.3	0.4
Sabena	5 974	6 528	6 760	7 572	6 223	6 203	1.0	-0.3	0.8
TAP Air Portugal	4 978	5 640	6 231	6 836	7 025	7 671	10.3	9.2	10.8
UTA	5 527	5 433	5 568	6 101	5 768	5 963	1.1	3.4	1.6
EC	201 356	213 271	277 892	245 695	234 451	268 720	4.1	14.6	6.7

(1) Domestic + international traffic
Source: AEA various Statistical Yearbooks

and the non-member airlines there are at least 55 scheduled passenger airlines operating in the Community.

Table 3 shows the ECU revenues of the major carriers that are AEA members for international geographical European operations as a proportion of total international passenger revenues. The average exposure of the European majors to Europe is around 42%, but with wide disparities. There appears to be a weak relationship between European exposure and the carriers financial results. In 1992, KLM and Air France were among the lower carriers with European exposure, yet they both turned in some of the worst net financial results in 1992. However, British Airways, which also has a low European exposure turned in the best results among the Community flag carriers. The relationship appears to be stronger at the negative end of the scale, where the higher the exposure the more effect the general economic malaise in Europe has had. This is particularly true for Luxair, Aer Lingus and the southern Europe carriers.

Charter passenger services

In the EC, some of the schedule carriers operate charter services directly or through subsidiaries as well as there being 35 mode specialised charter operators. The importance of these charter operators is pinpointed by ACE, the European Community's Independent Airline Association, which estimates that 60% of international revenue passenger-kilometres performed in Europe by the combined membership of ACE and AEA are performed by ACE members. Also, its members employ almost 20 000 staff (1992 figure).

Air freight services

Air freight is often referred to as the poor cousin in the air transport industry. This misnomer is due to the lack of accurate and substantive data on the sector, coupled with the market being a mainly sellers market. The scheduled passenger airlines are indeed extremely reliant on the freight forwarders to fill up the cargo holds on scheduled routes.

Often, the amount of cargo space is finalised at the last moment when the final number of passengers on the flight is known, usually an hour or so before departure. There are, however, very good early estimates of available cargo space based either on maximum passenger capacity and/or bookings for the flight. The scheduled freight carrier, whether independent or a subsidiary of a scheduled airline, typically has a scheduled route for cargo on dedicated freighter aircraft.

Amongst the EC carrier members of the AEA, the air freight sector is dominated by two airlines, Air France and Lufthansa, which together account for almost half of the recorded market. British Airways and KLM follow in third and fourth place. Comparing the revenues for scheduled passenger traffic with freight traffic in Tables 3 and 5, freight accounts for just over 14% of revenue.

Strategies

There are three dominant strategies observable in the EC at present, of varying degrees of importance and influence. These are privatisation of national flag carriers, the formation of alliances and, less importantly, the formation of start-ups and expansion of the small regionals.

On balance in the European industry, it will be the process of privatisation, which is encouraged by de-regulation, that will have the largest aggregate impact on the industry. Subsidy availability from governments to the Community flag carriers to cover the substantial operating losses will be severely restricted in the new environment. Airlines will have to operate profitably in order to survive, and this in turn will require a change in the corporate environment. This re-working of the corporate environment is most likely to come about by the benefits brought about by privatisation, which will allow the flag carriers to react more swiftly to changing circumstances and free these airlines to form strategic alliances and mergers. An example of the ability of the first tier carriers to react to changing circumstances is illustrated by some of the carriers reactions to contain costs during the recent downturn. British Airways reacted very rapidly to the downturn by reducing employment levels in 1991 by some 12%, whereas, amongst the larger state owned carriers the reaction was either weaker of contrary to expectations, with Air France reducing employment by 1.2% and Lufthansa increasing employment by 4.2%. It was only in 1992, that these two carriers reacted more strongly with Air France reducing employment by 7.5% and Lufthansa by 2.6%. Both these airlines have announced further and substantial reductions in staffing levels.

Privatisation will have a substantial impact on employment: for instance, in the run-up to privatisation British Airways reduced staffing by one third through a programme of voluntary reduction and early retirement schemes. This amounted to almost 20 000 employees, and if similar ratios are applied to the present expected round of privatisations Air France and Alitalia, staff reductions could reach 20 000 or almost 8% of employment of the AEA members (Table 10).

The most rapid transformation of the industry structure is taking place through alliances, both within the EC and globally. These alliances take a number of forms, from equity investment to code-sharing agreements. Typically equity alliances involve an EC airline purchasing minority stakes in other airlines, for instance, British Airways currently owns 24.6% of USAir, 25% of Qantas, 49% of Deutsche BA, 49.9% of TAT, 40% of the Plimsoll Line, and 31% of Air Russia, as well as absorbing Dan Air in October 1992.

Shared equity stakes could follow the pattern of the abandoned 'Alcazar' alliance between Scandinavian Airlines System (SAS), KLM Royal Dutch Airlines, Swissair and Austrian Airlines. These four medium sized airlines announced plans in April 1993 to set-up a jointly owned company with SAS, KLM and Swissair owning 30% of the equity each and Austrian taking the remaining 10%. The joint venture would have had a single management structure and balance sheet. The new company would have matched the individual European majors in size and passengers, and would not be too far behind the US 'mega-carriers'. Longer term expectations are that the four airlines will now form mergers or allied operations with other EC or non-EC airlines as their individual markets are considered by them to be too small to compete globally. This example provides a clear insight into forming strategic partnerships based on equity investment.

Typical non-equity alliances follow the pattern recently announced between Lufthansa and United Airlines as Lufthansa seeks a strategic link with one of the US mega-carriers. The form of the alliance will include ticket code-sharing, collaboration on frequent flyer programmes and marketing, and some sharing of airport facilities: essentially, it will allow Lufthansa access to the 200 cities served by United. This desire for an alliance with one of the American majors has also materialised into BA's partial equity purchase of USAir, Air France's co-operative agreement with Air Canada (and hence potential links with Continental), KLM's stake in Northwest, Delta and Swissair's cross-equity, and the proposed SAS-KLM-Swissair-Austrian alliance discussed above.

Increasing concentration in the airline industry, particularly through alliances, continues to dominate strategic thinking in Europe, especially following the third package. Many of these alliance involve code-sharing and block-space agreements. Code-sharing provides a seamless flight that may involve two or more airlines (usually two) and potentially a change of aircraft. The advantage of the code-share is that it shows up on CRS as a single flight and hence appears before flight combinations with two or more flight numbers. Blockspacing is where airlines add their code to another carrier's flight and vice versa, where the two carriers have blocked space on the flight of the other carrier.

Table 11: Air transport
ACE members traffic - 1992

	Country	RPK (million)	PAX (thousand)
Aero-Lloyd Luft	D	2 400	1 144
Air 2000	UK	10 013	3 405
Air Belgium	B	742	437
Air Berlin	D	1 000	500
Air Europa/Espana	E	4 500	2 328
Air Europe Italy	I	2 497	197
Air Holland	NL	1 000	500
Air Liberte	F	2 815	1 030
Airtours	UK	2 000	1 000
Air UK Leisure	UK	2 132	1 044
Britannia Airways	UK	15 515	6 865
Caledonian Airways	UK	6 330	1 006
Conair	DK	3 145	1 153
Condor Flugdienst	D	12 453	4 294
Corsair	F	2 000	1 000
Dan Air	UK	5 140	4 110
Euralair	F	610	630
Eurobelgian Airlines	B	702	384
Excalibur Airways	UK	1 000	330
Germania	D	2 130	1 000
Hapag-Lloyd Flug	D	8 360	3 346
Inter European Airways	UK	3 125	1 300
LTE	E	1 877	957
LTU Group	D	14 335	4 500
Maersk Air	DK	1 303	1 280
Martinair Holland	NL	7 486	1 704
Monarch Airlines	UK	9 102	3 461
Oasis Airlines	E	2 000	1 000
Sobelair	B	1 336	915
Scanair	S	5 700	1 714
Spanair	E	4 400	1 937
Sterling Airways	UK	3 156	1 128
Virgin Atlantic Airways	UK	8 632	1 233
Total		148 934	56 830
Total in Europe		134 041	51 147

Source: ACE

The liberalisation of the EC skies, discussed below, has allowed the smaller niche regional carriers to expand services where previously route rights and slots were hard to come. In addition the regulations on start-ups should foster additional point to point small airlines, as they take away some of the competitive edge previously held by other airlines through prior legislation. However, there is currently a shortage of investment capital for start-ups and this may seriously threaten expansion in this niche field.

Frequent flyer programme

Frequent Flyer Programmes (FFPs) are used as a competitive tool by airlines to win frequent travellers by providing rewards for flights taken on a particular airline or groups of airlines. These rewards usually take the form of points which count towards free flights, ticket upgrades, leisure travel and holidays, amongst others. Many airlines view FFPs as defensive, in order to maintain competitiveness and existing customer base rather than gain additional custom. The programmes have two advantages for the airlines in that they provide a useful marketing tool for matching customer requirements more exactly and developing new marketing strategies, and since they are usually restricted they enable airlines to balance loads on flights. The major drawback are the costs associated with administering the programmes and providing the rewards. The airlines in the EC have introduced FFPs cautiously and with a tremendous variation in the levels of rewards.

Two major changes have been observed recently, in that more airlines are rewarding the lowest fare leisure traveller compared to the original requirement of business or fully flexible economy tickets. Hence, airlines are keen to fill up the back of the aircraft on a marginal cost basis, and secondly, there appears to early indications of an FFP war, as airlines have been increasing rewards, in some cases doubling them. The Community has being studying the requirement for monitoring FFPs and a report issued by the Commission in early May entitled 'Frequent Flyer Programmes in the Internal Aviation Market' indicates that the code would guarantee that FFPs do not distort competition. The report notes that there are three principal areas where FFPs may contravene competition laws, the most important of which appears to be when an FFP is designed as a target rebate by requiring a member the FFP to attain certain flight-mileages within a specific period. At the end of 1992, the number of members of the major EC airline programmes was around 700 000, which is a tiny number compared to the 80 million participants of the US airline schemes.

ENVIRONMENT

The two most important environmental impacts of the air transport industry are noise and air pollution. Noise is particularly important, estimates included in the Commission's Green Paper on The Impact of Transport on the Environment suggest that the percentage of the population exposed to aircraft noise above 55 db(A) varies from 35% in the Netherlands to 1.7% in Denmark, and above 65 db(A) from 1% in Germany to 0.3% in Denmark. Hence, the location of airports close to residential areas is a key factor in noise pollution. Estimates released by the AEA show that the modern jets generate about the same level of noise as a TGV, but for a comparatively minute distance (some 4 kilometres). However, the discussion about noise continues at full pace, and most services that land or take off at airports near residential areas have strict requirements about night flights and the levels of thrust that can be used. This has a detrimental impact on the airlines costs as it can take much longer for an aircraft to reach optimum cruising altitude and hence the fuel burn and the time taken for a particular stage length is higher.

Estimates for air pollution put carbon dioxide emissions second to road transport but the gap is considerable, with road accounting for almost 80% and air taking almost 11%. Other emissions such as nitrogen oxides are still under investigation, however, some figures from the UK indicate that air emissions of NOx account for only 1%. Further research is being conducted on the measurement of NOx in the troposphere, where it is feared that the effect of the greenhouse gases is greater than at ground level.

An important caveat to understanding the relative pollution of air transport vis-à-vis other modes is that the advances made by modern technology are substantially reducing both air and noise pollution.

REGULATIONS

The Commission of the European Communities has taken a gradual approach to deregulation in order to avoid the pain experienced by the US industry following the deregulation of the US market. In 1978, the US government deregulated

Table 12: Air transport
Development of AEA's total (1) scheduled freight traffic, 1987-1992

Carrier	Tonne-kms (millions) 1987	1988	1989	1990	1991	1992	Average annual growth rates (%) 1987/91	1991/92	1987/92
Aer Lingus	87	102	118	128	115	110	8.0	-4.3	5.3
Air France	2 928	3 154	3 262	3 423	3 230	3 284	2.6	1.7	2.4
Alitalia	901	1 019	1 107	1 159	1 218	1 262	8.8	3.6	8.0
British Airways	1 873	2 028	2 183	2 291	3 236	2 461	18.2	-23.9	6.3
Iberia	524	589	725	753	614	578	4.3	-5.9	2.1
KLM	1 720	1 873	1 991	2 125	2 220	2 394	7.3	7.8	7.8
Lufthansa	3 242	3 479	3 840	4 026	4 093	4 284	6.6	4.7	6.4
Luxair	0 (2)	1	0 (2)	0 (2)	0 (2)	1	-	-	-
Olympic Airways	104	102	103	113	114	107	2.4	-6.1	0.6
Sabena	536	651	661	663	486	386	-2.3	-20.6	-5.6
TAP Air Portugal	125	141	160	171	163	167	7.6	2.5	6.7
UTA	431	503	528	542	485	448	3.1	-7.6	-2.2
EC	12 465	13 642	14 678	15 394	14 974	15 481	5.0	3.4	4.8

(1) Domestic + International traffic, excluding mail.
(2) Less than 0.5 million tonne-kms
Source: AEA various Statistical Yearbooks

Table 13: Air transport
Average annual growth rates in scheduled air traffic (1)

(%)	1985-1991	1986-1992	1989-1991	1990-1992
Passenger-kms	4.9	9.6	1.4	4.7
Tonne-kms	6.4	7.1	1.0	0.3
Employment	2.1	2.1	0.3	-2.6

(1) AEA carriers only
Source: AEA Statistical Yearbook

the domestic market by abandoning the geographical limits to route networks, fare regulation and refusing to enforce the hitherto powerful economic regulations. The result of deregulation in this market was a proliferation of new entrant carriers in the early 1980s. The lower unit costs arose from the surplus of experienced labour that had been made redundant by the established airlines. However, a large number of these new entrants were later either taken over by the larger airlines or went bankrupt and ceased operations, as well as some of the very large operators. The effect of this was to concentrate the US domestic and international air travel in a handful of 'mega' carriers with a number of substantially smaller 'niche' carriers. As a result of the deregulation in the US and in some other markets, deregulation is often accused of aiding or at the very least not stopping concentration as there appears to an inherent inability of airlines to adapt to the new regimes by changing cost rigidities, particularly labour rigidities: airlines are hence unable to compete and either go bankrupt or are taken over.

Following the US, European support for liberalisation of air transport policy gathered momentum, with the United Kingdom being one of the leaders. In 1984, the UK signed a new air services agreement with the Netherlands, which was further modified in 1985 and in essence completely freed air services between the two countries. The agreement allowed free entry of new carriers, open route access by designated airlines to any point in either country, no control on capacity and a double disapproval fare regime. This agreement represented the first major break in the usual bilateral traditionally found in Europe. More agreements followed in Europe, some of which were very liberal in that they removed any controls on the points that could be served in each country by the other county's airlines. In theory this offered equal opportunities for either countries' airlines.

Typically, the bilaterals that were negotiated in Europe during the mid 1980s allowed first, third, and fourth freedom rights, but more importantly relaxed the limits on capacity as well as fare regulation and propagated the double disapproval fare regime.

The Commission of the European Communities added weight to the existing agreements in a series of three packages, which enforced new agreements on members that had not negotiated liberal bilaterals, and, more importantly, allowed more extensive fifth freedom rights, as well as paving the way for cabotage later in this decade.

Although the first two packages were quite limited in scope, they nonetheless underscored the Commission's commitment to deregulating the air transport sector within the European Community.

The main achievement of the first two packages was to harmonise national legislation at the then most achievable level for competition as well as providing the foundations for the third package. The process has been quite gradual due to the negotiation required between the individual Member States and the need to keep in line with the progress towards the Single Market. The first and second packages were thus not viewed as deregulation since there remained a number of legislative constraints including continued capacity limitations and some fare regulation.

It is the third package that came into force on 1 January 1993 that really liberalised the air transport market in the European Community and that will influence most of the future organisation of the sector. This package essentially allowed any airline, existing or start-up, to operate anywhere in the Community with whatever capacity and fare level the airline chooses. There exist a small number of exceptions, such as very thin routes which can be protected, but these do not detract from the aggregate effect of liberalising air transport in the European Community. However, in order to obtain an 'air operator's certificate (AOC)' for start-ups, the airline has to provide the relevant authorities with a business plan that includes minimum capital requirements and the ability to operate for a minimum term. The main issue outstanding is one of cabotage, where it is currently restricted to 50% of capacity and is only allowed if the airline starts or finishes the flight in its home country. However, cabotage will be completely unrestricted from April 1997.

So far, the reaction by the airlines to the third package has been relatively cautious. There has been no explosion of fare reductions or added capacity, however alliances, whether equity based or not, are increasing, both amongst the EC airlines and between EC airlines and non-EC airlines. This increasing concentration is based on both the EC airlines' desire to seek positive positioning within the EC and the need to act global. This somewhat mirrors the situation that was observed in the US in the 1980s, but with less equity involved.

Recent agreement has been reached by the EC transport ministers on a code of conduct for computer reservations systems (CRS) which in essence ensure that airlines that own a CRS are prevented from poaching passengers from other airlines that participate in the same system.

OUTLOOK

There is a growing optimism for some of the European airlines since the weakness in the industry appears to have reached the bottom of the trough, and although the short term prospects

Table 14: Air transport
Comparison of EC, USA and Far Eastern IATA members, 1992

	Load-factor (%)	Employment
EC airlines	66.7	284 289
US airlines	63.7	521 566
Far East	68.0	226 647

Source: IATA Yearbook 1993

Table 15: Air transport
Air freedom rights

First Freedom	To overfly one country en-route to another
Second Freedom	To make a technical stop in another country
Third Freedom	To carry passengers from the home country to another country
Fourth Freedom	To carry passengers to the home country from another country
Fifth Freedom	To carry passengers between two countries by an airline of a third country on a route with origin/destination in its home country
Sixth Freedom	To carry passengers between two countries by an airline of a third on two routes connecting in its home country
Seventh Freedom	To carry passengers between two countries by an airline of a third on a route outside and completely separate from its home country
Eight Freedom/Cabotage	To carry passengers within a country by an airline of another country on a route with origin/destination in its home country

Source: AEA

Table 16: Air transport
Expected annual growth rates of air traffic by country market in the EC (1), 1993-1997

Average	1993	1994	1995	1996	1997	1993-1997
Belgique/België	9.1	4.7	3.9	5.7	5.9	5.8
BR Deutschland	8.0	6.0	6.4	6.7	6.5	6.7
Hellas	4.0	4.1	4.5	4.2	4.3	4.2
España	8.0	6.1	5.7	5.7	5.9	6.2
France	4.6	1.8	2.9	5.9	6.0	4.2
Ireland	5.2	3.8	2.9	2.9	3.1	1.4
Italia	5.8	5.8	5.5	5.3	5.2	5.5
Nederland	8.9	4.2	5.3	5.6	5.7	5.9
Portugal	4.2	5.4	5.1	5.2	5.4	5.1
United Kingdom	4.2	2.6	2.5	5.2	5.1	3.9

(1) Excluding Danmark and Luxembourg
Source: AEA

for 1993 are weak, a number of European airlines are very well placed for improved performance commencing in 1994. These expectations are based on the improving economic picture for the US, the UK and the gradual recovery of other European countries. Table 17 illustrates the AEA forecast by country, with nearly all countries providing reasonable average growth rates for the period 1993-97.

The deregulation of the skies will force continued consolidation within the industry in order for airlines to remain competitive with both their competitors within the EC and outside the EC. Hence the number of major EC operators is expected to decline in the future, whilst the number of smaller niche point to point airlines will increase.

One blight on future growth of air traffic in the EC is the limitations of Europe's Air Traffic Control (ATC). Eurocontrol, Europe's largest air traffic control grouping, has re-iterated warnings that significant investment is required to harmonise and update Europe's air traffic control in order to avoid the crunch that is looming. At present, 23 countries of the European Civil Aviation Conference have 31 different air traffic control systems. These systems rely on 18 different types of computers and 30 incompatible programming languages. In 1992, almost 13% of delayed short/medium haul flights (delays over 15 minutes) in Europe were due to airport and air traffic control reasons. Although improvements to ATC are being provided, there is still a long way to go in terms of investment capital and time before a harmonised system of ATC will be available that is comparable to the one currently in existence in the United States. One fillip for international airlines, including those of the EC, is the Future Air Navigation System (FANS), which if approved by the 33 members of the UN International Civil Aviation Organisation (ICAO) will move much of the current ground-to-air based navigation and air traffic management to satellite-to-air. Estimates on the savings for airlines reaches as high as ECU 7.8 billion by providing more efficient routing and reducing delays caused by air traffic control.

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Postal and express services
NACE 79

In the past decade private operators have been able to capture a substantial portion of the market for (non-reserved) high value added services. They have invested in efficient networks with large capacities to provide predictable, rapid door to door services. These were features required by users in that particular segment of the market, which the traditional postal administrations were traditionally unable to offer. The situation in the EC is changing considerably as postal administrations continue to invest in expanding and enhancing their services to meet market requirements enabling them to compete with private operators without relying on monopoly status. Further policy initiatives put forward by the European Commission will cause further structural changes in the services provided by both postal administrations and private operators.

INDUSTRY PROFILE

Description of the sector

NACE 790 includes all units exclusively or primarily engaged in transmitting sounds, images, documents and packages for the benefit of the general public. Apart from postal and express services, this NACE heading includes telephone, telegraph, telephotography and telex services.

This monograph deals exclusively with postal and express services. In particular it concerns the activities of postal administrations of Member States and private operators. However, postal administrations are also involved in financial services like postal giro offices (NACE 812) and post office savings bank branches (NACE 813.1).

Postal and express services provide the mechanism whereby letters and packages are moved between two distinct groups of users. The service provides transmission for business to business, business to private, private to business and private to private.

The distinction between letter services and parcel services for both postal and express is determined by weight and contents (typically letters carry 'communication'; parcels carry 'goods', although letter services can carry small goods). Pricing of the services is determined by weight, geographic destination (where zonal price differences are typically differentiated into domestic, EC, and substructures for the rest of the world) and required speed of delivery.

Letter services provided by postal administrations can be categorised in three main areas:

- Standard letter services for letters, post-cards, printed papers and small packets with or without priority delivery;
- Subsidiary letter services, which include registered letters, recorded letters, certificate of posting/advice of delivery, special delivery, express, direct bags ("M-bags"), post office boxes and post restante;
- Additional letter services, such as postal electronic mail, "hand delivery", "city mail", periodics (magazines and newspapers) and un-addressed direct mail.

Postal administrations typically provide letter services under a monopoly (reserved services). In general a concession is granted to the postal administrations, in which they have special and exclusive rights for offering these services. The provision of the service is then obligatory. Parcel and express services are offered in a competitive environment (non-reserved services), where postal administrations may dominate in some parcel sub-services (such as private-private), whilst private operators dominate express services and general parcel services. In some non-reserved services, postal administrations are expected to provide a service under universal service obligations, known as obligatory non-reserved services, where usually the obligation allows for packages up to 20 kilograms.

In financial services, postal administrations offer the following:

- postal payments (money orders, postal orders and cheques, "valeurs declarées");
- girobank operations (tele-payment, interior accounts/deposits/pay-out, foreign currency, mortgages and charge/credit cards);
- savings bank operations (home savings and common funds investment);
- other payments (pensions, welfare services, licences, taxation and public payments).

The distinction between postal administration priority services (often called 'express') and private operator express services is that the private operators are providing precise predictability, using time reliable, door to door services and facile track and trace capabilities. Generally, the postal administration priority services are not predictable as there is only an estimated

Table 1: Postal and express services
Postal administrations - Receipts in % of gross domestic product

(%)	1980	1985	1988	1989	1990	1991
Belgique/België	1.00	0.98	0.86	0.84	0.78	0.78
Danmark	N/A	N/A	N/A	N/A	N/A	N/A
BR Deutschland	0.84	0.98	0.74	0.82	1.16	0.81
Hellas	0.28	0.21	0.32	0.30	0.05	N/A
España	0.21	0.23	0.17	0.22	0.22	N/A
France	1.46	1.54	1.35	1.35	1.05	N/A
Ireland	0.61	0.94	0.87	0.81	0.82	0.86
Italia	0.40	0.06	0.69	0.67	0.73	N/A
Luxembourg	0.52	0.62	0.73	0.64	0.59	0.68
Nederland	1.53	1.55	0.88	0.91	0.90	N/A
Portugal	0.37	0.45	0.45	0.40	0.42	0.46
United Kingdom	1.00	0.92	0.83	0.87	0.86	N/A

Source: Eurostat using UPU data, national postal administrations

day of arrival, letter and packages often have to be taken to a post office (and if not, involve an extra fee) and although track and trace exists in most cases, it does not allow for rapid tracking. However, improvements in recent years have meant that the United Kingdom, France and Germany have substantially improved the predictability of their priority services.

Recent trends

The postal services sector is an important sector for the European Community, employing in excess of 1.7 million staff. The sector is critical for most business and private interaction and trade, as it provides an important mechanism for communication, which although it competes with other forms of communication such as telephone, fax, and international travel, remains the major force.

Measured in terms of the number of items handled, the largest postal administration in the EC is France's La Poste. This administration is estimated to have handled more than a quarter of all the EC's items handled in 1991. The German postal administration ranks second and the United Kingdom third. These top three provide more than 55% of item movements amongst the postal administrations.

Over the last few years the number of post offices open to the public and the numbers of employees have remained relatively stable.

Competition from private operators has taken some of the aggregate market share as in the late 80's private express services had strong growth with rates in the range of 30-40% a year. In market size the estimates for the total volume of items in the intra-European express market is around 30 million per year, which is significantly smaller than the comparable total for the postal administrations (including extra-European movements) of over 80 billion.

The private operators have caused a shift in the market for postal services. The national postal administrations, have been faced with increasing competition in the non-reserved services from the private international operators aggressively moving into the market, especially in the field of parcels and priority express services. This has hastened some of the more aggressive postal administrations into improving their own priority and package services.

International comparison

Comparing postal administrations in the EC with those in the USA and Japan reveals that the EC administrations with a total of some ECU 60 billion have the largest turnover. In the USA total turnover amounts to around ECU 30 billion, and in Japan turnover is around ECU 10 billion.

On average each EC citizen received 260 mail pieces in 1990 (243 in 1988). In the USA however, the number of mail pieces received annually by citizens is much higher at 650. This difference is due mainly to a much higher level of direct mailing activity - addressed and non-addressed. In Japan the average amounts to about 160 pieces.

Within the EC there are large differences in the average number of per capita mail items received. In Denmark and the Netherlands this number is the highest with over 400 items per year. On the other hand, in Greece and Portugal the average is below 100 items annually. Figures for Japan reveal that in Tokyo mail received per capita amounts to 388, whereas in some rural prefectures this is less than 60 pieces.

Comparisons of relative efficiency of the postal administrations often use the number of items handled per employee. Recent estimates for the US and Germany indicate that the US Postal Service handles 160 billion pieces for 800 thousand employees, that is 200 thousand pieces per employee, compared to the Deutsche Bundespost, which handles 17 billion pieces for 280 thousand employees, or 60 thousand pieces per employee. These comparisons, although partially useful for broad brush comparisons, are fraught with problems as the number employed by an administration may include workers who are irrelevant to postal services, for instance in the girobank division, and the structure of mail services differs significantly within the Community.

MARKET FORCES

Demand

Customers of postal services are either businesses and organisations or individuals. About 80% of all mail originates from businesses and organisations, of which around 45% is destined for the same business and/or organisational group. About half of the mail from individuals is destined for businesses and organisations. The other half goes to other individuals. For parcel services the distribution is slightly different. Businesses and organisations send about 85% of all parcel items, the bulk of which (70%) is received by individuals. About two thirds of parcels sent by individuals are destined for other individuals.

For postal administrations the market is rather evenly spread over various end users. The more important outlets are the

Table 2: Postal and express services
Postal administrations - Gross investments

(million ECU)	1980	1985	1988	1989	1990	1991
Belgique/België	29.7	25.0	34.0	44.6	82.3	99.8
Danmark (1)	36.1	46.5	17.6	22.1	17.2	27.4
BR Deutschland	209.6	359.8	613.3	615.7	664.0	646.9
Hellas	1.4	7.6	4.0	4.7	2.6	4.2
España	14.0	32.8	11.4	18.1	20.5	N/A
France	251.3	382.9	429.8	413.9	461.7	N/A
Ireland	2.2	9.8	10.8	16.3	9.5	11.9
Italia	179.7	681.0	948.0	758.6	836.6	N/A
Luxembourg	N/A	0.0	0.0	0.0	0.0	0.0
Nederland	67.2	123.9	89.7	76.7	90.0	N/A
Portugal	8.1	15.6	15.5	21.8	23.3	N/A
United Kingdom	115.8	2 507.1	216.7	382.4	330.6	N/A
EC	N/A	4 191.9	2 390.7	2 374.9	2 538.2	N/A

(1) 1980 and 1985 including telecommunications services
Source: Eurostat using UPU data, national postal administrations

Table 3: Postal and express services
Postal administrations - Main indicators

	1988	1989	1990	1991
Number of post offices open to public				
Belgique/België	1 838	1 833	1 821	1 822
Danmark	4 887	4 765	4 873	4 786
BR Deutschland	17 642	17 568	29 515	26 135
Hellas	N/A	N/A	N/A	933
España	12 985	18 582	41 833	N/A
France (1)	17 028	16 999	16 967	16 945
Ireland	2 082	2 069	2 046	2 023
Italia	14 426	14 439	14 464	N/A
Luxembourg	106	106	106	106
Nederland	N/A	N/A	N/A	2 405
Portugal	7 399	7 198	7 306	7 814
United Kingdom	21 030	20 871	20 638	N/A
Number of post items handled (millions) (2)				
Belgique/België	3 083	2 981	3 378	3 463
Danmark	1 744	1 758	1 790	1 815
BR Deutschland	15 844	15 940	16 318	17 052
Hellas	451	475	438	428
España (3,4)	5 026	5 574	5 609	5 700
France	18 833	20 016	20 746	21 868
Ireland (3)	465	472	482	646
Italia	8 279	8 988	8 912	8 247
Luxembourg	172	173	173	174
Nederland (4)	5 890	6 105	N/A	6 300
Portugal	601	636	707	794
United Kingdom (4)	14 242	15 803	16 412	16 500
EC (4)	74 630	78 921	N/A	82 987
Number of persons employed				
Belgique/België	46 022	46 057	45 383	46 133
Danmark	33 600	34 400	28 235	27 351
BR Deutschland	272 571	272 571	277 691	279 990
Hellas	11 602	11 690	12 020	11 216
España	56 094	70 389	70 236	N/A
France	295 300	295 887	299 785	297 428
Ireland	10 269	9 871	9 812	9 564
Italia	237 088	230 615	236 922	233 518
Luxembourg	1 694	1 702	1 704	1 769
Nederland	64 414	58 894	60 450	61 970
Portugal	16 277	16 092	15 837	15 800
United Kingdom	218 000	235 200	235 168	N/A
EC	1 262 931	1 283 368	1 293 243	N/A

(1) Including mobile post offices
(2) Domestic + International service
(3) Figures for Spain 1988 and Ireland 1988-90 include only domestic service.
(4) 1991 estimates
Source: Eurostat using UPU data, national postal administrations, DRI

publishing industry, which sends periodicals to its readers by mail and accounts for about one fifth of the shipments made, and direct marketing/advertising mail; for instance non-addressed mail delivered to household in 1992 by Belgium's La Poste was 51 million items, which is more than 7% of all items. Another important segment is mail ordering.

The largest users of services by private operators (mostly parcels and express shipments) are industry and mail order companies and the services sector. Industry constitutes about a quarter of total shipments, whereas mail ordering takes another 20%.

During the seventies and the eighties, mail order continued to develop as a competitor of store retailing services. This development allowed postal services to benefit from the growth in package movements created by mail order, as they have been able to meet with requirements such as customer communication, catalogue distribution, statement sending and goods distribution. Anecdotal evidence indicates that there has been a tendency, however, for private operators to take more of this market from public administrations by providing better service quality, security and reliability, specifically for the movement of the purchased articles in packages.

Advertising by mail (direct mail) has also become of considerable importance for postal services over the years. An increasing share of marketing and sales budgets is spent on direct mailing activities. But in this market segment also, postal administrations are loosing market share to private operators, particularly in urban areas, where local services are advertised using private delivery of sales and marketing information.

Distribution of publications by mail remains important for postal administrations. They can offer cheap mailing services

Table 4: Postal and express services
Postal administrations - Receipts and expenditure

(million ECU)	1988	1989	1990	1991
Receipts				
Belgique/België	1 106.8	1 170.7	1 181.3	1 264.5
Danmark	N/A	N/A	N/A	N/A
BR Deutschland	7 483.3	8 785.0	13 662.9	8 733.0
Hellas	144.6	149.0	26.0	151.4
España	509.2	755.2	833.4	N/A
France	11 007.6	11 836.8	9 866.6	N/A
Ireland	245.3	253.7	279.4	N/A
Italia	4 910.6	5 315.0	6 295.0	N/A
Luxembourg	42.3	41.9	41.5	208.7
Nederland	1 728.1	1 883.4	2 000.9	N/A
Portugal	157.1	163.6	197.9	N/A
United Kingdom	5 891.9	6 623.2	6 610.6	N/A
Expenditure				
Belgique/België	1 044.6	1 165.2	1 200.6	1 283.8
Danmark	N/A	N/A	N/A	N/A
BR Deutschland	9 584.2	9 454.4	13 662.8	9 410.3
Hellas	163.1	193.4	242.8	217.1
España	683.8	928.4	N/A	N/A
France	11 011.9	11 645.4	9 679.7	N/A
Ireland	243.1	260.4	290.2	N/A
Italia	6 455.3	7 007.9	7 935.2	N/A
Luxembourg	87.7	88.2	96.8	103.3
Nederland	1 684.6	1 790.4	1 856.2	N/A
Portugal	207.0	398.0	254.3	N/A
United Kingdom	5 718.6	6 535.4	6 188.9	N/A
Surplus/deficit (receipts - expenditure)				
Belgique/België	62.2	5.5	-19.3	-19.3
Danmark	N/A	N/A	N/A	N/A
BR Deutschland	-2 100.9	-669.4	.1	-677.3
Hellas	-18.5	-44.4	-216.8	-65.7
España	-174.6	-173.2	N/A	N/A
France	-4.3	191.4	186.9	N/A
Ireland	2.2	-6.7	-10.8	N/A
Italia	-1 544.7	-1 692.9	-1 640.2	N/A
Luxembourg	-45.4	-46.3	-55.3	105.4
Nederland	43.5	93.0	144.7	N/A
Portugal	-49.9	-234.4	-56.4	N/A
United Kingdom	173.3	87.8	421.7	N/A

Source: Eurostat using UPU data, national postal administrations

at preferential tariffs. However, private operators are competing with this low value mail services, as other requirements can be important (e.g. a guarantee to deliver the next day).

Supply and competition

Timeliness, reliability and service quality have become the major competitive factors that have provided the spur for the expansion of private operators. Postal administrations with their historical monopolies on letter mail services allowed these factors to be neglected in the past. This has allowed private operators to capture a significant part of the market for high value added express services, whereas public administrations with their obligation to provide reserved services have to a large extent been confined to low value added postal services. Private operators account for about 45% of turnover in the market with only some 5% of total shipments.

Large private operators increasingly offer a range of services that exceeds pure postal services. This change on the supply partly reflects changes in production management in the manufacturing industry, with increasing need of just in time deliveries and door to door transport. In addition, an enlarged range of services also results from excess capacity. Having created networks with large (air freight) capacities to enable fast deliveries all over the world, private operators have been affected by over-capacity as growth rates, although strong, have remained lower than original expectations. Hence, companies of 'integrators', started to extend their service package to transportation and distribution services. Some companies have developed into suppliers of complete logistic chains for manufacturing companies which wanted to externalise their transport and distribution activities.

Production process

The production process of postal services can be divided in five stages: collection of mail, sorting for destinations, transportation, final sorting and delivery of mail. Mail delivery is the largest cost item with about 60% of operational costs. Next comes transport and sorting for destination with a combined share of 25%. Mail collection accounts for 10% of total operational costs, whereas the remainder (5%) goes to

Table 5: Postal and express services
Postal administrations - Growth in number of items handled

(%)	Domestic service			International service			Total service		
	1988/89	1989/90	1990/91	1988/89	1989/90	1990/91	1988/89	1989/90	1990/91
Belgique/België	-2.2	14.9	3.2	-9.4	4.0	-2.2	-3.3	13.3	2.5
Danmark	0.6	2.0	0.5	3.1	-0.1	12.5	0.8	1.8	1.4
BR Deutschland	1.3	2.5	5.3	-8.5	0.3	-7.1	0.6	2.4	4.5
Hellas	7.4	-9.6	-1.2	-1.8	-1.3	-6.2	5.2	-7.8	-2.4
España	-0.1	0.1	N/A	N/A	5.7	N/A	N/A	0.6	N/A
France	6.2	4.0	5.1	8.7	-6.1	14.3	6.3	3.6	5.4
Ireland	1.5	2.2	2.5	N/A	N/A	N/A	N/A	N/A	N/A
Italia	8.2	-1.2	-8.0	12.7	3.7	-1.3	8.6	-0.8	-7.5
Luxembourg	0.4	2.4	3.1	-0.1	-2.3	N/A	0.2	0.2	N/A
Nederland	3.1	N/A	N/A	8.8	N/A	N/A	3.7	N/A	N/A
Portugal	9.3	9.0	11.6	-16.4	30.2	17.0	5.9	11.2	12.3
United Kingdom	11.5	4.0	N/A	4.5	2.0	N/A	11.0	3.9	N/A

Source: Eurostat using UPU data, national postal administrations

final sorting for delivery. However, these figures are aggregate approximations and individually vary widely between different administrations.

A good network is of crucial importance for postal services. The complexity of the interactions between all the different points in a network demands a good logistics chain. For international mail the problem is even more complex, as domestic networks have to be matched. Essentially there are two network systems: the hub-and-spoke system, in which a region is serviced from a central "hub" via "spokes" with local centres; and the spider's web system, in which local centres interact directly with each other.

Productivity is very different between the postal administrations of the EC countries. On average, postal administrations have an estimated turnover per employee of 22 000 ECU. On the other hand, private operators have a turnover per employee that is more than double the postal administrations. These differences arise from the different value added provided and consequently they are highly dependant on the type of services offered. Also, network quality, labour costs and productivity are among the factors that cause wide ranges in tariffs for what, apparently, are the same services. Private operators charges are substantially higher, since customers pay for a higher service quality.

A good indicator for service quality in postal administrations is the percentage of domestic mail delivered the day after collection. In small countries like Denmark, Netherlands and Luxembourg this rate is in excess of 95%. In Germany, a very large country relative to the previous ones, the Bundespost manages 90%, which equals the goal set within the Conference of European Postal and Telecommunication Administrations (CEPT). In Italy, however, a substantial portion of mail is not delivered the day after collection. This comparative poor service quality of the Italian postal authority has allowed private operators to gain a larger market share in Italy, than in most of the other EC countries. These estimates of delivery rates are not strictly comparable, and should only be used for broad comparisons.

INDUSTRY STRUCTURE

Companies

Private operators can be classified into four categories: companies operating globally or intercontinental, pan-European companies that are essentially EC domestic, national operators and local operators. The globals include companies such as the big four 'integrators': DHL, Federal Express, GD Express World-wide (a joint venture between TNT and the postal administrations of France, Germany, the Netherlands, Sweden and Canada) and United Parcel Services (UPS). They offer services which go beyond postal services and integrate various forms of transport and distribution. Examples of the second category are Kühne & Nagel (D), Jet Services (F), TAT Express (F) and Securicor (UK). In the national and local levels a host of small companies offer express services that range from long distance indigenous city to city pairs, to city or conurbation area delivery by specialist motorcycle couriers. There are often links between firms in the various categories, for instance a city motorcycle company may offer an international service through an account agreement with one of the major global operators.

The initial strong growth in the market for express services has attracted companies active in other fields of transportation and forwarding. For example airline companies like KLM, Lufthansa, British Airways and Air France support the services offered to the market by providing inexpensive, but otherwise redundant, cargo space in their aircraft to the freight forwarders and consolidators. Freight forwarders and railroads have started express services. Postal administrations have set up their own international express service (EMS) in order to take advantage of the higher value added market, and in some cases are involved with the private sector, for instance GD Express Worldwide.

Recently, however, the large private operators have been faced with weakening growth and have experienced some setbacks due to the downward pressure on the high value added end of the market caused by recessionary constraints. Rationalisations and closure of some activities has occurred as well as a fall in aggregate employment in the private sector. Federal Express has reduced its presence in the Community, and TNT has sold most of European its network into what is now GD Express Worldwide.

Table 7 profiles the legal status of the postal administrations of the Community in 1991. All administrations are controlled and owned by the various governments. However, more than half have financial autonomy and part of the Netherlands' Post Office is slated for privatisation in 1994.

Strategies

Postal administrations have become increasingly commercial in recent years. This has been due in part to the competition from private operators, but also to a tendency of individual governments in the Community to commercialise (and privatise) some public enterprises. Coupling this with a drive

Table 6: Postal and express services
Average delivery time for standard letters in the EC, 1990 (1)

	Country of destination	B	DK	D	E	F	IRL	I	NL	P	UK	Average FROM
	Belgique/België	.	2.1	2.6	3.0	2.2	3.7	3.1	2.0	4.6	2.4	2.9
	Danmark	2.1	.	3.8	4.2	3.8	4.1	5.3	2.7	4.6	3.0	3.7
	BR Deutschland	2.6	2.6	.	3.2	2.7	4.8	5.1	2.1	4.3	3.0	3.4
	España	3.5	3.3	4.8	.	4.2	4.2	7.9	4.1	4.4	5.7	4.7
Country	France	3.0	3.8	3.2	4.8	.	4.8	5.0	2.7	4.6	4.0	4.0
of	Ireland	3.0	2.9	4.6	4.8	4.5	.	9.2	3.3	4.0	2.1	4.3
origin	Italia	4.5	4.1	5.4	6.3	6.5	5.6	.	5.1	5.0	5.1	5.3
	Nederland	2.8	2.1	2.2	3.0	3.0	4.1	7.1	.	4.5	3.9	3.6
	Portugal	3.4	3.0	4.4	3.6	3.6	4.2	8.0	4.1	.	3.9	4.2
	United Kingdom	2.7	3.2	4.6	4.3	3.8	2.7	4.4	2.8	4.0	.	3.6
	Average TO	3.1	3.0	4.0	4.1	3.8	4.2	6.1	3.2	4.4	3.7	4.0

(1) Excluding Greece and Luxembourg
Source: Green Paper/BEUC

to reduce budget deficits has in some cases forced postal administrations to operate as a firm in the traditional sense. Examples provided by the United Kingdom and the Netherlands have shown that postal administrations are able to turn postal services into profitable operations, both the Royal Mail and PTT Post realise surpluses on mail services. Similarly, the Japanese Postal Service has been able to generate profits from 1981 onwards by improving services and operations efficiency and expanding business activities without resorting to postal rate increases or substantial government subsidies.

In some countries, the profitability of financial services provided by postal administrations is high, sometimes well above 10% of the turnover in that sector. This enables a partial and sometimes full compensation of losses on postal services, but at the same time begs the question of what is the level of cross-subsidisation in the administrations.

Apart from commercialisation on the demand side, public administrations have also tended to improve efficiencies on the supply side. This has been achieved by investments in automatic sorting of mail in the sorting centres. Also the efficiency of operations in the network has been improved by a more cost-based attitude.

In the private sector market for global parcel and express shipment services, the level of demand has placed a limit on the number of operators. Hence there has been a number of mergers and strategic alliances, which is likely to continue in the short to medium term. These have and will continue to involve integrators, carriers and forwarders, and also postal administrations.

A key example of the changing structure of the industry is TNT Australia, which sold most of its European network to GD Express Worldwide, which in turn is combined with at least five postal administrations in the Netherlands, Germany, France, Sweden and Canada. Hence, although TNT has a global presence, it no longer has a truly global network. In GD Express Worldwide the five key member administrations combine their EMS services with the international express network of old TNT network. This alliance is attractive for postal administrations as they have reduced their exposure to the old bilateral agreements structure.

REGULATIONS

In each country governments have legislation for postal administrations to provide universal postal services. Provision requirements differ from Member State to Member State.

In non-reserved services the market has tended to regulate itself. For reserved services however, a body has been responsible for regulating the monopoly market. Historically the regulator was also the operator, i.e. the postal authority. The recent trend has been for Member States to try to separate the regulatory authority from the operational function by establishing a body under the responsible ministry, however, this ministry is the same one that is responsible for the postal administration.

In an international perspective, postal authorities co-operate in various organisations, such as the Universal Postal Union (UPU) of the United Nations and the Association of European Public Postal Operators (PostEurope). The former is a worldwide organisation providing the basic framework for co-operation and discussion between international postal services. The latter includes not only the EC authorities, but also those from other countries in Europe.

In the continuing formation of the Internal Market, the Commission is developing a common policy for postal services throughout the Community. This requires substantial policy harmonisation in the various Member States. Many issues in this respect are being reviewed, such as the definition of reserved and non-reserved services, principles of cost-oriented tariffs and competition. The Commission presented a Green Paper in June 1992 on the development of the single market for postal services. This was followed in June 1993 with a communication from the Council to the European Parliament on Guidelines for the Development of Community Postal Services (COM(93) 247 final). This latest communication has taken into consideration the large (and generally positive) response generated by the Green Paper, and consequently seeks to provide a detailed approach to action by specifying the measures required. The communication discusses in some detail the following topics: the common definition of the universal service; the maintenance of reserved services; service quality standards; measures that may be required to promote harmonisation in the Community; separating the functions of regulation and operation; and some aspects of extra-EC postal interaction. In order to harmonise and liberalise the EC postal services, a provisional implementation process is proposed, which acknowledges that legislative action will be required at the Community level; but that strongly strives to avoid measures that will lead to a deterioration of the level of service provided in Member States.

The removal of custom barriers within the EC in 1993 has helped level the competitive playing field between postal administrations and private operators for intra-EC services, by significantly reducing the cost of the private operators that

Table 7: Postal and express services
Postal administrations - Legal status, 1991

	Legal status	Financial authority
Belgique/België	Public corporation	Financial autonomy
Danmark	State administration	Separate budget
BR Deutschland	Public corporation	Financial autonomy
España	State administration	No financial autonomy
France	Public autonomous establishment	Financial autonomy
Ireland	Public limited company	Independent
Italia	State administration	No financial autonomy
Luxembourg	State administration	No financial autonomy
Nederland	Public limited company	Independent
Portugal	Public corporation	Financial autonomy
United Kingdom	Public corporation	Financial autonomy

Source: EC

were required for customs clearance. Previously, these costs were minimal for the postal administrations as they were directly borne by the service users. However, the position of the private operators will continue to be affected by the legislation in force and any envisaged legislation changes. For example changes in the definition of non-reserved services could affect the private operators at the core of their activities. A major issue of current concern is the potential changes in remail activities.

REMAIL

A special issue in postal services is the remail service. This is a cross-border mail service offered by private operators. The most common type of remailing is the A-B-C mail: a private operator collects international mail of a large customer in country A, transports it to country B from where it is posted for delivery in third countries C. A second type is A-B-B mail, in which the mail (collected in A) is posted by the private operator in country B for delivery in B. The third type is A-B-A, in which the private operator posts the mail (collected in A) in country B for delivery in country A.

Remail has evolved from operators taking (price/cost) advantage of the weaknesses of the terminal dues system for international mail agreed in the UPU, where some postal administrations are able to charge less for international routed mail than the original pricing available in the originating country. However, the major drawback to remail is the loss of timeliness observed by users of the service and the lack of predictability, but this has been accepted as a necessary evil in order to achieve cost reductions. However, there a few instances where remail can be faster than via a public administration, particularly in the A-B-C case where the international service quality in country A is poor. There exists some a priori observations that although remail is less expensive than using the regular postal administration services, the overall cost efficiency is actually worse using remail due to hidden costs arising from the relative delay in the mail.

OUTLOOK

The outlook for postal services differ according to the type of service offered. For traditional letter services, growth is expected to continue but only at a marginal rate due to competition from advances in modern communication such as facsimile, electronic mail and EDI. In parcels and express services, growth is expected to be substantially higher. The integration of the European market implies increased interaction (in terms of traffic and trade) between the Member States at lower costs. However, this increased interaction will continue to put pressure on postal administrations to provide high quality services. Additionally, the trend in industry towards externalisation of transport and distribution will benefit the integrators.

Another strong growth market will be with direct marketing & sales related mail, possibly reaching the levels currently observable in the US in the long term, and to a lesser extent mail order. This will be a market with strong competition between postal administrations and private operators.

Of crucial importance for the competitive position is the application of modern technologies. Private operators are already at a high level, but some postal administrations seem to be far behind and may need a large investment program reach the same level as the private sector.

Another important issue is the regulatory environment. A community policy for postal services will seek to reduce the present lack of harmonisation in legislation concerning reserved and non-reserved services, to introduce a more cost-oriented tariff system and to apply free market principles where possible.

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Sea ports and other sea transport facilities
NACE 763

Supporting services to sea transportation are highly heterogeneous in nature. Services are provided by port authorities and private companies depending on the regulatory environment in the port and the extent of subsidisation in national port policies. Competition among ports is very severe. Investing heavily in modern infrastructure, suprastructure and facilities is an important way of keeping ahead of competing ports. Community initiatives could examine the competitive environment.

INDUSTRY PROFILE

Description of the sector

This group in the NACE classification includes all supporting services to sea transport and coastal shipping. In effect these are sea ports and other sea transport facilities. Examples of service types are tugs at sea, pilotage, lighthouse operations, buoys and other navigation facilities, stowing, stevedoring, loading and discharging of sea-going vessels, and operation and maintenance of sea harbours, piers and docks.

Recent trends

In 1991 the 179 seaports in the EC, reporting data to the MERC World Ports Database, handled total traffic of about 2 162 million tonnes of cargo. The three top individual country volumes were handled in the United Kingdom, with some 428 million tonnes in 39 ports, the Netherlands with 375 million tonnes in 12 ports, and Italy with 327 million tonnes in 23 ports.

Total traffic in the top 12 EC ports growth flattened in 1992 to almost nil after a 2.3% increase in 1991. Within the top 12 EC league, the two largest ports, Rotterdam and Antwerp managed to increase cargo volumes slightly in 1992, but in the case of Antwerp this achievement followed a decline in 1991. On average, the largest French ports witnessed a decline in traffic in 1992, which was exacerbated by industrial problems during the year that caused some traffic to be diverted to the ports of other member states.

Passenger transport

In most ports in the European Community, passenger traffic is negligible or even non-existent. For some ports, however, it is the main activity. The ports on both sides of the Channel depend heavily on ferry traffic between the United Kingdom and France, and to a lesser extent Spain. The opening of the Channel Tunnel by 1994 will be a major competitive threat to the ferry operations on the Channel and as a consequence to the ports along the Channel. There are also important ferry links between mainland United Kingdom and Ireland and Northern Ireland.

A number of ports in the Mediterranean have significant passenger facilities for ferry links. Particularly important examples are in the south of Italy, where ferry connections exist with Greece and the countries in Northern Africa. Also, Greek ports generally have passenger facilities providing for domestic inter-island ferry links in the Aegean Sea. The Thessaloniki Port Authority completed development of new passenger terminal in spring 1993 to cope with the growing international cruise line operations.

Finally, mention should be made of the ports in Northern Germany and Denmark. From these ports, important ferry links exist with Sweden and Norway. Copenhagen is currently building a new passenger terminal due for 1994 enabling the handling of 10 vessels simultaneously. However the proposed bridge between the south of Sweden and just south of Copenhagen across the Öresund will have a major impact on traffic currently on ferries between southern Scandinavia and mainland Europe (potentially similar in effect to the Channel Tunnel).

An important issue in passenger transportation is the existence of duty and tax free sales on ferry boats and in passenger terminals. Originally, the European Commission was keen to abolish these sales on ferry links between Member States. However, after further consultation it was decided that this would harm the passenger transportation sector severely as a substantial share of their revenues are from sales of duty-free goods. Abolition has now been postponed until 1999.

Table 1: Sea ports and other sea transport facilities
Total traffic in EC ports, 1990-1991

	1990		1991	
	Number of ports covered	Total traffic (million tonnes)	Number of ports covered	Total traffic (million tonnes)
Belgique/België	5	162.6	5	164.2
Danmark	6	30.9	8	38.4
BR Deutschland	14	181.8	19	203.5
Hellas	2	24.5	2	23.8
España	21	217.3	21	223.7
France	18	290.3	35	302.5
Ireland	3	19.0	7	25.4
Italia	12	249.6	23	327.2
Luxembourg	N/A	N/A	N/A	N/A
Nederland	7	358.0	12	374.7
Portugal	7	56.3	8	51.1
United Kingdom	23	407.9	39	427.9
EC	118	1 998.2	179	2 162.3
Japan	48	1 936.4	N/A	N/A
USA	39	901.5	53	1 156.6

Source: MERC World Ports Database

Table 2: Sea ports and other sea transport facilities
Top 10 seaports in the world showing breakdown by major type of goods traffic, 1991

Country	Seaport	Total traffic million tons	Breakdown of traffic by type of goods: Dry bulk	Liquid bulk	General cargo
Nederland	Rotterdam	290.8	92.4	139.8	58.6
Singapore	Singapore	206.5	91.5	6.2	108.8
Japan	Kobe	171.5 (1)	N/A	N/A	N/A
Japan	Chiba	168.6	106.3	61.9	0.1
PR China	Shanghai	139.6 (1)	15.9 (1)	92.5 (1)	31.2 (1)
Japan	Nagoya	136.8	44.5	37.6	54.7
Japan	Yokohama	120.1	15.9	45.1	59.6
Japan	Kawasaki	105.0 (1)	44.3 (1)	60.5	0.2
Belgique/België	Antwerp	101.4	30.4	25.5	45.5
Japan	Kitakyushu	78.7	10.8	3.3	84.6
Japan	Osaka	97.3 (1)	N/A	N/A	N/A
Brazil	Vitoria	94.6	85.6	1.9	7.1

(1) 1990
Source: MERC World Ports Database

Container transport

Container traffic emerged from the need to unitise general cargo items into manageable units of equivalent size. For this purpose the twenty-foot container was developed which could be easily filled with general cargo for transportation and easily unloaded when reaching its destination. During its development, containers of different size emerged, but the standard unit of measurement has remained the twenty-foot container. Traffic flows are thus expressed in Twenty-foot Equivalent Units (TEUs).

In 1991, total container handling in ports throughout the world amounted to some 90.7 billion TEU (86.1 billion in 1990: +5.3%) and initial estimates for 1992 indicate that there was further growth of over 4%.

The largest container ports are currently Hong Kong and Singapore, handling almost 8 million and 7.6 million TEU respectively in 1992. These ports have become major hubs in the Southeast Asian region for container traffic flows and Hong Kong's growth reached just 30% in 1992, whilst Singapore managed a healthy growth of 19%. The Japanese ports, however, show a poor performance in 1992 for container handling, with declines in Kobe (-1%) and Tokyo (-3%) and a small increase in Yokohama (+5%). In the USA, the ports of New York and Los Angeles recovered from the poor performance of 1991 to record reasonable growth in 1992 of over 12% each, whereas Long Beach, which bucked the trend in 1991, managed an increase of only 3.5%.

In the EC, Rotterdam is the largest container port, as well as being ranked third world-wide. In 1992, following growth in container movement of close to 10%, it regained this place that it lost in 1991 to the Taiwanese port of Kaohsiung. The other major EC container ports all improved their performance on 1991. Felixstowe, the 16th largest world and 4th largest EC port came second in the growth stakes with just under 8% on 1992. The other ports container growth varied from 4% for Antwerp to 3% for Bremen.

Port authorities and container handling companies make heavy investments to create an attractive infrastructure where containers and container ships can be handled as fast and as reliably as possible. Modern container terminals operate with highly automated container location and tracing systems. An example is the Maasvlakte-terminal of ECT in Rotterdam, where modern straddle carriers can trace containers automatically. Large gantry cranes also need to comply with the increasing ship size: the largest ships (of so called 'post panamax size') carry up to 4500 TEUs.

Table 3: Sea ports and other transport facilities
Top 12 seaports in the world (1)

Country	Seaport	Unit (2)	1992	1991	1990
Nederland	Rotterdam (4)	MT	291 574	290 815	287 692
Singapore	Singapore (4)	FT	238 446	206 429	187 789
Japan	Kobe	FT	169 546	174 101	171 455
Japan	Chiba	FT	153 000	169 000	170 000
PR China	Shangai (3)	MT	N/A	N/A	139 590
Japan	Nagoya	FT	130 857	136 794	128 934
Japan	Yokohama	FT	122 496	121 942	123 873
Belgique/België	Antwerpen (4)	MT	103 728	101 346	102 009
Hong Kong	Hong Kong	MT	102 447	104 502	89 005
Japan	Kitakyushu (3)	FT	N/A	98 680	95 190
Japan	Osaka	FT	95 108	98 659	97 378
France	Marseilles	MT	90 418	89 360	90 323

(1) Ranked on 1992
(2) Units are in 1 000 where MT=Mass Tons and FT=Freight Tons
(3) Ranked on latest available data
(4) Foreign traffic only
Source: Institute of Shipping Economics and Logistics (ISL) & Fairplay World Ports data

Table 4: Sea ports and other sea transport facilities
Top 10 seaports in the EC showing breakdown by major type of goods traffic, 1991

Country	Seaport	Total traffic million tons	Breakdown of traffic by type of goods				
			Oil	Oil products	Iron ore	Coal	Containers (1 000 TEUs)
Nederland	Rotterdam	290.8	96.6	25.2	92.7	23.7	3 666
Belgique/België	Antwerp	101.4	6.5	16.0	12.7	8.5	1 549
France	Marseille	89.4	47.6	11.9	4.6	4.8	481
BR Deutschland	Hamburg	65.5	4.6	10.8	6.6	1.4	1 968
France	Le Havre	57.2	30.5	6.0	N/A	3.4	858
United Kingdom	London	49.5	10.6	12.4	0.4	3.5	382
United Kingdom	Tees-Hartlepool	42.8	16.5	8.0	6.1	3.1	109
Italia	Genoa	42.0	28.2	N/A	1.4	1.4	310
France	Dunkerque	40.7	6.4	4.3	10.1	5.9	70
United Kingdom	Grimsby-Immingham	38.2	8.4	10.6	5.4	3.3	244

Source: MERC World Ports Database / JMM

International comparison

In the 1960s and 1970s European ports were among the larger ports in the world, however, in the 1980s ports in South East Asia and Japan emerged as the among the largest in the world's top 12 seaports. Japan's success in the league is spectacular, with half of the top 12, with ports like Kobe, Chiba, Nagoya and Yokohama. The port of Singapore has second position with large volumes of general cargo (mainly in containers) and liquid bulk (mainly oil). There are presently no north American ports among the world top 12.

The EC has three ports in the world's top ranking, which are Rotterdam, Antwerp and Marseilles. In 1992 Rotterdam celebrated its thirtieth year as the world's largest port. Total traffic handled in Rotterdam amounted to 292 million tonnes, which is over 50 million tonnes ahead of second placed Singapore. Traffic (1991 figures) handled through Rotterdam is dominated by liquid bulk (oil, oil products, chemicals, etc.) at 140 million tonnes, and dry bulk comprises 93 million tonnes, mainly consisting of iron ore and coal for the German steel industry. In general cargo, Rotterdam used to be the largest container port in the world, but now lags far behind the two larger container ports Singapore and Hong Kong, to rest in third place.

Antwerp, the second largest European port, moved up to the eighth position in the world's top 12 in 1992, displacing Hong Kong. It has a growing share in container traffic, but is also strong in other types of general cargo handling. Antwerp is an important competitor for Rotterdam. The third largest European port is Marseilles with some 90 million tonnes in 1992. Traffic through this port consists mainly of oil.

In 1992 the top three ports in the USA, according to ISL, are Long Beach, Los Angeles and Corpus Christi. Their current size varies from 66 million metric tonnes for Corpus Christi to 75 million round tonnes for Long Beach handled per year, which puts them into the medium sized bracket in comparison with European and Japanese ports. The most important types of goods handled are liquid bulk, which is essentially oil and oil products, and containers.

Table 5: Sea ports and other sea transport facilities
Top 12 seaports in the EC (1)

Country	Seaport	1992	1991	1990
Nederland	Rotterdam (3)	291 574	290 815	287 692
Belgique/België	Antwerpen (3)	103 728	101 346	102 009
France	Marseilles	90 418	89 360	90 323
BR Deutschland	Hamburg	65 083	65 533	61 098
France	Le Havre	53 110	57 220	54 019
United Kingdom	London (2)	N/A	52 832	58 149
United Kingdom	Newcastle	44 713	43 873	37 247
United Kingdom	Tees & Hartlepool	42 723	42 427	39 744
Italia	Genoa (2)	N/A	41 836	43 633
France	Dunkirk	40 204	40 737	36 553
Italia	Trieste	36 678	35 494	34 175
United Kingdom	Milford Haven	35 591	35 819	32 292
Total		898 490	897 292	876 934

(1) Ranked on 1992
(2) Ranked on latest available data
(3) Foreign traffic only
Units are in 1 000 tonnes
Source: Institute of Shipping Economics and Logistics (ISL)

Table 6: Sea ports and other sea transport facilities
Top 20 container ports in the world (1)

Rank	Port	Country	1992	1991	1990
1	Hong Kong	HKG	7 972	6 162	5 101
2	Singapore	SIN	7 560	6 354	5 224
3	Rotterdam	NL	4 123	3 783	3 667
4	Kaohsiung	TAI	3 961	3 913	3 495
5	Busan	KOR	2 751	2 571	2 349
6	Kobe	JAP	2 608	2 635	2 596
7	Los Angeles	USA	2 289	2 038	2 116
8	Hamburg	D	2 268	2 189	1 969
9	New York	USA	2 104	1 866	1 872
10	Keelung	TAI	1 941	2 008	1 828
11	Yokohama	JAP	1 887	1 796	1 648
12	Antwerpen	B	1 836	1 761	1 549
13	Long Beach	USA	1 830	1 768	1 598
14	Tokyo	JAP	1 729	1 784	1 555
15	San Juan	Puerto Rico	1 577	1 584	1 381
16	Felixstowe	UK	1 543	1 434	1 436
17	Dubai	UAE	1 482	1 255	916
18	Bremen	D	1 315	1 278	1 198
19	Bangkok	THAI	1 303	1 171	1 018
20	Oakland	USA	1 288	1 195	1 124

(1) Ranked on 1992
Source: Containerisation International Yearbook data

MARKET FORCES

Demand

Demand for seaport facilities and services comes primarily from transportation activities. Transport companies are in need of such facilities in order to move cargoes from origin to destination and from one transport mode to another. The demand for these companies (in effect the demand for transport services) comes from shippers wanting their goods to be transported and thus depends largely on the economic activity in the hinterland of the port.

Supply and competition

The variety in the supply of seaport facilities and services is very wide. It concerns not only the handling of cargo from one mode of transport to another, but also storage of goods, distribution facilities, customs clearance, towing and berthing of ships, food and fuel supply services, customs handling, ship-repair and other services.

Over the last ten years, there has been a tendency to broaden the variety of services available within the transportation services - which was traditionally limited to cargo handling and movement. Hence, transport companies have changed into service providers offering a complete logistic chain from door-to-door. In addition, increasing automation and electronic data interchange techniques have made transportation and handling processes substantially more efficient than what was available in the early 1980's. This has enabled transport companies to more closely match customer requirements, for instance, just-in-time delivery systems for industries.

INDUSTRY STRUCTURE

Port traffic

Most of the EC's largest ports can be characterised as importing ports as incoming traffic is much higher than outgoing. There are only few ports where exports exceed imports: Calais, Rouen, Algeciras-la-Linea and Tyne. Similar situations exist in the USA and Japan. In the USA, only Duluth is effectively an export harbour; in Japan, Tokyo can be characterised as such.

The breakdown by type of traffic in Table 4 shows which is the dominant traffic through the EC's ports for the major ports. In each Member State, one or a few ports specialise in liquid bulk traffic. These are essentially the locations for import of oil and oil products. Examples are Le Havre and Marseilles in France, Wilhelmshafen in Germany, Trieste in Italy, Sines in Portugal and Southampton in the United Kingdom. Similarly, specialisation exists for dry bulk traffic. Ports like Bremerhaven and Lubeck in Germany and Limerick in Ireland handle practically only dry bulk goods. Finally some ports can be characterised as general cargo ports, such as Brugge-Zeebrugge, Calais, Dublin, Valencia and Felixstowe.

Strategies

There is substantial competition among ports on the northern seaboard of Europe (the Hamburg to Le Havre range) to attract container traffic and become the one of the major hubs in Western Europe. Expansion by investment in facilities is seen by the ports as a major weapon in maintaining or improving their relative competitive positions. The Port Authority of Rotterdam is particularly ambitious to maintain its pole status with large investment plans. These investments should enable the port to reach 400 million tonnes of traffic handled by 2010. The total investment budget amounts to some 11 billion Dutch guilders, of which 7 billion will come from the central government. In addition, private companies will have to invest another 20 to 25 billion Dutch guilders in superstructures and facilities. The dedicated terminal for Sea-Land operated by ECT - the largest container stevedore - was officially opened in 1993 and is the first stage in increasing the number of containers handled in Rotterdam to 6 million by the year 2010. This Delta 2000-8 plan is a joint initiative of the port authority and ECT, and allows for at least eight new container berths to be constructed over the rest of the decade.

Additional multi-modal access to the port will be crucial in the development of the port of Rotterdam, requiring investment in more infra-structure. Very important for Rotterdam will be the planned construction of the Betuwe-lijn, a freight-only railroad connecting the port with Germany, which is currently under discussion. Another issue is the opening of the Rhine-Main-Danube canal, enabling Rotterdam to extend its hinterland connections to the countries bordering the Danube and

Table 7: Sea ports and other sea transport facilities
Traffic activity in million tonnes of cargo handled in largest ports, 1988-1992

Country/Port	1988	1989	1990	1991
- Belgique/België				
Antwerp	96.9	95.4	102.0	101.4
Brugge-Zeebrugge	20.1	25.8	30.3	30.8
Danmark				
Aarhus	7.3	7.0	6.9	6.9
Copenhagen	9.4	9.0	9.5	9.4
- BR Deutschland				
Bremen-Bremerhaven	31.1	32.5	30.2	30.7
Hamburg	58.7	57.6	61.4	65.5
Lubeck	17.0	17.7	18.0	16.5
Rostock	N/A	20.8	13.2	10.4
Wilhelmshafen	15.0	14.6	13.9	17.9
- Hellas				
Piraeus	8.9	9.4	9.4	9.8
Thessaloniki	11.2	14.6	15.1	14.0
- España				
Barcelona	18.0	18.1	18.0	18.3
Bilbao	26.3	27.0	25.2	27.4
Tarragona	22.8	26.0	24.2	23.7
Valencia	10.8	N/A	12.0	11.8
- France				
Bordeaux	8.9	9.1	9.6	8.9
Boulogne-sur-Mer	4.4	4.8	5.4	4.3
Calais	12.4	15.3	16.0	17.2
Dunkirk	35.7	39.1	36.6	40.7
Le Havre	49.9	52.2	54.7	57.2
Marseille	95.8	93.4	91.6	89.4
Nantes St. Nazaire	22.0	23.9	24.9	25.1
Rouen	20.4	20.9	22.3	23.1
- Ireland				
Cork	5.3	5.7	6.0	5.9
Dublin	7.0	7.3	7.4	7.7
Limerick	N/A	0.7	5.9	6.2
- Italia				
Genoa	41.9	41.3	42.7	42.0
Livorno	14.3	14.7	11.7	18.4
Naples	N/A	19.9	19.1	16.5
Savona	12.2	12.7	12.8	12.2
Tarente	30.1	N/A	32.6	30.0
Trieste	N/A	29.1	34.4	35.5
Venice	25.4	25.4	24.2	24.9
- Nederland				
Amsterdam	28.2	28.7	31.3	31.2
Rotterdam	272.8	291.9	287.8	290.8
- Portugal				
Leixoes	10.0	11.3	12.1	11.5
Lisbon	13.1	14.0	14.8	16.5
Sines	N/A	19.9	22.6	16.1
- United Kingdom				
Belfast	N/A	8.0	8.9	9.4
Dover	N/A	13.5	10.1	13.0
Felixstowe	17.0	16.5	16.1	15.9
Grimsby-Immingham	33.8	36.8	37.6	38.2
Liverpool	N/A	20.2	23.1	24.7
London	N/A	54.0	53.9	49.5
Manchester	8.4	8.3	8.1	7.6
Milford Haven	33.4	33.1	32.3	35.7
Southampton Fawley	N/A	26.1	20.0	31.5
Tees-Hartlepool	37.0	39.3	39.7	42.8
Tyne	6.4	5.9	5.1	4.9
- USA				
Baltimore	31.8	34.2	25.0	21.7
Corpus Christi	N/A	76.5	69.4	70.4
Duluth	N/A	37.0	37.0	35.0
Houston	N/A	69.0	57.1	87.6
New York	56.3	57.2	49.7	42.1
Philadelphia	N/A	79.2	75.6	N/A
Tampa	56.1	58.7	47.1	N/A
- Japan (in freight tonnes)				
Chiba	159.2	164.2	170.2	168.6
Kawasaki	N/A	N/A	105.1	N/A
Kobe	N/A	N/A	171.5	N/A
Nagoya	116.3	N/A	128.9	136.8
Osaka	86.3	N/A	97.4	N/A
Tokyo	N/A	N/A	79.3	N/A
Yokohama	N/A	64.3	123.9	120.1

Sources: MERC World Ports Database, Journal de la Marine Marchande, Lloyd's Ports of the World, 1992

the Black Sea. Furthermore, the transformation of certain parts of the port area into specialised port locations have been rated as a success; in particular the 'Distriparks' distribution centres, with nearly all of the allocated land being taken up.

In Belgium, significant investment in port expansion is planned. In Antwerp, the Left Bank development will cost about 37 billion Belgian francs. Further plans are in progress to construct a second container terminal, which will cost about 13 billion Belgian francs, of which the port authority has allocated 750 million Belgian francs in 1993. This second terminal is expected to manage 600 000 TEU a year following completion due in 1996, which is similar volumes to current facilities. Also, plans to renovate existing docks and locks are under way costing another 13 billion Belgian francs. The Port of Zeebrugge authority is investing in a new container terminal, which will provide three berths. The first of these berths is scheduled for completion by the end of 1993, and the other two by the end of 1994. The amount of the investment is put in excess of 10 billion Belgian francs.

In Germany, two operators of Hamburg, HHLA and Eurokai, have invested in improved infrastructure and equipment to boost capacity. Also, a new container complex is under discussion for the Altenwerder area of the port, which would expand the ports throughput to 4.2 million TEU per year by 2000. This project has, however, come up against resistance from environmental concerns and the current status is unclear. Bremerhaven is building two new container ship berths by extending the existing container terminal. Completion of this expansion will allow Bremerhaven to offer 12 berths for container vessels.

France's second largest port, Le Havre, is currently expanding by extending the dock extension, which is due for completion in 1993. Additional expansion is planned in the next five years.

Europe's larger ports not only have investment plans. Smaller ports also want to improve their position by investing in infrastructure, superstructures and operation facilities. An example is Bordeaux's study entitled Port Avenir 2000. In Spain, the Port Authorities of Barcelona and Valencia have initiated major container terminal developments in view of attracting direct liner calls. Barcelona is on of the larger container ports in the Mediterranean, and is planning to construct a new container terminal with multi-modal links that will expand current capacity from 500 to 700 million TEU per year. In Greece, the port of Piraeus also has ambitious plans: over a five year period the current central harbour facilities will evolve into a pure passenger and cruise terminal, and the cargo handling facilities will continue to be relocated to the 'west-side', where additional investment is in place to expand facilities. The port of Thessaloniki is planning to invest 30 billion Greek Drachmas by 1998 to expand port facilities and land area.

REGIONAL DISTRIBUTION

With Rotterdam, Antwerp, Hamburg and Le Havre, most of the EC's larger ports are to be found in the Le Havre-Hamburg range. These ports are the most important gateways to industrial and consumption areas on the European continent. This hinterland can be reached easily by way of a high standard infrastructure in terms of road, rail and inland waterways. The Rhine River is especially important for the port of Rotterdam. This connection and its good geographical location on the North Sea have combined to help Rotterdam evolve into the world's largest port.

Ports in the United Kingdom and Ireland have their domestic markets as their hinterland, which has typically kept their ports smaller than similar ports on mainland Europe. Good connections exist from UK ports to the major industrial areas. These connections mainly consist of motor ways and railways. Inland waterways have declined significantly over the years, plans abound for the revival of these canals. An important activity of UK ports (especially in Scotland) relates to the offshore activities on the North Sea. A port like Aberdeen, for example, is highly dependant on service provision to oil rigs in the North Sea and on oil handling coming from the North Sea oil wells.

In the Mediterranean, Marseilles and Genoa are important ports, especially for the import of oil and oil products. Their hinterlands can be found in the southern part of France (e.g. Lyon and surroundings) and the North Italian industrial areas (e.g. Milan and surroundings), respectively. Other goods handling activities are very dispersed over the broad variety of small ports along the coasts of the Mediterranean, Adriatic and Aegean Seas.

ENVIRONMENT

Increasingly, port authorities are taking a positively robust stance on environmental issues in their ports. The major issues that cause concern are accidental or illegal discharges of waste, leakage or spillage of fuels, spillage during bunkering, and pollution from in-port hull cleaning and re-coating operations. Port and ship operators will have to comply with environmental legislation that is becoming more stringent each year. Also shippers, in many cases, want their products transported in an environmentally responsible way in order to avoid negative publicity from environmental pollution and accidents that could be associated with these products. In some cases, the shippers require environmentally friendly transport facilities which exceed those obligatory by national legislation. This acts as a spur to port operators to make additional investments in environmentally sound handling facilities.

REGULATIONS

The supply of seaport facilities and services must be distinguished in the provision of infrastructure and superstructural facilities and handling services. Facilities are generally managed by a port authority, whereas handling services are mostly in the hands of private companies. The situation however, differs very much from country to country. Port authorities and companies can be either publicly owned or privately owned (or a combination).

In general, three types can be distinguished concerning the principle of exploiting port facilities:

- fully centralised ports, where exploitation is in the hands of the port authority. This authority is a state body. It does not exclude collaboration with private companies, but decisions on investments are mainly with this body. Examples are most Spanish ports, Italian ports, some ports in France and Denmark.
- decentralised ports, where the port authority is a municipal or collective body. Examples can be found in Belgium, the Netherlands, Germany, the United Kingdom and Portugal.
- fully private ports, where the port authority is a private company. Examples can be found in the United Kingdom, where Associated British Ports is the owner of 21 ports throughout the country, in Germany (e.g. Wilhelmshafen), Greece and Spain.

A very difficult issue is port pricing. Various principles of port pricing are used and depend effectively on the extent of subsidisation defined in national port policies. An extreme principle is that port pricing should be such that all costs of the operations together with depreciation and financing costs of infrastructure and superstructure have to be recovered. The other extreme is that port services are public services to be priced at marginal rates. Cost recovery is then made from subsidisation originating from public budgets.

In practice, port pricing is generally made on the idea that costs from operations and superstructures should be recovered. Investments in infrastructure are generally subsidised by central or local governments. The deviations are however large, which can cause onerous competition among ports. However, the industry would consider that in competitive pricing issues, the question of subsidising infrastructure is not a major threat to competition.

The European Commission is currently developing guidelines for integrating ports into trans-European transportation networks. Further, complementary initiatives on ports could examine the terms of competition among EC ports. In particular they could address the possible distortions from financial support by public authorities and the recovery of infrastructure costs from its users. At present the Commission is considering expanding the transparency of the ports and the operators.

Another issue is cabotage. For the transport sector as a whole, cabotage will become important in the future. New regulations will allow domestic transport by operators from other Member States which may cause shifts in transport flows throughout the EC and, as a consequence, shifts goods handling through EC ports. If this occurs then clearly some ports will benefit whilst others will could be harmed. Some of the smaller ports may lose cargoes to the larger hubs, but at the same time may remain competitive for the smaller niche cargoes, that are either required or manufactured for export in the localised hinterland of these ports.

OUTLOOK

The outlook for cargo handling depends heavily on the prospects for world trade and world shipping. As world shipping is beginning a cyclical upturn, especially in bulk transportation, the future for cargo handling is reasonably bright. In the next two to three years, growth in European ports may reach about 4% on average, and in the longer term annual growth rates will weaken slightly.

The outlook for container handling in ports is more optimistic. It is expected that liner cargo growth will be about 5-6% for imports and 2-3% for exports over the next four years. Also, the penetration of containerisation for general cargo will continue to increase, hence, container handling growth rates are thus expected to somewhat higher. Some ports, however, will be able to establish higher growth rates. This will depend on the increasing tendency to create large trunk lines between major hubs in various regions throughout the world. From these hubs, feeder lines will service container traffic demand in other ports in the region.

Written by: DRI Europe

Airports and other air transport facilities

NACE 764

Airports are a key component to air transport industry and to national and regional development. However, congestion in the EC's airspace and at some of the major EC hubs is causing problems for the operating economics of both airports and airlines as well as having an increasing impact on the environment. To overcome this, the EC is developing an improved air traffic management system, whilst some airports are actively investing in infrastructure improvements and additions. In the framework of the trans-European networks' programme, the Commission is presently developing guidelines for the airport network. The main objective of these guidelines is to ensure that the airport network can meet current and future demand for airport capacity while taking account of security and environmental protection requirements.
Competition between major Community airports for transit extra-EC traffic is heightening and this is allowing some of the national competing airports to gain share of traffic.

INDUSTRY PROFILE

Description of the sector

This sector comprises supporting services to air transport (airports and airfields). It includes units exclusively or primarily engaged in the activities essential to air transport, without actually transporting passengers or goods. Hence, units exclusively or primarily engaged in the operation of civil airports and airfields (public and private), radio beacons, radar stations, and units that manage air routes and air traffic control are classified in this group. This monograph will focus on airports.

Airports are the focal point of all aspects of the aviation industry. They are where passengers and freight concentrate before departure and after arrival, they provide bases for the airlines, air services related organisations and the physical means of providing air services - the aeroplanes.

Recent trends

Passenger growth at the major EC airports improved significantly in 1992 as the number of passengers handled grew by almost 11%, following a decline in 1991 of 5.2% caused by the recessionary pressures on the airline industry and exacerbated by the Gulf War. Cargo (including mail) also recorded growth in 1992 of almost 6%, which although less robust than passenger growth, was following a year of marginal decline of 2%.

The largest five airports in the EC for passengers are (in rank order) London Heathrow (45 million), Frankfurt (31 million), Paris Charles de Gaulle and Paris Orly (with 25 million each), and London Gatwick (20 million). In 1992 the individual growth in passengers handled at the major airports varied widely. In 1991 nearly all of the major airports suffered a decline in numbers, but the recovery in 1992 was positive for all of the majors. Amongst the top 20 European airports, ten managed double digit growth in 1992 and the fastest growing was London Stansted with 37%; this followed a 1991 result that bucked the average trend (+46%). However, some airports were unable to recuperate the loss of passenger loadings of the levels of 1990. London Gatwick, the sixth largest airport in the EC (and Europe), although showing growth in 1992, still had levels of loadings below those of 1990. Amongst the major EC holiday destinations, Palma de Mallorca was immune to the decline of 1991, achieving growth of almost 5%, but levels have remained almost constant with marginal growth in 1992 (1%).

The 1992 results for freight handled at airports in the major European cities provided a mixed picture. In the top 20 four recorded declines, three of which were marginal, but the most severe downturn took place at London Gatwick with a drop of 6% to 190 000 tonnes. A quarter of the top 20 had marginal improvement in the 0-5% range. The top three rankings in the EC for cargo growth were Milan Malpensa with growth of 24%, Barcelona with 15.5% and London Heathrow with 14.7%. Heathrow's growth was partially due to taking some of Gatwick's share of London freight. In terms of size, the largest airport for freight is Frankfurt with 1.24 million tonnes, followed by London Heathrow with 758 000 tonnes and by Amsterdam with 695 000 tonnes.

International comparison

When comparing volumes of passengers and freight handled in the three dominant world regions, the USA has the largest share (about 60% in passengers and about 50% in freight). In this country aviation has developed into the major transportation industry for domestic connections. The bulk of passenger and freight flows through USA airports are movements within the country. For freight, developments have been par-

Table 1: Airports
Main Indicators, 1990

	Number of enterprises (excl. VAT)	Turnover (excl. VAT) (million ECU)	Gross value added at market prices (million ECU)	Number of persons employed
Belgique/België	44	71	N/A	1 927 (1)
Danmark (1)	56	21	28.8	224 (1)
BR Deutschland	166	1 823	N/A	N/A
Hellas	N/A	N/A	N/A	N/A
España	22	N/A	N/A	7 425
France	N/A	N/A	N/A	N/A
Ireland	N/A	N/A	N/A	N/A
Italia (1)	23	1 003	809.0	12 930
Luxembourg	1	N/A	N/A	127
Nederland	73	325	205.0	3 150
Portugal	N/A	N/A	N/A	N/A
United-Kingdom	N/A	N/A	N/A	N/A

(1) 1989
Source: Eurostat (MERCURE)

Table 2: Airports
Passengers handled at major airports in Europe (1)

Airports	Country	1992	1991	1990	Growth rate 1992/91 (%)	Growth rate 1991/90 (%)
London Heathrow	UK	45.2	40.5	43.0	11.7	-5.7
London Gatwick	UK	20.0	18.8	21.2	6.1	-11.2
London Stansted	UK	2.4	1.7	1.2	36.6	45.8
Paris Orly	F	25.2	23.3	24.3	7.9	-4.2
Paris Ch. de Gaulle	F	25.2	22.0	22.5	14.6	-2.4
Frankfurt	D	30.7	28.0	29.4	9.9	-4.7
Amsterdam	NL	19.1	16.5	16.5	15.8	0.4
Rome Fiumicino	I	19.1	16.6	17.7	15.2	-6.2
Madrid	E	18.4	16.4	16.2	12.0	1.0
Zurich	CH	13.0	12.2	12.7	7.4	-4.3
Stockholm Arlanda	S	13.0	11.9	14.0	8.6	-14.7
Manchester	UK	12.4	10.9	10.8	14.5	0.4
Copenhagen	DK	12.4	11.7	12.1	6.4	-3.9
Düsseldorf	D	12.3	11.3	11.9	8.5	-5.2
Munich	D	12.0	10.8	11.4	11.3	-5.5
Palma de Mallorca	E	11.9	11.9	11.3	0.8	4.7
Barcelona	E	10.3	9.2	9.0	12.3	1.7
Brussels	B	9.4	8.5	8.5	11.1	-0.2
Milan Linate	I	9.4	8.9	9.4	5.3	-5.6
Oslo	N	7.5	6.9	7.0	9.8	-2.4

(1) Total passengers in millions
Source: ACI

ticularly influenced by express freight services. The equivalent share of EC airports amounts to just over 23% for passengers and just under 23% for freight. A major portion of this is intra-EC or intra-European traffic.

The large South East Asian airports handle about 18% of passengers and 28% of freight. In Japan, traffic is dispersed among a number of regional airports due to capacity problems. In the future, some may become major hubs for both intra-regional and intercontinental traffic. Freight handling at Asian airports is important for high value electronics shipped to the European and American markets.

The 1992 growth of 11% for the EC major airports for passengers exceeded the rates of growth of both the South East Asia (+6.8%) and the USA (+6.7%). As a consequence the market share of the EC in these three regions increased slightly from 1991. The picture is different for cargo as the return to growth for the USA supported freight growth of over 9%, far ahead of the EC's 5.7% and South East Asia's 3.1%; this helped the USA increase its to almost half of the aggregate of the three regions.

The world's largest airport city is New York. Its three airports handled nearly 72 million passengers in 1992. However, a vast portion of this is domestic travel - some 73%. Of the New York airports the largest is J. F. Kennedy which handles most of the international traffic. New York is also the most important freight centre in the world with 1.8 million tonnes. Second in city rankings is Chicago with two major airports Chicago Midway and O'Hare, which between them handled 69 million passengers in 1992. O'Hare is the worlds' largest airport in total passenger numbers at 64.4 million, of which 92% are domestic. However, ranking on international traffic only, London Heathrow is the world's largest with 37.3 million loadings.

In South East Asia the largest airport city is Tokyo, which handled 65 million passengers and 1.8 million tonnes of freight in 1992. Its major airport for international flights (19 million international passengers) and freight (1.3 million tonnes) is Narita.

MARKET FORCES

Demand

The strong growth in demand for passenger and freight air transport during the 1980s was due to the increasing globalisation of trade, the growing internationalisation of companies and demand for leisure. This has led to increasing demand for rapid reliable air transport for business people and enabled leisure travellers to spend less time reaching both short and long distance holiday destinations. The growth in air freight has benefited from the growing requirement for express freight services, in particular documents, high value goods (of limited weight) like electronic products, and goods for which fast transport is important, for instance perishables such as flowers, and urgent deliveries such as parts required for mechanical repairs. The growth in the air industry has had a direct and proportional impact on the demand for airports.

The type of demand, whether business travel, leisure travel or freight, has tended to partially focus on some airports. Also, airlines, in particular the 'flag carriers', have tended to focus on particular airports. The 'flag carriers' have usually dominated the largest of their indigenous airports, with smaller hubs at the more important indigenous regional airports, due to the nature of the restrictions that used to be prevalent in the EC before liberalisation. The larger non-flag carrying airlines have also based their operations at the larger airports of their countries of origin and the smaller regionals are usually based at regional airport that has a sufficient catchment area to support profitable operations. In non-scheduled services, a number of airports in Portugal, Spain and Greece are largely dependant on charter flight handling. In Northern Europe, some airports have also tended to specialise in charter flights (e.g. Manchester, Maastricht). In some cases, however, this specialisation has been due to reasons other than commercial policy. For example, until 1991, charter flights from London were deliberately assigned to Gatwick in order to alleviate capacity problems at Heathrow: these non-scheduled services made up 44% of all traffic at Gatwick.

Table 3: Airports
Freight handled at major airports in Europe

Airport	Country	1991	1992	Average annual growth 1992/91 (%)
Frankfurt	D	1 206.2	1 240.3	2.8
London Heathrow	UK	661.1	757.9	14.6
Amsterdam	NL	629.9	695.0	10.3
Paris Ch.de Gaulle	F	588.4	612.2	4.0
Brussel	B	315.9	313.6	-0.7
Paris Orly	F	264.4	275.3	4.1
Zurich	CH	248.5	271.5	9.3
Rome Fiumicino	I	234.2	235.3	0.5
Cologne	D	202.5	203.8	0.6
London Gatwick	UK	202.7	190.3	-6.1
Madrid	E	188.7	188.4	-0.2
Copenhagen	DK	139.0	152.7	9.9
Luxembourg	L	152.2	150.6	-1.1
Hamburg	D	92.0	92.0	0.0
Istanbul	TR	67.5	91.6	35.7
Milan (MXP)	I	72.6	90.1	24.1
Lisbon	P	74.2	78.5	5.8
Manchester	UK	66.2	75.7	14.4
Stockholm (ARN)	S	88.4	74.1	19.3
Barcelona	E	62.7	72.4	15.5
Vienna	A	62.9	68.0	8.1

Source: ACI (Airports Council International)

Supply and competition

Airport capacity is determined by several factors, such as runway layout, number of runways and gates at the terminal and number of positions on the apron. Also, within the terminal the check-in capacity depends on the access to the airport, the number of check-in counters, the capacity of the baggage handling system and the use of modern electronics. Further, juridical conditions are of relevance, such as restrictions on night flights, customs control capacity, etc.

One of the most significant current limitations on capacity, both for airlines and for airports is the present limitations of Europe's Air Traffic Control (ATC). At present, 23 countries of the European Civil Aviation Conference have 31 different air traffic control systems. These systems rely on 18 different types of computers and 30 incompatible programming languages. In 1992, almost 13% of delayed short/medium haul flights (over 15 minutes) in Europe were due to airport and air traffic control reasons. Although improvements to ATC are being provided, there is still a long way to go in terms of investment capital and time before a harmonised system of ATC will be available that is comparable to the one currently in existence in the United States. One fillip for international airlines, including those of the EC, is the Future Air Navigation System (FANS), which if approved by the 33 members of the UN International Civil Aviation Organisation (ICAO) will move much of the current ground-to-air based navigation and air traffic management to satellite-to-air. Estimates on the savings for airlines reaches as high as ECU 7.8 billion by providing more efficient routing and reducing delays caused by air traffic control.

A recent report from Airports Council International (ACI) on the Economic Impact of European Airports stresses airports are substantial contributors to regional development and public revenues. The airports contribute to employment through three mechanisms: the first is via direct employment in the airport by the airport itself and by the activities carried out by companies operating at an airport; the second is through an indirect impact of services related to the airport's business, for instance hotels and tour operators; and there is a third impact of induced employment which results from a multiplier effect from both the direct and indirect impacts. A case study on Copenhagen Airport showed that of total employment that could be attributed to the airport, 35% was direct, 27% was indirect but the balance of 38% was due to induced employment.

Production process

The services provided at airports form part of logistic chains. Passengers travel from one location to the other using air transport as one part, albeit major, of their total routing. Air transport involves adequate connections with other transport modes, lounges for waiting passengers, customs facilities for international flights. Further the passenger wants sufficient facilities such as bars, restaurants and shops in order to while away necessary waiting time.

Airlines also require services: they need weather forecasting services, fuel provision, flight catering services, and maintenance facilities. In particular, they need an adequate check-in procedure in which the passenger and its accompanying luggage is well administered and allocated to the correct flights. The market organisation of ground-handling services at Community airports is currently under consideration with a view to taking initiatives which would allow for a greater degree of access to the market.

The vulnerability of aircraft to terrorist devices has meant an substantial investment in equipment and personnel to supply adequate security monitoring of passengers and their luggage in the EC.

Local and national government has impacted the process through the provision of facilities such law enforcement, customs control and aspects of air traffic control.

Similar requirements exist for freight forwarding at airports. Services also form part of logistic chains in particular for industries. These more and more require modern logistic concepts like Just-In-Time and Door-to-Door transportation. Such facilities are comparable to those for sea ports.

Table 4: Airports
Traffic at major airports in the USA and South East Asia, 1992 (1)

	Total passenger handled (millions)	Growth rate 92/91 (%)	of which international (millions)	Growth rate 92/91 (%)	Cargo (2) (1000 tonnes)	Growth rate 92/91 (%)
USA						
Chicago, Illinois	64.4	7.7	5.2	10.4	1 115.1	12.9
Dallas/Ft Worth Airport, Texas	51.9	7.8	2.9	3.6	577.3	5.9
Los Angeles, California	47.0	2.8	11.5	10.4	1 238.2	8.5
Atlanta, Georgia	42.0	10.0	2.2	13.8	649.3	8.3
San Francisco, California	31.8	1.9	4.2	9.9	602.7	4.0
Denver, Colorado	30.9	9.2	0.2	0.0	327.2	7.8
New York, New York (JFK)	27.8	5.8	15.1	3.8	1 318.0	4.8
Miami, Florida	26.5	-0.4	11.5	5.7	1 002.5	14.2
Newark, New Jersey	24.3	9.0	3.3	19.0	587.8	21.2
Boston, Massachussetts	23.0	7.2	3.6	15.5	371.5	6.8
Minneapolis, Minnesota	22.9	11.2	0.5	12.8	301.6	12.5
Detroit, Michigan	22.8	7.2	1.9	66.1	235.6	11.8
Honolulu, Hawaii	22.6	1.8	5.5	8.1	380.9	-0.3
Phoenix, Arizona	22.1	-0.1	0.1	100.0	161.5	18.3
Total (29)	707.6	6.6	80.8	9.8	11 298.6	9.3
South East Asia						
Japan, Tokyo (HANEDA)	42.6	1.5	0.8	9.5	489.7	0.1
Japan, Osaka	23.5	0.2	5.4	5.5	482.4	-3.4
Hong Kong	22.7	14.7	22.1	15.1	956.9	12.6
Japan, Tokyo (Narita)	22.0	6.4	19.0	7.2	1 335.9	-3.4
South Korea, Seoul	21.2	14.9	9.8	8.9	743.4	5.5
Singapore	18.1	11.1	16.9	12.1	720.7	10.4
Thailand, Bangkok	16.7	9.3	11.3	8.7	438.4	9.1
Japan, Sapporo	14.7	2.6	0.3	30.0	194.2	-20.3
Japan, Fukuoka	13.9	3.1	1.9	17.3	185.1	-16.8
China, Taipei	12.1	13.8	10.8	15.7	723.5	14.4
Total	207.5	6.8	98.2	11.2	6 270.3	3.1

(1) Airports with a total of passengers handled above 10 million
(2) Cargo includes freight and mail
Source: ACI (Airports Council International)

INDUSTRY STRUCTURE

The major airports in the EC are competing with each other for passenger and freight traffic that is not destined for those particular airports, typically traffic that is using one of these airports as an intermediate staging post or hub. Estimates for London Heathrow indicate that about 30% of extra-EC traffic arriving are transferring to other flights, whether for intra-EC connections or even extra-EC connections. Hence airports such as Paris Charles de Gaulle or Amsterdam Schiphol can easily supply a similar routing. The major airports have been competing aggressively to take a larger share of the transfer market, and this competition has also been supported by the airlines that use these airports as their major hubs.

Strategies

Strategies to compete within national boundaries are less muted in the sense of hubbing; however, major (and minor) regional airports have been positioning themselves for a significant share of the potential market by offering direct services that negate the use of hubbing. An example is Manchester Airport, which is considering to expand capacity by adding a second runway and supporting infrastructure to attract additional airlines, passengers and freight for point to point services, to capture the traffic generated in a large catchment area in the North of England. In perspective, a significant portion of the potential traffic used to go (and some still does) via one of London's airports either by flight transfer or a combination of travel that would involve a train or car journey to a London airport, or via Manchester's regional competitors. The investment allows Manchester Airport to expand its market share at the expense of the other airport in northern Britain as well as taking some share of the London airports, and attracting new induced traffic. The success of Manchester's strategy is shown by the numbers of passengers, which have doubled from 6 million in 1984 to 12 million in 1992. The growth in freight for the same period is even more phenomenal, from 29 000 tonnes in 1984 to 81 000 tonnes in 1992. This development has also meant that Manchester has been developing a hub in its own right, with around 7% of passengers hubbing compared to around 2% six years ago.

Capacity problems are a major issue in airport strategies. Capacity problems arise on many air routes and in air traffic control and the number of aircraft that can be handled simultaneously at the airfields. Apart from improvements in air traffic control, airports' improvement of capacity availability takes many forms, including additional runways, additional infrastructure and improved equipment.

Capacity problems and safety provisions together with the need to keep ahead of competition have prompted airport authorities to invest in new facilities and service improvement. The attraction of additional traffic has also been achieved by offering higher quality services to all users of the airport. They also try, in co-operation with regional authorities, to attract economic activity. An example is Amsterdam-Schiphol. Together with regional and local bodies this airport drafted a strategic plan until 2000 for the development of both the airport and the region into a main complimentary port similar in concept to the port of Rotterdam.

There are many investment initiatives by airports, amongst which is the Italian Ministry of Transport's national airport

Table 5: Airports
Largest Community airports,1992 (1)

Rank	Airport	State Member	1992	1991	1990	Growth rate (%) 1992/1991	Growth rate (%) 1991/1990
1	London Heathrow	UK	45.2	40.5	43.0	11.7	-5.7
2	Frankfurt	D	30.8	28.0	29.4	9.9	-4.7
3	Paris Ch. de Gaulle	F	25.2	22.0	22.5	14.6	-2.4
4	Paris Orly	F	25.2	23.3	24.3	7.9	-4.2
5	London Gatwick	UK	20.0	18.8	21.2	6.1	-11.2
6	Amsterdam	NL	19.1	16.5	16.5	15.8	0.4
7	Rome Fiumicino	I	19.1	16.6	17.7	15.2	-6.2
8	Madrid	E	18.4	16.4	16.2	12.0	1.0
9	Manchester	UK	12.4	10.9	10.8	14.5	0.4
10	Copenhagen	DK	12.4	11.7	12.1	6.4	-3.9
11	Dusseldorf	D	12.3	11.3	11.9	8.5	-5.2
12	Munich	D	12.0	10.8	11.4	11.3	-5.5
13	Palma de Mallorca	E	11.9	11.9	11.3	0.8	4.7
14	Barcelona	E	10.3	9.2	9.0	12.3	1.7
15	Brussels	B	9.4	8.5	8.5	11.1	-0.2
16	Milan Linate	I	9.3	8.9	9.4	5.3	-5.6
17	Gran Canaria	E	7.0	6.7	6.1	4.0	9.3
18	Berlin (TXL)	D	6.7	6.5	N/A	2.9	N/A
19	Tenerife Sur	E	6.4	6.3	5.6	2.7	12.2
20	Nice	F	5.9	5.5	5.7	7.0	-3.1
21	Dublin	IRL	5.8	5.3	5.5	10.0	-4.2
22	Lisbon	P	5.6	5.3	5.3	5.3	0.6
	Total		330.4	300.7	303.6	9.9	1.0

(1) Airports with total passengers over 5 million in 1992. Data indicating million passangers.
Source: ACI (Traffic Statistics)

plan for the development of its airports. This plan not only envisages to invest in the large airports in Rome and Milan, but also in the small regional airfields. The Airport Authority of Copenhagen has drawn up a master plan for a substantial enlargement of facilities including a second terminal due for 1997 and co-operation in the Copenhagen Central to Kastrup rail link. BAA plc is still in the throes of the plan for a fifth terminal.

ENVIRONMENT

The conflict between air transport's major contribution to economic growth and its impact on the environment remains somewhat unresolved as policies (at both governmental and operator level) to minimise the environmental impact should also work hand in hand with growth in the sector.

The major negative environmental impacts of airports are air and ground pollution, substantial land use and noise. These impacts are both directly attributable to the airport itself and its users, and indirectly attributable to factors such as the external infrastructure required and other forms of transport used to and from the airport.

The major cause of air and ground pollution is the emissions from the engines of the aeroplanes and the land service transport. Advances in jet and turboprop technology has produced engines that are substantially more efficient than their earlier counterparts. However, congestion at the busy airports can lead to an excess fuel burn and hence emission that is 30-50% higher than would the case in the absence of congestion. The requirement by the end of the century that jet engines conform to Chapter III regulations will help reduce the amount of emissions (and noise), but the overriding issue that is likely to have a major positive impact in the short term is a reduction in congestion. Improvements in congestion can be achieved by improving the air traffic control system and expanding available infrastructure, but this will in turn for the major airports allow additional flights so that some of the gain will be used up.

Concerning noise pollution, estimates included in the Commission's Green Paper on The Impact of Transport on the Environment suggest that the percentage of the population exposed to aircraft noise above 55 db(A) varies from 35% in the Netherlands to 1.7% in Denmark, and above 65 db(A) from 1% in Germany to 0.3% in Denmark. Hence, the location of airports close to residential areas is a key factor in noise pollution. Estimates released by the AEA show that the modern jets generate about the same level of noise as a TGV, but for a comparatively minute distance (some 4 kilometres). However, the discussion about noise continues at full pace, and most services that land or take off at airports near residential areas have strict requirements about night flights and the levels of thrust that can be used. This has a detrimental impact on the airlines costs as it can take much longer for an aircraft to reach optimum cruising altitude and hence the fuel burn and the time taken for a particular stage length is higher, which in turn has negative implications for emissions.

Land use and noise tend to receive more public attention than air and ground pollution due to the direct and observable impact on people. Many applications to increase or change land-use go through a lengthy negotiation process at national and local governmental levels as well as public enquiries.

Both airport and airport services have become very aware of their responsibility to the environment. The service supplier are taking increasing responsibility to minimise pollution in maintenance and repair facilities for aircraft, fuel provision services and catering services.

Table 6: Airports
Major Community airport freight movements, 1991-1992 (1)

Rank	Airport	Member State	1991	1992	Average annual growth 1991-92
1	Frankfurt	D	1 206.2	1 240.0	2.8
2	London Heathrow	UK	661.0	757.9	14.6
3	Amsterdam	NL	629.8	695.0	10.3
4	Paris CDG	F	588.4	612.2	4.0
5	Brussels	B	315.9	313.6	-0.7
6	Paris Orly	F	264.4	275.3	4.1
7	Rome Fiumicino	I	234.2	235.3	0.5
8	Cologne	D	202.5	203.8	0.6
9	London Gatwick	UK	202.7	190.3	-6.1
10	Madrid	E	188.7	188.4	-0.2
11	Copenhagen	DK	139.0	152.7	9.8
12	Luxembourg	L	152.2	150.6	1.1
13	Hamburg	D	92.0	92.0	0.0
14	Milan Malpensa	I	72.6	90.1	24.1
15	Lisbon	P	74.2	78.5	5.8
16	Manchester	UK	62.7	75.7	14.4
17	Barcelona	E	65.6	72.4	15.5
18	Milan Linate	I	52.4	63.0	-4.0
19	Munich	D	52.3	54.3	3.8
20	London Stansted	UK	34.6	53.7	55.0
21	Venice	I	50.5	52.7	4.4
22	Dublin	IRL	47.2	50.5	7.0
	Total		5 244.5	5 529.8	5.4

(1) Total freight is at least 50000 metrict tonnes
Source: ACI (Airports Council International)

REGULATIONS

In order to ease EC airport policy requirements, the Commission has categorised airports throughout the Community. Category 1 airports are the major hubs or capital airports such as London, Paris, Frankfurt and Amsterdam. Category 2 covers the larger regional airports, such as the airports of Marseilles, Hamburg, Shannon, Luxembourg, Barcelona and Manchester. Finally the category 3 airports are those remaining offering international services. Airfields for domestic services only will not be subject to EC policy.

On the problem of air traffic control, the European Civil Aviation Conference (ECAC) Ministers of Transport established the European Air Traffic Control Harmonisation and Integration Programme (EATCHIP) in 1990. In 1993, the Commission issued a directive (65/93/EEC) mandating the use of standards set by Eurocontrol throughout the Community. Eurocontrol is also responsible for implementing EATCHIP. These efforts will go a large way in improving the management of flows of aircraft in the EC (and Europe), as more cohesion and compatibility will be brought to the various national air traffic control networks. The gradual global movement towards a Single Air Traffic Management System and the introduction of the Future Air Navigation System (FANS), which if approved will move much of the current ground-to-air based navigation and air traffic management to satellite-to-air, will act as a fillip to Europe's air traffic control improvements. However, the EC will need to consider additions to its position to take full advantage of this global movement.

In January 1993, the Council adopted the regulation on common rules for the allocation of slots at Community airports (95/93/EEC). This regulation forms the basis for allocating slots on neutral, transparent and non-discriminatory rules for Community carriers. It aims to allocate slots among existing carriers as fairly as possible, given severe congestion at some airports, and it also allows new entrants a fair opportunity to slots. It has a caveat on provisions for third country relations, in that if a third country does not allocate slots to Community carriers on a similar footing, then Community allocation of slots to carriers from the third country can be constrained or withdrawn. The regulation comes up for review in three years from adoption.

In July 1992, the Council adopted the regulation on licensing of air carriers (2407/92/EEC). This regulation per se has marginal impact on most airports, but it does have an impact on the small regional airports that cater for international flights. It is these airports that will host some of the new entrant airlines operating small niche point to point services, and the regulation requires that new entrants operating small aeroplanes (less than 20 seats or under 10 tonnes MTOW) maintain a net cash at hand balance of at least 80 000 ECU. The regulation is designed to ensure the financial fitness of air carriers in a commercial environment that has been shaken by company failures. However, niche start-up airlines initial outlay of start-up capital is huge by most industry standards. This initial outlay includes plane purchase or lease, landing rights, purchasing access to computer reservation systems, hangerage and maintenance options, etc., and is estimated to be in excess of 350 000 ECU. The heavy initial investment coupled with the minimum requirements does not bode well for new entrants which in turn will severely reduce the small regional airports ability to attract additional business.

DUTY AND TAX FREE SALES

Duty and tax free (DTF) sales have become highly important for airports (and airlines) as a source of revenue. Also, passengers want to benefit from low-priced products available in the DTF shops on the airports. The Commission originally envisaged abolishing DTF allowances for passengers travelling within the EC with the advent of the Single Market. Estimates on the loss of concession income to airports concluded that landing and passenger charges would have to rise by 13 to

Table 7: Airports
Passengers handled at other EC airports (1)

(million passengers)	Member State	1992	1991	1990	Growth rate 1992/91 (%)	Growth rate 1991/90 (%)
Málaga	E	4.9	4.7	4.7	4.9	-0.6
Glasgow	UK	4.8	4.3	4.4	12.4	-3.4
Stuttgart	D	4.8	4.2	4.4	12.5	-4.1
Marseille	F	4.7	4.5	5.0	5.8	-10.6
Lyon	F	3.9	3.6	3.8	9.3	-7.3
Birmingham	UK	3.8	3.4	3.6	12.6	-6.1
Cologne	D	3.6	3.0	3.1	16.8	-1.6
Faro	P	3.4	3.3	2.8	1.5	20.3
Milan	I	3.3	2.6	2.4	27.6	8.0
Hannover	D	3.1	2.9	2.8	6.9	2.8
Lanzarote	E	3.1	3.0	2.5	4.0	19.8
Sevilla	E	2.9	1.8	1.7	58.8	9.6
Alicante	E	2.8	2.7	2.7	5.6	0.4
Edinburgh	UK	2.7	2.4	2.6	10.3	-6.9
Ibiza	E	2.6	2.6	2.4	1.6	4.5
	Total	54.3	48.9	48.9		

(1) Airports with total passengers under 5 million in 1992
Source: ACI (Traffic Statistics)

25%. In turn, airlines would pass these higher charges onto the traveller in higher fares, possibly causing a negative effect on traffic demand especially in the leisure market. The effect of DTF abolition would have been exacerbated by airline companies, especially charter airlines, losing revenues from on-board DTF-sales. This would cause a cost push on fares to overcome this. Due to strong lobbying from many sections of the international transport industry, the abolition of DTF has been postponed within the EC until the 1st July 1999. In the meantime the DTF industry has developed a system of vendor control, in which the vendor checks compliance with DTF allowances. This system is necessary as customs control for travelling within the EC will disappear, but it has increased the allowance to travellers within the EC, for each intra-EC stage is counted as one for DTF purchase. Previously, a passenger travelling from the UK to Denmark, then to Italy and returning to the UK was only allowed to import one allowance into the UK, however the equivalent for this route is now three times as purchases are possible and legal at each stage for importation into the UK.

OUTLOOK

The outlook for airports depends on the demand for air passenger and freight, which is expected to be fairly buoyant in the future. However, in the short term some of the larger congested airports will not be able to take full advantage of potential growth as congestion will be the limiting factor. As the EC's air traffic control improves, part of this constraint will disappear temporarily. Additional flights fill the vacuum

Table 8: Airports
Freight handled at other EC airports (1)

(metric tonnes)	Member State	1991	1992	Average annual growth 1992/91 (%)
Düsseldorf	D	41.8	47.5	13.6
Marseille	F	32.2	38.2	18.8
Gran Canaria	E	38.1	35.0	-8.1
Nice	F	23.3	22.6	-3.2
Lyon	F	18.6	21.9	17.2
Birmingham	UK	26.0	18.6	-28.7
Tenerife Sur	E	17.7	18.3	3.4
Berlin	D	13.1	16.4	25.4
Glasgow	UK	14.9	15.0	0.8
Palma de Mallorca	E	16.8	14.7	-12.9
Stuttgart	D	14.4	14.6	1.2
Hannover	D	13.3	13.1	-1.4
Lanzarote	E	5.9	6.5	10.1
Malaga	E	5.8	5.9	1.3
Sevilla	E	3.0	5.7	88.5
Faro	P	1.9	2.3	16.8

Source: ACI (Airports Council International)

at these airports, then the problem of congestion will return and will only be solved by adding additional infrastructure capacity - a thorny problem at most of the largest airports close to dense populations. The medium sized airports will continue to expand, especially those which have positioned themselves as competitors to the major hubs. The small regional airports will see some growth, but the major limiting factor for these will be the size of the catchment area.

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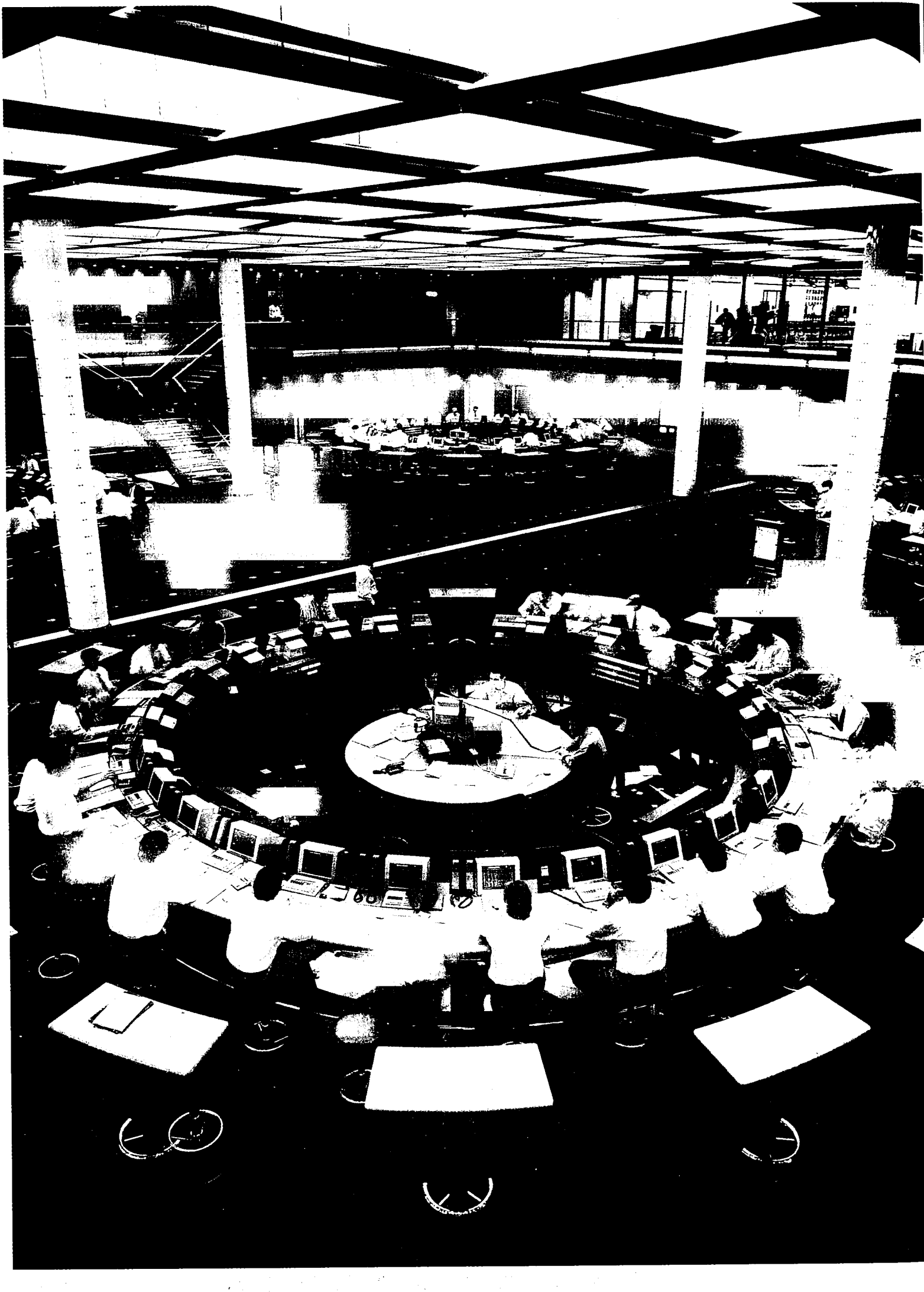


Overview

NACE 81, 82, part of 83

The traditional boundary lines between sectors providing financial services are becoming blurred in Europe. Whereas in the USA and Japan, these demarcation lines still exist, in Europe deregulation and liberalisation stimulate the emergence of integrated markets. Disintermediation, securitisation, the growth of the market for derivatives, 'Allfinanz' mergers and alliances, electronic banking and electronic markets are examples of important trends in the financial services sector. Information and communications technologies are a major force for change in the evolution of the financial services sector. There are signs of a change in saving behaviour that will increase the supply of funds on capital markets. Regulation on credit and market risks provides an element of stability in the rapidly evolving financial markets.

INDUSTRY PROFILE

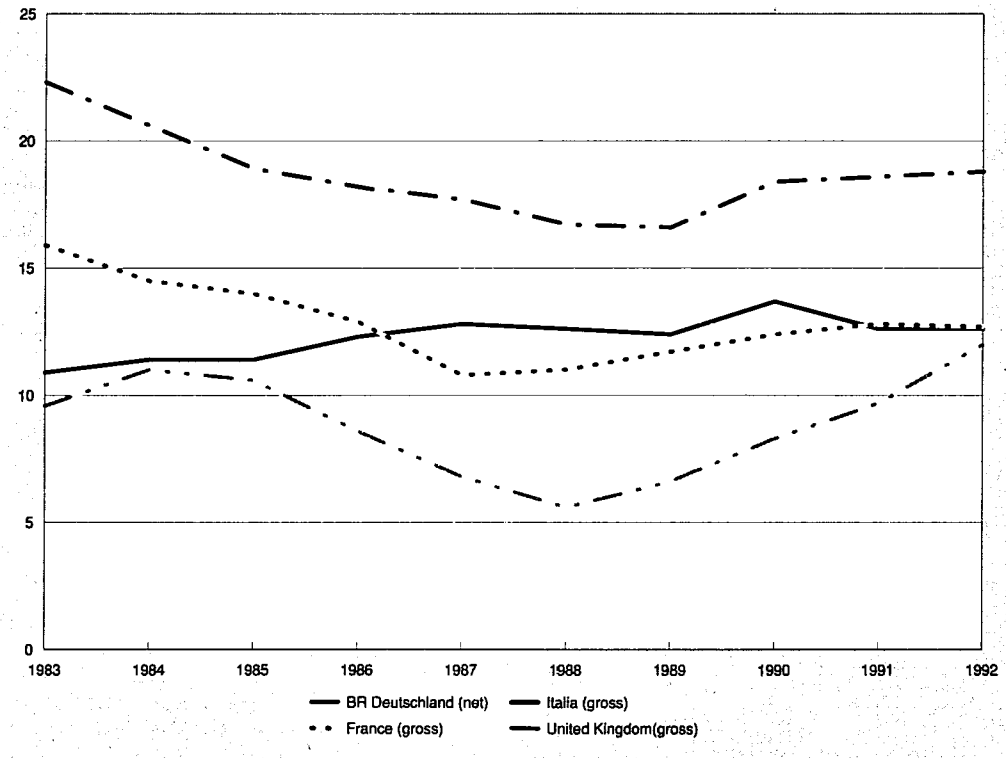
Description of the sector

The financial sector was traditionally, in many European countries, split up into various activities, which the authorities kept strictly separated, prohibiting diversification. However, distinctions between commercial banks (their role primarily being providers of short term credit to enterprises and individuals, financing enterprises and granting consumer credit), investment banks (which concentrate on the top line enterprises and engage in corporate finance, management of corporate assets and liabilities), and investment services firms were largely removed. Progressive liberalisation of the financial professions within the EC has allowed banks to play a direct role in the placement and brokerage of shares and bonds, as well as in related activities. At the same time, links between the banking and insurance professions have grown. Some insurance companies now offer credit services and payment facilities, while banks offer insurance products.

Although the demarcation lines between the providers of financial services has become fuzzy, the following classification is still valid:

- universal banks (can offer the whole range of financial services): most are joint stock companies, but in certain countries they are also savings, cooperative and public banks;
- specialised banks: among them are commercial banks (that offer a wide range of services), investment banks, mortgage banks, industrial banks, etc. (that offer only some types of financing according to their scope (industrial banks) and lending techniques (mortgage banks);
- finance companies (non-bank): consumer credit; industry credit; factoring; leasing; export financing;
- insurance companies and retirement funds: life assurance companies; non-life insurance companies; pension funds; social security funds; building societies; insurance brokers.
- other intermediaries: stockbrokers;; investment advisers; investment funds; exchanges; investment funds and other UCITS (undertakings for collective investment in transferable securities), clearing houses.

Figure1: Financial services
Personal savings ratios (1)



(1) Household savings as a percentage of disposable household income according to national classifications
Source: OECD (Economic Outlook)

Table 1: Financial services
Gross value added at market prices in % of country's total

(%)	1980	1985	1987	1988	1989	1990	1991
Belgique/België	4.6	5.8	6.3	6.1	5.7	5.0	5.3
Danmark	3.1	3.0	3.5	3.2	3.6	3.0	2.9
BR Deutschland	4.5	5.5	5.0	5.0	5.0	4.8	5.3
Hellas	2.4	2.4	2.5	2.4	2.5	2.5	2.3
España	5.8	6.0	6.3	6.6	6.9	N/A	N/A
France	4.6	5.0	5.8	5.5	5.3	4.5	4.4
Ireland	5.2	6.0	5.9	6.7	6.3	5.9	N/A
Italia	5.0	4.9	4.6	4.6	4.7	5.0	5.2
Luxembourg	10.2	21.2	19.3	16.8	13.0	12.9	13.6
Nederland	5.0	5.4	5.1	5.1	5.3	4.8	4.9
Portugal	5.4	5.9	6.8	7.3	7.7	8.6	8.6
United Kingdom	2.6	3.7	4.7	4.8	5.2	5.2	5.0
EC	4.4	5.0	5.2	5.1	5.2	5.2	5.3

Source: Eurostat (National Accounts)

Table 2: Financial services
Employment in the financial sector in % of total employment

(%)	1989	1990	1991
Belgique/België	8.1	7.9	8.2
Danmark	9.8	9.3	9.1
BR Deutschland	8.1	8.1	8.4
Hellas	4.6	4.9	5.3
España	5.3	5.4	5.8
France	8.8	9.0	9.7
Ireland	8.1	8.2	8.5
Italia	4.1	4.2	4.7
Luxembourg	12.5	12.4	13.0
Nederland	10.7	11.2	11.1
Portugal	3.4	4.6	4.5
United Kingdom	10.7	11.3	11.4
EC	7.7	8.0	8.3

Source: Eurostat (Labour Force Survey)

Table 3: Financial services
Gross value added at market prices

(billion ECU)	1989	1990	1991
Belgique/België	7.6	7.2	7.9
Danmark	3.0	2.7	2.7
BR Deutschland (1)	52.2	55.0	65.7
Hellas	1.1	1.1	1.1
España	23.8	N/A	N/A
France	44.6	40.7	41.1
Ireland	1.8	1.8	N/A
Italia	36.3	42.6	47.3
Luxembourg	0.9	0.9	1.0
Nederland	10.4	10.2	10.9
Portugal	3.1	4.0	4.8
United Kingdom	37.1	37.3	37.9
EC	222.0	237.6	257.0

(1) Includes only former West-Germany.
Source: Eurostat (National Accounts)

All these operate on all or some of the financial markets. These may be divided into groups according to various classifications. The most important distinctions are:

- money markets (short term instruments: call money, on-sight deposits, checking accounts) and capital markets (long term instruments: securities, loans, mortgage loans);
- primary markets (issues of securities) and secondary markets (dealing in already issued securities);
- regulated markets (like stock exchanges) and non-regulated markets (like over-the-counter markets, in which dealing takes place by dealers who may or may not be members of a securities exchange);
- spot markets, in which the operations and payments are carried out immediately, and forward markets, where the traded currency securities will be remitted later, and will be paid at the agreed time or upon remittance of those securities.

Recent trends

Difficulties in the European Exchange Rate Mechanism (ERM) affected the financial markets in 1992-1993. In 1992 the pound sterling, Italian lira and the Spanish peseta were withdrawn from the ERM. A period of relative calm followed, but in 1993, the tensions in the ERM increased again. This eventually led to the widening of the fluctuation bands in August 1993. This turmoil was reflected, and partly caused by, developments in the currency markets.

The real estate sector experienced a spectacular expansion during the past decade. Since the beginning of 1991, however, the sector is mired in a recession in several countries. This downturn is hurting the banking sector, as many banks are heavily involved in financing real estate.

The importance of the financial sector in the EC economy in terms of value added has been between 5% and 5.3% since 1985. Compared with 1980, this share has increased about 0.7 percentage points. The spread among most Member States is not large. Only in Luxembourg is the financial sector disproportionately important to the economy.

Four large EC countries, Germany, Italy, France and the UK, take account of 75% of gross value added in financial services. This figure is not very informative about the relative importance of each country on the different financial markets, since value added measures the contribution to the 'real' and not the 'financial' economy. To measure the latter, figures on assets, premiums written and stock turnover are more appropriate, and then a very different picture is revealed, with the UK clearly as the most important financial market.

Growth of the financial sector has resulted in a disproportionate growth in employment; indeed, employment in financial services has been growing at a faster rate than value added or profits.

International comparison

The leading financial centres are clearly New York, London and Tokyo. Although trade in financial products is to a large extent international, the international part of trade primarily originates from large (private as well as official) financial institutions or multinational firms. National regulations, conventions and culture still create distinct national markets. For instance, the consolidation of financial services in Europe - linking banking, insurance and other financial services - makes Europe the laboratory for new products and merged companies.

Japanese banks dominate the world market in terms of reserves, with Japanese banks on the first six places in the world. This is the result of a decade of exceptional growth during which Japanese banks pursued an aggressive policy of market share expansion that culminated in their moving into first place worldwide in terms of deposits. However, such a growth has been counterbalanced to a large extent by a significant devaluation of the yen vis-à-vis the dollar, all the European currencies and the ECU. The comparatively poor performance of US banks is the result of restrictive regulation, which limits the field of activity of the banks both geographically and commercially. The US banking system is fragmented and poorly diversified.

A substantial degree of internationalisation in the provision of financial services has been made possible by deregulation and the revolution in communication technology. The resulting integration of financial markets has broadened the choices of participants: issuers have increasing recourse to foreign markets to raise capital, while investors have tended to internationalise their portfolios.

The currency turmoil in 1992 (and in 1993) stimulated securities trading in so-called safe-haven currencies, at the expense of high-yield sectors. It also triggered a dip in bank credit. Lower long term interest rates stimulated demand for capital through financing and refinancing in longer-term instruments, to the detriment of short term paper. The greater risk involved with the variability of exchange rates and short term interest rates stimulated the use of derivative instruments, to hedge against these risks or to exploit opportunities to profit from these risks.

MARKET FORCES

Demand

Demand for financial services is determined by population and savings trends, deregulation and liberalisation of capital markets and changing patterns of consumption. In general, the population of Europe is ageing, which means that in the future a relatively smaller workforce will be available to generate the social security and pension benefits in pay-as-you-go systems. In anticipation of deficient social security payments, many people save in order to secure a sufficient pension. Till late in the 1980s, personal savings rates were declining in many countries, thereby constraining the financing of economic growth, and stimulating competition between banks, insurance companies, mutual funds and securities to attract savings. However, since then the fraction of saving in disposable income has taken an upward trend in several countries. If this trend continues, the supply of savings on the financial markets should increase. The question is then which financial instruments will be in demand. Households have changed their investment behaviour in the past decades. The high inflation years of the 1970s have made them fully aware of the phenomenon of monetary erosion. They have become more demanding about the yield on their savings, and look actively for the best investment opportunities. This has stimulated the success of more sophisticated saving instruments, like insurance products with a 'financial component' and mutual funds.

Retail banking, including investment of savings, portfolio management, consumer credit and mortgages, payment services and a wide range of advisory services, today constitutes one of the most important branches of the financial services sector. The retail banking sector has grown enormously since the

Table 4: Financial services
Direct investment in the EC (cumulative flows)

	Extra-EC				Intra-EC	
	Outward		Inward			
(ECU million)	1984-86	1987-89	1984-86	1987-89	1984-86	1987-89
All sectors	-54 459	-95 458	18 999	56 258	19 617	67 600
Finance and banking	-8 749	-5 698	5 451	17 656	5 729	16 922
Insurance	-3 879	-4 723	-140	3 982	117	3 893
Real estate	-757	-1 454	2 695	6 157	3 916	8 012
Industry	-18 681	-42 086	4 263	20 834	4 012	19 458
(%)						
All sectors	100.0	100.0	100.0	100.0	100.0	100.0
Finance and banking	16.1	6.0	28.7	31.4	29.2	25.0
Insurance	7.1	4.9	-0.7	7.1	0.6	5.8
Real estate	1.4	1.5	14.2	10.9	20.0	11.9
Industry	34.3	44.1	22.4	37.0	20.5	28.8
	Intra-EC as share of total		Intra-EC/extra-EC outward		Extra-EC outward/ inward	
(%)						
All sectors	21.1	30.8	36.0	70.8	286.6	169.7
Finance and banking	28.7	42.0	65.5	297.0	160.5	32.3
Insurance	3.0	30.9	3.0	82.4	-2 770.7	118.6
Real estate	53.1	51.3	517.3	551.0	28.1	23.6
Industry	14.9	23.6	21.5	46.2	438.2	202.0

Source: Eurostat (European Community Direct Investment 1984 - 1989)

Table 5: Financial services
Outstanding financial assets of personal sector

(%)	BR Deutschland 1980	1985	1990	France 1980	1985	1990	Italia 1980	1985	1988	United Kingdom 1980	1985	1989
Cash and other deposits	60.1	52.1	48.3	60.7	51.5	38.5	60.5	45.7	39.5	15.3	11.6	13.8
Building society	–	–	–	–	–	–	–	–	–	16.6	16.4	12.4
Securities	0.5	0.3	0.5	0.0	0.0	0.1	8.7	12.7	13.4	4.9	3.7	3.8
Loans	–	–	–	5.4	3.6	2.3	–	–	–	–	–	–
Trade credits	–	–	–	3.9	3.3	2.7	–	–	–	–	–	–
Bonds	11.5	15.2	16.6	9.2	7.0	2.7	7.6	16.7	22.2	–	–	–
Shares	4.3	6.3	5.5	14.1	26.4	41.4	6.9	10.1	9.8	13.2	12.0	15.1
Life insurance	21.6	23.8	26.4	3.2	4.4	9.3	14.4	10.3	9.4	34.1	43.8	44.8
Others	2.0	2.3	2.7	3.5	3.8	3.0	1.9	4.5	5.7	15.9	12.5	10.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: OECD

1960s, with the result that in many countries the market is saturated. This is demonstrated by the significant decrease in certain Member States of the number of banks branches. Banks can often only gain new business by directly luring it away from their competitors.

In the provision of financial services to the industrial sector three main trends can be identified. The first is an increasing demand for very specialised services for the management of assets and liabilities. Financial management increasingly relies on computer assistance and uses a wider range of instruments, for instance options and new fixed-term instruments. The supremacy of the banks is challenged by large companies, who have set up their own systems of financial management. The second trend is a growing intervention by banks in the management of businesses. Banks are increasingly asked to assist with financial restructuring and reorganisation, mergers and acquisitions, take-overs and leveraged management buy-outs. The third trend is the emergence of a capital market to finance small and medium-sized enterprises that have a solid track record but are unable to meet the criteria for an official market listing. These enterprises are served by risk capital companies, as well as by new segments of the official stock markets, such as secondary markets or over the counter markets.

Financial services linked to shares (especially the issue of shares, brokerage services, share transactions and portfolio management) have become on of the more important segments of financial markets since the beginning of the 1980s. Around 1982, when financial institutions were revealed as highly exposed to liquidity and country debt risks, they reoriented their activities towards stock-market based operations, in particular the underwriting of international bond issues and the intermediation of international transactions.

The market for derivative instruments has grown exponentially. The function of derivatives is to hedge against risks. Consequently, the trading of these instruments involves a degree of speculation. At present, there is a debate between banks and supervisors (e.g. BIS, Bundesbank, Federal Reserve) about the risk of the derivatives markets. The Group of Thirty asserts that these markets provide an important service and are not excessively vulnerable. Supervisory organisations however, emphasise the substantial undiversifiable market risks inherent in these instruments. These risks could materialise when the liquidity of the markets dries up.

Supply and competition

Since the mid-1980s deregulation has liberalised capital markets, thereby permitting the introduction of many new products, and has blurred the demarcation lines between different market players. In particular deregulation involved:

- an end to brokers' monopolies within stock exchanges and other organised markets accompanied by free negotiation between brokers and clients, which led to a reduction in commissions;
- reorganisation of the market for treasury bonds, with the appearance of specialists whose role is to stimulate the market and assure its liquidity;
- development of secondary markets;
- computerisation, resulting in improvements in market liquidity and in the precision and speed of information;
- creation of markets in derivative products, notably the United Kingdom's LIFFE and France's MATIF, respectively the fifth and sixth largest derivative markets in the world.

The result has been a more intense competition, but also a wave of acquisitions, mergers and alliances. While competition in new products and, to a lesser extent, price intensified, competition in territory (through building and extending a network of banking outlets) was less severe from the beginning of the 1980s as new organisational features such as home banking and automated banking facilities increasingly made the necessity of extensive branch networks less paramount. Product competition became particularly intense in the investment of household savings, with the appearance of a greater number of market participants. In addition to the traditional banks these included insurance companies and investment funds.

One of the major trends has been financing with securities rather than with (bank) loans. Examples are credit notes negotiable on the market in national currency, bonds issued by business firms, negotiable gilts issued by national treasuries and deposit certificates issued by banks. In line with this trend, financial disintermediation has spread. Increasingly firms bypass banks by going directly to the capital market (for an over-the-counter loan from for instance a life-insurance company, or the issue of bonds or commercial paper). As banks made less money out of 'normal' on-balance business, they had to look out for other income sources. These were found in off-balance activities thereby bringing commercial banks and investment banks into direct competition.

Foreign direct investment (FDI) has responded to the developments on the markets for financial services. The level of FDI has increased substantially when comparing 1987-89 with the period 1984-86. The share of insurance in intra-EC investment has increased considerably, but those of banking and real estate have lost a few percentage points. In banking and insurance, there is a redirection of direct investment flows towards other EC countries and away from the rest of the world. The intra-EC share of total direct investment flows in banking and insurance has increased significantly. In real estate

Table 6: Financial services
Chronology of principal financial innovations in Europe

	Reforms undertaken
1978	
Nederland	Creation of options market (EOE)
United Kingdom	SICAV, deposit certificates
France	SICAV
Italia	Creation of secondary market
1979	
United Kingdom	Removal of exchange controls
France	Creation of joint investment funds
1980	
United Kingdom	Creation of unlisted securities market (USM)
1982	
United Kingdom	Opening of futures (LIFFE) and options (LTOM) markets
Italia	Issuance of deposit certificates, creation of inter-bank market
1983	
France	Creation of secondary market
Italia	Lifting of credit controls
1984	
France	Removal of framework credit restrictions
Italia	Creation of variable capital investment funds
1985	
United Kingdom	Interest-bearing current accounts
1986	
United Kingdom	Big Bang stock market reforms: system of brokerage commissions and rules relaxed, end of enforced separation of brokers and jobbers, deregulation of stock exchange membership, creation of international SEAQ and reform state funds, issue of treasury bills in sterling
France	Issue of negotiable credit notes (deposit certificates, treasury bills, negotiable treasury bonds), end to monopoly of brokers and the creation of stockbrokerage houses, reform of the publicly-quoted stock market, creation of futures market (MATIF)
BR Deutschland	Creation of secondary market
Nederland	Liberalization of capital market: bullet loans, floating rate notes, commercial paper and bank issues of certificates of deposit are allowed, introduction of screen-based system for block-trading according to the market-making principle (AIM)
1987	
United Kingdom	Introduction of the Building Societes Act
France	Creation of share options market (MONEP), reform of the government securities market
Italia	Plan to reform the stock market: computerization and complete integration of the different functions, centralization of all stock trading
BR Deutschland	Creation of secondary market
Nederland	Creation of futures market
1988	
France	Opening of an options market in MATIF and a market for contracts on the CAC 40 index and on the OMF 50
Italia	Reform of the publicly-quoted stock market
BR Deutschland	Creation of DAX stock index
Nederland	Creation of automated transactions information system (HOS)
1989	
BR Deutschland	Introduction of stop-loss and stop-buy orders
1990	
France, Italia	Last phase of the removal of exchange controls
BR Deutschland	Creation of DTB futures and options market
Nederland	Introduction of system for professional trade in government bonds (OOB), stamp duty abolished
1991	
United Kingdom	Launch of futures and options contracts on the FT-SE Eurotrack 100 index, measuring developments in the main European stock markets
BR Deutschland	Introduction of electronic transactions system (IBIS), abolition of stock exchange transactions tax
France	Foreign companies are allowed to issue corporate paper on the French market without prior Treasury approval
1992	
Italia	A new type of multi-functional investment firms, incorporated as public limited companies becomes optional

Source: Eurostat, OECD

Table 7: Financial services
Breakdown of national, Community and international majority acquisitions (including mergers), combined turnover greater than ECU 1, 2, 5 and 10 billion

(billion ECU)	National (1)				Community (2)				International (3)				Total			
	1	2	5	10	1	2	5	10	1	2	5	10	1	2	5	10
1987/88	20	15	7	4	17	16	9	4	15	8	5	2	36	29	19	10
1988/89	27	20	6	1	14	12	6	2	12	11	7	4	53	43	19	7
1989/90	23	19	14	10	19	15	10	3	7	5	1	0	49	39	25	13
1990/91	20	16	11	4	16	18	11	9	6	5	3	2	42	37	25	15

(1) Operations of firms from the same Member State.
(2) Operations of firms from different Member States.
(3) Operations of firms from Member States and third countries with effects on the Community market.
Source: Data gathered by the Commission from the specialized press

virtually all foreign investment by the EC remains in the EC. The strong decline in the ratio between outward and inward extra-EC FDI flows indicates that the EC has become an attractive location for direct investment from non-EC countries. Measured by this ratio banking and insurance appears much more attractive for FDI than the industrial sector.

Production process

The decade of the 1980s was marked by the liberalisation of financial markets involving the removal of brokers' monopoly, the authorisation of new products and the removal of credit restrictions. This triggered the expansion of markets and the introduction of innovative new products. Moreover, the distinction between brokers, banks, exchanges and electronic markets has become less clear, and in several instances even obsolete. All compete to provide services to the suppliers and demanders of capital.

An indispensable factor for the explosion in market activity and the proliferation of products permitted by deregulation, was the availability of enhanced information and communications technology. From the point of view of costs, computers as a mass processing tool permit significant increases in output per employee. Productivity related to administrative functions is growing in the banking sector in the order of 5% to 7% a year. At the same time, by minimising manual intervention, using real time operations, keeping customer files updated to the minute, reducing delays and making deadlines more reliable, computers are an important quality tool as well. Finally, technology is necessary for the provision of new services as remote banking.

Technology and competition have led to changes in the organisation of work. The most important are the overall responsibility of employees for good performance and cost control; the improvement of working conditions; the increased direct contact between employees and customers; and better internal control.

New technologies and methods presuppose new staff skills. Financial establishments that hired large numbers of untrained staff during the expansion race in the 1960s and 1970s are now faced with major investments in training and writing off redundancies. Furthermore, the additional costs of investment in computerisation weigh on profits of banks and insurers. Set against a background of growing competition, the way institutions handle these changes will be crucial for their future performance.

INDUSTRY STRUCTURE

Financial institutions

The fifteen major European banks, ranked by Tier One capital, include French, Swiss, UK, Dutch and German banks. Tier One capital includes common stock and declared reserves. In short, Tier One capital measures only the core of the banks' solvency. If banks are ranked according to their assets; German banks figure more prominently. There are over 10 000 banks in the EC.

In 1990, there were almost 4900 insurance companies in the EC, mostly active in non-life insurance. This figure includes approximately 750 reinsurance companies, as well as companies from former East Germany. However, the number of independently-controlled groups was only about 2500. This number will continue to decline as competition pushes the small and medium-sized insurers to merge.

Strategies

The large financial services groups follow two main strategies. The first is diversification: offering a complete financial service package ("Allfinanz"). The second is cross-border expansion or linkage (global player). Allfinanz (also named 'bancassurance', although there the emphasis lies on insurance products) offers benefits to banks and insurance companies, especially in the life insurance sector. The life insurance market offers banks attractive prospects for improving the return from their distribution network. Precisely the scope of the banks' networks is also attractive for the insurer, in that a larger volume of customers can be accessed at lower cost. The strategy of global player is pursued through acquisitions, mergers and alliances. However, figures from the CEC show, that in 1991, acquisition and joint-venture activity has slowed down.

Other financial intermediaries, like securities brokers, must first determine if they want to be an international, national or niche player. To be an international operator the successful strategy seems to be to invest in international networks of offices. Goldman Sachs, Credit Suisse First Boston and S.G. Warburg all have invested heavily and all are leading advisers.

A strategy of innovation can create competitive advantages for all players in the financial services sector, but especially for the stock exchanges. International capital investments increasingly use new financial instruments, simply because they offer a better performance.

REGIONAL DISTRIBUTION

In Europe, London remains the centre of the international financial market, both in terms of stock market capitalisation and volume of transactions. London's pre-eminent position can be explained by the extent of deregulation and the role of the SEAQ International transaction system, which deals in European shares. UK experience has speeded up the pace of innovation in other European countries. New ideas have begun to spread rapidly to the continent from the beginning of the 1980s and Paris and Frankfurt have significantly increased their market share.

Table 8: Financial services
Breakdown of national, Community and international acquisitions and joint ventures

	National (1)				Community (2)				International (3)				Total			
	87/88	88/89	89/90	90/91	87/88	88/89	89/90	90/91	87/88	88/89	89/90	90/91	87/88	88/89	89/90	90/91
Acquisitions of majority holdings	67	66	81	66	26	24	41	20	25	26	37	71	118	116	159	103
Acquisitions of minority holdings	46	41	53	38	19	32	57	33	35	18	30	16	100	91	140	87
Joint ventures	26	19	16	12	10	11	14	13	10	10	11	5	46	40	41	30
Total	139	126	150	116	55	67	112	66	70	54	78	92	264	247	340	220

(1) Operations of firms from the same Member State.
(2) Operations of firms from different Member States.
(3) Operations of firms from Member States and third countries with effects on the Community market.
Source: Data gathered by the Commission from the specialized press

REGULATIONS

The market for financial services is partly very internationalised, partly still nationally segmented. Several EC directives applying to banking, insurance and investment services, have the objective to create a single market in financial services. The latest directives have introduced three important principles to steer market integration:

- the home country control principle, by which the country where the main unit of a company resides, has the supervision over that company;
- the single licence, allowing a financial institution licensed in a single Member State to operate freely in all Member States
- the mutual recognition principle, according to which Member States must accept that financial institutions having their head office in another Member State, and operating on their territory, will abide by their national prudential regulations.

The Second Banking Coordination Directive came into effect as from January 1, 1993. It is supplemented by a directive on monitoring and controlling large exposures of credit institutions. A directive on the credit institutions' own funds, another one on the solvency ratio for credit institutions and a last one on deposit-guarantee schemes are in the advanced stage of the process that will lead to their approval by the EC Council of Ministers (common position on 25 October 1993).

In the context of the internationalisation of capital markets and the exponential growth of new financial instruments, new regulation on the functioning of markets is essential to maintain the stability of the system and reinforce investor protection. The entire supervisory process with respect to capital markets has therefore been expanded. Supervisory authorities have strengthened their prudential control on financial institutions through the application of solvency ratios and the elaboration of new international standards. In 1993, the minimum requirements laid down by the European banking directives came into effect. These require that total capital should be at least 8% of risk-weighted assets and that Tier One capital should be at least 4% of assets.

The insurance business in certain countries has traditionally been subject to stricter regulation than banking or other financial services. In those countries, regulations impose standardised policy clauses and, in certain sectors of the industry, set prices. The "third generation directives" of the EC have established the home country control and the single licence principles for the insurance industry and have phased out most of the foregoing restrictive regulations, leaving to the relevant Member States only the possibility to make some controls "ex post".

The Capital Adequacy Directive (CAD) of 15 March 1993 and the Investment Services Directive (ISD) adopted on 10 May 1993, introduce the same principles for investment services, however, this situation will be discontinued between 1996 and 1999.

OUTLOOK

The major trend for the future seems to be the integration of national financial services markets. Whereas wholesale capital markets have already been very liberalised and internationalised, the national boundaries between markets serving private customers and small and medium-sized businesses have remained intact. Economies of scale and scope, as well as deregulation have already driven financial companies into acquisitions and alliances. The new EC directives encompassing the single licence and the home country principle, provide the regulatory basis for further integration.

For financial services and insurance, the Single Market remains a concept whose impact will probably not be felt until around 1995. For major firms, savings, financial services and insurance are already global matters. Individuals, meanwhile, tend to remain attached to locally-available services provided by local companies.

However, a single European capital market could emerge, given the elimination of all barriers to cross-border transactions. This market will be characterised by a high degree of competition and financial innovation. It can be expected that financial firms will serve not only the large 'Blue Chip' companies, but also some middle-sized firms.

Disintermediation will continue to be important, and perhaps its importance will grow, given the regulatory changes and the changes in information and communications technology. It can be envisaged that e.g. electronic markets can perform both the function of intermediary and market, making stock exchanges, banks and other intermediaries in those instances obsolete. The main participants, however, will in the near future be precisely those stock exchanges, banks and intermediaries.

There is a caveat to disintermediation, which already has become apparent. In order to survive competition, banks were and are tempted to take on bigger risks with what business they still have. Recession has already forced many banks to build up bad debt provisions, but the situation is improving. The new solvency ratios and capital requirements must reduce these risks in the future. Economic recovery will be the biggest help though.

Written by: Netherlands Economic Institute

Credit institutions
NACE 81

Disintermediation, bad debt provisions, capital requirements, rising personal saving rates and technology are the important trends for the banking sector. Especially in wholesale banking there is a tendency of borrowers and investors to bypass banks and to go directly into securitised money and capital markets. This trend has been a challenge to banks already for a couple of years. Banks' reactions have existed partly in looking for higher-return investments, which however bear also a higher risk. During the long economic upturn of the 1980s this policy proved fruitful, but when the economy turned into recession, many banks had to make provisions for losses. Capital requirements imposed by the Basle accord and the EC try to put a brake on aggressive lending policies and to secure a greater level of financial stability. With respect to the other side of banks' balance sheets, rising personal saving rates may mean that they can fund their activities more easily in the 1990s, although competition from other players like mutual funds is strong. Fast progress in information and communications technology will continue to drive developments in the 1990s, as they have done in the 1980s.

INDUSTRY PROFILE

Description of the sector

Banking fulfils various functions: accepting deposits and converting them into loans and credit to enterprises, public authorities and consumers; managing payment systems and clearing mechanisms; providing services with capital transactions; performing various other services like the provision of guarantees and insurance agency. These functions are not performed by banks alone. Consumer and industrial credit are provided also by finance companies (many of which have links with banks) and mortgage loans also by life insurance companies and property developers. The special nature of banks is being eroded by the trend towards deregulation: some banks' activities are becoming increasingly similar to some of the activities of other financial institutions with which they compete.

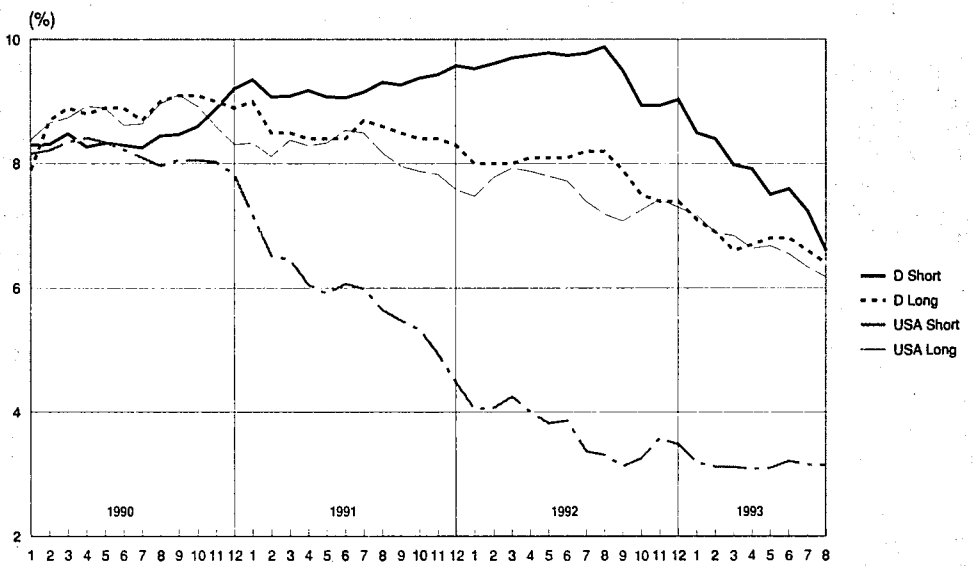
In looking at the banking market, it is possible to distinguish the retail and the wholesale/corporate market. Each has its own characteristics and to some extent also different players. The retail banking market in Europe is still very national. The degree of concentration in most national banking markets is not high. Only in a few Member States the three main banks have together a market share of more than 20%. However, in every country there are a few banks that are the market leaders, and as such in every country there is to a certain degree an oligopoly. On a European scale, however, the retail market is fragmented. Entry in these markets is difficult, because of a high degree of customer loyalty and high set-up costs. Furthermore, managing a pan-European retail banking network faces the concerned organisation with many difficulties, not to mention the disadvantages of some approaches (see strategies). Wholesale markets are very competitive and margins are thin. Activities in this sector are more complex than in the retail market.

Credit institutions can be classified along the following lines:

- Universal banks: multi-purpose banks which can offer the whole range of financial services. Most of them are joint stock companies, but in certain countries also savings, co-operative and public banks are universal banks;
- Specialised banks: among them are the commercial banks, which offer a wide range of services, and the investment banks, the mortgage banks, the industrial banks, etc. which offer only some type of financing, according to their scope (industrial banks), or their financial techniques (mortgage banks).

There are also institutions which offer some type of specialised credit, but are not credit institutions according to EC directives, and which are called "financial institutions" because they do not attract their funding from the public; such institutions are particularly active in consumer credit, industry credit, factoring, leasing, car financing.

Figure 1: Credit institutions
Interest rates (1)



(1) Short term interest rates: Germany 3- month FIBOR; USA certificates of deposit. Long term interest rates: Germany 7-15 year public bonds; USA US Government bonds (composite over 10 years)
Source: OECD

Table 1: Credit institutions
Other monetary institutions - Main indicators, 1990-91 (1)

	Number of enterprises	Number of local units	Number of persons employed	Total assets (million ECU)	Interests and commissions received (million ECU)
Belgique/België	131	10 653	76 160	390 660	44 317
Danmark	189	2 652	54 930	143 163	13 180
BR Deutschland	3 875	45 268	635 800	1 647 310	206 552
Hellas	42	2 590	47 000	78 000	N/A
España	325	33 872	255 989	613 840	70 984
France	640	31 509	362 567	1 439 018	217 281
Ireland	42	959	22 600	49 017	N/A
Italia	1 043	21 544	329 753	939 485	86 814
Luxembourg	231	537	19 000	317 260	27 934
Nederland	180	8 740	122 400	418 000	51 876
Portugal	260	4 482	63 631	83 600	11 972
United Kingdom	548	17 989	448 927	1 752 069	N/A
Total	7 506	180 795	2 438 757	7 871 422	730 910 (2)

(1) Other than central banks.
(2) EUR 9
Source: Eurostat (Mercure), OECD, national data, Eurostat estimates

Mortgage credit plays a fundamental role in the EC economy. It comprises 80% of outstanding debt of households and is also important in bank lending to enterprises. Characteristic of this part of the banking market is the high concentration of mortgage credit in the UK building societies, as well as large Danish, German and Spanish specialised banks. Another characteristic is the importance of legal traditions. Every country differs from the other in this respect. Notwithstanding the second banking directive, the EC market for mortgage credit remains by and large the sum of twelve national markets. National differences in tax treatment of interest on mortgage loans and in preferences for renting obstruct effectively the international expansion of banks engaged in mortgage credit.

Finance companies specialise in providing credit to consumers and industry. Mostly, they are subsidiaries of larger financial (and insurance) institutions. Industrial credit (to be distinguished from leasing) is common in Germany, France, the United Kingdom and Sweden. Transactions with private customers represent in general more than 50% of the total volume.

The UK has the largest banking sector, measured by total assets, followed by Germany and France. The German bank sector employs the most people. The number of banks in Germany is overestimated because many of the cooperative banks are counted as different banks, whereas in other countries (e.g. France or the Netherlands) they are subsumed under the heading of their central or regional cooperative bank. The number of local units is informative about the presence of (retail) banking in the countries concerned. Cooperative banks figure prominently in Germany, France and the Netherlands, and savings banks in Italy, Portugal, Spain, Germany and Belgium. However, in every country except Germany, the (large) majority of assets is held by straight commercial banks.

Recent trends

In 1992 and 1993 banks were affected by the turmoil on the exchange markets, the economic recession and the capital requirements of the Basle accord and the EC. The unfavourable effects of the current economic situation in Europe have made themselves felt in the construction and property market sectors,

Table 2: Credit institutions
Breakdown of total assets by type of banks, 1991

(million ECU)	Total assets commercial banks	Share of total (%)	Total assets savings banks	Share of total (%)	Total assets of cooperative and mutual banks	Share of total (%)
Belgique/België	297 700	76.2	91 800	23.5	19 183 (1)	0.3
Danmark	107 000	74.9	19 900	13.9	355	11.2
BR Deutschland	659 300	40.0	563 900	34.0	308 961	25.7
Hellas	69 400	89.0	7 400	9.5	32	1.5
España	386 719	63.0	196 600	34.0	33 901	3.0
France	968 000	67.3	129 200	9.0	341 818	23.7
Ireland	46 300	94.5	1 300	2.6	2 283	2.9
Italia	609 500	64.9	240 700	28.7	60 485(2)	6.4
Luxembourg	303 900	95.8	12 100	3.8	1 260	0.4
Nederland	304 956	73.0	18 200	4.3	94 844	22.7
Portugal	58 944	70.5	17 300	26.2	2 711	3.3
United Kingdom	1 716 200	97.9	32 000	1.8	3 869	0.2
Total	5 527 919	70.2	1 330 400	17.5	869 702	12.3

(1) All Belgian co-operative banks (i.e. savings banks and co-operatives) have co-operative statutes
(2) Excluding the group of Banca Popolare
Source: Eurostat (Mercure), Central banks, NSO, Eurostat estimates

Table 3: Credit institutions
Deposit money banks and other banking institutions - Banks' assets

	End of year (ECU bilion)		Change (%)	
	1991	1992	1986/92	1991/92
Belgique/België (1)	281	305	8.1	8.5
Danmark	105	107	13.8	2.0
BR Deutschland	1 921	2 180	9.9	13.5
Hellas (1)	59	63	6.7	5.6
España (1)	514	552	12.1	7.5
France	1 392	1 554	9.0	11.6
Ireland	42	52	13.6	24.3
Italia (1)	840	873	5.9	3.9
Luxembourg	290	325	11.8	12.2
Nederland	388	434	9.8	11.9
Portugal	64	82	17.7	28.1
United Kingdom	1 835	1 701	9.8	-7.3
EC	7 730	8 227	9.5	6.4
USA	3 727	4 157	2.7	11.5
Japan	7 401	8 615	10.5	16.4

(1) Estimates: Belgium 1991, 92; Greece 1992; Italy 1992; Spain 1992.
Source: IMF (International Financial Statistics), The Banker

with a fall in output of 1.2% in overall construction activity in 1992 and a downturn in the volume of property related business. The construction of new housing is down in Europe as a whole . Some growth is still visible in the rehabilitation and maintenance of residential buildings. Non-residential building is very sensitive to fluctuations of the business cycle and is performing poorly in the current recession. Property markets across Europe have not escaped the fall in overall activity. ECMF figures on property transactions recorded a sharp drop in 1992, while nominal house prices showed a mixed performance.

In 1992 banks' assets registered an average growth of 6.4%, lower than the yearly average since 1986. Differences among the Member States were widespread, however, with the UK banks reporting a decline and Irish and Portuguese banks reporting strong increases. It is remarkable that, according to the Banker, the number of bank employees rose in 1992 in most countries.

The recession overall and in the real estate sector depressed the demand for credit by the private sector. It also resulted in increasing bad debt provisions, except in the UK, where it seems that the worst is over. Nordic banks, however, slumped even further. In the Scandinavian countries the real estate sector was hit particularly hard, and many banks were forced to make large provisions. Some of them had to be rescued by the government with the taxpayer money.

The European mortgage credit market was directly affected by the depressed real estate sector and lending figures fell in 1992. The situation varied greatly from country to country, however. Strong increases in residential lending were recorded in Germany, Belgium, The Netherlands and Portugal. The gains in these countries were more than offset by sharp decreases in France and the United Kingdom. Levels of outstanding loans against residential property increased by only 4.0% in 1992, substantially lower than the growth figure of 1991.

According to EUROFINAS's members, total credit of finance companies outstanding at the end of 1992 amounted to ECU 155 billion for the EC (excluding Greece and Luxembourg), a decrease of 0.5% compared with the previous year. The amount of new credit registered a drop of 8% to ECU 86 billion.

The recession combined with structural developments has resulted in lower profitability in many countries. Net interest income in particular has declined in recent years in all major banking markets of the EC (UK, France and Germany). There are, however, countries where the opposite holds, like Italy, Portugal and Ireland.

International comparison

Japanese banks dominate the world market in terms of assets, with Japanese banks on the first six places in the world. This is the result of a decade of exceptional growth during which Japan's banks pursued an aggressive policy of market share expansion that culminated in their moving into first place worldwide in terms of deposits. The fact that the volume of assets held by Japanese and EC banks is roughly equal shows that the Japanese market is much more concentrated than the EC market. Japanese banks have engaged in excessive lending in too risky ventures. In 1992 huge provisions against bad lending were needed. It is important to note that only two European banks are listed among the first ten in the world (Crédit Agricole and Union Bank of Switzerland) in terms of own funds.

North American banks figure less prominently among the rankings, with only 7 banks in the top 50, measured by assets. Banks' assets are also on average much smaller than those of Japanese or the European banks. However, interest margins are on average higher.

Foreign trade

The strong growth of international capital markets is a major feature of the past decade. The stock of net international bank credit at the end of 1992 amounted to ECU 3 022 billion. In US dollar terms (USD 3 660 billion) it was almost 21 times as high as ten years earlier. In 1992, the expansion of net international bank credit was 6%. Growth was inflated by in- and outflows of funds at the time of the exchange market turmoil, when the pound sterling and the Italian lira stepped out of the ERM. Taking this into account, growth has been very modest. Slow economic growth, which weakened credit demand and increased risk aversion, and perhaps also the new capital requirements, have taken their toll.

In the EC too growth of international bank assets has been on average very modest. However, when excluding exchange rate effects, the growth was probably higher. French banks recorded the largest increase, one quarter of which can be attributed to foreign affiliates.

Table 4: Credit institutions
Total annual net lending against mortgage (1)

(million ECU)	In residential and commercial property		In residential property	
	1991	1992	1991	1992
Belgique/België (2)	2 416	2 140	1 895	1 539
Danmark (3)(4)	3 477	384		
BR Deutschland (7)	32 127	34 234		
Hellas (5)	338	361		
España (8)	14 844	9 297	10 674	6 900
France (5)	10 669	2 760		
Ireland	115	416		
Italia (1)	9 560	8 838	7 342	7 601
Luxembourg	43	31		
Nederland (6)	9 390	14 506	5 669	10 330
Portugal (3)	1 677	1 750	1 029	1 209
United Kingdom	37 951	24 264		
EC	41 702	37 276	107 514	89 284

(1) Net lending is defined as the difference in outstanding loans from one period to the next.
(2) The figures are ABCI estimates.
(3) ECMF members only.
(4) Figures refer to difference in outstanding mortgage bonds from one period to the other.
(5) 1992 figures are provisional.
(6) 1992 is estimated.
(7) These figures include loans for residential property not secured by mortgage.
(8) Lending against mortgage in residential property; estimated figures.
Source: ECMF

MARKET FORCES

Demand

Demand for banking services derives from economic activity: savings and investment on the one hand and transactions on the other form the backbone for the volume of demand. The development of interest rates is of importance, especially the difference between long and short term interest rates, because a role of banks is to bridge the supply of shorter term savings (supply of capital) and the demand for longer term credit (demand for capital). Apart from the fact that interest rate developments determine the interest margin, they also influence patterns of supply and demand of capital.

Demand for international capital has originated partly from the growth of international trade, foreign direct investment and portfolio investment, and partly from the liberalisation of capital markets, which made it possible for investors to seek the best location to invest.

There is an increasing demand for more sophisticated and diversified financial products: flexible credit products, foreign currency financing, derivatives like swaps, options and futures. Innovation is very important in this area and plays a double role. It responds to demand, but by creating new products it also stimulates demand.

Supply and competition

The main trends in banking since the mid-1980s are deregulation, liberalisation and disintermediation. These trends pose challenges as well as threats to the banking sector. Disintermediation, involving securitisation (loans transformed into securities) and the operation of near-banking activities by large firms reduces interest income. Only when a bank succeeds in attracting new business with services (e.g. the issue of securities) can it compensate the loss with more income out of commissions. Up until now the banking sector has adjusted with some difficulties. Negative developments include declining profitability, financial fragility and increasing bad debt provisions. Competitive pressures, showing up in smaller interest income, drive wholesale banks to higher-risk and higher-return activities. The recession revealed the dangers of this evolution: bad debt provisions have grown considerably. In the 1980s set-asides had to be made against loans to heavily indebted developing countries, but in more recent years the provisions are primarily against bad domestic debts. Especially banks involved in financing real estate unsecured by mortgage credit and highly leveraged corporations were affected.

The pressures on interest income made banks look for other income sources: fees (e.g. for underwriting of security issues), commissions, advice for customers (retail and wholesale), arranging swap and forward exchange and interest rate contracts. As a result off-balance sheet activities have grown considerably, making the supervision by regulatory bodies more difficult. The search for other income has also spurred the drive towards 'Allfinanz'. Banks want to increase revenues from their customer base by selling them more products.

Pressures on profitability have pushed banks to higher efficiency. Cutting costs has become a major concern in the banking business. Many opportunities are still available in this field. One option is the reduction of the number of branches, especially in overbanked and overbranched markets. Technology (automated teller machines, telebanking) will preserve a wide access to banking services for the public. Another option is the merging of smaller banks to reap the benefits from economies of scale or scope.

The profitability of banks is also threatened on the deposit side on the tax treatment of deposits in the country concerned. Customers are more alert to invest their savings in high-yield deposits, or turn away from banks to mutual funds. In some countries, tax treatment of certain life insurance products lures savings away from banks. Banks can only compete by offering the same conditions, which means that the cost of funding goes up.

In the UK, the challenge of the building societies to the banks has forced the banks to move more strongly into the financing of residential investment. Furthermore, UK banks also faced competition on the credit card market by the development of store-based credit cards. In the 1980s and the beginning of the 1990s, UK banks were severely hit by bad debt provisions because of loans to the Third World and subsequently by the

impact of the recession, which affected particularly the real estate sector.

In Europe, but also elsewhere, one of the questions is how capital markets will evolve: with the emphasis on bank finance or on direct financing on the capital markets? Both have their own advantages. Bank-based systems are less crisis-prone, have a longer-term view in decision making and provide superior continuous monitoring of corporate performance. Market-oriented systems are usually more efficient, support more financial innovation and better resist conflicting interests between stakeholders.

Production process

Technology, especially computerisation, is of crucial importance to banking productivity and the development of new activities. Technological progress in information and communications technology has lowered the costs of collecting and analysing information. It also enabled to meet demand for more sophisticated products. Offering electronic banking services to corporate clients helps to generate fee-earning business.

First, large administrative processes were automated, by using batch processing in the 1960s and 1970s. This gradually evolved in spreading automation from back-office to front-office, together with the use of computers in office automation (e.g. word-processing). Finally, banking services itself became automated and electronic banking was born. As of the beginning of the 1980s, computerisation in banking activities accelerated, with marketing of specific services such as long distance banking by computer. In France a high degree of interbank compatibility and the spectacular development of a government sponsored video text system called minitel have allowed the development of one of the largest automatic teller networks in the world, with one machine for every 1 500 customers. On the other hand, customers are now familiarised with card services, and expect something new, such as genuine one-stop agencies featuring automated disc-storage, cheque printing, information and advice. Apart from automatic cash dispensers, telebanking now includes a variety of on-line videotext and off-line ASCII services. There is a definite trend towards more automation in transactions between bank and customer.

Computerisation is a processing tool that can produce major productivity gains. Estimates show that administrative productivity is growing annually at about 5% to 7%. However, investment in computerisation represents a heavy financial burden. In the decade 1980-1990, bank spending for computers rose by nearly 30%. Banks show an increasing tendency to centralise their technological resources, concentrating their information technology system in a limited number of centres, typically on a group or regional level.

The cost of acquiring a new customer is very high, at around 1 000 ECU according to a recent study. Adding one point of market share is estimated to cost between 1 billion and 2 billion ECU in investment.

INDUSTRY STRUCTURE

Companies

The fifteen major European banks, ranked by Tier One capital, include French, Swiss, UK and Dutch banks, and only one German bank. Tier One capital includes common stock and declared reserves plus (the increasing number of) perpetual, irredeemable and non-cumulative preference shares; it excludes hybrid forms of capital and extras as goodwill and revaluation reserves. In short, Tier One capital measures the core of a bank's solvency. The ranking would change if banks were ranked according to their assets. German banks would then figure more prominently.

The major retail banks in France are Crédit Agricole (a co-operative bank), Crédit Lyonnais, Société Générale and BNP. Banks in France have been subject to many political pressures. Many were nationalised in 1982 and then privatised again after 1986 when the political tide was reversed (e.g. Société Générale). Since the election of the new French government privatisation has again gained momentum, resulting in the privatisation of BNP in October 1993. Important wholesale and merchant banks are Paribas and Indosuez. French banks have invested heavily in new technology like automatic cash dispensers.

Deutsche Bank, Commerzbank and Dresdner Bank dominate the German banking market. German banks play a special role in the German economy because of two reasons. The first is that they hold stakes in many industrial enterprises and have influence on the companies' supervisory boards (Aufsichtsrat). This influence is usually thought to be beneficial, because banks tend to take a long-term view and provide valuable financial advice. The second is that they act as stock-brokers for the exchange (credit institutions own 80% of the new unified structure of the Deutsche Börse).

The UK banking market is dominated by Barclays, National Westminster, Lloyds Midland (HSBC Holdings) and Abbey

Table 5: Credit institutions
Commercial banks - Income as share of average balance sheet total

(%)	Net income 1986	Net income 1991	Net interest income 1986	Net interest income 1991	Net provisions 1986	Net provisions 1991	Profits before tax 1986	Profits before tax 1991
Belgique/België	0.76	0.61	1.62	1.34	0.31	0.31	0.45	0.31
Danmark	0.02	N/A	2.63	N/A	0.39	N/A	-0.37	N/A
BR Deutschland	1.36	1.05	2.58	2.16	0.55	0.47	0.81	0.58
Hellas	0.76	2.44	1.27	2.19	0.32	0.82	0.44	1.62
España	1.60	2.28	3.74	3.96	0.79	0.72	0.81	1.56
France	0.96	0.81	2.47	1.74	0.61	0.52	0.35	0.29
Italia	1.78	1.73	3.26	3.54	0.58	0.50	1.20	1.23
Luxembourg	1.00	0.67	1.13	0.83	0.66	0.42	0.33	0.26
Nederland	1.08	0.80	2.42	1.78	0.34	0.29	0.74	0.51
Portugal	1.13	3.32	2.76	4.97	0.84	0.79	0.29	1.53
United Kingdom	1.73	1.72	3.17	2.97	0.54	1.32	1.19	0.41
USA	1.58	1.78	3.34	3.57	0.78	1.01	0.80	0.77
Japan	0.56	0.39	1.27	1.11	0.04	0.07	0.52	0.32

Source: OECD

Table 6: Credit institutions
International bank assets by nationality of ownership

	1989		(1)1990		(1)1991		(1)1992	
	(billion ECU)	% of total	(billion ECU)	% of total	(billion ECU)	% of total	(billion ECU)	% of total
Belgique/België	80.6	2.2	87.6	2.4	99.8	2.5	99.8	2.7
Danmark	32.7	0.9	43.2	1.2	52.0	1.3	46.6	1.2
BR Deutschland	322.4	8.7	383.1	10.3	462.8	11.7	463.6	12.5
España	38.6	1.0	44.9	1.2	63.3	1.6	65.0	1.7
France	358.1	9.6	373.6	10.1	424.8	10.7	439.4	11.8
Italia	185.0	5.0	208.9	5.6	266.6	6.7	283.1	7.6
Luxembourg	20.5	0.6	25.4	0.7	28.3	0.7	36.2	0.9
Nederland	114.5	3.1	133.8	3.6	151.1	3.8	147.8	4.0
United Kingdom	229.1	6.2	211.4	5.6	222.7	5.6	211.6	5.7
EC 9	1 381.5	37.2	1 511.9	40.7	1 771.4	44.7	1 793.1	48.5
USA	619.7	16.7	558.2	15.0	579.4	14.6	522.4	14.1
Japan	1 708.5	46.1	1 643.8	44.3	1 614.3	40.7	1 381.2	37.3
Total	3 709.7	100.0	3713.9	100.0	3 965.1	100.0	3 696.7	100.0

(1) March
Source: BIS, International Banking Developments, 8/91

National. The banking oligopoly from some years ago has to face the challenge from building societies, of which one already has transformed itself into a public limited company and now shows up in the ranking.

The Italian banking market is more fragmented. Only two Italian banks figure under the first twenty European banks: Banca di Roma and Cariplo. Other important banks are the Istituto Bancario San Paolo di Torino and the Banca Nazionale del Lavoro. Many banks are state-owned and were under the influence of political parties. As a result the Italian banking sector is not very competitive. However, the adoption of the Amato law in July 1990 paved the way for major restructuring and modernisation. This law opened the way for publicly owned banks to become joint stock corporations with additional fiscal benefits. The Cassa di Risparmio di Roma acquired a 65% stake in the Banco di Roma and took over the Banco di Santo Spirito and created the Banca di Roma. This trend will develop in the near future with the privatisation of major public banks decided by the Ciampi Government in 1993 and which go beyond the Amato law which limited the private ownership to 49% of the capital. The process has already begun with the Credito Italiano which has become a "public company".

Strategies

The changes in the banking sector are numerous: removal of exchange controls, freedom to provide services, freedom of establishment, the Basle accord and the EC directives stipulating minimum capital requirements, the tendency for more and more companies to develop operations in Europe, the opening up of Eastern Europe. Banks must develop strategies to maintain competitive advantage and market share in a changing environment.

Large (retail) banking groups are following several strategies, of which two attract much attention. The first is diversification and includes: offering a complete financial service package like the sale of insurance products ("bancassurance"), acquiring shares in industry (merchant banking), offering a wider range of various financial services (leasing, factoring, forfeiting, etc.). This strategy is often named by the German term "Allfinanz". The most notable development over the past five years has been the emergence of bancassurance. This has led to numerous agreements between banks and insurance companies: in Germany, between Allianz (Europe's prime insurer), Dresdner Bank and Bayerische Hypothekenbank, and between DBV and Commerzbank; in the United Kingdom, between Commercial Union and Midland Bank (now HSBC); in France, an entity run by Groupe des Assurances Nationales (GAN) which brings together the Crédit Industriel et Commercial (CIC) and the Banque de l'Union Européenne (BUE); another development is that a number of French banks have opened insurance companies of their own, (e.g. "Predica" established by Crédit Agricole which within few years has become a leader in the life insurance business); and, in the Netherlands, the formation of the Internationale Nederlanden Groep (ING) out of Nationale Nederlanden and the NMB-Postbank. In many cases banks take over insurers, but in some cases the reverse occurs. The number of agreements is not a good indicator, however, of the penetration of bancassurance. For instance, French banks sell 35% of France's life insurance, whereas German banks only 5% of Germany's life insurance.

The Allfinanz strategy is a difficult one. To manage insurance companies with a life and a non-life division is already difficult, let alone a holding in which banking activities also play a role. The rationale of this strategy lies primarily in economies of scope (economies of scope exist when the joint production of a certain product mix is more efficient than the separate production of each product). One of the advantages (if not the most important one) is using each others distribution channels. However, differences in cultures between typical insurance distribution channels (agents, brokers) and banking distribution channels also pose a problem; in some cases each channel could see the other as a competitor. One way out of this is to use the banks for 'confection', simple products, and the agents and brokers for more complex and tailor-made products. The Allfinanz strategy usually directs attention to domestic markets and away from e.g. a European retail market. Indeed, most of the bancassurance alliances, mergers and acquisitions are domestic ones.

The second strategy is cross-border expansion or linkage (global player). This strategy can be developed along the following lines. First, a bank could opt for direct investment in a foreign country. However, this approach is not very attractive because of legal barriers and high consumer resistance in some countries. Second, a bank could acquire a foreign one (e.g. Barclays acquired Merck Finck in Germany, Deutsche Bank acquired the Banca d'America e d'Italia and the Banca Popolare di Lecco in Italy, the Crédit Lyonnais acquired the Credito Bergamasco in Italy, the Istituto Bancario San Paolo acquired the Banco Matutes in Spain, etc.). This approach has the advantage that the bank gets physical presence and

direct control, but the costs of this approach are high, let alone the organisational difficulties of integrating companies. Third, a bank could form a strategic alliance with a foreign bank (e.g. the Royal Bank of Scotland with Banco Santander in Spain). The advantage is that banks of similar size can develop links without threatening ownership of the company. Fourth, banks could agree to have a cooperation agreement which does not involve exchanging shares or developing joint European policies, but give the customers of one bank access to the other banks. An example is the agreement (1991) between Crédit Agricole (F), Rabobank (NL), Banco Ambrosiano (I), Lloyds Bank (UK) and Bayerische Vereinsbank (D) and the alliance (1992) between the Banque Nationale de Paris (F) and the Dresdner Bank (D). Banks that want to play a role in the wholesale banking market usually find the 'global player' strategy attractive.

In the single market prospect, and also in the broader context of a European cooperation strategy, in 1990 the savings bank members of the European Savings Banks Group signed a Co-operation Charter. That is now reflected in the more than 100 national framework or bilateral cooperation agreements (without exchanging shares) and in several multilateral initiatives (e.g. EUFISERVs.c., EUFIGEST, EUFINFORM-ADVERTISE).

Information on mergers and acquisitions from the CEC shows that in 1991 the number declined for the first time. With a share of 58%, national operations constitute by far the largest segment of these activities, followed by cross-border activities within the EC; banks from non-EC countries were only involved in 14% of the operations. More than half of all operations were mergers and acquisitions of majority interests.

Besides these two strategies other options are internal consolidation and innovation in banking. The aim of internal consolidation is to amalgamate or merge domestically in order to grasp economies of scale, so that the bank gets a competitive edge internationally. Several Italian banks follow this strategy, but also the Dutch ABN-Amro is an example. Innovations in banking include electronic banking, tailor-made loans, high-yielding deposits, financial products that link mortgage, savings and insurance. Through innovations banks can gain a competitive advantage and improve market shares.

Swiss banks figure prominently in the rankings. They pursue a double strategy: consolidation on their home market, with selective international banking in order to become a global player in the wholesale market. One of the differences with other banks is the small staff of their foreign and international divisions. These divisions contribute more than proportionally to their profits, resulting in a high ratio of income to costs.

REGIONAL DISTRIBUTION

The retail market is by its nature geographically dispersed. However, in the wholesale banking market, the activities are concentrated in the leading financial centres. There is a hierarchy of centres, based on the locational attractiveness. At the most global level there are the leading centres New York, London and Tokyo. These are followed by regional centres like Paris, Frankfurt, Amsterdam (and e.g. Sydney and Hong Kong), specialist centres like Chicago and Singapore and local centres like Madrid and Stockholm and Milan.

REGULATIONS

Banking has traditionally been sheltered by national authorities. In the context of the single market programme a regulatory framework is being built for the integration of the financial sector in Europe.

The Second Banking Coordination Directive no. 89/646/EEC of 15/12/1989 on the coordination of laws, regulations and administrative provisions relating to the taking up and pursuit of the business of credit institutions, came into effect on January 1, 1993. The directive establishes the single market licence, the home country principle and the mutual recognition principle. It is sufficient for a financial institution to be authorised to operate in one EC country in order to supply or establish financial services in any other EC country. Solvency and large exposures are under control of the home country. The practical application of the home country control principle is laid down in so-called Memoranda of Understanding (MoU's) between central banks and other supervisory authorities of the Member States.

The Council Directive no. 92/30/EEC of 6/4/1992 on the supervision of credit institutions on a consolidated basis applies to financial holdings also. Financial holdings are companies - not being credit institutions according to EC law - whose principal activity consists of holding shares in credit institutions or other financial institutions. The directive also applies to mixed holdings, which can be thought of non financial companies holding shares in credit institutions and insurance companies.

Table 7: Credit Institutions
External positions in foreign currency of banks in individual reporting countries (1)

	1988		1989		1990		1991		1992	
	(billion ECU)	% of total	(billion ECU)	% of total	(billion ECU)	% of total	(billion ECU)	% of total	(billion ECU)	% of total
Belgique/België	122.1	4.4	136.1	4.4	144.5	4.6	160.5	4.7	169.6	4.9
Danmark	16.5	0.6	26.7	0.9	30.9	1.0	33.6	1.0	32.7	0.9
BR Deutschland	176.1	6.4	225.6	7.4	275.6	8.8	309.1	9.1	303.2	8.8
España	20.7	0.7	22.8	0.7	28.5	0.9	38.0	1.1	50.6	1.5
France	235.8	8.6	281.1	9.1	311.6	10.0	333.2	9.8	367.9	10.7
Ireland	4.5	0.2	7.1	0.2	8.1	0.3	10.3	0.3	13.4	0.4
Italia	54.1	1.9	69.7	2.3	68.0	2.2	87.0	2.5	85.7	2.5
Luxembourg	161.2	5.9	192.5	6.3	217.1	6.9	252.4	7.4	287.3	8.3
Nederland	96.1	3.5	114.5	3.7	127.5	4.1	145.1	4.3	161.6	4.7
United Kingdom	755.2	27.5	776.5	25.3	784.3	25.2	793.1	23.3	820.8	23.4
EC 10	1 642.3	59.7	1 852.6	60.4	1 996.1	64.0	2 162.3	63.7	2 292.8	66.8
USA	478.7	17.4	504.9	16.5	424.3	13.6	473.7	13.9	430.1	12.5
Japan	627.1	22.8	707.6	23.1	697.4	22.4	760.5	22.4	708.5	20.6
Total	2 748.1	100.0	3 065.1	100.0	3 117.8	100.0	3 396.5	100.0	3 431.4	100.0

(1) For 1988-1991, situation in December, for 1992 in September.
Source: BIS, International Banking Developments 8/91

Table 8: Credit Institutions
Trade - Financial services provided to or received from non-residents by resident banks (1)

(ECU million)	1988 Receipts	1988 Expenditure	1988 Balance	1991 Receipts	1991 Expenditure	1991 Balance
Belgique/België	27 852	27 229	623	65 549	63 498	2 052
BR Deutschland	11 505	8 469	3 036	27 873	21 008	6 864
Hellas	173	1 337	-1 164	293	1 621	-1 328
España	1 308	1 968	-661	3 804	6 018	-2 214
France	18 605	18 227	378	38 995	43 669	-4 675
Nederland	7 257	6 262	995	14 287	12 197	2 090
Portugal	388	1 154	-766	1 320	1 300	19
United Kingdom	56 715	55 694	1 021	78 853	81 255	-2 402
USA	36 930	32 068	4 863	34 341	32 809	1 532

(1) Financial services include income on direct investment and on other investment, commissions and fees. Capital gains and losses, and income from arbitrage are excluded.
Source: OECD

The directive on monitoring and controlling large exposures of credit institutions (92/121/EEC), accepted by the Council on December 21, 1992, has the purpose to spread credit-risks of the banks in Member States without distortion of competition. Main elements are a ceiling of 25% of equity capital for large exposures applying to a single borrower or group of borrowers, and a limit of 800% of equity capital for all large exposures together, a large exposure being an exposure corresponding to at least 10% of the equity capital of the relevant bank. The directive will be in effect from January 1, 1994. Requirements on large exposures should be flexible enough to take account of the unique structure of co-operative banks. Co-operative banks have a widespread decentralisation with autonomous management practices. A further point to be mentioned is that the Commission has proposed to the Council a Regulation for a Statute for the European Co-operative Society.

The application of the home country control principle requires some harmonisation of the different deposit guarantee schemes in the Member States. In 1993 the EC Council of Ministers has approved on October 25th a common position on a proposal of directive transmitted by the Commission on June 1992. The proposal specifies minimum guarantees (ECU 20 000, but with the possibility for the Member States to use a lower amount of ECU 15 000 until the end of the century), but no maximum guarantees. The latter has been left open, i.e. the national regulations apply. The guarantee does also apply to customers (with an account) of banks with headquarters in a different Member State.

In 1993 the minimum requirements laid down the EC directives became effective. These require i.a. that total capital should be at least 8% of risk-weighted assets. Furthermore, Tier One capital should be at least 4% of assets. Whereas Tier One capital can be depicted as core capital, Tier Two capital is made up from hybrid debt-equity instruments, revaluation reserves and from provisions available to meet unexpected losses.

The objectives of these capital requirements are to limit the exploitation of higher levels of leverage thereby putting a brake on aggressive lending policies, and to secure a greater level of financial stability.

Table 9: Credit Institutions
Top 15 European banks by Tier 1 capital, 1992

Rank		Country	Tier 1capital (ECU million)	Change (%)	Assets (ECU million)	Change (%)	World ranking
1	Crédit Agricole	F	12 888	25.2	241 642	14.6	7
2	Union Bank	CH	10 572	15.9	151 300	18.5	8
3	HSBO	UK	9 743	73.9	212 826	120.0	10
4	Deutsche Bank	D	9 334	18.4	250 921	23.5	11
5	Crédit Lyonnais	F	8 834	20.4	290 677	35.2	12
6	BNP	F	8 441	17.6	235 171	21.5	14
7	ABN - Amro Bank	NL	7 871	18.3	212 367	22.8	15
8	Paribas	F	7 693	-0.9	168 421	20.1	18
9	Barclays Bank	UK	7 444	6.1	186 190	19.6	21
10	Swiss Bank	CH	7 306	13.6	113 949	7.5	23
11	ING Bank	NL	7 101	24.6	147 379	20.4	24
12	National Westminster Bank	UK	6 960	10.4	178 822	29.3	26
13	Société Générale	F	6 593	32.8	212 931	29.3	27
14	Rabobank	NL	6 408	19.7	106 255	18.7	28
15	Crédit Suisse	CH	6 098	24.9	141 431	25.2	32

Source: The Banker, July 1993

Table 10: Credit institutions
Efficiency ratios

	Profits/ costs	Net profitability (%)	BIS ratio (%)
Crédit Suisse	1.96	9.9	10.0
Union Bank	1.78	7.6	10.0
Swiss Bank	1.72	7.6	11.5
Deutsche Bank	1.70	10.4 (1)	10.7
Lloyds Bank	1.62	16.9	9.7
Barclays Bank	1.56	-5.6	9.1
Commerzbank	1.55	12.8 (1)	8.3
National Westminster Bank	1.54	3.7	9.8
Dresdner Bank	1.50	9.2 (1)	9.0
ABN Amro Bank	1.48	10.7 (1)	9.8 (2)
Rabobank	1.48	7.6 (1)	N/A
Société Générale	1.42	1.9	9.1
BNP	1.42	4.9	9.2
ING Bank	1.38	11.2 (1)	N/A
Crédit Lyonnais	1.37	-4.4	8.2

(1) Latent reserves are not counted.
(2) Estimate Financieele Dagblad
Source: Het Financieele Dagblad, July 21, 1992

OUTLOOK

The banking landscape is changing. Challenged by liberalisation of capital markets and technological opportunities, under pressure from smaller margins and customers who expect and are aware of new products and services in the financial sector, banks need to carve themselves a position in the competitive banking market. Especially the wholesale market is in a flux.

The European retail banking market is still very much made up of the national markets. In recent years there has been a spate of mergers, acquisitions, alliances and cooperations between banks, but many of these deals involved only domestic banks. Many national champions were created but few international ones. Cross-border activity has involved more alliances and cooperations than acquisitions. Furthermore, most international acquisitions targeted smaller banks. However, economies of scale will eventually be the decisive factor, and create a pan-European retail banking market. The reduced segmentation of financial markets due to the EC directives levels the way for a regional banking market. In the mean time, ameliorating cost structures will be important to banks to gain a competitive edge over their future rivals.

In the medium term, the slow economic recovery and decreasing interest rates will show up in the performance of the banking sector. Since recovery of commercial real estate is expected to lag behind, the volume of industrial and consumer credit and bank loans will increase first, followed by mortgage loans for residential property. On the other hand, lower interest rates and rising stock markets may lower intermediation margins and reduce the availability of cheap funds. However personal saving rates have been increasing in recent years so that the supply of funds may not become a problem.

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Insurance
NACE 82

The single European insurance market is still in its infancy. Although financial markets have been liberalised and financial services are internationalising, the insurance business is still segmented in different national markets. However, the third generation directives of the EC will provide the regulatory framework for the integration of insurance markets. Stimulated by these developments, insurance companies have in recent years adopted strategies to strengthen their position. This has led to bancassurance, the linkage of banks with insurers and other financial services, and to take-overs and alliances within the insurance industry itself. For the customer this meant new distribution channels and new products; for the industry it meant more intense competition and faster growth in activities. Especially life insurance has developed quickly. Its growth has outpaced that of non-life insurance and of gross domestic product in recent years.

INDUSTRY PROFILE

Description of the sector

The NACE classification defines the insurance sector as embracing all units "exclusively or primarily engaged in insurance", i.e. converting individual risks into collective risks. Compulsory social security is not included.

Insurance is thus defined in terms of the economic function of converting and mutualising risks. NACE 82 distinguishes three classes of insurance according to the type of risk:

- life insurance, where the risk covered relates to the decease of the insured person;
- non-life insurance (health, casualty, injury and accident insurance), where the risk covered is defined as everything not included in the previous category;
- composite insurance, where the risk covered comprises life and non-life risks.

Reinsurance is not regarded as a separate category: it is assigned to one of the above three classes according to the type of risk reinsured. Not all countries allow composite insurance undertakings and the creation of new ones has been banned under Community rules. The breakdown is thus confined in some instances to two classes: life and non-life insurance. In non-life insurance, a further distinction can be made regarding the different types of customers and the competitive structure of the markets. Non-life insurance can be divided into individuals ("mass risks"), small- and medium-sized enterprises and large, multinational, firms ("large risks").

Although reinsurance is not considered as a separate activity by the NACE classification, its market share is an important indicator of insurance activity. It can be evaluated in two alternative ways: the rate of accepted reinsurance and the retention rate. The rate of reinsurance accepted is calculated by dividing the premiums on reinsurance accepted by total gross premiums. This measures the share of accepted premiums and provides an indication of the significance of reinsurance accepted in the national insurance market. There are few data, however, but the rare ones indicate a low and declining rate for life insurance (3.4% on average in 1990) and a higher and more stable one for non-life insurance (12.1% on average in 1990). These ratios are very variable between countries: for non-life they range from 2.5% for Portugal to 20.2% for the UK. The retention rate expresses the percentage of total gross premiums written that is retained by the insurers; the remainder represents premiums ceded. The retention rate is very high in life insurance, where reinsurance is very rare: 93.5% for the EC on average. In non-life insurance the retention rate is about 79%.

Within the Community three countries dominate the market: the United Kingdom (74 billion ECU in 1990), Germany (71 billion ECU) and France (59 billion ECU). These three account for 74% of total operations in the EC. In southern Europe insurance markets are much smaller. Premium income corresponds to 3.5% or less of the gross domestic product, whereas in northern Europe 5% or more is common.

The density of insurance, measured by premiums per capita, differs widely in the EC. Density of insurance is relatively low in southern Europe (Spain, Portugal, Italy and Greece), and relatively high in northern Europe (United Kingdom, the Netherlands, France, Luxembourg and Germany).

Table 1: Insurance
Main indicators, 1991 (1)

	Number of enterprises	Turnover (million ECU)	Number of persons employed
Belgique/België	274	7 967	41 117
Danmark	807	80 740	302 800
BR Deutschland	232	4 864	15 200
Hellas	152	926	10 000
España	446	16 257	68 984
France	614	57 633	217 200
Ireland	88	3 250	9 818
Italia	264	25 768	70 870
Luxembourg	60 (1)	386	6 814 (1)
Nederland	401	19 322	65 000 (1)
Portugal	72	1 964	57 900
United Kingdom	836	84 334	367 300
EC	4 246	303 411	1 233 003

(1) 1990
Source: CEA

Recent trends

Total gross premium income in the EC was 303 billion ECU in 1991, of which 151 billion in life insurance and 152 billion in non-life insurance. The three leading European countries in terms of both overall premium income and premium income by sector (life and non-life) are Germany, the United Kingdom and France.

The non-life insurance sector represents around 50% of European gross premium income from all sources, life insurance makes up the remaining 50%. This division has been shifting over the past years, because the life insurance sector is growing at a faster rate than the non-life sector. In 1985 the split between non-life and life was 63%/37%.

The insurance sector (life and non-life) registers a considerable growth when using gross premiums written as indicator. Between 1985 and 1990 life insurance premiums tripled, and non-life insurance premiums grew with a factor 2.5. However, when this growth is compared with GDP growth a pattern more in line with overall economic activities shows up. Premiums as percentage of GDP increased only slowly in recent years, with a dip in 1990. The UK displayed a contrary picture with decline before 1990, and a rise in 1990. The UK market, as well as the German market, is mature and the only sources of growth are general economic growth and demographic trends. In recent years the UK market suffered from the recession.

In 1991 around 800 000 people were employed in the insurance industry in the EC. This figure applies to the insurance industry in the strictest sense, excluding intermediaries (brokers and agents).

International comparison

Compared with the two other large markets, the EC insurance market is larger than that of Japan (230 billion ECU in 1991) but smaller than that of the USA (363 billion ECU in 1991), which remains the world's biggest market. In terms of market share, in 1991 the USA had 34% of the world market (thought to be some 1 055 billion ECU). whilst the EC and Japan had 29% and 22% respectively.

Each of these three markets is also very differently structured. Whereas the American market is still largely dominated by non-life insurance (some 58% of all operations), the Japanese market is very much dominated by life insurance which accounts for 73% of all business. The structure of the EC market is thus somewhere between these two patterns.

Foreign trade

In the non-life sector, some 40% of insurance companies derive more than 5% of their premium income from foreign branch activities while in the life insurance sector only 25% of companies report similar export intensity. In both sectors, the importance of foreign operations is expected to increase in the years ahead.

The share of foreign-source premium income remains modest in most EC Member States. The United Kingdom is the leading exporter of insurance services in the EC: 44% of the non-life insurance business and 16% of the life insurance business in the UK derives from non-domestic sources. Lloyds of London (an ECU 15 billion insurance market) derives two-thirds of its premium income from non-domestic sources. The UK insurance sector is traditionally oriented towards the USA and former British colonies, while its continental European business is relatively small. French insurers have also expanded activities abroad. They focus on the EC and have consistently increased their market share in all Member States (26% in 1992). Finally, Switzerland has a very strong presence in the insurance markets of continental Europe.

Although they maintain a European presence, neither US nor Japanese insurance groups seem poised to acquire a substantial share of the European insurance business in the short term. They are active to any significant degree only in the United Kingdom.

MARKET FORCES

Demand

Consumer behaviour differs radically in the life insurance and the non-life insurance markets.

As far as the life sector is concerned, the ageing of Europe's population has played a decisive role in the growth of premium income. The need for comprehensive insurance coverage increases with advancing years, especially when social security benefits relating to pensions and medical treatment appear progressively inadequate. In an effort to compensate for the erosion of state benefits, the public is turning increasingly towards life-insurance products. Greater life expectancy and a lowering of the legal retirement age have had the combined effect of increasing the average length of retirement to a period equivalent to a quarter or one fifth of human life. The legal or accepted retirement age in every European country is now between 60 and 65 years (except Denmark, with a retirement

Table 2: Insurance
Gross premium income in the EC

(million ECU)	1989 Life	1989 Non-life	1989 Total	1990 Life	1990 Non-life	1990 Total	1991 Life	1991 Non-life	1991 Total
Belgique/België	2 280	4 399	6 679	2 450	4 888	7 339	2 675	5 292	7 967
Danmark	N/A	N/A	4 232	1 905	2 686	4 591	2 194	2 670	4 864
BR Deutschland	23 963	30 533	54 496	26 364	44 414	70 777	30 702	50 038	80 740
Hellas	278	406	684	322	463	785	427	499	926
España	3 405	7 998	11 403	3 586	9 449	13 035	5 072	11 184	16 257
France	28 569	27 211	55 780	29 680	29 041	58 721	33 843	23 790	57 633
Ireland	1 977	1 152	3 129	1 878	1 224	3 102	1 905	1 345	3 250
Italia	4 902	14 955	19 857	5 634	16 562	22 195	6 869	18 899	25 768
Luxembourg	79	191	270	110	219	329	147	239	386
Nederland	7 362	8 253	15 615	9 150	8 529	17 680	10 506	8 816	19 322
Portugal	263	1 009	1 273	379	1 209	1 588	521	1 443	1 964
United Kingdom	44 340	25 253	69 593	48 289	25 911	74 200	56 418	27 916	84 334
	0								
EC	N/A	N/A	243 011	129 747	144 596	274 343	151 279	152 132	303 411

Source: CEA

Table 3: Insurance
Density of insurance (direct gross premium per capita), 1991

	Premiums per capita (ECU)
Belgique/België	745.5
Danmark	1 017.4
BR Deutschland	1 049.2
Hellas	97.0
España	424.3
France	1 139.8
Ireland	1 019.0
Italia	488.4
Luxembourg	1 084.5
Nederland	1 388.9
Portugal	201.9
United Kingdom	1 613.3
Switzerland	2 422.7
USA	1 555.4
Japan	2 004.8

Source: Schweizerische Versicherungszeitschrift 61, Heft 7/8 (Bern, 1993) (primary source: Schweizer Rück, Sigma Report 4/93)

age of 67 years). The effective retirement age now tends to be the same throughout the EC and is below the age prescribed. In addition, there is a growing propensity on the part of retirees to insure themselves more comprehensively. Incomes of elderly persons measured in units of consumption now exceed the average income of the working population in certain Member States.

Improvements in living standards emerge as an essential factor in the shifting patterns of non-life insurance consumption. The population insures not only itself but also its growing number of possessions. In this respect, it is worth noting that the demand for passenger cars in the EC increased from 3 million in 1960 to more than 12 million in 1989, amounting to a stock of 128 million passenger cars (excluding eastern Germany). There are also now 150 million homes. Non-life insurance is coming to be regarded as a commonplace product. Here, a distinction has to be made between mandatory insurance coverage on the one hand (car insurance, workplace accident insurance, and so on) and other categories of insurance which are currently marketed. It is above all in the former category that price sensitivity plays a key role.

Supply and competition

There are broadly two models of insurance markets: the Anglo-Saxon model and the continental model. The models mainly depend on the extent of regulation in the respective countries. The first model is found in the UK, Ireland and the Netherlands (and in the USA). It is characterised by less prescriptive regulation, a wider range of consumer choice and a distribution dominated by independent brokers. The second model applies elsewhere in Europe (notably Belgium, Germany, Switzerland, Italy and France) and is characterised by strict regulations, less product innovation and tied company agents as the main distribution channel.

These distinctions are not the only ones, however. Usually, companies active in the continental model adopt more conservative reserve policies, often induced by favourable tax rules. Furthermore, shareholders put more pressure on insurance companies in countries following the Anglo-Saxon model, making insurers there more concerned about short term profits.

New players have entered the insurance sector. The most significant competitive challenge is coming from the banks. The countries that pioneered "bancassurance" are the United Kingdom, France and Spain, but in other countries banks are also beginning to enter the insurance market. Entry takes the form of alliances and cross participations and acquisitions or even creation of insurance companies. In all cases, banks operate as distributors of insurance services, in order to globalise the approach of their clients. The market share of the insurance market which is influenced by bancassurance has been increasing very quickly. It is estimated that by 1995, the market share influenced by bancassurance in the individual life insurance business will be around 10%, and a further 10% only as distributors of insurance. French banks sell 35% of France's life insurance; in Germany this figure is only 5%. However, deregulation in 1994 will increase the German figure. Deutsche Bank started its own life insurance company, DB Leben, in 1989; in 1992 it ranked among Germany's top 15 life insurers.

Table 4: Insurance
Premiums as share of gross domestic product

	1987			1988			1989			1990		
(%)	Total premiums	Life	Non-life	Total premiums	Life	Non-life	Total premiums	Life	Non-life	Total premiums	Life	Non-life
Belgique/België	5.0	1.6	3.4	5.0	1.6	3.4	5.0	1.7	3.3	4.1	1.2	2.9
Danmark	4.9	1.7	3.2	5.4	2.0	3.4	5.4	1.9	3.5	4.5	1.9	2.6
BR Deutschland	6.0	2.3	3.6	6.2	2.5	3.7	6.1	2.4	3.7	5.8	2.2	3.5
Hellas	1.3	0.4	0.9	1.4	0.5	0.9	1.5	0.6	0.9	1.6	0.7	0.9
España	3.8	1.6	2.2	6.1	2.3	3.8	4.4	1.9	2.5	3.3	0.9	2.3
France	5.8	2.2	3.6	6.3	2.8	3.5	6.6	3.3	3.3	5.9	3.1	2.8
Ireland	11.1	6.5	4.6	10.0	5.8	4.2	11.9	7.5	4.4	9.5	5.6	3.8
Italia	2.8	0.6	2.2	2.8	0.7	2.1	2.9	0.8	2.1	2.6	0.7	2.0
Luxembourg	3.7	0.9	2.8	4.1	1.0	3.1	3.1	0.9	2.2	4.8	1.6	3.2
Nederland	7.0	3.1	3.9	7.4	3.4	4.0	7.7	3.6	4.1	8.1	4.2	3.9
Portugal	2.7	0.3	2.4	3.0	0.5	2.5	3.2	0.6	2.6	3.4	0.8	2.6
United Kingdom	11.0	5.2	5.8	10.1	4.8	5.3	6.9	3.6	3.3	9.7	6.2	3.4
EC	6.0	2.4	3.6	6.3	2.7	3.6	5.7	2.4	3.3	5.2	2.4	2.8
USA	10.2	3.9	6.3	11.2	4.1	7.1	10.3	3.7	6.6	8.9	3.8	5.1
Japan	8.8	6.4	2.4	9.8	7.3	2.5	10.3	7.3	3.0	8.8	6.4	2.4

Source: Eurostat, Sigma Report 4/92

Table 5: Insurance
Premium income in EC, USA and Japan, 1991 (1)

	Premium income (billion ECU)	Real change 1990-91 (%)	Share of the world market (%)
Total			
EC	302.0	7.9	28.6
USA	363.0	-3.2	34.9
Japan	229.5	-0.2	21.8
Non-life			
EC	153.3	5.3	30.6
USA	211.7	-1.5	42.3
Japan	61.3	-1.1	12.3
Life			
EC	148.7	10.7	26.8
USA	151.3	-5.4	27.3
Japan	168.2	0.1	30.3

(1) Exchange rates of end-1991
Source: Schweizerische Versicherungszeitschrift 61, Heft 7/8 (Bern, 1993)
(primary source: Schweizer Rück, Sigma Report 4/93)

The non-life business appeared less vulnerable to entry by bancassurance, but there have been some recent and successful developments also in this segment. At the same time, major insurance groups have adopted a symmetric strategy, also known as "assurfinance", acquiring banks and other financial institutions in order to sell banking and other financial services, in addition to their own-made insurance services.

Insurance markets are still largely national. Increasingly, though, one can speak of a European insurance market. Freedom of establishment has not only facilitated market entry on the part of domestic groups, it has also boosted the presence of foreign insurers. The advent of foreign institutions has intensified competition in national markets.

Production process

In a unified and deregulated market, tariff structures increasingly reflect management and distribution costs. Management costs and tax prepayments can result in substantially increased insurance premiums. Keeping these costs down necessarily entails the introduction and development of administrative procedures that are as cost-efficient as possible. The various approaches open to distribution include:

- salaried employees (particularly in the life sector);
- tied company agents: an intermediary between the client and the insurance company, contractually bound to, but not employed directly by, a specific company, remunerated on a commission basis;
- independent brokers: mandated by the client, without any link to an individual insurer, remunerated on a commission basis;
- direct-writing by the companies themselves;
- banks: several distribution arrangements are possible (e.g. distributed under the bank's own name or that of the insurer, sold by insurance salesmen on recommendation by bank staff, sold partly by the bank staff and partly by the insurance salesmen);
- others (e.g. retail chain stores).

The preferred strategies vary from one country to another, depending on the regulatory environment, the companies' strategy, the influence of shareholders and the concentration of companies. Brokers dominate the markets in the Anglo-Saxon model (UK and the Netherlands), whereas agents are more common in the continental model (Germany and France). Banks are a growing distribution channel. As far as operational costs are concerned, marketing and distribution costs rank immediately after policy payments in terms of size. Not surprisingly, less expensive modes of distribution are being explored, like direct writing.

INDUSTRY STRUCTURE

Companies

In 1991 there were 4 246 insurance companies in the EC, the majority of which is active in non-life insurance. However, the number of independently-controlled groups is only about 2 500. This number will continue to decline as competitive pressure to merge occurs among the small and medium-sized insurers.

The average size of insurance companies is measured as total gross premiums divided by the number of undertakings. In the EC the average size in 1990 was 66 million ECU, 115 million ECU for life insurance companies against 45 million ECU for non-life insurance companies (both including composite companies).

The leading groups in Europe typically have a total premium income in the range of 3.5 to 10 billion ECU. However, the largest group, Allianz, had a premium income of 23.8 billion ECU in 1991, followed by UAP (15.1 billion ECU), Generali (11.3 billion ECU) and Zürich (11.0 billion ECU). The ranking differs a little when one compares the companies' market capitalisation, but Allianz remains the largest insurance group.

In some European countries, the state holds equity in the major insurers. Often the state finds it difficult to disengage from the insurance sector, which has an important influence on financial markets. In France, the newly chosen government has set a reprivatisation programme in motion, with i.a. the privatisation of France's largest insurance group, UAP.

Strategies

Insurance companies react in different ways to the desegmentation of insurance and other financial markets in Europe and the process of liberalising financial markets in general. One strategic route can be subsumed under the heading of bancassurance, another under the heading of concentration and internationalisation.

Table 6: Insurance
Foreign companies' market share in the domestic market (gross premium basis), 1990 (1)

(%)	Life	Non-life
Danmark	9.1	27.2
BR Deutschland	12.5	17.7
España	16.4	31.5
France	8.2	12.1
Nederland	24.9	27.4
Portugal	30.9	13.1

(1) Market share of foreign-controlled undertakings and branches/agencies of foreign undertakings in total domestic business (gross premium basis).
Source: OECD, Insurance Statistics Yearbook, 1983-1990

During the past decade several factors have stimulated the process of convergence between insurance and other financial services. Among them are: financial disintermediation, internationalisation and globalisation of financial markets, the development of new communication and information technologies and more competitive pressure. The emergence of bancassurance (or 'Allfinanz' or 'financial supermarket') offers benefits to banks and insurance companies, especially in the life insurance sector. The life insurance market offers banks attractive prospects for improving the return from their distribution network. Precisely the scope of the banks' networks is also attractive for the insurer, in that a larger volume of customers can be accessed at lower cost. While bancassurance is motivated in the first place by distribution concerns, the combination also offers advantages on the product side.

The convergence of banking and insurance can be limited by regulatory restrictions, specific features of market segments and the costs of functional linkages. EC legislation has kept the distinction between banking, the securities business and insurance. As a consequence, banks and insurance companies will continue to fall under different supervisory authorities. In order to get around the general principle of specialisation, bancassurance conglomerates are created in the form of holding companies. For instance, the Dutch ING group is a holding with Nationale Nederlanden as insurance company and NMB-Postbank as bank.

While bancassurance mergers, acquisitions and alliances have mostly been organised within national markets, cross-border mergers (between insurers only and between insurers and banks) also occur. Since 1987, there have been a number of cross-border takeover actions, and more are expected. Particularly the French companies (UAP, GAN, AGF, AXA, Groupe Victoire) have been active. Cross-border expansion has taken the form of take-overs rather than joint-ventures or minority stakes. This is explained by the preference of large insurance groups to exercise management control over their foreign subsidiaries in order to integrate them into their wider strategic and financial control system. Furthermore, establishing a new network in a foreign market is extremely difficult. Insurance is a product which is sold rather than bought, and the consumer usually prefers to deal with a local/national entity that he knows and trusts.

In the near future, the market share of national insurance companies should decrease to the benefit of international operators. However, recent figures indicate that European insurance markets are less international than all the cross-border merger activity might suggest. Penetration by foreign insurers is relatively high only in smaller markets, which have been the main targets for the recent acquisition activities. Southern Europe is likely to be a main target of acquisition activities, given the degree of relative under-insurance and the low level of competitiveness of local companies. Finally, it can be expected that cross-border activity will increasingly take the form of strategic alliances, because they are less costly. Attention is turning to improving operations. Acquisitions cut into the financial resources of the acquiring company, which can be applied better towards improving operations.

REGULATIONS

The European insurance sector belongs to one of the most heavily regulated sectors of the economy in view of its strong focus on consumer protection.

As a financial institution, an insurance undertaking is submitted by national law to stringent licensing and supervision regulations, which evolved into more harmonised approaches through the adoption, at Community level, of three generations of framework directives. The third generation of insurance directives (92/49/EEC for non life insurance services and 92/96/EEC for life assurance services), entering into force on July 1994, will provide the legal background for a real internal market for insurance services.

The original specific situation of the insurance regulations in each Member State heavily influenced the structure and practices of each individual national market. In most continental countries, "material" supervision regulations imposed prior approval of all contacts and tariffs, in addition to prudential supervision of the undertakings. In Anglo-Saxon countries, a "normative" approach of supervision has been focusing primarily on prudential supervision of the undertakings.

The achievement of the internal market for insurance has been described as a "deregulation process" due to the fact that Member States have finally agreed that systematic material supervision of products and tariffs might lead to certain excessive entrance barriers for cross-border activities and that the "European passport" could be provided to the undertakings through prudential supervision of their financial situation (normative approach), in combination with some additional rules to protect consumer rights.

The harmonised prudential rules, progressively adopted at Community level, consist of three basic prudential tests, applicable by the relevant supervisory authority to each individual insurance undertaking, at least once a year, on the basis of its annual returns:

- an adequacy test on the prudent calculation of technical provisions (introduced in the 1991 directive on insurance

Table 7: Insurance
Productivity as direct total gross premiums per employee

(ECU)	1983	1990
Belgique/België	136 530	246 060
BR Deutschland	N/A	328 102
Hellas (1)	N/A	90 638
España	116 690	327 075
France	190 778	460 786
Ireland	196 667	351 153
Italia	203 095	496 978
Luxembourg	149 436	325 480
Nederland (1)	196 868	303 074
Portugal	44 052	111 792
United Kingdom (1)	169 359	311 428
EC (2)	171 791	341 274

(1) Net written premiums basis.
(2) For available data only.
Source: OECD, Insurance Statistics Yearbook, 1983-1990

Table 8: Insurance
Retention ratio (1)

(%)	1987 Life	1987 Non-Life	1988 Life	1988 Non-Life	1990 Life	1990 Non-Life	1991 Life	1991 Non-Life
Belgique/België	94.9	80.6	93.8	80.8	92.5	80.9	94.1	80.3
Danmark	97.3	76.3	98.0	75.6	97.5	N/A	98.5	N/A
BR Deutschland	93.3	75.7	91.9	75.7	92.8	75.9	91.6	77.5
Hellas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
España	97.8	80.3	98.9	79.8	98.1	81.2	96.6	81.7
France	95.4	82.9	96.0	84.0	96.7	86.9	96.5	82.8
Ireland	98.3	78.1	98.1	81.1	98.5	82.5	95.9	83.9
Italia	83.3	77.9	83.1	78.9	82.3	79.7	81.6	79.9
Luxembourg	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nederland	95.8	85.5	94.8	85.6	95.4	85.8	95.6	84.9
Portugal	90.8	82.3	95.0	82.9	95.5	83.8	95.2	85.1
United Kingdom (2)	100.0	75.0	100.0	81.2	100.0	80.0	100.0	74.9

(1) Net written premiums/Total gross premiums.
(2) Estimate for life insurance.
Source: OECD, Eurostat

accounts for non-life and, within general principles, in third directive for life insurance);

- a solvency test (introduced in the first insurance directives): selected items of the own funds are added together to form the solvency margin, which is required to equal a minimum percentage of the technical provisions (or business written), in order to provide a "safety net" to the policy holders with regard to pending claims;
- a test of diversification and spread rules over the assets backing the technical provisions, in order to ensure safety, yield and liquidity of these investments (introduced in the third insurance directives).

Considering the investment policy of an insurance undertaking, the third generation of insurance directives also introduces a matching test on the currency of the assets at 80% of the corresponding liability and prohibits Member States to impose any precise investment operation to their insurance undertakings.

The policy holder's interests are also safeguarded due to the fact that:

- systematic notification of policy conditions is maintained for obligatory insurance and health cover substituting for social security schemes (Germany, the Netherlands, the United Kingdom);
- the freedom of companies to establish policy conditions without prior notification is bounded by the need to respect Member State provisions designed to protect the "general good", insofar as such provisions are proportional and do not unnecessarily obstruct cross-border activity;
- extensive disclosure obligations on life insurance services and a cooling-off period after signature of the contract.

A further very important insurance issue concerns taxes. In general, taxes are a matter for Member States. The insurance directives are therefore based on the principle of "territoriality" for indirect taxation. Certain countries maintain specific fiscal measures to encourage the consumption of life insurance products. In Germany, for example, 80% of life policies are on a tax deductible guaranteed yield basis. In other countries, life premiums are still taxable (Belgium, Italy, Portugal). In Europe as a whole, premiums paid are as a rule partially deductible from taxable income. Exceptions are Denmark and the United Kingdom. Capital gains are generally exempt, ex-

Table 9: Insurance
Top ten insurers by market capitalization, September 1992 (1)

Rank		Country	Market capitalization (million ECU)	Profit (million ECU)	Employees
1	Allianz	D	17 404.9	925.7	73 300
2	Generali	I	10 645.6	706.8	6 705 (2)
3	Münchener Rück	D	8 148.5	187.8	3 510
4	Prudential	UK	6 547.1	340.2	25 886
5	ING	NL	5 656.9	947.9	48 744
6	UAP	F	5 120.8	893.0	40 453
7	Zürich	CH	4 711.8	455.9	36 051
8	Fortis	NL/B	3 243.7	534.7	21 386
9	Swiss Re	CH	3 145.9	282.3	23 457
10	AGF	F	3 141.1	451.1	22 019

(1) Market capitalization is the number of a company's shares multiplied by the price of its shares.
(2) Parent company only.
Source: Financial Times

Table 10: Insurance
Market concentration, share of 3 largest companies by premium income, 1989

(%)	Non-Life	Life
Belgique/België (1)	28.6	51.3
Danmark (2)	40.7	58.9
BR Deutschland	18.0	25.4
Hellas (1)	41.7	71.5
España	13.6	51.7
France	29.7	23.3
Ireland (1)	37.6	58.5
Italia	25.5	52.1
Nederland	22.8	41.9
Portugal (1)	37.0	32.8
United Kingdom	35.0	27.1

(1) 1987 data.
(2) 1991 data.
Source: EEC, Sigma Report 1/92

OUTLOOK

The national insurance markets of Member States will slowly evolve towards an integrated European insurance market. The institutional framework for integration is set by the third generation EC directives, which will come into force in 1994. To prepare for the internationalisation of markets companies move to strengthen their financial assets and to look for new distribution channels and products. An important strategy in this respect is that of bancassurance, the marriage of insurance with banking and other financial services.

Market concentration will increase, not only because of the expansion of bancassurance, but also because of take-over activity within the insurance sector. Within the next decade, European insurance will be dominated by a small number of large pan-European groups like Allianz, UAP and Winterthur, while a number of parallel groups continues to be active as specialists in niche markets. Banks will capture more than 10% of the life insurance sector within the EC, and be responsible for a further 10% in terms of marketing and distribution.

Table 11: Insurance
Tax treatment of insurance premiums (basic rates), 1992

(%)	Motor	Fire	Health	Life
Belgique/België	9.25	9.25	9.25	4.40
Danmark	50.00	0.00	0.00	0.00
BR Deutschland	10.00	10.00	10.00	0.00
Hellas	10.00	15.00	10.00	4.00
España	0.50	0.50	0.50	0.00
France	18.00	30.00	9.00	0.00
Ireland	1.00 (1)	1.00 (1)	1.00	3.00
Italia	12.50	21.25	2.50	2.50
Luxembourg	4.00	4.00	4.00	0.00
Nederland	7.00	7.00	0.00	0.00
Portugal	0.40	0.40	0.40	0.10
United Kingdom	0.00	0.00	0.00	0.00

(1) Per policy
Source: CEA

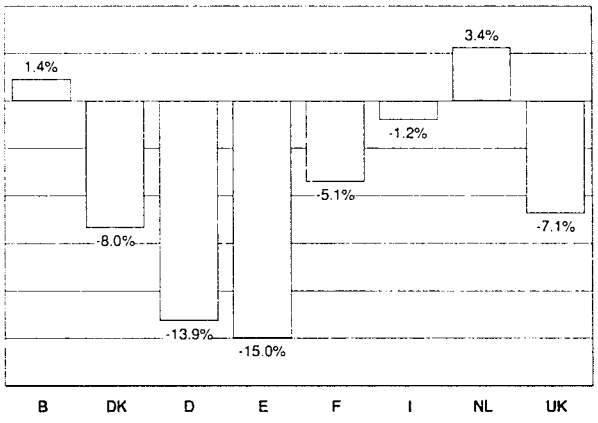
cept in Spain and Norway. As a rule of thumb, life insurance business is comparatively modest in those countries where premiums are taxed. Tax rates on non-life insurance products are also very much heterogeneous within the Community, as shown in Table 11.

Written by: Netherlands Economic Institute, on the basis of Panorama 1993
The industry is represented at the European level by: Comité Européen des Assurances (CEA). Address: 3 bis rue de la Chaussée d'Antin, F-75009 Paris; tel: (33 1) 48 24 66 00; fax: (33 1) 47 70 03 75;
Delegation in Brussels: Square de Meeûs 29, B-1040 Brussels; tel: (32 2) 513 6845; fax: (32 2) 514 2549.

Financial intermediaries
NACE 831

Financial intermediaries have become more important during the last decade. The large growth in demand and supply of funds on the financial markets (fuelled by rising saving rates and privatisation), as well as the spate of new financial instruments have stimulated demand for their services. In the future, intermediaries - brokers, stock exchanges, electronic markets and (investment) banks - will compete both on international and local markets. Knowledge of the local situation combined with international presence is an important source of competitive advantage. A global presence is required of banks or securities firms operating on international markets. National and regional stock exchanges will on the one hand compete to attract business, but on the other cooperate to create an efficient European market that can compete internationally with USA and Asian markets.

Figure 1: Financial intermediaries
Stock market performance, mid-1992 to mid-1993



Source: Morgan Stanley Capital Investment

INDUSTRY PROFILE

Description of the sector

Financial intermediaries provide services for participants in the financial and insurance markets. They assist in the transformation of savings into investment and in the transformation of the portfolio of existing stock of capital. Their activities consist of brokerage, advice, research, dealing in securities, market-making and organising the "marketplace". Stock exchanges, brokers, but also large parts of investment banks operate in this industry. Partly the financial intermediaries perform functions that are complementary to banking and insurance activities, partly they provide financial services in competition with banks and insurance companies. The traditional clear distinction between various categories of financial institutions, each with its own activities, has become more and more blurred.

The activities of financial intermediaries contribute to a better allocation of resources, help ensure market liquidity of stocks and enhance negotiability. In general they bring greater efficiency to the financial system by stimulating competition and reinforcing market mechanisms. In particular they increase the number of competing enterprises in the various financial markets; extend consumer and borrower choice both nationally and internationally by launching a wide variety of new financial instruments; improve market transparency by using up-to-date information technology; improve overall financial system efficiency by exploiting deregulatory measures; attract foreign borrowers and investors; introduce efficient new technological infrastructures (such as new systems for payments, information transfers, negotiation and clearing); strengthen links with other international markets; contribute to market security and stability; and boost price competitiveness.

While providing services, financial intermediaries make the market for short- and long-term securities and, to a lesser extent, loans. Short-term securities include commercial paper (CPs), certificates of deposit (CDs) and repurchase agreements (Repos). Long-term securities consist of equity and debt, with the well-known examples of stocks and bonds. In the 1980s the market for derivatives or derivative securities has grown considerably. Derivatives are futures and options in stocks and stock indexes. Nowadays, a very large fraction, estimated to be a half, of the investment banks' public activities consists of advice and assistance with (cross-border) acquisitions and mergers.

The liberalisation of capital markets since 1986 led to the emergence of sizeable financial intermediary groups. These groups operate in corporate finance, in stock markets and in collective savings management. Banks also have a strong presence in these markets.

Recent trends

During the past decade financial markets recorded an enormous growth of volume. In the 1980s the economic recovery combined with the liberalisation of capital markets produced not only a large quantitative growth, but also a spate of new financial products.

The London stock exchange is by far the largest in Europe, followed by Frankfurt and Paris. This ranking, based on shares turnover, does not change when the exchanges are ranked according to capitalisation, or the number of companies listed (excluding investment funds).

Stock market performance, measured by stock market indices, has been negative from mid-1992 to mid-1993. However, stimulated by lower interest rates and perhaps by expectations of economic recovery, the stock market indices have been rising since then.

Stock market capitalisation of the three most important European stock exchanges increased sharply. In nominal terms, capitalisation in 1992 was three to nine times as high as in 1982. Even in real terms (taking into account the development of the stock market indices) growth has been impressive. Expressed as a percentage of gross domestic product, stock market holdings more than doubled in the German and the United

Table 1: Financial intermediaries
Stock exchanges, 1992

	Shares turnover (billion ECU)	Companies listed (1)
London	511.3	2 440
Paris	96.3	1 008
BR Deutschland	350.3	1 259
Amsterdam	35.3	413
Italia	21.0	258
NYSE	1 346.0	2 089
Tokyo	367.8	1 768

(1) Excluding investment funds.
Source: FIBV

Table 2: Financial Intermediaries
Stock market capitalisation

		1982	1986	1991
BR Deutschland	Nominal (ECU billion)	69.8	206.6	292.7
	Real (index)	100.0	107.3	132.5
	Share of GDP (%)	10.0	25.0	23.0
France	Nominal (ECU billion)	31.3	133.6	278.5
	Real (index)	100.0	152.3	206.7
	Share of GDP (%)	5.0	20.0	29.0
United Kingdom	Nominal (ECU billion)	219.3	345.9	735.4
	Real (index)	100.0	114.5	122.7
	Share of GDP (%)	44.0	83.0	92.0

Source: OECD, IMF, FIBV

Kingdom markets between 1982 and 1991. In Paris, they were multiplied by six over the same period.

On the primary markets the volume of securities issues in five major countries (UK, F, D, NL, I) amounted to 560 billion ECU in 1992, more than double the volume of 1986. This means that the slowdown after the 1987 crash has come to an end.

Difficulties in the European Exchange Rate Mechanism (ERM) affected developments on the financial markets in 1992-93. In 1992, the pound sterling was withdrawn from the ERM. A period of relative calmness followed but in 1993 the tensions in the ERM increased again. This eventually led to a widening of the fluctuation bands. This turmoil was reflected, and partly caused by, developments in the currency markets.

In the 1980s corporate finance was a booming business, spurred by large take-over bids. The early 1990s, however, are characterised by low activity according to Securities Data Co, with less emphasis on large take-over bids and more on alliances, mergers and joint-ventures. It is estimated by Goldman Sachs that in 1992 around two-thirds of the European bids took place on the continent and a third in the United Kingdom. In five years, acquisition activity has thus shifted away from the United Kingdom (still accounting for two-thirds in 1987) to the continent.

International comparison

The most important financial market in the world is the New York Stock Exchange (NYSE). In 1992, its turnover was 2.6 times larger than that of London and its capitalisation 3.8 times. The Tokyo stock exchange has a turnover of shares comparable with Germany, but its capitalisation is almost 8 times higher. This is the result of the highest price-earnings (PE) ratio of the major stock exchanges.

In 1992, US financial markets were the strongest performers in the mature and large markets. The Morgan Stanley Capital Index rose by 4.2% over the year as a whole (end 1992 compared with end 1991), notwithstanding the economic recession. The PE ratio was 22.7. Japanese stock market performance was negative, with a decline of the MSC index of 22.1%. The PE ratio at the end of 1992 was 38.9. European markets were situated between these two figures. The London market decreased by 7.2% and had a PE ratio of 19.7. The German market decreased by 11.8% and had a PE ratio of 14.3.

Foreign trade

A substantial expansion of international activities has been made possible by deregulation and the revolution in communication technology. The resulting integration has broadened the choices of market participants: issuers have increasing recourse to foreign markets to raise capital, while investors have tended to internationalise their portfolios.

In 1992 the volume of transactions in foreign shares slipped back in Frankfurt, Paris and Amsterdam, but increased in London and New York. London is clearly the international financial centre. 43% of its share turnover originates from shares of foreign companies.

Indicators of activities on the international capital markets showed a remarkable growth of non-underwritten facilities, especially Euro Commercial Paper and Medium Term Notes programmes, in 1992, a growth that continued in 1993. Furthermore, issues of international and foreign bonds grew strongly in 1992-93 (1993 estimate based on the first four months). The growth was spurred by falling interest rates in a number of major markets and the large funding requirements of governments and corporations.

Table 3: Financial intermediaries
Securities issues

	1986				1992			
(billion ECU)	Shares	Bonds (gross)	Debt certificates (net)	Total	Shares	Bonds (gross) (net)	Debt certificates	Total
BR Deutschland	7.7	120.5	10.8	138.9	8.5	283.0	3.3	294.8
France	20.3	50.7	0.0	71.0	102.7	51.8	0.0	154.5
Italia	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.2
Nederland	1.1	12.1	13.4	26.6	0.3	51.2	10.4	62.0
United Kingdom	11.4	25.6	0.0	37.0	8.0	40.4	0.0	48.5

Source: OECD

Table 4: Financial Intermediaries
Evolution of mutual funds - Assets

(million ECU)	1986	1988	1991
BR Deutschland	67.0	92.2	140.7
France	155.9	203.1	319.6
Italia	48.0	34.0	38.3
Nederland	13.1	N/A	19.7 (1)
United Kingdom	52.3	64.8	81.3

(1) 1990
Source: IMF

MARKET FORCES

Demand

Demand for services from financial intermediaries is a result from the demand and supply of funds on the financial markets, where the intermediaries are active. Especially the securities market is important, and the position of this market towards the banking market.

The supply of capital ultimately originates from savings. When the suppliers of capital desire a specific form for their portfolio investments, like bonds, shares or a savings account, the supply of capital is translated into a demand for those specific financial assets. Since 1987 the supply of capital has grown, due to strongly rising personal saving rates in several European countries.

The demand for capital ultimately originates from investment, and translates into demand for (bank) loans, and into 'supply' of securities (shares and bonds issues). In recent years the opening up of Eastern Europe, the preparation for the Single Market and the liberalisation of capital markets all stimulated the demand for capital and the supply of financial instruments, especially securities (and in the 1980s with the emphasis on debt instruments). Difficulties in the ERM increased volatility of exchange rates and interest rates. Against this background of expanding activities and increasing risk, the demand for the services of financial intermediaries grew, their role being to ensure market liquidity and spread, as well as advice on the risks and returns of different forms of investment.

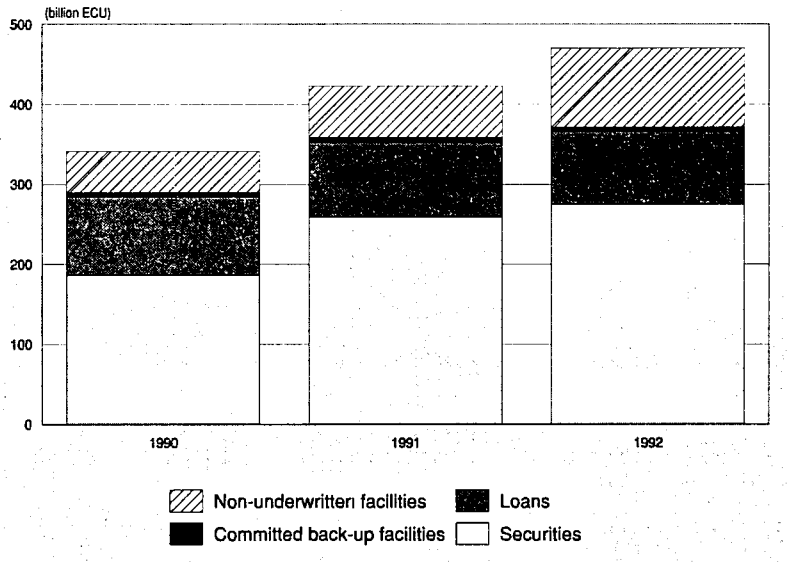
Mergers, acquisitions and management buy-outs require services from financial intermediaries in various forms. The demand for services involving management of corporate assets and liabilities has increased, above all in situations involving financial and corporate restructuring. Furthermore, the need for advice and support for cross border alliances and take-overs has grown.

Supply and competition

Financial services can be divided into two groups according to their target markets: institutional and everything else. Institutional lenders and borrowers have different needs, and international competition mainly takes place on this market. Local markets will keep their role, however, because many private persons and companies prefer the home financial market to the foreign markets for borrowing and investing. Most domestic shares will be bought by the inhabitants of the country and not by foreign investors.

On the institutional markets, stock exchanges compete with each other to hold or increase their share of trading. An exchange's competitiveness is based on its technology and procedures for trading, clearance and settlements. In Europe, the London Stock Exchange has attracted much trade of shares of non-United Kingdom companies. The other European ex-

Figure 2: Financial Intermediaries
Borrowing on the international capital markets



Source: OECD

Table 5: Financial intermediaries
Top advisers on completed European deals (mergers and acquisitions) (1)

(ECU million)	Value	Number of deals
Lazard Houses	1 940.5	10
Credit Lyonnais	1 265.2	1
S.G. Warburg	898.0	7
Morgan Grenfell	600.7	10
UBS Philips & Drew	528.4	1
MeesPierson	514.3	2
Swiss Bank	448.6	1
Lehman Bros	405.0	5
Kleinwort Benson	382.8	5
Wertheim/Schroder Group	336.9	8
Societé de Banque Occidentale	327.6	1
Goldman Sachs	304.0	6
Barclays de Zoete Wedd	194.6	4
Wasserstein, Perella	174.6	1
Citicorp	129.3	1
Total	10 096.6	698

(1) Between January 1 and March 31, 1993
Source: Securities Data Co (secondary source: Financial Times)

changes have been investing heavily to boost liquidity on their local markets. Although the London Stock Exchange was forced to abandon its investment in the computerised settlements system, Taurus, in March 1993, London's SEAQ International remains an important trading centre for many leading German, French, Dutch and Swedish companies. Regulation is very important to the competition between exchanges, both as an instrument or as a constraint in making exchanges attractive. Stamp duty, capital gains taxes, brokers' fees, trading hours and the delivery-clearing systems all determine competitiveness.

Large international brokers compete with the stock exchanges, and with each other, to gain the business of the institutional investors. They try to lure customers with the advantages of one-stop shopping. Instead of deciding whether to deal net (without commission) or agency (with commission), home market or off-shore, and then splitting orders among brokers, institutions can deal with just one large broker. Through the large broker investors can benefit from superior services, for instance 24-hour trading in stocks. Brokers compete with exchanges, because they can offer a customer to deal outside the exchange and directly through the broker with another customer. Only brokers with a sufficiently large customer base can offer such a service.

Electronic markets also threaten the more traditional stock exchanges. They allow investors and intermediaries to deal anonymously on an electronic system. Participants enter bid and offer prices directly into the system and can either trade instantly against these prices, or negotiate on screen on order size. Instinet (owned by Reuters) is a leading example of an electronic market. Electronic markets blur the distinction between brokers and exchanges. Instinet works like an exchange, but is registered and acts as a broker, being a member of several stock exchanges including London, Frankfurt and Paris.

The reorganisation of stock markets has also played an important part in stimulating the supply of financial services and the competition between financial intermediaries. Its aim was improving efficiency while ensuring stability and investor protection. Key elements include: an end to brokers' monopoly and liberalisation of commissions; a reorganisation of the market for treasury bonds, with the consequent adoption of a secondary market in such stocks to reflect the needs of investors; the creation of secondary listings, allowing medium-sized businesses, unable to meet the conditions for full listing, to improve their access to capital; and the computerisation of stock markets and market operations in all European exchanges boosted market liquidity by making information more rapidly available and accurate.

Following US developments, markets for derivatives (options, futures) have been created: the EOE in Amsterdam in 1978, LIFFE and LTOM in London as of 1982, MATIF and MONEP in Paris as of 1986, and the DTB in Germany as of 1990. They were modelled on the Chicago Board Options Exchange (financial options), the Chicago Board of Trade (financial futures) and the Chicago Mercantile Exchange (index futures). The aim of these markets is to afford investors hedging opportunities against fluctuations in interest rates, exchange rates and stock market prices. They have experienced rapid growth in terms of transaction volume.

Another important development is the securitisation of debt. To the detriment of banks, instruments designed to allow the transformation of loans into negotiable debt stocks attract more and more interest. This innovation, based on experiences in the USA and the United Kingdom, is new to France and still unknown in Italy and Germany. It offers financial institutions more flexibility in managing their assets.

Production process

Trade on stock exchanges can be order-driven or quote-driven. In Europe, the first is predominant on the continent and the second in London. In quote-driven trading systems there are broker/dealers and market makers, the latter being required to take positions to ensure liquidity. Order-driven systems depend on a confrontation of buy and sell orders, brought to the market by brokers remunerated by a commission. The market-makers' (or dealers') profit or loss is the difference between the price paid and the price received for the same security. However, the same firm or individual may function, at different times, as broker or dealer.

The progressive institutionalisation of share dealing suggests a shift towards a two-tier system, with order-driven, centralised national exchanges and a quote-driven, decentralised system outside the exchanges for block trades.

An order can specify to buy or sell a stated amount of a security at the most advantageous price obtainable after the order is represented in the trading crowd (market order); to buy or sell a stated amount of a security at a specified price, or at a better price (limit order, not possible in Paris); or to buy at a price above or sell at a price below the current market (stop order, or stop loss order, possible in Amsterdam, NYSE, Zurich, and to a limited degree in Frankfurt).

The settlement is the conclusion of a securities transaction when a customer pays a broker or dealer for securities purchased or delivers securities sold and receives from the broker the proceeds of the sale. Settlement times differ between stock exchanges, and tend to become shorter, due to competition and computerisation. Settlement times range from 2 working days (domestic shares in Germany) to once a month (in Paris, but for a fee it can be settled in less than 5 days).

INDUSTRY STRUCTURE

Companies

Competitors in this industry consist of different groups. Brokers are the most important. They can be divided into large, international brokers, small, national ones and niche players. The stock exchanges themselves are engaged in the competition, positioned either as an international player or as a domestic one. Private electronic markets are becoming significant, and in some instances (Instinet) already play a

Table 6: Financial intermediaries
Ranking of European brokers, 1993

	Equity research			Equity execution		
	Rank 1	Rank 2	Rank 3	Rank 1	Rank 2	Rank 3
Belgique/België	Petercam	Dillon Read	Warburg	Petercam	Dillon Read	Warburg
Danmark	Danske Securities	Enskilda	Carnegie	Danske Securities	Alfred Berg	Carnegie
BR Deutschland	Deutsche Bank	Sal Oppenheim	Warburg	Deutsche Bank, Commerzbank		Warburg and BHF
Hellas	Schroder	Baring Securities	Sigma			
España	FG Inversiones	Carnegie	Asesores Bursatiles	FG Inversiones	Carnegie	Warburg
France	Cheuvreux de Virieu	Warburg/ Bacot Allain	Paribas	Cheuvreux de Virieu	CCF	Warburg
Italia	CIMO	Warburg	Euromobiliare	CIMO	SIGE	Euromobiliare
Nederland	Mees Pierson	ABN-AMRO	James Capel, Warburg	ABN-AMRO		
Portugal	Midas	Schroder	Carnegie, Singer & Friedlander	Midas	Carnegie	Schroder
United Kingdom	James Capel	BZW	Warburg	James Capel	Warburg	BZW, Smith New Court
Pan-European	Warburg	Morgan Stanley	BZW	Goldman Sachs	Morgan Stanley	Warburg

Source: Euromoney (September 1993)

leading role. Finally, the (investment) banks are also active in this industry.

In the past decade, large groups of financial intermediaries have emerged, consisting of combinations of brokers and banks. Monitoring these groups is a difficult matter, as they engage in activities that fall under different supervisory authorities in most European countries.

Stock exchanges can be compared by their performance. Merchant banks and securities firms can be compared by for instance their engagement in take-over deals. This measure reveals the dominance of Lazard Houses (UK), Crédit Lyonnais (F, a bank), and S.G. Warburg (UK). Brokers' ranking according to a Euromoney poll shows that in the different European countries local analysts are preferred to London-based pan-European teams for recommendations on the local market. Another interesting feature is the difference in rankings between research and execution. Investment banks can easily gain a top ranking on research, to be passed by others in the ranking on execution. Part of the explanation can be found in the possible conflict of interests between the research and corporate finance departments at the same bank or firm.

Strategies

Brokers must first determine if they want to be an international, national or niche player. To be an international operator, the successful strategy seems to be to invest in building up international networks of offices. Goldman Sachs, Credit Suisse First Boston and S.G. Warburg all have invested heavily and all are leading advisers.

The privatisation trend can warrant a local strategy, coupled with an international presence. Local knowledge is needed in order to successfully bring state enterprises to the market. International presence is needed to manage the typically large size of privatised companies.

Stock exchanges will compete with each other on market-making or order-routing trading systems, and with brokers and electronic markets by offering more linkages between exchanges (and possibly by offering market-making systems, like Amsterdam has done for wholesale investors). Eventually, European stock exchanges will be linked together. This can be accomplished through the following steps. First, barriers to market-makers in different markets must be eliminated. Second, mutual recognition of nationally-organised markets. Third, a single European exchange for the main trade stocks.

A programme to standardise listing requirements, Eurolist, is already being developed. A joint project of the FIBV, it is designed to produce one set of listing details for European blue-chip stocks that will apply in all exchanges. The Euroquote plan for a European exchange has been under review since the beginning of 1991.

REGULATIONS

The objective of the Investment Services Directive (ISD) which was adopted on 10 May 1993, is to create one single market for securities firms. The ISD must be transposed into national law by 1 July 1995 and be effective from 31 December 1995. A securities firm will then need a licence only in a single Member State to operate in all Member States. Investment firms and banks will however have to respect conduct of business rules on a host Member State basis. The directive provides that banks and securities firms may become stock

exchange members in their own name in each Member State, subject to a transitional period for France, Italy and Belgium until the end of 1996, and to Greece, Spain and Portugal until the end of 1999.

Furthermore, under certain conditions a Member State is allowed to force market participants to handle securities transactions on the regulated market. The investor, however, can demand that the transaction will be executed outside the regulated markets. A Member State can then require the investor to ask permission for such a transaction. This rule is a compromise between countries with highly regulated markets and countries with less regulated markets.

Together with the Capital Adequacy Directive (CAD) of 15 March 1993, the ISD regulates the EC securities market. The CAD stipulates minimum capital requirements, as well as a minimum starting capital. The ISD stipulates that securities firms and banks need to fulfil the CAD requirements.

OUTLOOK

The role of financial intermediaries is likely to gain weight in the future, due to the increasing relative importance of securities vis-à-vis bank loans. First, several privatisation programmes are going on in e.g. France, the United Kingdom, the Netherlands, Spain, Portugal, Italy. Second, demographic trends, falling birth-rates and rising longevity imply that in the future relatively more elderly people will have to be supported. Governments will then encounter difficulties to finance the growing volume of payments in unfunded systems. To alleviate this future problem, governments now stimulate private pension plans. Besides, the growing awareness of these trends also induces the public to look out for supplements to possibly deficient state pension and health care payments in the future. This stimulates saving through institutional investors and pension funds in particular, increasing the demand for securities.

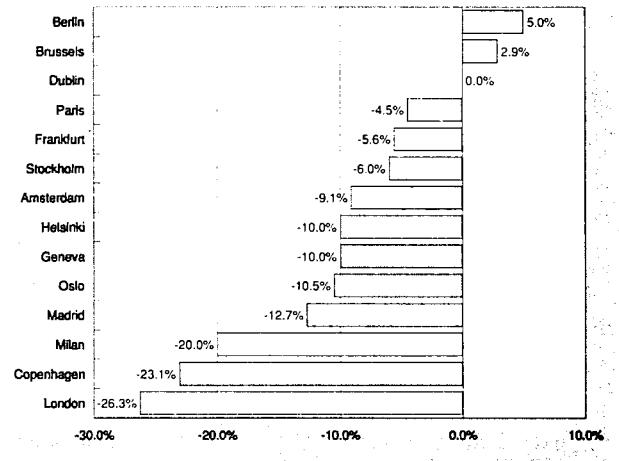
The increased exchange rate risks, due to the suspension of the EMS, will stimulate the demand for products to hedge against these risks, and therefore the demand for related services. Falling interest rates, nominal as well as real, are likely to boost the demand for equities in the short term. Finally, the expected slow economic recovery will increase activities on the financial markets.

Written by: Netherlands Economic Institute

Real estate
NACE 833, 834, 835

The European real estate sector is going through a severe downturn, which has set in after a long period of strong growth in rental and capital values. The downturn started in London and spread over the continent. Now, German cities are also affected. The recession in the property market has partly been caused by the general economic slowdown and high real interest rates, and partly by rental and capital values that have overshot. The downturn is aggravated because many investments have been largely funded by bank debt, and as a result the high real interest rates are undermining the profitability and solvency of developers and investors. The withdrawal of Swedish and Japanese investors has also worsened the situation. Falling rentals and rising vacancy rates reveal the difficulties in the market. Nevertheless, in the medium term a recovery, although modest, is expected.

Figure 1: Real estate
Growth of office rents (prime rentals), 1992



Source: ICPA (International Commercial Property Associates)

INDUSTRY PROFILE

Description of the sector

The various professions active within the property sector attest the dual nature of the industry, implicit in its primary and secondary markets. Certain activities relate to primary demand and the completion of property development, whereas other relate to the functioning of the secondary market. To the first category belong builders, developers and consultants specialising in feasibility studies. Real estate agents operate on the secondary market, with their expertise in surveying and valuation of properties, and their role in sales transactions and estate management.

In addition, the property market sector may be divided in two separate compartments: Residential property and commercial property, where the latter includes offices, retail shops and factories.

Recent trends

All over Europe a spectacular expansion occurred during the past decade, which peaked in the first quarter of 1991. Since then the property sector has slumped, due to economic recession, high real interest rates and sometimes too excessively increased office rents. The office sector has been hit harder than the retail sector; values have fallen by 23%, according to the Jones Lang Wootton property index. In other than prime locations, office rentals declined between mid-1992 and mid-1993 by on average 14%, hence less than the rental in prime locations. The industrial rental prices declined about in line with the decline of the prime office rents. Prime retail rentals experienced the sharpest drop. Finally, selling prices of residential property were in 1993 on average 10 to 15% lower than in 1992.

While the trend is mainly negative everywhere, there are large differences between cities and regions. London, Stockholm and South-European cities have been hit particularly hard; in London-City the office rents for prime locations were halved in three years time. Brussels, Amsterdam and some German cities show relatively modest declines in office rents and yields. Germany seemed for a long time invulnerable to the downturn in the property markets elsewhere in Europe, but in Frankfurt and München there is now an oversupply of office space and office rents are falling. Elsewhere in Germany office rents are stable. The German property market is highly regionalised, divided between west and east, and containing several cities that sustain important markets (e.g., Düsseldorf, Hamburg).

Table 1: Real estate
Total number of transactions of dwellings (1)

	1990	1991	1992
Belgique/België	99 773	99 654	103 000
Danmark	56 750	52 441	47 224
BR Deutschland	554 000	513 000	515 000
Hellas	(93 070)	(43 833)	(52 620)
España	N/A	N/A	N/A
France	754 000	725 000	644 000
Ireland	34 812	37 058	44 433
Italia	517 085	555 888	(350 693)
Luxembourg	2 893	3 082	N/A
Nederland	202 100	211 100	229 500
Portugal	170 426	N/A	N/A
United Kingdom	1 398 000	1 306 000	1 136 000

(1) Including those occupied for the first time.
Source: ECMF

Table 2: Real estate
The property market in European cities

	Average sales prices ECU/m²				Urban houses (1)		Average yearly rent in ECU/m²			
	New apartments		Old apartments		(1 000 ECU)		New apartments		Old apartments	
	1992	1993	1992	1993	1992	1993	1992	1993	1992	1993
Brussels	1 623	1 210	1 109	1 067	N/A	74-124	123	103	79	96
Berlin	2 099	2 593	N/A	1 540	394-590	431-770	136	144	87	72
Frankfurt/Main	1 763	2 285	N/A	1 437	290-467	349-501	102	106	77	80
Hamburg	3 137	2 407	N/A	1 369	138-295	254-462	135	142	90	93
Athens	N/A	1 535	N/A	1 181	N/A	N/A	N/A	N/A	N/A	N/A
Barcelona	N/A	N/A	N/A	1 476	N/A	N/A	N/A	N/A	N/A	N/A
Madrid	N/A	2 506	N/A	2 026	N/A	192-352	N/A	206	N/A	159
Nice	3 885	2 706	2 428	1 533	233-728	225-451	N/A	N/A	N/A	N/A
Paris	4 764	4 134	3 074	2 969	N/A	N/A	213	186	149	176
Dublin	962	1 232	962	1 232	131-210	87-173	160	130	93	99
Milan	4 491	3 222	3 777	2 652	253-909	215-773	147	130	125	115
Luxembourg	2 891	3 010	1 901	1 979	238-475	247-495	128	163	114	104
Amsterdam	1 651	1 727	1 236	1 346	238-475	247-495	58	61	26	27
Lisbon	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	88
London	N/A	N/A	N/A	N/A	182-215	168-196	N/A	N/A	N/A	N/A

(1) Range of price for a 4-5 room house.
Source: FIABCI

Paris's property market also saw a sharp downturn, with office rents falling in one year by 5 to 10%, and by 20-30% since the peak; capital values declined even more. Outside Paris, however, the office rents are much more stable. In Spain and Portugal the real estate sector will get a stimulus from the liberalisation of rent controls.

Not only prices are down, but volume is also. In London-City demand for offices in 1992 was 15% lower than the year before; London-West End showed a modest increase with 2%. In Paris the demand was 25% down and even Brussels registered a decline. These developments have resulted in a vacancy rate of 6% on average in 1992, compared with 2.5% in 1989.

The severity of the downturn has been aggravated by the extent of funding by bank debt. The downturn forces banks to make heavy provisions for their portfolio, and makes them more reluctant to finance new projects and investments. This in turn depresses the property market. This chain of events has mainly occurred in the United Kingdom, France and Sweden.

International comparison

The commercial property markets in the USA are very large compared to European markets. The value of transactions in the USA is estimated at USD 1 000 billion (ECU 800 billion) a year - nearly 7.5% of GNP. New construction accounted for half of the market until recently, but the structural oversupply has made funding of new projects almost impossible, resulting in less new construction. Only regional malls are considered relatively attractive by experts, although several retail chains have problems. The office markets are still characterised by high vacancy rates, due to structural oversupply. It will take a long time, seven years or more, before supply and demand will get balanced.

The Japanese market, confronted by problems of overpopulation and over concentration of activities in certain areas, has probably reached a saturation point. Rental prices in Tokyo's Central Business District are the highest in the world, being twice as high as in London.

Foreign trade

The increase in the proportion of international investment in the property market has slowed down in the economic reces-

Table 3: Real estate
Non-residential property market - Average sales prices

	Office property				Commercial property (retail)			Industrial property			
	Prime		Others		City center		Shopping center	Downtown		Periphery	
(ECU/m²)	1991	1992	1991	1992	1991	1992	1991	1991	1992	1991	1992
Brussels	N/A	2 138	N/A	1 425	N/A	10 691	N/A	N/A	N/A	N/A	238
Copenhagen	3 014	N/A	1 745	N/A	4 124	N/A	1 904	656	N/A	529	N/A
Hamburg	N/A	4 182	N/A	2 706	N/A	27 060	N/A	N/A	N/A	558	590
Madrid	6 962	N/A	3 868	N/A	11 603	N/A	4 254	1 135	N/A	903	N/A
Nice	N/A	1 547	N/A	773	N/A	5 099	N/A	N/A	1 457	N/A	1 068
Dublin	N/A	2 040	N/A	1 603	8 882	1 247	N/A	487	N/A	369	N/A
Milan	7 812	5 803	2 604	2 273	5 859	101 363	4 557	1 682	1 623	955	812
Luxembourg	4 251	4 276	2 834	2 851	4 723	7 127	3 306	N/A	N/A	708	713
Amsterdam	2 154	2 181	1 077	1 227	4 308	6 544	N/A	582	589	431	436
Lisbon	3 045	N/A	1 626	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Source: FIABCI

Table 4: Real estate
Components of acquisition price, 1988

	Home ownership transfer duties (% of scale)	VAT rate on construction (%)	Real-estate agents fees for the sale of residential property (% of the sales price)	Interest rate on mortgage loans (1st quarter) 1988	1989
Belgique/België	12.5	17.0	3.0 -- 5.0	8.3	8.8
Danmark	N/A	22.0	2.0 -- 5.0	11.9	10.4
BR Deutschland	2.0	14.0	5.0 -- 6.0	7.4	7.7
Hellas	13.0	-- (4)	4.0	22.0	21.0
España	6.0	6.0	3.0 -- 5.0	15.0	14.6
France	18.2	18.6	5.0 -- 7.0	10.4	10.2
Ireland	2.0 (1)	23.0	2.0 -- 3.0 (5)	9.3	8.3
Italia	8.0	18.0	1.0 -- 3.0	15.0	14.5
Luxembourg	6.0 (2)	N/A	3.0	7.0	6.8
Nederland	6.0	19.0	1.5 -- 2.0 (6)	7.0	7.6
Portugal	10.0	N/A	3.0 -- 5.0	18.0	18.5 (7)
United Kingdom	1.0 (3)	15.0	1.5 -- 2.5	10.3	13.5

(1) 6% above UKL 50 000.
(2) 9% in the town of Luxembourg.
(3) Exoneration below UKL 30 000.
(4) Adoption of VAT in progress.
(5) + VAT of 25%.
(6) + VAT of 20%.
(7) Housing Savings Plan; the rate of interest on loan without maximum limit was 22%.
Source: FIABCI; European Community Mortgage Federation, Hypostat '88

sion. Potential investors focus on opportunities in their home markets. The relaxation of investment controls in the late 1980s caused a surge in geographical diversification, which was not always warranted. The London and Paris markets were both stimulated between 1988 and 1990 by Japanese, German and Swedish investors. Only the German investors have remained, and they concentrate on the United Kingdom.

Japanese real estate investments overseas were estimated at ECU 1.5 billion a year in the early 1990s. At the end of the 1980s, 75% of Japanese property investments were in office blocks, commercial properties and hotels. The remaining 25% was invested in golf courses, apartments and private hotels. Total real estate investment in the EC was evenly distributed between Germany, France and the United Kingdom.

MARKET FORCES

Demand

Property demand is of course largely determined by local factors. The most important are: economic growth, replacement demand, luxury demand (upgrading) and locational preferences. Economic growth creates a need for more space for offices, shops and factories. Replacement demand is the base for demand for commercial property. Its volume is dependent on the average lifetime of real estate. Upgrading will take place in a favourable economic climate and when the existing stock of real estate is estimated to be of poor quality (which applies to the building and the location). Finally, other factors can increase the attractiveness of a particular location and create an additional demand for property

The rental market is less dependent on economic fluctuations. Unlike the sales market, it is not bound by investment logic: rental is not investment in, but consumption of real estate. Therefore, interest rates are less crucial in the rental market than in the property market.

Transfer duties are levied at the time of sale of a property. At present, France has the highest such taxes in the world with 18.2%, compared to between 6% and 12.5% in most other European countries. The United Kingdom and Germany are the exception, with transfer duties of 1% and 2%, respectively.

The level of infrastructure provision and planning also influences demand. The three regions of Greater London, the Rhine-Ruhr and Ile-de-France comprise the principal focuses of wealth of the EC. When cities are ranked according to several attraction factors Paris and London stand out ahead of others. These cities have an outstanding infrastructure and benefit from a strong presence of multinational firms.

In the commercial property market, the shift in business demographics towards the services sector increases the demand for office properties to the detriment of industrial sites. In addition, the demand for offices is becoming more sophisticated, with the development of large luxurious American-style complexes, such as the Quartier de la Défense in Paris.

The domestic property market is still a sector that appears resistant to the kind of factors noted above. In this case, other factors are at work that are sometimes less pragmatic and more personal.

Supply and competition

National and even urban markets still have distinct evolutions. However, due to the growing activities of internationally operating firms, developments in the different national or urban markets are coming more in line with each other. The market in Brussels can be called a monoculture, based on the existence of international organisations as the EC and, to a lesser extent, NATO. The German market is very regionalised and has many centres. It is also characterised by the importance of owner-users of office-space. In the French real estate market, the south will gain importance, but Paris will remain by far the most important area. The United Kingdom market, with London at the forefront, is trend setting for the developments in office space. It is, however, underpinned by a relatively weak economy. The Dutch market is stable.

Currently, there is an oversupply in the property market. The boom in Europe's property values during the 1980s stimulated construction, often funded by large amounts of bank debt. Economic slowdown and high real interest rates hit these mar-

Table 5: Real estate
Non-residential property market in European towns - Average annual rents

(ECU/m²)	Office property: Prime 1992	Office property: Prime 1993	Office property: Others 1992	Office property: Others 1993	Commercial property (retail): City center 1992	Commercial property (retail): City center 1993	Industrial property: Downtown 1992	Industrial property: Downtown 1993	Industrial property: Periphery 1992	Industrial property: Periphery 1992
Brussels	223	235	160	108	1 010	866	71	74	N/A	52
Frankfurt/Main	467	403	177	205	1 968	1 386	N/A	N/A	N/A	N/A
Hamburg	236	215	177	135	1 476	1 396	N/A	N/A	57	55
Berlin	494	400	192	216	1 993	1 745	N/A	N/A	N/A	N/A
Athens	N/A	123	N/A	N/A	N/A	671	N/A	45	N/A	31
Barcelona	441	207	204	128	650	537	102	65	N/A	N/A
Madrid	473	403	204	163	1 207	640	121	61	N/A	54
Nice	175	142	131	120	N/A	N/A	N/A	N/A	N/A	N/A
Paris	583	541	357	326	2 914	2 480	87	113	76	76
Dublin	191	185	N/A	124	1 706	1 611	71	62	46	43
Milan	387	304	149	127	812	829	97	88	55	39
Rome	N/A	366	N/A	138	N/A	884	N/A	N/A	N/A	N/A
Luxembourg	346	371	N/A	247	713	742	N/A	N/A	46	68
Amsterdam	196	209	93	97	676	764	57	59	41	42
Lisbon	418	351	268	N/A	634	882	N/A	N/A	N/A	N/A
London	526	413	N/A	266	1 737	1 060	128	106	N/A	N/A

Source: FIABCI

kets hard. Many countries have seen office vacancy rates rise. Overcapacity in property has been even more pronounced to the extent that foreign investors, notably from Japan and Sweden, have pulled out: Japanese investors because of too low rates of return and Swedes because of home market problems (the slump in the Swedish property market has even undermined the Swedish banking system). Sales agents were the first to be hit by the property recession. Having been drawn in by seven years of market growth, they counted on the rapid and highly profitable turnover of property and borrowed, in some cases, up to 100% from the banks. The recession brought major losses, aggravated by the withdrawal of the banks.

The evolution was different in central business districts and outlying areas. In central business districts, the recession initially only reduced shortages and rents were stable, whereas outlying areas were hit more severely. As the recession continued, however, rents in the central business districts also dropped sharply.

The property investment market has gone through the same developments, but in a more pronounced way. Investors have preferred to postpone their activities while markets are gripped by uncertainty. The degree of speculation that has characterised the investment climate in the 1980s and the early 1990s caused a severance of the link between supply and demand, exacerbating the current recession.

Production process

Supply of offices is fed simultaneously by the arrival on the market of new buildings (60 to 65% of supply) and the recycling of older ones. Few markets have a primary sector coexisting with a secondary sector to such a degree. This secondary market allows property to be used as an investment base, as it guarantees a measure of liquidity. (This role as an investment base is more pronounced in office property than in residential property. The latter has more of a community character, and is often the subject of regulation designed to preserve its social utility. This in turn holds down yields on capital investment.) This closed-circle structure accords particular importance to the role of intermediaries. They exist to help transactions (and ensure market liquidity), performing an essential role in affording investors continuity between primary and secondary sectors. Another consequence of this special configuration is that the various players in the marketplace can either simultaneously or successively adopt opposing roles: buyer and seller, provider and consumer.

Satisfying end-user demands presupposes activity by developers, investors, financial funders and consultants. Each is in competition with the next - both over the character of the product and the means by which it is acquired, i.e., purchase, rental, or leasing. Professional competence in this sector takes a number of forms:

- Local market knowledge; the ability to put a precise value on a site and its possibilities, and to define a product suited to the needs of the end-user. This factor can only be provided by local experts, and has acted as a brake on internationalisation of the sector as a whole.
- Manpower resource deployment: this activity is an integral feature of the sector. It should be pointed out that high levels of productivity are present: consultants achieve rates of ECU 150 million per employee in the larger firms within this sector, a productivity level comparable to that recorded in heavy industry. In terms of sales, volume exceeds ECU 350 billion at the level of 300 employees and above.
- Financial expertise: the professions in the property market are closely linked to the world of finance, which explains the presence of banks in the sector. Financing of the product, besides production and sale, presupposes management.

As in every service activity, communication capacity plays a major role. The profession is able to intervene rapidly, which is a key element for success. This is seen, for example, in the auction process, where investor reaction must be immediate. In such conditions, the larger institutions, with their hierarchical structure and their prudential constraints, are at a disadvantage in the race to obtain business.

INDUSTRY STRUCTURE

Companies

Within the EC, property professionals represent a workforce of around 120 000 authorised practitioners. Most agencies are small and operate at a local level.

There are two categories within the property profession: developers who construct buildings on land that they already own with a view to their sale or rental, and intermediaries who make markets in the product and counsel those involved.

Table 6: Real estate
Office rents and costs, June 1993 (1)

(ECU/1 000 m2)

Tokyo - central business district	2 073
Tokyo - central	988
London - West End	942
London - city	846
Paris	700
Berlin	555
Frankfurt	526
New York - mid town	466
Milan	439
Madrid	372
Brussels	332
Barcelona	328
Chicago	291
Los Angeles	247
Amsterdam	240

(1) Rental price and accompaying costs for airconditioned office space at a central location.
Source: Richard Ellis

Outside the property profession two other groups play an important role on the market: firms or persons who construct buildings for own use, and the government, often an important owner of land.

There are four types of developers. First, the independent developers. They make up only a small part of the sector. Secondly, the subsidiaries of banking or financial groups. Almost all have in-house development divisions, both as a channel for the distribution of credit and as a profitable activity in itself. Thirdly, subsidiaries of public works and construction authorities. Again, the large ones all have development arms. And fourthly, institutional developers. An example is the association of around 15 insurers and bankers in the Société Française d'Investissements Immobiliers.

At the intermediary level, the approach to the market is characterised by an increasing professionalism at the level of estate agents, an increasing role for consultants and progressively national/international structure. In this context, three types of intermediaries can be identified. The first type, estate agents and administrators, are specialised in marketing and renting to end users, as opposed to developers targeting institutional investors. Consultants are the second type; their numbers and importance increase as products become more sophisticated and the sector more international. These usually take the form of small, independent practices. Their role is important because decisions on development, investment and acquisition are wholly dependent on market conditions. The third type are the market-makers who buy to resell. These are the speculators who exploit market imbalances (notably when causing undervalued purchase prices) to their own advantage. In addition, however, they also act as a buffer, mitigating the impact of major differences between supply and demand. Their ability to play this role depends on their capacity to carry a property over a period.

Strategies

One current striking characteristic is the emergence of widely divergent strategies on the part of developers. Until recently, developers tended to adopt similar strategies; they were typically small-scale and unambitious, finding it difficult to operate on an international level in such a conservative profession. The current trend, however, is towards integration of upstream and downstream activities: development-proper upstream and commercialisation downstream.

One can also identify a growing tendency to extend the range of products offered in an attempt to reduce dependence on the vagaries of a single market sector, a case in point being developers originally specialised in housing who reposition to profit from the boom in office property. Two major strategic groups of developers can thus be identified. Some have elected to diversify into complementary development activities such as administration, hotel chain management or even insurance, which do not share the cyclic nature of property development. Others have opted to remain specialised, but have diversified their product portfolio and attempted to become more international in scope.

For several years now, intermediaries have tended towards the Anglo-Saxon model of consultancy. This strategic transformation, which is accompanied by an increased presence of banks in the marketplace, has facilitated globalisation of the property market. The main consultancy offices assume the role of go-between by opening up their domestic marketplace to foreign partners. This development also admits a larger volume of transactions, regardless of the size of the market. For instance, while the office markets in London and

Table 7: Real estate
City comparison - capital values, 1993 (1)

(ECU per m2)	Offices	Shops	Industrial
Berlin	8 557	6 040	1 150
Brussels	2 938	1 971	663
Dublin	2 886	2 304	610
Paris	9 354	4 343	1 042
Frankfurt	7 700	4 317	1 057
Stockholm	2 993	869	680
Amsterdam	3 368	1 556	571
Helsinki	2 157	857	491
Geneva	7 938	4 415	1 438
Oslo	1 790	286	384
Madrid	3 600	1 733	718
Milan	5 367	1 514	560
Copenhagen	1 383	925	482
London	6 754	3 800	1 084

(1) Prime capital value based on net prime rents and primes.
Source: ICPA, NEI calculations

Table 8: Real estate
Occupation status of dwellings

(%)	Owners 1985	Total	Tenants Private rental	1985 Others	Owners 1993
Belgique/België	65.0	35.0	30.0	N/A	N/A
Danmark	52.8	40.0	N/A	7.2	N/A
BR Deutschland	42.8	56.0	40.0	1.2 2	5.0
Hellas	74.7	25.3	21.3	N/A	N/A
España	69.0	27.5	N/A	3.5	80.0
France	52.0	40.9	27.8	7.1	51.0
Ireland	73.4	25.0	N/A	1.6	80.0
Italia	59.0	36.0	31.6	5.0	70.0
Luxembourg	70.0	N/A	N/A	N/A	75.0
Nederland	43.0	55.5	18.5	1.5	45.0
Portugal	58.6	39.0	35.0	2.7	N/A
United Kingdom	61.3	37.7	8.0	1.0	N/A

Source: Cereve, UN, FIABCI

Paris are almost the same by volume, there may be (depending on the period in question) between ten and twenty times more transactions in London than in Paris.

As far as estate agents are concerned, the present recession in property has revealed their inadequate financial resources. Developing these resources has emerged as a priority objective, and agents are working more closely with the banks to allow the development of projects for which no immediate client has necessarily been identified.

Despite growing globalisation of the property market and the increasing sophistication of products - both of which aim towards responding increasingly to demand along the lines of the Anglo-Saxon model - consumers tend to remain more attached to traditional national models.

REGIONAL DISTRIBUTION

Most real estate activity is concentrated in northern Europe, in an area that is bounded by Paris, London and Frankfurt and includes the Brussels area, the 'Capitals Centre'. This region has more than 30% of employment in the EC (excluding the new German Länder) and more than 35% of gross value added in the EC. London and Paris house the largest volume of office space in Europe, with a total surface area of around

Table 9: Real estate
Share of all homes occupied by their owners, 1991

(%)	
Belgique/België	65
Danmark	52
BR Deutschland	40 (2)
Hellas	70 (1)
España	78
France	54 (3)
Ireland	81
Italia	72 (2)
Luxembourg	59 (1)
Nederland	45
Portugal	66
United Kingdom	68

(1) 1981
(2) 1988
(3) 1990
Source: EC Mortgage Federation

Table 10: Real estate
Prime yields, mid 1993

(% per annum initial)	Offices	Shops	Industrial
Berlin	5.8	5.0	8.0
Brussels	7.3	7.0	9.5
Dublin	7.0	6.3	10.0
Paris	6.5	7.0	9.5
Frankfurt	6.0	6.0	7.0
Stockholm	7.3	7.3	10.0
Amsterdam	6.8	6.8	8.8
Helsinki	7.0	7.0	11.0
Geneva	6.5	6.5	8.0
Oslo	10.5	10.5	12.5
Madrid	7.0	7.5	11.0
Milan	6.0	7.0	10.0
Copenhagen	8.8	8.0	9.8
London	6.5	6.5	9.5

Source: ICPA

Table 11: Real estate
Proportion of transactions made with the assistance of real estate agents

(%)	1990	1991	1992
Belgique/België	60	N/A	60
Danmark	80	80	N/A
BR Deutschland	50	60	60
Hellas	20	N/A	40
España	20	25	N/A
France	55	50	55
Ireland	86	86	90
Italia	36	35	35
Luxembourg	80	80	80
Nederland	60	60	60
Portugal	N/A	10	N/A
United Kingdom	72	84	N/A

Source: FIABCI

32 million m^2. Other European capitals typically average around 5 to 6 million m^2.

As manufacturing activity moves increasingly out of the cities, European urban development is to a considerable extent influenced by the existing infrastructure and knowledge related to market services. These historically "locked-in" advantages create a significant element of rigidity in the economic ranking of European cities. London for instance has retained its prime position for financial services because of first-mover advantages (gained thanks to the early liberalisation of markets),

Table 12: Real estate
Economic indicators for cities

	Annual growth of gross value added 1991-97 (%)	Share of market services in total employment (%)	Total employment 1991 (thousands)
Barcelona	3.4	46	683
Dublin	3.2	56	345
Lisboa	3.0	47	884
Berlin	3.0	47	972
Hamburg	2.9	49	1 061
München	2.8	44	1 000
Lille	2.8	42	763
Utrecht	2.7	46	247
Bruxelles	2.6	62	695
Wien	2.6	45	777
Frankfurt	2.6	45	951
Paris	2.6	54	4 943
Amsterdam	2.4	53	535
Edinburg	2.3	53	305
Lyon	2.3	48	611
Rotterdam	2.3	46	482
Kobenhavn	2.1	44	922
Bologna	2.0	44	406
Stuttgart	2.0	31	1 097
Marseille	1.9	50	546
Athens	1.8	41	1 302
Madrid	1.7	46	1 631
Milano	1.7	46	1 740
Roma	1.6	53	1 447
Glasgow	1.6	50	589
Torino	1.5	38	922
Cardiff	1.5	54	208
London	1.2	63	3 689
Düsseldorf	1.2	43	640
Köln	1.1	35	811
Manchester	0.8	48	1 147
Birmingham	0.2	44	1 203

Source: ERECO (European Regional Prospects, May 1993)

Table 13: Real estate
Economic indicators for city regions (1)

	Annual growth of gross value added 1991-97 (%)	Share of market services in total employment (%)	Total employment 1991 (thousands)	Annual growth of employment 1991-97 (%)
Total	2.1	48	34 235	0.5
Growth cities (1)	2.7	50	9 553	1.3
Declining cities (2)	1.2	47	9 973	-0.6
High productivity cities (3)	2.7	54	1 817	0.5
low productivity cities (4)	2.0	44	4 872	1.1
Stable cities (5)	2.1	46	8 020	0.3

(1) Berlin, Hamburg, Paris, Lille, Utrecht, Barcelona and Lisboa.
(2) Köln, Marseille, Torino, London, Birmingham, Manchester, Glasgow and Cardiff.
(3) Wien, Bruxelles and Dublin.
(4) Lyon, Bologna, Athens, Kopbenhavn and Madrid.
(5) München, Frankfurt, Stuttgart, Düsseldorf, Roma, Milano, Amsterdam, Rotterdam and Edinburgh.
Source: ERECO (European Rehgional Procpects, May 1993)

and because of the depth of the supporting financial and business services.

However, the opening up of markets, political and infrastructural changes provide all challenges to established patterns. The cities best positioned to prosper in the more competitive environment are those that have attracted unique international functions and that have a critical mass of activity and infrastructure sufficient to support the presence of specialised services needed locally by other activities.

REGULATIONS

The regulatory provisions that affect the real estate profession vary widely from country to country within the EC. Generally speaking, regulatory provisions apply mainly to estate agents. Certain countries - Denmark, Spain, France and Italy - have erected major barriers to entry into the profession; elsewhere, professionals are subject to the provisions of common law.

With the exception of Greece, Portugal and Denmark, each EC jurisdiction has a professional charter. Harmonisation of regulations on a European level is still pending.

OUTLOOK

The outlook for the property sector is one of modest growth, which means that in the medium term, the current downturn will be reversed into a moderate upturn. In the medium term, growth in the real estate sector will pick up, but will not achieve the high growth rates of the 1980s. This outlook is based mainly on the anticipation of a slow recovery of general economic conditions. Moreover, growth will differ strongly between cities. A distinction has been made between: growth cities - experiencing relatively high growth rates in production and employment; declining cities - experiencing relatively low growth rates in production and employment; high productivity cities - combining high production growth with low employment growth; low productivity cities - combining low production growth with high employment growth; and stable cities, which have neither high nor low growth rates.

Growth cities have the best prospects, since demand for real estate will be supported by the need for more space given the employment growth and by the desire to upgrade given the production growth. The current situation of excess supply might, however, delay the recovery. For Paris, no recovery is expected before 1995. Declining cities - of which many are in the United Kingdom - do not have these good prospects. Furthermore, there will be marked differences between central business districts and outlying areas; for the latter, development prospects appear less promising.

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Overview

Business services experienced considerable growth and development throughout the eighties. The market has been powered by greater awareness of the benefits from increased externalisation of certain activities. Furthermore, the recent slump in economic activity did not hamper business services dynamism, which exhibited outstanding employment growth in comparison to the services sector as a whole.
The sector's prospects are rosy. As customers get progressively out of the depression, the sector's performances are likely to strengthen over the coming years.

INDUSTRY PROFILE

Description of the sector

The business services sector comprises a number of heterogeneous activities engineered by specialised companies, and aimed at assisting their customers in order to increase efficiency, productivity and competitiveness. The business services sector, as classified on the basis of the function performed on the account of the client company, includes the following sub-sectors:

- management and administration services (legal services, accountancy services, management consultancy, etc.)
- production services (architecture, engineering, operational leasing, repair and maintenance, packaging, quality control, etc.)
- research-related services (market research)
- personnel-related services (vocational training, labour recruitment, supply of temporary labour, etc.)
- information and communications services (software and computer services, advanced telecommunications services, data banks, etc.)
- marketing services (advertising, direct marketing and public relations)
- operational services (industrial cleaning, security services, linguistic services, etc.)

Recent trends

The business services sector employs above 6 million persons, that is well above 5% of total EC employment.

The business services sector was among the fastest growing sectors of the economy throughout the eighties. The economic recession which hit the EC in 1991 translated only into slower growth of business services activity, an outstanding performance which illustrates the relative insensitivity of some of the business services sectors to economic downturns.

This significant growth was the result of the increasing externalisation of this type of activities, coupled with the introduction of important innovations in service management. But the major factor that generated such growth was the strong demand for these services, sustained by the expansion of economic activity.

Moreover, unfavourable market conditions have often led industrial or financial organisations to get rid of in-house services such as economic services, legal or marketing services, and to use instead professional consultants. This has occurred particularly in 1992 and 1993, when companies were in the throes of a financial turmoil. Interestingly, their dismissal from industrial or financial companies led some people to either join existing business services firms or to establish their own company. This phenomenon has counted among the factors underlying the increasing externalisation of business services.

MARKET FORCES

The business services sector has thus been relatively sheltered from the economic downturn. Despite the poor financial position of the sector's customers, the business services industry reported continued growth of employment. This outstanding performance can be explained by the need for customer companies to meet such challenges as new technologies, emerging or plummeting markets, or new regulatory environments for example. Their determination to maximise competitiveness under changing and difficult business conditions have obliged firms to increasingly externalise functions requiring new or specialised skills that they either cannot afford or do not want to acquire for their own premises.

Furthermore, the economic downturn has led a significant number of industrial and financial organisations to try and

Table 1: Business services
Employment compared to selected sectors, 1991

	Business services	Financial services	Recreational services and other cultural services	Hotels and catering
Belgique/België	158.2	145.4	51.1	98.5
Danmark	133.9	90.6	54.6	64.6
BR Deutschland	1 399.1	1 040.4	301.3	749.2
Hellas	118.3	73.7	47.8	165.5
España	415.0	311.2	193.3	683.8
France	1 421.5	614.0	288.0	720.4
Ireland	58.4	37.9	21.1	57.0
Italia	N/A	N/A	N/A	N/A
Luxembourg	6.9	14.3	1.5	7.0
Nederland	530.3	177.9	140.0	185.2
Portugal	105.5	100.5	40.2	180.9
United Kingdom	1 737.6	1 022.7	619.4	1 150.5
EC (1)	6 084.7	3 628.5	1 758.2	4 062.7

(1) Excluding Italia
Source: Eurostat (Labour force survey)

Table 2: Overview business services
Breakdown of employment by sub-sector in the EC, 1990 (1)

(%)	DK	D	F	IRL	I (4)	L	NL (4)	P	UK	EC average
Computer and related services	13.3	5.8	9.8	2.9	24.6	17.0	9.2	2.9	22.4	8.8
Professional services (2)	10.3	23.0	17.3	3.4	18.4	18.6	18.4	17.0	10.7	19.6
Advertising, marketing	5.2	5.4	9.0	1.4	2.0	4.2	4.4	7.0	6.4	6.7
Technical services	35.5	15.4	12.4	67.3	21.6	15.4	16.4	16.6	12.4	15.2
Renting and leasing services	1.5	2.3	2.1	0.4	3.4	1.6	1.9	5.8	7.3	2.4
Personnel supply services	N/A	7.0	17.9	0.8	0.2	3.3	1.9	5.0	6.9	10.6
Operational services (3)	28.5	36.2	17.0	8.3	23.4	35.9	36.6	39.7	10.3	27.0
Other business services	5.8	4.9	14.5	15.4	6.7	3.9	11.1	6.1	23.6	9.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(1) Excluding Belgique/België and Greece.
(2) Includes legal services, accounting, auditing, bookkeeping taxation, management consultancy.
(3) Includes security services and contract cleaning services.
(4) 1989
Source: Eurostat, pilot survey on business services

find new outlets, new forms of production organisation or production processes, in order to get out of the turmoil. This translated into increasing demand for business services aimed at supporting their clients' activity.

INDUSTRY STRUCTURE

The business services sector is characterised by considerable fragmentation and intense competition. The sector is composed of a large network of small companies, a size which give them the flexibility, quality and specialisation necessary to perform their businesses. In activities where economies of scale are important, the companies are usually larger; overall the sector counts a limited number of large, often multinational, firms. Consulting engineering, accountancy, market research, testing, inspection, quality control and some operational services are those sub-sectors of the business services industry where larger firms (i.e. companies with more than 50 employees) can be found.

REGIONAL DISTRIBUTION

As far as marketing or research services are concerned, the location of offices does not necessarily depend upon their demand. Furthermore, the development of information technologies gives companies active in these businesses increased flexibility and freedom in the location of their offices. Consequently, these companies are often found in large urbanised areas, and particularly around the national capitals.

For operational, production, labour-related, management and administration services, it is, in contrast, a real advantage (and sometimes even mandatory) to have offices in the places where high demand is expected. For example, vocational training is typically an activity highly correlated with population distribution and economic activity. This service is consequently quite evenly spread over the Community's territory, although a bigger concentration is observed in urbanised and more industrialised areas.

A glance at the country breakdown gives evidence of the preponderance of the European major economies as the largest employers in EC's business services sector. The United Kingdom is the largest employer, with 1.7 million employees in 1991, or 28.6% of EC's employment (excluding Italy). Such figures witness the peculiar structure of the British business services sector: the largest companies operating in business services are indeed primarily British-owned. This is particularly true in the legal services sector, where, contrary to any other Member State but Netherlands, law firms in the UK employ hundreds of lawyers.

Along with these differences in the size of the workforce, there are considerable differences in market growth between Member States. These differences mainly reflect the large variety of industrial market organisation that can be observed in the different Member States. With this respect, EC's southern countries have posted more rapid expansion in the second half of the eighties than the Big Four economies, in line with the process of integration of these economies in the European Community.

OUTLOOK

In the future, quality of service will constitute a key asset for companies to increase their market positioning.

For the time being, strategic alliances and mergers and acquisitions involving companies from different Member States are not very numerous. In the future, however, an acceleration of this concentration is foreseeable, thanks to the increased integration of EC's business services practices, and to the facilitation of the movement of services by the development of international communication and information networks.

As customers of the business services sector get progressively out of the depression, the performance of the sector is likely to strengthen over the coming years, leading to a further increase in employment.

Written by: DRI Europe

Advertising and direct marketing

NACE 838

Due to the deep recession in most EC countries, the growth of expenditures in both advertising and direct marketing slowed down in 1992. Nevertheless, growth was sustained although at a much lower rate than in the buoyant 1980s. Advertising expenditure as a percentage of GNP is still much lower in the EC than in the USA, which suggests that the sector has a substantial growth potential. The importance of direct marketing in total marketing communications' activities is increasing. Direct marketing techniques are replacing direct selling by sales representatives in some cases. New telecommunication and data processing systems have added to the effectiveness and application possibilities of direct marketing. In response to these new opportunities and to the demand of their clients, advertising agencies are expanding into direct marketing activities, often by acquiring an established direct marketing agency.

INDUSTRY PROFILE

Description of the sector

Advertising and direct marketing is classified under section 838 of NACE, called advertising. The turnover of the sector is approximately 75 billion ECU in 1992. This means it is one of the most important service sectors in the EC. Advertising accounted for approximately 64% of turnover, direct marketing for 36%. Both professions have one thing in common: an ability to deliver vital information effectively. The sector is engaged in communications services that promote ideas, goods and services.

Advertising

Advertising is the persuasive process by which users for goods, services or ideas are found through paid-for communications' media. It is an image oriented support for branded products. Its aim is to give the advertised product extra value over alternate products. Advertisements should be eye-catching, because people assimilate advertising messages in the same way as other information, both consciously and unconsciously. This is the reason why advertisements are placed in the main mass media: television, radio, cinema, newspapers, magazines, periodicals, outdoor.

Direct marketing

Direct marketing is a general term to describe a wide selection of techniques, using various media, that requires a direct response from the consumer (either the individual or business to business). Direct marketing can be used to sell products directly from distributors or producers to elicit information, promote ideas and information or to elicit funds for non-profit bodies, such as charities. In most cases, it seeks a measurable response from the consumer. Direct marketing techniques have been popular for some time in America, an recent elections in the USA have proved its potential both as a means to encourage funding of parties or candidates and to stimulate voting for candidates.

The main direct marketing techniques are: direct mail (mail order catalogues, addressed and unaddressed mail); direct response advertising in the printed press, broadcasting, including teleshopping systems and other mass media (cinema, outdoor and transport); marketing by telecommunications (telephone or fax); and interactive videotext (such as the French Minitel system).

Direct mail is estimated to generate 400 billion ECU of sales within the EC. No measurement of sales has been made for other forms of direct mail, however, the increase in their use would indicate that they are effective. Because they provide the user with a measurable response rate, they are ideal for product testing and for small and medium sized businesses which cannot afford expensive distribution systems.

Recent trends

Despite recessions in most EC countries preliminary estimates for 1992 show a slow growth of the total expenditure on advertising and direct marketing since 1991. Employment in 1992 was only marginally higher than 1991.

Advertising

Advertising agencies define turnover or 'billings' in terms of the amount of money they spend with the media on their clients' behalf. Normally the gross earnings are fixed as 15% of the turnover. The mass media with the highest billings by advertising agencies are newspapers and television. Both media together hold more than two thirds of the total advertising expenditure. Television is the only sector which expanded its share of total advertising expenditure in all mass media since

Table 1: Advertising and direct marketing
Advertising expenditure in Europe in current prices

(million ECU)	1981	1991	1992
Belgique/BelgiëLuxembourg	400	950	925
Danmark (1)	428	843	817
BR Deutschland	5 334	12 811	13 517
Hellas	105	387	564
España	974	6 012	7 777
France	2 857	7 040	7 135
Ireland	137	365	406
Italia	1 446	5 589	5 858
Nederland	1 157	2 118	2 305
Portugal	59	412	539
United Kingdom	5 024	8 936	8 722
EC	17 921	45 464	48 567
USA	625	56 694	56 303
Japan	8 477	23 424	22 670

(1) Figure estimated for 1992
Source: EAAA

Table 2: Advertising and direct marketing
Final adjusted total expenditure on direct marketing, 1992

(million ECU)	Mailings	Direct advertising	Telemarketing/ Others	Total
Belgique/België/Luxembourg	200	190	50	440
Danmark	630	100	80	810
BR Deutschland	5 190	3 170	1 440	9 800
Hellas	10	60	10	80
España	480	1 170	4	1 690
France	3 500	410	1 080	4 990
Ireland	20	40	10	70
Italia	1320	1 370	190	2 880
Nederland	1 260	310	1 010	2 580
Portugal	10	60	10	80
United Kingdom	1 350	1 850	140	3 340
EC	13 970	8 730	4 060	26 760

Source: EDMA

1990. The billings per employee and year in advertising services are between 0.4 and 1 million ECU. Employment marginally increased from 1991 to 1992. Most of the bigger agencies expanded their staff. Roughly 10% to 15% of the total workforce is self-employed. Usually they are photographers, illustrators, designers, copywriters and translators. Average wage cost are higher in advertising than in direct marketing because more specialised people are working in advertising.

Direct marketing

Direct marketing is traditionally less expensive than mass media advertising because the creative and production costs are smaller. The importance of direct marketing will also increase as its customers have access to new electronic media such as E-mail, teletext, Minitel and other telecommunication systems. Direct mail accounted for more than 52% and direct response advertising for more than 32% of the total expenditure on direct marketing

Telemarketing accounted for less than 15% of the total direct marketing expenditure in 1992, because it is the most expensive form of direct marketing. Expenditure per capita on direct marketing in 1992 was only 56% of that in advertising, however, it should be noted that direct response advertising in the mass media (broadcasting, press, etc.) is double counted (i.e. calculated for both direct marketing and for media advertising). An increasing volume of direct marketing operations is included in the advertising sector, where direct marketing is replacing more expensive salesperson promotion.

International comparison

Since 1981 the EC shortened the gap in advertising investment compared with the United States. In 1981 the EC advertising expenditure was only 50% of the USA's expenditure for advertising. Due to exchange rate variations and the recession during the eighties, the EC was able to reach 85% of the US expenditure in 1992. The largest medium in the United States in 1992 was television with a 35% share of total expenditure.

Japan saw a fourfold increase from 1981 to 1991. But in 1992 expenditures fell more than 3%. The most important mass medium is still television. In relation to the GDP, Japan has a smaller advertising expenditure than the United States and the EC.

In Europe, Germany held the first rank in total advertising expenditure in 1992, followed by the United Kingdom, France and Spain. Concerning the expenditure per person, Greece is in the top position. Second are Denmark and Portugal. It is interesting to note that the importance of the mass media

Table 3: Advertising and direct marketing
Advertising expenditure per capita

(current prices, ECU)	1980	1985	1990	1991	1992
Belgique/België/Luxembourg	36.4	51.0	89.9	91.4	88.8
Danmark	71.8	111.5	175.0	163.6	158.0
BR Deutschland	79.4	123.1	129.2	123.4	124.4
Hellas	6.4	12.3	141.3	160.5	167.8
España	19.7	43.7	32.6	37.6	54.8
France	41.5	71.9	101.5	103.5	114.5
Ireland	37.8	46.6	91.5	97.9	101.4
Italia	17.5	45.9	140.8	140.6	151.9
Nederland	73.7	91.0	32.3	42.0	54.7
Portugal	3.8	7.7	136.9	154.1	199.0
United Kingdom	68.0	117.7	160.6	155.0	150.8
EC	46.2	78.5	125.9	131.8	139.9
USA (1)	102.5	307.2	230.6	224.4	220.7
Japan (1)	47.3	112.7	167.7	189.0	182.5

(1) Estimated figures for 1992
Source: EAAA

Table 4: Advertising and direct marketing. Comparison of expenditure per capita, 1992

(current prices, ECU)	Advertising	Direct marketing
Belgique/België/Luxembourg	96	44
Danmark	168	156
BR Deutschland	124	123
Hellas	176	7
España	48	43
France	115	88
Ireland	103	19
Italia	157	50
Nederland	54	171
Portugal	158	8
United Kingdom	151	58
EC	138	78

Source: EAAA, EDMA

varies enormously across the EC. Magazines are the most important medium in France, newspapers in Denmark and Ireland, and television in Greece and Italy.

Within the EC, Germany has the largest direct advertising expenditure, followed by France, the United Kingdom and Italy. The ranking of direct marketing expenditure per head is led by the Netherlands and Denmark.

MARKET FORCES

Demand

Advertising

The major products advertised are consumer products of the food and non-food sectors. The most important are: alcoholic drinks, food and beverages, baby care products, cosmetics, pharmaceuticals, tobacco products, sanitary products, toiletry goods, motor vehicles and car accessories as well as financial services.

Very few large international companies run their own advertising department. Most large companies working on a national and international level use advertising agencies. Advertising also plays an important role in promoting retail outlets.

Small and medium sized enterprises often cannot afford organised advertising campaigns. Their clients are usually located in the vicinity and they often advertise by conducting direct mail campaigns. But the increase of local TV and radio stations will probably induce more local advertising campaigns by medium and small sized enterprises.

Direct marketing

Direct marketing helps promote customer loyalty and supports sales activities It is a major means of providing sales promotion to the customer. Direct marketing is also extremely popular for local enterprises, and allows local retailers, service providers and producers to contact consumers directly by means of addressed or unaddressed mail, free newspapers and local newspapers, radio, local television and cable systems or by telephone marketing. Direct marketing is designed either by advertising agencies or in-house by the advertiser. Most telephone marketing is done in-house, although use of telemarketing agencies is increasing, bringing with it a professionalism of service and effective measurement data.

In larger enterprises and smaller chain stores, direct marketing is mostly conducted on a 'do-it-yourself' basis. This means the firms are using in house specialists. Smaller enterprises hire direct marketing agencies more often. Lately, direct marketing is increasingly replacing direct personal contact with the clients and demand for direct marketing services is increasing as a result.

Supply and competition

Within the EC, no regulatory barriers to starting an advertising or direct marketing agency exist. However, newcomers face difficulties entering the market, because client loyalty is one of the most important conditions for a good cooperation. Consequently, the market is dominated by large agencies, which often have worked for their clients for more than a decade. International companies mainly choose a single agency that has local offices in various regions for all campaigns. Small or new agencies accept lower profit margins to be more competitive.

Direct marketing should benefit most from the completion of the single market. Not only should small and medium sized enterprise be able to overcome the problems of setting up outlets in the regions or countries in which they identify their potential customers, but also overhead costs in terms of labour, printing, production, fulfilment of orders and media costs (post or telephone) can be reduced by using one country as a base rather than another. Unfortunately, these benefits are often

Table 5: Advertising direct marketing
Advertising expenditure as a percentage of GDP (at market prices)

(%)	1980	1985	1990	1991	1992
Belgique/België/Luxembourg	0.48	0.49	0.59	0.57	0.53
Danmark (1)	0.95	1.24	0.88	0.80	0.74
BR Deutschland	0.88	0.83	0.96	1.01	0.99
Hellas	0.30	0.91	0.63	0.68	0.92
España	0.63	0.86	1.38	1.41	1.72
France	0.48	0.57	0.78	0.73	0.69
Ireland	0.78	0.67	1.05	1.04	1.07
Italia	0.37	0.49	0.61	0.60	0.61
Nederland	1.01	0.83	0.95	0.90	0.93
Portugal	0.22	0.34	0.68	0.74	0.83
United Kingdom	1.11	1.11	1.21	1.10	1.07
EC	0.73	0.77	0.91	0.90	0.91
USA	1.32	1.45	1.34	1.25	1.24
Japan	0.73	0.78	0.90	0.87	0.80

(1) Figure estimated for 1992
Source: EAAA

Table 6: Advertising and direct marketing
Distribution of total advertising expenditure by media, 1992

(%)	Press		TV	Radio	Cinema	Outdoor	Total
	Newspapers	Magazines					
Belgique/België/Luxembourg (1)	35.4	18.5	27.4	5.0	1.1	12.6	100.0
Danmark (1)	63.3	15.2	16.9	1.7	0.7	2.3	100.0
BR Deutschland	51.8	21.9	17.8	4.0	1.0	3.5	100.0
Hellas (1)	17.4	21.3	54.2	3.5	N/A	3.6	100.0
España (1)	37.8	14.6	30.3	10.7	0.9	5.9	100.0
France	24.9	26.4	29.3	6.9	0.7	11.9	100.0
Ireland	64.4	3.9	20.4	6.8	0.3	4.2	100.0
Italia	26.5	22.1	46.7	1.3	N/A	3.4	100.0
Nederland (1)	49.7	25.0	14.0	2.3	0.4	8.6	100.0
Portugal	29.2	13.4	42.6	7.3	N/A	7.5	100.0
United Kingdom	43.5	17.4	32.9	2.2	0.6	3.5	100.0
EC	40.6	20.6	28.1	4.6	0.7	5.5	100.0
USA	39.9	13.1	35.0	10.8	N/A	1.1	100.0
Japan	31.1	9.3	38.6	5.7	N/A	15.2	100.0

(1) Estimated figures
Source: EAAA

not available in practice. Postal regulations prevent companies from choosing the cheapest country to produce in, fulfil or mail from. Data protection and other national rules have also retarded the use of the single market. Except for business to business, there is little cross-frontier direct marketing except between the United Kingdom and Ireland, and Belgium and Luxembourg.

International competition between direct marketers is determined by differences in standards and costs, especially labour costs, between the various countries. Therefore, high volume printing tends to be produced in countries with the lowest production costs. Direct mail is often mailed from countries with lower tariffs. This offers a chance to freight and courier companies to enter the delivery market because they charge a calculated price depending on their costs, and not a fixed fee for each service like the national public postal services.

Production process

Closer international relations support an increasing number of international newspapers and magazines that are targeting larger international audiences. Electronic printing methods allow simultaneous publication in several countries.

The media for direct marketing are either telecommunication channels, the printed press, broadcasting or the public postal service. Modern computer networks automate the direct marketing process and the production and dissemination of inserts, flyers, catalogues, etc.. Consumer databases help to target the potential consumers.

INDUSTRY STRUCTURE

Companies

The sector is dominated by large advertising agencies, which include direct marketing services as well. Within the EC, 15 agencies have more than 1 500 employees. All of them are working on an international level. But there are still a lot of small to medium sized enterprises that are mainly serving regional markets.

Since 1990, the list of the most important companies has not changed much. If companies expanded, this was mainly caused by acquisitions and not by organic growth. The European top 20 agencies is still headed by Euro RSCG (F) with the greatest number of employees and the greatest gross income by equity. BDDO (UK) rose from 8th to 5th place, BSB (UK) from 10 to 7 and Saatchi & Saatchi (UK) fell from 4th to 8th place between 1990 and 1992.

Strategies

Advertising agencies are increasingly expanding into direct marketing because their clients are seeking to pinpoint their targets. For these jobs, they often acquire established direct marketing agencies. Running an advertising agency is not a capital intensive business. Human capital, in the form of a marketing, creative and media experts, is the essential asset. This differs slightly from direct marketing where computer technology and other expensive technical equipment is the main asset. A desire to increase efficiency and reduce costs is also reducing the environmental impact of direct marketing.

Table 7: Advertising and direct marketing
European advertising expenditure by media

	(million ECU)				% of total held by each medium			
	1980	1990	1991	1992 (1)	1980	1990	1991	1992 (1)
Newspapers	6 531	17 932	18 596	19 386	43.5	41.4	40.9	40.6
Magazines	4 020	9 739	9 663	9 819	26.8	22.5	21.3	20.6
TV	2 662	10 964	12 328	13 413	17.7	25.3	27.1	28.1
Radio	690	2 036	2 097	2 188	4.6	4.7	4.6	4.6
Cinema	153	298	306	316	1.0	0.7	0.7	0.7
Outdoor/Transport	945	2 373	2 476	2 63	76.3	5.5	5.4	5.5

(1) Figures for 1992 are estimated
Source: EAAA

Table 8: Advertising and direct marketing
Employment in major agencies

	1991 (1)		1992 (2)	
Belgique/Luxembourg	Top 50	2 200	Top 50	2 000
Danmark	Top 90	2 000	Top 83	1 896
BR Deutschland	Top 50	9 901	Top 50	9 715
Hellas	Top 20	850	Top 20	1 192
España	Top 10	1 486		
France	Top 30	4 878	Top 30	4 732
Ireland	Top 38	850	Top 38	810
Italia	Top 67	4 357	Top 58	4 167
Nederland	Top 35	2 229	Top 35	2 164
Portugal	Top 62	1 128		
United Kingdom	13 000	12 000		

(1) 245 agencies
(2) 241 agencies
Source: EAAA

The sector tries to lower costs through the prevention of waste and the use of recycled material. In this context, more attention is given to the timing and the targeting of direct mailing. This means mailings are only sent out if they are likely to be of interest to the recipient and not discarded right away.

REGULATIONS

Regulations affect advertising and direct marketing to an important extent. Regulations still vary from country to country. Most Member States have self-regulatory as well as regulatory standards and various forms of codes of conduct.

Table 9: Advertising and direct marketing
Top 25 advertising agencies by billings in the EC, 1992

(million ECU)	Billings by equity	Gross income by equity
Euro RSCG	4 125	775
Publicicis FCB	2 886	560
McCann-Erickson Worldwide	2 147	418
Young & Rubicam	1 975	372
Backer Spielvogel Bates	1 749	340
Saatchi & Saatchi Advertising	1 799	335
Ogilvy & Mather Worldwide	1 800	324
Lintas : worldwide	1 664	324
J. Walter Thompson Co.	2 407	322
Grey Advertising	1 625	312
DDB Needham Worldwide	1 637	297
BBDO Worldwide	1 414	263
D'Arcy Masius Benton & Bowies	1 476	252
BDDP Worldwide	997	214
Leo Burnett Co.	890	173
Lowe Group	859	167
N W Ayer	529	96
TBWA	532	95
FCA Group	441	76
Armando Testa Group	431	73
GGK International	382	73
Alliance International (Lopex)	250	49
Gold Greenless Trott	265	47
Bozell	189	32
Conquest Europe	194	25

Source: EAAA

Since TV broadcasting has been deregulated and a lot of private channels compete for advertising clients, TV advertising has expanded enormously in some EC countries.

At present, European directives exist on misleading advertising, pharmaceuticals, baby foods and food advertising. There are also advertising-related rules on various other product sectors, often related to labelling, such as alcohol, agricultural products, footwear, household appliances, financial services. Other notable EC regulations include credit, public procurement, copyrights, broadcasting, product safety, product liability, etc.

At present, a wide variety of EC initiatives of relevance to both advertising and direct marketing are in the process of being considered. These include tobacco advertising, comparative advertising, guarantees and after-sales services, time-sharing and claims in the advertising of foods.

Direct marketing has attracted considerable attention from the EC recently and has a variety of directives of relevance presently being considered, including data protection, data protection in the telecommunications sector, distance selling, environmental packaging waste and database protection.

The EC is currently preparing a discussion (green) paper on commercial communications which is intended to take stock of both national and European regulations for all forms of marketing communications, and propose a policy for the future.

OUTLOOK

The tendency towards cooperation between advertising and direct marketing companies will positively influence the total expenditure on advertising and direct marketing. In the near future increasing competition between clients for market share will keep the turnover of advertising and direct marketing agencies on a high level. New broadcasting channels will offer new markets for the advertising business.

Direct marketing is, for the most part, data driven. New media will increase its potential. The telephone, in particular, is becoming an important means of communications for direct marketing, however its development will depend on EC regulations. A European freephone number, ISDN (Integrated Systems Digital Networks), DNIS (Dialling Number Identity System), ANI (Automatic Number Identification) and ACD (Alphabetic Call Distribution) open many new possibilities for direct marketing strategies. But, these new technologies will also increase the costs of direct marketing agencies.

Table 10: Advertising and direct marketing
Europe's top advertising agency networks, 1992

Rank	Agency	Gross income by equity (million ECU)	Number of employees
1	Euro RSCG	597.4	6 250
2	Publicis FCB	431.7	4 013
3	McCann Erickson Worldwide	322.0	3 437
4	Young & Rubicam	286.7	N/A
5	BSB Worldwide	261.6	2 225
6	Saatchi & Saatchi Worldwide	258.7	2 262
7	Ogilvy & Mather	249.6	2 272
8	Lintas Worldwide	249.5	2 459
9	JWT Europe	247.9	1 812
10	Grey Advertising	240.5	2 937
11	DDB Needham Worldwide	228.5	2 000+
12	BBDO Worldwide	202.9	2 237
13	DMB&B	193.8	2 001
14	BDDP	164.8	1 800
15	Leo Burnett	133.5	1 501
16	Lowe Group	128.9	930
17	NW Ayer	74.3	580
18	TBWA	73.6	653
19	FCA Group	58.8	600
20	Armando Testa Group	56.47	N/A

Source: EAAA/Advertising Age/Media Marketing Group

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World Federation of Advertisers. Address: rue des Colonies 18-24 bte 6, B-1000 Brussels; tel: (32 2) 502 5740; fax (32 2) 502 5666;
European Direct Marketing Association (EDMA). Address: 36 rue du Gouvernement Provisoire, B - 1000 Brussels; tel: (32 2) 217 6309; fax: (32 2) 217 6985;
Federation of European Direct Marketing. Address: place des Chasseurs Ardennais 20, B-1040 Brussels; tel: (32 2) 735 2252; fax: (32 2) 735 4948; and
European Advertising Tripartite. Address: avenue de Tervueren 267, B-1150 Brussels; tel: (32 2) 779 2130; fax: (32 2) 779 8980.

Public relations
NACE 838

Today a growing number of companies, organisations, public institutions and bodies are using public relations as an efficient technique of global communications towards the public opinion in general, specific targets related to a company or its products and services and the media.
In 1992, the number of public relations agencies and public relations firms decreased while the number of consultants increased. United Kingdom had the highest public relations turnover and also the highest number of public relations consultants within the EC. Germany, in both cases, was in second place.

INDUSTRY PROFILE

Description of the sector

At the end of the second World War the public relations sector started to develop in Europe in parallel with the re-establishment of democracy in politics and in social life.

The main objective of public relations is to establish and develop appropriate relation systems between a company (or organisation), its products or services and the public or other interested parties, according to the companies' target.

A relation system handles to gain, maintain and develop public confidence and acceptance of a company, its products or services.

In order to establish this appropriate relation system, public relations use their own methodologies which refer to the entire company's communication system.

Public relations can be considered as the combination of different, but not separable, elements as the application of Human sciences to individuals, a strong behaviour ethics, the analysis of the communication channels in a global network and the knowledge of technical elements related to the interests and the needs of the public.

The key publics, which are the key issues of the public relations profession, may be listed as follows: Consumers, traders, suppliers, shareholders, company managers, company personnel, competitors, local community, government authorities or officials, public servants, public bodies, media, unions, environmental groups and so forth.

From a technical point of view a public relations practitioner should have the professional skills to handle corporate communication, community relations, internal/employees communication, consumer relations, media relations, public affairs, financial relations, environmental issues, sponsorship, product publicity, house publications and audio-visual, special events, institutional advertising and crisis management.

The number of public relations agencies and consultancy firms has considerably grown in many European countries with a reduction of the number of public relations practitioners who operated as individual consultants. This is due to the need of better facing a more sophisticated and articulated service request by the client, but also the great difficulties that public relations consultants incur by working alone at high costs for the office, the organisation, the personnel, etc.

Very often, all over Europe, the responsibility for managing public relations in a company or in a public institution is shared between in-house practitioners that are public relations officers, and outside consultants, in order to merge their respective professional skills to face different issues and publics.

Public relations professionals are divided between those who are employed by and handle the public relations programs of a company, organisation or public institution by public relations agency or consulting firm and offer their services to a variety of clients.

The jobs in the public relations sector are equally shared between women and men who are 51% and 49% respectively.

Recent trends

CERP is a professional organisation to which belong professional public relations Associations representing 17 European countries with a total of 15 789 full members who are in-house public relations practitioners or individual consultants.

According to CERP's European 1992 public relations survey, the total public relations investments in the twelve EC countries were estimated to 5.3 billion ECU while the figure amounted

Table 1: Public relations
Number of consultants

	1991				1992			
	PR agencies consultants employed	PR firms consultants employed	Individual consultants	Total PR consultants	PR agencies consultants employed	PR firms consultants employed	Individual consultants	Total PR consultants
Belgique/België	135	60	25	220	87	69	86	242
Danmark	45	30	150	225	39	63	140	242
BR Deutschland	120	1 100	1 630	2 850	105	1 068	3 663	4 836
Hellas	20	25	15	60	20	30	22	72
España	75	120	30	225	96	213	263	572
France	120	380	2 875	3 375	180	533	1 320	2 033
Ireland	60	25	140	225	105	53	59	217
Italia	135	500	1 830	2 465	225	346	1 817	2 388
Luxembourg	N/A	N/A	N/A	N/A	15	10	5	30
Nederland	150	180	723	1 053	303	350	481	1 134
Portugal	30	40	115	185	30	40	113	183
United Kingdom	210	1 900	3 340	5 450	459	1 241	5 260	6 960
EC (1)	1 100	4 360	10 873	16 333	1 664	4 016	13 229	18 909

(1) Excluding Luxembourg 1991
Source: CERP

Table 2: Public relations
Public relations agencies and public relations firms

	1991			1992		
	PR agencies	PR firms	Total	PR agencies	PR firms	Total
Belgique/België	45	60	105	29	69	98
Danmark	15	30	45	13	63	76
BR Deutschland	40	1 100	1 140	35	1 068	1 103
Hellas	10	25	35	10	30	40
España	25	120	145	32	213	245
France	40	380	420	60	533	593
Ireland	20	25	45	35	53	88
Italia	45	500	545	75	346	421
Luxembourg	N/A	N/A	N/A	5	10	15
Nederland	50	180	230	101	350	451
Portugal	10	40	50	10	40	50
United Kingdom	70	1 900	1 970	153	1 241	1 394
EC (1)	370	4 360	4 730	558	4 016	4 574

(1) Excluding Luxembourg 1991
Source: CERP

to 6.2 billion ECU in 1991. This 15% decrease confirms that the recession of the economy is also affecting the service sector, as well as the public relations sector.

Considering the public relations consultancy sector only, a total of 16 333 individual consultants did their job in 1991, while in 1992 18 909 consultants resulted to serve their clients in the twelve EC countries.

Therefore more professionals are active within the public relations sector, but in the same period the total investment has been reduced with more marked reduction of consultancy fees granted to each individual.

The same investment reduction affecting the public relations sector is stronger in advertising and sponsoring all over Europe.

The above situation shows that when there is economic crisis or recession in some European countries, companies reduce communication investments in parallel with their own minor capability to develop the business in the respective market.

INDUSTRY STRUCTURE

The current situation

A common standard, accepted and applied in all European countries, considers only the turnover from consultancy fees related to a time sheet, with different level of fees according to the various positions of consultants working for a client (for instance the project coordinator, the Executive Project Head, Clients Account, Media Specialists, Executive Assistants and so forth). Therefore, in keeping with the previous criteria, the 1992 CERP survey considered the consultancy fees and not the operational costs related to the execution of a public relations program, which are not included in the public relations turnover. This aspect must be particularly stressed, as it is really different from other professional activities conducted within the communication area, such as advertising and sales promotion.

The public relations consultancy sector is made up of public relations agencies, public relations firms and individual consultants.

A public relations agency is normally a registered firm, a small company formed and managed by some consultants providing companies and organisations with full service in public relations. A public relations agency consists of a group of consultants, on average from a minimum of 3 to a maximum of 10, assisted by executive and secretarial support, handling for instance public relations services in specialised areas as media relations, public affairs, sponsorship, in-house publications and so on, but not covering the whole of the issues and publics related to the global corporate communication.

The individual consultants normally provide their professional service in two different ways:

- some of them operate on an annual contract basis for two or three clients covering a very wide part of the whole client's communication needs;
- other operate on the basis of contracts related to specific short term public relations projects referred to single issues, public and client needs.

All above considerations are today generally applicable to the twelve EC countries, even if the development of the public relations sector is not consolidated due to the different economical and social conditions and to the fact that public relations firstly started to be considered as a separate profession in some countries, as in the United Kingdom, France, Belgium, Germany, The Netherlands and Italy.

Only in the last twenty years a certain consolidation has been achieved in all the twelve countries through professional National Associations and CERP itself.

In 1992, in the EC countries, the number of the public relations agencies and public relations firms amounted to 4 016 with a 15% decrease in comparison with the 4 730 public relations agencies and firms estimated in 1991.

In the meantime, the number of consultants employed in public relations agencies and firms in 1992, increased 4% and reached then 5 680.

As far as the turnover of public relations agencies and firms is concerned, an amount of 489 million ECU was estimated for the twelve EC countries with a reduction in comparison with the 512.5 million ECU in the previous year.

The situation is improving for individual consultants, as the data showed an increase of their number and their respective fees were estimated to 1.16 billion ECU compared to the 953 million ECU in 1991.

The total consultancy fee turnover of the public relations sector was estimated to 1.46 billion ECU in 1991.

Public relations consultancy is strictly connected with the same sector directly handled by in-house practitioners and therefore it is important to note that CERP's survey evaluated 28 911

Table 3: Public relations
Number of enterprises, turnover and consultants employed

	1991			1992		
	Number of enterprises	Turnover (million ECU)	Consultants employed	Number of enterprises	Turnover (million ECU)	Consultants employed
Belgique/België	105	18.0	195	98	12.2	156
Danmark	45	4.9	75	76	7.9	102
BR Deutschland	1 140	119.5	1 220	1 103	121.9	1 173
Hellas	35	1.9	45	40	2.0	50
España	145	15.7	195	245	20.4	309
France	420	31.9	500	593	48.2	713
Ireland	45	11.0	85	88	26.5	158
Italia	545	53.3	635	421	41.6	571
Luxembourg	N/A	N/A	N/A	15	0.9	25
Nederland	230	28.4	330	451	54.5	653
Portugal	50	N/A	70	50	N/A	70
United Kingdom	1 970	227.9	2 110	1 394	152.8	1 700
EC (1)	4 730	512.5	5 460	4 574	488.9	5 680

(1) Excluding Luxembourg 1991, and turnover for Portugal 1991-1992
Source: CERP

Table 4: Public relations
Consultancy fees turnover

(million ECU)	1991	1992
PR agencies and PR firms fees	512.5	489.1
Individual consultants fees	952.9	1 161.5
Total consultancy fees turnover	1 465.4	1 650.6

Source: CERP

public relations officers working as a company or organisation employees in the twelve EC countries, with a modest increase in comparison with the 28 507 in the previous year.

A classification of the EC countries with the highest public relations turnover assigns the first place to the UK (153 million ECU), the second place to the BR Deutschland (122 million ECU), the third place to The Netherlands (54 million ECU), the fourth place to France (48 million ECU) and the fifth place to Italy (42 million ECU).

For the number of the public relations consultants, including those operating for public relations agencies, firms and individuals, the first country is the United Kingdom again (6 960), the second is BR Deutschland (4 836), the third is Italy (2 388), the fourth is France (2 033) and the fifth is The Netherlands (1 134).

Table 5: Public relations
Public relation professionals

	1991			1992		
	Consultants	PR officers	Total	Consultants	PR officers	Total
Belgique / België	220	480	700	242	378	620
Danmark	225	575	800	242	858	1 100
BR Deutschland	2 850	7 350	10 200	4 836	3 317	5 350
Hellas	60	360	420	72	578	650
España	225	1 025	1 250	572	1 628	2 200
France	3 375	4 125	7 500	2 033	3 317	5 350
Ireland	225	75	300	225	75	300
Italia	2 465	2 785	5 250	2 388	2 692	5 080
Luxembourg	N/A	N/A	60	30	120	150
Nederland	1 053	2 847	3 900	1 134	3 066	4 200
Portugal	185	1 035	1 220	183	1 037	1 220
United Kingdom	5 450	7 850	13 300	6 960	7 540	14 500
EC	16 333	28 507	44 900	18 909	28 911	47 820
Austria	N/A	N/A	250	413	1 087	1 500
Cyprus	N/A	N/A	60	16	64	80
Finland	350	1 600	1 950	306	1 394	1 700
Sweden	1 440	2 160	3 600	1 374	1 976	3 350
Switzerland	600	1 400	2 000	574	1 276	1 850

Source: CERP

Table 6: Public relations
Public relation professionals - Men and women

	1991				1992			
	Men (%)	Women (%)	Men	Women	Men (%)	Women (%)	Men	Women
Belgique / België	65	35	455	245	55	45	341	279
Danmark	58	42	464	336	56	44	616	484
BR Deutschland	60	40	6 120	4 080	53	47	6 572	5 828
Hellas	58	42	243	177	46	54	299	351
España	70	30	875	375	54	46	1 188	1 012
France	47	53	3 525	3 975	40	60	2 140	3 210
Ireland	38	62	114	186	37	63	129	221
Italia	53	47	2 783	2 467	52	48	2 642	2 438
Luxembourg	N/A	N/A	N/A	N/A	30	70	45	105
Nederland	50	50	1 950	1 950	49	51	2 058	2 142
Portugal	65	35	793	427	65	35	793	427
United Kingdom	52	48	6 916	6 384	45	55	6 525	7 975
EC (1)	54	46	24 238	20 602	49	51	23 348	24 472
Austria	N/A	N/A	N/A	N/A	55	45	825	675
Cyprus	N/A	N/A	N/A	N/A	35	65	28	52
Finland	42	58	819	1 131	40	60	680	1 020
Sweden	50	50	1 800	1 800	51	49	1 708	1 642
Switzerland	55	45	1 100	900	57	43	1 055	795

(1) Excluding Luxembourg 1991
Source: CERP

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Legal services
NACE 835

The advent of the European Union in 1993 has focused attention on a number of large-scale changes which are reflected on a much smaller scale within the legal professions. These trends are characterised firstly by a process of "harmonisation" or reconciliation and simplification of common elements; and secondly, by a recognition of the need to compete in a supra-jurisdictional marketplace. The process of simplification of the legal professions is occurring in both common law and civil law jurisdictions, both inside and outside of Europe. Over the past few years, international legal practice has been growing rapidly. Within Europe, the growth of economic integration and trade has strongly challenged the traditional jurisdictional restrictions that characterised legal practice. Multinational (also referred to as cross-border or trans-national) partnerships are permitted within the EU and function to varying degrees within a number of EU countries. These developments are likely to continue.

INDUSTRY PROFILE

Description of the sector

The legal services sector described within this report covers all professional staff working in the liberal legal professions within the states of the European Union. This report does not relate to lawyers undertaking legal work as employees of central or local government, the judiciary, the prosecution service or commerce and industry. This report was written primarily on the basis of statistics supplied by Eurostat supplemented by information held in the International Database of the Research and Policy Planning Unit of the Law Society of England and Wales.

The EC Directive to facilitate lawyers' effective exercise of freedom to provide services (77/249) included the following professions within its definition:

- Belgium: Avocat - Advocaat
- Denmark: Advokat
- Germany: Rechtsanwalt
- France: Avocat
- Greece: Dikigoros
- Ireland: Barrister, Solicitor
- Italy: Avvocato
- Luxembourg: Avocat-avoue
- Netherlands: Advocaat
- Portugal: Advogado
- Spain: Abogado
- United Kingdom: Barrister, Solicitor

Table 1 compiled from a number of sources shows the number of registered lawyers within the definition in EU member states and available data on the structure of their practices. The number of registered lawyers in some cases conceals those who may be registered but not currently practising as lawyers. For example in Greece, where there are an estimated 20 000 lawyers (not including notaries) - 14 000 of whom are located in Athens - the Athens bar association estimates that between a quarter and a third are not practising. In Spain, over 22 000 of the registered advocates are non-practising.

In addition to the above, the analysis in this chapter includes the work of notaries, where appropriate, whose function is principally the preparation of deeds and legal documents. Table 2 from Eurostat shows the latest estimates for the number of notaries and their practices in the European Union.

The services provided by the legal professions - described as "lawyers" within this chapter - fall within the following general categories:

- negotiation on behalf of a client;
- the preparation of legal documents;
- legal advice; and

Table 1: Legal services
Registered lawyers and structure of practice, 1993

	Total number of registered lawyers	Number of lawyers per 10 000 population (1)	Number of groups of lawyers (2)	Average number of professionals per group	Individual practice	Average number of employees per lawyer
Belgique/België	10 090	12 (3)	600	6.0	6 500	1.0
Danmark	3 852	7	718	2.3	931	2.9
BR Deutschland	67 120	10	9 000	30.0	30 000	1.5
Hellas	24 000	23	(4)	5.0	20 000	1.0
España	84 719	15	N/A	N/A	(5)	N/A
France	30 973	6	N/A	N/A	N/A	N/A
Ireland	4 678	16	N/A	N/A	N/A	N/A
Italia	59 700	10	N/A	N/A	N/A	N/A
Luxembourg	470	13	N/A	N/A	N/A	N/A
Nederland	7 140	5	1167	5.6	947	1.2
Portugal	11 781	10	229	5.0	10 636	3.0
United Kingdom (6)	76 235	12	N/A	N/A	11 187 (7)	N/A

(1) Sources: ESSEBA and CCBE submissions by each jurisdiction as well as population data from the UK Office of Population Censures and Surveys.
(2) Firms, group, etc
(3) Lawyer density figures only relate to avocats
(4) Official law firms 9, unofficial law firms 500
(5) Vast majority
(6) Estimates from the Research and Policy Planning Unit of the Law Society of England and Wales
(7) Not including Scottish solicitors
Source: Data given by the national CCBE delegations

Table 2: Legal services
Number of notaries, notaries' offices and employees, 1992-1993

	Notaries	Notaries offices	Employees	Number of inhabitants per notary
Belgique/België	1 221	1 209	4 155	(2)
Danmark (1)	N/A	N/A	N/A	N/A
BR Deutschland	10 179 (3)	N/A	N/A	25 000 (4)
Hellas	2 800	2 800	3 000	3 500
España	2 105	2 058	8 458	19 100
France	7 551	4 735	38 353	7 691
Ireland (1)	149	149	149	N/A
Italia	4 376	4 000	24 000	10 000
Luxembourg	35	35	175	11 000
Nederland	N/A	N/A	N/A	N/A
Portugal	N/A	N/A	N/A	N/A
United Kingdom (1) (5)	27	5	92	N/A

(1) Common law countries
(2) It varies from different districts from a maximum of 1 notary for 5 000 inhabitants in small districts to a maximum of 1 notary for 9 000 inhabitants for big districts
(3) Notaries 1 563 and lawyers working as notaries 8 616
(4) Referred to the notaries
(5) Data referred within the jurisdiction of the Society of Public Notaries of London There are approx. 15 more notaries practicing in the outer London area
Source: CACE

- representation of clients before Courts, Tribunals and administrative bodies.

Within these broad categories, lawyers perform a wide variety of tasks such as:

- practising in court (civil and criminal), including preparatory advice and investigation;
- preparation and negotiation of contracts between parties;
- the purchase and sale of properties (domestic and commercial);
- company law including mergers and acquisitions;
- intellectual property law;
- consumer and social security law;
- preparation of wills and settling the estate of the deceased client;
- tax planning and investment advice;
- company formation and statutory change; and
- translations of legal documents.

It is important to note that many of these functions are also performed by legally trained professionals employed in government or commerce and industry but who fall outside our working definition of lawyer.

Recent trends

As there are no management statistics uniformly collected on the legal professions throughout the EU, it is difficult to identify with a high degree of certainty specific economic factors which have affected the providers of legal services throughout the Union.

Table 3 from Eurostat shows estimates for five European countries indicating the total gross income for legal service providers. However, gross income figures should be treated with some caution. They are at best a rough estimate of the fees paid to lawyers within a particular jurisdiction before salaries and other overheads are deducted. They are not a measure of profits or the net earnings of lawyers. They also mask a high degree of variability within jurisdictions - such as the higher overheads and costs of legal practice in urban centres like London or Paris and those of more rural practices. The figures do suggest that lawyers in Germany, Netherlands and the United Kingdom have the highest fee income, although the figures for Germany pre-date reunification.

A key factor that characterises the professions which provide legal services is that - in the absence of a distinct limit to their size (numerus clausus) - they have been growing rapidly. Figure 1 compares data from the CCBE on the numbers of registered lawyers in 1989 with figures supplied for 1993. Professional providers of legal services have increased on average by over a fifth across the EU over the last four years, with the largest individual increases in Luxembourg (from 346 avocats to 510, an increase of 32%), Portugal (30%) and Belgium (29%). In France, the 40% increase is largely attributable to the amalgamation of the legal profession of avocat with that of conseil juridique which took effect from 1 January 1992.

The advent of the European Union in 1993 as outlined in the Treaty of Maastricht has drawn attention to a chain of large-scale trends reflected on a much smaller scale within the legal professions. These trends are characterised firstly by a process of "harmonisation" or reconciliation and simplification of common elements; and secondly, by a recognition of the need to compete in a supra-jurisdictional marketplace. These two characteristics dictate a third development which is the building of international regulation to codify and structure behaviour within the new system (see Regulation section below).

The process of simplification of the legal professions is occurring in both common law and civil law jurisdictions, both inside and outside of Europe. The legal professions in England and Wales, Scotland, Germany, France, Greece and Spain have and are currently undergoing substantial structural and legislative changes. The overall effect is one of simplification and regulatory harmony. In England and Wales and in Scotland, the traditional specialisation of the profession and legal restrictions on rights of audience have been relaxed, with the first Scottish "solicitor-advocates" now beginning to practise.

Within the European member states, the question of whether the large macro-economic structural changes initiated by European institutions will or should result in a complete harmonisation of law within the European Union is one that is still

Table 3: Legal services
Total gross income

(million ECU)

Danmark (4)	325
BR Deutschland (1)	2 814
Hellas (3)	125
Nederland (2)	685
United Kingdom (5)	4 077

(1) 1987
(2) 1990
(3) 1992
(4) Approximate for 1993
(5) England and Wales 1990-1991
Source: CCBE

the focus of debate. However, there is clearly a growing awareness of a wider market for legal services outside traditional limits.

In Germany, reunification forced the pace of the re-orientation of the domestic legal market from a focus on small firms working within court-delimited practice limits to trans-local firms with up to 80 partners with offices in cities throughout Germany. This larger focus, in turn, has provided the basis for the internationalisation of the German legal profession: a number of the new trans-local firms have opened Brussels offices and then moved on to enter alliances and networks with other European law firms.

Another possibly important factor in relation to the provision of legal services has been the considerable shifts in policy toward the public funding of legal aid in a number of countries. Although many areas of the law and legal practice are becoming more European in character, legal aid appears to have remained primarily defined by national policy. Given the national parameters, no national government with the exception of France (whose expenditure prior to the 1992 reforms was one of the lowest in Europe) expects to increase central expenditure on legal aid. A common experience amongst a number of countries is that the State wishes to control the steady increase in legal aid expenditure, while legal professionals have indicated that the provision of legally-aided work is becoming increasingly un-economic for them to carry out. In some jurisdictions, legally-aided work accounts for up to 12% of the estimated gross income of the legal professions.

International comparison

Reliable data on the patterns of development of the United States and Japanese markets for legal services are also difficult to obtain as each state and the District of Columbia is considered to be an individual jurisdiction and there is little information available on Japanese lawyers in private practice.

However, preliminary analysis of the little comparative information available yields startling contrasts between the two legal markets. In 1986, there were 12 500 licensed lawyers in Japan with about 9 000 in active practise. The ratio of lawyers to population was about one practising lawyer to every 14 000 people. In the same year, there were approximately 650 000 lawyers in the United States, with an estimated 325 000 in practise; this was equivalent to one practising lawyer for every 700 Americans. In other words, there were about 20 times more practising lawyers in the United States than in Japan. Some of the available American figures are shown in Table 4 with examples of the contrasts in the number of lawyers per population in a number of individual jurisdictions.

One commentary noted that in Japan in the 1980's, when litigation was increasing in the United States and in parts of Europe, the use of litigation was both uncommon and on the decrease. However, lawyers in Japan play a different role than that played by lawyers in other civil and common law jurisdictions. They do not have a monopoly on the provision of legal services, although the license allows them to appear in court. Most of the top corporations in Japan have in-house legal departments staffed by non-licensed law graduates. A licensed lawyer would be retained only when a court appearance is necessary.

The output of law graduates from Japanese universities is high - between 65 000 and 70 000 a year. Approximately 30 000 to 35 000 per year sit the examination to continue their training to become advocates, judges or public prosecutors - less than 500 per year pass the examination. Thus, the number of lawyers in private practice is low.

Foreign trade

Over the past few years, international legal practice has been growing rapidly. However, it is important to note that international legal practice is numerically a minority undertaking in relation to the bulk of most legal work. As one commentator notes:

"Even in the American legal profession, generally characterised as the most aggressively competitive and internationalist, foreign branches contain fewer than 2 000 lawyers - or less than a quarter of a percent of the profession (and many of them are foreign qualified lawyers practising local law). The only country that even approaches that proportion is the United Kingdom. Elsewhere no more than a handful of firms have even the barest toehold outside their borders".

However, it seems clear that this is changing. In 1989 there were no foreign law firms in Spain; in 1991 there were nine representing three countries. This trend is all the more striking in a recessionary climate that has resulted in cut-backs on the expansionist impulses that characterised the 1980s; since 1989, there has been an estimated 25-30 % shrinkage in the number of American lawyers in London.

Within Europe, the growth of economic integration and trade has strongly challenged the traditional jurisdictional restrictions that characterised legal practice. Multinational (also referred to as cross-border or trans-national) partnerships are permitted within the EU and function to varying degrees within Belgium, France, the Netherlands, Spain, Denmark, Germany, Portugal, Ireland, and England and Wales. The mechanisms through which these practises function are numerous: delivery of occasional services in another country; becoming a fully integrated member of another jurisdiction's legal profession; establishing oneself in another jurisdiction but retaining only one's home state qualification; and through an association with other firms, groups, networks or through European Economic Interest Groupings (EEIGs).

Lawyers in the Netherlands have recently been the most overtly active in developing international links. A 1989 survey by the Netherlands Bar Association found that 85% of Dutch advocates had some arrangement - formal or informal - to

Table 4: Legal services
Selected data on legal services in the USA

Jurisdiction	Number of lawyers (1987)	Lawyers per 10 000
USA	666 903	28
- Washington DC	26 888	43
- California	82 646	30
- West Virginia	2 922	15

Source: The Law Society

Table 5: Legal services
Number of representations before the European Court of Justice

	1988	1989	1990	1991	1992	1993 (- Oct.)
Belgique/België	39	56	30	32	39	51
Danmark	4	6	4	2	6	19
BR Deutschland	26	41	65	43	56	1
Hellas	6	6	19	8	4	3
España	2	1	1	12	18	13
France	23	37	44	18	34	2
Ireland	1	4	8	10	11	2
Italia	19	28	12	20	26	29
Luxembourg	20	11	1	15	8	3
Nederland	9	38	14	23	13	14
Portugal	1	1	1	3	6	4
United Kingdom	26	43	33	57	55	67
EC	176	272	232	243	276	208

Source: European Court of Justice

facilitate international co-operation. The firms that seem the most successful at forming international associations or offices are those that truly international in focus. As one lawyer recently noted: "Firms that open offices abroad to practice only the law of the jurisdiction from which they originate find it difficult to make money,".

MARKET FORCES

As consistent statistics across all the member states are not collected, it is difficult to fully assess the effects of market forces on and within the legal professions through the EU.

Demand

Table 5 and Table 6 from Eurostat provide crude measures of the demand for legal services by showing the number of representations before the European Court of Justice over a period of years and the estimated number of notarial acts for 1992-93, respectively. This is only a small proportion of the advocacy and legal documentation work undertaken by the legal professions within EU jurisdictions.

Table 7 from Eurostat provides an indication of the number of legal businesses in each jurisdiction in 1990 where available and the estimated turnover in millions of ECU. These figures are also difficult to compare because of the emphasis on in-house lawyers in some jurisdictions and their inclusion in the figures (e.g. in Italy and France) and not in others (e.g. Germany).

Supply and competition

Table 8 from Eurostat provides an overview of the market share of lawyers and notaries in terms of a range of legal services in five EU member states.

In Belgium, the Belgian Order of Advocates announced a "joint declaration of rapprochement" between advocates and notaries, stating that it is advisable to allow lawyers and notaries to work together, provided clients are informed of such collaboration. A survey of Belgian advocates asked them to comment on the value of co-operation with other legal professions and yielded interesting results. Although 61% of the respondents favoured collaboration with notaries, they did not feel that such co-operation was necessary. Some advocates were concerned that there would be a loss of specialisation, possible ethical conflicts, threats to the independence of the profession and to attorney-client privilege. However, analysis of the figures in Table 8 show that in some areas of law such as property and real estate and company law including mergers and acquisitions, arrangements between notaries and advocates would result in the capture of a large proportion of the market share.

In the Netherlands, partnerships between advocates and accountants had traditionally been forbidden, however local bars now allow joint partnerships between advocates and public notaries, tax advisors and patent agents. A recent decision by the advocates' professional body recommended not to expand the existing possibilities for establishing joint or multiple partnerships to other groups, specifically banning partnerships between advocates and accountants. It felt that many areas of legal practice could be endangered by allowing partnerships with those outside of the legal profession. As in the Belgian context, co-operation between legal professionals would account for a considerable share of the domestic market for legal services.

Although not featured on the table, in Germany partnerships between attorneys performing advocacy work and patent attorneys, tax consultants/auditors, and notaries are allowed in regions which permit attorneys to be notaries. The success of this arrangement is widely attributed to a common code of ethics which protects the secrets of clients with their lawyers and accountants.

However, Germany is certainly the exception as most lawyers' professional bodies have resisted any move toward formal acceptance of partnerships between lawyers and their rivals in the foreseeable future, although some commentators maintain that there is at least some "cross-fertilisation" taking place, notably between lawyers and accountants. One commentator suggests that in its desire to control the legal work generated by an increasingly global marketplace, the legal profession throughout Europe has rebuffed any formalised co-operation with accountants. Paradoxically, lawyers in Europe are trying to learn as much as they can from accounting firms: some law firms in Spain, for example, send junior lawyers to train with accountants. This has been linked to the resulting favourable position Spanish lawyers as gaining skills necessary to a new breed of European lawyers. An interesting contrast to the Spanish image is the approach of the Italian legal profession, which traditionally shunned not only co-operation with accountants, but business matters in general as a "vulgar" dilution of the proper work of the legal profession. A number of studies maintain that one result of such a stance has been to isolate Italy's lawyers in the global marketplace for legal services, as Italian lawyers are just now struggling to come to grips with the knowledge which Italian accountants have been mastering since World War II.

Table 6: Legal services
Number of notary acts, 1992-1993

	Number of acts per country	Number of acts per 1 000 inhabitants	Number of acts by notary
Belgique/België	650 000	65	532
Danmark	N/A	N/A	N/A
BR Deutschland	N/A	N/A	N/A
Hellas	1 200 000	N/A	428
España	4 116 466 (1)	107	2043
France	4 058 259	70	540
Ireland (2)	80 000	200	250
Italia (1) (3)	5 500 000	240	2 667
Luxembourg	39 000	100	1 100
Nederland	N/A	N/A	N/A
Portugal	N/A	N/A	N/A
United Kingdom	N/A	N/A	N/A

(1) Without acts of protest bills
(2) Common law countries
(3) Without acts of transfer of vehicles
Source: CACE

The legal professions are not the only ones struggling to forge a place in the European market for professional services. Arthur Andersen, one of the "big six" accounting firms, has established a legal arm in London much the same way it has in France and Germany - by associating with a newly-created law firm which will rely on Arthur Andersen as a prime source of business.

Fees and prices

The extent to which fees for legal services are regulated is not standard between different countries. There appears to be a continuum with total control of pricing and billing for legal services on the one hand (through the profession and/or the state) and complete non-regulation on the other. The one shared element appears to be the high level of control over legal fees for cases in which the State is the indirect client, i.e. for legal aid work. Many countries fit somewhere in the middle of this range, and reviews suggest that they are far from static.

However, it can be argued that civil law jurisdictions exhibit greater level of control over fees for legal services and most European Union member states have adopted and maintain more institutional mechanisms for regulating legal costs. One result of regulating legal fees is that it achieves a level of standardisation not found in jurisdictions where lawyers are free to set their own fees. Fee standardisation is of some benefit to users of legal services because it allows for some predictability of legal expenses and affords some peace of mind on the "reasonableness" of the fees charged. The great disadvantage for users is that it does not allow for competitive pricing, and possibly reduced cost of some standardised legal services, and does not necessarily reflect the amount of work actually done by the lawyer dealing with their individual case.

Price competition has some obvious implications on the cost of legal services and the cost of justice for clients. However, it is important to note, however, that the cost of the litigation process involves more than lawyers' costs. Price competition does not apply equally across all jurisdictions as some legal professionals comply with fee scales set by government or the professional bodies, while in other jurisdictions professionals set their own prices and fees. For example in Germany, it is possible to predict fees for any type of work very near the initial consultation period which defines the nature of the matter and the level of judicial activity required. In common law countries such as the United Kingdom, charging on an hourly rate is used extensively. It is sometimes used in civil law jurisdictions for international legal work.

INDUSTRY STRUCTURE

Companies and practices

There are thirty-four legal professions within the European Union arising from the unique histories and social structures of each member state. The structure of legal professions and the limits it imposes on how lawyers work - for example what legal work they can do or where they can practise - also defines at least in part, the type of legal service which lawyers provide. As one commentator notes: "there are considerable differences between countries in the extent to which legal work is concentrated on a narrow range of functions and substantive areas or broadly diversified... Representation in court is the functional core of all legal professions, at least historically, but they differ greatly in the extent to which they have diversified into counselling, drafting, and negotiating... Within the range of functions that legal professions have carved out for themselves and defended against competing occupations there are further differences in the degree to which particular lawyers specialise".

Taking the British jurisdictions as an example, the legal profession's formal specialisation and separation into solicitors and barristers may entail the use of more than one lawyer for a single legal problem. Another example is provided by countries that operate a limited geographical or local system of jurisdiction. Again such divisions of legal functions, this time based on geography as opposed to specialism, may lead to involving more than one set of lawyers for a particular case. An obvious case is that of "localisation" in Germany which prevents individual lawyers from practising outside their court-delimited jurisdiction. Before the legalisation of trans-local firms in the last year, a "correspondence system" had evolved with two or more lawyers working on a shared case in each of their jurisdictions.

There are numerus clausa controlling the number of notaries in operation in the Latin notary countries. Notaries occupy a unique position in most of the jurisdictions in Europe of being both an independent practitioner acting solely on behalf of his/her client, as well as an official of the state from which his/her notarial power to act is derived.

Table 7: Legal services
Main indicators, 1990 (1)

	Number of enterprises employed	Turnover million ECU	Number of persons
Belgique/België	4 329	97	8 589 (3)
Danmark (4)	1 931	482	N/A
BR Deutschland	30 707	5 942	N/A
Hellas	N/A	N/A	N/A
España	19 301	N/A	57 563
France	22 294	7 583	N/A
Ireland (4)	N/A	N/A	9 316
Italia (2)	36 534	N/A	75 777
Luxembourg	202	N/A	779
Nederland	N/A	N/A	N/A
Portugal (4)	24 681	1 381	N/A
United Kingdom	17 460	9 208	N/A

(1) Including notaries
(2) 1981
(3) Number of wage and salaries earners 1987
(4) 1989
Source: Eurostat D4 (MERCURE)

Table 9 from Eurostat showing the largest 15 law firms in Europe, illustrates an important point about the traditional structure of legal practises throughout the world: the large law firm is a phenomena particular to common law jurisdictions. Of the 10 largest firms in the world, there are 7 American firms and 3 British; of the 40 largest, there are 25 American firms, 10 British, 4 Australian and 1 Canadian. However, there is evidence that a direct challenge to the common law hegemony may be emerging within Europe where of the 30 largest firms, 25 firms are British and 5 are Dutch firms.

However, size is not the best indicator of the quantity or quality of the legal services provided, it is simply the only one available. In jurisdictions with relatively low population concentrations or with smaller economic centres where large firm arrangements might not be appropriate, the legal needs of the jurisdiction could be best met by smaller collections of practitioners. For example, French notaries are acknowledged as one of the most profitable legal professions in Europe, yet their numbers and size of their practices are relatively small when compared to other legal professionals. International associations, co-operation and EEIGs as described above give smaller groups of practitioners access to the international legal marketplace. However, the economic impact of such groupings compared to that of the large firms is currently invisible due to their relative informality and the lack of any means of measuring or quantifying their effects.

REGULATIONS

EC regulation

A number of EC Directives circumscribe and define the activities of legal professionals within the European context.

One of the most basic was '[t]he Council Directive to facilitate the effective exercise by lawyers of freedom to provide services' (77/249/EEC) also known as the EC Services Directive of 1977. It requires each member state to recognise lawyers from another member state for the purpose of providing occasional services. It specifically does not address the issue of the rights of establishment or the mutual recognition of qualifications. It does allow for the right of home title and encourages lawyers to abide by local codes of conduct as well as those of his/her home state. This Directive has been implemented by all the member states.

A second Directive of importance is the EC Directive 89/48 on the Mutual Recognition of Qualifications. The so-called "Diplomas Directive" provides for full integration into the legal profession of a host member state, upon that state's recognition of home state legal qualifications. Recognition can take one of two forms: the host state may require an aptitude test, or it may subject lawyers to a waiting period before becoming fully-qualified members of the host state profession. The deadline for implementation of the Directive was 1 January 1991, but all states still have not yet implemented it into national law. As of 1 January 1992, six states had implemented the Directive: Germany, Ireland, the United Kingdom, Luxembourg, Spain and France. All have opted for an aptitude test, although the practical organisation of the tests has not yet occurred in all states. Since then, some member states have introduced legislation to implement the Directive.

In Belgium, although the Directive has not yet been implemented into Belgian law, the National Order of Advocates has accepted the temporary organisation of an aptitude test pending implementation. The Brussels French Bar adopted on 21 January 1992, a resolution organising the aptitude test given once a year, in French, Dutch or German.

Implementing legislation is under preparation in Denmark. The General Council of the Danish Society of Advocates recommends a waiting period; a lawyer from another member state must work in the profession in Denmark for three years before becoming fully qualified as a lawyer in Denmark. The Council foresees few applications from lawyers of other member states, and thus sees the preparation of an aptitude test for so few applicants of little practical value. Should the recommendation of a waiting period be adopted, Denmark will be the only member state to allow applicants to become fully qualified members of the profession without passing an aptitude test.

The Directive has been fully implemented in Greece and was transposed into Greek law by a Presidential decree. The general legal machinery for the provision of aptitude tests has been specified, however the details are not yet fully developed for the administration of tests. Current laws restricting lawyers in Greece from having foreign offices are expected to be lifted in regard to offices in EU countries.

Table 8: Legal services
Competition relations and market share in business related legal services in 5 EC Member States

(%)	Countries	Lawyers	Notaries	Legal advisers	Accoun-tants auditors	Tax accoun-tants	Patent lawyers Tax advisers	Trade-Unions/ Employers	Others (Banks, Real-Estate)
Company Law	B	25	35	30	5	-	-	-	5
Including Mergers &	DK	60	10	-	20	-	-	-	10
Acquisitions	H	79	-	-	5	16	-	-	-
	F	30	10	40	20	-	-	-	-
	NL	40	30	10	20	-	-	-	-
General Commercial	B	45	-	45	-	-	-	5	5
Law	DK	80	-	-	10	-	-	10	-
	H	92	-	-	1	7	-	-	-
	F	80	-	20	-	-	-	-	-
	NL	40	20	10	30	-	-	-	-
Fiscal Law	B	30	-	10	10	40	-	-	10
	DK	15	-	-	25	60	-	-	-
	H	79	-	-	1	20	-	-	-
	F	20	10	50	20	-	-	-	-
	NL	10	-	-	30	60	-	-	-
Social Security Law	B	40	-	10	-	-	-	50	-
	DK	60	-	-	-	-	-	40	-
	H	50	-	-	-	50	-	-	-
	F	70	-	30	-	-	-	-	-
	NL	75	-	-	-	-	-	-	25
Employment Law	B	40	-	20	-	-	-	40	-
	DK	50	-	-	-	-	-	50	-
	H	96	-	-	-	4	-	-	-
	F	70	-	30	-	-	-	-	-
	NL	45	-	5	-	-	-	20	-
Environmental Law	B	75	-	20	-	-	-	5	-
	DK	95	-	-	-	-	-	5	-
	H	100	-	-	-	-	-	-	-
	F	80	-	20	-	-	-	-	-
	NL	60	-	10	20	-	-	-	10
Competition Law	B	50	-	40	-	-	-	10	-
	DK	100	-	-	-	-	-	-	-
	H	100	-	-	-	-	-	-	-
	F	80	-	20	-	-	-	-	-
	NL	70	-	10	10	-	-	-	10
Patent - trade	B	50	-	50	-	-	-	-	-
Markt Law	DK	-	-	-	-	-	100	-	-
	H	100	-	-	-	-	-	-	-
	F	50	-	50	-	-	-	-	-
	NL	30	-	-	10	-	60	-	-
Public	B	60	-	40	-	-	-	-	-
Administration Law	DK	80	-	10	-	-	-	10	-
	H	100	-	-	-	-	-	-	-
	F	90	-	10	-	-	-	-	-
	NL	60	-	10	-	-	-	-	30
Property and	B	40	40	-	-	-	-	20	-
Real-estate	DK	10	70	-	-	-	-	-	20
	H	100	-	-	-	-	-	-	-
	F	20	70	10	-	-	-	-	-
	NL	30	50	10	-	-	-	-	10
Sea and	B	50	-	50	-	-	-	-	-
Transport Law	DK	80	-	-	-	-	-	10	10
	H	100	-	-	-	-	-	-	-
	F	70	-	30	-	-	-	-	-
	NL	70	-	20	-	-	-	-	10

Source: Estimates of the national CCBE delegations.

Table 9: Legal services
Largest 15 law firms in Europe, 1992

Law firms	Rank	Number of fee earners
Clifford Chance	1	1 122
Linklaters & Paines	2	692
Lovell White Durrant	3	599
FreshFields	4	556
Slauthter And May	5	542
Allen & Overy	6	516
Herbert Smith	7	445
Simmons & Simmons	8	444
Norton Rose	9	430
Denton Hall Burgin & Warrens	10	407
Nabarro Nathanson	11	407
Nauta Dutilh	12	345 (1)
Mckenna & Co.	13	324
Richards Butler	14	294
Dibb Lupton Broomhead	15	285

(1) Partners included
Source: Law Firms in Europe and Legal Business

The Directive was implemented in Italy on 27 January 1992, and provides for an aptitude test. However, the practical organisation of the test has not yet been arranged.

In the Netherlands, the Directive has not yet been implemented into Dutch law, however the Dutch Order of Advocates has recommended that the government require an aptitude test. Draft legislation has been promulgated to this effect, and awaits the advice of the Council of State to the government.

The general provisions for enacting the Directive have passed into Portuguese law stating a requirement for an aptitude test. However, the additional machinery for the administration of the tests has yet to be developed.

EFTA countries have been changing their laws in anticipation of accession to the Treaty. In Finland, for example, the Act of Advocates has, from early 1993, allowed lawyers from other EFTA and EU member states (which now make up the European Economic Area) to be admitted to practice in Finland. The Finnish Bar Association plans to develop an aptitude test as a requirement for admission to the Finnish Bar.

Another important development in the regulations affecting the legal professions in Europe is the Council of the Bars and Law Societies of the European Community (CCBE) draft Directive on working in another member state under home state title. Responding to the feeling that the Services and the Diplomas Directives alone do not adequately respond to the real needs of the market for international legal services in Europe, The CCBE developed a Draft Directive on Rights of Establishment for Lawyers in 1992.

The draft Directive allows a lawyer of one member state to be established in another member state under his or her home state title, without integration into the legal profession of the host member state (which would have to be acquired under the Mutual Recognition Directive 89/48), and without necessarily having the right to perform all of the activities reserved to the lawyers of the host state. Such an agreement would allow, for example, the establishment of branch offices in other member states, or setting oneself up as a "foreign law consultant" without integrating oneself fully into the host member state's profession.

The draft Directive provides that all EC lawyers have the right to be established to practice under their home title in another member state. It provides for a registration process with the competent authority of the member state in which a lawyer wishes to practice; and it provides that lawyers must practice under the professional title of the home state, not the host state. Special areas which could be reserved for host-state lawyers include conveyancing and estate administration; there could also be requirements that lawyers appear with a host state lawyer in court. Lawyers would be subject to the disciplinary authority of the host member state, but special procedures would ensure fairness and a final right of recourse to the European Court of Justice.

The draft was agreed upon by a 10-2 majority (Spain and Luxembourg opposed). Since the CCBE obtained the required majority of member states to agree, the draft has gone to the Commission. The Commission has held meetings with member state governments throughout to ensure that all approve the draft.

The draft Directive on Establishment as proposed would greatly facilitate associations between lawyers of different member states. It will allow greater numbers of lawyers to remain established in their home member states but provide legal services on a greater than occasional basis (currently all that is permitted by the Services Directive) in another member state, without having to become qualified in the host member state's legal profession.

International regulation

To cope with the issues raised by the numerous changes brought about by the developing European market for legal services, a number of supra-jurisdictional organisations have attempted to lay down some agreed ground rules to regulate the new scope of the professions. The CCBE has been at the forefront of organisations trying to address the issues and has issued an international Code of Conduct for European Community lawyers. The code recommends approaches to the regulation of fees, how to deal with lawyers belonging to more than one bar or law society by providing a "choice of law" rule.

These provisions have been adopted by most professional bodies in Europe; where the local bar has a regulatory function, the national bar has suggested the adoption or incorporation of similar rules. On a lesser scale, the International Bar Association has been working on an international code of conduct along the lines of the CCBE provisions.

In addition, one of the key negotiating groups involved in the discussions around the General Agreement on Tariffs and Trade (GATT) has been working a parallel General Agreement on Trade in Services (GATS) covering the international provision of services such as legal work. The central aim is to liberalise services by dismantling barriers and opening markets to foreign competition. GATS would set up agreed rules to regulate international transactions to ensure that, a) the GATT principles of non-discrimination against foreign providers of services were followed; b) that established foreign firms should be treated as domestic firms; and c) that the rules are published and available to all should be applied to the provision of legal services. These provisions have yet to be fully agreed and established.

As one commentator notes: "The local and regulatory framework at world-wide, community-wide, national and local levels, must continually adapt to this [growing competition] process by facilitating the changes which are necessary while maintaining essential safeguards for professional standards and the protection of the consumer."

OUTLOOK

As comparable information on the legal professions throughout the European Union is not available, it is impossible to make any concrete forecasts as to the anticipated market for legal services.

However, it most likely that the overall trend toward the growth of the legal professions throughout Europe and the increasing internationalisation of service provision will continue. One indication of the possible new forms this trend could take is embodied in a new challenge to the previously unassailable national parameters of legal aid provision. In 1993, in response to a "written question" to the European Commission by an MEP, the European Parliament resolved to investigate the establishment of a pan-European Legal Aid Bureau. The resolution has been referred to the Legal Affairs Committee of the European Parliament. The central concept underpinning the establishment of such a body would be to ensure all EU citizens equal access to national courts.

If the trends of cross-border co-operation, simplification and the creation of pan-European organisations continue, the legal professions in each jurisdiction are likely to grow and cross-border legal activity is likely to increase. Co-operation between the providers of legal services within jurisdictions as well as between jurisdictions is likely to grow rapidly over the next few years, especially within the European market.

In addition to more co-operation, another likely result is that of more direct competition on both a national and international basis. Competition on a national scale between specialist providers of legal services within jurisdictions is likely to occur as all attempt to promote themselves within an increasingly international business context. This is likely to be circumscribed by increased competition between jurisdictions as legal service providers learn from the German experience of reunification to regard legal advice as a vital export. Already this has lead to a climate of intensifying struggle between lawyers from Europe and North America for the adoption of their systems of law as the primary system to govern commercial contracts in the new markets opening in the East.

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Accountancy services
NACE 836

Accountancy services providers, like all those providing external services to businesses, experienced decreased turnover due to the general economic downturn.. The industry is dominated by several major accountancy firms: six large firms accounted for 78% of the fee income of the top 20 EC firms. There remains, however, a vast number of smaller firms providing vital, local services to small and medium sized enterprises. Despite efforts at the EC level to eliminate barriers to cross-border practice by professional accountants and accountancy firms, national differences in business and accounting practice, as well as oversight of the accountancy services industry, still prevent a truly open border situation for this sector.

INDUSTRY PROFILE

Description of the sector

"Accountancy services" is a generic description which embraces a number of services. The accountancy profession dominates most of these markets and competes with other professions on certain other markets. Consequently, there is no strict correspondence between accountancy services and the scope of practice of the accountancy profession, the latter being much wider than the former. The situation varies, however, from country to country and is still strongly affected by history. Some EC countries have a long tradition in these areas of the economy, whereas these markets are somewhat new in others.

Accounting services have long existed in Europe, but it was not until the mid 19th century that some specialists started to organise themselves on a professional basis. These developments took place in the United Kingdom which has since kept its tradition of a self regulated profession and services. As a result, the British and Irish markets are nowadays the most developed in Europe in terms of both accountancy services and the profession. Similar developments later spread through continental Europe, where the market has been organised and structured according to local traditions, with a greater use of laws and regulations.

Financial information is at the heart of accountancy services. Accurate, relevant and timely financial information has been a key success factor since the beginning of the market economy. Accountancy services have logically followed the development of the European economy, in terms of volume, variety, sophistication, etc. With the expansion of capital markets, financial information has even reached the status of a public utility. Given the many possible ways of accounting for one single economic reality, public authorities have felt it necessary to intervene in order to protect the public interest. As a result, accountancy services and the accountancy profession are heavily regulated in all EC countries, which gives a specific character to the market.

The rules and regulations governing the profession and the services it provides, have so far been developed from a national perspective in order to respond locally to national problems. It is no surprise that significant differences between the EC Member States have resulted from the process.

The range of services accountants can offer is very wide, although it can vary from country to country. It is, however, fair to state that the core activity of accountants remains centred on financial information and hence, on accountancy services. These cover mainly accounting and auditing. Accounting includes the production of financial information which involves the analysis of economic transactions, the selection of a relevant accounting treatment and some data processing or computing. Auditing consists of the expression of an objective opinion on a given set of financial information, according to a given set of standards, in order to improve the reliability of that information.

The competence developed by accountants to be able to produce, process, analyse or audit financial information can be used for other purposes, too. Hence, according to national business cultures, the activities of accountants have been expanded far beyond accountancy services. As it is, for example, not possible to produce financial statements without having properly addressed the fiscal liabilities of the enterprise, accountants have developed an expertise in the tax area. This can obviously be used outside an accountancy context. In the same way, accounting or auditing activities require a sound knowledge of the enterprise, its activities, its structures, etc. On that basis, it is easy to develop management consultancy activities, and many accountants do.

In addition to accounting and auditing, the range of services provided by accountants in most of the EC countries can be grouped into seven broad categories.

Table 1: Accountancy services
Main Indicators, 1990

	Number of enterprises	Turnover (excl.VAT) million ECU	Number of persons employed
Belgique/België	15 767	1 326	N/A
Danmark (2)	6 330	865	N/A
BR Deutschland	55 974	15 847	N/A
Hellas	N/A	N/A	N/A
España	12823	N/A	53 386
France	14 155	5 933	103 954 (1)
Ireland (1)	N/A	N/A	7 891
Italia	N/A	N/A	N/A
Luxembourg	342	N/A	1 735
Nederland	9 414	2 687	60 000
United Kingdom	17 029	6 098	N/A

(1) 1988
(2) 1989
Source: Eurostat D4 (MERCURE)

Table 2: Accountancy services
Income by major branch, 1991

(%)	Audit	Tax	Consultancy	Other	Total
Belgique/België	50	23	14	13	100
Danmark	59	12	22	7	100
BR Deutschland	51	21	27	1	100
España	54	21	22	3	100
France	58	10	18	14	100
Nederland	58	17	16	9	100
Portugal	49	13	36	2	100
United Kingdom	43	23	21	13	100

Source: European Accounting Focus

Merger audit, which consists of the expression of an objective opinion on a merger in order to guarantee fair treatment of the shareholders of all merging companies.

Contribution audit, which consists of the expression of an objective opinion on the value attributed to assets (property, inventories, trade mark, etc.) contributed by a shareholder to the capital of a company in order to guarantee a fair treatment of the other shareholders of the company.

Insolvency services consist of acting as liquidator, receiver or administrator. It may even cover advising clients on strategy before a critical or irredeemable stage is reached in its financial position.

Expert witness accountants can act as experts before most courts.

Tax advice includes tax planning or tax compliance. The former consists of advice on the application of taxation law. Tax compliance relates to the preparation and presentation of the various returns and declarations required by law, and assistance to clients in their dealings with the relevant authorities.

Investment services include advising clients on potential investments, performing financing studies or even acting as trustee.

Management consulting includes, inter alia, information technology (IT) consulting, internal control and procedures review, organisational review, etc.

This large range of services varies from country to country according to local rules and regulations. Accountants can even be prevented by law, in some countries, from offering some of these services. In France, for example, accountants cannot offer insolvency services or tax advice, except in very limited circumstances, as these activities are restricted to other professions. In other EC countries, though, accountants are leading providers of such services. As a consequence, the NACE classification of services does not correspond to the division of the market between the various professions. Therefore, only general data are so far available on turnover, number of persons employed and the number of firms of the accountancy profession, and for income of a given category of professional services offered by accountancy services.

Foreign trade

More than 35 years after the signing of the Treaty of Rome, 12 national markets still exist for accountancy services and the accountancy profession in the EC. Many factors work towards retaining the existing barriers between national markets. Four main factors work towards this reality.

- The dependence of the profession on law. Many of the activities of accountants require an extensive knowledge of law in a number of areas (accounting, tax, company law, social law, etc.). As most of these laws diverge deeply from one Member State to another, the investment necessary to bridge these differences in order to be capable to practice in another Member State remains substantial, although the professional know-how would be almost the same in a large number of cases.
- A number of services provided by accountants are supplied within a limited distance, because of the close relationship which should exist with the client. This is especially true for small and medium sized enterprise (SME) clients, which constitute the bulk of the market. Cross-border competition on these markets is very limited so far.
- The implementation of the general system of Mutual Recognition of Diplomas has not led to large movements of accountants across borders. It is estimated that only around 10 professionals benefit from the system each year. The system is indeed not designed to get rid of the existing barriers, but is rather a device helping people to establish themselves abroad despite those barriers. All initiatives taken at the EC level in the recent past have put a strong emphasis on the keeping of the current legal status quo. This is why, despite the provisions of the EC Treaty, the cross-border provision of most accountancy services and the mutual recognition of professional firms is still not possible.
- International networks of firms of accountants have long developed their own solutions. They mainly rely on locally licensed professionals to supply their services and refer the work to their corresponding members in the relevant countries, as soon as any international service is needed.

Although no figures are available on the matter, it is very likely that intra-EC trade in accountancy services remains marginal.

MARKET FORCES

Demand

Although individuals may, from time to time, use the services of accountants, the bulk of the market is accounted for by enterprises, whatever their legal form (sole practitioner, partnership or corporation) and ownership (private, public, state, etc.). Professional accountants could therefore be defined as professional advisors to the business world. The demand is potentially very wide and can be segmented according to many indicators. One is the size of a business, as the needs of sole-practitioners, SMEs and big companies are definitely not identical. Others could be the economic sector, the legal form of the business (as some legal obligations are associated with corporate forms for example), quotation on a stock exchange, etc.

As for many other markets, the scope of the demand varies with the size of the client, big multinationals requiring very

sophisticated and diversified services, and SMEs having generally more basic needs. However, it is fair to state that big companies can afford several consultants, and have strong enough internal structures to get each service from the best specialist in the area. On the contrary, SMEs appreciate that the same consultant, in whom they have "invested", can provide them with a large range of services to limit both costs and waste of time. In small firms, for example, it is frequent that the professional accountant be the sole external advisor to management.

Legal requirements oblige many companies to have their annual financial statements audited. A properly approved auditor or firm of auditors must state whether the financial statements they have audited give a "true and fair view" of the results of the company's activities and its financial position, and whether accounts comply with the relevant legal provisions.

The purpose of the independent external audit is to lend credibility to financial information, thereby enhancing the effectiveness of economic decisions made on the basis of it. In addition, many companies and other entities not subject to the statutory audit requirements voluntarily request contractual audits, in view of the benefits that accrue from this service. Finally, there is growing demand for audit-related services, which involve the issuance of special-purpose reports and opinions on the application of certain defined procedures.

In the past, many small companies, self-employed people and other small businesses were unable to do any of their own accounting and bookkeeping and therefore depended on the services of accountants. However, because computer hardware and accountancy software programmes have fallen so much in price, nearly every business can afford the investment required. Nonetheless, many businesses continue to use accountancy service firms in order to make better use of their own resources and to have access to specialist expertise.

Another source of demand can be the public authorities. Courts allocate insolvency work and require expert services; governments require audits and evaluations should they decide to privatise State owned businesses. With the development of the so called "social economy", a market has recently emerged in the non-profit making organisations as their requirements tend to get closer to those of the rest of the economy.

Supply and competition

In order to offer certain accountancy services, it is often a legal requirement that the provider holds a professional qualification and belongs to a recognised accountancy body. This is especially the case for statutory audit, which can only be performed by a properly qualified and approved professional. For the other activities of the accountancy profession, the requirements in that respect vary from country to country, some imposing conditions similar to statutory audit. In any

Table 3: Accountancy services
Accountancy bodies in the EC

Belgique/België & Luxembourg	Institut des Réviseurs d'Entreprises (I.R.E.) Institut des Experts-Comptables (I.E.C.)
Danmark	Foreningen of Statsautoriserede Revisorer (F.S.R.) Foreningen of Registrerede Revisorer (F.R.R.)
BR Deutschland	Wirtschaftsprüferkammer (W.P.K.) Steuerberaterkammer (S.B.K.) Institut der Wirtschaftsprüfer in Deutschland
Hellas	Soma Orkoton Elegkton (S.O.E.) Association of Certified Accountants and Auditors of Greece (S.E.L.E.)
España	Instituto de Contabilidad y Auditoria de Cuentas (I.C.A.C.) Consejo General de Colegios de Titulares Mercantiles (C.G.C.T.M.) Instituto de Auditores-Censores Jurados de Cuentas de España (I.C.J.C.E.)
France	Ordre des Experts-Comptables et des Comptables agréés (O.E.C.C.A.) Compagnie Nationale des Commissaires aux Comptes (C.N.C.C.)
Italia	Consiglio Nazionale dei Dottori Commercialisti (C.N.D.C.) Consiglio Nazionale dei Ragionieri e Periti Commerciali (C.N.R.P.C.)
Nederland	Nederlands Instituut Van Registeraccountants (N.I.V.R.A.) Nederlandse Orde Van Accountants-Administratieconsulenten (N.O.V.A.A.)
Portugal	Camara dos Revisores Oficiais de Contas (C.R.O.C.)
United Kingdom & Ireland	Institute of Chartered Accountants in England and Wales (I.C.A.E.W.) Institute of Chartered Accountants of Scotland (I.C.A.S.) Institute of Chartered Accountants in Ireland (I.C.A.I.) Chartered Association of Certified Accountants (A.C.C.A.) Chartered Institute of Management Accountants (C.I.M.A.) Chartered Institute of Public Finance and Accountancy (C.I.P.F.A.) Association of Authorised Public Accountants (A.A.P.A.) Institute of Certified Public Accountants in Ireland (I.C.P.A.I.)

Source: FEE

Table 4: Accountancy services
Top 20 firms by fee income, 1991

(million ECU)

Coopers & Lybrand	826
KPMG Peat Marwick	708
Price Waterhouse	573
Ernst & Young	571
Touche Ross	500
Arthur Andersen	473
Grant Thornton	169
BDO Binder Hamlyn	164
Pannell Kerr Forster	123
Stoy Hayward	98
Kidsons Impey	86
Clark Whitehill	77
Robson Rodes	53
Moore Stephens	51
Neville Russell	48
Moores Rowland	44
Baker Tilly	37
Haines Watts	29
Saffery Champness	24
Finnies	20

Source: KPMG, European Accounting Focus and Accountancy

case, all the professional titles of the members of the main professional bodies in the EC are protected.

The process of qualifying as a professional accountant is a long one, requiring both theoretical knowledge and practical experience. The entire process can last from six to seven years, or even up to ten or fifteen years in some countries. Many of those working in lower positions in accountancy firms are doing so to gain the practical experience necessary to qualify as a professional accountant. Most people working in the accountancy services sector are not professional accountants. They include support staff and technical staff as well as trainee accountants.

The accountancy profession is mainly practised through collective entities in almost all EC countries. Only Italy still prevents the use of such entities by liberal professions, and even in that Member State, professional associations without legal personality are very popular in the accountancy profession.

Production process

IT has already been integrated in accountancy services for a long time. However, some further developments can be expected in that respect in the near future. EDIFICAS is the latest initiative of the accountancy profession which intends to tailor EDI (electronic data interchange) to accounting and auditing needs. Although accountancy services are not technology driven, these evolutions, which should help accounting data circulate more rapidly and accurately, will impact on the way the services will be supplied within a few years.

Given that professional standards have long existed in the sector, ISO 9000 has not yet had any real impact on accountancy services. Things are developing, however, and the British profession recently took steps towards its implementation on a voluntary basis. It is too early, though, to state whether this will constitute a precedent for the other Member States.

INDUSTRY STRUCTURE

Companies

Supply segmentation almost parallels that of demand. The most visible part of the profession is the big international firms, which attract much public attention, the most famous being the so called "Big 6".

These firms mainly serve the big national and international companies in each EC country as they do all around the world. One of their major features is indeed to be able to provide the same services with the same quality wherever their client is located. These big firms dominate the market of large quoted companies, banks and insurance companies.

As well known as these big firms may be, the bulk of the accountancy profession is made up of small and medium sized firms which are often better suited to serve the many SMEs of each Member State. Altogether, these smaller firms cover the same range of services, although each firm separately may supply a more limited range of services to its clients.

Unlike the 1980s, the beginning of the 1990s has not witnessed any more mega-mergers at the top end of the sector. Small and medium sized firms in the EC are currently developing regional networks to gain national or even international coverage. That evolution follows the trend set by a number of enterprises which use the internal market to expand their activities abroad.

The general economic slowdown affects the accountancy sector as all others. Pressure on fees is growing, and the growth rate of the profession's turnover, which in the past has averaged 10 % in most EC Member States, now barely shadows inflation.

Strategies

The structure of the accountancy profession in the EC is very contrasted, and one can find a different national model in almost each country. The existence of independent professional bodies or institutes is actually the only common feature. These bodies have either been established by the profession itself as in the United Kingdom or the Netherlands, or created by law as in France or Belgium, or combine structures of both origins as in Germany or Spain. However, even in those countries where the profession took the lead, governments have become more and more involved in the regulation of the profession over the recent past, partly as a result of implementing EC directives.

The profession is generally structured with several tiers corresponding to the segmentation of demand in terms of sophistication of services. The differences between the various tiers is a matter of: level of education, measured in terms of university education, practical experience, etc.; the scope of practice, the less qualified members of the profession having, in principle, more limited rights to practice; ethics, the code of conduct of some bodies being looser or less stringent than others; and international recognition, as some international professional bodies like FEE only have first tier members, etc.

There are, however, some exceptions to the several tiers rule. In France, Greece and Luxembourg, to a lesser extent, although several professional bodies exist, they all belong to the first tier. In these countries it is consequently not possible to get a less sophisticated service from a less qualified professional, at least for the many regulated activities restricted to accountants.

In addition to the ordinary functions of any professional body, the accountancy bodies are heavily involved at the national and international level in the development of accounting standards or reporting standards, of auditing standards and other standards on professional activities and finally of ethical codes. They have an important role to play in overseeing their members.

The structure of the profession has been rather stable over the years. Any evolution is rare but may be significant given its potential impact on the market (on the supply side at least). The implementation of the Eight Company Law Directive and the mutual recognition directive (see regulation section) has had a major influence on the structure of the profession in a number of countries like Germany, Spain, Italy, etc. Over the last year, two countries, Greece and the Netherlands, have seen dramatic evolutions in that respect. In Greece, the former state agency charged with statutory audit, SOL, has been replaced from 1 May 1993 by an independent institute, SOE, modelled on the professional bodies of the other Member States. As a result, statutory audit is now supplied in Greece on a market basis by auditors independent from the state. In the Netherlands, the second tier profession acquired with the law implementing the 8th directive the right to practice statutory audit.

In the EC, approximately 300 000 persons are members of the professional organisations belonging to the Fédération des Experts Comptables Européens (FEE). About one-third of these persons work in the accountancy services sector. Most of the remaining 200 000 members of professional bodies represented in FEE, are employed as accountants in industry, commerce, education and the public sector. Obviously, the size of the profession in one country does not mirror the size of its economy. This derives from the conception of the profession in countries like the United Kingdom, Ireland, the Netherlands, Italy, etc., where all those having the relevant educational profile are permitted to be members of professional bodies, be they in practice, in industry, retired, or whatever. Belgium, France, Germany or Greece, restrict the membership of the professional organisations only to those in public practice. The membership of the institute is then associated with a given function, and no longer with a certain education.

REGIONAL DISTRIBUTION

As the provision of accountancy services usually requires a degree of geographical proximity to clients, the regional distribution of accountancy services providers throughout the EC closely mirrors the regional distribution of economic activity. However, special concentrations can be noted in major financial and administrative centres. Another determining factor is the scope of practice permitted to the profession, with a relatively greater concentration of providers in those Member States with a broad-scope profession.

ENVIRONMENT

There is a clear and definite growth in the importance given to environmental accounting and auditing. The number of companies disclosing environmental information in their annual reports is growing although the information is in most cases limited to qualitative information with no assessment of the financial impact. Companies in a number of countries are moving in the direction of producing "greener" financial statements; however, the development of an accounting and management reporting framework which specifically deals with environmental issues is some way off. The environmental audit requires knowledge and experience which go beyond that of a financial auditor. The financial auditor does have a role to play in this field, but only as part of a multi-disciplinary team of experts. The accountancy profession, with its considerable experience in carrying out financial audits and in reporting the results of such work, may provide the starting point for the creation of a new form of profession comprised of individuals from different professional backgrounds.

REGULATIONS

Accounting and auditing services are highly regulated in the EC. Regulations are both numerous and complex and vary from one country to another, despite the attempts made at EC level to bring them closer together. These regulations fall into two main categories: regulation of the services themselves including rules governing the manner in which the services should be provided and regulation of the accountancy profession and its members working in this sector.

Regulation of services

Many of the services provided by the accountancy profession have been regulated for a long time in most European countries, often in different ways. These services include statutory audit, accounting, public sector audit, contribution audit, insolvency practice, etc. National regulations define the type of work to be carried out, when, under which conditions and by whom.

Statutory audit is the only service provided by the accountancy profession which is regulated in all EC countries in the same way. It is also the only service which has been subject to specific EC directives. As a result, all companies above certain minimum thresholds must now prepare and file financial statements audited by an independent expert. All the other services have, until now, kept their own national specifities. Certain services are regulated in some countries, but not in others; some services are reserved to one profession in certain countries but are shared between several professions in other countries, or even forbidden to the accountancy profession in others. Consequently, the range of services provided by the profession varies significantly within the EC as does the degree of competition which exists in each of these markets between the accountancy profession and other professions.

Regulation of the profession

In addition to the services it provides, the accountancy profession itself has been regulated for a long time in European countries. Because the economies of the Member States developed in different ways, the regulation of the profession differs from one country to another. The degree of self-regulation, which historically has been very significant in the profession in many countries, has decreased in the recent past, mostly as a result of the implementation of EC directives.

In a majority of Member States, the profession has been created and organised by law or by public authorities. Even in those countries where the profession has been privately organised, it enjoys official recognition by the State, which entitles its members to carry out regulated activities. Regulation, be it

Table 5: Accountancy services
Membership of FEE Member bodies - March 1993

	Total membership	% in public practice
Belgique/België	8 850	48
Danmark	2 465	21
BR Deutschland	7 242	100
Hellas	280	100
España	5 794	48
France	14 000	100
Ireland	5 850	49
Italia	60 500	90
Luxembourg	247	100
Nederland	8 360	40
Portugal	682	66
United Kingdom	193 000	24

Source: FEE

public or private, applies to a number of areas such as the definition of professional titles, protection of the titles, membership requirements, minimum levels of education and training, continuing education, ethical standards or codes of conduct, technical standards, additional licensing requirements for specialised areas of practice, rules for establishment of professional firms, etc.

In the EC, only limited attempts have been made to harmonise these rules. This has resulted in the Eighth Company Law directive on "the approval of persons responsible for carrying out statutory audits of accounting documents". The directive established minimum education and training or requirements for statutory auditors, be they individuals or firms. However, Member States remained free to impose more demanding requirements, and many did.

Another directive applying to the accountancy profession is the First Mutual Recognition directive which, when implemented, allows professionals from other Member States to seek recognition of their qualifications so as to be able to carry out regulated activities without having to re-qualify. In the case of the accountancy profession, Member States can require applicants to pass an aptitude test on local laws and ethical requirements. Although such a regime previously existed in some countries such as Belgium, France, Ireland, Luxembourg and the United Kingdom, it is new for others. This new system should have come into force early in 1991, but its implementation has been delayed in a number of countries. However, it is already obvious that it will not generate significant flows of accountants across EC internal borders. Despite making it easier for professional accountants to establish themselves abroad, differences remain between national laws and regulations with which accountants must be familiar. These differences will continue to restrict the free movement of accountants within the EC.

OUTLOOK

Growth of the accountancy services market is dependent on the general economy's health, and the current downturn is affecting the accountancy profession as all others. However, the shape of the economy does not seem to be the main challenge accountants face at the moment, as it is very likely that their activities will sooner or later resume with double digit growth.

The recent wave of financial scandals, and the litigation which followed, have had an effect on the whole profession. Some now question its credibility. Even if one can argue that accountants are easy scapegoats for business failures at a time of economic recession, the challenges ahead of the profession now include, in addition to the increased financial pressure resulting from the huge claims made against its biggest members, the evolution of laws and regulations that may limit its freedom to act, and the strengthening of its public standing. Considerable work on these issues has already started, both inside and outside the profession, and will no doubt lead to a satisfactory response.

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Market research
NACE 839.1

The EC accounts for 40% of the world market for market research. Four of the top ten world market research companies have their headquarters in the EC. 53% of all EC market research is bought by manufacturers, 12% by the public sector and 11% by the service sector; 67% of research is for consumer products and services. The market research sector employs nearly than 24 900 permanent employees and over 76 000 interviewers as well as freelance researchers and other self-employed consultants and sub-contractors.

INDUSTRY PROFILE

Description of the sector

Marketing research is covered by NACE category 839.1 and is distinct from management consultancy. Market research analyses the markets for products and services of all kinds and provides a channel of communication between consumers and the product or service supplier with a flow of information on what people want and why they want it. It is used by decision makers to:

- identify and define opportunitics, threats, competition and emerging concerns
- initiate, modify and evaluate marketing activity
- improve understanding of marketing processes

Marketing research enhances economic efficiency by enabling companies and other organisations to provide the goods and services that customers want, by investigating their needs, attitudes and behaviour. This helps companies avoid wasting resources in developing unwanted products and services, or communicating the benefits of their goods and services inadequately. Marketing research provides the information required to address these issues, designs the method for collecting information, manages and implements the data collection process, analyses the results and communicates the findings with recommendations for action. For instance in recent years, marketing research has highlighted to both manufacturers and governments increasing public concern about protecting the environment and associated health issues.

As an activity based firmly on the application of aspects of scientific method such as hypothesis generation and testing, experimental design and the use of statistical and sampling methods, market research combines many elements of academic rigor with the characteristics of both a profession and a key sector of the business service industry.

In 1992, the market for market research amounted to 2.516 billion ECU in the EC. This total includes research conducted by research institutes but excludes in-house research by companies, advertising agencies or governmental and academic bodies and work by consultants. In 1992, Germany had the largest marketing research expenditure in the EC of 637 million ECU (25%), ahead of France at 571 million ECU (23%) and the United Kingdom at 565 million ECU (22%). Italy was in fourth place with 290 million ECU (12%), followed by Spain at 148 million ECU (6%) and the Netherlands with 144 million ECU (6%) in sixth place.

If market research expenditure is compared with population, Gross Domestic Product and advertising expenditure in 1992, the significance of market research in France, the United Kingdom and the Netherlands is apparent as well as its more limited use in Italy, Spain and Portugal.

Recent trends

Rapid growth in market research since the 1950s was interrupted by the economic recession triggered by the oil crises

Table 1: Market research
Market research markets (1)

	1990		1991		1992	
	Turnover (million ECU)	(%)	Turnover (million ECU)	(%)	Turnover (million ECU)	(%)
Belgique/België	71	3	73	3	70	3
Danmark	27	1	30	1	32	1
BR Deutschland	490	22	548	23	637	25
Hellas	14	1	18	1	21	1
España	136	6	146	6	148	6
France	540	24	545	23	571	23
Ireland	14 (2)	1	15	1	15	1
Italia	254	11	281	12	290	12
Luxembourg	1	(4)	1	(4)	1	(4)
Nederland	123	6	136	6	144	6
Portugal	16	1	18	1	22	1
United Kingdom	539	24	553	23	565	22
EC	2 225 (2)	100	2 364	100	2 516	100
EC	2 225 (2)	40	2 364	39	2 516	40
Other Europe	279 (2)	5	294	5	309	5
Total Europe	2 504 (2)	45	2 658	44	2 825	45
USA	1 916	35	2 171	36	2 226	36
Japan	471(2)	9	484 (2)	8	499	8
Other (3)	641	12	673	11	713	11
Total world	5 532 (2)	100	5 986 (2)	100	6 263	100

(1) Excludes market research conducted ""in-house"" by marketing departments, advertising agencies, governmental organisations, academic institutions, etc; average calender year exchange rates used: 1990 ECU 1 = US$ 1.27; 1991 ECU 1 = US$ 1.23; 1992 ECU 1 = US$ 1.29.
(2) Market size figures have been corrected to include the more accurate data made available after the publication of the ESOMAR Annual Market Study on 1991.
(3) No complete data are available for 'other' parts of the world; the assumption has been made that the annual growth rate was 5% for 1990-91 and 6% for 1991-92.
(4) Signifies less than 0.5%
Source: ESOMAR Annual Market Study

Table 2: Market research
National shares of EC Member States, 1992

(%)	Market Research Expenditure	Advertising Expenditure (1)	Gross Domestic Product (1)	Population
Belgique/België	3	2	3	3
Danmark	1	2	2	1
BR Deutschland	25 (2)	28 (3)	26 (3)	23 (2)
Hellas	1	1	1	3
España	6	13	7	11
France	23	15	20	16
Ireland	1	1	1	1
Italia	12	12	17	17
Luxembourg	(4)	(4)	(4)	(4)
Nederland	6	5	5	4
Portugal	1	1	2	3
United Kingdom	22	20	17	17
EC total	100	100	100	100

(1) Data refer to the 1991 market situation due to the unavailability of the 1992 data
(2) Including East Germany
(3) Excluding East Germany
(4) Signifies less than 0.5%
Source: ESOMAR Annual Market Study, Eurostatistics

of the 1970s. While hard figures are difficult to produce (particularly since the distinction between marketing research/information, marketing consultancies and related disciplines is increasingly blurred), the 1980s saw an annual real growth in excess of 10% with particularly strong growth in South Europe, albeit from a low base. Since 1989, growth in marketing research expenditures has slowed considerably because of the worldwide recession. Nevertheless the market research industry has outperformed the advertising business in this recessionary period and grew by 6% in both 1991 and 1992 in the EC.

International comparison

As shown in Table 1, the EC market research market of 2.516 billion ECU accounted for 40% of the total world market for market research in 1992. The USA accounted for 36% (2226 million ECU) and Japan for 8% (713 million ECU). The 1992 EC growth rate of 6% compares to 3% in the USA and 3% in Japan but when estimates are based on local currencies the picture looks somewhat different with the USA showing a growth rate of 8% and Japan a growth rate of 2%.

Many US major corporations have disbanded or downsized their market research departments in the past few years and this trend has also been observed in other countries. This has given research institutes the opportunity to develop new and often closer forms of relationship with clients whilst the client also benefits in a switch from a fixed to a variable cost. In Japan, client marketing management rather than research companies tends to collect marketing information, and there is greater integration of survey based data with other market information sources such as dealer visits and interviews, store

Table 3: Market research
External trade by value, 1992

(%)	Client origin for EC research organizations: National	Client origin for EC research organizations: Foreign	Subcontracted by research organizations to foreign research suppliers
Belgique/België	80	20	12
Danmark	90	10	4
BR Deutschland	75	25	N/A
Hellas	79	21	2
España	90	10	(1)
France	90	10	5
Ireland	87	13	3
Italia	82	18	7
Luxembourg	70	30	0
Nederland	90	10	7
Portugal	90	10	6
United Kingdom	87	13	15
EC average	84	16	8

(1) Signifies less than 0.5%
Source: ESOMAR Annual Market Study

Table 4: Market research
Source of revenue for EC market research organizations, 1992

%	Manufacturing	Services	Advertising agencies	Public sector	Wholesale/ retail	Research organisations	Others
Belgique/België	35	20	10	12	8	12	3
Danmark (2)	53	16	4	8	9	7	3
BR Deutschland	62	5	3	13	4	3	10
Hellas	64	8	9	2	2	7	8
España (2)	25	13	7	24	8	19	3
France (3)	56	10	8	11	4	5	6
Ireland	45	28	5	10	5	5	2
Italia	52	8	18	5	5	10	2
Luxembourg	5	20	10	40	5	20	0
Nederland	N/A	8	N/A	9	N/A	N/A	N/A
Portugal	58	10	15	8	5	3	2
United Kingdom	54	18	4	14	3	(1)	7
EC average	53	11	7	12	4	5	7

(1) Signifies less than 0.5%
(2) Data for 1992 are based on more accurate source, hence the marked differences compared with previous years
(3) Estimate based on average of comparable countries
Source: ESOMAR Annual Market Study

observation and personal contact with customers at retail outlets. This may account for the lower total turnover quoted for Japan.

Foreign trade

In 1992, 84% of market research conducted in the EC was commissioned by domestic clients. The proportion of international research grew from 10% in 1990 and preceding years, to 14% in 1991 and 16% in 1992. Foreign clients are particularly important for Germany, Belgium, Italy, Greece and Luxembourg. Of total European research expenditure in 1992, 8% went on multi-country survey research where an institute in one country coordinates studies and subcontracts fieldwork abroad. United Kingdom research institutes handled about 40% of such work with French institutes handling 20% and Italy 14%.

MARKET FORCES

Demand

Traditionally, manufacturers of consumer packaged goods were the main buyers and users of market research and this remains the case with 53% of research within the EC being conducted for manufacturers. In recent years however, a broader range of business and non-commercial organisations have used market research to aid their planning, decision making and policy formation. The public sector is a significant client with 12% and research is becoming more important in providing feedback to governments, both local and national, about public reactions to policies implemented or planned. Taking 11% of research spent, service industries are also important and growing clients and hospitals, banks and airlines are amongst those who use market research results to improve

Table 5: Market research
Employment in EC market research industry (1)

	1991		1992	
	Permanent employees	Freelance interviewers	Permanent employees	Freelance interviewers
Belgique/België	800	1 300	800	1 300
Danmark	400	1 300	390	1 400
BR Deutschland	7 500	30 000 (2)	6 650	29 800
Hellas	575	1567	700	1 635
España	1 800 (3)	N/A	1 900 (3)	N/A
France	5 600 (3)	8 000	6 720 (3)	7 000
Ireland	270	550	280	600
Italia	1 200	5 000	1 200	6 000
Luxembourg	11(3)	8	11(3)	100
Nederland	2 000 (2)	7 000 (2)	2 000	7 000
Portugal	670	2 000	670	2 000
United Kingdom	6 500 (3)	20 000	4 000 (3)	16 800
EC	27 326 (4)	N/A	24 871(4)	N/A

(1) All figures are estimates
(2) Figure modified since publication of 1991 ESOMAR report
(3) Number excluding full-time research functions within client companies
(4) Total excluding full-time research functions within client companies for some countries
Source: ESOMAR Annual Market Study

Table 6: Market research
World top 10 market research companies, 1992

Research company	Turnover (million ECU) (1)	Countries with office (2)	Head office	Ownership
1. A.C. Nielsen	868	32	USA	Dun & Bradstreet, USA
2. IMS International	454	62 (3)	USA/UK	Dun & Bradstreet, USA
3. IRI	214	4 (3)	USA	Public Company, USA
4. GfK	178	26	D	Public Company, D
5. Arbitron	138 (4)	1	USA	Ceridian Corp., USA
6. Sofrès/Cecodis	131	8	F	Fimalac-led Group, F
7. Research International	113	40	UK	WPP, UK
8. Westat	88	1	USA	Private Company, USA
9. Infratest/Burke	87 (5)	13	D	Private Company, D
10. Video Research	82	1	JPN	Dentsu et al, JPN

(1) Excluding associates
(2) Including associates
(3) No 1992 information available, these data refer to the 1991 market situation
(4) Estimate (J. Honomichl)
(5) Turnover relates to the year ending 9/92
Source: ESOMAR Annual Market Study, major research companies, J. Honomichl

the quality of their services. Advertising agencies (7%), wholesalers/retailers (4%), other research organisations (5%) and other clients account for the rest. In the EC, approximately 65% of the total expenditure stems from research for consumer products/services while the non-consumer studies (including business-to-business and government research) amount to 35%.

There have been considerable changes in the information needs and priorities of marketing companies. A key factor is the globalisation/regionalisation of many businesses and their branded properties with an increasing number of major companies now being run on a European basis, rather than as separate national units. This increased demand for market information resulting from client companies addressing the Single Market is strengthened by the growth in pan-European media and underlines the need to remove statistical barriers created by different national definitions to improve the comparability of survey findings. Clients are demanding that research companies have a wider geographic spread of resources but also a strong local presence and perspective so the national insight is not lost in the global picture.

Another change is the growth of profitable new markets in South East Asia and the emergence of markets in East and Central Europe. In the short term, demand for market research in East and Central Europe will only grow gradually because of the high cost of studies and the lack of expertise but as the demand for market research relates to the productive investment rate, the potential demand is significant in the long term. The growth of demand will also depend on variables such as qualification standards, and will be strongest in countries where the labour force is highly qualified. Business opportunities for market research are increasingly apparent with studies made by public institutions and a number of cooperation agreements between EC and East and Central European private companies.

Another change is that top management increasingly views brands as a company's key asset. A greater emphasis on building and maintaining strong brands has a major influence on the types of market research in demand as companies strive to understand brand elasticity and the measurement of brand relationships, positioning and brand equity.

Changes in technology, growth in the information industry, diversification of life-styles and proliferation of media has made marketing research ever more necessary to monitor changes in the market place. However, increased computer power, the advent of scanner data and the associated area of single-source information has meant a greater detail and frequency of reporting which has produced a sense of data overload amongst many users. This has led to an increased need amongst marketing management for researchers to provide diagnostic, interpretive and predictive services and specialisation and expertise in the client's business sector. It also implies that clients will demand an on-going strategic counselling relationship rather than one characterised only by a string of projects.

Growing areas are research into customer satisfaction, branding and corporate image and research for the business to business, finance, retail, utility and legal sectors- sectors that have only recently started using market research systematically. Studies suggest that expenditure on most types of market research is likely to increase rather than decline over the next five years. This will be markedly so in the case of main areas of research activity such as usership and attitude studies, product testing, advertising and concept development and evaluation, and advertising campaign tracking, particularly with the proliferation of different types of media, new publications and TV stations.

Supply and competition

With the diversification of sources for marketing data, companies will have smaller marketing research departments, if they have one at all and it will be increasingly necessary for researchers to provide an interpretative service to help marketers understand the implications of data for marketing strategy. This trend is already evident with an increasing number of researchers acting as consultants to companies.

There is considerable cost and price variation among the EC countries, largely reflecting differences in salaries and social costs. For instance, freelance and part-time interviewers in France and certain other countries are eligible for benefits and large social costs for employers include income tax and social security contributions as well as holiday entitlements, redundancy pay and pension provision. In other countries they are employed on a very different basis which affects pricing and competitiveness.

Other factors in pricing include the degree of competition in the local market, the enhanced efficiency that comes with greater experience in certain types of research, the mix of research and data collection methods and geographic dispersion of populations.

In an E.S.O.M.A.R. survey designed to discover how research prices vary from one country to another, research institutes were sent detailed specifications for six different surveys and asked to state what price they would quote to a client for carrying out each of these six studies. Averaging across all six projects, France and Italy emerged as the most expensive countries and Belgium, Greece and Portugal as the cheapest. In 1991 the rank order in terms of average research costs from the most to the least expensive was as follows: France, Italy, Germany, Ireland, United Kingdom., Denmark, Spain, The Netherlands, Belgium, and Greece with Portugal the least expensive. Research prices in Germany and Denmark were relatively much less expensive in comparison with three years before. These are relative changes and they should not be taken to mean that research prices in Germany and Denmark had necessarily fallen in absolute terms.

Recent developments in exchange rates of various EC countries will also have made the prices of certain countries such as the United Kingdom increasingly competitive and Germany more expensive.

The structure of the market research industry is remarkably similar across the Member States. Generally, the market can be split into three parts:

- Media market measurement.
- Audit shops or scanning (the analysis of consumption from computerised tickets shops).
- Specialised market research by multinational research companies and local unaffiliated companies. They include specialised quantitative research, ad hoc research and qualitative research.

Ad hoc and continuous research have traditionally accounted for about two thirds and one third of global research expenditures respectively. Continuous research, involving audits and panels for market and media measurement, has always demanded higher investment than ad hoc research.

However, over the past decade, more EC research companies in the ad hoc sector have begun to emulate US. research firms in the standardising and branding of research products. This, too, involves investment, although typically in the time of first-rate research technologists and innovators. Significant investment in designing, testing and validating new research techniques, and subsequent marketing investment in communicating the benefits of these techniques to customers is only possible if the costs can be amortised by the application of the same techniques across many countries and over time.

In the continuous research sector, the advent of scanners in stores and homes that record product purchase, peoplemeters recording television viewing, growing computer power, and single-source data services have added further to the high technology and investment that characterise this sector of the research business. Data thus derived, as well as from other sources, increasingly from part of database management information systems (decision support systems) - a further significant investment. Computer-aided interviewing especially by telephone (CATI) has involved the commitment of substantial sums to the installation of facilities typically comprising 20 to 100 telephone booths with appropriate telecommunication and computing equipment.

These costs, and the protection afforded to the research suppliers by time series data, have created entry barriers that have led to a limited number of very large players. Corporate guidelines for research buyers worldwide for preferred research suppliers or techniques and a demand for increasingly sophisticated international coordination of research projects have all led to a concentration of ownership, the formation of international research chains or networks of national agencies.

Table 7: Market research
Number of research organizations in EC member countries, 1992 (1)

	1992	1992/91 (% change)
Belgique/België	30	3.4
Danmark	15	15.4
BR Deutschland	105	6.1
Hellas	18	0.0
España	38	26.7
France	77	0.0
Ireland	5	-16.7
Italia	75	0.0
Luxembourg	3	50.0
Nederland	42	0.0
Portugal	9	0.0
United Kingdom	117	2.6
EC total	534	3.9

(1) The figures refer to the numbers of research organisations with a full listing in the ESOMAR 1993 Directory which reflects the market situation in the year 1992; comparison has been made with the listings in the 1992 Directory (1991 market situation).
Source: ESOMAR Directory 1993

Parallel to this has been the emergence of more specialist research companies dedicated to CATI omnibus services, advertising tracking and research into particular business sectors, for instance pharmaceuticals or automobiles. Larger research businesses have also broken down into separate operating divisions or subsidiaries focusing on specific areas of market information need or research techniques. Clients can now choose among a wide spread of suppliers from large full-service research companies to specialist research boutiques and consultants.

Market research has always been highly competitive and subject to intense price pressure with very few entry barriers to ad hoc research. Recession exacerbates this tendency with a growing number of research professionals leaving research institutes or client corporations to set up their own consulting businesses.

An estimated total of 24.870 people are employed in the EC market research industry with about a further 76.000 as freelance interviewers. Over the past year, several countries have seen a fall in numbers of permanent employees, for instance Germany and the United Kingdom. mainly because of automation and downsizing for greater efficiency.

External competition is emerging with other business services firms also offering marketing and management information including management consultants, accounting firms and database marketing organisations.

Production process

Research methods can be divided into ad hoc and continuous research and qualitative and quantitative research. In 1992, 55% of research was ad hoc and 45% was continuous research (30% on panel research, 5% on omnibus research and 10% on other continuous research). About 85% of research expenditure in the EC is derived from quantitative research, 10% from qualitative research with the balance coming from desk research and secondary activities.

Data collection methods in quantitative research are divided between mail survey, telephone and face-to face interviewing. Despite the higher costs involved, face-to-face studies continue to account for the majority of quantitative research expenditure in the EC: 30% compared to 12% telephone studies and 5%

Table 8: Market research
Top 10 market research companies in the EC, 1992

Research Company	EC market research turnover (1) (million ECU)	EC countries with office (incl. associates)	Current ownership/Acquired/ Merged with
1. A.C. Nielsen	399	11	Dun & Bradstreet, USA (acquired 1984)
2. IMS	188 (2)	11	Dun & Bradstreet, USA (acquired 1988)
3. GfK	164 (2)	10	Public Company, D (ex public association)
4. Sofrès/Cecodis	127	7	"Fimalac-led group, F (ex-Sema; acquired Cecodis 1992)"
5. Research International	84	8	WPP, UK (acquired 1989)
6. Infratest/Burke	79	9	Public Company, D (acquired Burke in Europe 1980)
7. Taylor Nelson AGB	69	4	Public Company, UK (acquired MaS 1987, Addison 1990, AGB 1992)
8. IPSOS	61	5	Public Company, F (acquired Makrotest (Italy) 1990, RSL, GFM-Getas, ECO 1992)
9. MAI	47	3	Public Company, UK (acquired MIL, NOP, SRA 1989)
10. Millward Brown	36	5	WPP, UK (acquired 1989)

(1) Excluding associates
(2) The figures are derived from extrapolating of the ratio between EC: non-EC turnover for the company in 1991 based on the worldwide turnover figure for 1992
Source: ESOMAR Annual Market Study, major research companies, J. Honomichl

mail studies. Smaller countries with a highly developed infrastructure tend to make more use of telephone studies (21% of all research expenditure in Denmark) compared to South European countries where, for example, they account for only 2% of total research expenditure in Greece, 4% in Portugal and 8% in Spain. The proportion of telephone studies is rising because of cheaper costs, higher telephone penetration and problems associated with some inner city areas. For qualitative research, group discussions account for the majority of the research expenditure in EC (approximately 5% of total research expenditure) compared to 4% for in-depth interviews, with variations among countries depending on socio-economic factors.

A major problem for the research industry is falling response rates caused by a range of reasons. People now have minimal time available with work, family and social commitments and do not have the time or motivation to respond to interviews without monetary incentives. Rising crime levels in urban areas and a distrust of being approached by strangers also affect response rates. There is also growing concern about invasion of privacy and about what happens to personal information given during an interview and who has access to it thereafter. This is particularly the case when respondents have difficulty in distinguishing between a sales call and a research project.

INDUSTRY STRUCTURE

Companies

There are well over 1500 market research companies and consultancies in the EC, including the headquarters of several of the world's largest. Four of the top 10 world market research companies including two of the world's three major market research chains (networks of independent companies) have their headquarters in Europe. Although there are a number of major players in the EC, the industry is, nevertheless, characterised by considerable fragmentation and intense competition. Barriers to entry are low except in the high tech/high investment areas of market and media measurement (around 35% of total market research expenditure). Many of the major research organisations are represented within the E.S.O.M.A.R. membership.

Pre-tax margins have historically been modest (an average of around 5 to 6% on turnover for ad hoc research organisations) though perhaps a little higher in recent years. Substantially higher margins are earned by research companies with multiclient services and a contractual customer base.

As can be seen from Table 8, the US-owned A.C. Nielsen Company, which mainly provides store audit data on a regular and continuous basis, is by far the largest operating research organisation in the EC and has been so for many years. IMS, specialising in pharmaceutical research, is the second largest company. Both these organisations are owned by Dun & Bradstreet Group (USA).

The German GfK Group is the third largest research company in the EC and the largest EC-owned company. The French Sofrès/Cecodis Group is fourth with the EC-based Research International Group ranking fifth. Among the top ten EC research organisations there are four based in the UK, two in Germany, two in France and two in the USA.

Strategies

Several companies have restructured their services to survive in the rapidly changing market. A number of mergers and acquisitions have taken place, often as part of the creation of major marketing services corporations. One effect of this development has been to reduce the level of American ownership of EC research businesses. Another effect has been to increase industry concentration and to produce seven major research holding companies in the EC.

Parallel to this is the growth in automatisation and technological developments evidenced by innovations such as television audience meters and scanners developed by the largest research chains. This trend and the growth of international research chains, have made it possible for buyers to go to one head office to commission a research project in many countries or several regions. A variant on this is the licensing in other countries of particular research techniques or brands. This is practised most commonly by American research firms which license elsewhere their techniques in advertising pretesting, simulated test market, brand position and customer satisfaction/service quality.

The other major structural change process is horizontal specialisation. Increasingly, market research organisations throughout the EC are setting up specialist divisions or operating subsidiaries that concentrate on key business sectors (e.g. media, health care, automotive, travel, finance) or research specialisations/problem areas (e.g. qualitative, advertising, customer care).

The rapidly growing interest in international research has also led some research suppliers into setting up multi-country syndicated services on a regional or global basis.

Vertical integration has always been a feature of the European market research industries. All but the smallest companies have combined a client service function with a data handling facility (data collection, preparation, processing and printing). However, there are signs that this vertical integration is beginning to be questioned by some companies, especially where personal interviewing fieldwork is concerned. The US. market for instance has long been characterised by an ownership separation of research companies from fieldwork suppliers.

The client-research company relationship is likely to be affected by growing Total Quality Management (TQM) and Service Quality demands and the associated measurement needs. Many companies are adopting TQM and cultivating service quality and so research organisations must also expect to do the same to offer consistently high and reliable quality in their services.

REGIONAL DISTRIBUTION

The 1993, E.S.O.M.A.R. study on the size of the research industry in 1992 showed an 6% growth in the size of the market within the EC from 2364 million ECU in 1991 to 2516 million ECU in 1992 (ignoring inflation). The prominence of Germany can be attributed only partially to relatively strong growth in this market since the fall in the United Kingdom. exchange rate has undermined the monetary value of equally strong growth in the United Kingdom. Together, the three major countries continue to account for over two thirds of the EC market research turnover.

Whilst the definition and collection of this information is gradually improving over the years, detailed trend data is not yet available. Thus whilst all EC markets show an increase in the monetary value of their market research turnover on the previous year, this does not take inflation into account and so may or may not represent real growth. Of the three major countries with quotations in local currency show that Germany and the United Kingdom both had healthy growth rates of 10% for 1992, where France shows slower growth at only 3%. This represents an improvement on 1991 for the United Kingdom which had only moderate growth and France which remained static. The Netherlands continued its relatively high growth rate of 12% whilst smaller growth rates for 1992 are shown in Italy (7%) and Denmark (4%) compared to 10% to 11% growth in 1991. The Spanish market growth of 7% in 1991 slowed down to 4% in 1992.

When a market reaches a certain stage of maturity, an equilibrium is established, in which continuous research captures about one third of total expenditure. Other regular services (e.g. advertising tracking, quality of service monitoring) add a further semi-contractual sector, partly substituting for ad hoc studies and partly reflecting overall growth in the information market. Other geographic variations stem from broader economic and marketing influences. In smaller countries, less research on new product development is undertaken as the major R & D activities and corporate headquarters are located elsewhere. This leads to more research involving the screening of concepts, products or communications approaches that have been developed and more thoroughly researched in the larger EC markets.

Market research tends to be relatively less widely used in those countries where the emphasis is more on industrial products. There have been different patterns in the post-war evolution of markets and of marketing. Restrictions on television advertising (and hence, related research) in a number of countries have also contributed to this differential use of market research across the Community as have the varying levels of retail trade concentration (broadly, more concentration in the North than in the South).

REGULATIONS

Market research is like many service industries dependent on self-regulation. For instance, the ICC/E.S.O.M.A.R. International Code of Marketing and Social Practice is applied by all E.S.O.M.A.R. members and the national marketing research societies and societies in all the 12 EC Member States. This Code guarantees the respondent's anonymity and specifies responsibilities towards respondents. the rights of respondents, relations with the general public, the mutual responsibilities of clients and researchers, and reporting standards. The Code is particularly relevant in the light of the EC Directive on privacy of personal data. For the time being, such restrictions based on the protection of personal data vary from one EC Member State to another, without preventing marketing research in recognition of the fact that it deals with aggregated and anonymised data and not personalised data.

Another Directive which can also have an effect on the industry, in particular telephone research, is the proposed Directive for the protection of personal data in the context of

Table 9: Market research
Corporate parents of EC market research companies, 1992

Corporate parent	Market research turnover in EC (1) (million ECU)	Main research companies in EC	EC countries with office (incl. associates)	Home country of corporate parent
1. Dun & Bradstreet	587 (2)	Nielsen, IMS	11	USA
2. GfK	164 (2)	GfK	10	D
3. WPP	152	Research International, Millward Brown, MRB Group	8	UK
4. Sofrès/Cecodis	127	Sofrès, Sobemap, Sofemasa, Abacus, Cecodis	7	F
5. Infratest/Burke	79	Infratest, Burke Europe	9	D
6. Taylor Nelson AGB	69	Taylor Nelson, MaS, Addison, AGB	4	UK
7. IPSOS	61	IPSOS, Makrotest (Italy), RSL, GFM-Getas, ECO	5	F
8. MAI	47	MIL, NOP, SRA	3	UK

(1) Excluding associates
(2) The figures are derived from extrapolating of the ratio between EC: non-EC turnover in 1991 based on the worldwide turnover figure for 1992
Source: ESOMAR Annual Market Study, major research companies, J. Honomichl

digital telecommunications networks in particular ISDN (Integrated System Digital Network) and digital mobile networks.

The proposed EC Directive on Temporary Employment will affect most free-lance interviewers and ultimately will drive up market research prices. At the moment, legislation on social security and benefits varies widely among EC member states.

Other restrictions which vary from country to country can affect the right to conduct and publish public opinion polls, particularly in the run-up to an election. Although political opinion-polling constitutes only about 2% of the entire market research industry and actual pre-election polling less than 0.3%, it naturally attracts a lot of media and public attention.

OUTLOOK

The adoption of TQM by many major corporations brings the need for measurement to monitor its degrees of success, both initially and over a period of time. This will involve behavioural measures of business control monitors in efficiency and quality, satisfaction studies amongst internal as well as external customers, the effectiveness of their communication and studies amongst personnel. Apart from major corporations in the commercial sector, research companies will increasingly be working with central and local government, including education, health and crime prevention services.

Another trend will be the enhancement of tracking services with a demand for more multi-country tracking on a comparable basis, more emphasis on various types of brand equity measurement, and a wider scope for tracking studies including business control monitors, advertising effectiveness, business efficiency and environmental and other issues of public concern.

Downsizing has already been seen in the USA and the United Kingdom and will be a continuing trend because of recessionary pressures. In Europe, a major change will be the move towards pan-European data collection where the region is treated as an entity. One-stop data collection through integrated European data handling companies will move the research industry further along the road of international research co-ordination and steps in this direction have already been taken with computer assisted telephone interviewing.

The outlook for the marketing research is good provided that proposed European legislation takes into account the needs of legitimate marketing research. Furthermore, the marketing research industry will need to ensure that it can convert to being predictive rather than reactive, and that services continue to develop from providers of techniques and data to on-going strategies for management in industry and service.

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Management consultancy
NACE 839.1

New technologies and market globalisation have strongly pushed demand for management consultancy services in the 1980s. The current economic slowdown has placed the industry in a difficult situation. Many companies have cut-back very significantly in external services directly affecting management consultancy firms. Turnover of the sector has fallen in 1992 compared to 1991. Many firms have stepped out of the market completely, also causing employment in the industry to fall rapidly.

INDUSTRY PROFILE

Description of the sector

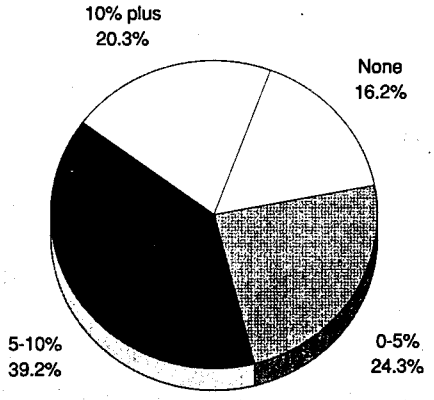
Management consulting consists of providing information, advice and expertise on a whole range of specialised management functions in an independent, objective manner. Services are performed by specialised personnel with considerable experience in the specific branches in which they work. Consultants include people with backgrounds in banking, computing, economics, general management, accounting, law, management communications, management planning, marketing and sales, market research, personnel selection, quality assurance and control, stock markets and technology transfer.

Management consulting is a diverse industry comprising very diverse subsidiary business services including: corporate strategy and development of organisations; administrative and financial systems; management of human resources (including recruitment of executives and temporary management staff); management of production and services (including technology, organisation support management, research and development and quality control); marketing and corporate advertising and promotion; information and management technologies and systems; project management; and economic and environmental impact studies. The most relevant sector of management consulting is information technology. This service is very similar to the computer-based management schemes developed by computer software houses. Management consultancy firms are increasingly involved in helping companies develop information technology and apply computer tools.

Management consultancy services also often overlap with other services. A main area of overlap is contract research, particularly ad hoc market studies which often form part of strategic analysis projects. Accountancy companies offer management consultancy services in the European market and many US firms are among the major suppliers of this service.

This overlap occurs, to a lesser extent, with consulting engineering firms concerning production or computer-based production, organisational support, project and programme management and also economic and environmental impact studies.

Figure 1: Management consultancy
Impact on sales of contracting out internal consulting work (1)



(1) Number of companies responding to question: 74
Source: EAG Survey

Table 1: Management consultancy
Turnover and number of enterprises (1)

	Number of enterprises			Turnover (million ECU)			Share of the global market (%)	
	1989	1990	1992	1989	1990	1992	1989-1990	1992
Belgique/België	24	21	19	112	129	141	85	80
Danmark	50	46	46	42	71	68	40	45
BR Deutschland	270	310	310	1 400	1 550	2 053	36	39
España	35	29	29	385	224	N/A2	0	20
France	40	48	50	323	432	455	60	60
Ireland	15	15	15	N/A	47	N/A	80	80
Italia	48	55	50	300	320	212	50	50
Nederland	30	27	29	151	172	227	65	70
Portugal	19	19	19	N/A	70	N/A9	0	N/A
United Kingdom	31	32	32	980	1 170	1 012	54	55
EC 10	562	602	599	3 693 (3)	4 185	4 168	43 (2)	N/A
Global market	N/A	7730	N/A	N/A	9 603 (4)	N/A	100	N/A

(1) Figures for EC cover members of FEACO
(2) Revised figures
(3) EC 8
(4) Estimation
Source: FEACO

Table 2: Management consultancy
Situation of management consultants (1)

	Number of consultants			Turnover per consultant (in ECU)	
	1989	1990	1992	1990	1992
Belgique/België	853	877	848	91 220	167 000
Danmark	344	386	340	183 938	111 000
BR Deutschland	7 000	7 000	9 000	221 429	156 000
España	1 300	1 900	N/A	117 895	N/A
France	1 990	2 000	3 175	216 000	143 000
Ireland	369	316	N/A	148 734	N/A
Italia	2 310	2 400	2 092	133 333	105 000
Nederland	1 323	1 450	1 797	118 621	126 000
Portugal	733	733	N/A	95 498	N/A
United Kingdom	6 760	7 265	6 321	161 046	160 000
EC (10)	22 982	24 327	23 573	170 017	176 812
Global market	N/A	87 360	N/A	110 588	N/A

(1) Figures for EC cover members of FEACO
Source: FEACO

Figures in this monograph are taken from an EC-wide study carried out by EAG, as well as figures from FEACO (Federation of European Consulting Associations): members of these groups account for between 40% and 70% of the activities of the sector.

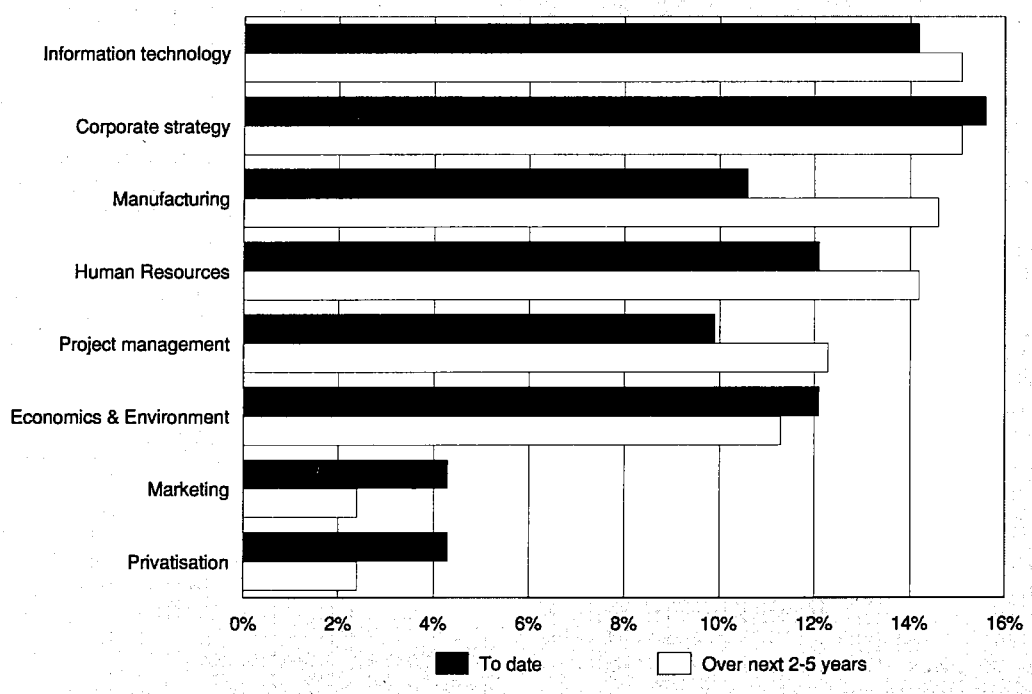
Recent trends

Total EC turnover (10 FEACO members) reached 4 185 million ECU in 1992; nevertheless other sources (EAG) estimate that the total market for management consultancy in Western Europe (including, but not restricted to the EC) is worth about 6.4 billion ECU in early 1993 prices.

Germany, United Kingdom and France were the countries with the highest 1992 revenues among the EC members, with 2 053, 1 012 and 455 million ECU, respectively. In 1992, the country with highest number of consultants was Germany with 9 000, followed by the United Kingdom and France with 6 321 and 3 175, respectively. At the same time, Belgium was the country with largest turnover per consultant, 167 000 ECU, followed by the United Kingdom and Germany with 160 000 and 156 000 ECU, respectively.

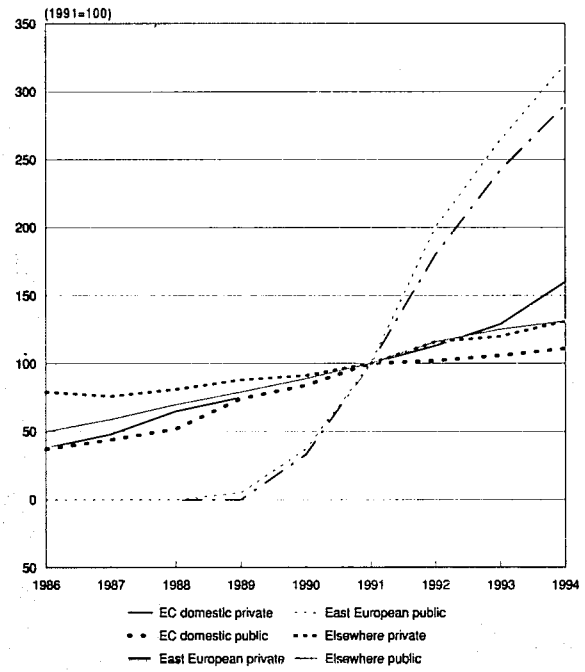
The field of activity that has been accounting for the largest segment of the industry is information technologies. In 1992, the average EC turnover in this field represented 25% of the total turnover of the industry. Denmark and United Kingdom

Figure 2: Management consultancy
Fields expected to grow



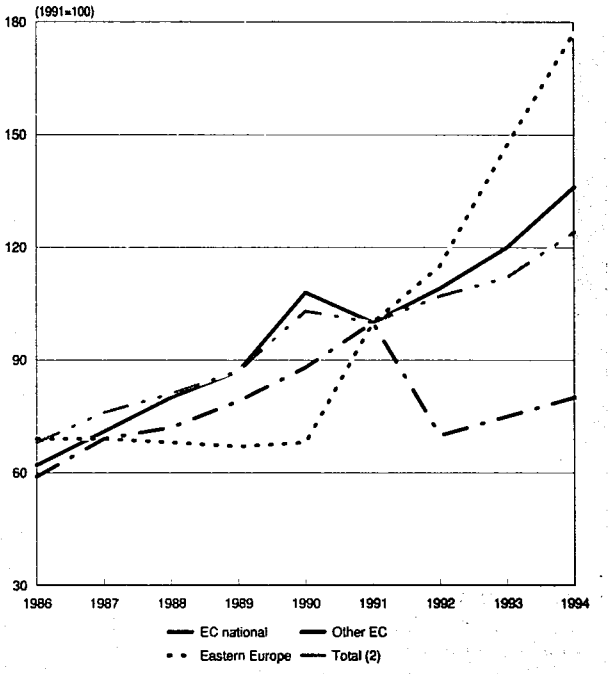
Source: EAG Survey

Figure 3: Management consultancy
Trends in management consultancy revenues (1)



(1) Figures after 1991 are projected
Source: EAG Survey

Figure 4: Management consultancy
Trends in management consultancy personnel (1)



(1) Figures after 1991 are projected
(2) Includes EC, Eastern Europe and elsewhere
Source: EAG Survey

showed the highest percentages of activity in this field compared to the other fields in the industry, with 46% and 40%, respectively.

The second largest field of activity was corporate strategy and organisational structure, reaching an average of 21.5% of total EC turnover in the industry. The highest percentage of turnover in this field of activity, 33%, occurred in Germany; Denmark had the second highest with 23%.

MARKET FORCES

Demand

Specific factors such as technology development and market globalisation have introduced a higher level of complexity in entrepreneurial and economic activities. Therefore, demand for expertise and advice has increased since the early 1980's (with slowdowns due to the general economic crisis).

Private industry is the main user of management consultancy according to FEACO. Private industry accounts for more than 60% of its member's commissions. The private business services sector accounts for roughly 20% to 25%, and trade between 5% and 10%. The public sector is very small (civil, services, public authorities and governments) although the importance of public authorities as buyers of management consulting services is higher on average in France and the Netherlands. There is also a growing demand for consultancy by certain public services (in particular, health, education and transport).

The development and introduction of information and management systems remains the main area of activity. Strategy definition is a very commonplace management consultancy activity. An important part of strategy studies recently have focused on the single European market. Others concern strategies for developing business in the East European countries, or the wider global market.

Management consultancy revenues from intra-EC cross-border activity approximately doubled over the period 1986-1991.

For some specialised markets, experts from outside of the EC might be used. Exports, varying 5% to 25% according to country, are mainly to developing nations.

Three trends are predominant within the management consultancy sector: (1) recourse to management consultancy is becoming increasingly common practice, at least among companies with more than 500 employees; (2) the use of strategy or systems consultancy is becoming increasingly recognised as an intangible/strategic corporate investment; and (3) consultants who formerly intervened from time to time concerning improvements of performance and productivity are being used to promote quality and the optimisation of resources in all corporate functions: key factors in finding the competitive edge.

The break-up of the Soviet Union has had an important effect on the development of East European business consultancy. These include political risk studies, industry infrastructures analyses, legal system assessment, investment analyses and market analysis. A smaller market exists for consultants to work directly for East European authorities. These public authorities demand advice and expertise to establish foundations or to consolidate their new market economies. The former East Germany currently provides over 15% of the turnover of German consultancy firms. To a large extent, this growth has compensated for cutbacks in consultancy assignments in markets such as the United Kingdom. A number of West European firms have established "test" offices in, or sent consultants to, Eastern Europe, mainly Hungary, Poland, CSFR and Russia. Consultancies based in Northern Europe tend to be far more active in the region than those based in Southern Europe. The Anglo-American consultancies associated with multinational accountancy practices tend to dominate.

Supply and competition

The majority of management consultancy in the EC is carried out by local consultants. Foreign companies often use the services of EC based consultants to provide them with information rather than hiring consultants from their own locality.

Table 3: Management consultancy
Fields of activity, 1992 (1)

(% of turnover in terms of fees invoiced)	B	DK	D	F	I	NL	UK
1. General management (Corporate strategy & organisation development)	20	23	33	13	19	21	10
2. Financial and Administrative systems (Administrative information, Financial consultancy)	13	2	7	12	15	15	12
3. Human resources (including executive search)	17	7	5	18	10	18	10
4. Production and services management (Manufacturing, research and development)	27	6	34	12	17	12	14
5. Marketing and corporate communication (including procurement)	17	5	9	7	5	2	4
6. Information technology and systems	14	46	4	28	31	21	40
7. Project management (including specialised services)	1	7	7	8	2	7	7
8. Economic and environmental studies (including government administration)	2	4	1	1	1	4	3

(1) Figures for EC cover members of FEACO
Source: FEACO

There are no formal regulations that directly constrain cross-border activity. Following the study of the industry carried out by EAG for the European Commission, the most important constraint on the growth of cross-border activity is the client attitudes. These attitudes range from the desire to have local knowledge and understanding to "xenophobia". During the survey for the above mentioned study, industry representatives stated the preference of the public sector for either national or truly multinational consultancies, both of which have local offices. This leaves medium sized consultancies based in other countries at a competitive disadvantage. A second important constraint for cross-border activity, is low fee rates in certain markets (especially Eastern Europe).

INDUSTRY STRUCTURE

Companies

There are five broad categories of consultancies within the industry; high level strategy consultants (usually US in origin), EC multinationals (often developed from accountancy practices), large information technology system groups, consortia and nationally based consultancies. The development of consortia or EC networks appears to be growing, partly because they require lower levels of investment than the establishment of branch offices, while allowing the partners to compete against the multinationals. There is a fairly high level of concentration in the industry with the top 20 firms accounting for at least 50% of total revenues, most of these large firms are also audit companies. There are, however, thousands of independent practitioners, or partnerships of specialist consultants which means that the industry is "polarised" between the large and the small players. Large practices are growing more quickly than medium-sized ones. Some medium size, nationally based consultancies, have expressed concern over this polarisation.

In the top auditing consultancy practices, KPMG (NL), Price Waterhouse (USA) and Arthur Andersen (USA) in particular, have strengthened their market positions by developing management consultancy services.

Strategies

The EC integration process as well as market globalisation have given priority among the industry, in many cases, to establish cross-border strategies. Current cross-border strategies can be grouped under three headings; export, association (via network or consortium) and establishment. The export strategy is recognised by most consultancies as limited since some local representation is usually important. The growth of associate networks and consortiums however, is an important phenomenon, specially among medium sized national firms that are trying to cope with the competition from large firms and networks. Associate networks or consortia may ultimately retard cross-border strategies since such associations are based on referred rather than exported business. The third

Table 4: Management consultancy
Fields of activity of FEACO members, 1992

(% of total turnover)	Countries bracket	EC average
Information and management systems (information technologies)	4 - 46	25
Finance - Administration	2 - 15	9
Strategy - Structures	10 - 33	22
Human resources	5 - 18	12
Production	6 - 34	20
Marketing	2 - 17	10
Others	3 - 11	7

Source: FEACO

Table 5: Management consultancy
Leading consultancy firms within the EC (1)

BR Deutschland	España	Italia	France	Nederland	United Kingdom
Roland Berger	Andersen Consulting	Ambrosetti Consulenza	Arthur Andersen	Berenschot	Coopers Lybrand
MC Kinsey	Price Waterhouse	Andersen Consulting	Bossard	Twijnstra Gudde	PA
Kienbaum	CP	Mc Kinsey	Cegos	KPMG	Andersen Consultants
Treuarbeit	Mc Kinsey	Coopers Lybrand	Sema Group	Ernst and Young	Price Waterhouse
Deloitte	KPMG	Cueno et Associati	Euroquip	Deloitte	KPMG
Arthur Andersen	Mac Group	Galgano & Associati	Algoe	GITP	PE Inbucon
Wibera	Bedaux	Hay	Eurosept	Andersen	Ernst and Young
A.T. Kearney	Bossard	KPMG	O & A	Coopers Lybrand	+ Braxton
KPMG	Coopers Lybrand	Orga	Bernard Julhiet		Touch Ross
BCG		Praxi	Gamma		Bain
		Telos Consulting			ADL

(1) Approximate classification by turnover of management consultancy, excluding computing services.
Source: FEACO

heading, establishment of a branch offices in a host country, is generally regarded as having to be staffed largely by nationals.

Medium-sized, and especially large firms, are increasingly offering multidisciplinary services to gain competitiveness.

REGULATIONS

There are no regulations specifically affecting management consultancy or regulating the type of persons engaged in the profession. There is also no requirement for consultants to be a member of any professional association. In fact, the EC market is currently open to all consultants wishing to work internationally. The only force stopping non-EC consultants from carrying out assignments in Europe would be their failure to gain travel visas.

The legal/regulatory framework is one of self-regulation via a number of national industry associations, membership of which is voluntary. Harmonisation of the standards, certification or codes of conduct applied by these associations is being examined by the FEACO and the International Council of Management Consulting Institutes (ICMCI). However, a harmonised international system of accreditation had not yet been developed, and in practice, there is little mutual recognition between the national associations.

Qualification and certification procedures are being developed in France, the United Kingdom, the Netherlands, Denmark and Italy. The attempts to comply with international standards (ISO) confirm the way in which the industry is maturing.

OUTLOOK

Since mid-1990, market growth has weakened, reflecting the economic downturn. However, the development of market economies in East European countries, following the virtual collapse of communism, will present further opportunity for new growth. The management consultancy companies already involved in meeting East European demand may grow by up to 200% between 1991 and 1994 (based on data on EAG report). Development in the East European countries will need to be largely supported by international finance from developed market economies before more EC consultants will be affordable to developing businesses in those countries. The slowing down of demand and the maturity of the EC sector in the medium-term should lead to more competition and possibly further mergers and alliances between the major consultancies.

Owing to the nature of this service sector, it is very difficult to predict growth rate values for the next five year period. A great deal of management consultancy is ad hoc and often cannot be planned for until firm contracts are made. There are plenty contradictory moves in the sector. Many management consultancy practices have been increasing staff levels in the third quarter of 1992; this comes from more than just optimism. Most already have a clear idea of what lies ahead of them in the next year. Some clients that have retained consultants for a range of management services, including financial auditing, have written management consultancy into their budgets.

Among industry members, there is moderate optimism regarding increases in sales in the next 2-5 years. A survey developed by EAG for the Commission stated that 39.2% of the management consultancies companies interviewed think that sales will increase in a range of 5-10% over the next 2-5 years.

The sectors with largest expected growth are: manufacturing, human resources, project management and information technology. Corporate strategy will experienced a lower rate of growth than in previous years, nevertheless, it will still have, together with information technology, the largest growth over the next 2-5 years. The industry believes that future growth will be mainly driven by the public sector demand rather than private sector demand.

Revenues in the industry will increase in 1993 and 1994, mainly as a result of a higher EC private demand and exponential growth in the East European countries.

Personnel hiring will probably show steady increases. However, the number of non-EC personnel in the industry who are located in EC member states is expected to decline up to 1994.

The earlier mentioned forecasts were made in early 1993 and were the only existing and reliable forecasts. Based on a later evaluation of the general economy, P&G believes the prospects for the industry are slightly more pessimistic than those stated in EAG report. Growth in sales for 1993 will probably reach 0.5%; at the same time, expected annual growth will be around 1.8% from 1994 to 1997.

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Architects
NACE 837

Undertaking the analysis of professional activities led by European architects from an economic point of view is not an easy task. This difficulty is due not only to the lack of systematic and unbiased data available, as is the case in most service activities, but mainly because of the extreme complexity of the actual environment in which the profession of architect is being practised in the twelve countries of United Europe. Although the term "architect" is commonly used worldwide, it doesn't have the same meaning in all countries, especially from a legal point of view.

The European architects' common scope of activities is quite broad and, even though their economic significance is quite poor in the light of consolidated GNP, European architects as a whole have a powerful impact on the evolution of the building industry.

As a matter of fact, considering the huge scope of their tasks from a social and cultural point of view (environment, heritage, well-being...) and considering their high skills, both general and specialised, architects are to be found everywhere in the process of development, design and management of real estates.

The difficulty to represent the outlook of this profession is further enhanced by the fact that the architect is less and less an isolated professional. He is more and more implied in highly complex combined professional teams that require all sorts of complementary features to meet the requirements of complex building or development programmes requested by the various sleeping partners.

In order to make-up for the highly fluctuating effects of the economic trends in the building and real estate markets, many "architects' firms" endeavour to diversify their activities in related fields such as the management of real estates, surveying, programming, planning, home design, landscaping, city planning, etc.

As all objective data likely to usefully further complete the economic statistics related to the profession of architect have not yet been collected, it seemed necessary to have an outlook of the profession by considering the actual situations that vary from one country to another.

INDUSTRY PROFILE

Training

Generally speaking, the training of architects at a university level covers five academic years. However, in many countries, there are variations in the educational networks that are characterised either by specific options offered by the educational institution or by the nature of the training. There are for instance options in the technical or scientific field or other options in the field of art and creativity. Situations vary with the type of institution considered, whether they are Higher Vocational Training Institutes, Higher Institutes of Architecture, so-called "Polytechnical" Institutes or Universities.

The training of the architect takes place at the highest level of education thanks to highly diversified curricula composed of core syllabuses and specialised courses. It makes it possible for those who have been granted their diploma to enter highly diversified careers that are often far from the practice of the profession of architect. Some countries require a one-year or two-year training period, reserved to those fully qualified professionals who intend to specifically practise the profession of architect.

The architects' title

Institutions teaching Architecture deliver a diploma that stipulates the qualification or skills and bears with a title: namely the title "Architect". This title does not necessarily provides the right to practise the profession and, in some countries, it is not required to have been granted the title of "architect" to practise the profession. Moreover, the title "architect" itself is not protected everywhere so that in some countries like Denmark for instance just anybody can claim he is an "architect" and can practise the profession, although in reality only qualified architects are ever employed. In some countries, the title or diploma required to practise the profession of

Table1: Architects
Number of architects and students(1)

	1983		1989		1990		1991(2)		1992
	Architects	Students	Architects	Students	Architects	Students	Architects	Students	Architects
Belgique/België	5 940	3 400	6 500	3 400	8 761	N/A	8 850	N/A	8 950
Danmark	4 900	2 270	N/A	N/A	5 700(4)	650	6 000	1 675	5 944
BR Deutschland(3)	60 424	29 823	N/A	48 000	67 533(4)	39 057	67 770	41 205	88 657
Hellas	9 500	1 000	N/A	N/A	12 240(4)	1 821	13 000	N/A	12 661
España	10 391	13 856	11 000(4)	14 000	19 243(4)	16 253	20 600	19 289	20 528
France	20 081	16 200	28 850	13 000	25 746(4)	13 635(6)	27 200	15 500	26 405
Ireland	1 200	475	N/A	N/A	N/A	500	1 350	520	1 350
Italia	65 000	66 000	N/A	N/A	53 300(5)	90 000	50 000	N/A	N/A
Luxembourg	125	50	200(4)	75	265(5)	44	290	N/A	N/A
Nederland	2 500	3 000	5 000(4)	2 500	4 665(4)	3 040	4 900	N/A	N/A
Portugal	N/A	N/A	N/A	N/A	4 198(4)	2 696	4 516	N/A	4 855
United Kingdom	27 575	7 529	31 000	7 200	31 000(4)	7 600	33 000	8 800	31 300
EC	N/A	N/A	N/A	N/A	233 951	175 296	237 470	N/A	N/A

(1) For 1991, data on students not available
(2) Estimate
(3) Excluding East Germany
(4) Self-employed and employed architects on national registers
(5) 1988/1989
(6) 1989/90, excluding the students of the Ecole Speciale d'Architecture de Paris and of the Ecole Superieure des Arts et Industrie de Strasbourg
Source: ACE

architect may vary: (civil or construction) engineer, architect-engineer, architect, certified architect, etc.

Missions and services provided

Within the large scope of architecture, missions carried-out by architects are highly diversified. In most cases, this mission consists in developing a space framework in which human activities provided for in the programme developed by sleeping partners will take place. In some cases, this mission is also extended to the follow-up or the supervision of the building works up to their completion (a mission which is mandatory in Belgium).

More and more, the mission of the architect covers the whole building process, from the development of the programme and the pre-feasibility study to the completion of the file required by the administrations and by those who will carry-out the works through all the coordination and works planning services, the follow-up, the supervision of works, the advice and assistance to be provided to the sleeping partner and, finally, specialised services in real estate management of completed buildings. This process also applies to refurbishment and rehabilitation operations.

Therefore the activity of architects' firms covers significant and diversified services that require a structure and an organisation adapted to the scope and the diversity of tasks that result from the architectural missions which they have been entrusted with.

REGULATIONS

Legislation and liability

One of the most significant factors determining the cost of services provided by the architect is the burden of civil liability which this activity involves. Again, there are large differences in the twelve countries of United Europe. In most countries indeed, the legislation requires an architect for the delivery of a building licence. In some countries like Belgium, Spain or Germany such legal obligation is not limited to the development of the building plans, it also applies to the follow-up of the works themselves.

Civil and professional liability may also vary a great deal from one country to another. In the Netherlands, for instance, the damages which an architect may have to pay are limited to his fees for the task he has carried-out and shall in no case exceed one million guilders. The cost of such damages is unlimited in France and in Belgium and damages may be claimed any time during a ten-year post-building period (ten-year guarantee) while this period is limited to five years in Germany.

Professional risks are so high that architects take an insurance to cover such risks, even in the countries where such an insurance is not mandatory. The cost of such insurance may vary a great deal here too. Such an insurance is for instance mandatory in France and in Belgium.

Of course these factors have a significant impact over the cost of services. This important matter is now being tackled in depth at a European level.

Professional rules and regulations

In most countries in which the title of architect is protected and required to be able to practise the profession, in which an architect is required in some cases and in which legal liabilities are defined, the practice of the profession is placed within a specific regulatory framework. Professionals have then to be registered and are submitted to strict codes of ethics.

Controlled professions are also ruled by an Official Institution or a Professional Chamber having widespread powers, namely in the field of ethics.

The rules included in the codes of ethics are also quite diversified though we note, in all European countries, an ethical streamline towards independence and social service that is inherent to the aspect of public interest in architectural creation.

Professional status

From the viewpoint of social legislation, the profession of architect may be practised in very different ways:

- as a liberal professional (self-employed and working on his own behalf);
- as a free-lance worker, working for an employer but bearing himself the cost of social security and retirement;
- as an employee in the private sector (architect, engineering firms, industry etc.);
- as a civil servant in a public administration.

In some countries, architects are not allowed to practise their profession under various statuses that may be incompatible. In Belgium for instance, an architect who is a civil servant is not allowed to practise as a self-employee.

The status that corresponds to the most widespread concept of architect is the liberal profession or the independent employer. As a matter of fact, they are those architects who have most often been entrusted with the mission of developing buildings on behalf of public or private institutions and some of these architects are famous and are recognised for their great skills.

More and more architects' firms or agencies are now setting-up EEIGs (European Economic Interest Groupings) to pool and promote their cross-border activities. They do so pending a European legislation that would make it possible for them to set-up more adequate associations that would be European legal entities.

Structural framework

The evolution of the legislative and economic context obliged professionals practising their profession under the status of liberal professionals or independent employers to look for the most adequate legal form of practice in order to separate their personal assets from those of their professional activity. Many of them have placed their professional activity within the framework of a company. This structural framework also varies to a large extent from one country to another, since some countries accept that the architect has a profession with a commercial nature while others forbid such commercial practice or limit it, probably in order to maintain the personal liability of the liberal professional.

To make-up for this inconvenience, architects have adopted structures that have the "form" of a business company without actually being one, keeping its "civil" object. Others have set-up a company whose object consists in carrying-out a specific professional action that does not involve their personal civil liability. In other cases, the architect is employed by his own company.

The establishment and the registration of a legal entity in order to practise the profession is not authorised in several European countries. The choice of the structural framework does not only have an impact from a tax point of view, it also has an impact over the management of the assets or over the inheritance of the latter.

EUROPEAN HARMONISATION

Competition

Competition can be felt both within the field of architecture and beyond. As a matter of fact, parts of the missions are entrusted by some sleeping partners to professionals who do

not practise the profession of architects, namely real estate and city planning surveyors or engineers specialised in specific techniques, in programming, in coordination, in planning or in real estate management or quantity and quality surveyors and project managers or building consultants, or even interior design architects or designers.

Many building companies and real estate agencies, both in the public and in the private sector, tend to work with multidisciplinary consultancy firms composed of architects and other specialists.

Harmonisation through EC directives

The main directive aimed at the harmonisation of the practice of the profession of architect is Directive 384/85/CE. It aims at harmonising the rights for architects to establish themselves and to provide services in the 12 Member States. It lists the education institutions that are authorised to deliver the diploma and the title of architect as required by the cross-border practice of the profession. The profession of architect is the only profession in the building and real estate industry that rests on a European Directive which is specific to it. This European Directive has been included in the national laws of most of the 12 countries and does not raise many difficulties in its application.

Voluntary harmonisation of the profession

The architects of the EC have set-up an Architects' Council of Europe whose objective, among others, consists in endeavouring towards a harmonisation of the practice of the profession of architect in Europe as a whole. The various commissions within ACE are working actively and in a concerted way to draft reference documents, regarding, namely, the missions, the fees, the principles of professional ethics, etc. in a spirit of harmonisation. Regional cross-border relationships between professional organisations are also making efforts with a view to harmonise the practice in the field, while respecting national specific characters.

OUTLOOK

The architects are conveniently placed at a cross-roads that makes it possible for them to observe, as from the start, all the trends in the building and real estate markets. We note that large architects' firms that are linked to multinational sleeping partners are more significantly hit by these movements.

On the other hand, smaller or middle-sized architects' firms seem to adjust themselves to economic fluctuations in a more flexible way. The number of large firms with an international scope seem to get smaller or seem to keep the same size while the number of small-sized or middle-sized firms is increasing and is better adapted to the needs of local markets in terms of savings and personal credits.

One of the factors in the evolution of the profession is the contribution and the more systematic use of new tools such as CAD (Computer-Aided Design) in the field of design and in the management of projects.

Generally speaking, beyond the issues of the evolution of professional ethics, the most significant problems which the profession of architect will be faced with in the short term is its fundamental approach towards a commercialised nature of its activities and structures. In some countries, this approach could have an impact both on the way to use management and marketing techniques and on the way to meet some rules of professional ethics. This evolution is not specific to architects only, it is specific to all professions.

The various Architects Conventions in Europe and throughout the world now emphasise the need to highlight the architect's mission of public interest by taking into account environmental concerns. There is no doubt that most European architects are open to these options but that these will be clearly translated into architectural production only once such European architects have a reliable information on all building products and techniques from the environmental point of view.

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Construction economists
NACE 837

The construction economist - traditionally known in various countries as the quantity surveyor, the metreur-verificateur, and the geometra - is a professionally qualified expert who assists the client/owner/building promoter in contractual, financial, managerial and economic matters, to optimise the value of a construction project over its lifetime.
Building surveyors and construction experts are closely associated with construction economists and are included in this monograph.

Table 1: Construction economists
Number of construction economists, 1989 - 1990 (1)

	1989	1990
Belgique/België	20	20
Danmark	68	80
España	15 000	15 500
France	6 100	6 500
Ireland	340	350
Nederland	250	250
Portugal	490	500
United Kingdom	22 268	23 200

(1) Estimates for 1989
Source: CEEC

INDUSTRY PROFILE

Description of the sector

The services of the construction economist encompass :

- project development;
- project and quality management;
- feasibility studies, including the environmental impact;
- risk analyses;
- cost information and estimates;
- drawing up bills of quantity;
- drawing up project specifications;
- planning of time scales;
- preparation of documentation and analysis of tenders;
- contracts between client and technical consultants and between clients and contractors;
- planning of site and security measures;
- logistics to and on the construction site;
- planning of building maintenance and operation;
- facilities management;
- arbitration and related services.

In France, and Ireland, construction economists are trained as quantity surveyors. In the United Kingdom they are trained as quantity surveyors as well as building surveyors. Traditionally quantity surveyors deal mainly with new construction while building surveyors specialise in facilities management, building pathology, maintenance and refurbishment. In other countries the services of construction economists are provided by several professions. In Germany construction economists are either architects or engineers by training. In Spain and Portugal they are technical architects - Apraejadores y Arquitectos tecnicos. In the Netherlands and Finland they are architects and engineers who have specialised in construction economics. In Belgium the construction economists are predominantly engineers and in Denmark they are architects, construction technologists and engineers who have specialised in construction economics and participated in a post graduate training programme.

As the professional training and the role of the construction economist varies from country to country - only in the United Kingdom and Ireland is the situation very similar - a European Association of Construction Economists, CEEC, was founded in 1979. The aim of CEEC is to harmonise and promote the profession on a Europe wide basis. In particular the organisation works to:

- establish guidelines for the definition, contents, practice, and supervision of construction economics;
- coordinate working methods;
- facilitate the exchange of information and experience;
- promote basic and continuing education of construction economists;
- promote the use of qualified construction economists.

So far the CEEC has organised a system for the exchange of information and experience - especially on costs, time scales and tender actions.

In Ireland and the United Kingdom quantity surveyors are traditionally occupied in new construction, while 10 000 building surveyors specialise in facilities management, building pathology, maintenance and refurbishment. To recognise the distinct profession of building surveyors a special European Association for Building Surveyors/Experts, AEEBC, was founded in 1991. Its statutes and work programme are very parallel to those of CEEC and it also maintains close links with the CEEC.

Recent trends

In 1993 close to 50 000 construction economists were registered in the national, professional associations in EC countries, excluding Germany, where presently no figures are available. In addition more than 20 000 building surveyors operated in Italy, the United Kingdom, France, Belgium, the Netherlands and Ireland.

Building surveyors realised a turnover of about 1.4 billion ECU in the six Member States mentioned above for which data are available. In the United Kingdom the turnover of quantity and building surveyors combined amounted to about 2.7 billion ECU.

The activity of this sector mainly follows general economic developments, and in particular developments in the construction sector.

MARKET FORCES

Demand

Capacity of the EC construction industry exceeds demand for construction. This will be the case for years to come, except in eastern Germany. Demand here refers to effective demand reflected by the resources actually allocated to construction, not to the obvious need for improvement of older dwellings with poor sanitary installations, inadequate heating systems and in poor repair. Only a large-scale, determined EC effort to obtain a substantial reduction of CO2 and CFC pollution within a short span of time might be able to redress the balance between supply and demand in the building in-

Table 2: Construction economists
Independent private practices of construction economists, 1989 - 90 (1)

	1989 Total number of firms	1989 Average size	1990 Total number of firms	1990 Average size
Belgique/België	10	5	10	5
Danmark	58	5	50	5
España	3 000	5	3 000	6
France	1 500	4	1 500	4
Ireland	110	8	110	8
Nederland	200	5	200	5
United Kingdom	2 226	20	2 300	20

(1) Estimates for 1989
Source: CEEC

dustry. The resulting demand for the modernisation of existing buildings could lift construction demand to full capacity level for an extended period.

The number of construction economists in the various EC countries reflects the degree of competition and the stage of professionalism in the particular property market. Until now the decision to start a construction project has been motivated almost everywhere by a direct need for production infrastructure, or for dwellings for a growing population in the cities, and not by considerations on the internal interest rate of the project. The exception is the United Kingdom where professional developers of construction projects emerged as early as in the second half of the last century. Furthermore, until recently the major part of income from investment in property has originated from increases in value. Consequently the incentive for improvement of productivity in construction has been small. However, overcapacity in industry and high vacancy rates in existing buildings have depressed the value of real estate substantially. The unoccupied space is not primarily a result of economical recession but a consequence of increasing cost competition in many economic sectors. Increases in productivity are often accompanied by a decline in the need for labour and space.

The response to increased competition in the construction sector is likewise an increase in productivity, which must be achieved by an increasing specialisation of the various construction activities. This creates a need for the services of the rapidly growing number of construction economists. Their function in the construction process is to optimise the contractual and financial interests of the client.

The need for construction economics is amplified by the EC Directive on Procurement of Services. Public procurement contracts with architects, consulting engineers or design teams exceeding 200 000 ECU can be awarded only after an open or limited tender. Criteria for awarding contracts are either lowest price or the economically most favourable bid. The EC directive on services only deals with public procurement but in reality the principle of tendering is expected to be applied to almost all procurement of services. For these reasons there is a growing demand for the skills of construction economists even though the demand for construction is declining. Their skills are needed by purchasers of construction services in planning the procurement of services and in evaluating the bids, as well as by those bidding in formulating a competitive proposal.

Production process

The nature of the services provided by construction economists evolves over time. The following elements are becoming increasingly important:

- assistance with bidding for construction services;
- quality management;
- use of information technology;
- optimising the financial interests of the client;
- care for the environment.

The salient characteristic of tender and bidding for immaterial services is the difficulty of specifying the exact nature and quality of services wanted. The present classifications of services in the construction industry, often drawn up as part of fee scales, are rather general, and consequently not very suitable for tender or bidding. In response to these problems the CEEC has started to formulate a Code of Practice. It is based on a standard model for project management and includes standard formats for all kinds of documentation. The aim is, through consultation within the AEEBC and the CEEC, to produce a European Code. This Code will be implemented in the various countries over a period of time. Initially it will merely serve as a structure for decision making, and gradually it will prescribe general contractual conditions.

Quality management according to EN 29 001 is expected to be included in all contracts. The primary aim of quality management standards is not to improve basic services but to reduce time spent on negotiation of contracts, time wasted on misunderstandings, inter professional friction, and judicial disputes. For the client the main advantage will be the reduction of these indirect costs, as the safeguarding of the interests

Table 3: Construction economists
Breakdown of the services provided, 1989

	Danmark	España	France	Ireland	Nederland	United Kingdom
Public sector	7	22	5	12	3	22
Private sector	93	78	95	88	97	78
Total	100	100	100	100	100	100

Source: CEEC

of the consumer in the case of design and construction defects may be provided by an EC directive on liability.

A thorough and intelligent use of information technology and exchange of data offers a possibility for substantial cuts in production costs. Furthermore as a service to the client a database can be constructed with all data relevant to facilities management - structured in a functional way. This database is handed over to the operator of the completed building, and helps to cut costs in facilities management.

The financial interests of the client are optimised by evaluating the expected payback of the project over the next 20-30 years before the project is started, and by the efficient management of the design and construction process. Income from property mainly derives from the difference between income/rent obtained and costs of running and maintenance. The evaluation of the payback must thus focus on life cycle costs, location, indoor climate, design and the various 'green' issues, in that order.

INDUSTRY STRUCTURE

Companies

Construction economists are engaged as employees by governmental institutions, local authorities, architects, contractors, and in consulting companies owned by construction economists. The total number of construction economist companies operating on a business service basis is about 7 500 in the EC. In most Member States the majority of construction economists is employed in private consulting companies. However, in some countries, notably the Netherlands and Spain, a substantial majority works as employees within contracting organisations. In all countries a smaller number of construction economists works for the public sector.

The total number of private companies within the EC Member States varies from 10 in Belgium to 3.000 in Spain. The average number of qualified staff in such firms is less than 10, except in the United Kingdom, where the average is 20. However, there is a small number of firms, particularly in the United Kingdom, with a total worldwide staff in excess of 100, and in some instances in excess of 500. In Denmark only five private companies work exclusively in construction economics. The other are predominantly architectural firms owned by or employing construction economists.

ENVIRONMENT

About half of CO2 emissions in Western Europe results from the use of energy in buildings for heating, lighting and air condition. In addition, air condition accounts for about half of the CFC emissions. Consequently major changes must be implemented in the design of new buildings as well as in existing buildings.

Along with other environmental objects this presents an enormous challenge to building owners - and a need for services rendered by construction economists in order to arrive at optimal solutions.

REGULATIONS

No formal regulations exist for construction economists but professional training is based on the directive on Mutual Recognition of Diplomas.

OUTLOOK

In general, the outlook for the construction industry is bad. However, as a result of increased competition among building owners, the directive on Procurement of Services, and the need for a variety of measures to protect the environment, the outlook for construction economists is quite good. Their services will be in demand in construction as well as in civil and heavy engineering. Further demand will originate from the need for new construction and extensive rehabilitation in Eastern Europe and the absence of local know-how concerning project management and other fields of construction economics.

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Engineering consultancy services
NACE 837

In 1992, engineering consultancy and related services affiliated to EFCA accounted for more than 8 000 firms for both the EC and the EFTA countries and for about 200 000 persons employed within the same area. However, compared with 1991, turnover has increased when staff is reduced in favour of more free lance consultants hired by large companies.
Competition is mainly between in-houses and private services. 1992 showed public demand decreased in favour of private demand in almost all EC countries. The Single European Market, however, appears to promote cooperation.
The outlook for 1994 is brighter than for 93 as the general economic situation improves.

INDUSTRY PROFILE

Description of the sector

Engineering consultancy services are defined as the intellectual services which aim at optimising investment projects in, inter alia, industry, construction and infrastructure, at all stages of a project from its conception to its actual functioning. These services are provided either by engineering consultancy firms, consulting engineers, engineers employed by construction firms, design firms or public agencies which employ engineers and design consultants, or by individual engineers and consultants. All of them are equipped with highly specialised technical knowledge and provide comprehensive multi-disciplinary neutral services, independent of any supply or manufacturing interest. Their main objective is to optimise investment projects by proposing the lowest cost - highest investment productivity engineering solutions, consistent with the particularities of the specific markets. The broad range of these services includes pre-feasibility studies, preliminary designs, cost-benefit analyses, working drawings, efficiency investigations, building management and supervision of construction, commissioning technical management and advisory services, management, overall planning, project supervision and logistics. Engineering consultancy services include engineering design and construction services. An engineering consultant could be responsible for part of a project or for a whole project from the inception itself to the final inspection. The latter projects are known as turn-key-projects.

Engineering consultancy services apply to residential and non-residential buildings, to civil engineering like transmission lines, power plants, transportation facilities, public work facilities, environment, telecommunication, industrial plants and other technical services (e.g. geology, hydrology, ship-building and marine engineering).

Engineering consultancy services can be traced back to the 18th century when they first emerged in the United Kingdom construction sector. Before the second world war, the international market was dominated by British companies. Since 1946 the United States became more and more important. In the sixties and early seventies the market changed significantly to an international market. Large projects financed by international aid programs especially in third world countries influenced the market situation enormously.

Engineering consultancy services are, to a large extent, part of the construction industry but are not separately reported in public statistics. Thus there are only data available for the EFCA and national association members.

Table 1: Engineering consultancy services
Main indicators (1), 1992

	Number of firms	Turnover (excl.VAT) (million ECU)	Number of persons employed	Exports (million ECU)	Export intra-EC	Export extra-EC	Exports as share of turnover (%)	Average no. of employees per firm	Turnover per employee
Belgique/België	102	300	4 150	75	3	72	25	41	72 290
Danmark	310	610	9 540	138	N/A	N/A	23	31	63 940
BR Deutschland	2 940	3 830	41 570	628	N/A	N/A	16	14	92 130
Hellas	153	95	3 750	9	N/A	N/A	9	25	25 330
España	187	1 110	11 020	160	62	98	14	59	100 730
France	866	2 800	23 500	680	N/A	N/A	24	27	119 150
Ireland	96	30	820	N/A	N/A	N/A	N/A	9	36 590
Italia	180	1 690	21 500	490	2 990	100	29	119	78 610
Luxembourg	46	40	600	3	N/A	N/A	8	13	66 670
Nederland	250	810	10 800	238	N/A	N/A	29	43	75 000
Portugal	57	95	1 950	6	1	5	6	34	48 720
United Kingdom	634	3 060	42 580	1 021	73	948	33	67	71 870
Total	5 821	14 470	171 780	3 448	N/A	N/A	24	30	84 240
Austria	1 280	N/A	5 160	N/A	N/A	N/A	N/A	4	N/A
Finland	221	360	8 900	75	N/A	N/A	21	40	50 000
Norway	350	300	4 070	50	7	43	17	12	73 710
Sweden	275	670	8 730	51	6	45	8	32	76 750
Switzerland	244	620	5 920	104	N/A	N/A	17	24	104 730
Total	2 370	N/A	32 780	N/A	N/A	N/A	N/A	14	N/A

(1) Only EFCA figures
Source: EFCA

Table 2: Engineering consultancy services EC trade balance

(million ECU)	1991	1992
Domestic market	9 800	11 000
Intra-EC trade	400	400
Exports	3 600	3 500
Total turnover	13 500	14 500

Source: EFCA

Recent trends

In 1992, an increase of the turnover and of the total of registered firms was accompanied by a reduction of staff compared with 1991. Thus the average turnover per employee in 1992 is significantly higher than in 1991. The total turnover in the EC countries increased more than 8%. This increase was due to the domestic markets. Foreign markets showed a downswing in 1992. The average number of employees per firm decreased from 34 persons in 1991 to 30 persons in 1992.

Though engineering consultancy services represent only about 8% of the construction industry, their economic significance is far more important, because the sector is causing a large turnover in the production industry for equipment and material. The sector is always moving. The markets for engineering materials, new technology and equipment are always producing new ideas. Engineers are the users of these new ideas. They are responsible for the diffusion of new processes, materials and technologies throughout the economy and constitute an important link between research and development and production. The determining factor for these processes is the search for more efficiency, productivity and competitiveness to the benefit of the client.

Exports still play an important role in the engineering consultancy services sector, because these services use well known domestic technology, there is an important demand for material and equipment caused by engineering consultancy services. This fact influences the balance of payments of exporting countries.

International comparison

During the eighties the US was steadily loosing market share in favour of Europe and Japan. Demand decreased until 1987. The opening of east European markets and the necessary reconstruction of war damaged countries caused increasing demand. This is the reason for the increasing importance of the international markets.

Foreign trade

Foreign trade is of significant importance for the engineering consultancy services sector, which is still dominated by a flow from developed to less developed countries. The majority of exporting engineering consultancy service companies is registered with international organisations which play an important role in the awarding of contracts to consulting firms. The most well-known are the World Bank, The Asian, Inter-American and African Development Bank, the EC, and some organisations of the United Nations like the EBRD, FAO, WHO and UNDP.

An increase of the intra-EC trade, due to the start of the Internal Market evolving increased mobility for engineering consultants across the borders, is still to be measured.

In 1992, Germany holds the first rank within the EC concerning the number of companies and turnover. In Germany, the service structure is dominated by many SME's, with an average number of employees per firm which is under the EC average. Although the largest enterprises have their headquarters in the United Kingdom, it is interesting to note that the greatest average size per enterprise is in Italy. The firms with the smallest average number of employees are located in Ireland. Concerning exports as share of the total turnover, the United Kingdom is on top of the rank followed by Italy and The Netherlands. Denmark is the only EC country that shows substantially increased exports in 1992. In comparison with that, the exports as share of turnover fall from 27% in 1991 to 24% in 1992. The largest average turnover per employee is calculated for France and Spain.

MARKET FORCES

Demand

Demand for engineering consultancy services is closely related to the general economic situation and activity. Three main factors are of important influence: public and private investment, technological progress and the availability of finance. Engineering consultancy services derive most of their turnover domestically. In the export market, demand from international working organisations has the greatest importance. There are still contracts for consultancy in third world and less developed countries offered. But also some large European projects (e.g. the channel tunnel) increased the intra-EC demand for engineering consultancy services during the last decade.

In 1992, from the domestically generated turnover, public demand decreased in favour of private demand in almost all EC countries. The reason therefore was a lack of funding for infrastructural investment in most EC countries.

Supply and competition

The recession seems to make price as a selection criterion more often used. This creates concern by engineering consultants: the scope of work in a commission of engineering consultancy is often necessarily ill-defined and must itself be developed by the engineering consultant working with the client. When it is known that a commission is to be awarded on the lowest price, there is inevitable pressure on those, submitting offers to base their tenders on using less experienced and cheaper staff. This will tend to minimise the scope of work offered to meet no more than what the client specifies. Furthermore an apparent saving in the initial stages will seldom provide the best value for money for the implemented project as a whole. However, most international lending agencies select engineering consultants by using the combined criteria of quality and price. On public projects, private engineering consultancy firms are often in great competition with in-house engineering consultants. Especially the public sector is using its own in-house consultants. This is an other competitive disadvantage for the profits of private consulting engineering companies. The externalisation of in-house services could prove decisive factor for the development of EC engineering consultancy services sector. Today small enterprises which are only covering part of the services required by the clients, are facing strong competition from large enterprises. Such are firms with own planning offices and firms which offer the complete management and coordination of projects. This means for smaller firms or independents that they have to specialise in fields where the larger enterprises are not working in or to cooperate more with larger enterprises as it was the case in the past. The Single European Market is assumed to enhance cooperation. In cases where foreign enterprises are commissioned with work abroad they will need local experts who know the specifics of the national markets and their regulations. 1993 shows already a tendency towards an externalisation and to a reduction of staff in favour of more free lance consultants who are hired by large companies.

Table 3: Engineering consultancy services
The EC Top 20 consulting engineering and/or architect groups in 1992 by turnover

Rank	Group	Country	Turnover (million ECU)	Number of employees
1	Heidemij Group	NL	359	2 403
2	Serete Group	F	286	1 606
3	Sir Alexander Gibb & Partners	UK	215	4 500
4	Ove Arup Partnership	UK	210	3 878
5	G. Maunsell & Partners	UK	199	2 300
6	Mott MacDonald Group	UK	182	3 400
7	WS Atkins Group	UK	160	2 533
8	FUGRO-McClelland BV	NL	136	2 029
9	DVH Group	NL	122	1 850
10	Acer Consultants Ltd.	UK	120	2 039
11	COWI consult	DK	103	1 699
12	Carl Bro Group	DK	100	1 692
13	BAeSEMA Ltd.	UK	98	1 450
14	Ramnboll, Hannemann & Hojlund Group	DK	91	1 400
15	Tebodin BV	NL	90	1 300
16	Fichtner Consulting Engineers	D	86	1 200
17	Sir William Halcrow & Partners Ltd.	UK	85	1 955
18	Sener S.A.	E	82	835
19	High-Point Group	UK	82	1 205
20	Lahmeyer International Group	D	75	2 100

Source: Konsulttidningen, number 4, 1992

INDUSTRY STRUCTURE

Companies and strategies

In the 1960's, engineering design services were closely related to trade in engineering equipment. Due to the externalisation process engineering design companies are now more independently operating. However, engineering consultancy is still causing exports of material and equipment.

The engineering consultancy sector is highly concentrated. Besides a great number of small, sometimes even one-man firms, there are giant companies existing as well. According to employed persons the largest engineering firms in the world are Canadian, American and Finnish. The world Top 30 1991, shows 13 US, 2 Canadian, 7 English, 2 Dutch, 2 Swedish, 1 Finnish, 1 German, 1 Japanese and 1 Egyptian company. Within the EC and EFTA countries the largest companies have their headquarters in The Netherlands, Finland, the United Kingdom and Sweden. Swedish and Finnish companies are of great importance in the European market. During 1991 and 1992 most of the large companies reduced their staff due to the recession. The last few years some larger companies merged. The trend to create international alliances is still continuing. The reason therefore is to gain market positions in foreign continents and countries. Since 1990 the list of the most important companies within the EC has not changed much. If companies expanded, this was mainly due to acquisitions and not by organic growth.

On the international market firms often cooperate with domestic firms, which have knowledge about the domestic market.

REGULATIONS

The title consulting engineer is not protected by an official EC regulation. Nevertheless regulations are influencing engineering consultancy services to an important extent. However, they are still varying from country to country. The following EC regulations are mainly influencing the sector: the Council Directive 92/50/EEC of 18 June 1992 relating to the coordination of procedures for the award of public service contracts (Public Procurement) and the Council Directive 92/57/EEC of 24 June 1992 on the implementation of minimum safety and health requirements at temporary or mobile construction sites.

The Directive on Services allows every professional to offer his services in a foreign EC country. The aim of this directive is to promote price competition on the markets for services. National laws were to be brought in compliance with this directive as of July 1993, however some countries still have to do so.

The EC Directive for Public Procurement is relating to the coordination of the procedure for the award of public service contracts. Studies with fees exceeding 200 000 ECU fall within this directive. They are to tender on the EC level. This directive is already adopted into national law in Denmark, Germany, Greece, Ireland, Italy, Luxembourg and the United Kingdom.

The Directive about the minimum of safety and health requirements is still in discussion in most EC countries. This directive is only adopted in Luxembourg.

OUTLOOK

In spite of the bad economic situation also influencing engineering consultancy services in most EC countries in 1993, a small improvement of the general economic situation is expected for 1994. The development of the financial situation of public authorities will be of great influence for the short and medium term perspectives of the engineering consultancy services sector. At the moment the demand for engineering consultancy services by public administration is at a standstill in some EC countries.

Some factors will probably improve the situation of the engineering consultancy services in the near future. But this will be different from country to country. The harmonisation of environmental regulations, stricter environmental control and technological progress in Europe and the USA, and the reconstruction of the infrastructure in the former planned

economies in Central and Eastern Europe will cause additional demand. Moreover planned large projects in Asia (e.g. a huge dam at the Jangtse river in China), Africa and Latin America and the construction and completion of a European transport network will cause additional demand for engineering consultancy services.

These facts imply that most of the services are needed in Europe. This will increase the market of EC engineering consultancy services during this decade but the Single Market is expected to cause keen competition among domestic services and foreign services.

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Geodetic surveying
NACE 74.2

Due to the economic situation and the wide spread market saturation, the industry will in the near future show no growth, with the exception of Germany. The long term prospective is, however, promising. The number of people employed in the industry will remain stable, but qualitative demands will become higher. There are over 65 000 professionals working in the industry of which more than half are in France and Germany, and about half are working in the public sector. There is a trend towards larger companies offering a more diverse range of services.

INDUSTRY PROFILE

Description of the sector

Geodetic surveyors measure the size, position and three dimensional shape of the earth surface and the objects upon or in it. The following areas of expertise come within this broad description: cartography (national and international, small or large scale, plans, navigation charts, etc.), measured building surveys; tunnelling and mining surveys; measurement and location of underground structures and services; cadastral and boundary surveys; industrial and engineering surveys; preparation for construction; monitoring and deformation surveys; land and geographic information systems; ocean bed, coastal and river surveys; measurement of marine resources; and other surveying services.

In many Member States, urban and regional planning, land and building valuation, soil testing, land management, and management of development can also come within the scope of the geodetic surveyor, although not necessarily as part of a traditional definition of the geodetic activities. Measurement systems can be land, sea, air or space borne. Examples of these systems are remote sensing (land, air or space), Global Positioning Systems (space), hydrography (sea) and tachymetry (land). Much of the geodetic surveyors work, however is in the management, analysis and structuring of the acquired data, in order to create information (e.g. maps, plans, positions, size etc.) from this data.

Recent trends

In many Member States, the geodetic surveyor is traditionally a public servant as in the Netherlands, Germany, France, or the access to the profession is legally protected as in Belgium and Germany). Only in some Member States, like the United Kingdom and Ireland has the profession been open to competition. In the last decade this has changed in some Member States (e.g., the Netherlands). The number of people employed in the private and the public sector together, is given in Table 1. In total over 65 000 surveyors and technicians are employed in the countries of the European Community. If this figure is recalculated over the number of inhabitants in each country, the level of penetration is highest in Denmark, Greece and the Netherlands and lowest in Spain and the United Kingdom. The high level of penetration in Denmark and the Netherlands can be explained by the legal situation in these countries and the demand for high accuracy. In Greece the penetration level is high because there are many other activities which involve geodetic surveyor.

The penetration in the United Kingdom is low because of the large number of other types of surveyors, who are not included in the figures, and the fact that the land registration system in the United Kingdom is essentially descriptive. In Spain it is expected that the number of surveyors will grow in the coming years.

Table 2 shows the sector in which the geodetic engineers and technicians are employed. Clearly visible are the large differences between the countries: it varies from over 80% public sector employees in Italy and Germany to the opposite in Belgium and Denmark who have 80% private sector employees. In the near future no major changes are to be expected which could significantly alter this.

The turnover in the private sector in each Member State is given in Table 3. About three quarters of the estimated total turnover in the private sector is generated in just three countries: France, Germany and the United Kingdom. There is widespread market saturation within the EC, with the exception of Spain and Germany.

MARKET FORCES

Demand

Geodetic surveyors provide a service to developers, builders and contractors, architects, planners, lawyers, engineers, geophysicists, oil companies and government bodies.

The list is a growing one as more people, for instance in earth sciences, start to benefit from the services and skills of the profession. Satellite positioning systems have opened new markets where conventional techniques would not have been considered due to cost. However, the apparent ease of

Table 1: Geodetic surveying
Number of geodetic surveyors, 1991-1992 (1)

	Surveyors	Technicians	Total
Belgique/België	N/A	N/A	2 500
Danmark	800	1 200	2 000
BR Deutschland	7 000	8 000	15 000
Hellas	N/A	N/A	4 300
España	2 000	N/A	N/A
France	3 000	17 000	20 000
Ireland	40	300	340
Italia	5 000	2 000	7 000
Luxembourg	34	77	111
Nederland	580	5 385	5 965
Portugal	1 800	200	2 000
United Kingdom	1 250	2 000	3 250

(1) Estimates
Source: F, L, NL by Bakkenist Management Consultants, Amsterdam and others CLGEE (ZfV 9 and 12, 1992)

Table 2: Geodetic surveying
Share of geodetic surveyors working in the private and public sector

(%)	Private	Public
Belgique/België	80	20
Danmark	80	20
BR Deutschland	20	80
Hellas	45	55
España	67	33
France	60	40
Ireland	N/A	N/A
Italia	14	86
Luxembourg	31	69
Nederland	37	63
Portugal	42	58
United Kingdom	60	40

Source: F, L, NL by Bakkenist Management Consultants, Amsterdam and others CLGEE (ZfV 9 and 12, 1992)

operation of such systems means that often for low precision work the geodesist is involved more in the role of a consultant than a practitioner.

Market differences exist between Member States in the amount of workload derived from the private and public sectors. Belgium, Denmark, France, Greece and the United Kingdom have a larger proportion in the former and Italy, Luxembourg, Germany, the Netherlands, Portugal and Spain a larger proportion in the latter. Generally, cadastral surveys and other public sector works show a fall in demand balanced by an increase in engineering and industrial surveys and large scale mapping.

Supply and competition

Within each country profit margins have been reduced considerably due to the economic downturn, which has its affect on government spending and the construction industry.

In certain sectors of the industry, especially in the areas of land and geographic information systems, computer software companies are competing for work. These companies are also competing for qualified geodesists at a time when most predictions are of a shortage of suitable personnel.

Geodetic surveying is a national business and in many countries even regional. In surveying there is hardly any international competition. Generally over 95% of the turnover is generated in the home country. Only companies in Spain and, to a lesser extent, Luxembourg and Portugal meet serious competition in their home market. The main disadvantages for outside competitors are the regulations necessitating membership of professional bodies and educational requirements.

The focus of some specialised areas, notably aerial photogrammetry and hydrography is almost by nature international. The largest photogrammetry companies have their headquarters in Germany, France, Belgium and the Netherlands, and the major hydrographic companies are located in the United Kingdom and the Netherlands.

The distribution of geodesists is highly correlated with the population distribution overall. The service provided is strongly tied to the land itself and hence the industry polarises where land or real estate is being exchanged, monitored or developed.

INDUSTRY STRUCTURE

Companies

The number of private companies in each Member State is given in Table 4. In total the number of companies is well over 6 000. Most companies (over 90%) are small, less than 10 persons employed. Belgium, Germany, Denmark, Greece and Ireland all have a high proportion of very small companies and in Belgium self-employed status is the normal situation. The United Kingdom and the Netherlands have a more equitable spread of company size. Most larger companies are either technically specialised, for example in aerial photogrammetry and remote sensing (Hansa Luftbild, Eurosens and KLM Aerocarto (NL)) or part of a bigger group such as civil engineering, offering geodetic surveying within their operation (Oranjewoud, Heidemij Advies (NL)). Some larger companies do offer a range of services purely within geodetic surveying (Engineering Survey/Clyde Surveys, Inpark).

Because many of the larger companies form part of a company with activities in other fields, it is hard to rank with any certainty the largest companies operating in this sector.

However, the following companies are amongst the largest operating within the EC. They are listed in order of the estimated size by number of employees: Inpark (NL), Racal Surveys (UK), BRS Grontmij/Geogroep (NL), Oranjewoud (NL), Hansa Luftbild (D), Starkstrom Anlage Gesellschaft (D), Engineering Surveys/Clyde Surveys (UK), BKS Surveys (UK), Mason Land Surveys (UK), Egle Vermessungsbüro (D) and Eurosense (B).

Table 3: Geodetic surveying
Turnover (1)

(million ECU)	1991	1992	1993
Belgique/België	35.5	N/A	36.0
Danmark	59.2	N/A	60.0
BR Deutschland	650.0	N/A	N/A
Hellas	14.2	N/A	15.0
España	N/A	N/A	N/A
France	500.0	522.0	500.0
Ireland	3.9	N/A	4.0
Italia	N/A	N/A	N/A
Luxembourg	3.0	3.0	N/A
Nederland	129.0	107.0	130.0
Portugal	N/A	N/A	N/A
United Kingdom	396.7	N/A	400.0

(1) Estimates
Source: F, L, NL by Bakkenist Management Consultants, Amsterdam and others CLGEE (ZfV 9 and 12, 1992)

Table 4: Geodetic surveying
Number of geodetic companies in the private sector (1)

	1991	1992
Belgique/België	1 000	N/A
Danmark	162	N/A
BR Deutschland	1 400	N/A
Hellas	1 230	N/A
España	60	N/A
France	1 848	1 818
Ireland	15	N/A
Italia	75	N/A
Luxembourg	4	5
Nederland	57	50
Portugal	10	N/A
United Kingdom	470	N/A

(1) Estimates
Source: F, L, NL by Bakkenist Management Consultants, Amsterdam and others
CLGEE (ZfV 9 and 12, 1992), VNBG Report 1991

Strategies

The most general strategies especially for larger companies point towards diversification of services offered and collaboration with associated professionals, particularly in the field of information technology and aerial photogrammetry. Some smaller companies tend to specialise, offering niche marketing solutions to specific problems (e.g. monument measuring). Most companies try to attempt to keep abreast of the latest technological developments, since many professional customers also use these technologies. Lesser themes include efforts to achieve quality accreditation, and a change in personnel structure.

REGULATIONS

The most important regulations are those concerning cadastre. Most countries recognise boundaries based on survey measurements. These measurements are carried out by specialist organisations (e.g. the Administration du Cadastre et de la Topographie in Luxembourg), by public servants (cadastral surveyors in most countries) or by licensed geodetic surveyors (e.g. Öffentlich Bestellter Vermessungs Ingenieur (ÖbVI) in Germany). In the last case, this work often forms a substantial part of a geodesist's activities. Ireland and the United Kingdom have an essentially descriptive system of land registration. The geodesist's role in these two countries in cadastral work is, therefore a minor one. The difference in cadastral law between countries (and also between regions within one country such as exists in Germany) mean that this sector of the market sees little competition across borders.

EC regulations concerning recognition of qualifications for migrant workers are being addressed by the Comité de Liaison des Géomètres-Experts Européens (CLGEE). A detailed report of education for geodetic surveyors within the EC was published in 1988. A second update to this report is being prepared. The CLGEE is striving to harmonise qualification standards and mutual recognition of diplomas. Some cross border commissions have already resulted from these initiatives.

EC directives concerning public service contracts have had no significant effect to date.

In Denmark, Germany, France and Italy the profession is afforded legal protection. In the Netherlands, Ireland and the United Kingdom no such legislation exists. Elsewhere there is a position between these extremes.

OUTLOOK

The outlook in the short and middle long term is strongly linked to the economic situation in the countries of the European Community. It largely depends on the activities of the construction industry, public utilities, off shore industry and the cadastre. Since the construction industry shows in most countries less economic activities, the turnover of the geodetic surveyors in this sector will in general remain stable at best. The off shore activities in the North Sea and the Continental shelf are limited, thus affecting the hydrographic activities in a negative way. This is partially offset by the increase in activities in the far east.

In most Member States, government or semigovernment bodies are facing budget constraints. This too will have its effect on the activities of geodetic surveyors.

In Germany the near future looks brighter, especially for the ÖbVI's. All five new "Länder" (former East Germany) have accepted the ÖbVI's. The market in these five "Länder" is growing with the regulation of land property.

The long term future for geodetic surveyors is good and will rest largely with their ability to adapt to change. Many of the traditional skills in data acquisition are becoming less relevant with the advance of automated systems. However the processing, structuring and manipulation of these data within land and geographic information systems for resource management, planning, route guidance systems and other projects is becoming increasingly important. Collaboration with information technologists will be essential to be able to provide such services.

In general there is a tendency towards fewer and larger companies offering a more diverse service, but there is also a place for small sized companies who offer simple low tech services with low overhead or who invest and can offer state-of-the-art products.

It is estimated that the number of people employed in the industry will remain stable. The qualitative demands will become higher as more and more knowledge is required for the manipulation of data and the user requirements of this data become broader.

Industrial metrology is a growth area where the surveyor's measurement skills are competing with long established methods. It is to be expected that some surveyors will choose to specialise here and increase their market share.

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Landscaping

The landscaping, gardening and sports ground construction industry is finding increased demand with the growing urban population and a concern with a green environment. The sector is dominated by a large number of small to medium sized firms who operate labour intensively. The future for landscaping companies anticipates increased activity in renovation and maintenance of existing parks and gardens along with more complete biological and ecological environmental projects.

INDUSTRY PROFILE

Description of the sector

This sector includes the installation, renovation and maintenance of gardens, landscaping and sports ground construction in private and public gardens, parks and leisure centres. Specific activities like tree maintenance/transplantation, landscaping of public works, installations for noise prevention, creation and construction of ways and places within parks fall within this sector. Less traditional activities are gaining importance, biological engineering and natural landscaping are examples. The former is landscaping by using living plants and inanimate materials like wood, stone, and geotextiles; natural landscaping is the creation of "almost" natural spaces or ecological niches not typically intended for public use.

Data for Member States are incomplete for this sector. In 1990/91 a structural survey was taken among some national associations, however it was non-conclusive, as not all EC Member States participated. Limited data did indicate that in 1991, employment in member companies of national associations in gardening, landscaping and sports ground construction for eight Member States totalled 69 250 individuals. Thus, overall employment figures for the sector clearly exceed 100 000 persons. Germany employs the largest number of landscape gardeners, approximately 31 000, while the United Kingdom, the second largest employer, accounts for 13 000 gardeners. Clearly Germany has the largest turnover per enterprise, with France and the United Kingdom following far behind. The majority of garden, landscape and sports ground construction companies are small and medium sized firms.

Recent trends

Traditional landscaping work such as construction, laying out and maintaining, gardens and parks is the core sector. However, due to the current recessionary business climate, landscaping companies have seen the construction of new gardens, parks and sports grounds facilities decline. In response, firms have been seeking out new fields of work such as: gardens in the backyard, on the roof, or facade and even indoor gardens. Ecological and biological works are also new areas of expansion. Thanks to the increased concentration of urban population, municipal and state projects have been areas of growing interest, for example: landscaping in traffic-restricted zones, natural landscaping of roads and highways, city redevelopment, new private and public parks, play grounds, and leisure centres. Renovation of pre-existing sites and ongoing maintenance is a significant field of work for landscape contractors.

Foreign trade

As most companies are small to medium sized, they depend on a small regional market. Intra-EC projects do take place when the landscaping firms are located close to national borders, or decide to collaborate efforts for a specific contract, or if the firm is highly specialised and is able to fill special requirements i.e. transplantation of larger trees, roof planting.

MARKET FORCES

Demand

The concentration of the population in extensive housing estates, the construction of highways and increasing pollution have made stronger demands for a healthy environment for the public. As a result, the requirements for the construction of gardens, landscapes and sports grounds have not only increased, but are also undergoing a big change.

The data available shows that the landscaping demand is closely divided between privately funded clients and public and semi-public clients. This division is not consistent throughout all Member States, for example, 30% of Denmark's demand comes from private clients, while private clients account for 60% of Belgium's demand. In the United Kingdom and Italy public demand represents the highest portion of sales.

Landscaping often deals with various projects of recultivation (reclamation) and renaturalisation. In general, these projects are a result of a legal condition. An example would be the renaturalisation of gravel pits or quarries, greening of mounds or slag heaps, recultivation of industry fallows or areas under recent construction, and the restoration of damp areas.

Table 1: Landscaping
Main indicators, 1991

	Number of enterprises (1)	Number of persons employed (2)	Annual turnover/enterprise (million ECU) (2)
Belgique/België (3)	2 000	3 000	N/A
Danmark	400	2 400	27.9
BR Deutschland	7 200	31 000	2 439.0
France	6 000	12 000	862.5
Ireland	120	450	10.0
Italia	3 000	1 600	20.9
Nederland	2 200	5 800	129.1
United Kingdom	3 000	13 000	573.8
Total EC 8	23 920	69 250	N/A

(1) Estimate
(2) Covers member companies of national associations in the EC (excl. GR, E, L and P).
(3) 1990
Source: ELCA

Table 2: Landscaping
Turnover by type of customer, 1991 (1)

(%)	Private	Public	Semi-public
Belgique/België (2)	60	30	10
Danmark	30	40	30
BR Deutschland	47	30	23
France	50	45	5
Italia	46	54	0
Nederland	50	40	10
United Kingdom	52	48	0

(1) Covers member companies of national associations in the EC (excl. GR, E, IRL, L and P).
(2) 1990
Source: ELCA

Supply and competition

State companies, most particularly, road construction and civil engineering, are currently main competitors for garden, landscape and sports ground construction companies in the EC. Government initiatives such as employment programs, social rehabilitation, and even agriculture programs compete with private landscaping firms. State financed employment and social programs employ untrained persons to maintain parks and public places. These programs are especially prevalent in Denmark, Germany and the Netherlands. Competition is growing from farmers as government agricultural programs are reducing the amount of cultivated acreage by paying farmers to leave their fields untilled. Another objective is to maintain and beautify the land. Although farmers are not landscaping the countryside or building parks, some of the activity of maintaining uncultivated ground competes with landscaping companies.

Production process

The industry is labour intensive. The average salary per employee per hour varies between approximately 6 and 11 ECU with an average estimated work week of 39 hours. Within the EC, traditional construction machines i.e. wheel loader, excavator and tracked vehicle make up, on average, 45% of equipment used. Transport vehicles are the second largest capital expense followed by machinery and equipment for speciality use e.g., compressors for building paths and squares. The use of special machines varies dramatically among the individual Member States and their needs. Winter equipment is a good example of this.

Professional qualifications are treated differently by public authorities throughout the EC. In the Netherlands, and outside the EC, i.e. Austria and Norway, a professional certification is required in order to manage a landscaping company; whereas, in other countries no certification is necessary to open a landscaping company although professional certificates do exist and membership in national associations require an adequate qualification.

INDUSTRY STRUCTURE

Companies

The industry has a low concentration. Available data indicates that 90% of garden, landscaping and sports ground construction companies operate with less than 50 employees. In fact, in Belgium, France and the Netherlands, most firms have five or less employees. There are only larger garden, landscape and sports ground companies with more than 50 to 100 staff in Germany, France the United Kingdom, the Netherlands and Switzerland. Firms frequently collaborate across national boundaries to expand capacity and expertise in larger projects. At present the market for landscaping services is very price sensitive.

ENVIRONMENT

The push for environmental quality in and around urban centres continues to benefit the industry. As land gets more expensive, gardens and green spaces become smaller. This encourages creative and intensive use of gardens. Reurbanisation projects such as Parc André Citroën in Paris are another example of the urban need for green space.

REGULATIONS

An important area for currently developing EC regulation is the standardisation of quality and safety norms. Lawn quality and maintenance for sports grounds alone is subject to several different norms depending on the use and need for safety of the different facilities. Another concern is the contract bidding process. Public works projects, now must be offered for tender on the EC level instead of a national or local level as before.

Table 3: Landscaping
Main competitors of landscaping companies, 1991 (1)

	B	DK	D	F	I	NL	UK	Number of observations
Agricultural companies					X	X	X	3
Civil engineering companies						X	X	2
Road construction firms	X		X		X	X		4
Social institutions	X	X		X	X	X		5
Employment programmes	X	X	X	X				4

(1) Covers member companies of national associations in the EC (excl. GR, E, IRL, L and P).
Source: ELCA

Table 4: Landscaping
Number of enterprises by employment size classes, 1991 (1)

(%)	1 - 5	6 - 10	11 - 20	21 - 50	51 +
Belgique/België (2)	63	21	9	6	1
Danmark	20	50	15	15	0
BR Deutschland	42	19	20	14	5
France	53	20	8	16	3
Italia	0	5	32	54	9
Nederland	50	20	20	7	3
United Kingdom (2)	0	13	35	20	32

(1) Covers member companies of national associations in the EC (excl. GR, E, IRL, L and P).
(2) 1990
Source: ELCA

Table 5: Landscaping
Future perspectives(1)

	B	DK	D	F	I	NL	UK	Number of observations
Biological/ecological works		X			X			2
Environmental works			X				X	2
Facade gardens				X				1
Natural parks					X			1
Maintenance works		X						1
Recultivation				X				1
New private gardens	X							1
City redevelopment		X						1
Parks		X						1

(1) Covers member companies of national associations in the EC (excl. GR, E, IRL, L and P).
Source: ELCA

Other areas of public policy like social legislation, industrial law and the safety and security directives for work place and machines affect the industry.

OUTLOOK

Landscaping is a growing sector, but as mentioned above, it is linked to general economic development, above all the construction of houses, business facilities and public projects. Although the general economic outlook at the moment is not the best, landscapers are confident for its future development. The 1990/91 survey of participating national associations indicates that recultivation and renaturalisation, leisure centres, natural parks and maintenance work will become increasingly important. Biological/ecological and other more comprehensive environmental works will also grow in many Member States.

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Linguistic services
NACE 839.3, NACE 935

This sector includes translation services, interpretation and foreign language instruction. Demand remained high for these services due to the internationalisation of economies both within the EC and worldwide. Registered professionals in this sector increased 13% from the 1991 total of 11 500, although the actual number of practising interpreters, translators and instructors is much higher. Competition is strong among the major EC languages but less so for others, such as East European and Asian languages. This sector is seeing a greater demand for expertise in specific business or technical fields and experience with computer automated translation programs.

INDUSTRY PROFILE

Description of the sector

Translation and interpretation services, as well as language teachers, belong to the linguistic services. Translators and interpreters are included in NACE 839.3. Language teachers are part of NACE 935 (private tuition).

The translator has the duty to translate texts from one language to another. Translation covers an extremely diversified market. In all realms of human activity, translation is required ranging from commercial and industrial affairs, scientific matters, legislative, press and audio-visual subjects to literary works. In fact, there are two different types of translators. The literary translator who translates only literary texts and the techno-scientific translator who is responsible for all other required forms of translation. The technical translator must keep pace with innovative specialised terminology. This knowledge needs to be more than verbal. Literary translation is extended to encompass fiction, such as plays, essays and poetry. It demands subjective involvement - often identification - with the original author.

Interpretation also covers a wide range of subjects. Interpreters translate spoken words directly from one language into another. Three different types of interpretation exist. Simultaneous interpretation is done instantaneously, mainly during international conferences and with the help of modern communication technologies. Similar to this form of interpretation is whispered interpretation: the interpreter whispers the translation of a foreign language into the ear of his client. This form of interpretation is normally used for speeches or statements, which are directly translated for a second person. The third form is consecutive interpretation. In this case, a person stops talking after a few spoken sentences then the interpreter translates what was said. Then the speaker continues with the speech. The interpreter translates again after some more spoken sentences. This continues until the end of the conversation and is mainly used during face to face conversations.

Language teaching covers language courses provided by public institutions, private enterprises and individual teachers. Besides normal language education during public school time, language teaching, in the form of advanced vocational training, takes place in private language schools or public high schools and in the in-house language courses of big companies.

Professionals in all three groups work mainly as independents or for the public sector. Only a few are employed by private enterprises.

Recent trends

The total number of translators and interpreters registered in the national professional associations within the most important EC countries was around 13 000 in 1992. Compared with 1991, this was an increase of about 13%, mainly caused by a large increase in the BDÜ produced by new memberships of translators and interpreters located in the former German Democratic Republic. Around 70% of all members are women. Most professionals work as free-lance translators. For example, free-lance translators make up almost 100% of the total in France, about 90% in the United Kingdom and about 85% in Belgium. The largest group of employed translators is registered in Germany with around 50% of the EC total; Italy is second with around 40% of all registered translators. The national professional associations estimate that their registered members cover only a quarter of all persons working as a translator. However, in each reporting country the figures for registered translators are slightly increasing year by year.

The literary translator is normally paid in a lump sum and/or royalties, while the technical translator tends to be paid by the word, line, page or hour. In some societies, technical translation is financially more rewarding than literary translation, in others the reverse is true. Considering that a translator has a full-time job, his average yearly turnover is likely to be between thirty-five and fifty thousand ECU. This is a wide range because translators are mostly paid according to the lines translated, and the prices per translated line vary from country to country. Another reason is the experience of a translator. More experienced translators are able to translate more rapidly than beginners and obtain better contracts. Sometimes, remuneration also depends on the degree of difficulty and demanding deadlines. Since there are no figures available on the number of interpreters and language teachers, there

Table 1: Linguistic services
Number of translators and interpreters (1), 1989 to 1992

	1989	1990	1991	1992
Belgique/België	243	243	281	281
BR Deutschland (2)	4 067	4 146	4 300	5 200 (3)
España	N/A	N/A	800 (2)	N/A
France	400 (5)	450 (5)	1 400 (2)	N/A
Italia	700	950	1300	1400
Nederland	N/A	N/A	1 440 (2)	1 150 (3)(4)
United Kingdom	1 260 (3)	1 397 (3)	2019	2242

(1) Registered members of professional associations, including interpreters and literary translators.
(2) Excluding interpreters.
(3) Including the former German Democratic Republic.
(4) Excluding literary translators.
(5) Only literary translators
Source: National professional associations, F.I.T.

can only be an estimation for the average yearly turnover of a full-time working interpreter and a full-time working language teacher. The estimated yearly turnover is dependent on the labour costs which vary from country to country and on the specific needs of the user. Considering this, the yearly turnover of a free-lance interpreter is probably between fifty-five and ninety thousand ECU. For a free-lance language teacher the turnover will be between thirty and sixty-five thousand ECU a year.

International comparison

Germany is the country with the highest number of registered professionals among the Member States, followed by the United Kingdom and France. Translation and interpretation within the EC is more important than in Japan and the USA because more countries which work together in the EC which has no fewer than nine different official languages. But since Japan has close trade relations with the EC, and as cultural relations become more and more intensive, literary and technical translation from a European language to Japanese are assuming increasing importance.

MARKET FORCES

Demand

In general, demand for linguistic services has grown with the increasing number of international relations in the private business and with the closer cooperation of national governments in international organisations like the EC, the OECD, UNESCO and the other United Nations agencies based in Europe. Private undertakings with international relations also require the services of translators and interpreters from time to time. But decreasing budgets for translation, especially in international organisations, are limiting the demand for linguistic services.

Presently, more than 50% of the demand for translation comes from the commercial and industrial sector, about 20% is scientific and less than 30% is legislative and miscellaneous translation including press, audio-visual and literary translation. During the 1980s, only the demand for literary translation was decreasing or stagnant in a few EC Member States. The demand of large companies for exotic languages has recently increased because in-house translation offices mostly employ translators of the four major languages English, German, French and Spanish. Large companies consequently tend to hire free-lance translators for translation into exotic languages. In general, the employment status of registered translators is the following in most EC countries: one third work free-lance, almost half are employed by private enterprises and the remainder are engaged by public administrations or private translation offices.

Interpretation is mainly necessary for conferences on an international level and required by the public sector as well as by private enterprises. These conferences are not regularly scheduled and take place in various places. This requires a great deal of flexibility on the part of the interpreters and is the reason why most of the demanding institutions and enterprises do not have an in-house staff of interpreters, and why most of the interpreters are independent. Employed interpreters mainly work for international organisations like the EC, the United Nations and the OECD.

The demand for language teaching services differs from that for translation and interpretation services. Large enterprises of the business sector or national and international institutions need language teachers for the vocational training of their staff. Usually, however, they have their own teachers for in-house training. Smaller companies tend to use private language schools. These schools employ their own staff. Demand for independent language teachers mainly comes from private persons who need to learn a foreign language in a short time.

In general, demand for linguistic services is not dependent on the general economic development of a country. But it is interesting to note that private enterprises tend to reduce their in-house staff if their economic situation is bad. In this case, there are greater possibilities for independent translators and interpreters to obtain free-lance work awarded by large public or private enterprises.

Supply and competition

With a distinction between the private and the public sector, there are different types of translators, interpreters and language teachers: free-lance workers and salaried workers.

Traditionally, free-lance translators are members of a professional association. They work on their own premises, dealing directly with the client or through the mediation of agencies or translation businesses. These agencies normally have no in-house translators, but subcontract free-lance professionals. Employed translators are mainly hired by international institutions or large enterprises involved in international business. The typical free-lance translator normally works for smaller private enterprises which cannot afford their own translating staff. But in recent years, even government agencies and international organisations increasingly award translation con-

Table 2: Linguistic services
Translations by country of publication and by UDC classes

	1982	1983	1984	1985	1986
Belgique/België	798	854	639	680	550
Danmark	1 387	1 503	1 639	1 610	1 771
BR Deutschland (1)	9 009	8 509	7 542	6 305	8 936
Hellas	N/A	N/A	N/A	181	283
España	7 381	7 447	7 741	7 944	9 649
France	1 894	3 436	3 821	4 679	1 710
Ireland	N/A	N/A	5	8	8
Italia	2 034	2 939	289	93	961
Luxembourg	N/A	5	N/A	N/A	N/A
Nederland	N/A	N/A	N/A	4 286	3 945
Portugal	949	794	738	729	872
United Kingdom	1 070	1 143	1 153	1 121	914
Japan	2 479	2 498	2 698	2 892	2 875
USA	1 319	969	828	21	N/A

(1) Including former East Germany
Source: UNESCO Yearbooks 1990, 1991 and 1992

tracts to free-lance translators because they have too much work which requires detailed knowledge and specialised skills in translation. A new trend is interesting to note: for free-lance translators as well as for employed translators alike, a combination of translating and commercial skills are an advantage for obtaining jobs and contracts.

In reality, free-lance translators generally have sufficient work because a majority of them only work part-time. Nevertheless, quite a few translators in most of the EC countries are registered as unemployed. For example, more than one thousand unemployed translators were registered in Germany in 1992. But the number of unemployed translators has been decreasing in almost all EC countries since 1988.

Although the unemployment rate of translators is quite high, competition between free-lance translators with specialised knowledge is not very high. There is, however, great competition for well-paid positions on a permanent employee status offered by international organisations. Only larger volumes of translation which require multilingual knowledge are mostly done by translation enterprises employing translators with different native languages. Free-lances specialise more in exotic languages, smaller projects and in specific subjects. Compared with in-house translation, the free-lance translation is cheaper in most of the EC countries. This is a small advantage for free-lance translators competing with in-house translators. Strong competition between single independent translators is mainly concentrated close to the borders of countries where the official languages are the same. This is the case along the borders between Belgium and France and between Belgium and the Netherlands.

Normally, the number of free-lance interpreters is sufficient within the EC. Though more interpretation into English, French and German is required than into other languages, competition for interpretation into these languages is larger than for interpretation into exotic languages. This is mainly dependent upon the huge number of interpreters for these three languages. Specialisation in certain sectors (especially in the technical field) and the knowledge of exotic languages enable the free-lance to avoid competition. But in general, the free-lance interpreter is always in competition with the in-house interpreting staff of public administrations, like the EC and the OECD.

Language teaching services are offered by individual professors, private schools of all sizes and free-lance teachers. Competitors for these three are enterprises which offer telephone tutorials or training programmes in the form of books, videos, records, tapes and compact discs. This method of learning foreign languages is cheaper and offers more flexibility to the pupil than scheduled courses.

INDUSTRY STRUCTURE

Companies

Employed professionals are mainly employed by large companies or the public administration, having their in-house translation, interpreting and language teaching services. The EC Commission is the most important public employer of translators and interpreters. Private translation, interpretation and language teaching enterprises are usually large. Most have more than one hundred full-time translators or interpreters and award contracts to independent free-lance professionals. The largest European companies in the translation sector are located in the United Kingdom. These include Interlingua T.T.I. Ltd., Randall-Woolcott Services Ltd. and the Longman Group UK Ltd. The most important company offering interpretation services in the world market is the German company Brähler International Congress Service whose share in the world market was almost 30% in 1992. This company also provides all the technical equipment and experienced technicians necessary for interpretation services. In the language teaching sector, Linguarama Ltd., London, and Elsevier Languages of the Netherlands are the largest European enterprises. But two other language schools are important within the EC: Berlitz, with headquarters in Princeton, USA, and E.F. with headquarters in Lund, Sweden. Both run schools in many different countries.

Strategies

Considering the growing market for linguistic services, free-lances and enterprises working in that business will face stronger competition in the future. In this context, stronger competition means shorter deadlines, more translation into East European languages, more detailed texts in technical languages and more translations with specific software demanded by the clients. In this context, there is a trend to recognise, that small companies or free-lances offer comprehensive services, e.g. from the translation to the printout of a manual and desk-top publishing.

These facts require great flexibility on the part of the professionals. In particular, the technical standard of translators must be raised. Computer assisted translation is already being used. This means the translated texts are typed with specific software and provided on diskettes. The use of translation machines, work with certain systems like "Systran" (used by the Commission of the EC), and access to terminological data bases like "Eurodicatom" make the work of the translators faster and more efficient. But the creation of such a modern infrastructure is expensive. Only large institutions and enterprises are able to create such translation assisting tools. Furthermore, computer assisted translation is only possible with less emphasis on quality. This places the free-lance translators who do translations of good quality at a disadvantage. However, they have the chance to specialise in certain subjects which require fundamental software and computer knowledge. Since increasing numbers of specialists are required, firms with modern equipment offer free-lance translator contracts for certain periods and projects; contracted translators work with the machine and on the premises of the clients.

REGIONAL DISTRIBUTION

Professionals working in the linguistic service sector are concentrated in regions where large enterprises or international organisations are located. Inside the EC, the OECD and the European Commission have the largest staff working as translators and interpreters. This means that a great proportion of all employed translators and interpreters work in, or in the vicinity of Paris, Brussels, Luxembourg and Strasbourg. Since the EC and the OECD cannot translate everything in-house many free-lance translators have their premises close to these institutions. The same is the case for interpreters; they also settle very near to these cities. Regarding private industry, translators and interpreters concentrate in areas where international, export-related companies are located. This is the case in most capitals of the EC Member States, and in a few other cities of international importance such as Berlin, Hamburg, Düsseldorf, Frankfurt, Munich, Milan, Barcelona, Amsterdam and Rotterdam.

REGULATIONS

The role of translators and interpreters is only manifested by two international documents:

1. The UNESCO Recommendation on the Protection and Improvement of the Legal and Social Status of Translations and Translators, adopted in Nairobi in 1976.

2. The relevant provisions and recommendations regarding translators and translations set forth in the Final Act of the Conference on Security and Co-operation in Europe, signed in Helsinki in 1975.

Both documents recognise translators and interpreters as members of important professions which play an important role in the interest of international understanding, the promotion of culture and the furtherance of science, technology and economic progress. But they neither include any regulations for the professions themselves, nor for education related thereto.

In most EC countries, there are either absolutely no or only unsatisfactory regulations governing the legal status of translators and interpreters, apart from international or national copyright laws that apply to translators. Only a few EC countries have laws regulating admission to the practice of translation and interpretation. There is no professional job profile. Professional training is not necessary. There are no examination and qualification criteria that protect the title "translator" and "interpreter", codify the rights and duties of the profession, or provide for regulation of the practise of the profession of translator and interpreter. In most of the other EC countries, the legal situation is the same as in the United Kingdom: civil law is decisive in such matters as negligence, liability and performance of contract. Some countries such as Germany, have already enacted various legislative measures to regulate interpretation and translation in legal and administrative proceedings. But in general, the public has no guarantee that every person offering and discharging his or her services as an independent interpreter and/or translator does in fact possess the requisite skills. Only interpreters and translators registered in the national professional associations of some countries must have a university degree. More and more EC countries are offering an education for translators which leads to an academic, legally protected title. The already existing EC Directive on the acknowledgement of academic education is the only regulation which would be valid for the interpretation and translation professions, has not yet been adopted as national law in all EC countries. Consequently, at the present time, any person without any specific education as interpreter or translator is able to work in these professions within the EC.

OUTLOOK

The demand for the so-called "traditional languages" is almost satisfied within the EC. But the opening of Eastern Europe and closer relations in the world economy offer new possibilities for the profession. Therefore, a good knowledge of East European languages and other "exotic" languages is increasingly being sought. Greater professionalism, specialisation and comprehensive services will be required by clients. The use of artificial intelligence is becoming necessary. Free-lance translators and interpreters will face more competition from translation companies which are well equipped with computers and different in-house specialists. But the market remains large enough for free-lance translators and interpreters who are able to speak at least one "exotic" language and have special knowledge in a certain branch.

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The industry is represented at the EC level by: Fédération Internationale des Traducteurs (F.I.T.). Address: Dr. Heinrich Maierstraße 9, A-1180 Vienna; tel: (43 1) 44 3607; fax: (43 1) 44 3756; and,
Association Internationale des Traducteurs de Conférence (A.I.T.C.). Address: Route des Morillons 15, CH-1218 Le Grand-Saconnex; tel: (41 22) 791 0666; fax: (41 22) 788 5644; and,
Association Internationale des Interprètes de Conférence (A.I.I.C.). Address: 10 avenue de Sécheron, CH-1202 Genève; tel: (41 22) 731 3323; fax: (41 22) 732 4151.

Publishing services
NACE 839

The publishing services sector is growing very rapidly, influenced by the pace at which technology is advancing. The customer base of publishing services is broadening. They range from non commercial concerns such as hobby clubs to major international commercial enterprises. This sector overlaps into other service sectors, which include computer consultancy, below the line advertising consultancy, and secretarial support services. The sector employs almost 50 000 persons in total.

INDUSTRY PROFILE

Description of the sector

Publishing services are services which help people prepare documents for publication. This help can take various forms from consultancy to the actual preparation of print ready documents. Companies and individuals providing publishing services include Desktop Publishing (DTP) consultants, DTP shops, pre-press companies and printing companies. Because of its diversity, no reliable statistics are available on the publishing services industry.

Recent trends

In recent years, the publishing services industry has been revolutionised by the introduction of computerised methods, and in particular by the growth of DTP. DTP equipment has replaced phototypesetting equipment in many printing companies. DTP shops have been established throughout Europe. It is thought that there are now at least 5 000 such shops in the EC. Finally many companies in all fields and of all sizes have found it worthwhile to establish their own in-house DTP facilities. A few years ago, working drawings and slides were the input for the graphic reproduction process, now in the Netherlands, for example, it is estimated that 60 per cent of the input of printers and pre-press shops is in the form of floppy disks.

Most DTP software is of American origin, notably PageMaker and Ventura. As a result, it was first available in English, which gave the United Kingdom a lead in the use of DTP in Europe. Nowadays, the major programmes are available in all European and many other languages, and the UK's lead in this field has been much reduced.

International comparison

It is difficult to estimate the size of non-EC markets for publishing services owing to a lack of statistics. The USA has a sophisticated publishing service market. The EC lags behind the USA in desktop publishing and design services. Japan despite being a developer of very hi-tech equipment is trailing a long way behind the EC in the development of DTP companies.

Foreign trade

There is very little trade in publishing services. The service companies involved sometimes have production carried out in a country with lower costs, such as Singapore or Thailand, especially for regular large production volume publications. Extra-EC imports and exports are very small. Taking data for the whole printing sector these are less than 2% of the internal market turnover. Cross border business within the EC is also minor, amounting to less than 5% of the turnover of the sector.

MARKET FORCES

Demand

Many printing press businesses have now computerised their production processes. Relatively inexpensive and more efficient computerised systems have helped many to make the decision to convert. There is a polarisation in the demand for final finish of documents. For some customers printing on a laser printer (300 dots per inch) gives an acceptable quality. Often this demand comes from persons and companies not using this type of promotion or communication tool before.

Those professional customers converting from the older technology often require the best possible finish and have 2 540 dots per inch bromide films made before printing. Professionals also enhance pictures in documents, often to give them a crisper look, using specialised desktop publishing program extensions.

Customers often require the flexibility of the electronic publishing system which allows documents made at the pre-printing stage in several formats so that they can choose the one they think is best. The text for a document, nearly always generated by word processor, is transferred to DTP software to enhance the way it looks. Style sheets, automatically set, present information in a given style. Very few key strokes are necessary to change style sheets. In fine tuning a document font types and character sizes can change to achieve the most suitable result.

The introduction of "in-house" DTP facilities in many companies reduces the potential demand for outside publishing services, especially if the company thinks it can handle the whole job itself, perhaps with the help of a colour photocopier. However, really high standard work still requires, sooner or later, the help of a professional pre-press or printing company. Moreover lack of graphic knowledge can cause trouble and extra cost at the next production stage.

Supply and competition

The traditional pre-press and printing companies are to a certain extent in competition with DTP shops and in-house DTP departments. Printing is a highly skilled profession, and in most countries the industry is a well organised, high wage industry often with strong trade unions. In competition with the new DTP shops, traditional companies must compensate their higher labour costs with higher productivity resulting from their skilled workforces and more sophisticated equipment.

There are no major pan-European DTP service companies. Most companies in this relatively new market sector only serve a limited locality in their own country.

Companies offering a full professional service are fewer than those offering processing and production at 300 DPI. Increasingly the latter subcontract pre-printing to printing companies, if they have to produce a high quality document.

Prices of publishing services offered by both pre-press and printing companies, and DTP shops have been falling, partly due to increased competition in the present economic climate, and partly because of falling hardware and software prices leading to improved productivity.

Production process

Computer technology is rapidly replacing technologies involving manual techniques prevalent in the mid-1980s. Most of the companies in the sector are new. Many only started business in the mid-1980s. Some business service companies with longer histories have altered business plans to get into the flourishing DTP services market. Many computer consultants have become more involved in DTP than in other activities.

Other professionals attracted to DTP include those that were previously involved in translating, printing, typing, word-processing, copy-writing, and proof-reading. Publishing production professionals, photo composers, page layout specialists and photo engravers, have had to move with the times by making investments in electronic printing. Most have now converted from manual to computerised page layouts. These include PC picture publishing, PC art, computer aided design (CAD), and DTP.

Most DTP companies are very small enterprises. Their main work is to layout documents from manuscript or electronic text using professional DTP packages, and subcontract the production. Many use only four main tools: an Apple Macintosh, IBM compatible or other PC, a scanner, computer software including DTP programmes, and a laser printer.

Some have made investments in higher or additional cost pre-printing equipment. This includes film making and bromide, and Cromalin proofing equipment. Often DTP involves incorporating pictures, graphs and tables into a document, and this sometimes needs special scanning or filming equipment and software to create files in tagged image film format (TIFF).

PageMaker has offered colour picture DTP software for several years. This has meant that Apple Macintosh has been the computer system chosen by many printing companies for DTP. In 1991, Xerox's subsidiary, Ventura, launched some very professional colour printing products for its IBM compatible PC customer base.

Specialised computer programs are available for making multi-coloured pictures. These programs allow PC users to make colour separations and retouch images. Examples are Ventura Separator, Ventura Photo Touch and Ventura ColorPro.

Professional picture publishing programs and scanners are expensive. For example, the normal retail price of Picture Publishing Plus software plus Scanner is about 8 000 ECU. The unit price of some sophisticated drum and flat bed scanners is about 100 000 ECU. Less effective hand held scanners serve the other end of the market.

Although scanning photographs or drawings has been the main method of making electronic pictures, programs now exist to make picture films from video films. "Multimedia" computer programs provide pictures by the latter method. An editor can also buy picture files. Many electronic picture libraries and software companies sell electronic pictures. Documents containing line drawings, data tables and graphs must merge files or parts of files from other PC programmes.

Big professional printing companies generally produce the final documents because they have the equipment for high resolution film or bromide production and large print-run capacity. Higher resolution desktop printers have recently become available. Eventually this may change things for small print-run printed matter, such as newsletters.

Moreover, photocopy machine technology has developed to the extent that the newest generation of professional photocopiers integrate printing and binding of documents. This process involves a computer terminal linked to the photocopy machine.

There are many DTP programs. They range from programs designed to make single page layouts to those for long documents. Printing professionals mostly use Ventura Publisher and PageMaker.

Companies not requiring so much sophistication or text adjustment can use other programs. These programs include Timeworks Publisher, Express Publisher, Newsmaster, Avagio, Finesse and Page Plus. Most programs are available for use in the DOS, Windows and Mackintosh operating systems. Some are also available on Unix and OS/2.

IBM compatible computers are now becoming the standard for the computer industry and users are changing from the DOS operating system to Windows. Apple Macintosh was the major computer system for DTP until recently.

PC art and picture publishing packages to create layouts are newer products for desktop publishers to work with. Some of them have existed for several years. PC art computer programs such as Artline, Illustrator, FreeHand and Corel-DRAW, many in fourth generation versions are relatively inexpensive (about 750 ECU per single user software in 1993). These programs help operators, lacking flair for drawing, to produce very professional drawings.

Printing companies that have resisted the conversion to the higher technology are unable to offer much flexibility or radical last minute changes. The DTP market is growing organically as trade associations, clubs and various companies begin producing magazines, newsletters and other printed material for their members.

REGULATIONS

There are no EC regulations governing this sector. National regulations which concern the computer and printing industries apply to publishing services. Companies involved in DTP must observe copyright and trademark laws.

OUTLOOK

As the cost of DTP hardware and software continues to fall more and more, "non-professionals" will be able to afford the equipment necessary to prepare their own documents for publication. Professionals such as DTP shops and pre-press houses will find their market increasingly restricted to, on the one hand, clients who do not have in-house DTP facilities, and on the other hand, to the final preparation of high resolution documents, already in electronic form, for printing.

As costs fall, the overall volume of pre-press undertaken both in house and by independent professionals, will increase. More newsletters and publicity material will be produced and catalogues will be updated more frequently. This will create increased demand for ancillary services such as electronic picture libraries. It is generally estimated that the pre-press market is growing at about 10% a year in the EC as a whole.

Written by: Databank - MIA

Temporary work services
NACE 839.2

Over the past four decades, temporary work services have progressively changed into a sophisticated, professional service industry providing instruments for labour management. The industry has been the main tool for helping businesses fill temporary shortages in their workforce. Since temporary workers often find permanent employment through their temporary assignment, this has turned the industry into personnel recruitment advisors. Temporary work businesses are now widely accepted in most countries and have flourished in the recent past. Currently, however, the sector is experiencing a period of stagnation or even recession in some countries. This is largely due to a general economic recession, and in part to the fact that the sector has reached a maturity phase in several countries.

INDUSTRY PROFILE

Description of the sector

Temporary work businesses hire temporary workers putting them at the disposal of a third party, and forming a triangular relationship. Key to this relationship is the fact that they receive their salary from the temporary work business but their workorders on assignments from the third party. Client firms call upon the services of temporary work businesses when they have temporary shortages of labour. The hourly cost of temporary labour may at times be higher than that of permanent workers, but since temporary labour is usually resorted to for short, well defined periods or for specific tasks, the cost is borne only for effectively supplied hours of labour. The alternatives, overtime or a permanent reserve of extra manpower, would be more expensive. Temporary work businesses bear the cost of recruitment, selection, pay rolling, statutory social security insurance, etc.

For temporary workers, temporary work businesses satisfy particular individual needs and preferences. However, a growing number of jobless workers also resort to temporary work businesses to find a temporary occupation with the expectation of finding permanent positions at a later stage. It is estimated that on average well over one third of temporary workers find permanent jobs as a result of temporary contracts. The actual proportion varies widely between different EC countries.

The ageing of the European workforce and the increase of the female component also have an effect on the temporary work services sector. These developments have been associated with a greater desire for more flexible and temporary working arrangements.

It is important to note that temporary work is very strictly linked to the level of economic activity: therefore, like advertising or transport services, it constitutes a useful conjunctural indicator.

Recent trends

The importance of temporary work can be shown by the number of people who are active in the sector each working day. In Table 1 it can be seen that France, (West) Germany, the Netherlands and the United Kingdom are the largest employers of temporary workers in the EC. On the whole it is estimated that in the EC well over a million persons a day work through temporary work businesses. In the United States, a country with a comparable workforce, this figure was lower for many years. But the past few years have shown a quickly increasing market penetration, so that employment per day is now higher than in the EC. For a correct comparison, however, it should be taken into account that the temporary work services sector is nonexistent in Italy and Greece, and still not very developed in for example Luxembourg and Ireland.

Most of the turnover in this sector is generated in Belgium, France, Germany, the Netherlands and the United Kingdom, as can be seen in Table 2. The sector in general has shown double digit growth in recent years, in countries where temping was already developed and in countries where it has been developing rapidly. The arrival of the current recessionary period in many countries, however, has resulted in a zero or even negative growth in 1991 and 1992. The sector is still growing in importance in Spain and Portugal. In these two

Table 1: Temporary work services
Employment through temporary work businesses, 1992

	Employment per day (thousands)	Total workforce (3)	Employment as share of total workforce (%)	1993 (1)
Belgique/België	31	4 091	0.8	-
Danmark	10 (2)	2 889	0.3	=
BR Deutschland	140	29 829	0.5	-
España	27	15 021	0.2	+
France	300 (4)	23 929	1.3	-
Nederland	121	6 784	1.8	-
Portugal	4 (2)	4 694	0.1	N/A
United Kingdom	400	28 133	1.4	+
Total EC	1 033 (5)	144 542	0.7	N/A
EFTA	23 (6)	16 335	0.1	N/A
United States	1 349	124 787	1.1	+
Japan	284 (4)	63 840	0.4	-

(1) For 1993, an estimate is given of the development of the employment figure; + when growth is expected, - when decline is expected, = when a stabilisation is expected
(2) Data for 1991
(3) Data for 1990
(4) Estimate
(5) Estimate including the above mentioned countries only
(6) Data for 1988
Source: CIETT, Bakkenist Management Consultants, Eurostat

Table 2: Temporary work services
Development of turnover

(million ECU) (1)	1990	1991	1992	1992/91 (%)	1993 (2)
Belgique/België	944	978	1 028	5.1	=
Danmark	N/A	N/A	51	N/A	=
BR Deutschland	2 500	2 650	2 750	3.8	-
España	98	163	195	19.6	+
France	7 459	7 116	6 899	-3.0	-
Nederland	2 531	2 542	2 495	-1.8	-
United Kingdom	6 414	5 772	5 772	0.0	+
Total EC (3)	19 946	19 221	19 190	-0.2	N/A
EFTA (4)	601	481	725	N/A	N/A
United States	16 957	17 326	21 090	21.7	+
Japan	7 138	8 772	9 174	4.6	-

(1) National currencies were converted to ECU at the exchange rates of September 30, 1993
(2) For 1993, an estimate is given of the development of turnover: + when growth is expected, - when decline is expected, = when stablisation is expected
(3) Estimate including the above mentioned countries only
(4) Estimate, including only Switzerland in 1990 and 1991, Austria, Norway and Switzerland in 1992
Source: CIETT, Bakkenist Management Consultants

countries, temporary work businesses have only recently been legalised, or tolerated in the case of Spain (the sector has not yet been officially legalised). The market potential is, therefore, still large. Most Member States indicate that 1993 is not bringing signs of recovery. Improvement in the market situation is generally not expected until the second half of 1994.

International comparison

Total turnover in the EC was approximately ECU 19 billion in 1992, down from almost ECU 20 billion in 1990. Turnover in the USA, in comparison, was approximately ECU 17 billion in 1990 and is now estimated at ECU 21 billion. While the sector is clearly stagnating in the EC, it is a large growth market in the United States. Market expectations there are still positive. The sector has also grown in importance in Japan and was estimated at over ECU 9 billion in 1992, although market forecasts are now comparable to the EC. In EFTA countries, the sector is still not very developed, though it must be noted that the figures given are incomplete due to a lack of statistics from several countries. The world market is estimated at approximately ECU 50 billion currently. All estimates given are based on statements made by national federations, since no regular statistical surveys are held in this sector in the EC or other countries.

Foreign trade

Basically, temporary work businesses operate on a local scale, whether they are a small, independent oneoffice company or an office of a larger multinational temporary work business enterprise. "All business is local", is a saying which applies very directly to this sector, with the possible exception of highly specialised businesses. Furthermore, it is difficult to send temporary workers across borders due to contradictory national legal regulations. Therefore, cross border activity takes place only on a very small scale. Temporary work businesses wishing to operate in foreign countries generally do this by starting a local branch or by buying into a local company.

MARKET FORCES

Demand

The enormous growth in demand for temporary work services in the past clearly stemmed from the growing need for more flexible labour contracts. The favourable economic climate, also helped boost growth. The current situation is somewhat reversed. The more developed temporary work markets show saturation tendencies, and the stagnation of economic growth or recession in most EC countries have caused zero to negative growth. Markets which are heavily effected by these trends are, for example, France and the United Kingdom. In general,

Table 3: Temporary work services
Temporary workers by sector, 1992

(%)	B	DK	D	E	F	NL	UK (1)	USA	JPN
Agriculture	1	-	-	-	0	2	-	-	-
Industry	83	10	67	10	49	43	24	25	23
Construction	-	5	-	-	21	-	24	5	8
Commercial services	13	50	20	66	24	32	50	60	53
Other non-profit or	-	-	-	-	-	-	-	-	-
governmental	-	25	-	20	-	23	2	-	14
Other fields	3	10	13	4	6	-	-	10	2
Total	100	100	100	100	100	100	100	100	100

(1) Data for 1991
Source: CIETT, Bakkenist Management Consultants

Table 4: Temporary work services
Data on enterprises, 1992

	Number of enterprises	Number of local offices	Number of offices per enterprise	Workforce in 1990 (thousands)	Employment per office
Belgique/België	91	558	6.1	4 091	7 332
Danmark	63	100 (4)	1.6	2 889	28 890
BR Deutschland	1 840	2 836	1.5	29 829	10 518
España	209	300	1.4	15 021	50 070
France	1 016	4 650	4.6	23 929	5 146
Ireland	50 (1)	160 (5)	N/A	1 294	8 088
Nederland	300	1 750	5.8	6 784	3 877
Portugal	165	250	1.5	4 694	18 776
United Kingdom	4 000	8 000	2.0	28 133	3 517
EFTA	966 (3)	1 216 (3)	1.3	16 335	13 433
United States	5 500	16 000	2.9	124 787	7 799
Japan	1 183 (2)	10 150 (4)	8.6	63 840	6 290

(1) Members of local branch federation only
(2) Data for 1988; Japan's local branch federation had 205 members in 1992"
(3) Estimate including Austria, Norway and Switzerland
(4) Estimate
(5) Data for 1988
Source: CIETT, Bakkenist Management Consultants, Eurostat

it is expected that growth will remain more in line with general economic activity in the future.

The fields in which temporary workers fulfil their assignments tend to differ between countries. In France and Germany, for example, the majority of temporary workers are blue-collar workers. In the United Kingdom, Denmark and Spain temporary workers are primarily active in the administrative or commercial fields, as is the case in the United States and Japan. In some countries this is due to restrictive regulations. The differences are further illustrated by Table 3.

The length of the contract that is desired by clients varies. This is usually dependent on the function which the temporary worker will fulfil for the client. If the temp is called for to replace someone who is, for example, ill or on holiday, contracts are usually fairly short: from a day to several weeks. However, if a temp is called for because of an unfilled vacancy, or because the client is not certain whether the development of his business will allow him to hire an extra worker permanently, contracts can be extended to months or even a year or more. Contract duration is usually limited by national regulations, but the maximum period varies per country. Client companies often treat temping contracts as if they were trial contracts. They increasingly tend to offer a permanent contract to workers who have worked for them through a temporary work business.

Supply and competition

The number of branch offices per enterprise can serve as a basis for market coverage calculations and concentration figures. The fourth column in Table 4 shows quite clearly that the sector is the most concentrated in Belgium and the Netherlands. Market coverage in terms of active population per establishment is highest in the Netherlands and the United Kingdom. In these countries, there is one office for every 3 500 to 4 000 potential temps. Differences in market coverage are large, as can be illustrated by comparing this last figure to that of Spain: where the number of persons one branch office serves is many times higher. These differences will diminish with the further development of the sector. Naturally, the market coverage figures also give an indication of the degree of competition in the different EC markets. In general it can be said that competition is fierce in well developed and/or stagnating markets, such as the United Kingdom and moderate in less developed and/or growing markets, such as Spain. In comparison to the EC, Japan especially has a high number of offices per enterprise. The workforce served per office in Japan and the United States indicates temporary work markets which are fairly developed.

The degree of differentiation in supply varies from country to country, depending on market demand and regulations, but does not seem to differ very much within any particular country. An exception which regularly appears, is a specialisation in client markets, like intermediating for medical staff for example,. Prices and other terms offered are more or less the same, competition takes place through elements such as response time to a client request, distance between client office and temporary work business, past performance of temps hired and other client services offered.

INDUSTRY STRUCTURE

Companies

Some of the largest temporary work businesses operating in the EC and their home countries are (in alphabetical order): Adia (CH), BIS (F), ECCO (F), Manpower (USA), Randstad (NL), and Vendex (NL). Their estimated total market share in the EC is 35%. In the United States the four largest companies are estimated to hold 30% of the market. Temporary work businesses of EC origin account for over 80% of the EC market (above percentages based on 1989 data). Many temporary work businesses operate under more than one name in the same market. Some have the same management, others operate more or less independently. Franchising is known to be practised by, for example, Manpower and Adia. The market leader differs per country; regularly, the leading position is held by a business with its home base in that country. Examples are Randstad in the Netherlands, ECCO in France and Interlabor in Belgium.

A notable phenomenon is the existence of cost-based government temporary work businesses in Belgium (T Interim) and the Netherlands (START). They have gained a considerable share of the market. At the same time their operation has proven to be beneficial to the acceptance of organised temporary work in these countries, and thus to the market size.

Table 5: Temporary work services
Degree of regulation in EC Member States, United States and Japan, 1992

Liberal	Restricted	Prohibited
Belgique/België	BR Deutschland (1)	Hellas
Danmark	France	Italia
Ireland	Japan	España
Luxembourg		
Nederland		
Portugal		
United Kingdom		
United States		

(1) Former West Germany
Source: CIETT, Bakkenist Management Consultants

Strategies

In the past years temporary work businesses, particularly the larger enterprises, have diversified into less related services such as security, contract cleaning and maintenance, language services, business information and financial services. The present trend is more focused on efficiency and upgrading, while expansion is strongly geared to services related to personnel management and internationalisation. In their efforts to improve the efficiency of their operations and the quality of their services, temporary work businesses are investing heavily in computer systems and networks. The second trend is to upgrade, illustrated by the fact that some temporary work businesses are shifting towards temporary workers with higher educational qualifications and more experience. The major temporary work businesses have expanded their businesses internationally. Internationalisation not only takes place in EC countries, sometimes by acquisition but also, outside the Community, notably in the USA and the Far East including Japan.

The expansion into personnel management areas is to be found in services such as personnel management for small and mediumsized enterprises, recruitment, including head-hunting and training of personnel. This is triggered by the fact that the distinction between permanent and temporary employment is becoming less pronounced.

In those countries with a liberal regulatory regime a shortage of qualified temporary personnel has shown to be an obstacle to growth. This shows the importance of education and training now provided by an increasing number of temporary work businesses. Typing courses, word-processing training and low-level technical courses are forms of training that figure regularly in their programme. Specific training tailored to the job or the individual is also common.

The issue of quality accreditation has also made its entrance into this sector. The countries in which the sector is well developed have recently started efforts in this direction. It is a result of a more competitive market situation, combined with the trend in business in general towards a higher level of client service. Companies try to offer quickly available and flexible services, while still complying to the high quality standards demanded.

REGIONAL DISTRIBUTION

Basically temporary work business is local business. Most companies operate through a network of local offices. Offices are located either in the near vicinity of potential clients or in the near vicinity of potential temps. This differs for each country.

REGULATIONS

Organised temporary work is widely practised in the majority of the Member States. There are, however, considerable differences in regulation between EC countries which is clearly explained in "Temporary Work and Labour Law of the European Community and Member States", edited by R. Blanpain, Kluwer Lavv. Several countries prohibit temporary work altogether. Other countries accept temping, either with or without specific regulation. Two countries, Greece and Italy, absolutely prohibit the operation of temporary work businesses and the conclusion of temporary work contracts. In these countries, illegal practices are known to exist. In Italy, the social partners are becoming increasingly aware of the benefits of temporary work and the negative effects of the illegal practices at this moment. The Prime Minister has announced the intention to publish a new draft law in 1994. In Spain the estimated 200 temporary work enterprises are still officially forbidden, although they are tolerated in practice. The local branch federation GEESTA is recognised as a partner in the discussions which take place about the legalisation of temporary work. A draft law is expected to be accepted in 1994.

Denmark, Ireland and the United Kingdom accept the existence of temporary work without applying specific regulation. This leads to a relatively protected status of the temporary worker in Denmark, as he is considered to be an employee and therefore enjoys normal labour standards and social security. In both other countries, however, the temporary worker is not necessarily considered an employee.

Belgium, France, Germany, the Netherlands and Portugal have regulated temporary work. Some restrict the use of temporary workers in one or more business sectors. For example, the Netherlands and Germany prohibit temporary work in some areas e.g., blue-collar workers in the building and construction industry. Belgium has the same rule for that industry as well as for furniture removal and storage. A number of other restrictions and requirements are common to regulations in Member States as well, the most important being: requirements for the contract between the user and the temporary work business; registration and/or licensing of temporary work businesses; limitations to the conditions under which temporary work is allowed; limitations to the duration of contracts, varying from 3 to 24 months or no restriction; requirements for wage levels and social security conditions.

An indicative summary by the national branch federations of the degree of regulation is shown in Table 5. The statements 'liberal' and 'restricted' should be seen relatively; they are meant to compare the EC countries to one another. The United States considers its regulatory regime liberal, while Japan characterises its regulation as restricted.

Three Commission labour law proposals, enacted in 1990, apply to temporary work. They mainly consider working conditions, specific regulation for contracts involving distortion of competition and measures regarding health and safety. This last proposal was accepted in 1991. A fourth proposal which also affects this sector, accepted in 1991, regards the posting of workers across borders and considers, among others, pay and working time. Implementation of the proposals could cause difficulties in several countries, as this can imply significant changes in the current regulations. Also, problems arise because of different conceptions of key aspects such as "employee" and "employer".

OUTLOOK

The expectations for growth vary from country to country. However, unlike the growth figures mentioned in earlier Panorama editions, the 1993 growth figure is expected to be zero e.g. Belgium or negative e.g. France, the Netherlands, Germany, with the exception of the growth markets in Spain and

Portugal. In general it is clear that the industry is dependent on the growth of the economy. Economic recession and full employment both tend to reduce turnover. The sector seems to thrive best in a climate of moderate or brisk general economic activity. Prospects are expected to improve in the course of 1994.

In those countries where temporary work businesses are well developed, competition is strong. In the countries where the sector is less developed or as yet illegal, measures leading to a more liberal regulatory regime could still provide large growth impulses for the sector. Competition there is much weaker.

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Industrial cleaning services
NACE 923

The EC market for industrial cleaning services reached 19 billion ECU in 1992, a 5.35% increase in real terms over 1991. The three main users of industrial cleaning services are government, private businesses and hospitals. The rate of penetration of industrial cleaning services is still fairly low at about 50%, indicating that the sector could continue to enjoy rapid growth in the coming years. Client demand is increasing for quality standards and a broader range of services. This industry is labour intensive and thus very sensitive to changes in the regulatory environment.

INDUSTRY PROFILE

Description of the sector

The service activity presented in this chapter is the cleaning by specialised firms of buildings whether they are used for administrative, industrial or commercial ends. Services provided by cleaning contractors are the following: inside cleaning of buildings such as offices, factories and workshops, inside cleaning of transportation vehicles (buses, trains, planes, metros, trams, ships), tanks, and simple building maintenance. The following activities may also be provided by cleaning firms, but are not covered here: security services, waste management services, evacuation of asbestos, laundry, dry cleaning, and pressing. In some EC Member States, chimney sweeping, facade cleaning (not including restoration), the maintenance of areas around buildings and general sanitation are also part of industrial cleaning services.

In 1992, overall turnover of cleaning contractors in the EC was over 19 billion ECU. This growth can be explained not only by an upturn in European market for industrial cleaning services, but also by an increase in the level of market penetration by cleaning firms. All the Italian data for 1992 remain the same as 1991 due to lack of new data and the current difficulties in Italy.

The degree of market penetration, extremely important for business services, measures the share of the total potential market that is actually subcontracted to specialised service contractors. The rate of market penetration by cleaning contractors is calculated based on several estimates, one of which is the sales of cleaning products and materials to cleaning companies. At present, the rate of penetration in Europe is estimated at 51%. The rate of market penetration differs between Member States, in Belgium and Germany it remained the same from 1991 to 1992, but it grew in France from 46% in 1991 to 48% in 1992. The low rate of market penetration in Denmark and in the United Kingdom explains the relatively low turnover achieved in those countries, compared to other countries with a similar level of development.

Recent trends

Office cleaning is traditionally more important in terms of turnover than other market segments. It is also the segment of the market where in-house cleaning is estimated to be the most significant, and it is also estimated that there is still a significant potential for growth. Indeed, many private or public companies do not yet contract out the cleaning of their premises, except perhaps for some exceptional work like, window cleaning, cleaning of carpets, floors, etc. In-house cleaning may, however, be limited to certain segments of industry with specialised facilities or controlled environments such as nuclear power stations, agri-food industries, dust-controlled rooms, etc. In the public sector, the rate of market penetration is higher than in the private sector e.g., for Spain with 70% penetration in public markets and 60% penetration in private markets.

Hospital cleaning must be separated from the other market segments since the requirements are very specific. It entails both, the cleaning of common spaces, and rooms, quite similar to hotel cleaning (in terms of day-time work, full-time and with longer average working time) and the disinfection of more sensitive areas such as operation rooms. This latter task generally requires specific techniques and skills. Frequently rooms and public spaces are still cleaned by the hospital's own staff.

MARKET FORCES

Demand

Two trends have recently appeared on the cleaning market : the demand for quality and a broader range of services. It is, however, still difficult to either quantify or measure their impact on the industry.

Cleaning service customers are more and more demanding in terms of quality. These customers often ask that objective criteria be used to establish the price for a defined level of quality. This raises serious problems in the case of industrial

Table 1: Industrial cleaning services
Turnover

(million ECU)	1987	1989	1990	1991	1992
Belgique/België	358	448	529	588	623
Danmark	333	385	401	442	576
BR Deutschland	2 442	2 634	2 930	3 313	3 936
España	1 825	2 076	2 230	2 430	2 612
France (1)	2 181	2 693	3 065	3 304	4 242
Italia (2)	1 964	1 997	1 971	3 906	3 906
Luxembourg (2)	19	19	15	29	29
Nederland	721	917	1 146	1 396	1 661
Portugal	47	55	55	68	75
United Kingdom	1 723	1 610	1 563	2 394	1 875
Total	11 614	12 836	13 906	17 870	19 535

(1) Former data of 1991 were estimated
(2) Data 1991
Source: FENI

Table 2: Industrial cleaning services
Market penetration of cleaning subcontractors

(%)	1991	1992
Belgique/België	55	55
Danmark	25	30
BR Deutschland	65	65
España	55	60
France	46	48
Italia	40	40 (1)
Luxembourg	60	60 (1)
Nederland	58	63
Portugal	45	60
United Kingdom	30	35

(1) Data 1991
Source: FENI

cleaning services because of the high subjectivity attached to the concept of cleanliness. It is, indeed, extremely difficult to measure quality in the cleaning sector. Some projects towards the establishment of quality measuring systems have been carried out. A Dutch cleaning institute, VSR, has developed a relatively sophisticated system which can be applied to approximately 25% of the local market. It consists of establishing, with the client in advance, a precise list of criteria based on a range of possible errors. The level of quality, according to this list, is checked periodically. This quantitative account is used to define what is an acceptable level of quality for the client and is then registered with the contract. In France, the International Technical Centre for Cleanliness (CTIP) is also trying to define a means of quantifying cleanliness and the technical means to achieve the desired results.

The client's natural requirements for high quality are in contradiction with the widespread tendency of systematically choosing the lowest priced tenderer. The process "low price/poor service quality/dissatisfaction of the client" is thus engaged, seriously damaging both the quality of the services performed and the profession's image. A first solution comes from the contractors themselves, who try to make their clients aware of the problem as the contracts are being drafted. Another solution is provided by the professional organisations who organise communication campaigns, and promote establishing minimal professional requirements necessary for market entry and performing cleaning services.

Another trend that seems at present to be limited to the British market and, to a lesser extent, the Dutch market, is the extension of the contractors' activities to the provision of broader support services. These may include, security services, catering, building maintenance, and the care of surrounding areas, etc. This trend is the consequence of the requirements expressed by some big clients, especially the British public sector, who are seeking to simplify subcontracting by limiting the number of contractors. It is, however, not yet possible to measure the impact of this trend on the market or on the profession. It is also impossible to appreciate whether it will extend significantly to other EC markets.

Supply and competition

Structurally, the sector is characterised by a large number of small companies, employing less than 20 workers. Broadly speaking, more than 90% of the cleaning contractors in the EC employ less than 100 people. The number of employees is still increasing, but the augmentation was less important between 1991 and 1992, than it had been in the past.

There is still a large proportion of women in industrial cleaning services. One should note moreover the constant prevalence of part-time workers, with an average working time which is about 4.5 hours/day. Cleaning services are performed outside the usual working hours, when the clients buildings are relatively unoccupied.

Contractors must, therefore, concentrate their workforce on two relatively short periods: in the morning and in the evening. Full-time work is quite atypical in the cleaning industry, as the "work day" is frequently split into non-consecutive periods : morning and evening.

Wages are close to 6.2 ECU/hour. Except in Portugal and in the United Kingdom which are in fact estimates, the minimum hourly wage for unskilled workers in the cleaning industry is quite homogeneous. The gross wage appears to be quite high in Denmark, but this results from the fact that the social contributions are distributed differently between employees and employers. The total cost of labour including both the wages and employer contributions, varies significantly from one country to another. This mainly reflects differences in national and professional contributions which are required by the government and guaranteed by the collective agreements for social protection systems, across countries. However in Spain, the devaluation of the peseta must be taken into account when comparing the 1991 data and the 1992 data.

In order to promote greater professionalism in the cleaning industry, employers are aware of the necessity to increase work time. At the same time, they intend to develop vocational training initiatives especially for the lower levels of professional qualification. Beyond its direct affects on the quality of the services, this strategy hopes to keep workers in the

Table 3: Industrial cleaning services
Number of employees

	1987	1989	1990	1991	1992
Belgique/België	25 800	30 000	42 000	58 000	58 000
Danmark	20 000	20 000	21 000	24 000	26 000
BR Deutschland	430 000	490 000	457 500	466 200	473 400
España	160 000	175 000	190 000	200 000	200 000
France	168 118	187 000	203 700	215 300	239 481
Italia	350 000	350 000	350 000	330 000	330 000 (1)
Luxembourg	N/A	1 500	1 700	1 960	2 275
Nederland	110 000	120 000	131 450	146 000	158 107
Portugal	12 000	13 000	13 000	14 850	22 405
United Kingdom	256 000	260 000	270 000	300 000	277 800
Total	1 531 918	1 646 500	1 680 350	1 756 310	1 787 468

(1) Data 1991
Source: FENI

Table 4: Industrial cleaning services
Number of employees per enterprise, 1992 (1)

(%)		5-19	20-99	100-499	500-999	1000 +
Belgique/België	48.0	29.0	17.5	4.0	1.0	0.5
Danmark	84.3	12.5	2.5	0.6	0.0	0.1
BR Deutschland	N/A	N/A	65.0 (2)	20.0	10.0	5.0
España	50.4	20.0	14.0	11.0	4.0	0.6
France	67.0	16.0	12.0	3.5	1.0	0.5
Italia	N/A	N/A	N/A	N/A	N/A	N/A
Luxembourg	43.6	33.3	23.1	0.0	0.0	0.0
Nederland	62.5	22.5	13.5	0.4	0.5	0.6
Portugal	42.0	20.0	22.0	12.0	2.0	2.0
United Kingdom	N/A	N/A	N/A	N/A	N/A	N/A

(1) % of enterprises with 0-5, 5-19, 20-99, 100-499, 500-599 and 1000+ employees
(2) 0-99 employees
Source: FENI

company, or at least in the industry, and stimulate their professional motivation by offering them the opportunity to have a professional career in this industry.

INDUSTRY STRUCTURE

Companies

Apart from Spain and Luxembourg the number of firms within EC Member States is still increasing, for example in Germany the number of cleaning companies increased 33% between 1991 and 1992, while in Portugal the number of firms grew 22.16% from 1991 to 1992, the largest increase occurred in Denmark with 73.91%. The EC cleaning industry in 1992 was made up of nearly 40 000 companies, this number is constantly increasing as a consequence of the dynamism of the industry.

Strategies

The trend towards a greater concentration of the market through mergers or acquisitions is evident in all EC countries. It is hard to put numbers beside this trend since there is usually only a change in capital ownership as the establishments often retain their previous name after the transaction, which usually only affects the capital ownership.

More frequently the larger groups are seeking to diversify their activities by entering the cleaning services market and taking over existing companies. This has particularly been the case with large temporary work service companies, and of companies such as the French Compagnie Générale des Eaux. The big groups are also growing in importance in terms of employment and turnover. In France, more than half of the workers are employed by firms with more than 500 employees which represents less than 100 firms and 40 companies with over 1 000 companies account for one third of the turnover of the sector.

Table 5: Industrial cleaning services
Part-time work, 1992

	Part-time work (as % of total)	Average working time (hour/day)
Belgique/België	83.0	4.7
Danmark	84.6	4.5
BR Deutschland	80.0	4.0
España	55.0	5.5
France	54.0	5.0
Italia	88.0	4.0
Luxembourg	90.5	3.5
Nederland	81.0	4.0
Portugal	N/A	6.0
United Kingdom	76.2	N/A

Source: FENI

REGIONAL DISTRIBUTION

Cleaning contractors are naturally located in industrial and urban areas, close to their clients. The industry is in effect characterised by the necessity for the contractor to be established very close to the clients. This results in a high fragmentation of the industry. The firms which develop activities in several regions usually operate via a network of local agencies, linked to the mother company through regional or national subsidiaries. Most of the big groups are established in several countries EC and non-EC. The internationalisation of these groups, however, is hard to measure since, they often enter new markets by taking over national companies which remain essentially national establishments. The cross-border provision of cleaning services is quite rare and limited to neighbouring regions or to very specific contracts.

REGULATIONS

The cleaning industry is highly labour intensive, which makes labour-related costs an extremely important factor in the determination of the price of the service. Labour costs represent between 75% and 85% of the companies' turnover. Companies are therefore directly affected by social regulations. The organisation of work is unique to cleaning activities and often requires the adaptation of social laws to its features. For instance, any regulation limiting part-time work would have a major impact on the cleaning service sector. The social statute of workers in the cleaning industry is generally defined by sectoral collective agreements, at the national or regional level, except in the United Kingdom where agreements are made at the company level.

One of the most constraining social regulations for cleaning contractors is the obligation in most EC countries to keep all or part of the workers at a given site in the case of a change in ownership and contractor. The terms of this transfer of employment vary across the Member States. By taking away the contractor's manoeuvrability, this regulation tends to decrease competitiveness.

Except in Germany, the access and the exercise of the profession are completely free in the EC Member States. Because

Table 6: Industrial cleaning services
Women employees, 1992

	Number of women (%)
Belgique/België	70
Danmark	70
BR Deutschland	79
España	75
France	62
Italia	N/A
Luxembourg	86
Nederland	67
Portugal	94
United Kingdom	74

Source: FENI

Table 7: Industrial cleaning services
Labour costs, 1992

(ECU/hour)	Wages (1)	Total cost of work
Belgique/België	7.0	12.6
Danmark	10.2	12.8
BR Deutschland	7.3	17.5
España	5.0	8.8
France	5.3	8.9
Italia(3)	5.9	14.3
Luxembourg	8.6	11.9
Nederland	6.5	14.8
Portugal	1.8	2.9
United Kingdom (2)	3.9	5.4

(1) Minimum guaranteed wage - unskilled workers
(2) Minimum average wage - unskilled workers 1991
(3) Data 1991
Source: FENI

Table 8: Industrial cleaning services
Number of enterprises

	1987	1989	1990	1991	1992
Belgique/België	915	1 002	1 017	1 023	1 144
Danmark (1)	2 598	2 598	2 300	2 300	4 000
BR Deutschland	2 700	3 227	3 349	3 432	4 568
España	3 900	5 200	5 500	5 100	5 000
France	6 774	7 232	7 831	8 000	9 155
Italia	5 500	5 500	5 500	6 500	6 500 (2)
Luxembourg	16	N/A	40	40	39
Nederland	2 100	2 400	2 540	2 924	3 106
Portugal	120	150	150	185	226
United Kingdom	3 840	4 500	5 345	5 345	6 000
Total	28 463	31 809	33 572	34 849	39 738

(1) Data of 1991 are undervalued
(2) Data 1991
Source: FENI

the sector is a fairly dynamic one, many new cleaning companies are created every year. Most of them are small (less than 5 employees), and managed by people who neither have a basic knowledge of management rules nor basic professional skills. This makes the "life expectations" of these firms quite short, and many do not survive beyond one year.

Most small companies have a tendency to tender at unrealistic prices which are sometimes lower than the local cost of labour. Furthermore, they often do not have a sufficient financial capacity to be able to face the difference between the date at which they are paid by their clients and the monthly payment of their social obligations. This explains why so many companies go bankrupt after only a few months of existence. Beyond its social consequences, this problem damages the whole profession and often results in a return to in-house cleaning by the client who initially out-contracted these services. The profession has tried to react in most of the European countries, and national organisations of cleaning contractors are trying to impose minimum standards with which firms must comply to be allowed to enter the market. The solutions adopted by the industry representatives differ from one country to another, depending on the national legislative system and habits. Some systems have been established by the profession itself as in France: "Marque Professionnelle", and in Germany "Guterschutzgemeinschaft"; but the labels are granted by independent authorities.

OUTLOOK

From an economic point of view, the completion of the single European market offers good opportunities for the companies in this sector. Beyond the opening up of public procurement of services and the complete liberalisation of service provision, cleaning companies should benefit from the cooperation tools offered by the EC law, especially the European Groups of Economic Interests, a body which aides in formulating legislation. The creation of a European company statute should also facilitate the internationalisation of cleaning companies in the near future. One major concern must be mentioned: the distortion of competition that can result from differences in labour costs. The current situation shows large differences in unit labour costs across countries. This may result in an artificial delocalisation of companies, eager to benefit from lower labour costs in certain regions. This could seriously damage the regional, economic and social landscape of these regions. However, because of the proximity requirements, this phenomenon would be limited to cross-border regions, and to a limited number of long distance or very specific contracts.

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Security services
NACE 839.3

The security services sector in Europe had a turnover of approximately 7 billion ECU in 1993, employing 424 550 people of which some 314 410 persons were employed by the 4 635 private security companies operating in the EC.
About three quarters of security activities are subcontracted with the remaining quarter handled by corporate security divisions.
Many Member States are working hard to improve the quality of the services provided. Some individual firms have already been certified in accordance with ISO standard 9000.
Quality improvement in the education and training of employees has in some Member States resulted in forms of co-operation with the regular police in the field of preventive supervision. Against previous expectations, no real growth took place in the security services sector. Due to the recession, the private security sector stabilised on the level of 1992. Also a lot of companies had to cope with an increase of direct costs, such as staff salaries, social premiums etc., which have put the net results of many companies under pressure.

INDUSTRY PROFILE

Description of the sector

The term "security" comprises a variety of specialities within the sector. This monograph is mainly based on data concerning the "manned guarding" sector, but also provides some information on transportation of valuables and other related and ancillary specialities.

The sector of the production of electronic and technical equipment, for example, manufactures detection systems offering a variety of possible security applications, as well as exchange units capable of handling many types of signals and forwarding these to central alarm stations via telephone or permanent lines.

We are witnessing the dawn of the "electronic age". Wireless transmission from detection systems to a central alarm station may mean lower installation costs and can in some cases positively affect the risks of sabotage etc.; it may also prove the best solution in case of objects needing temporary protection (as in the building sector).

Even the technical advantages of the space age are noticeable in the security services sector. Today, tracing systems are being applied which can, by using satellite communication, accurately trace any object on earth equipped with a signal code emitter to within a few metres. This represents a great step forward in combating crime, (e.g. in the case of VIPs taken hostage). Furthermore, this development can also play an exceptionally useful role in improving the security of, for example, shipping traffic after a calamity has occurred.

Satellite tracing systems also contribute to the improvement of efficiency in international land, sea and air transport by allowing continuous spotting of the transports. This helps to coordinate the deployment of materials and/or ensure proper monitoring.

As an extension of the production sector of security equipment, the technical installation sector constitutes a logical speciality. It ensures the installation of security equipment in buildings, on grounds and to an increasing degree in private homes. This sector is developing very fast.

In the construction of new office and industrial buildings, a clear increase of so-called "smart buildings" can be observed where building automation plays an essential part. Often the technical installation comprises not only the security equipment: elements like air-conditioning, automatic access control, lift service programs etc., are also included in the technical infrastructure.

The central alarm station forms a vital link in the above-mentioned sectors. Equipped with state-of-the-art security equipment and usually manned by a team of at least two, it receives the signals from technical systems installed at the clients' premises and handles them according to a scenario agreed previously with the client. Depending on the type of occurrence, assistance is called in from the police, fire units,

Table 1: Security services
Main indicators, 1992

	Total number of security employees	Own security division	Private security companies	% subcon-tracted	Security guards per 100 000 inhabitants
EC	424 550	110 140	314 410	74.1	125
Belgique/België	10 000	3 000	7 000	70.0	100
Danmark	5 000	2 000	3 000	60.0	98
BR Deutschland	105 000	40 000	65 000	61.9	140
Hellas	2 000	600	1 400	70.0	20
España	60 750	1 300	59 450	97.9	157
France	70 000	11 000	59 000	84.3	123
Ireland	5 000	1 500	3 500	70.0	142
Italia	40 000	1 000	39 000	97.5	70
Luxembourg	800	240	560	70.0	200
Nederland	17 000	7 000	10 000	58.8	113
Portugal	15 000	4 500	10 500	70.0	146
United Kingdom	94 000	38 000	56 000	59.6	164
Non-EC countries	33 600	N/A	N/A	N/A	104
Austria	3 100	N/A	N/A	N/A	40
Finland	3 500	N/A	N/A	N/A	70
Norway	3 500	N/A	N/A	N/A	81
Sweden	16 000	N/A	N/A	N/A	186
Switzerland	7 500	N/A	N/A	N/A	110
Total	458 150	N/A	N/A	N/A	123

Source: CoESS

Table 2: Security services
Employees in private security companies, 1992

	Number of security companies	Number of security guards	Average number of employees per company
EC	4 365	314 410	72
Belgique/België	70	7 000	100
Danmark	40	3 000	75
BR Deutschland	800	65 000	81
Hellas	20	1 400	70
España	699	59 450	85
France	1 100	59 000	54
Ireland	150	3 500	23
Italia	729	39 000	53
Luxembourg	7	560	80
Nederland	130	10 000	77
Portugal	120	10 500	88
United Kingdom	500	56 000	112
Non-EC countries	457	33 600	74
Austria	42	3 100	74
Finland	110	3 500	32
Norway	55	3 500	64
Sweden	200	16 000	80
Switzerland	50	7 500	150

Source: CoESS

technical emergency services or the alert verification team of a private security organisation.

The central alarm station is also increasingly seen to give active response to certain signals because today's data network infrastructures allow remote control of technical processes. Systems can be switched on or off at a distance, the degree of distance being basically irrelevant. Visual images can also be transmitted via this method.

In the EC over 1500 central alarm stations are operational with an estimated 4.5 million connected installations. This sector has a considerable growth potential. It appears likely that middle-class households, too, will increasingly decide to purchase professional security equipment linked to a central alarm station. Considering technical developments, the purchase of "domestic equipment" will in principle suit all purses.

MARKET FORCES

Demand for manned guarding services

All over Europe, the beginning of the nineteenth century saw the advent of night security services, usually on a small scale, active locally and often established in industrial areas. Not until after the Second World War did a substantial growth occur due to a number of factors: increasing industrialisation and the prosperity it brought, increased crime, weakened social supervision by the environment (family, church etc.); increased awareness by entrepreneurs of the necessity of protecting their own belongings instead of considering the mere responsibility of the authorities or the police. Preventive security activities were carried out by security staff employed by the company itself as well as by employees of the contracted private security organisation.

The growth of the private sector was greatly enhanced because businesses frequently chose to concentrate on their own field and hive off disparate tasks. After industrial cleaning maintenance and catering, security activities were also increasingly subcontracted. Besides subcontracting, we find the birth of the "externalisation" concept meaning that "corporate" security guards are transferred to a security organisation specially selected for a particular purpose. In this new form the existing security activities are continued on a contract basis. This tendency may be compared to the process of privatisation of government tasks.

Annual growth in the security services sector over the previous year is 10% on average. This growth is occasionally the result of incidents, such as the Gulf War (1991) when heightened threats of terrorism compelled entrepreneurs to take additional security measures.

The existence of an extremist terrorist group in a country can strongly affect the level of prevention within companies. But security is also seen to contribute to the continuity of the production or labour process and as such represents important support for a company's continuity criterion.

Preventive security has become a profession. The duties have grown more complex. Where in the past they were mostly concerned with porter services, mobile surveillance and the like, present day security guards perform extremely useful and critical tasks within the framework of the total management of extensive projects involving a wide range of crucial security functions.

In large industrial plants and exhibition operations, security guards are in charge of not just access control but also fire prevention and sometimes fire protection; they perform tasks in traffic control and parking supervision on the grounds and provide First Aid. For all these purposes, they man control rooms from where the security of the production process in the widest sense is monitored.

Another reason for the growth is the diversification of the security services sector. The uniforms (often an element of identification), recognisibility, mobility and up-to-date communication equipment represent an infrastructure that allows private security organisations to explore new fields of activity such as operating bridges and locks in water-abundant areas, management of nature reserves or preventive supervision in the recreational sector (campsites, beaches). Other activities

Table 3: Security services
Market leaders in security services, 1992

Country	Company
EC countries:	
Belgique/België	Group 4 Securitas SA, Intergarde Monitor Security SA, Garde Maritime Industrielle et Commerciale
Danmark	ISS Securitas A/S, Boligministeriet, Cerberus Group Denmark A/S
France	S.P.S., S.G.I., Adia-Protectas
BR Deutschland	Gesellschaft für Eigentuschutz GmbH, Niedersacksische Wach- und Schliessgesellschaft Eggeling & Schorling K.G., Wach- und Schutzdienst Fritz Kotter GmbH & Co
Ireland	Securicor, Group 4, ADT Security Systems
Italia	Vigilanza Ditta di Milano Spa, CIVIS Spa, Centro Nazionale Sicurezza
Luxembourg	Securitas SA, Securicor SA, Securite Civile S.A.R.L.
Nederland	Nederlandse Vieligheidsdienst, Randon Beveiliging, VNV
Portugal	Securitas, Ronda, Grupo 8/Transegur
España	Prosegur, Prosesa, Esabe
United Kingdom	Security Guards, Group 4 Securitas, Securicor
Non-EC countries:	
Austria	Group 4 / Securitas
Finland	Suomen Teollisuuden Vartiointi Oy, Servi Turvapalvelu Oy, Suomen Vartioimis ja Sulkemis Oy
Norway	Securitas A/S, Verdisikring A/S, Norsk Industrivakt A/S
Sweden	Securitas AB, ABAB, SSS
Switzerland	Securitas AG, Protectas SA, Wache AG

Source: CoESS

include environment-screening in cooperation with companies or public authorities.

In many countries there is some form of cooperation with public authorities. For example, budget inadequacies of the police have contributed to the development of cooperation in which the police play a supervisory role. A common example is the security check of passengers in many international airports where private security guards screen passengers under the supervision of the regular police force. Less familiar are forms of cooperation (e.g. the overseeing of detainees, traffic control, parking supervision in city centres and intendancy in public transport particularly in large cities) where drug abuse has especially caused criminal acts to multiply. Security guards are also used to protect military objects and to perform preventive activities in prisons.

Supply and competition

In many EC countries, much is being done to improve the quality of the service. Quality is increasingly becoming a measurable element which relates to:

- quality/expertise of the company management;
- quality of the organisation, procedures, etc.
- quality of the performing staff (education/training);
- quality of the terms of delivery.

In the countries where relevant legislation exists these rules are often seen to contribute to the quality aspect. Indeed, competition among security firms is first of all a matter of quality aspects and much less a question of rates and on-charging. In those countries where competition has focused on the cost price of the service, we also find that this policy leaves no room for financial investments in quality improvement. Although no unequivocal standard has as yet been established, it seems likely that the international quality standard for services (ISO 9000) will be applied as a certificate of quality assurance.

Several security firms have so far been certified according to this standard and no doubt more companies will follow their path.

INDUSTRY STRUCTURE

Manned guarding services

A survey held in 1992 among the members of CoESS (Confédération Européenne des Services de Sécurité) showed that this service sector employs 424 550 people.

The subcontracting percentage in the EC Member States averages 74% (314 410). The remainder (110 140) employed in a corporate situation. In the EC an average 124.9 out of each 100 000 inhabitants work as a security employee. The turnover of the 4 365 private security firms in the EC amounts to 6 684 million ECU, with an average annual turnover of 21 259 ECU per employee.

There are 4 365 security firms in the EC. The average work force is 72 employees per firm. In non-EC European countries, the average company size is 74 employees in the 457 security firms established in these countries. An overview of the company size of security firms can be given for the following EC countries: United Kingdom, Germany, Spain, The Netherlands and Italy.

In addition, about 33 600 security employees are being employed in non-EC countries by a total of 457 security firms. Their total turnover is 1 014 million ECU which means an annual turnover per security employee of 30 164 ECU.

Transportation of valuables

In 1993, this sector of activity employed 44 600 persons in the EC, for a total turnover of 1.6 billion ECU. The sector of transportation of valuables consisted of 197 companies, with 8 900 armoured vehicles of all types. The average work force in the sector is 226 employees, and the annual turnover per employee was 35 830 ECU.

Table 4: Security services
Turnover and employment in transportation of valuables, 1992

	Number of companies	%	Number of employees	%	Number of vehicles	%
Belgique/België	6	3	700	2	300	3
Danmark	2	0	100	0	23	0
BR Deutschland	100	7	3 000	7	1 150	13
Hellas	5	0	310	1	125	1
España	15	8	2 600	6	830	9
France	16	23	7 500	17	1 100	12
Ireland	4	0	200	0	60	1
Italia	25	12	3 600	8	1 250	14
Luxembourg	4	0	130	0	50	1
Nederland	6	7	922	2	300	3
Portugal	4	1	500	1	170	2
United Kingdom	10	39	25 000	56	3 500	40
EC	197	100	44 562	100	8 858	100
Austria			2 300		150	
Switzerland			5 400		125	

Source: ESTA

The activities of armoured car transportation of valuables are diversifying to include services such as: coin processing, cash note processing, cheque encoding, and Automatic Teller Machine servicing.

New technology is progressively introduced to protect the crew members from hold-up attacks. The principle used is the self destruction of the transported valuables in case of robbery.

REGULATIONS

In various ways there are considerable dissimilarities in the laws and regulations. These laws and regulations are, of course, subject to change. The information supplied below was valid in late 1990 and early 1991. It describes a number of marked differences in laws and regulations. Since then, two EC countries have adopted new statutes, namely Spain (1992) and Portugal (1993).

Most European countries have some form or other of laws or regulations. One noticeable exception is the United Kingdom where no government rules exist whatsoever. Germany too, considering the extent of the sector there, takes a position of its own. This country does have some incorporated legislation but no specific legislation.

A number of duties are performed on a standard basis. In some countries the array of duties is quite wide. In Sweden the tasks include the production of identity cards and assistance in fire-fighting. In Germany a considerable amount of activities are connected with the maintenance of public order. In Spain part of the duty is to pursue and arrest lawbreakers.

All European countries (excluding the UK) have mandatory licence and practical requirements which are generally the same. Although such harmonisation exists, a number of countries enforce special requirements, including:

- compulsory third-party liability insurance (Belgium, France, Portugal, Spain and Switzerland);
- Belgium and France apply restrictions for those who have previously been employed professionally in the police force or have been in the military. Italy and Spain, on the other hand, make it a requirement to have accomplished one's military service to be allowed to work as a security guard;
- in France it is not possible to enter the security services sector after a bankruptcy.

The requirements and the duration of the various types of schooling in Europe are quite diverse. In Germany there is no unified concept. In The Netherlands, however, schooling is organised quite thoroughly as compared to the other European countries.

Laws and regulations with regard to equipment (uniform, weapons, identification and the use of dogs) are on the whole similar in all countries. Wearing a uniform is compulsory in most countries, but is optional in four countries. The uniform shall not resemble the police uniform.

Carrying arms is permitted with the exception of Denmark, the United Kingdom, the Netherlands and Norway. In some countries, the laws and regulations with regard to arms are contained in the Fire Arms legislation of the country in question. In other countries, a separate article is included in the Security legislation.

In most countries employees in the private security services sector are obliged to carry an identity paper; Austria is an exception. In Spain security guards can easily be recognised by a badge that each guard is required to wear.

As for government supervision, Belgium, the Netherlands, Portugal and Spain stipulate annual reporting to the Ministry in charge. In Sweden and Norway supervision is in the hands of the police.

The amount of possible sanctions varies widely. In the Netherlands there is only the possibility of withdrawing the licence. Belgium, Denmark, France, Norway, Portugal, Spain and Switzerland have, in addition to that sanction, the possibility of imposing fines and/or imprisonment.

Other noticeable clauses include:

- security firms are not to concern themselves with or intervene in political or labour conflicts (Belgium and France);
- in case a person offers resistance against removal a certain amount of violence may be used (Finland and Sweden);
- the wages of a security guard must not be lower than the starting salary of a police officer (Greece);
- in Austria approval from the Prime Minister is required if someone wishes to exercise other activities simultaneously with security activities;

- in Spain each private security organisation is assigned an exclusive number. This number must be mentioned on any document and in any publication the firm produces.

OUTLOOK

Late 1993, the Directorate General V organised a social dialogue on the security sector in Brussels. The dialogue was attended by representatives of trade union (Euro-Fiet), branch organisations such as CoESS, IPSA and DGIII.

The basis is created for structural debate in future on a variety of important themes, such as: legislation, vocational training, screening and licensing. In general the meeting found agreement for setting up a minimum of standards throughout Europe in relation with the mentioned subject.

Although, at this moment, no direct improvement of the economy is in sight, the security sector hopes that it will maintain the actual size and volume and by improving quality to be able to grow again in future.

As for the security transportation sector, it will continue to grow as it did during the 1988-92 period, when it nearly doubled its turnover. At present the contracting of the security transport services to private companies is reaching the top of the potential market in some EC countries and will stabilise in the years to come to the actual values.

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Car rental
NACE 844

The EC market for short term and long term car rentals is dominated by five large companies. These companies are able to offer competitive prices for business and leisure travellers. Small and medium-sized companies tend to service other market segments, but regularly do not have car rental as their major activity. It is, however, likely that the large companies will gain market share at the expense of small and medium-sized firms. Market developments strongly correlate with economic activity and air travelling. With the slowdown in economic growth the increase in car renting in 1992 was only 2%; in 1993 and 1994 growth will not be much higher. After 1994 an improvement of the growth rate is expected at about 5% per annum.

INDUSTRY PROFILE

Description of the sector

The car rental branch deals with the commercial rental of motor vehicles (passenger cars, vans and trucks) without driver. Distinction can be made between short term rental (a few days) and long term rental (contract hire and leasing). Car rental with driver is not included, as this belongs to the taxi business classified in NACE 722.

Commercial car rental is provided by companies either exclusively or in combination with other business activities. The majority of the big companies are in the car rental business exclusively, in part also in combination with car leasing. The small and medium-sized companies, however, combine the car rental business with other activities, especially with gasoline stations, motor vehicle dealerships and repair in garages. Mostly, in such companies car rental is not the major activity.

Another distinction which can be made is between car rental for business purposes and for tourism purposes. The former relates to short term car rental by business travellers and long term car rental; the latter basically is short term car rental by tourists.

The largest short term car rental markets can be found in Germany, France and the United Kingdom. In 1991, the United Kingdom accounted for 25% of the EC total of short term passenger car rentals. Germany, with 24%, was of more or less equivalent size. France took 20% of the EC total.

Germany is by far the largest market for long term car rentals. In 1991, the German fleet amounted to about 2.2 million passenger cars and 300 000 light vans. The United Kingdom ranks second with 1.26 million passenger cars, 73 600 light vans and 90 800 trucks.

For short term car rental the average rental period for a passenger car has increased from 3-4 days in 1989 to 4-5 days in 1991. For light vans the average period was 2-3 days; for trucks it was 3-4 days.

Long term car rental periods vary considerably. In Greece, the average period for passenger cars is the lowest with 6 months. The longest period is identified in Switzerland with 38 months. For vans the lowest is also 6 months, but the highest is 29 months. Long term truck rental periods vary from 12 months in France to 42 months in the United Kingdom.

The average distance per short term hire amounts to about 150 kilometres, with the exception of Italy where it is at 450 kilometres. The demand for one-way rentals varies substantially, from 33% of all rentals in France to 3% in Italy. Rental activity is the strongest during the summer months (May to August), whereas it is markedly weaker in the winter months (January and February).

Vehicle utilisation indicates to which extent demand meets supply in the car rental business. In long term rentals the norm for the utilisation rate is 100%, as there is usually one customer using the car on a permanent basis. In short term rentals the utilisation rate is lower. For cars it varies from 55% to 70%; for light vans it is between 48% and 70%; for trucks, utilisation ranges from 50% to 80%. Higher utilisation rates in short term rentals are considered counterproductive, as too many clients have to be turned away without a vehicle.

Recent trends

Over the 1989-91 period, the EC market for short term car rental has grown considerably. The fleet expansion, for passenger cars, increased on average 8.5% from 449 000 in 1989 to 528 000 in 1991. For light vans, the increase was lower: 5.5% on average; for trucks the growth was more substantial: 10.9%.

Long term car rental also shows high growth rates. The market for passenger cars in the EC has increased by 17.4% on average during the 1989-91 period. Growth in light vans was of a similar percentage: 15.8%. Long term renting of trucks has increased by 10.8%.

Table 1: Car rental
Main Indicators, 1989-90

	Number of enterprises		Turnover (excl.VAT) (million ECU)		Gross value added at market prices (excl. VAT) (million ECU)		Number of persons employed	
	1989	1990	1989	1990	1989	1990	1989	1990
Belgique/België	439	533	490	567	N/A	N/A	N/A	N/A
Danmark	1 000	N/A	155	N/A	N/A	N/A	N/A	N/A
BR Deutschland	N/A	4 735	N/A	4 807	N/A	N/A	N/A	N/A
Hellas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
España	N/A	1 063	N/A	N/A	N/A	N/A	N/A	4 894
France	974	1 026	1 605	1 993	1 127	1 312	N/A	N/A
Ireland	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Italia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Luxembourg	13	14	N/A	N/A	N/A	N/A	103	112
Nederland	462	540	1 118	1 323	190	266	3 020	3 440
Portugal	225	N/A	65	N/A	N/A	N/A	N/A	N/A
United Kingdom	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Source: Eurostat

Table 2: Car rental
Number of vehicles for short term rentals (units)

	1989			1991			Average change (%)		
	Cars	Light vans	Commercial vehicles	Cars	Light vans	Commercial vehicles	Cars	Light vans	Commercial vehicles
Belgique/België	7 249	1 748	720	8 000	1 835	470	5.1	2.5	-19.2
Danmark (1)	5 256	-	N/A	5 451	-	N/A	1.8	-	-
BR Deutschland (2)	65 000	N/A	15 000	125 000	N/A	35 000	38.7	-	52.8
Hellas	12 800	0	0	24 000	0	0	36.9	-	-
España	33 000	1 250	45	31 500	1 170	40	-2.3	-3.3	-5.7
France	95 000	35 000	15 000	105 000	50 000	16 000	5.1	19.5	3.3
Ireland	10 500	N/A	N/A	11 750	N/A	N/A	5.8	-	-
Italia	38 000	2 800	N/A	41 000	3 400	N/A	3.9	10.2	-
Luxembourg	1 650	120	5	N/A	N/A	N/A	-	-	-
Nederland	17 000	5 500	650	19 000	6 000	700	5.7	4.4	3.8
Portugal	23 500	2 347	N/A	24 750	4 239	N/A	2.6	34.4	-
United Kingdom	140 000	38 000	27 000	132 800	29 900	19 700	-2.6	-11.3	-14.6
EC total	448 955	86 765	58 420	528 251	96 544	71 910	8.5	5.5	10.9
Austria	2 724	302	84	3 151	320	100	7.6	2.9	9.1
Sweden	23 000	3 000	N/A	23 000	3 700	275	0.0	11.1	-
Switzerland	9 500	N/A	N/A	9 000	N/A	N/A	-2.7	-	-
Other (3)	19 405	862	460	9 950	400	310	-	-	-
Total	503 584	90 929	58 964	573 352	100 964	72 595	6.7	5.4	11.0

(1) Light vans included in cars.
(2) 1989: excluding Eastern Germany.
(3) 1989: Israel, Malta and (former) Yugoslavia; 1991: Israel and Malta.
Source: ECATRA Statistical survey 1991

The high growth rates were not only caused by favourable market conditions. The opening up of Eastern Germany has resulted in a strong upward movement of units rented. This can be clearly seen from the data on Germany, which show high growth rates. However, the effect of reunification could not be isolated.

In 1992, the European car rental industry grew by only 2% according to budget. This was due to low economic growth and slow growth in the airline industry. In 1993, the growth rate could be harmed by the economic slowdown.

MARKET FORCES

Demand

The three most important factors affecting the growth of the European car rental market are general economic growth, airline traffic growth, and customer attitudes. According to the "Budget report on Car Rental in Europe", a 1% increase in disposable income leads to a more than proportional growth in demand for car rental, namely 1.8%.

Most short term car rentals (20 to 30%) occur at airports, where business travellers and tourists arrive. Business travellers are more and more in need of flexible transportation to use their time as efficiently as possible. Further, in view of European integration, there is a growing need for mobility as business deals are more and more concluded internationally instead of locally, which benefits car rental demand. Furthermore, the European tourist is becoming increasingly independent and enterprising, a tendency which also benefits the car rental industry. The greatest benefit will accrue to South and East European travel markets where transport systems have not been fully developed yet.

The long term car rental business benefits from a growing demand for advantageous financing constructions, whereby fleet owning companies sell their fleets and lease them back from a rental company. Further, companies want to concentrate on their core businesses, and leave the maintenance of their fleet to the rental company.

Supply and competition

In general there is extraordinarily strong price and service competition in the car rental industry. It is led by the big companies. They court the business sector as well as the leisure sector with a very flexible pricing policy based on partial cost thinking. At the same time the performance standards (car plus service) have been expanded and improved substantially.

The Budget Report confirms that average rental fees per day for a Ford Escort declined by 12% from 1988 to 1991. Comparing the cost of owning a car with the cost of renting one on weekends shows that up to a utilisation rate of 44 weekends per year renting the car is cheaper or at least not more expensive than owning the car. The Budget Report lists additional advantages of car renting, namely higher quality and reliability, time saving, petrol costs saving by using the shortest route, and adaptation of the rental car to special requirements.

The partial-cost oriented pricing policy of the big car rental companies is possible because of the effects of rationalisation and declining costs resulting from the size of the companies, and also and importantly because of the strong financial and/or contractual ties to the automobile industry. Vehicles are bought from the European car manufacturers at large discounts. Selling used cars yields high revenues, further enabling low rental rates. However, there are indications that the automobile industry is limiting discounts, leaving opportunities for Japanese manufacturers. Moreover, the prices on the used car markets have recently come down, causing a rise in rental prices.

Companies in short term rentals compete for the customers by offering all kinds of services. Express desks, self-service returns and reward schemes for frequent clients (e.g. Avis's

Table 3: Car rental
Number of vehicles for long term rentals (units)

	1989			1991			Average change (%)		
	Cars	Light vans	Commercial vehicles	Cars	Light vans	Commercial vehicles	Cars	Light vans	Commercial vehicles
Belgique/België	58 000	N/A	N/A	101 500	N/A	N/A	32.3	-	-
Danmark	N/A	N/A	N/A	N/A	N/A	N/A	-	-	-
BR Deutschland (1)	1 200 000	150 000	N/A	2 200 000	300 000	N/A	35.4	41.4	-
Hellas	3 200	N/A	N/A	5 000	N/A	N/A	25.0	-	-
España	5 500	80	N/A	7 000	100	N/A	12.8	11.8	-
France	260 000	82 800	61 200	335 000	75 000	64 000	13.5	-4.8	2.3
Ireland	N/A	N/A	N/A	N/A	N/A	N/A	-	-	-
Italia	80 000	2 600	N/A	105 000	3 000	N/A	14.6	7.4	-
Luxembourg	N/A	17	45	N/A	N/A	N/A	-	-	-
Nederland	182 800	31 200	1 000	213 670	23 140	7 650	8.1	-13.9	176.6
Portugal	19 000	1 300	N/A	59 600	12 070	N/A	77.1	204.7	-
United Kingdom	1 300 000	95 000	70 000	1 260 900	73 600	90 800	-1.5	-12.0	13.9
EC total	3 108 500	362 997	132 245	4 287 670	486 910	162 450	17.4	15.8	10.8

(1) 1989: excluding Eastern Germany.
Source: ECATRA Statistical survey 1991

Club, Hertz's Gold Club and Eurodollar's First Choice Card) entice the business clients. Also, modern computerised reservation systems (e.g. Avis's worldwide Wizard network) have become an essential competitive edge.

For the leisure traveller rental companies have organised all kinds of arrangements together with airline companies and tour operators. Fly-drive arrangements have become a popular product. Recently, rail-drive arrangements and rail-sail-drive arrangements (e.g. to Ireland with Sealink, British Rail and Hertz) were added to the product range.

A new development in the industry is the rental of electric cars. These cars contribute to reducing air pollution and to promoting cleaner and quieter roads. In Geneva, Switzerland, a pilot project has started with Avis, Hertz and Sixt-Alsa. Clients can rent an electric car for SFr 50 a day.

INDUSTRY STRUCTURE

Companies

The five big car rental companies in Europe are Avis, Budget, Eurodollar, Europcar and Hertz. Avis, Budget and Hertz operate worldwide with international networks in many countries. Eurodollar and Europcar are trying to establish a global presence through cooperation. Eurodollar is the major licensee of the American Dollar group and Europcar has marketing agreements with National in the USA, Tilden in Canada and Nippon in Japan.

Hertz, the largest car rental company worldwide, is owned by Park Ridge Corporation, in which Ford Motor Company holds a majority equity share. After Hertz, Avis is the second biggest car rental firm worldwide. Avis Europe, in which the Belgian Lease International and to a lesser part General Motors and the American parent company Avis Inc. hold shares, is the market leader in Europe, ahead of Europcar. In 1991 its pure rental turnover amounted to 175 million ECU.

The largest companies are also leading in the various national markets in the EC. Avis is the market leader in the United Kingdom, Italy, France and Denmark, Budget in the Netherlands and Austria, Hertz in Sweden, Switzerland and Belgium and Europcar in Germany and Finland.

Strategies

Avis relies primarily on its extensive agency network at airports and train stations in Europe. Exclusive contracts exist with the French, Belgian and Luxembourg railroads. In addition, there are cooperation agreements with most of the big travel agencies, many airlines e.g. Lufthansa (D) and hotel chains. Avis, like the other big companies, provides a number of special services for the business customer, the major client. A computer system supports fast and flexible management decisions. With its "super value" programme in 1991, Avis was the first of the major car rental firms in Europe to offer leisure travellers special discount rates.

Hertz relies primarily on its strong airport presence; it has 2 000 airports locations worldwide. Travel from the USA, where Hertz is market leader, is a cornerstone of its business. In the United Kingdom Hertz also has an exclusive agreement with British Rail and a cooperation agreement with the national railroad of The Netherlands. Hertz has specialised in the business segment of the market. The company has numerous fly-drive agreements with airlines, e.g. its "Business-drive"-programme in partnership with British Airways. In combination with British Rail Hertz introduced its "Intercity-drive" programme. In 1991, a number of products were introduced for the leisure traveller, like the "Holiday-saver" programme. Since 1991 Hertz has been selling its used cars directly to the final consumer or user rather than to wholesalers.

Europcar was created in 1989 by a merger of InterRent, a 100% Volkswagen subsidiary (until then market leader in Germany) and Europcar, the leading car rental firm in France and the United Kingdom, a subsidiary of the Belgian-French travel firm Compagnie Internationale des Wagons-Lits et du Tourisme. Reorganisation, rationalisation, and network adjustment took place in 1990 and 1991. With counters in about 260 airports in 79 countries, Europcar's market share is around one third. Europcar has cooperation agreements with National Car Rental of the USA, Tilden rent-a-car of Canada and Nippon-rent-a-car of Japan. Further, it is extraordinarily active in East European markets. It entered the Soviet market in 1989, and the East German market in 1990. In addition it has licensees in Czechoslovakia, Hungary, Yugoslavia and Bulgaria. During 1991 the non-airport segment of the market was more intensively courted by Europcar with the programmes "Cost cutter", "Business-drive" and "Super drive".

Table 4: Car rental
Largest companies in car rental, 1991

	BR Deutschland	France	Italia	Nederland	United Kingdom
Market leader	Europcar	Avis	Avis	Budget	Avis
Number of outlets	380	300	120	31	200
Number of cars	20 000	15 150	8 000	2 900	16 000
Market share (%)	13	15	20	14	12

Source: The Budget Report on car rental in Europe 1991

Especially for the visitors of Euro-Disneyland the company started the pan-European promotional campaign "Join the countdown to Euro-Disney".

Budget is the third largest car rental company worldwide with a fleet of 250 000 vehicles and 3 600 outlets in 140 countries. It operates its own network, in Belgium and in France, as well as a franchise network. Despite difficult market conditions, its own network grew at a rate of 15% in 1991. Franchise partner in Germany is Sixt AG, which in recent years achieved second place with low-price strategies and a rapid pace of expansion. A new segment which Sixt believes promising is the rental of heavy tractors and trucks (in excess of 9 tons). Budget was the first company to introduce all-inclusive rates. Within this all-inclusive rate it is the only company to offer personal insurance. Budget must also be considered the price leader among the big car rental firms. Budget's fast pace of expansion was based on the mix of corporate and licensed operations. Especially, the various local market segments could be reached with franchise partners. One specialty is the provision of luxury cars. Of all car rental firms Budget maintains the largest Mercedes fleet and is the biggest customer of Mercedes in the world.

Eurodollar International is the European franchise of the American group Dollar Rent A Car Inc. Dollar in turn belongs to Chrysler Corporation, which also owns Thrifty Rent A Car. Eurodollar has own and franchised outlets in 20 European countries. In 700 locations in Europe it offers more than 70 000 vehicles (worldwide this figure is 125 000 in 1 800 locations). In 1991, the French, Dutch and Italian franchisees were taken over by Eurodollar International. Through cooperation with Autohansa in Germany the franchise network was expanded there. An extension of the network is planned to Eastern Europe, the Middle East, and Africa. In early 1992 a new franchise started in Poland. The sharp expansion, especially in the business segment, has diminished the originally strong dependence on the UK market.

Together, these five large companies represent over 50% of the market in Western Europe. the remaining share of the car rental market is accounted for by a great number of small, medium-sized and larger firms of local, regional and nationwide importance, which frequently enter into horizontal cooperation arrangements in order to improve their efficiency.

A clear pricing policy and a constant high level of service are becoming increasingly important. This trend favours the big car rental companies with evenly high performance standards and large agency networks. Economies of scale and financial and/or contractual interrelationships with the automobile industry create additional structural competitive advantages for the large car rental companies. They use these advantages consistently and efficiently in order to safeguard and expand their market shares. The beneficiary is the car renter who enjoys very low rental fees.

In this way the airport business has fallen almost entirely into the hand of the big car rental companies. The numerous small and medium-sized car rental firms focus on the non-airport segment of the market. This consists of the rental of substitutes for accident damaged cars (turnover share approximately 50%), the rental for business purposes (app. 30%), the rental to tourists (app. 15%) and the rental for other private purposes (app. 5%).

Price comparisons suffer from the very low degree of standardisation within the individual EC countries. The sector is in the process of providing a solution for the standardisation of services and quality levels. This should render the market more transparent and more competitive.

The sales prices of the small and medium-sized firms are not always based on exact cost calculations, but are oriented on market prices. As this frequently results in prices which fail to cover costs, the car rental division is often being subsidised by other activities of these smaller firms. There are still local supply monopolies or oligopolistic constellations, especially in the countryside, which make cost-covering prices possible. The increasing regional expansion of the large companies' networks, however, results in increasing price and service competition here, too.

ENVIRONMENT

The car rental activity has positive and negative effects on the environment. Positive environmental considerations include the use of train for long distance travelling, the smaller size of rented cars compared to owned cars, and the use of relatively new cars in rental fleets.

The combination train and rented car can replace the use of one's own car for long distance travelling. The rented car is then used at the point of destination. The environmental damage and the resource use of the railroads, in terms of person-kilometres, is much lower than that of one's own automobile. Besides, the substitution of the train for the car ride results in less traffic on motorways, contributing to a decline in accidents and emissions. The economic costs of car accidents, in particular, are considerable.

Another environmentally beneficial effect relates to the use of rental cars versus the use of private cars. Generally, rental cars are smaller, leaner and younger than privately owned cars. Further, car rental fleets get regular maintenance and inspection, which contributes to energy efficiency and the minimisation of harmful exhaust gas emissions. However, in southern EC countries car rental firms frequently have older, poorly maintained cars in their fleets.

Environmentally damaging factors include the use of aeroplanes for long distances and increased car use in holiday resorts. Exhaust emissions of aeroplanes, in terms of person-kilometres, are much higher than that of automobiles. In holiday resorts tourists using car rental services cause a far higher transport demand resulting in higher exhaust emissions.

REGULATIONS

One of the most important problems in the car rental industry is vehicle theft and conversion. Theft by juveniles accounts

for the majority of vehicle crime. Enormous losses are involved and the abolition of custom control at national borders has aggravated the problem. The industry is spending considerable efforts on prevention. These include a call for improvement of car security systems by car manufacturers, a microchip security system on rental cars and car security cards.

In the long term rental business companies encounter refusals by car manufacturers to supply vehicles. They justify this using an EC Directive for selective distribution in Europe. This Directive will expire in July 1995, but it could be renewed or amended by that time.

Truck rental companies have requested the EC to examine the EC Directive on Truck Rental. It deals with the proposed liberalisation of truck rentals. The application of this Directive seems to differ in the Member States, which is considered harmful to the industry.

The envisaged harmonisation of VAT and excise duties is important for the industry as well. Currently, large differences exist in the Member countries causing rental companies to charge different prices. For the consumer, who regularly comes from another country, prices are by no means comparable due to these differences, causing less clarity in the market. It also creates annoying inflexibilities in international car renting.

Finally, the proposed directive on unfair clauses in consumer contracts is of importance. Rental agreements by companies need to comply with this directive.

OUTLOOK

Car rental will most likely register strong growth in the years to come. Mobility in all EC countries is rising and this trend is expected to continue in the medium and long term. Growing business travel in the wake of the completion of the EC internal market, economic growth in Eastern Europe as well as continued expansion of Europe-wide tourism will stimulate the car rental market in the future.

Car rental has become a true alternative to the use of a self-owned automobile or truck. Short term car rental is stimulated by an increasing tendency to use rail or aeroplane services in combination with a rental car for both business and tourism passengers. Long term car rental benefits from the increasing need for flexible financing of car and truck fleets.

In view of the above growth in the car rental industry is expected to be relatively strong. In 1993-94 a slowdown can be expected and therefore growth rates may not exceed 2% on average. For 1994-97 a real expansion of close to 5% is expected.

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Leasing
NACE 84

The idea of equipment leasing was imported from the USA and quickly gained general acceptance throughout Europe in the 1970s and 1980s. It became particularly popular in the service sector. Hence, leasing became a strong growth industry and currently is responsible for around 20% of investments in equipment. National legislation in the various Member Countries has dealt with leasing in very different ways. As a consequence, the leasing business varies considerably from one country to another. Harmonisation of regulations is difficult and is likely to take a long time. Due to the economic recession the high growth rates have come down and even turned into negative figures. However, when the economy recovers new investments will lead to a new upward trend.

INDUSTRY PROFILE

Description of the sector

NACE 84 covers renting, leasing and hiring of movables, of which leasing is the most important. The leasing of real estate is excluded. Consequently, figures only refer to the leasing of movables, or the so-called equipment leasing. More specifically, the following types of equipment leasing will be discussed, leasing of agricultural machinery and industrial equipment, NACE 841; leasing of construction machinery and equipment, NACE 842; leasing of bookkeeping and office machines, electronic data processing equipment and cash registers, NACE 843; leasing of cars NACE 844; leasing of other means of transport without driver, including aircraft and ships, NACE 845; and leasing of other movables, NACE 847. All these categories do not include permanent staff or chauffeur as part of leasing.

The definition of leasing is not exactly the same in the different Member States. Comparisons across Member States therefore have to be interpreted cautiously. Commercial and civil laws in most Member States were developed at a time that leasing did not exist. Consequently, no legal definitions of leasing exist (except in France for 'crédit bail', the French system for leasing). Instead ministerial decrees and court rulings are regulating the leasing business. This hinders the formation of a single market for leasing.

Broadly speaking, leasing refers to the transfer of a good from the lessor (the owner) to the lessee, who is able to use the good with regular payments. While leasing concerns an operation on medium or long term, renting refers primarily to a transfer of a good in the short term (hours, days, etc.) between two persons on payment of a fee. The differences in regulation between Member States and the existence of intermediary forms (e.g. hire-purchase) clouds the distinction between leasing and renting. A large proportion of English and French leasing contracts for example would be classified as hire-purchase in Germany.

Recent trends

With leasing being a relatively new operation, the market for leasing in the different Member States showed huge growth figures in the 1970s and the 1980s. However, because of the economic recession, this rapid development came to an end recently, with even negative growth figures in several Member States.

The US was the first country where leasing operations were set up and further developed. Within the EC, leasing is relatively more widespread in the UK and Ireland, two countries which are traditionally more affiliated with the US. Leasing operations in these countries make up around 30% of total investments, the same level as in the US.

The growth in leasing activity affected also the number of companies. In the first years of leasing, the manufacturers of capital goods dominated the leasing market: they used leasing operations mainly as a marketing instrument in order to stimulate the sales of their 'core' products. Attracted by this booming market, independent leasing firms established themselves and gained a firm position. These independent firms, mainly bank subsidiaries, overtook producer leasing in new business generation, in part because of the introduction of

Table 1: Leasing
Main Indicators (1)

(million ECU)	Leasing 1990	1991	1992	Growth (%) 1990	1991	1992	Number of companies (2) 1990	1991	1992	share of leasing in total investments (%),1992 by total industry (3)	by national associations
Belgique/België	1 534	1 671	1 512	21.2	8.2	-10.5	63	59	54	7.0	6.5
Danmark	780	707	485	0.0	-10.3	-45.8	19	18	24	11.0	8.5
BR Deutschland		16 561	19 050	36.5	-10.3	13.1	74	89	96	16.6	12.3
Hellas	97	139	201	49.2	30.2	31.0	4	8	7	4.2	4.2
España	7 569	7 170	5 120	-3.7	-5.6	-40.0	106	97	85	17.5	17.3
France	15 111	13 100	11 214	-6.8	-15.4	-16.8	127	129	113	14.6	14.2
Italia	13 368	13 426	9 334	87.7	0.4	-43.8	142	122	91	11.5	10.3
Ireland	864	866	841	10.2	0.2	-3.0	18	17	17	32.0	28.3
Luxembourg	172	121	167	6.8	-42.1	27.5	8	5	5	N/A	N/A
Nederland	2 559	2 411	2 830	10.7	-6.1	14.8	21	23	23	10.5	8.9
Portugal	1 041	1 288	1 557	23.6	19.2	17.3	18	20	26	20.4	20.4
United Kingdom	18 799	18 081	16 022	-4.3	-4.0	-12.9	75	73	84	28.2	27.3
EC	62 674	59 687	68 336	8.1	-5.0	12.0	675	660	625	N/A	N/A

(1) Only members of the national associations.
(2) Companies which offer only equipment leasing and companies which offer equipment leasing as well as real estate leasing.
(3) Includes independent leasing companies, not leasing subsidiaries.
Source: Leaseurope

Table 2: Leasing
Importance of leasing machinery according to the turnover, 1992

(%)	Machinery and industrial equipment	Computer and business machines	Subtotal	Others
Belgique/België	15.5	25.4	40.9	6.4
Danmark	23.5	30.5	54.0	10.9
BR Deutschland	13.1	19.6	32.7	7.4
Hellas	56.2	10.4	66.6	15.4
España	34.2	7.9	42.1	11.0
France	33.9	18.8	52.7	1.2
Ireland	29.1	9.0	38.1	N/A
Italia	47.0	12.9	59.9	4.8
Luxembourg	N/A	N/A	N/A	N/A
Nederland	11.8	24.4	36.2	10.6
Portugal	28.7	13.9	42.6	8.8
United Kingdom	25.0	16.9	41.9	3.9

Source: Leaseurope

new innovations. The present economic recession which has caused a major decrease in investments, and increasing competition between leasing companies has resulted in the shake-out of companies in some Member States.

Principally, there are two major categories of leasing contracts: the financial lease and the operational lease. Financial lease refers to a contract with full pay out (full amortisation). It is in principle irrevocable and does not provide for maintenance and service as the legal ownership stays with the lessor, but the economic ownership shifts to the lessee. Furthermore, in several Member States the financial lease includes an option to buy for the lessee at the expiration date.

Operational lease refers to a contract with non-full pay out (partial amortisation): the lessee only uses the capital equipment for a portion of its normal service life, and there are normally one or more additional users. The leasing rates and payments are calculated at a fraction of the purchase value. Furthermore, an operational lease can in principle be cancelled. This form of leasing may or may not call for the lessor to maintain and service the leased equipment, and the costs of this maintenance are either built into the lease payments or contracted out separately as the legal and economic ownership stay with the lessor.

International comparison

The leasing market in the US is relatively well developed, with a leasing ratio (share of leasing in total investments) above 30%. Japan has lagged behind, but is now making up for it with growth rates in leasing activity ranking among the highest in the world. Within Europe, the leasing market is far more developed in the EC than in Eastern Europe. In countries such as Poland, Czech Republic, Slovakia and Hungary, leasing becomes more prevalent and the prospects are very optimistic.

MARKET FORCES

Demand

The structure of the European leasing market in the 1990s is different from the structure earlier. The European leasing market has gradually undergone significant changes in terms of suppliers, customers and products.

In the beginning, leasing operations were mainly focused on office equipment. Through the years however, leasing has come to encompass all kinds of goods, such that almost everything can be leased. Machines and industrial equipment, in several Member States, are now almost as important as office and computer equipment. Lately, leasing commercial vehicles

Table 3: Leasing
Analysis by type of customer according to turnover in % for all leased goods, 1992

(%)	Agriculture	Industry	Services	Central and local government	Consumer	Others
Belgique/België	3.2	33.3	51.2	3.6	N/A	8.8
Danmark	2.5	35.3	32.4	15.9	N/A	14.0
BR Deutschland	0.6	33.7	52.0	3.4	10.3	N/A
Hellas	0.5	39.8	37.8	0.5	0.5	20.9
España	1.3	38.7	49.5	0.3	N/A	10.2
France	5.1	36.2	40.8	2.5	15.4	N/A
Ireland	29.1	9.0	15.0	46.8	N/A	N/A
Italia	1.1	52.3	38.0	8.5	0.1	N/A
Luxembourg	N/A	N/A	N/A	N/A	N/A	N/A
Nederland	0.9	22.4	56.2	4.8	0.6	15.1
Portugal	3.0	43.7	40.1	1.9	0.9	10.5
United Kingdom	4.7	31.3	56.9	7.1	N/A	N/A

Source: Leaseurope

Table 4: Leasing
Breakdown of investment leasing by field of use, 1992

(million ECU)	Agriculture	Industry	Services	Public administration	Consumers	Other
Belgique/België	48	503	774	54	N/A	133
Danmark	12	171	157	77	N/A	68
BR Deutschland	114	6 420	9 900	654	1 962	N/A
Hellas	1	80	76	1	1	42
España	67	1 982	2 534	14	N/A	523
France	572	4 060	4 575	278	1 729	N/A
Ireland	245	76	126	394	N/A	N/A
Italia	103	4 883	3 548	794	9	N/A
Luxembourg	N/A	N/A	N/A	N/A	N/A	167
Nederland	26	633	1 591	136	18	426
Portugal	47	680	624	29	14	163
United Kingdom	753	5 017	9 122	1 130	N/A	N/A

Source: Leaseurope

and cars has rapidly developed. Confronted with a slowdown in the world demand for cars, the major car producers offered, via their own leasing company or via independent leasing companies, extremely favourable leasing conditions in order to stimulate their sales.

The growth of car leasing is partly reflected in the shift of customers. In some Member States car leasing to private persons has been made possible, especially in France and Germany where private customers account for a considerable share of the leasing market. Private households are attracted by the favourable leasing conditions offered by the car manufacturers; conditions are in many cases much better than the conditions for personal loans from financial institutions.

The service sector remains however, the largest customer of leasing products, within some Member States it has a share of 50% or more. The expansion of the services in the 1980s has caused a shift from the industry to the services as the main customer.

Supply and competition

As said earlier, originally, leasing companies were mainly manufacturers trying to stimulate their sales by offering additional services for customers. A second family of leasing companies was formed by financial institutions which in several Member States overtook the manufacturers because of their financial expertise. In reaction, a lot of manufacturers founded leasing companies with an independent legal status and adopted some of the contract ideas of the independent competitors. Recently however, the observation in most Member States is that leasing companies are becoming more independent of large corporations, as well as of bank and insurance companies.

The shift in suppliers has also led to a growing specialisation of leasing companies. Leasing activities are increasingly realised by independent leasing companies, which are less and less dependent on manufacturers or financial institutions. This evolution and the introduction of new innovations results in a stronger profile of leasing companies vis-à-vis pure financing. Furthermore, because of the economies of scale in some stages of the leasing process, newcomers entering on a relatively small scale face serious drawbacks.

REGULATIONS

EC Member States not only define leasing differently, but also have a wide variety of civil law, fiscal and accounting rules. In addition, there is no standardised supervision by governments or central banks. Differences include clauses to civil liability, maintenance of the leased good, insurance, tax rates for depreciation and the accounting rules for capitalisation. So far, this did not cause major problems, but in view

Table 5: Leasing
Breakdown of investment leasing by type of asset, 1992

(million ECU)	Machines and industrial equipment	Office and computer equipment	Commercial vehicles	Cars	Ships, aircraft and railways	Other equipment
Belgique/België	234	384	267	453	77	97
Danmark	114	148	109	37	24	53
BR Deutschland	2 503	3 736	1 405	9 402	596	1 400
Hellas	113	21	9	27	N/A	31
España	1 750	402	1 920	485	N/A	563
France	3 799	2 113	2 663	2 502	N/A	137
Ireland	245	76	126	394	N/A	N/A
Italia	4 388	1 205	1 288	1 513	495	448
Luxembourg	N/A	N/A	N/A	N/A	N/A	167
Nederland	334	690	567	277	663	299
Portugal	447	216	454	290	13	137
United Kingdom	4 007	2 712	1 984	5 984	710	625

Source: Leaseurope

Table 6: Leasing
Breakdown of investment by primary contract term, 1992

(million ECU)	up to 2 years	up to 5 years	up to 10 years	longer than 10 years
Belgique/België	N/A	1 436	76	N/A
Danmark	23	290	94	78
BR Deutschland	2 858	12 382	3 239	571
Hellas	N/A	182	19	N/A
España	818	4 020	132	150
France	34	10 024	1 121	34
Ireland	181	574	86	N/A
Italia	747	7 995	485	112
Luxembourg	N/A	167	N/A	N/A
Nederland	N/A	2 689	141	N/A
Portugal	78	1 408	71	N/A
United Kingdom	2 881	9 738	1 923	1 480
EC	N/A	50 903	N/A	N/A

Source: Leaseurope

of the Single Market this may lead to unfair competition between leasing companies of different Member States.

The European Commission would like to come to a harmonisation in the fields mentioned. However, this has appeared to be a difficult process as Member States consider these fields as part of their sovereignty. Special working committees have been installed in order to come to a breakthrough. Especially with respect to accounting rules, major differences between Member States exist. Accounting operates according to two methods: the economic approach or the legal approach.

The economic approach neglects the legal content of a contract and interprets the economic content ('substance over form'). This interpretation is decisive for the capitalisation of the leased good: the economic owner is allowed to capitalise and depreciate the leased good. This means that with financial leasing, the lessee (economic but not legal owner) can enter the leased good on his balance sheet, while with operational leasing the lessor (economic and legal owner) is allowed to capitalise and depreciate the leased good. This approach is also called the Anglo-Saxon method, and is advocated in Europe by the UK, Ireland, the Netherlands and Belgium.

The legal approach gives the right to the legal owner to enter the leased good in his balance sheet. Consequently, no distinction with respect to accounting rules is made between financial and operational leasing, since the lessor stays in both cases the legal owner. This approach is used in most countries of continental Europe which includes France and Germany.

In France, financial leasing is indicated by 'crédit bail', while operational leasing is called 'location financière' or 'location simple', although some intermediary forms exist. A 'crédit bail' transaction is only present when at the outset the renter is granted an option to buy. Furthermore, the law stipulates that the purchase of goods for the purpose of renting is the precondition for a 'crédit bail' transaction. The law thus specifically excludes manufacturers from leasing. Manufacturing companies in all kind of sectors have therefore set up special finance companies in order to comply with these requirements.

Companies who offer exclusively 'crédit bail' operations are subject to other regulations than companies which offer also other forms of leasing. 'Crédit bail' companies are aided by legal regulations that guarantee market entry limitations, refinancing advantages, etc. On the other hand, these companies are subject to strict government controls and rules on advertising.

In Germany, the lessor is accountable as legal owner of the leased good and not the lessee. Operational leasing is understood to mean short and medium term leasing contracts in which the lessee has the right to cancel the agreement at any time. Financial leasing is irrevocable and includes an option to buy for the lessee at the expiration date of the contract. Because conditions for leasing are considered to be relatively favourable in comparison with other operations, hire-purchase and other rental forms are less widespread.

In the UK, leasing is not subject to any specific regulations or restrictions, as in some other Member States. In contrast with Germany and France, the lessee can capitalise and depreciate the leased good in financial leasing, an element taken from US law. Finance leasing contracts are those agreements transferring all the major risks and advantages inherent to ownership of the leased object to the lessee. If the minimal payments made by way of leasing are equal to 90% of the market value of the leased good, the contract is considered as a financial lease contract. All other leasing contracts are treated as operational leasing contracts. In the UK, operational leasing is considerably more widespread than in other EC Member States, which is partly due to the differences in definition.

The characteristic feature of the leasing market in Ireland is the relatively favourable fiscal situation and diverse subsidies. Just as is the case for the UK with financial leasing, the lessee can enter the leased good in his balance sheet.

In Denmark there is no specific legislation. Leased goods are capitalised and depreciated by the lessor, but special tax codes for leasing are non-existent. In the beginning, leasing in Denmark faced considerable acceptance problems and had to adjust to frequent changes in treatment by taxation legislation. In the Netherlands and Belgium, in the case of financial leasing, the lessee is allowed to capitalise and depreciate the leased good. Leasing to private households is not allowed in Belgium.

Spain and Portugal have, like France, introduced laws and relatively tight regulations for leasing. Spanish law obliges firms to operate as stock companies and comply with minimum equity provisions. These regulations partly explain why financial institutions have absorbed their subsidiary leasing companies.

No specific rules on leasing are present in Italy, although preparatory work is done in working groups. The current trend concerns the incorporation of leasing firms within financial institutions; as such leasing companies expect an improvement of their long term refinancing.

The conditions for leasing in Greece are relatively disadvantageous. The leasing of buildings, buses and trucks is not allowed and the depreciation rates are unfavourable. Although the country has shown considerable growth, leasing is still unimportant, which is partly explained by the unattractive conditions.

OUTLOOK

The economic recession had a considerable negative effect on the leasing market, causing negative growth figures for leasing operations in several Member States. In 1993 and 1994 leasing will face difficult times, due to the unfavourable economic developments. On the longer term however, an upward trend is expected, mainly because of the economic growth and the accompanying increase in investments in the second half of the 1990s. Furthermore, the forming of a single market for leasing with adequate solutions for the differences between Member States, can form an additional impetus for the development of leasing within the EC.

All types of assets are expected to show a growth with respect to leasing operations. Investments in office machinery and computer equipment are expected to grow because of the increasing penetration of these goods and the increasing importance of services in most Member States. The decline of hardware prices however, reacts as a counter effect to this positive evolution.

Investments in machinery and construction equipment, which show a relatively high conjectural character, are expected to increase because of the favourable economic climate. Furthermore, the build up of the former East Germany will result in a significant growth of leasing activities in Germany. Also the evolution in East European countries like Hungary the Czech Republic, and Slovakia can offer new opportunities for EC leasing companies.

Car leasing has shown in recent years the highest growth figures and is expected to do the same in the short term. In this segment, leasing should be able to increase its market share. For the moment, car leasing is hindered by the fact that in some Member States leasing to private households is not allowed. Should this situation change, leasing growth will accelerate considerably.

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Franchising

Franchising is a means of adaptation to local conditions without losing the benefit of global concerns, ideas and scales. Within the EC, franchising has become the most dynamic business development strategy. France is by far the European leading country and the second after USA at the world level. The outlook is bright as franchising has an important role to play in the promotion of EC trade and has the tools for that purpose.

INDUSTRY PROFILE

Description of the sector

Franchising is a strategy of business development that has a remarkable success all around the world. Nevertheless there exists a very specific European form of franchising because the European culture has given this strategy a specific colour, a clear concern for balance and transparency.

Franchising is a means to achieve adaptation to local conditions without losing the benefit of global concerns, ideas and scales. Therefore, if in its actual realisations Italian or Belgian franchising is quite different from German or French franchising, the basic definition of franchising contained in the Code of Ethics is accepted by all members of the European Franchise Federation and by the EC Commission itself.

Franchising is a system of marketing goods and/or services and/or technology, which is based upon a close and ongoing collaboration between legally and financially separate and independent undertakings, the franchisor and its individual franchisees, whereby the franchisor grants its individual franchisees the right, and imposes the obligation, to conduct a business in accordance with the franchisor's concept. The right entitles and compels the individual franchisee, in exchange for a direct or indirect financial compensation, to use the franchisor's trade name, and/or trade mark and/or service mark, know-how, business and technical methods, procedural system, and other industrial and/or intellectual property rights, supported by continuing provision of commercial and technical assistance, within the framework and for the term of a written franchise agreement, concluded between parties for this purpose.

Guiding principles of franchising

1. The franchisor is the initiator of a franchise network, composed of itself and its individual franchisees, of which the franchisor is the long-term guardian.

The obligations of the franchisor: the franchisor shall

- have operated a business concept with success, for a reasonable time and in at least one pilot unit before starting its franchise network;
- be the owner, or have legal rights to the use, of its network's trade name, trade mark or other distinguishing identification;
- provide the individual franchisee with initial training and continuing commercial and/or technical assistance during the entire life of the agreement.

The obligations of the individual franchisee: the individual franchisee shall

- devote its best efforts to the growth of the franchise business and to the maintenance of the common identity and reputation of the franchise network;
- supply the franchisor with verifiable operating data to facilitate the determination of performance and the financial statements necessary for effective management guidance, and allow the franchisor, and/or its agents, to have access to the individual franchisee's premises and records at the franchisor's request and at reasonable times;
- not disclose to third parties the know-how provided by the franchisor, neither during nor after termination of the agreement.

Recruitment, advertising and disclosure:

- Advertising for the recruitment of individual franchisees shall be free of ambiguity and misleading statements.

A specific organisation

In 1972 the European Franchise Federation (EFF) was created. This international non-profit association assembled all national Franchise Associations or Federations established in the Member States. The members of the national Associations are franchisors settled in the country.

The aims of the EFF are:

- the promotion of franchising in Europe;

Table 1: Franchising
Main indicators, 1992

	Number of franchisors	Number of franchisees	Turnover billion ECU	Persons employed by franchisees
Belgique/België	90	3 200	3.3	N/A
Danmark	42	500	N/A	N/A
BR Deutschland	370	15 500	8.2	N/A
Ellas	N/A	N/A	N/A	N/A
España	117	14 500	2.1	N/A
France	600	30 000	21.0	300 000
Ireland (1)	20	N/A	0.1	N/A
Italia	318	16 100	8.5	44 500 (2)
Luxembourg	N/A	N/A	N/A	N/A
Nederland	331	12 640	6.5	69 000
Portugal	55	800	N/A	N/A
United Kingdom	373	18 100	6.8	172 600

(1) 1989
(2) Estimate
Source: EFF, national franchise associations and federations

Table 2: Franchising
Top 10 franchisors in four EC countries, 1992

BR Deutschland	France	Italia (1)	United Kingdom
Porst	Phildar	Scudo-Sidis	Greenhalls
Eismann	Yves Rocher	Buffetti	Budget Rent-a-Car
Foto-Quelle	Promodes	Amico Gio'	Perfect Pizza
Quick-Schuh	Comod	Stefanel	Body Shop
Zentrale G. Schülerhilfe	Pingouin	Tecnocasa	Burgerking
McDonald's	Alain Affelelou	Pingouin	Prontaprint
Getifix	Jean-Louis David	Standa	Wimpy
OBI	Cinq à Sec	Maggioli	Dyno Services
Portas	Agence N 1	Upim	Servicemaster
Musikschule Fröhlich	Elephant Bleu	Max Mara	Kentucky Fried Chicken

(1) Ranked by number of stores.
Source: National franchise associations and federations

- protecting the franchise industry by promoting the European Code of Ethics;
- influencing and encouraging the development of franchising in Europe;
- representing the interest of the franchise industry in international organisations such as the European Parliament;
- the promotion and representation of the European franchise industry and its members worldwide;
- the exchange of information and documentation between national Associations or Federations in Europe and in the world.

MARKET FORCES

The last 20 years have seen quite an evolution in the channels of distribution. Stronger competition resulted in increased specialisation and the emergence of new ideas. Franchising is one of them.

ithin the EC franchising has become the most dynamic business development strategy. More than 2000 franchisors and more than 110 000 franchisees achieve an annual turnover of over 55 billion ECU.

In Europe franchising was first adopted in the retail sector, where with some exceptions the traditional forms of cooperation were not much used, and in completely new business sectors, like the do-it-yourself shops, fast food restaurants and car rentals. Although North American franchisors found their way to Europe, many national franchise networks were developed. Despite a growing internationalisation most of the national markets are still held by national networks.

France

France is by far the leading country in Europe and comes second in the world after the USA. 600 franchisors and 30 000 franchisees realise a turnover of 21 billion ECU, which represents 7.5 % of French retail turnover.

Franchising appeared in the north of the country, where the major wool manufacturer Pingouin led the way in 1929. It then spread to the confection sector, giving a strong impetus to the growth of product franchising, which today represents 70% of all franchising in France. Personal equipment represents 30% of the franchise market, food 20% and home equipment 20%. The remaining 30% consists of service franchising, at present achieving annual growth rates of 20% in areas such as fast food, hotels, instant printing and car maintenance.

French franchising networks sell world famous brands as Chanel, Yves Saint Laurent or Cardin. Product franchising is mainly aimed at the promotion of the trademark and image of the network, while know-how is relatively unimportant.

Franchising in France is moving towards increasingly innovative and performance-oriented forms in services for the individual consumer or business. In these areas a new trend is appearing: Franchisors consider franchisees more and more like partners with an increased freedom in their actions as long as the network's image is preserved.

95% of the franchising networks present in France are French. The remaining 5% are mostly American fast food chains.

The success of French franchising is best measured in terms of employment. In 1992, 10 000 jobs were created or saved by franchisors and franchisees.

United Kingdom

373 franchisors and 18 100 franchisees realise a turnover of 6.8 billion ECU. In recent years, the growth of the turnover was 25%; this was mostly due to expansion in services and specialised retail businesses. The characteristics of the United Kingdom are

- the absence of confection franchises. In 1989 the United Kingdom had 7 confection franchises, when France at the same time had 150.
- the great influence of American franchises. For US firms the United Kingdom has always been the natural gate to Europe, most of them started their European strategies with an English subsidiary. Consequently almost 30% of the franchise networks in the United Kingdom are American, and the United Kingdom is the leading country for Master Franchise.

Germany

70 franchisors and 15 500 franchisees realise a turnover of 8.2 billion ECU.

Germany has become one of the important franchising countries in Europe although, because of its cooperatively structured retail industry with strong "Buying Groups", franchising did not really take off until 5 years ago. It mostly developed in food distribution, with very large groups like Spar or Eisman, and in pottery and household equipment, followed by personal equipment and services.

Service franchising is largely made up of fast food chains. The growth of German franchising will receive extra stimulus from the development of the eastern Länder and countries.

The Netherlands

With 331 franchisors, 12 640 franchisees and a turnover of 6.5 billion ECU, franchising represents 12% of retail turnover in the Netherlands.

Except in the fast food sector, developed like generally in Europe by American franchisors, most of the franchisors are Dutch.

Belgium

Belgium counts 3 200 franchisees sponsored by 90 franchisors. Franchising has revealed itself as a successful strategy since 15 years, and expands according to the French model: product franchising is preponderant, while service franchising is developing since only recently.

50 % of the networks settled in Belgium are Belgian. The GB Group is the largest franchisor.

Italy

Italy has 318 franchisors and 16 100 franchisees achieving a turnover of 8.5 billion ECU.

A sudden expansion started in 1987 and lasted two years until 1989, with an important development in personal equipment. In the number of franchisors and franchisees Italy is the third country in Europe. Franchising seems perfectly adapted to the need of the country, experiencing at the same time a severe recession and a rapidly spreading culture of individual entrepreneurism.

Still, franchise turnover is very low compared with total retail turnover, representing roughly 1.2%. Very few foreign franchisors, mostly American and French, have settled in Italy.

Spain

Franchising is a rather new distribution channel in Spain. Taking off only in 1988 it did expand very quickly: until 1991, the annual growth rate was almost 70%. Today Spain has 117 franchisors and 14 500 franchisees realising a annual turnover of 2.1 billion ECU.

The expansion is mostly due to foreign franchisors. In 1991, only 58% of the franchisors were Spanish. The trend is now changing. An important number of national networks has been established, and as a culmination the Spanish Franchise Association was founded in October 1993.

The traditional business areas are personal equipment, confection and food distribution. Service franchising is still not developed, but the needs are obvious in sectors like car services, hotels, restaurants, as well as in specialised retail business.

Portugal

In the past four or five years, Portugal has experienced the same evolution as Spain.

Today 55 franchisors and 800 franchisees are operating.

Eastern Europe

In Eastern Europe franchising may be a way to import managerial know-how and an efficient retail structure.

Countries like Hungary have grabbed this opportunity and have today a successful franchising sector.

REGULATIONS

While franchising occurs in many forms in the various Member States, its regulatory framework is very homogeneous, mainly ruled by two texts:

- the block exemption
- the European Code of Ethics

The block exemption

Before 1986 no specific national laws existed and jurisprudence was poor, with the notable exception of France.

In this context a French company, Pronuptia, provoked the first judgement of the Court of Justice of the European Communities favourable to franchising. Article 85 (1) of the Treaty of Rome, establishing the European Economic Community, prohibits cartels between suppliers of commodities. However, the Pronuptia ruling took for the first time into account both the interest of the consumer and of a 'new economic being': the network in which franchisor and franchisee fight together against their competitors, and whose identity and image need a real protection.

It was the first step towards a global exemption for franchising from Article 85 (1), in recognition of the fact that consumers benefit from the combined purchasing power and higher service level that franchisees are able to offer in comparison with independent, individual entrepreneurs, and even that franchising does not in itself harm competition.

After four other individual exemptions, Yves Rocher, Computerland, Charles Jourdan, Service Master, the block exemption for franchising was passed in 1989.

The EC regulation covers product and service franchising (Art 1) only if the interest of the final consumer is taken into account (Art 4). Franchising was at last recognised as a distinct form of business, establishing a common legal basis for the development of franchising in EC Member States.

The European Code of Ethics

Since the very beginning of franchising in Europe there has been a real concern for ethics and self-regulation. The first Code of Ethics (1971) created by the French Franchise Federation, followed by a European Code in 1972 has permitted a smooth development of franchising, becoming a reference for all the partners of franchising: franchisors, franchisees, lawyers and consultants, administrations, governments, being even increasingly used by courts throughout Europe as the benchmark of franchising standards.

Since 1992 a new European Code, drafted in close consultation between the European Franchise Federation and the Directorate-General XXIII of the European Commission (which has responsibility, inter alia, for Trade and Distribution), is promoted in all the countries where the EFF has members.

The absence of specific laws in EC Member States is a proof, if one is needed, of the power of a self regulating effort, a code of ethical conduct and fair behaviour in an economic environment.

The franchise agreement

extracts of the Code of Ethics)

The Franchise agreement shall comply with the national law, European Community law and the European Code of Ethics and any national extensions thereto. The essential minimum terms of the agreement shall be the following:

- the rights granted to the franchisor
- the rights granted to the individual franchisee
- the goods and/or services to be provided to the individual franchisee
- the obligations of the franchisor
- the obligations of the individual franchisee
- the terms of payment by the individual franchisee
- the duration of the agreement, which should be long enough to allow individual franchisees to amortise their initial investments specific to the franchise
- the basis for any renewal of the agreement
- the terms upon which the individual franchisee may sell or transfer the franchised business and the franchisor's possible pre-emption rights in this respect

- provisions relevant to the use by the individual franchisee of the franchisor's distinctive signs, trade name, trade mark, service mark, store sign, logo or other distinguishing identification
- the franchisor's right to adapt the franchise system to new or changed methods
- provisions for termination of the agreement
- provisions for surrendering promptly upon termination of the franchise agreement any tangible and intangible property belonging to the franchisor or other owner thereof.

OUTLOOK

Franchising has more than ever a role to play in the modernisation of commerce, not only because the existence of the network allows a rapid diffusion of technological discoveries (for example the computerised cash register that can treat and analyse sales data), but also because franchising is a means of making alliances for the sake and benefit of the franchisor, the franchisee and the consumer.

Franchising is adapting to a new environment and may be showing the way to a new and better model of European distribution. It should then be a means of standardisation.

Franchising is a strategy that makes it possible to keep the advantage of scale economies, while respecting the identity of all the partners. Thanks to its centralised and flexible structure, thanks to the clear common interest which is preserving the network's image, franchising makes it possible to redistribute the decisions at the right level.

Now more than ever franchising has an important role to play in the promotion of trade within the EC. And indeed, it has all the relevant tools for that purpose. It is certainly a way to grab the opportunities of a changing market. The present evolutions promise a radiant future.

Written by: EFF
The industry is represented at the EC level by: European Franchise Federation / Fédération Européenne de la Franchise (EFF). Address: c/o FFF, Bd des Italiens 9, F-75002 Paris; tel: (33 1) 42 60 00 22; fax: (33 1) 42 60 03 11.

Fairs and exhibitions

Fairs and exhibitions are one of the most important business service sectors. They are the product of a long European tradition, they currently represent a direct value added of more than 18 000 million ECU and 520 000 employees. 300 major cities house 3 500 fairs per year of which 300 can be regarded as international. They are a growing factor for the European economy thanks to the 450 000 direct exhibitors and 63 million visitors in 1990.

INDUSTRY PROFILE

Description of the sector

Fairs and exhibitions (F&E) are trade activities linked to specific and extraordinary spaces and times with the objective of connecting, supply and demand, of those interested in knowledge, market expansion. The sector is built around the exhibition centres and organisers. They try to attract exhibitors and visitors interested in increasing sales, opportunities, image, contacts and market knowledge. There are different types of fairs, and currently trade and professional exhibitions are the most successful ones.

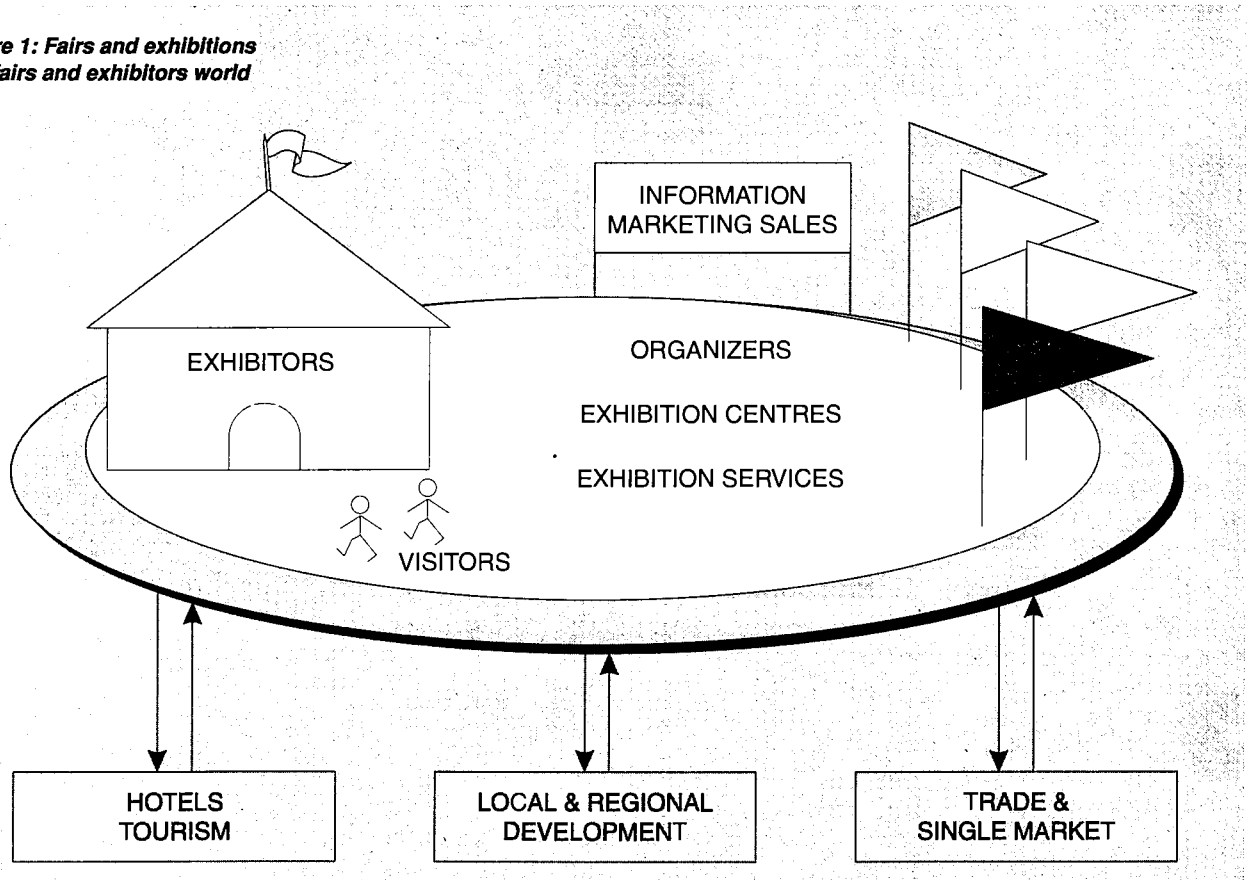
The content of the sector includes a wide number of exhibition activities mentioned in other Panorama chapters: stand constructors, catering and restaurants, hotels, security and cleaning services, other business services, etc. They all co-produce the service which benefits a broad number of enterprises: marketing and publicity firms, tourism and hotels, as well as manufacturing and service firms. All these contribute to increasing the consolidation of the European market. Figure 1 represents the fairs and exhibitions and their impact on the surrounding environment.

Although economic statistics are not available for this sector, it is possible to estimate the overall importance of the sector by taking into account the number of fairs existing in each country and the average spending coming from exhibitors and visitor costs. The fairs and exhibitions sector covers over 3 500 fairs throughout the entire EC, of which 1 200 have national relevance and 300 have an international scope. Sited in 300 exhibition centres, in 1990 exhibitors and visitors generated around 18 000 million ECU. The estimates of employment reveals 70 000 direct full time equivalent employees and more than 500 000 total jobs. These amounts do not include the profits coming from the contracts and additional business transactions at a fair or as a result of a fair, nor the benefit on urban and regional development.

Table 2 shows the overall relevance of the sector through its specific indicators: around 20 million sq. metres of net rented exhibition surface, 450 000 direct exhibitors, and 63 million people visiting fairs per year. This grouping strives to give the maximum comparability regarding the number of biennial fairs, the irregularity of normal activity and the lack of available data. Figures included in tables are taken from the professional association coverage. Most large fairs are included, while local / rural fairs are not.

In absolute terms, there are five main countries: Germany, France, the United kingdom, Italy and Spain. Germany is the leader with the 11% of foreign exhibitors, 16% of foreign visitors, and the highest number of exhibitors and net rented surface, 121 000 and 6.6 million sq. metres respectively. France is the second most important country for fairs and exhibitions, and Paris is the leading trade fair city. Italy, the United Kingdom, Spain and the Benelux countries follow. They have been growing very fast. Compared to these, Denmark, Portugal, Ireland and Greece have minor relevance.

Figure 1: Fairs and exhibitions
The fairs and exhibitors world



Source: Author

Table 1: Fairs and exhibitions
The economic weight of the fairs and exhibitions sector, 1990 (1)

	Source of estimates	Number of fairs and exhibitions	Total direct spending (million ECU)	Total employment
Belgique/België	Eurostat estimates	190	1 500	43 000
BR Deutschland	AUMA report	600	5 000	143 000
España	Local estimates	250	1 700	49 000
France	FFSS report	600	2 688	77 000
Italia	Eurostat estimates	700	2 525	72 000
Nederland	Eurostat estimates	240	1 200	34 000
United Kingdom	EIF report	660	1 477	42 000
Sub-total		3 240	16 090	460 000
Rest of EC	Eurostat estimates	250	2 000	57 000
Total		3 490	18 090	519 000

(1) All data are estimates. The spending calculations are derived from different reports based on professional associations without a common methodology. The employment is calculated according to the factor of 0.37 employment created each 12 900 ECU spent (EIF report).
Source: Dr. Luis Rubalcaba, Professor of Economics

Table 2: Fairs and exhibitions
Geographic distribution of fairs and exhibitions -Annual average over 1988 - 1991. (1)

	Source	Number of F&E covered	Number of cities	Net rented surface (thousand sq.m)	Number of exhibitors	Of which, foreign (medians, %)	Number of visitors (millions)	Of which, foreign (medians, %)
Belgique/België (2)	European Trade Fairs	19	3	443	6 530	10	2.3	7
Danmark	Bella Center	N/A	1	N/A	4 500	30	0.6	15
BR Deutschland	FKM	188	23	6 657	121 250	11	14.7	16
España	AFE	183	16	2 000	35 004	8	6.8	3
France	OJS	273	31	4 571	101 614	5	15.3	2
Italia	AEFI	148	33	3 963	80 958	13	9.9	8
Luxembourg	FIL	8	1	162	3 071	24	1.1	N/A
Nederland (2)	European Trade Fairs	37	3	699	11 879	11	2.1	5
Portugal (3)	FIL-Bdo Binder	46	2	259	7 424	17	0.9	1
United Kingdom (4)	EIF	333	19	N/A	76 329	6	5.9	4
EC 10		1 250	131	19 200	448 558	11	60.0	50
Rest of EC	Eurostat estimates	30	3	300	2 000	N/A	3.0	N/A
EC 12		1 280	134	19 500	450 558	11	63.0	4

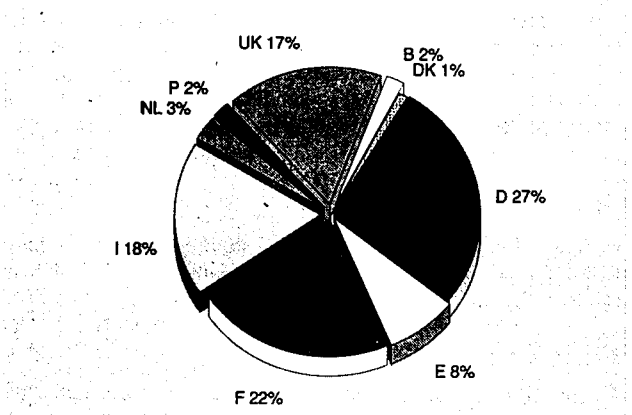
(1) Percentages of foreign exhibitors and visitors are medians of available data
(2) NL & B 1988-89 data
(3) P data from 1988-91
(4) UK data from 1990-91
Source: Dr. Luis Rubalcaba, Professor of Economics

Table 3: Fairs and exhibitions
Origin of foreign visitors at exhibition sites and trade estimates

Geographical distribution of visitor origin	BR Deutschland (%)	France (%)	Italia (Milan) (%)	United Kingdom (%)	Intra- and extra-export trade (million ECU)
European Community	56	67	77 (1)	50	1 000 - 1 400
Rest of Western Europe	17	14		10	200 - 320
North America	11	5		9	80 - 140
Rest of the world	12	6	23 (2)	31	180 - 340

(1) Data also includes rest of West European visitors
(2) Data also includes North American visitors
Source: AUMA report (1990), EIF report (1993), FFSS report (1990) and Golfetto (1991), trade figures are estimated by Dr. Luis Rubalcaba, Professor of Economics.

Figure 2: Fairs and exhibitions
Geographic distribution of number of exhibitors



Source: Author

Recent trends

The evolution of fairs and exhibitions seems to be more linked to the service cycle than the manufacturing cycle. During the petrol industry crisis in the 70s, fairs were not significantly affected. However, in the current crisis, the recession is affecting fairs, especially since late 1991, and up to 1993. Exhibitors and visitors cut marketing budgets including exhibitions. They spend less at fairs, they rent smaller areas and some decide not to attend. This latter situation does not seem to be a rule, but an exception. Enterprises still go to fairs trusting in their counter cyclical effects. Some firms use fairs to their own advantage, as a tool against recession.

International comparison

The relatively strong position of the European trade fair sector is also due to its comparative superiority over the USA or Japan. Fairs are a typical European phenomenon. No historical tradition of fairs and exhibitions exists in the USA or Japan, so fifteen to twenty years ago, this was a purely European sector. However, in recent years some cities such as Tokyo, Atlanta, Los Angeles and Chicago are augmenting their possibilities with some major fairs. Regardless, the EC is still different in terms of marketing strategies and business approaches. A major factor explaining these differences is the diversity inside European markets.

Foreign trade

The wide fairs and expositions market all over Europe involves a great volume of intra- and extra-EC trade. Unfortunately, the lack of statistics keeps data on foreign trade from being revealed. However it is possible to estimate some part of trade by looking at the following variables: direct spending, percentage of foreign exhibitors and visitors and percentages belonging to the EC. Supposing the percentages of foreign exhibitors and visitors to be 20% and 3% on the average, and that exhibitor spending is around half of the total, we estimate that 12% of the total spending in one country is made by foreign countries. In overall terms, that is more than 2 000 million ECU. It is mostly intra-EC trade since more than half of foreign exhibitors and visitors come from EC countries. The rest should be divided in two parts, spending done in country of origin (20-25%), and spending in Europe. If so, extra-EC exports may be estimated at 500 to 800 million ECU. EC spending in other countries cannot be estimated.

MARKET FORCES

Demand

All kinds of markets, from local to international, are propitious to fairs. However, the relative importance of the sector varies sector by sector. General fairs have been decreasing to the current 22%. Their growth has stopped, reducing the coverage to local markets and waiting for new functions more related to basic sales, leisure and attraction The most important and fast-growing sector in specialised fairs is "Other industries and services." That is not because of commercial and business services, but because of other manufacturing industries such as machinery, electrical equipment and cultural services. The relative importance of fairs and expositions sectors is revealed in Table 4.

Most large enterprises participate in fairs. A large and increasing number of small and medium size enterprises (SME) do as well. A considerable proportion of the marketing budget is spent in this sector e.g., 30% in Italy, 20% in France, 10% in the UK [Tenth Anniversary of PARIS-NORD Villepinte]. There are three main factors explaining this success: commercial advantages, marketing and communications. Commercial advantages are not only sales, but also in the creation and extension of trade distribution networks. Marketing refers to fairs as a marketing tool: an alternative channel to traditional publicity, a laboratory for testing strategies and a comparison with the competition's marketing. Lastly, the communication factor is important when competition is fierce, and market knowledge is necessary. At fairs it is possible to very quickly obtain and transmit information on clients' opinions and desires, the competition, and one's own position, new product tests, the opportunities of one's own current prices, etc. Fairs contribute to the market's transparency through quick feedback. A summary of these functions is shown in the Figure 3.

Supply and competition

The supply has a multiple number of agents operating at three levels. Level 1 is organisation: organisers, exhibition centres (also known as hall owners) and professional organisations. Level 2 is exhibition services firms: stand constructors, consultancies, business services, auditors and the whole set of internal services such as catering and restaurants. Level 3 is city reception services: local administration, hotels, transport, communication services, etc. These three levels' supplies have different problems and situations.

The EC supply has to compete at all three different levels, especially in order to host international fairs. Cities, exhibition centres and organisers try to attract exhibitors and visitors in a narrow market segment. For example, in a wide number of subsectors, no more than 2-6 major international fairs can be held successfully in the same year. For instance, in Germany competition affects mayor cities; in UK there is competition between London and Birmingham and among organisers; particularly in France, international fairs and exhibitions vie especially with one another. However, the more local the fair, the less the competition. There are many forces which have heightened competition in this sector: the current demand requires a fuller complement of services, information, quality, and prices; the general internationalisation of markets, and the arrival of new movable organisers, and some state interventions (which may sometimes generates a relative market saturation and duplicity of events).

Prices play an important role in deciding which fairs are interesting for participation, especially for small and medium-sized fairs. For demand, the cost of hiring each square meter of space involves calculating stand construction costs, staff expenditures and promotion. For visitors personal expenses are the only direct costs. For supply, price policy varies between considering the investments and maintaining costs, and the results they can offer in terms of visitors. This second factor has been increasing in importance as a tool for evaluating

the quality:price ratio. The real prices of fairs and exhibitions services are not only direct costs but the opportunity cost a firm must pay if it does not attend.

Production process

Due to the increasing competition and the unique features of this sector, innovative processes are highly important. First, new technologies are being used in an attempt to provide technical facilities for stands and transportation. Second, new spaces are being used to house complementary activities such as conferences, product demonstrations, special meetings, etc. Third, exhibition services are improving in quality and quantity. In addition to these three factors, the crucial innovation requires the creation and implementation of new ideas. One of these is new computer systems, used to help establish contacts between visitors and exhibitors.

The rise of specialisation is also relevant. Specific training for trade fairs and exhibitions staff is on the increase with some workers becoming professional specialists (e.g., training courses are emerging). This is happening, not only inside enterprises, but also outside enterprises. Certain degrees of out-sourcing are being reached, specially in countries like the UK or France.

INDUSTRY STRUCTURE

Companies

The number of companies operating in this sector is difficult to estimate. At least 1 200 organisers exist in Europe since most regional fairs organise only one or two major fairs. Major international and national major fairs (1 200) are organised by 300 organisers in only 100 cities. Major cities are able to organise between 15 and 140 events. There are two ways of organising fairs: the hall owners are in charge of organisation; or the hall owners let the space to organisers. The former case is more prevalent in Germany, the Netherlands and Denmark. Separation of functions dominates in the UK, France and the United States.

Most organisers are state-run companies, semi-public companies or public institutions, but an increasing number of non-state for-profit companies are entering the market in competition with traditional organisers. They are exponents of a more professional way of organising fairs. Further from traditional organisers are groups like sectors' professional organisations. Technical competence and specialisation are reforming the industry outlook.

Organisers' details can be estimated since their turnover may be multiplied by a factor of 5 to generate total spending [AUMA report]. Then, 3 600 million ECU could be the overall turnover of organisers. The average turnover is 9 million ECU thanks to 250 direct full time jobs.

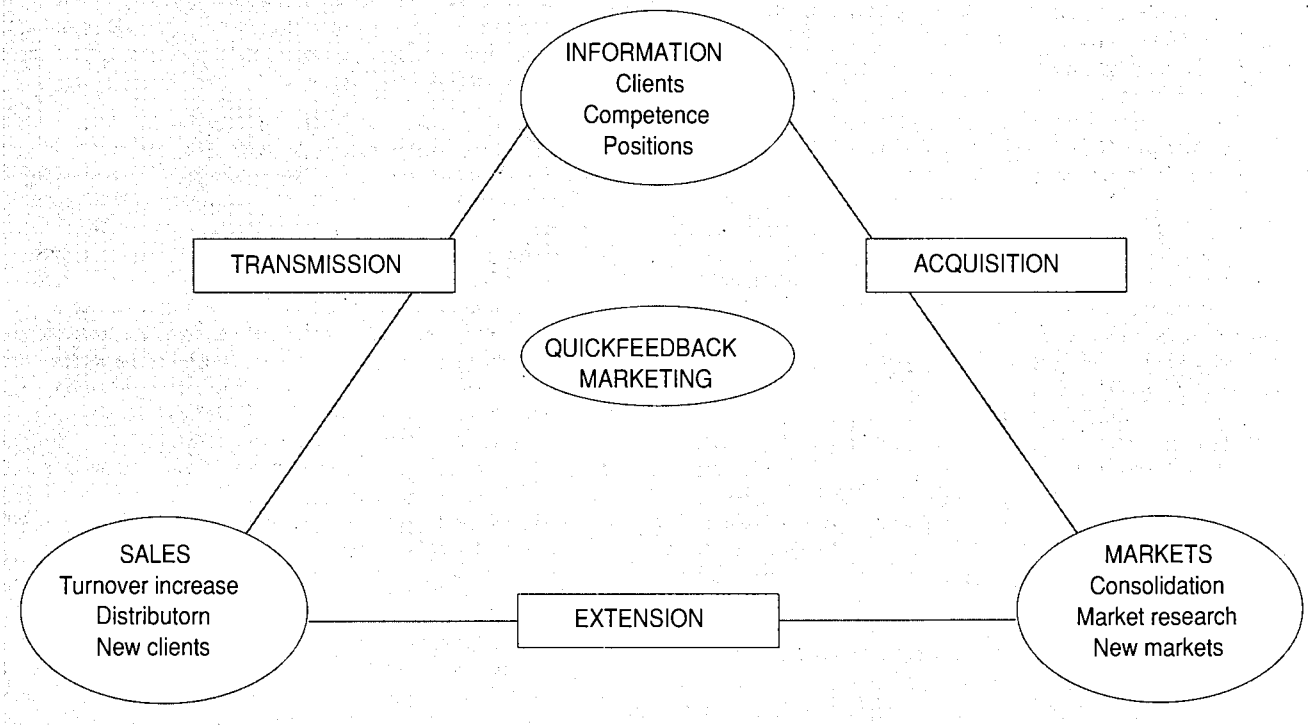
The leaders throughout the industry are well represented by the major exhibition parks in Europe, most of them members of European Major Exhibition Centres Association (EMECA). Overall employment in a mayor exhibition centre can create 5 000 - 6 000 full time equivalent jobs. Table 5 shows the main available indicators for these centres.

In considering fairs and exhibitions of greater than regional size, concentration is quite important. The total exhibitors given in Table 5 represent 55% of the total showed in Table 2 (41% in terns of visitors). However, these percentages are less revealing, since a true measure of market share should consider the market subsector by subsector. The large number of exhibitors going to general and culture fairs distort the results.

Strategies

All industrial concentration processes are affecting fairs and exhibitions, particularly organisers. As has already been men-

Figure 3: Fairs and exhibitions
The axes of successful use of exhibitions



Source: Author

Table 4: Fairs and exhibitions
The fairs and exhibitions markets - Annual average over 1988 - 1991 (1)

Specialized fairs	Number of F&E	Number of cities	Net rented surface (1 000 sq.m)	Number of exhibitors	Share of foreign exhibitors (%)	Number of visitors (millions)	Share of foreign visitors (%)
Agriculture, forestry, fishery, etc.	57	38	1 208	24 966	13	3.6	5
Food industry, restaurant & hotel trade, catering	67	38	981	25 718	10	2.4	4
Textiles & clothing, footwear & leather goods, jewelry	134	28	1 890	50 863	11	2.3	9
Public works, building, mining, completion & extension	50	30	1 212	21 670	12	2.2	6
Furnishing, household appliances, houseware,							
Lifestyle, perfumery, arts & crafts	103	41	2 004	38 066	8	4.0	5
Health, hygiene, protection at work	30	19	298	8 651	10	0.6	5
Environmental protection	17	11	148	3 840	12	0.3	10
Transport, traffic	39	27	790	10 788	12	3.7	6
Information, communication, office, packaging,							
Entertainment electronics	66	32	1 157	23 626	14	2.8	6
Sports, games, leisure, music	114	45	2 128	43 616	10	7.3	7
Other industries, trade, services, culture, education	139	44	1 864	46 280	9	3.7	5
Art & antiques	36	27	110	6 257	12	0.6	6
General fairs	158	65	3 676	68 825	6	17.8	1
Multibranch fairs	10	6	404	10 889	25	0.7	5
Other fairs	28	9	549	10 205	18	1.4	7
Total	1 048	460	18 419	394 259	12 (2)	53.3	6 (2)

(1) Data collected from sources indicated under table 2 (from countries presented in table 2, B and NL are excluded).
(2) Median
Source: Dr. Luis Rubalcaba, Professor of Economics

tioned, some of them operate in narrow markets where competition is high. Major international fairs fight to win the first or second position (the pole position is often held by Germany). Organiser's strategies are based on the innovation. Dynamics in the sector are very high, so restructuring must be made continuous.

The changing factors push organisers and hall owners to look for more careful strategies, to make investments in services and facilities, to search for a balance between making fairs open to the public and limiting entrance to professionals only, and to professionalise the service, stimulating efficiency, quality and innovation. Investments inside exhibition centres are still continuing while some organisers are testing investments abroad (Messe Frankfurt in the USA and Asia).

One strategy which will be seen in the future is the forming of alliance networks between organisers so one exhibition can become movable instead of fixed. That means not setting up fairs and exhibitions in one city each year or each two years, but going one year to one city, the next to another and so on. This kind of rotation system already exists for some fairs. Textile equipment and tools and machinery (ITMA and EMO) are good examples. They have been rotating between Paris, Hannover and Milan.

REGIONAL DISTRIBUTION

Some estimations say that in terms of exhibitors, the leading city is Paris followed by Frankfurt, London and Milan. However the leader country continues to be Germany since 5 of the top 10 first cities are German and their figures for foreign participation are extremely high. The figures indicate that the sectors' regional structure varies greatly from country to country. While in Germany the location of fairs and exhibitions is not concentrated, in France activity is very concentrated around Paris. In the United Kingdom most exhibitions are distributed between London and Birmingham. In Italy, there is a broad group of cities of national importance, but Milan is the most international. In Spain, Barcelona and Madrid hold similar positions, and in the Netherlands, so do Amsterdam and Utrecht. In Belgium, Brussels is the only relevant city.

Fairs and exhibitions are a major instrument for regional and urban development. Although increasing competition is cutting down the number of events, local and regional fairs can maintain their market position in association with local "niches". Most of them are protected from strong international competition.

ENVIRONMENT

Fairs and exhibitions are also an instrument for environmental policies. New exhibition centres are a sort of pilot cities in which new methods of organisation are tested. These are the main items in which fairs and exhibitions tend to contribute to a better environment: spatial distribution, helping to clear congested areas; arrangement of buildings low-rise buildings, with modern lines and safe structure; transport systems with intensive electric transportation, close to airports and traffic hubs; waste treatment, new processes for ecological waste treatment; green areas and reforesting. All these conditions depend on the exhibition centres' policy in coordination with local administrations. A major effort should be made in this direction. In old exhibition centres, these elements are very difficult to obtain.

Once an exhibition centre organises its own urban development, it begins generating positive external economies. Tech-

Table 5: Fairs and exhibitions
Major exhibition centres in Europe, 1992 (1)

	Land area (hectares)	Gross built surface (1 000 sq.m)	Net exhibition space (1 000 sq.m)	Number of exhibitors	Number of visitors (thousands)	Number of exhibitions	Spin-off effects (2) (million ECU)
Barcelona	25	140	116	17 921	1 214	31	340
Basel	9	208	172	15 904	1 311	46	300
Birmingham	254	188	158	29 600	3 600	110	330
Brussels	70	158	114	11 970	2 668	39	280
Frankfurt	40	383	273	39 900	1 431	53	950
Leipzig	92	N/A	195	10 348	600	58	N/A
London	17	283	103	22 500	2 750	110	580
Lyon	108	119	93	6 663	1 034	43	300
Madrid	97	210	102	21 395	2 036	N/A	650
Milan	68	452	175+74(3)	43 000	2 250	81	260
Paris-Villepinte	110	275	164	26 598	1 477	42	1 070
Paris	36	259	222	35 080	4 300	102	1 200
Utrecht	26	196	120	11 000	2 078	56	300
Total	952	2 871	1 990	291 879	26 749	771	6 560

(1) Only association members are listed, major non-members of EMECA are Hanover, Dusseldorf, Cologne, Munich, Vienna and Valencia.
(2) The spin-off effects are based on very different methodologies; these estimates must be considered with caution.
(3) Reflects the one exhibition centre plus supplementary area
Source: EMECA

nological nuclei, enterprise investments and infrastructure can arise, improving economic growth rates and local living conditions.

REGULATIONS

The state has a serious influence on the sector. Local, regional and national administrations have certain instruments to regulate, control and promote fairs and exhibitions activities. The use of these instruments varies country by country, but in general, there are two levels of participation, the legal and the economic.

Regulation of general activity and the granting of rights (specific laws); Concession of licenses and permits for developing activities; Restrictions on product imports, soon to end due to the Single Market; criteria of recognition e.g. internationality.

Support for exhibition centres (investments in infrastructures, exhibition centre improvements); economic aid for supply (subsidies for organisation, subsidies for invitations and participation, special fiscal treatment); economic aid to demand (export policy instrument, subsidies for enterprise's participating).

Most of these regulations are not important, considering the general activity of the sector. The current situation is heading towards deregulation, so the current level of regulation and state aid does not substantially affect the hierarchy of fairs and exhibitions and fair competition. In some cases, regulation does pose obstacles to Single Market consolidation, and causes saturation of exhibitions, price distortion, and discrimination. However, a certain kind of economic support can be considered positive for the whole sector and normal regarding the current situation in the European industry.

The sector is also heading towards a self-regulating system explained by the emergence of national and international professional organisations. They are very active giving prestige and training, and trying to guarantee certain standards of quality (e.g. security regulation, technical standards in stand construction or electronic material, statistics through control and data auditing). The Commission of the EC can play an important role in these processes by reinforcing this self-regulation.

The role and coverage of professional associations is growing, especially in major fairs and exhibitions centres. EMECA represents 25% of the total market in terms of number of fairs hosted by centres, but considering only major exhibitions, it covers the 65% of fairs. The other two major international organisations in fairs and exhibitions are UFI ("Union des Foires Internationales") and IFES (International Federation of Exhibitions Services), grouping mayor organisers and exhibition services firms respectively.

OUTLOOK

The future evolution of the sector depends on two factors. On one hand, it is contingent on economic evolution and the eventual end of the recession. The current situation makes it impossible to project forecast estimates. The agents do not even know how the sector will evolve over upcoming months. Some time ago, it was possible to predict the volume of activity for the next two-three years. Nowadays, the visibility margin has been reduced. Even exhibitors do not decide on participation until a few months in advance.

On the other hand, the demand situation will coincide with increasing competition in the sector, especially at the international level and between organisers. The near future can be set by restructuring measures, forming strategies through alliances, intensifying innovation processes, and looking for better service quality. Specialisation and more professional processes will continue. Customisation is also more and more important; supply and demand are called on to work more closely.

What seems certain is that in any scenario produced in the near future, fairs and exhibitions will continue to play a central role in European economic development.

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Overview

The advanced industrial economies are entering the so called information age where information services are very important and they deeply impact the overall efficiency and innovation of the economic system. For this reason, information services can be considered the essential infrastructure of the most competitive countries. In the information technology sector, in spite of the crisis in the hardware market, information services (including telecommunications services), software and computing services and electronic information services are very dynamic and fast growing; the EC information services market was worth about 154 billion ECU in 1992.
The most important segment of the information services in 1992, telecommunications, amounted to about 93 billion ECU, whereas software and computing services were worth 57.4 billion ECU and electronic information services 3.6 billion ECU.
Telecommunications remains a tightly controlled market in most of the EC; state-owned monopolies maintain control of the most basic telecom services. Liberalisation of the market is a growing trend, particularly in emerging telecom markets such as mobile communication, value added services (VAS) and data communication.
Software, computing services and electronic information services are comparatively less regulated and are very open markets.

INDUSTRY PROFILE

Description of the sector

Information services include three distinct but linked segments:

- telecommunications services such as local and long distance telephone calls, fax and data transmission, value added services, mobile communications services and satellite communications;
- software and computing services such as system software, application packages, custom software, office services, system integration, consultancy, and training; and
- on-line and off-line electronic information services and products such as on-line data bases (real time or not), and CD-ROM (off-line).

Recent trends

The EC information services market amounted to 155 billion ECU in 1992. The largest segment of the information services market was telecommunications, which reached 93 billion ECU (60% of the total market); software and computing services were worth about 57.4 billion (37%) and electronic information services were worth just 3.6 billion (2.4% of the total market). The overall growth rate from 1991 to 1992 was 5.8%, but growth in the three market subsectors varied: growth in telecommunications was about 4.5%; in the software and computing services market it was 8.7% and that of electronic information services was about 12%.

It is estimated that in the EC, the information business (inclusive of hardware, software and telecommunications services all included) is already more than 5% of the GDP. This percentage will surely increase in the future due to the quick development of information services which will grow faster than the overall economy. It is forecasted that by the year 2000, telecommunications alone should be more than 7% of the EC GNP.

These data show only the direct contribution that the information services sector contributes to the general economic growth. In the information age, the advanced networks services (mobile communications services and digital networks) are becoming more and more strategic and are becoming the 'nervous system' of the whole economy. Real time communications and distributed information are a must either to increase individual and social productivity and efficiency or to quickly innovate products and processes.

Foreign trade

Generally speaking, USA and Japan are worldwide leaders in information technologies and consumer electronics, Europe has an increasing trade balance deficit for hardware products (computers in particular). Most computer hardware imports into the EC come from the Four Dragons countries (Korea, Taiwan, Singapore and Hong Kong).

But, as far as the trade balance for services is concerned, estimates are questionable as reliable data are difficult to find because the flow of services is not easily measurable. However, services still represent a point of strength of EC countries, especially the telecommunications and computing services.

Presently, the EC has a surplus in relation to the American telecommunications services, though it is decreasing because of the lowering of long distance tariffs. In fact, telecom carriers have agreed to a cooperative mechanism to share revenues for international calls and incomes of each carrier depends not only on the usage of the networks but also on the level of the tariffs fixed by each country. Because the EC countries usually have higher tariffs than the USA for international calls, they benefit from a trade surplus.

As far as the computing services are concerned, about 95% of the EC market is supplied by EC companies (while just 75% of hardware systems are produced by EC based companies). The trade balance is also negative with regard to software because very innovative American companies, Microsoft (USA), Novell (USA) and IBM (USA), control the worldwide standards and the largest share of the market (just 45% of the software market is supplied by EC firms). The trade balance is also negative concerning electronic information services because many on-line data bases are supplied by American companies, although some European companies, Reuters (UK) for instance, have a worldwide leadership.

Table 1: Information services
Electronic information services revenues in the EC

Million ECU	1985 (1)	1986 (1)	1987	1988	1988	1990	1991	1992 (1)
EC 12	880	1 070	1 290	1 535	1 810	2 120	2 490	2 910
Total Western Europe	1 990	1 200	1 430	1 710	2 020	2 340	2 750	3 200

(1) Estimate
Source: Input, SEMA GROUP/Consultronique Analysis

Table 2: Information services
Electronic information services market by delivery support in the EC

Million ECU	1990	1995	Average % growth/yr 1990/95
ASCII Terminal	1 580	3 100	14
Videotex	300	600	15
Audiotex	220	580	21
CD-Rom	20	220	6
Total	2 120	4 500	16

Source: Input, SEMA GROUP/Consultronique Analysis

Another big trade balance issue concerns the reciprocal free access to the domestic markets for EC and extra EC companies. This problem has been recently discussed before Oftel and FCC (the telecom regulatory bodies in the United Kingdom and USA) by AT&T and British Telecom, each of them claiming a lowering of the cntry barriers of the other competitor's domestic market.

For many years, extra-EC suppliers of software and computing services have been operating in the EC market through subsidiaries or associated firms; more recently, because of the opening of European telecom markets, many extra-EC telecom firms opened their branches or made partnerships in Europe, thus contributing to the generation of employment and value added in the EC. Nevertheless, it is very important for the EC to face the problem of the growing trade deficit.

MARKET FORCES

Demand

In the information services sector, demand of the business users has a major influence on the market because of the sophistication of their needs and their purchasing power. Also, residential users are important, either in using telecom basic services (telephone, audiotex and videotext) or as customers of easy to use application software.

Broadly speaking, business customers need more customised and sophisticated solutions (for example outsourcing in the telecom sector, financial and technical databases, or custom business software), have a growing bargaining power (particularly in the telecom sector because of the introduction of competition) and are very performance sensitive.

Residential customers are more price sensitive, requiring more standard products and user-friendly services. Demand is strong for entertainment services and cheap information services and products that prove to be useful in daily or professional life. In fact, working at home is becoming more and more important and is facilitated by advances in the computer, software and telecom sub-sectors .

Beyond the great difference between business and residential users, the whole market is segmented into niches because of the increasing differentiation of end user needs: penetration of the market requires being closer to the customer and increasing investments in marketing research and promotional efforts.

The information services market is also becoming more globalised and, therefore, it is increasingly necessary to have international distribution channels to reach the customers.

Supply and competition

There is a very important difference between the telecommunications sector, on one side, and software, computing services and electronic information services on the other. The telecommunications market, in fact, is basically still nationally based and strictly regulated, whereas the others have always been very competitive and usually global.

The main telecom players are the national public carriers that maintain a monopoly on the telephone services; the telephone market is the largest one in the telecom sector providing about 85% of the total revenues. However, emerging services like mobile and data communications are, in many EC countries, becoming more competitive as they are in open markets not dominated by the national monopolies. Newcomers in the liberalised markets can be private telecom operators, foreign or extra EC telecom carriers, computer and professional services companies, specialised companies (for instance in the VAS market or as providers of outsourcing services) and large customers who have data networks and the possibility to sell the extra capacity on thc free market.

EC carriers have never faced an open and competitive market. So the public carriers are deeply involved in improving efficiency, providing flexible and timely market services and becoming closer to their customers. They are forming many partnerships with other telecom carriers to provide global services to multinational companies, and with VAS vendors and other operators such as computer vendors to be able to acquire complex knowledge in the data network and services arena.

The market for professional and computing services is mostly country based because of the necessity to offer specific solutions to specific problems. Many firms are in the market, but there is a trend towards concentration. This market is coming under strong competitive pressure from groups of different origins such as computer manufacturers, end user organisations or consortia and audit firms.

The packaged software market is definitely global but because of many historical reasons, the EC players have a marginal role, whereas the American companies are leaders.

The electronic information services market is both international and country based. In fact, some markets, like those related to scientific and financial information, are global while some other markets are national, such as those concerning information about local laws or domestic companies. Moreover, the international flow of information is still constrained by linguistic barriers.

OUTLOOK

The information services market will be one of the largest and fastest growing business sectors in the EC. According to some estimates, the total market will reach 244 billion ECU in 1997. The telecommunications market will amount to more than 136 billion ECU, remaining the largest subsector of this market, and will grow at a compounded average annual growth rate of 8% from 1992-1997. Software and services will grow

at the annual rate of about 7% during the same period, exceeding the 80 billion ECU level. Electronic information services will have a 12.4% growth rate and, in 1997, will amount to 6.5 billion ECU.

The convergence of the telecommunications, data processing and media industries is finally happening and is beginning to keep its promises. New ranges of service are underway such as intelligent telecom services; high speed digital networks; intelligent mobile services spurred by the forthcoming introduction of PDA (Personal Digital Assistant, a computerised mobile telephone); and multimedia services like those that will be offered by video on demand, Cable TV or CD-ROM players. All these services require the integration of different activities of the major information industry companies, so new waves of partnerships, technological and commercial agreements and joint ventures are highly probable. The EC industries are well positioned to take advantage of the opportunities emerging from this sector. In fact, the EC has some of the world's largest companies in the market, like some of the most important telecom carriers, international publishing companies and computing services companies. To meet the challenge, however, the EC industries have to use more aggressive strategies on a worldwide basis.

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Software and computing services
NACE 839.2

The software and computing services sector continued to experience positive growth, confirming its strategic role on the overall EC economy with a growth rate of 8.7% between 1991 and 1992. The industry is a heterogeneous group of companies, products and services making it difficult to provide comments that are applicable to the entire sector. In terms of growth in market value, however, the areas of software and system integration/networking can be identified as the most important.
Industry concentration is still low but there is a rising trend towards technical collaborations and alliances that tend to create higher market entry barriers. This encouraged the presence of few large European groups and many small, niche-oriented companies: alliances and cooperative arrangements between these two categories of firms could be important means to face the competition of American industries in the European market.
Nearly every area of activity still has room for development as the saturation of the hardware market brings new demands on software and services by more highly sophisticated end users.
Threats, coming from increased competition and constantly falling prices, will quickly shrink profit margins and accelerate industry concentration. However, more opportunities will arise as a consequence of new technologies and infrastructures (multimedia, data highways, personal electronics, etc.) and expansion into new markets such as Eastern Europe.

INDUSTRY PROFILE

Description of the sector

This sector provides different categories of information technology (IT) software and services and includes various kinds of suppliers. The broad areas of the sector's activities can be classified into the following four categories:

- software products, including application packages, system software and tools;
- professional services, including consultancy, technical assistance, software customisation , training, education, auditing, etc.;
- processing and network services such as the traditional service bureau, new IT services like facilities management, disaster recovery, etc. and value added network based services (VANS); and
- hardware maintenance and support services, including hardware installation, site preparation, etc.

System integration and turnkey systems delivery, often cited in the literature as individual segments, would be better considered as a combination of most of the above mentioned services for supplying complete IT solutions (systems integration or solution integration), sometimes with hardware and software included (turnkey systems). This kind of service can be provided both as main activity itself by specialised companies, or in addition to other products or activities by non-specialised companies, such as hardware vendors or telecom services vendors.

Recent trends

The area of services as a whole accounts for 70% of the EC software and computing services market, out of which the professional services are the most important (36% in 1992). The remaining 30% is accounted for by software products.

In 1992, Germany had the highest percentage of EC revenues with 22% (12 billion ECU), followed by France with 17%, the United Kingdom with 16%, Italy with 13% and Spain with 3%. Revenue breakdown by country is expected to be about the same in 1993 and 1994.

Since 1990, the EC market for software and services has been increasing, both by total market value, from 48 058 million ECU in 1990 to an estimated 61 378 in 1993, and by product category. A positive but slower trend is also expected for 1994, with a market value that is expected to reach 65 933 million ECU.

The increasing complexity of end user requirements, combined with heavier demand for organisational and application consultancy and training, has maintained strong growth in software products and professional services categories. They registered growth rates of 11.6% and 10.3%, respectively, from 1991 to 1992. Processing and network services had a respectable 7.6% rate of growth during the same period, but the 1993 figure is expected to dip slightly before climbing to near 1992 levels during 1994. The hardware and maintenance subsector experienced a 3.5% growth rate in market value in 1992, but expectations are for its growth to level off at around 2% per year for 1993 and 1994.

Network services are anticipated to grow at a compound annual rate of 16.1% per year from 1992 to 1994. The slower growth segment in that period will be processing services with a 5.2% compound growth rate (CGR). Growth will be faster in countries where software and computing services are less widespread and the actual markets are still far from their potential size. Spain, for example, will see a 14.1% CGR from 1992 to 1994. Even though the German market is already in the forefront, its revenues are predicted to increase by 9.1%.

Applications, systems and network operations (facilities management, outsourcing services, disaster recovery services, etc.)

Table 1: Software and computing services
EC market by product category

(million ECU)	1990	1991	1992	1993	1994
Software products	13 100	14 819	16 533	18 041	19 663
Professional services	16 843	18 790	20 726	22 378	24 414
Processing and network services	7 229	7 754	8 340	8 840	9 455
Hardware maintenance and support services	10 886	11 476	11 875	12 119	12 401
Total	48 058	52 839	57 474	61 378	65 933

Source: IDC, European Information Technology Observatory 93

Table 2: Software and computing services
West European market by product category (1)

	1992 (billion ECU)	1992 (%)	1994 (billion ECU)	1994 (%)	1992 to 1994 (2)
Packaged software	19	36	23	36	9.0
Professional services	24	45	28	45	8.2
Processing services	9	16	10	15	5.2
Network services	1	3	2	4	16.1
Total	53	100	62	100	8.2

(1) Western Europe includes EC (excl. Hellas, Portugal and Ireland) and EFTA countries.
(2) Compound annual growth rate in %
Source: IDC, European Information Technology Observatory 93

will record the highest growth in the 1992-1994 period (16.5% CGR), while lower rates are foreseen for education and training (8.6% CGR), contract programming (8.1% CGR), IT consulting (7% CGR) and staff delegation or temporary personnel services (4.9% CGR).

International comparison

While the demand for services is essentially satisfied at a local/domestic level, the demand for software products strongly depends on extra-EC suppliers. Overall, the European packaged software market is the largest in the world, followed by that of USA and Japan. For USA software developers, Europe is the second largest market, accounting for 10.8 million ECU (33% of total USA production) compared with their domestic market worth 16.2 million ECU. The European industry's share of the world packaged software market is 16%: USA packaged software dominates the market with a 78% share and the rest of the world controls only 5%.

Foreign trade

The European industry share of the domestic packaged software market is less than 35%, compared to 63% for USA vendors. Most of the packaged software produced by European vendors is directed to the European market (6 million ECU on a total production of 6.7 million ECU), the rest is sold to the USA (0.4 million ECU) and to Japan (0.3 million ECU).

American companies are present on the European markets through local subsidiaries or, at a lower degree, through distributors: the number of companies directly present has recently grown very fast in proportion to the growth of the European market.

Table 3: Software and computing services
West European market by major countries

	1992 (billion ECU)	1992 (%)	1994 (billion ECU)	1994 (%)	1992 to 1994 (1)
BR Deutschland	12	22	14	23	9.1
España	2	3	2	4	14.1
France	9	17	10	16	5.0
Italia	7	13	8	13	8.6
United Kingdom	8	16	10	16	7.2
Other	15	28	18	28	9.1
Total	53	100	62	100	8.2

(1) Compound annual growth rate in %
Source: IDC, European Information Technology Observatory 93

Table 4: Software and computing services
West European professional services market by applications

	1992 (billion ECU)	1992 (%)	1994 (billion ECU)	1994 (%)	1992 to 1994 (2)
IT consulting (1)	4	19	5	18	7.0
Contract programming	10	40	11	40	8.1
Staff delegation	4	16	4	15	4.9
Education and training	4	17	5	17	8.6
Systems/network operation	2	8	3	9	16.5
Total	24	100	28	100	8.2

(1) Information technology
(2) Compound annual growth rate in %
Source: IDC, European Information Technology Observatory 93

Table 5: Software and computing services
Market concentration - share of top 10 vendors of national markets, 1992

(%)	Software	Services
Belgique/België (1)	14.6	18.0
Danmark	13.0	31.0
BR Deutschland	13.0	10.0
Hellas	N/A	N/A
España	13.0	35.0
France (2)	23.5	23.5
Ireland	N/A	N/A
Italia	13.5	45.2
Nederland	15.0	59.0
Portugal	N/A	N/A
United Kingdom	16.8	30.0

(1) Includes Luxembourg
(2) 1991
Source: IDC, European Information Technology Observatory 93

So far, the European software industry has not been able to control its own internal market or expand into other industrialised markets. Recently, software export activities to Eastern European countries have become more important as a consequence of the growing consultancy work, technology supply and investments in that region.

The custom software business is characterised by a stronger presence of local firms who are specialised and focused on vertical markets by being nearer to the end-users and aware of their specific requirements. EC firms dominate the local markets for custom software development.

The professional services category also has a high percentage of locally based companies. Only Cap Gemini Sogeti (F), Andersen Consulting (USA) and EDS (USA) have global and international structures, but many other American consultancy and service companies are contemplating expansion of their business by entering the European market. The presence of Japanese and Southeast Asian companies in the EC market remains weak and is not foreseen to become a substantial threat in the future.

MARKET FORCES

Demand

The impact of the economic recession on IT expenditures has affected the recent upward trend of software and computing services, but to a lower extent than the computer and office equipment sector.

Concepts such as downsizing (offering products with lower price/performance ratios that has fostered the development of the mass consumer market) and down pricing (i.e., unitary price dropping) are adaptable to the software business. The standardisation of software platforms (DOS, Windows, MAC, OS/2, UNIX, etc.) has promoted the development of new products to satisfy a broader range of applications, allowing in-house software developers to concentrate more on business specific (strategically important) issues and less on routine aspects.

So far, the larger volumes have balanced software price reductions, establishing a large installed base with a growing potential market for new software modules and applications.

Moreover, the structural change from a "product/technology" demand push to a "market/application" demand pull is favouring the software vendors who are application driven, as well as the services vendors. Because of this, hardware vendors are facing a rapidly changing business environment.

The investments in computers and, to a certain extent, in office equipment, increasingly have to be justified in terms of return on investment and the positive impact they will have on the user companies' organisation and business; customers are looking for business solutions rather than for technology tools only. This customer orientation creates new demand for top-down consultancy services (from strategic to organisational management, all the way down to system integration consultancy) but, more than this, what is changing are the supplier selection rules in the IT market.

With computing hardware becoming more commodity-like, professional and software service companies are developing into the main contractors of large projects by supplying even the hardware needs of their clients. This trend towards a vertical industry orientation is helping service companies maximise their value added. System integration firms now present themselves as business and organisation integrators.

The current recession is shifting demand from traditional services, such as in-house software development and processing, to new ones such as facilities management or outsourcing, to find cost reduction opportunities.

The fastest growing market segments are the low end market for low cost, horizontal application packages (productivity tools, netware, etc.) or the large vertical segments (like CAD/drafting, desk top publishing, etc.). Industries experiencing business and/or organisational change (such as banking, transportation, health, logistics, etc.) create rich and complex growth opportunities.

The personal electronics systems market is an important one for the future, particularly for hardware manufacturers and media publishers since they appear to be in a better position to exploit this market than software and service companies.

Table 6: Software and computing services
Geographic breakdown of the worldwide packaged software market, 1991

(million ECU)	Region of consumption					
Region of production	Europe	USA	Japan	Rest of world	Total	% of world total
Europe	6.0	0.4	0.3	0.0	6.7	16
USA	10.8	16.2	2.4	3.1	32.5	78
Japan	0.1	0.0	1.7	0.0	1.9	5
Rest of world	0.3	0.1	0.0	0.1	0.5	1
Total	17.2	16.7	4.4	3.2	41.5	100
% of world total	41	40	11	8	100	

Source: IDC, European Information Technology Observatory 93

Table 7: Software and computing services
International comparison of customer allocation of software spending, 1992

(%)	EC (1)	USA	Japan
Internally developed	59	56	52
Packaged applications	24	29	10
Outside contractors	16	14	32
Other	1	1	6
Total	100	100	100

(1) Includes BR Deutschland, France and United Kingdom.
Source: IDC, European Information Technology Observatory 93

Supply and competition

The competitive environment of the software and services market is mainly characterised by the presence of specialised software and services suppliers and systems/hardware vendors looking for new means with which to diversify their range of activities. Most of the traditional hardware giants are now also significant software and service players and have clear and explicit goals concerning the expansion of this aspect of their business. The telecoms and consulting groups are equally pushing to extend their sources of income by moving in to adjacent software related activities. The changing nature of the competition is a major issue for the established players.

According to their core business, the competitors can be identified in the following groups:

- independent software and professional services companies (Cap Gemini Sogeti, F; Sema Group, UK; Finsiel, I; etc.);
- packaged software developers, (Sap, D; Microsoft, USA; Matra Datavision, F; etc.);
- strategy , management and audit consulting firms (Andersen Consulting, USA)
- data processing departments and subsidiaries of end-user companies;
- hardware vendors, software departments and solution units.

Generally speaking, there is a weak presence of global competitors, apart from system software and the most popular packaged software segments where American companies are absolute leaders. Both large and small companies can take advantage of their size to be competitive: the former can rely upon financial and marketing resources and large contracts to give them bargaining power in the market. Small companies can base their activities on innovation, flexibility and ingenuity. Local players still dominate the European market because of the closeness to the end-user and their specialised vertical market-focused activities. This is particularly true for custom software and processing services. European companies dominate the professional services segment too, as their required skills are highly specialised.

The competitive environment of this sector has recently evolved very rapidly. This is mainly due to the changing of end-user requirements. The suppliers must correctly understand the needs of their destination segments and offer specific solutions to particular problems. That is why key factors of success are the capability to control vertical markets and to develop specialised application skills.

This sector is also characterised by low entry barriers, allowing small, specialised newcomers to enter market niches at the local level. This condition is changing as the larger installed base and distribution/marketing barriers are causing an increasing concentration in the most standardised and horizontal product segments. There are also some global hardware vendors, telecommunication operators and consulting companies that are widening their range of activities.

Production process

The industry is characterised by fast technological evolution, particularly towards user specified standardisation.

The EC is supporting quality standards in relation to the services business. This is seen by the service industry firms as an opportunity to establish competitive advantage and differentiation and is shown by the fact that there are a growing number of companies adopting ISO 9000 standards. The variety of the hardware environments forces end users to use tools that facilitate the shift towards open systems, decentralised computing and requirements concerning integration of platforms and operating systems. The importance of systems software and utilities in enabling greater user friendliness and hardware optimisation is increasing.

The functional level development of UNIX, personal computer and network operating environments is bringing about a convergence of operating systems. The most prevalent operating systems currently are UNIX, Windows and MS-DOS; in the near future, Windows NT is expected to gain in numbers of installations. The operating systems vendors, in general, are aiming towards interoperabilty, portability and modularity, as end-users are demanding to be independent from suppliers and to be free to adopt the best available solution to their present requirements.

Application tools are evolving towards a third generation of languages and utilities. Among system development tools, the C++ language and SQL (standard query language) are gaining in importance.

On-line transaction processing is an important area that covers many issues such as operating systems, communication protocols and graphical interfaces. Middleware also has a strategic importance because it allows the integration of hardware and software with the focus on a vertical market approach. Middleware is also an important element in providing interoperability and portability and the move towards open systems is causing more "middleware" and more application programming interface standards to be produced. In turn, this creates more business opportunities for potential middleware producers. Specific tools are emerging as important means to improve the use of IT in an organisational context, such as performance management, business management and problem management software.

INDUSTRY STRUCTURE

Companies

In Europe, more than 16 000 firms are listed as sector participants. There are many local companies operating in the market; the few international ones have low market shares. Local market entry is generally made by larger firms through acquisitions of existing local companies.

Cap Gemini Sogeti (F) is the leader in the EC market, recording a turnover of 1.44 billion ECU and 17 971 employees in

Table 8: Software and computing services
Top 20 EC companies, 1991 (1)

Rank	Company	Country	Turnover (2)	Number of employees
1	Cap Gemini Sogeti	F	1 437 214	17 971
2	Sema Group	UK	587 818	7 450
3	Sligos	F	460 244	5 421
4	HCS Technology	NL	402 167	2 766
5	SAP AG	D	344 585	2 685
6	Hoskyns Group	UK	285 975	3 297
7	Logica	UK	265 774	3 592
8	Volmac Software Groep	NL	258 805	3 206
9	Enterprise Computer Holdings	UK	224 318	871
10	CSEE	F	177 664	1 809
11	ACT Group	UK	169 737	1 856
12	Random France	F	167 915	702
13	Harland Simon Group	UK	116 221	1 268
14	Misys	UK	96 385	1 048
15	Micro Foces Group	UK	79 542	503
16	Cegid	F	74 539	811
17	Microgen Holdings	UK	68 030	708
18	Dansk Data Electronic	DK	52 492	480
19	Sage Group	UK	28 527	322
20	Macro 4	UK	25 715	188

(1) Ranked according to total turnover, i.e., revenues from other activities than services are also included.
(2) thousands of ECU
Source: CEC DGIII (DABLE)

1991. The Sema Group (UK) is the second largest European company with a 1991 turnover of 588 million ECU and 7 450 employees.

Strategies

The software and computing services sector saw an increasing amount of alliances, partnerships and mergers geared towards sharing competencies and capabilities, strengthening market positions, achieving R&D synergism for common basic technologies, exploiting diversified distribution and trade channels and widening market access.

The trend towards mergers is mostly linked to French companies, the European market leaders, who typically are professional services vendors pursuing a European-wide presence.

Microsoft and other American companies such as Novell, Oracle and IBM were involved in world-wide agreements to create R&D and marketing synergism.

Among European companies, Cap Gemini Sogeti (F) was the most active European company in forming partnerships and alliances. The most notable recent European corporate marriages in the software and computing services sector were: Cap Gemini Sogeti (F) with Sap (D), Software AG (D) with Apple Computer (USA) and the technological agreement between Andersen Consulting (USA) and Sap.

Entry into new markets is usually pursued through establishing subsidiaries. This facilitates the liberalisation of trade and the standardisation of infrastructure investment. Also, it is not uncommon for consultant firms to accompany their clients' new investment projects abroad, thus giving the smaller consultant firm international exposure.

OUTLOOK

The trend towards globalisation and international competition will have a strong impact on the market evolution and competitiveness. The context differs by products and/or service offered. As far as packaged software is concerned, European companies will be increasingly threatened by the American vendors who already dominate the market.

In the professional services and custom software areas however, Europe can compete at high levels due to the competencies and the experience achieved in these segments. Only in the professional services segment is competition among European players particularly strong. This is due to the openness of the EC single market that has recently been extended to the banking, insurance and public contracts areas. Small vendors stand to loose out on open market benefits if they resist expansion under the belief that there will always be little or no competition in their niche market.

The future demand trend will remain positive, but with lower growth rates than in recent years. Of course, the software and computing services sector also depends on the trend of other sectors, but economic downturns also place a demand on consulting products that assist in cost cutting measures such as company re-organisations, outsourcing, optimisation of core business activities, etc. Despite the domestic trend of the IT sector towards price reduction, decreasing profits, and company failures, the software and computing services area will maintain positive growth rates. In fact, end user demands for custom and sophisticated products and services create more room for developing the existing segment and possibilities for the birth of new ones.

Some other factors that will change the competitive rules and create new opportunities in Europe are: the re-industrialisation process involving the East European markets, the increasing integration of the European markets and the obsolescence of the installed base.

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Electronic information services
NACE 839.2

The sector includes four key segments: "classical" online database services, videotex services, publications on optical disk (including interactive multimedia) and audiotex and fax-based information services. Total revenues of electronic information are rapidly increasing: they reached 3.3 billion ECU in 1991 not including audiotex; 12% more than the previous year. More than 90% of the revenues came from on-line databases, 9% were from off-line information services, while just 2% came from CD-ROM.
The most consulted on-line information services were, by far, financial and business data bases: altogether they accounted for more than 90% of the total turnover of the on-line information market. Most of the segments are typically international, such as scientific and financial telematics services. In these markets, global suppliers are the most important players. In spite of the dominance of the USA competitors, Europe has several world ranking information and media corporations that can compete globally. In some other important segments, such as in the company profiles segment, national suppliers are the most important ones because they have an in-depth knowledge of their domestic market. Banks and financial companies are the most important users of professional services, but the individual consumers are growing in importance. Audiotex proves to be a very fast growing medium because it is easily accessible with only a telephone. The diffusion of videotex services, on the contrary, is very slow, with the notable exception of Teletel services in France

INDUSTRY PROFILE

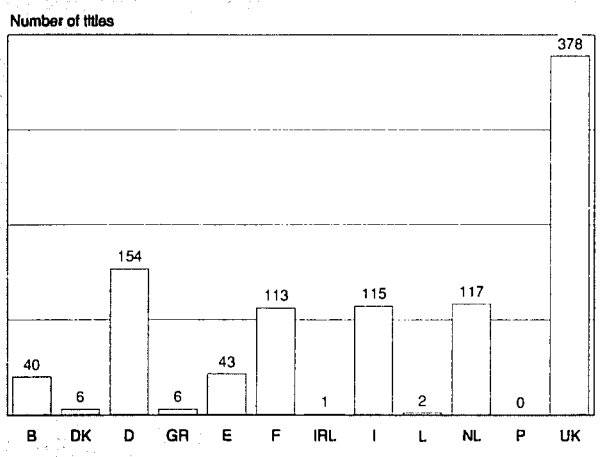
Description of the sector

The sector includes on-line and off-line electronic information services such as on-line databases, realtime or not realtime electronic information and CD-ROM databases.

Electronic information is related to various kinds of subjects: financial data, market research, business information, international and national laws and regulations, news, science and technology, patents, etc. In fact, the field of information is unlimited and continuously growing.

The major companies in this sector come from different categories of business where they functioned as publishers, producers, vendors or brokers. In addition, it is not very easy to collect reliable data about this market since electronic information is an immaterial good. The Information Market Observatory (IMO), working as part of DG XIII/E, strives to improve the knowledge and understanding of the European electronic information services market. In the '70s when the sector started developing in Europe, it was highly linked to the science and technology field and the majority of databases were on scientific subjects and came from public organisations. Afterwards, electronic information services increasingly became a specific business area with the growth in popularity of the financial and economic databases. Videotex technology was introduced in the early 1980s by telecom carriers that wanted to offer a very easy access to information (data, text, graphics) via telephone lines. Videotex is billed to customers through a central billing system, or kiosk. Audiotex services - information services offered by telecom carriers and is also billed through a kiosk - were launched in the late 1980s and early 1990s.

Figure 1: Electronic information services
Commercial CD titles produced in the EC, 1992



Source: TFPL

Recent trends

Total revenues of electronic information averaged 3.3 billion ECU in 1991 (not including audiotex revenues), recording a growth rate of 6.5% in comparison with the previous year. More than 90% of the revenue (3 billion ECU) came from on-line database while just 9% (298 million ECU) came from off-line information.

As far as on-line services are concerned, turnover increased more than 14% from 2.6 billion ECU in 1990 to 3 billion ECU in 1991. In 1991, 59.6% of the revenues originated from real-time services (mostly financial services), the rest came from non real-time services. Employment is increasing as well. In 1991, the EC total number of employees in the Electronic Information sector was 28 805 (8.5% more than in 1990).

Off-line information services grew more slowly: from 1990 to 1991 with a growth rate of less than 5%. A remarkable leap in the off-line information services market is expected because of the planned introduction of many new multi-media titles by the major computer companies. Of the overall EC production of commercial CD-ROM titles, 39% came from the United Kingdom, 16% from Germany and 12% each from Italy, France and Holland.

Most of the on-line revenues of EC suppliers came from Member States' consumption, this was 70.7% of total revenues in 1991. Almost 35% of supplier revenues came from national markets and 36% from intra-EC trade. Since 1989, the incidence of revenues coming from EC domestic consumption has been increasing due to increased intra-EC trade. Exports accounted for 29% of total revenue, which was a decrease in comparison with the previous years. Figures about imports are not available, though a trade deficit with USA seems very likely.

By far, the most consulted databases are financial and business data bases: together they accounted for more than 90% of the total turnover of the online information market in 1991; this was a decrease from the 1990 figure of 96%. Other kinds of electronic data bases, like scientific, technological and government data bases played a minor, but increasing role; the latter had the highest growth rate. From 1990 to 1991, financial data base turnover grew 3.7% while business data bases had a double digit growth of almost 25%.

Table 1: Electronic information services
Dissemination of information in electronic form

	1989	1990	1991	Growth (%) 1989/90	Growth (%) 1990/91
Employment	25 465	26 539	28 805	4.2	8.5
Turnover (million ECU)	2 606	2 925	3 283	12.2	12.2
Geographic distribution of online revenues, in %					
National consumption	32.9	32.6	34.7	14.0	39.4
Intra-EC trade	31.8	34.8	36.0	26.1	35.3
Total EC domestic	64.7	67.5	70.7	20.0	37.3
Exports	35.3	32.5	29.3	6.0	18.2
Turnover by subject content, in %					
Finance	68.5	70.7	63.9	15.2	3.7
Business	27.3	25.2	27.4	3.4	24.5
Science, technology and medicine"	2.0	1.9	3.2	5.3	94.0
Government	1.5	1.6	3.3	14.2	143.0
Other	0.7	0.6	2.2	7.9	295.7
Turnover by type of service, in %					
Online information services	88.6	89.3	90.9	13.1	14.3
Offline information services	11.4	10.7	9.1	5.9	4.9

Source: IMO/EIIA survey

Table 2: Electronic information services
Online services - Turnover by type of service/product (1)

	1989	1990	1991
Turnover (million ECU)	2 309	2 611	2 985
Real-time, in %	58.2	59.1	56.3
Non-real-time, in %	41.8	40.9	43.7

(1) Percentages derived after factoring out unclassified services.
Source: IMO/EIIA survey

Table 3: Electronic information services
Online ASCII databases - Worldwide production/distribution, 1992

	Number of database producers	Number of host services	Number of gateway services
EC	792	246	25
North America	1 269	451	43
Rest of the world	182	121	25
Total	2 243	818	93

Source: Directory of On-line Databases, Cuadra/Elsevier, July 1992

International comparison

North America is the greatest worldwide producer of on-line ASCII databases: at the beginning of 1991, there were 1 269 database producers. At the same time, there were 792 of them in EC and 182 throughout the rest of the world. In the USA, there were also 451 hosts, while there were 246 in the EC and only 121 in the rest of the world. America had the highest number of gateway services (43), while 25 gateways existed in the EC and 25 in the rest of the world.

There was a total of 4 million CD-ROM drives installed worldwide in 1992, nearly doubling in numbers from the previous year. The USA has the highest installed base of drives (67% of the total or 2.7 million) in 1992. In the same year, there were 400 000 (almost 10% of the total number) of CD-ROM players installed in Europe, while in Asia, the amount was nearly 1 million units (because of the large Japanese market).

Table 4: Electronic information services
Online ASCII databases - EC production/distribution, end-1991

	Number of database producers	Number of hosts	Number of gateway services (1)
Belgique/België	33	6	0
Danmark	27	17	1
BR Deutschland	110	20	4
Hellas	0	0	0
España	36	25	1
France	154	62	3
Ireland	2	2	0
Italia	39	21	2
Luxembourg	10	3	0
Nederland	32	14	0
Portugal	8	9	1
United Kingdom	341	67	13
EC	792	246	25

(1) The figures relate to the number of online service organisations offering gateway facilities to third parties; the actual number of gateways is not indicated.
Source: Directory of On-line Databases, Cuadra/Gale, July 1992

MARKET FORCES

Demand

Information services end users are a very broad category which can be divided into business and residential customers. By far, the most important customer segment has been the business users due to their bargaining power and their use of the most sophisticated on-line data bases. The latter mainly use cheap and user-friendly technologies such as audiotex and videotex. CD-ROM are used by both segments of users. Most of the demand, however, came from the professional users (lawyers, accountants, tax advisors, etc.) who are dependent on external information sources.

Business end-users of electronic information services can be grouped into the following categories: banks and finance, services and research companies, media, manufacturing and commercial companies, institutions, universities, unions and other associations. Banks, finance and insurance companies are the most important users of on-line financial and business data bases, followed by the main industrial and commercial companies.

The most requested subjects are related to financial and business information. As far as industrial and commercial companies are concerned, the demand for on-line information services mainly came from the need to verify clicnt backgrounds and suppliers' reliability (consulting business data bases), while the enquiry of scientific, technological and patents databases supports the R&D activities.

Audiotex is a fast growing, easily accessible individual consumer segment (only a telephone is needed for access). In 1993, audiotex services were already available in almost all of the EC countries thanks to the deregulation (formerly the public carrier supplied both the network and the information services, the latter is now provided by private competitors). The growth of the service is favoured by the penetration of the dial tone multi-frequency (DTMF) telephone sets. In 1992, the United Kingdom, the largest EC market, reached a turnover of about 350 million ECU: the total EC market was worth more than 800 million ECU.

Entertainment services (adult services and chat lines) are the most frequently used ones, followed by information services (news, sport and financial). Regulations have a big impact on the market, especially on adult entertainment services.

The success of a videotex service depends on heavy investments on the part of the service provider in placing terminals with end-users, implementing the network and marketing the products. These costs will be regarded by most firms as "normal" operating costs to develop their business in this competitive environment.

Videotex technology was mainly developed by France Telecom. In the 1980s, France Telecom supplied free terminals to a large number of users (substituting them for telephone books), creating demand for the products offered on their system. Currently, there are about 7 million Minitel service users and more than 10 000 information providers. The French market was worth more than 80% of the total European market in 1992. The most popular Minitel services are telephone directories, tourism and transport information, reservation services, home banking, home shopping, weather news and other information and entertainment services.

Table 5: Electronic information services
Installed base of CD-ROM drives by region 1991 - 1992

	(million)	(%)	(million)	(%)
Europe	0.20	8.9	0.40	9.9
America	1.45	64.4	2.70	66.8
Asia	0.60	26.7	0.94	23.3
Total	2.25	100.0	4.04	100.0

Source: Infotech

Table 6: Electronic information services
Audiotex - Installed equipment base and market size in the EC, 1992

	DTMF sets		Number of fax machines (thousands)	Premium rate services market (1)	
	Total number (thousands)	Of all telephone lines, in %		ECU (thousands)	ECU/capita
Belgique/België	2 343	55	250	10 789	1.08
Danmark	2 755	95	80	24 773	4.86
BR Deutschland	3 300	10	600	11 712	0.15
Hellas	390	10	40	0	0.00
España	5 480	40	320	54 062	1.39
France	18 662	62	550	279 990	4.96
Ireland	660	60	50	6 504	1.86
Italia	9 100	35	500	742	0.01
Luxembourg	226	77	29	N/A	N/A
Nederland	2 998	40	280	99 587	6.64
Portugal	301	10	25	1 756	0.17
United Kingdom	9 900	33	700	346 707	6.04
EC	56 115	36	3 424	836 623	2.43

(1) Premium rate services market means information services billed through a central billing system or kiosk system offered by the telecom operator.
DTMF: dial tone multi-frequency
Source: GRID

Videotex is growing in Germany (where about 360 000 terminals were installed at the end of 1992) and Spain (400 000 terminals), while its spread in the United Kingdom and Italy is still limited. In Germany and Spain, many customers use personal computers to access the services rather than specialised terminals. Professional information services are the most popular ones in these countries. Because of the different technical standards of the videotex systems, there is no integrated EC market in this area.

Supply and competition

The professional data base market is divided into many segments according to the content of the data bases. Generally, a few operators dominate the market in each segment. For instance, Reuters (UK), Telerate (USA), Telekurs (CH) and a few other companies control the market for real time financial information services; while operators like Dun & Bradstreet (USA) and the Japanese Teikoku Databank are among the main firms in the company profile niche of data bases. Esa-Irs (I), Questel (F), Dialog (USA) are the main competitors in the scientific and technological services.

Scientific and financial information services are typically an international market where global suppliers are the most important players. Global competitors are generally USA and EC companies. In some other important market segments, (such as the company profiles), national suppliers (with the exception of the Dun & Bradstreet (USA) are the most important because of the deep knowledge of their domestic market.

United Kingdom data base publishers are the most important producers of commercial CD-ROM titles in Europe, followed by suppliers from Germany, Italy and the Netherlands. The majority of companies that provide audiotex and videotex entertainment and information services are nationally based. Each country has hundreds of companies supplying these kinds of services. There are, for instance, about 500 suppliers of audiotex services in United Kingdom and the Netherlands. In the videotex business, there are more than 14 000 service codes offered in France and more than 3 000 information providers in Germany. Cultural, linguistic and, to a certain extent, technical differences, prevent services from going international.

INDUSTRY STRUCTURE

Companies

In spite of the dominance of the USA competitors, many EC information and media corporations can compete worldwide, like Reuters, Reed International (UK), Pearson-Financial Times (UK), Bertelsmann (D), and VNU (NL).

However, a disadvantage for European companies is the linguistic fragmentation and national boundaries that still hinder the development of the EC unified market and slow down the development of the sector. To overcome this, companies look for new partnerships, new distribution networks and technological innovations.

OUTLOOK

The demand for electronic information services is expected to develop at a compound growth rate of about 12% over the next five years.

The main users of professional services and CD-ROM will remain the banks and the financial companies, but the diffusion of the services towards industrial and commercial sectors is underway. Many large companies use information services to assist their planning, marketing, and production functions. As their use becomes easier and less expensive, professional information services should see user growth expanding into the small to medium sized enterprise range. The spread of the services will be aided by the expansion of new, high performance networks like ISDN (Integrated System Digital Network) and new technologies such as expert systems that allow the access of foreign language databases in the user's home language and new software for automatic language translation. Harmonisation of the rules covering government owned data bases is also expected.

The development of the market will likely be faster for CD-ROM as the major computer companies launch multimedia personal computers in the mass market and sell more and more PCs with CD-ROM drives. The price of CD-ROM drives has dropped dramatically, and many publishers are working hard to publish new and appealing CDROM titles for expanding the new consumer market.

Table 7: Electronic information services
Subject analysis of revenues in the EC, 1991

	Online services (million ECU)	(%)	Offline products (million ECU)	(%)
Classified revenues	2 822.9	100.0	190.8	100.0
Of which,				
Finance	1 945.4	68.9	14.8	7.8
Business	728.3	25.8	95.2	49.9
STM (1)	55.7	2.0	24.3	12.7
Government	52.5	1.9	34.4	18.0
Other	41.0	1.4	22.1	11.6
Unclassified revenues	162.2		107.5	
Total	2 985.1		298.3	

(1) Science, technology and medicine
Source: IMO/EIIA survey

EC audiotex services are at the beginning of their life cycle and it is expected that they will have a double digit growth in the next few years. After the success of the adult services, which characterised the period immediately following the launch of audiotex, it is expected that more professional services will consolidate and become more important audiotex providers in many countries. Greater penetration of touch tone telephones will facilitate the use of telephone services such as voice recognition and fax on demand, which is the combination of audiotex and fax for automatically ordering and receiving information.

A major expansion of videotex services outside of France is not very likely because of the national technical differences that continue to exist between systems. The increased use of personal computers that have the necessary hardware to connect to videotex networks and the spread of ISDN services (that allow the transmission of images) could favour the service, although it will be into the next century before these technologies make a difference for videotex growth.

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Telecommunications services
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In 1991, revenues generated by EC telephone carriers nearly reached 90 billion ECU, and the gross investment of public carriers totalled more than 32 billion ECU. The sector will expand at the annual growth rate of 6% over the next few years. This favourable growth will be assisted by the development of new digital technologies, a wide range of intelligent services, a fall in prices and the growing need to communicate globally. However other sectors based on information technology such as telecom will pass through a period of crisis. The main EC telecom operators are the national telephone carriers who generally are large, profitable and state owned companies (with the exception of the United Kingdom). In spite of the variety of the telecom services, 85% of the EC telecom carriers' revenues still mainly come from telephone services, while mobile and data communication and other new services account for the remaining 15%. However, these services are foreseen to have the most exciting growth rates. As for telephone lines, the EC is the largest market in the world with 147 million lines.
Public carriers still have the monopoly of the basic telecom services, but competition is increasing in the international and domestic arena because of the liberalisation of data services and mobile communications markets. New competitors, particularly American carriers and computer companies, are emerging. Users are getting very sophisticated and differentiated: paradoxically, the more the EC telecom market moves towards integration, the more demand moves toward segmentation.

INDUSTRY PROFILE

Description of the sector

Telecommunication Services permit interactive interconnection between persons, between persons and computers, and between machines, through many different media networks such as cable, microwaves and satellite networks. They also permit the diffusion of information from a single point to multiple points such as direct satellite broadcasting for television or data transmission.

Telecommunications services are services provided by public or private networks, such as telephone or telex, where the messages are simply transmitted by the networks, or value added services (VAS) like electronic mail, EDI (electronic data interchange) or protocol conversion, where the messages are stored, processed and repackaged along the route before being received by the addressee.

The transmitted information can be voice, data or images. Until recently, each type of information required the use of a specific network (telephone, telex, or packet switching networks). However, new networks like ISDN (Integrated Services Digital Network) allow for integrated distribution of all three information types (fixed or full motion images).

Recent trends

New technologies derived from microelectronics, optics and information technology, such as digitalisation of exchanges and transmission, fibre optics and advanced software, allow the transmission of an increasing variety of intelligent services for the benefit of many different customer segments. Due to new networks, such as ISDN and broad band lines, the lack of bandwidth for new services that require a vast amount of data (like video transmission) promises to no longer be a bottleneck for the customers.

These new technologies are also prompting the prices of all the telecom services, particularly the long distance services, to fall dramatically. Price cuts, especially for the business customer, are also strongly pushed by the emerging competition.

Because of the monopoly of the telephone services, the main EC telecom operators are public carriers; only in the United Kingdom has the telephone carrier been privatised, allowing the entry of competition into the data and local telephone services. Therefore, the geographical distribution of the production of telecom services in EC depends mostly on the size of the public telephone carrier and on the strength of the economy of the country of origin. Germany, the United Kingdom, France, Italy and Spain are the main markets of the EC in this ranking.

In spite of the telephone monopolies, many newcomers are entering the newly opened EC mobile and data commercial telecom markets. USA carriers and, to a lesser extent, computing companies, are taking advantage of these new opportunities.

From 1980 to 1991, gross investments and revenues for telecom services in EC Member States showed a notable increase.

Table 1: Telecommunications services
Gross investments

(million ECU)	1980	1985	1988	1989	1990	1991
Belgique/België	426.3	490.4	419.9	589.7	657.3	668.7
Danmark	250.4	323.7	517.3	449.7	414.1	355.7
BR Deutschland	3 956.9	7 060.4	8 174.4	N/A	9 382.9	11 870.2
Hellas	177.8	322.8	203.6	275.3	296.8	440.9
España	1 175.4	1 478.0	2 581.8	4 331.8	5 230.6	4 846.9
France	4 028.5	5 237.1	N/A	N/A	3 782.1	4 959.7
Ireland	190.6	196.4	175.3	208.6	222.0	222.1
Italia	2 052.4	3 693.1	4 972.7	6 803.2	6 383.3	6 499.9
Luxembourg	17.9	13.7	31.3	40.8	48.0	51.6
Nederland	510.8	643.6	836.0	1 296.7	1 169.0	1 312.0
Portugal	106.5	227.8	369.4	431.5	561.8	426.6
United Kingdom	2 030.5	3 349.9	4 435.4	4 626.5	3 681.9	3 659.1
EC	14 924.0	23 036.9	N/A	N/A	31 829.8	N/A

Source: Eurostat using ITU data, national telecom administrations

In 1990, EC telecommunication services receipts totalled about 2% of the EC gross domestic product. In 1991, the EC revenue generated by telecom services by public operators totalled 90 billion ECU, for a corresponding gross investment of more than 32 billion ECU.

In the same year, the EC was the largest region in the world when considering the total number of main telephone lines with 147 million compared to 130 million in the USA and 56 million in Japan. The number of lines per 100 inhabitants in the EC was 43 compared to 51 in the USA and 45 in Japan. This number varies considerably between Member States and ranges from 27.3 in Portugal to 57.7 in Denmark.

In 1991, total employment averaged 899 000, a decrease of 28 000 from 1990. Since the average growth rate is about 10% per year, this decrease means that the sector is rapidly changing with technological innovation and is gaining in productivity.

The mobile communication subsector is expected to increase dramatically in the EC: in mid-1993 there were 7 million subscribers to analogue cellular telephone services. The subscriber base is increasing rapidly: the penetration level now is about 20 subscribers per 1 000 inhabitants. Also, the private networks - mostly user built to obtain reliable and cheaper communications inside the company- increased in the last few years: between 1988 and 1990 they increased more than 17%. It was estimated that more than 14 000 private networks existed in 1990.

The level of telephone line penetration in the EC is much higher than in Eastern Europe and the former USSR. In 1992, there were 11 main lines for 100 inhabitants in Hungary, 9 in Poland and 14 in the former Soviet Union. The quality of the services offered in East Europe is very low compared to western standards. Even if East European countries show a high potential for growth, telecommunication investment scenarios are very uncertain because of the economic problems and financial shortages of these countries. This is confirmed by the average rate of growth from 1986 to 1991, that varied from 4% to 8% per year depending on the country, far from the real potential of the sector.

Table 2: Telecommunications services
Public operators - Receipts and expenditures

(million ECU)		1988	1989	1990	1991
Receipts					
	Belgique/België	1 806.3	1 943.7	2 112.7	2 268.2
	Danmark	1 609.3	1 767.5	1 771.5	1 923.9
	BR Deutschland	18 041.2	N/A	19 779.6	23 013.0
	Hellas	884.1	899.5	989.5	1 058.3
	España	N/A	5 559.2	6 336.7	7 831.0
	France	13 942.4	14 851.9	16 232.2	16 491.5
	Ireland	778.8	879.7	982.0	1 001.6
	Italia	11 158.3	12 627.2	14 017.6	11 759.5
	Luxembourg	118.2	N/A	155.5	164.4
	Nederland	3 341.5	3 760.2	4 100.1	4 397.0
	Portugal	868.9	469.1	547.6	692.4
	United Kingdom	16 662.3	18 290.5	17 562.0	19 025.7
	EC	N/A	N/A	84 587.0	89 626.5
Expenditure					
	Belgique/België	1 647.4	1 762.4	1 894.2	2 059.4
	Danmark	N/A	N/A	N/A	2 185.1
	BR Deutschland	16 575.9	18 011.7	19 168.4	21 940.2
	Hellas	698.1	770.2	812.5	806.4
	España	4 104.7	5 044.6	5 644.3	7 217.2
	France	13 403.1	14 199.9	15 421.7	N/A
	Ireland	721.9	789.8	884.6	901.6
	Italia	10 705.6	12 093.6	14 122.8	11 466.0
	Luxembourg	65.4	N/A	74.5	83.1
	Nederland	2 840.1	N/A	3 540.9	3 824.5
	Portugal	625.0	622.1	783.1	988.7
	United Kingdom	14 285.8	16 010.6	13 456.7	16 067.0
Surplus/deficit (1)					
	Belgique/België	158.9	181.3	218.5	208.8
	Danmark	N/A	N/A	N/A	-261.2
	BR Deutschland	1 465.3	N/A	611.2	1 072.8
	Hellas	186.0	129.3	177.0	251.9
	España	N/A	514.6	692.4	613.8
	France	539.3	652.0	810.5	N/A
	Ireland	56.9	89.9	97.4	100.0
	Italia	452.7	533.6	-105.2	293.5
	Luxembourg	52.8	N/A	81.0	81.3
	Nederland	501.4	N/A	559.2	572.5
	Portugal	243.9	-153.0	-235.5	-296.3
	United Kingdom	2 376.5	2 279.9	4 105.3	2 958.7

(1) Receipts less expenditures
Source: Eurostat using ITU data, national telecom administrations

Table 3: Telecommunications services
Distribution of main lines

	Millions of main lines			Lines per 100 inhabitants		
	1989	1990	1991	1989	1990	1991
Belgique/België	3.7	3.9	4.1	37.8	40.1	41.0
Danmark	2.8	2.9	3.0	55.5	56.7	57.7
BR Deutschland	28.8	30.0	33.6	36.8	37.9	42.1
Hellas	3.8	3.9	4.2	37.8	39.3	41.4
España	11.8	12.6	13.3	30.4	32.4	34.0
France	26.9	28.1	29.1	47.9	49.6	51.1
Ireland	0.9	1.0	1.0	25.6	28.0	29.3
Italia	21.3	22.4	23.1	37.0	38.8	40.0
Luxembourg	0.2	0.2	0.2	46.1	48.5	50.0
Nederland	6.7	6.9	7.2	45.2	46.6	47.8
Portugal	2.1	2.4	2.7	20.2	24.1	27.3
United Kingdom	24.9	25.4	25.0	643.6	44.3	44.5
EC	133.9	139.7	147.1	39.2	40.7	42.6
USA	125.8	127.2	130.0	150.6	50.9	51.5
Japan	52.0	54.1	55.9	42.1	43.8	45.2

Source: Eurostat using ITU data, national telecom administrations

Eastern countries are looking for EC technical and financial assistance and partnerships. Western partners must bring genuine commitment and expect only long-run returns on investment. In the last few years, there has already been a flurry of activity as EC and American companies (like Deutsche Bundespost Telekom, France Telecom and US West) have signed many partnerships with telecom carriers of East European countries (that still maintain the majority stake in the joint ventures) such as the partnerships made in Poland, Romania and Estonia. Typically, the investments by western countries have been made in the areas where there is the possibility of faster returns on investments, like in mobile and international services. There is no denying the need for these services, but it is also clear that a major effort is needed for upgrading basic telephone services; Deutsche Bundespost Telecom is already deeply engaged in rebuilding the telephone network in the former East Germany.

Foreign trade

International telecom services are regulated by a very stable mechanism by which revenues are shared by the international carriers. The revenue of the carriers depends on the traffic and also on the different tariffs fixed by each country. Large price differences between countries for international calls explain much of the trade surplus or deficit of the countries in this sector. Because of its high tariffs for international telecommunications, the EC has traditionally had a trade surplus with the USA, the principal partner for extra-EC communications. It is very likely that, because of the general drop of EC long distance tariffs, the surplus trade will diminish.

MARKET FORCES

Demand

The telecommunication market is as diversified as in the past, with technologies and needs (both of residential and business users) rapidly evolving and becoming more sophisticated. As a result, the more the EC telecom market becomes global, the more the integrated market segments itself along the lines of technologies and type of service.

Table 4: Telecommunications services
Employment

(thousand)	1980	1985	1988	1989	1990	1991
Belgique/België	28.9	27.6	25.8	25.3	26.3	26.8
Danmark	15.9	N/A	19.0	18.0	18.0	17.9
BR Deutschland	195.0	212.4	216.2	216.2	212.2	229.0
Hellas	30.2	30.6	30.3	29.7	28.1	27.6
España	70.6	72.1	66.1	71.2	75.4	75.5
France	161.0	166.8	159.5	157.3	155.8	156.2
Ireland	19.7	16.2	14.3	13.7	13.5	13.4
Italia	104.0	109.8	113.7	116.4	118.0	87.6
Luxembourg	0.6	0.7	0.7	N/A	0.7	0.7
Nederland	27.9	28.8	29.1	28.8	29.0	30.6
Portugal	22.8	23.2	23.1	21.7	23.0	23.1
United Kingdom	240.7	226.7	244.4	245.7	226.9	210.5
EC	917.3	N/A	942.2	N/A	926.9	898.9
USA	956.6	813.0	725.0	696.0	684.0	575.6
Japan	333.0	311.0	286.0	277.0	272.3	266.1

Source: Eurostat using ITU data, national telecom administrations

Table 5: Telecommunications services
Private networks in the EC, 1988-90

	Number of private networks 1988	1990	In % of total 1990	Growth in % 1988/90
Belgique/België	608	723	5.1	18.9
Danmark	276	297	2.3	7.6
BR Deutschland	1 550	2 110	13.0	36.1
Hellas	60	68	0.5	13.3
España	790	891	6.6	12.8
France	2 140	2 490	17.9	16.4
Ireland	65	73	0.5	12.3
Italia	1 420	1 480	11.9	4.2
Luxembourg	30	39	0.3	30.0
Nederland	447	561	3.7	25.5
Portugal	84	103	0.7	22.6
United Kingdom	4 460	5 170	37.4	15.9
EC	11 930	14 005	100.0	17.4

Source: OECD Telecommunications Outlook 1993

Networks are becoming increasingly intelligent and, for this reason, they are very good platforms for the provision of new services that could meet the expanding user requirements.

In spite of the fact that the number of new telephone subscribers is diminishing in the EC, the demand for telephone services is still growing, as indicated by the high annual growth rate of both local and long distance traffic. It is not surprising that intelligent services are the most important means used by the EC telephone carriers to increase traffic and revenue per line. In the USA, intelligent services already generate about 20% of total telecom income of the carriers.

As a result of widespread use of newer methods of information and data transfer, telex use is dwindling rapidly. From 1989 to 1991, the number of telex lines in the EC decreased by 23%; in Japan they decreased by 32% and in the USA, the numbers increased 6% from 1989 to 1990 only to plunge 65% from 1990 to 1991. In 1991, Luxembourg had the highest concentration of telex lines with nearly 6 lines per 1 000 persons.

Intelligent networks provide services for both the residential users, the price sensitive segment of the telecom market, and for the business and corporate users, the performance sensitive segment. New intelligent services such as caller identification, follow me, credit card calling, audio conference, free phone, intelligent fax, audiotex and Virtual Private Network (VPN) are bound to spread fast. So far, banks, insurance companies, building societies, hotels, airlines and services companies are the major business users of the services offered through intelligent networks.

Mobile services permit easy communication with very few constraints. Mobile communication has been very successful, being accepted by both business users and an elite group of residential customers. Due to economies of scale and new technologies such as PCN (personal communication network) that have been designed from the outset for the domestic customer and small business markets, prices will decrease over the next few years and a major share of residential users will be able to afford mobile telephone services. Tariffs have also been adjusted to take into account customer discrimination.

Datacom services are also at the brink of a major leap ahead in technologies. The increasing need to exchange data among the computers of departments within companies, and also among different companies linked through business relations, pulls demand for data networks like X.25 public and private networks. There is also an increasing demand expected for transmitting large data flows and video signals through ISDN and high speed broad band lines and networks of both private and public origin. Fast transmission of data and video could change the way people work and live and could also favour the growth of less developed regions and countries.

Also, the demand for very personalised data services like VPN is emerging. VPN is based on a public network but completely controlled and configured by the customer according to his or her needs. VPN (like ISDN) could be seen by the customers as an alternative to their own private data network.

Table 6: Telecommunications services
Public telecommunications services in Eastern Europe and the former USSR

	Main lines at 1 Jan. 92 (thousands)	Main lines per 100 inhabitants	Average annual 1986/91 growth (%)
Bulgaria	2 206	23.4	6.6
Hungary	1 129	10.9	7.9
Poland	3 565	9.3	6.3
Rumania	2 464	10.7	3.4
Former Czechoslovakia	2 464	15.7	4.9
Former USSR	40 363	13.9	N/A

Source: OECD Telecommunications Outlook 1993

Table 7: Telecommunications services
Peak rate telephone calls between EC Member States, December 1991(1)

Country of origin	Country of destination B	DK	D	GR	E	F	IRL	I	L	NL	P	UK
Belgique/België	.	0.68	0.48	0.68	0.68	0.48	0.48	0.68	0.34	0.40	0.68	0.48
Danmark	0.39	.	0.35	0.45	0.45	0.39	0.39	0.45	0.39	0.39	0.45	0.39
BR Deutschland	0.53	0.53	.	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
Hellas	0.65	0.65	0.65	.	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
España	0.90	0.90	0.90	0.90	.	0.90	0.90	0.90	0.90	0.90	0.90	0.90
France	0.52	0.52	0.52	0.52	0.75	.	0.52	0.52	0.52	0.22	0.52	0.52
Ireland	0.75	0.75	0.75	0.75	0.75	0.75	.	0.75	0.75	0.75	0.75	0,59
Italia	0.70	0.70	0.62	0.62	0.70	0.62	0.81	.	0.62	0.70	0.81	0.70
Luxembourg	0.33	0.47	0.47	0.47	0.47	0.47	0.47	0.47	.	0.33	0.47	0.47
Nederland	0.45	0.45	0.45	0.60	0.60	0.45	0.60	0.60	0.45	.	0.60	0.45
Portugal	0.77	0.77	0.77	0.77	0.73	0.77	0.77	0.77	0.77	0.77	.	0.77
United Kingdom	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	.

(1) Figures show the price per minute in ECU of a 4 minute call (without tax).
Source: Eurostat using data from OECD Telecommunications Outlook 1993

Table 8: Telecommunications services
Public telecommunications operators - productivity in the EC, USA and Japan, 1990

	Productivity (mainlines per employee) 1990	Annual avg. growth of productivity in % 1985/90
Belgique/België	149	6.1
Danmark	164	1.8
BR Deutschland	141	3.2
Hellas	141	6.6
España	167	5.2
France	179	5.4
Ireland	73	10.9
Italia	189	3.6
Luxembourg	262	2.8
Nederland	218	1.5
Portugal	104	11.4
United Kingdom	112	4.7
USA	128	6.2
Japan	197	3.8

Source: OECD Communications Outlook 1993

The VAS (value added services) market, on the contrary, is still suffering from bottleneck problems. Demand exists, but the lack of diffused and accepted standards still hampers its further expansion. Demand is also rising from multinational enterprises, as management of worldwide facilities requires negotiation with many different national authorities. Large companies would prefer to deal with a single telecom company for worldwide communications provision. Through this kind of user demand, it is obvious that global solutions for business, entailing sophisticated services and guaranteed reliability, are better achieved through a single global carrier, or "supercarrier", with sole responsibility for genuine end-to-end provision.

Supply and competition

The development of the market (and therefore the pace of new service offerings) has been traditionally limited by national monopolistic regulations. But new technologies and liberalisation push for the offering of a broader range of services. New competition pushes the public carriers to fix the prices of each service according to the cost specifically sustained. In fact, there is a general trend with regard to the tariffs. Public carriers are bound by strong competition to heavily decrease their prices for long distance calls and for services directed to the business users, while a lower decrease occurs for local calls and for services addressed to the residential users. Therefore, the norm of cross-subsidisation between long distance and local calls and between business and residential users will diminish in importance.

The increasing risk derived from the liberalisation of Data and VAS markets, and from the entrance into the market of powerful players like IBM (USA) and DEC (USA) and other computer companies and foreign carriers, is tackled by the domestic carriers through the increasing supply of new intelligent services and high performance digital networks like ISDN.

EC public carriers in the most regulated markets may have an incentive to invest heavily in ISDN in order to offer a new range of advanced services which might help them to compete against new private competitors entering the market after deregulation. ISDN is a major challenge for public carriers: their goal is to push the big business users to migrate from their own private networks or other service providers, to the public digital network.

Public carriers are engaged in building mobile communications networks on the GSM (Global System for Mobiles) standard, the European unified standard established by ETSI, to allow every subscriber to communicate easily with anyone else throughout Europe. As the EC chose a unified standard (GSM), public and private operators are ahead of the USA carriers who are currently implementing two different standards for digital mobile communications. GSM permits the use of multiple channels, security and a larger amount of digital services for the customer. However, prices for GSM services and terminals are currently higher than the prices for analogue services and terminals. It is foreseen that shipments of GSM telephones will overtake analogue shipments by 1994.

There is also increasing competition in the long distance market, which is the market that provides the highest profit margins and revenues for the carriers. Pushed by changing technology and rising competition, EC carriers are gearing for price cuts and searching for international partnerships. The new alliances target products for large multinational corporations; they generate the largest volume of long distance traffic and have the strongest bargaining power. As a result, new partnerships are taking place and new "supercarriers" are emerging.

Table 9: Telecommunications services
Top 9 companies in the EC, 1992 (1)

Rank	Company	Country	Service revenue (million ECU)	Number of employees
1	Telekom	D	26 616	231 000
2	British Telecom	UK	18 010	170 700
3	France Telecom	F	17 845	155 300
4	SIP	I	13 475	87 475
5	Telefonica	E	8 689	74 437
6	PTT Telecom	NL	4 000	N/A
7	Belgacom	B	2 172	27 700
8	Teledanmark	DK	1 996	17 829
9	Mercury	UK	1 248	N/A

(1) Ranked according to service revenues.
Source: ITU Telecommunication Indicator Database; DG XIII

The most important partnership was set up between British Telecommunications PLC and MCI Communications, the largest USA long-distance carrier after AT&T. A second alliance was set up by France Telecom and Deutsche Bundespost Telekom. A third was formed by a three-way alliance, called Unisource, between the Dutch, Swedish and Swiss phone companies. Due to deregulation, American companies are entering the EC advanced services markets such as cable and satellite TV, mobile communications, "one stop shopping" and VAS.

Late in 1993, an announcement was made for the intended merger of Bell Atlantic, a regional USA telecom company and Telecommunications, Incorporated (TCI), the largest cable operator in the USA. If this acquisition is finalised, it will create a major American company that will offer not only the normal telecommunications services, but also interactive products such as video on demand, long-distance learning and home shopping. This type of merger may be the wave of the future for the EC telecommunications market as well.

Production process

Thanks to the digitalisation of networks and the introduction of OSS (Operating Support Systems), telecom carriers can heavily cut the expenses for monitoring and maintaining the networks and for supplying new services. Between 1985 and 1990, the annual average growth of productivity of EC telecom operators varied from 1.5 % in Holland to 11.4% in Portugal, while big countries like the United Kingdom, Germany, France, Spain and Italy had annual rates between 3 and 6%.

The diffusion of digital networks like ISDN, GSM and satellite telecommunications certainly will increase these trends. Therefore public carriers will be able to cut prices for the benefit of the customer.

INDUSTRY STRUCTURE

Companies

Generally speaking, public telecom operators are very large and profitable companies with a large number of employees. They also sustain large investment efforts for improving the networks and offering a broad range of services.

The top EC network operators are Deutsche Telecom Bundespost (D), British Telecom (UK), France Telecom (F), SIP (I), Telefonica (E). British Telecom and DBP Telekom are by far the top corporate performers: their profits as percentage of their revenues were 20.5% and 18%, respectively, in 1990/1991. On the contrary, because of the heavy investments made to modernise public networks in 1991, some public carrier, like those operating in Denmark and in Portugal, suffered losses.

Strategies

EC public carriers operating in a quasi-monopoly regime are preparing themselves to tackle new competitors in the open market.

EC carriers are deeply engaged in restructuring and increasing their productivity. Many carriers are changing their organisation in order to focus on emerging services and markets and be more flexible and nearer to the customer. Some telecom carriers, like BT and France Telecom have set up new companies for operating in specialised markets, like mobile communications or data network markets.

Many telecom carriers' goals are to introduce flexible pricing and sophisticated services (like network management and outsourcing), especially for the benefit of the most advanced business users, and to increase the traffic generated by the residential customers with products like intelligent services.

The need to introduce intelligent systems, data bases and software for monitoring the network and offering more services to the customers has a big impact on the telecom carriers strategies of partnerships with computer and software and computing services companies. For instance, France Telecom has recently signed a partnership with the service company Sema (F), while Stet (I) has bought Finsiel, an Italian software and services company.

Telecom carriers are also preparing offensive or defensive strategies concerning internationalisation. European Telecom carriers are very interested in the privatisation processes of many domestic carriers that are underway all over the world. France telecom and Stet, for instance, each hold a 32% interest of the Nortel consortium which, in turn, holds the majority share (60%) of the privatised Argentinean elecom carrier, Telecom Zona Norte, and are leading the modernisation of this Argentinean telephone network. Recently, France Telecom bought private data carriers in the United Kingdom, Germany and Italy.

In 1992, BT planned an investment of about 400 million ECU over 10 years to start the "Cyclone" project, designed for offering an international network and outsourcing service for large multinational companies.

ENVIRONMENT

Telecommunication services have a positive impact on the environment, as they reduce the need for physical transport. Many services such as satellite remote sensing and telemonitoring are used for monitoring air, water and soil pollution. Remote sensing services are also used for managing and preventing disastrous events. One minor environmental problem

Table 10: Telecommunication services Regulatory environment, 1991

	Main Operators	Regulatory body	Services markets liberalized	Rules concerning leased lines	Markets for terminal equipment
Belgique/ België	Régie des Téléphones et Télégraphes (RTT) a public utility	RTT and the Ministry	PBX only	Connection allowed Resale forbidden	All wide-diffusion terminals are still a monopoly of the RTT
Danmark	Tele Denmark, a state-holding, owns 4 regional monopolies and one functional	Telec. Inspectorate, a public authority, created in 1990	Only VAS Resale allowed	Connection allowed	Liberalized in 1990
BR Deutschland	Deutsche bundespost Telekom, a public utility	Department of Regulatory Issues (under the Ministry) created in 1989	All, except telephony lines only	Connection allowed for international	Liberalized in 1990
Hellas	OTE, a public utility	The Ministry regulates the sector	None	Connection forbidden Resale forbidden	First telephone set is still a monopoly
España	Telefonica, a private company, 35% state-owned	A department of the Ministry, since 1987	VAS	Connection allowed Resale forbidden	Liberalized in 1987
France	France Telecom, a state-owned public enterprise, is holding Cogecom	DRG, a body under the Ministry, created in 1990	Mobile Com. VAS	Connection allowed Resale forbidden	Liberalized in 1987
Ireland	Telecom Eireann, a state-owned private company since 1983	Department of Com. (under the Ministry)	VAS	Connection allowed Resale forbidden	Liberalized in 1984
Italia	STET, 85% and IRI, 100% state-owned, state-owned, control 3 concessionaires: SIP, Italcable, Telespazi. Three government depts. ASST, DCSR, DCST - also supply telecom services	Several bodies assist the Ministry in the regulation of Telecoms	None	Connection forbidden Resale forbidden	First telephone set and telex terminal are not open to competition
Luxembourg	Administration des Postes et Commun. P&T, a govnt. dept.	P&T and the Ministry regulate the sector	None	Connection allowed Resale forbidden	First telephone set is still a monopoly
Nederland	PTT Netherlands, a private company, 100% state-owned	HDTP, under the Ministry, created in 1988	None	Connection allowed Resale forbidden	Liberalized in 1989
Portugal	CTT, TPL - public util. CPRM, a private co., 51% state-owned	ICP, an Institute under the Ministry, created in 1989	VAS	Connection allowed Resale forbidden	Liberalized in 1990
United Kingdom	British Telecom 49% state-owned, Mercury Communications, private	OFTEL, an independent body, All created in 1984		Connection allowed Resale allowed	Liberalized in 1984

VAS: value added service
Source: CEC, DGXIII

posed by telecommunications is the negative impact on the countryside from large transmission stations.

REGULATIONS

In spite of the general trend towards liberalisation of the telecom market, the pace and the method of introduction of liberalisation varies according to the laws and regulations in the EC Member States. The United Kingdom liberalisation example of the 1980s, the first EC opening of a telecoms market, is likely to be followed by other countries.

In the majority of countries, the VAS market and the terminals market are very open to competition. Because of an EC directive at the beginning of 1993, liberalisation came into force

Table 11: Telecommunication services
Market structures for mobile communications services in the EC

	Operator	Status	Start-up date	Technology
Belgique/België	RTT	Monopoly	1987	NMT 450
Danmark	Tele Danmark Mobil	Analogue	1981	NMT 450
		monopoly	1987	NMT 900
	Dansk Mobil Telefon	GSM duopoly	1992	GSM
BR Deutschland	BDP Telekom	Analogue monopoly	1986	C 450
	Mannesmann Mobilfunk	GSM duopoly	1991	GSM
	Third carrier planned		1993	DCS 1800
Hellas	No analogue service	GSM duopoly planned	1993?	GSM
España	Telefonica	Monopoly	1986	NMT 450
			1990	TACS 900
France	France Telecom	Analogue	1985	Radiocom 2000
	(Radiocom 2000)	duopoly		
	SFR		1990	NMT 900
Ireland	Telecom Eireann			
	(Eircell)	Monopoly	1985	TACS 900
Italia	SIP	Analogue	1985	RTMI
		monopoly	1990	TACS 900
		GSM duopoly planned		
Luxembourg	P&T Administration	Monopoly	1985	NMT 450
Nederland	PTT Telecom Netherlands	Analogue	1985	NMT 450
	(ATF2, ATF3)	monopoly	1989	NMT 900
		GSM duopoly planned		
Portugal	Telemovel	Analogue monopoly	1989	C 450
	Telecel	GSM duopoly	1993	GSM
United Kingdom	Racal Vodafone	Duopoly	1985	TACS 900
	Cellnet		1992	GSM
	Mercury PC	Open	1994	PCN/TACS 1800
	Hutchinson Microtel	competition	1994	PCN/TACS 1800

Source: OECD Telecommunications Outlook 1993

for some other telecom services such as Videotex, intelligent fax and data networks. Resale of leased lines and satellite transmission of data trough VSAT are usually subject to national regulation, but are being approved at an increasing rate. In many countries, such as the United Kingdom, Germany and France, the mobile communications market is also competitive: in fact, in these countries, the public carrier compete with a private company. PCN is already a competitive market in the United Kingdom, Cable TV is highly regulated at the national level in France and Germany, but it is very open in the United Kingdom.

According to a recent EC deliberation, the liberalisation process will be completed in 1998, when all the EC countries, with few exceptions, will also be obliged to open the market for basic services. This will have a major impact on the growth rate of the sector, which is expected to increase very quickly.

So far, only two companies in the United Kingdom, BT and Mercury, compete in the market of basic telecom services.

The opening of the markets will continue to have two major consequences. The first is the creation of public authorities or regulatory bodies overseeing the telecom sector which, in the majority of cases (except in the United Kingdom), will be under the supervision of the ministry of post and telecommunications. The second consequence is the privatisation of the telecom national carriers that have traditionally been state owned. Stet , Deutsche Telecom and France Telecom are expected to be partly privatised in the next few years, although in different ways: in some cases the state will maintain a majority share, in other cases the majority share will be public-.

In many EC countries, regulatory bodies are being set up. They regulate competition between the domestic carrier and other national and foreign private operators, preventing monopolistic positions and also take into account the needs and

Table 12: Telecommunications services
Mobile communication growth

Number of subscribers (%)	1990	1994	1997	2000
Personal communications networks	N/A	0.3	1.3	4.0
Cellular & micro cellular networks	0.8	1.8	3.2	3.7
Paging	0.9	1.0	0.8	0.6
Private mobile radio	0.2	0.8	0.9	0.9
Mobile data	N/A	N/A	0.3	0.5

Source: SEMA GROUP estimates based on UNITEL, Financial Times, Thursday Nov 7, 1991

Table 13: Telecommunications services
Projected EC infrastructure of ISDN basic lines, 1994"

	ISDN lines by 1994 (thousands)	Basic lines per thousand inhabitants
Belgique/België	140	14.0
Danmark	125	24.5
BR Deutschland	1 250	15.7
Hellas	170	16.8
España	420	10.8
France	1 100	19.5
Ireland	30	8.6
Italia	825	4.3
Luxembourg	7	17.5
Nederland	280	18.7
Portugal	60	6.1
United Kingdom	1 000	17.4
EC	5 407	15.7

ISDN: integrated services digital network
Source: Yankee Group, 1992"

interests of end users. In many countries, the regulatory body still decides on the basic services tariffs but, following the United Kingdom example, the price cap mechanism for fixing tariffs has been increasingly adopted by other EC countries (the price cap mechanism generally is the automatic increase of the telephone tariffs according to the level of inflation minus a certain level of previously fixed productivity growth).

OUTLOOK

The telecommunication market will change rapidly because of the introduction of digital networks (broad band ISDN), new services and increasing competition. Completely original services are expected in the market, like, for example, video on demand. This service allows transmission on traditional telephone wire, thanks to ISDN networks and image compression techniques, of full motion TV images, interactive plays and other telematics services coming from a great variety of sources. All the major EC carriers are testing the technology and are trying to foresee the major applications and the degree of acceptability by potential users. Video on demand could have a major impact on the diffusion of other technologies and on markets such as cable TV, satellite TV and video recorders.

Among other services currently underway, there are the development of high speed networks based on the frame relay protocol (for connecting local area networks), virtual private circuits, broad band services (for transmitting high volumes of data and full motion picture) especially targeted to the business users, intelligent mobile services, based on GSM networks; satellite services for data transmission; network management and outsourcing. Also, the potential of growth in Eastern markets is very promising, notwithstanding their current financial troubles.

New players, together with the traditional national operators, will emerge. Worldwide, three or four global companies are likely to reinforce their market position in the international telecommunications area; these are AT&T, BT, and the Japan's NTT.

The customer will increasingly determine the trends of the new market, and telecommunications companies will be compelled to make greater use of sophisticated marketing research techniques to explore the needs of the users and to forecast the customers' reactions before offering and promoting their services.

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Education
NACE 93

In a constantly changing world, education is called upon to play an increasingly important role in the preparation of young people for entry to the world of work.
Total public expenditure on education represents approximately 9% of total public expenditure in most EC countries, compared with figures of 12% in the USA, 16% in Japan and 18% in Switzerland. Europe's future will be built essentially on the quality of its human resources and therefore on the past and future ability of its Member States and economic participants to develop and disseminate training at school level. Through its content, organisation and the quality of its results creating expertise in each member country, education is the first way of satisfying demands and changing conditions in the labour market. In this sense, it is the most important investment in every country.

INDUSTRY PROFILE

Description of the sector

This sector includes all structured teaching activities in schools or universities which issue diplomas at any level.

The structure and evolution of the teaching sector reflect the way in which each country has attempted to build in historical components of its main demographic and economic factors (mainly in terms of activity and jobs), taking the best possible account of foreseeable and estimated developments, and the extent to which they have succeeded.

Its organisation is different according to countries, since each has organised its own educational system giving different priorities to technical and professional teaching, incorporating part time education at very different scales, and defining diploma types and levels in a specific manner, particularly in higher education corresponding to non homogeneous theoretical ages.

Also, the importance of private education is very variable within the various educational systems.

Recent trends

Participation

Participation in education is in most countries about the same level, though the growth rate is declining. The proportion of the population younger than 15 years old, is getting less in most countries. This means that more people receive education during a longer period of their life. Demographic changes in the EC Member States is characterised by a general weakness. Thus throughout the 1980-90 period the growth rate varied from close to zero in Belgium, Denmark and Portugal till 0.5 in France, Luxembourg and The Netherlands. Logically, this lack of demographic vitality is combined with a relative ageing of the population of the Member States. For example, the proportion of the population under 15 years old to the population between 15 and 65 years old in West Germany changed from 27% in 1980 to 21% in 1990, from 34% to 24% in Italy, and from 42% to 30% in Spain. In the USA in 1990 this proportion was 33, in Canada 31 and in Japan 28, which is a more positive perspective. These countries also have a smaller proportion of people in the age group older than 65 years.

The decreasing numbers of potential school entrants in the EC, is obviously a difficult trend which affects all Europe, and in which the less developed countries (particularly in Southern Europe) are reducing their differences with the more developed countries. It has a strong influence on the size of the educated population and on their proportion in the total population. Nevertheless the percentage of school attendance rises. One reason is due to changes in the period of compulsory education. The duration of compulsory education, varying form 8 years in Italy till 12 years full-time in Northern Ireland. In The Netherlands, Belgium and Germany the compulsory period is also 12 years, but the last 1 or 2 years are part-time.

The general trend of changes proposed recently is in the direction of extending the period of compulsory education, by either considering lowering the starting age (Belgium, Luxembourg) or raising the leaving age (Italy). Luxembourg has recently lowered the starting age from 6 years of age to 4 to help immigrant children to integrate better into the education system. Portugal has decided to extend the duration from 6 years old to 9 years old with a view to raising the overall level of education of the population, combating its very high illiteracy rate and enabling a greater number of young people to enter higher education. In the case of Spain, extending the period of compulsory education reflects both a desire to come into line with the other countries and the need to guarantee all its citizens a genuine complete basic education.

A significant increase in the educated population is caused by a relative diversification of some syllabuses (secondary technical and professional education, tertiary education) in order to take advantage of needs in the job market and technical developments. However, this increase also depends on the increased time that students have to spend (compulsory education) or need to spend in the educational system. This has to do with increased higher education, but also protection

Table 1: Education
Number of students attending school in the entire Community (1)

(in thousands of students)	1975/76	1980/81	1985/86	1989/90	1990/91
Pre-primary	8 685	8 557	8 850	8 759	9 608
Primary	28 374	25 687	22 742	21 750	22 387 (2)
Secondary	32 284	34 554	34 225	32 855	34 067
Higher	5 186 (2)	6 005	7 191	8 276	9 049 (2)
Total (3)	75 374 (2)	75 633	73 633	72 339 (2)	75 870 (2)

(1) Until 1990 figures include only former West-Germany
(2) Provisional or estimated figure
(3) Total includes special education
Source: Eurostat (Working conditions)

Table 2: Education
Share of population attending school as a percentage of the total population (1)

(%)	1981	1986	1990	1991
Belgique/België	25	25	24	24
Danmark	22	21	20	19
BR Deutschland (2)	23	21	19	20
Hellas	20	21	20	20
España	25	26	26	26
France	25	25	25	25
Ireland	28	28	29	29
Italia	23	21	20	19
Luxembourg	16	16	15	N/A
Nederland	27	26	24	24
Portugal	20	21	20	22
United Kingdom	23	22	22	22
EC	24	23	22	22

(1) Including pre-primary and special education
(2) Until 1990 figures include only former West-Germany
Source: Eurostat (Working conditions)

against unemployment and the political desire of many countries to increase the opportunity for as many students as possible to complete their secondary studies.

The most significant point concerns the very large increase in the number of students registered for tertiary education. Over the last 15 years this growth was 60%, whereas the number of students receiving primary education decreased by more than 23% in 1989/1990. The drop in the total school population is almost equal to the difference between the increased number of higher education students and the reduced number of primary students. These two opposing trends work together, with the second in most countries only partly compensating the negative effect of the first.

The general trend of the participation of girls is undoubtedly towards seeing the same ratio in the educational system. However, differences in the proportion in secondary education can be seen as far as vocational training is concerned. In most of the countries, the girls are overrepresented in general education and underrepresented in technical/vocational studies.

Education as a labour market

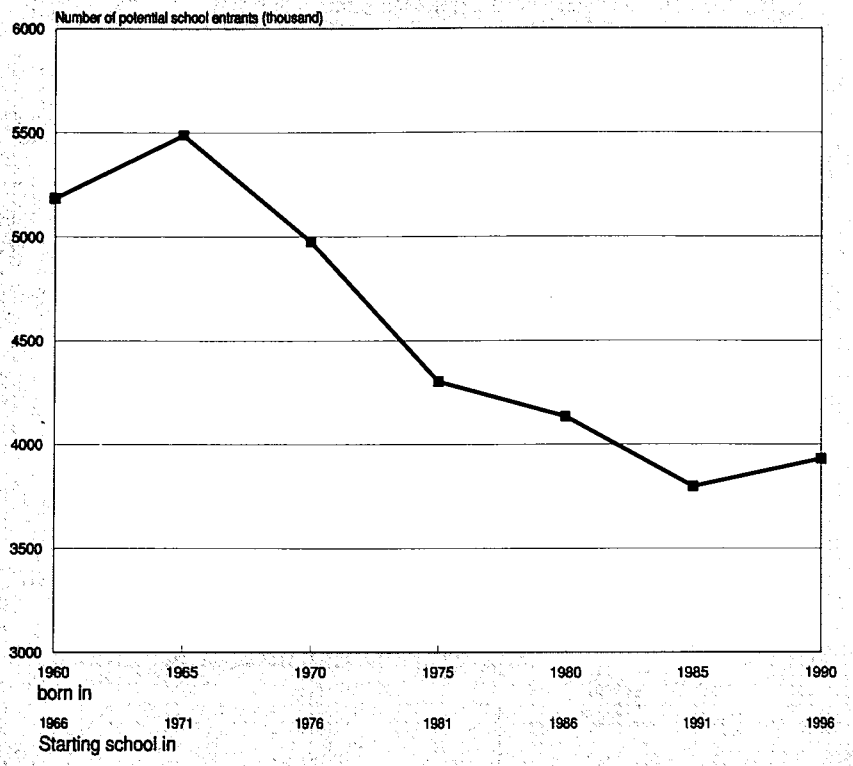
According to the OECD, in the 1987-88 period about four million people were employed in the education sector in the EC (taking into account only primary, secondary and special education and excluding the administrative personnel). About 1.5 million people worked in primary education schools, about 2.4 million in secondary schools and 0.1 million in special schools.

Table 3: Education
Population - Proportion of age groups, 1990

(%)	15 years	15-64 years	65 years
Belgique/België	18.1	67.0	14.9
Danmark	17.0	67.3	15.6
BR Deutschland (1)	15.0	69.7	15.3
Hellas (1)	19.8	66.6	13.7
España	20.0	65.9	13.4
France	21.1	65.9	14.0
Ireland (1)	27.8	61.0	11.3
Italia	16.5	69.1	14.3
Luxembourg	17.4	69.1	13.5
Nederland	17.6	69.2	13.3
Portugal	20.9	65.0	13.2
United Kingdom	19.1	65.4	15.7
EC (1)	18.3	67.3	14.4
Switzerland	17.1	68.4	14.6
USA (1)	21.7	65.8	12.5
Japan (2)	19.5	69.2	11.2
Canada (1)	21.0	67.7	11.3

(1) 1989
(2) 1988
Source: Eurostat (Basic Statistics of the Community, 1992)

Figure 1: Education
Potential school entrants in the EC



Source: Eurostat (Working conditions)

Private education

In Europe, private education, in other words education that is not directly under the authority of the State, is given varying degrees of importance by country as a function of education level and the type of relation with the State, particularly concerning financing.

Thus, the proportion of private education in Belgium and the Netherlands is very high due to the fact that it is entirely covered by public funds. There are also hybrid formulas in which State participation methods vary. The higher the amount paid to private schools financing by the State is, the larger the proportion occupied by private schools in the educational system tends to be.

There are many reasons explaining why the private sector exists and the varying support given to it. These include religious and historic factors or image - related factors along with a possible difference in quality, and special training.

Recently in France an agreement was reached with the Catholic education sector (17% of all pupils), on the recruitment and training of teachers, contributing to more equal educational opportunities, irrespective of the type of school. In Denmark during the last ten years, the number of municipal primary and lower secondary schools has been subject to a drastic decline of 12%. On the other hand, the number of private schools has increased by 22.5%. The greater number of private schools means a reduction in the cost to the public authorities.

The pedagogic environment

A pedagogic reason based on the assumption that teaching efficiency improves when there are fewer students, and a logic reason of adapting to demographic changes, lead the trend towards a relative reduction in the number of students per teacher. Some age groups then benefit from better teaching ratio.

These numbers hide important differences in that they are national averages whereas there are reduced numbers of students per teacher due to population drops in some areas, and at the same time there are sometimes large increases in suburban areas. This urbanisational phenomenon, almost complete in north European (97% urbanisation ratio in Belgium), is continuing in other countries, particularly in the South (for example the urbanisation ratio of 32% in Portugal). It will result in further adjustments in the number of students per teacher, and will be affected by some hysteresis.

PRIMARY SCHOOLS

Apart from Spain, there are no countries where the structure of primary education is being changed. In the curricula the main point of innovation has to do with increasing attention to foreign languages, as it is the case in Greece, France, Spain, Italy and Scotland.

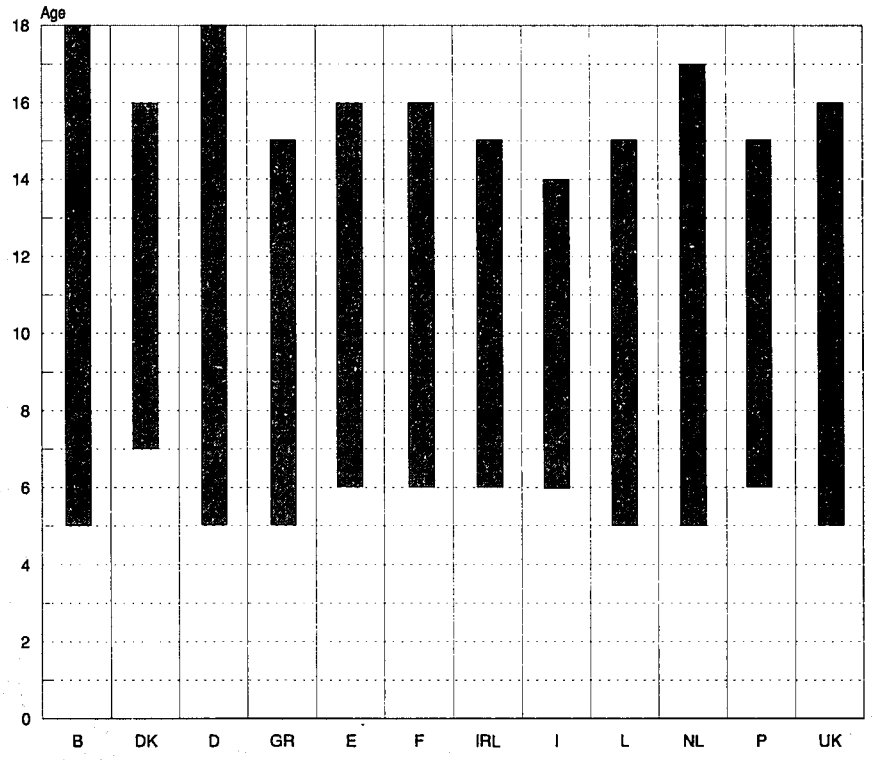
In some of the countries health and environmental education are subject of improvement.

SECONDARY SCHOOLS

This is the sector in which there are the largest differences in teaching among the various countries. These differences are related to teaching matter (general or polyvalent compared with technical or professional), and also to its organisation (full time and part time or apprenticeships). This is also the sector which is subject to attempts to improve effectiveness by changing the organisation of education. Two types of policy measures are to be seen.

The first one concerns specification of several routes that provide access either to university or to advanced vocational training, depending on the branch chosen. This is going on in France, The Netherlands and Spain.

Figure 2: Education
Duration of compulsory education in the European Community



Source: Eurostat (Working conditions)

The second one concerns policies which heterogeneously encourage the introduction of technical and professional components into education and therefore preparation for entry into the labour market.

In many countries growing attention is paid to the low achieving pupils and prevention of early school leaving. In 1991, general or polyvalent full time education (full time in all countries) represented 43% of all education in the second part of secondary education for the entire community. This ratio was 20% for Germany, 86% for Portugal and 63% for France, compared with 72% in Japan and 100% in Canada and USA.

Quantitatively, the senior secondary education across the community provides secondary education representing its concern with professional needs but also showing up differences in selected approaches.

HIGHER EDUCATION

The challenges faced by the European community (trade competition, research and development, demography) have already resulted in a relative drop in the proportion of unqualified labour. This trend will undoubtedly continue.

Higher education continues to be an important focus of current concern. Issues are changing conditions of access, systems of scholarships and bursaries, concern for autonomy and reforms.

In general a clear growth in the number of students in higher education and the number of diplomas can be seen. There are differences among Member States partly due to the initial situation, characterised in the case of Greece, Portugal and Ireland by a relatively low proportion of students. In these cases, there is a catching up effect, and also a political objective of creating the ability to meet the main economic and social challenges.

The proportion of women having received higher education increased from 40.4% in 1975 to 46.4% in 1985 (more than 50% in France and Portugal) therefore approaching the proportion of girls in the 5-24 year old population.

Scientific characteristics of the higher education

Qualitatively, in regard to changes in high level abilities related to new technologies, it is interesting to note the ratio of natural sciences and engineering sciences taught in universities (excluding non-university education which exists in some countries - for example Engineering Schools in France).

The diversity of situations in EC countries is related to two aspects:

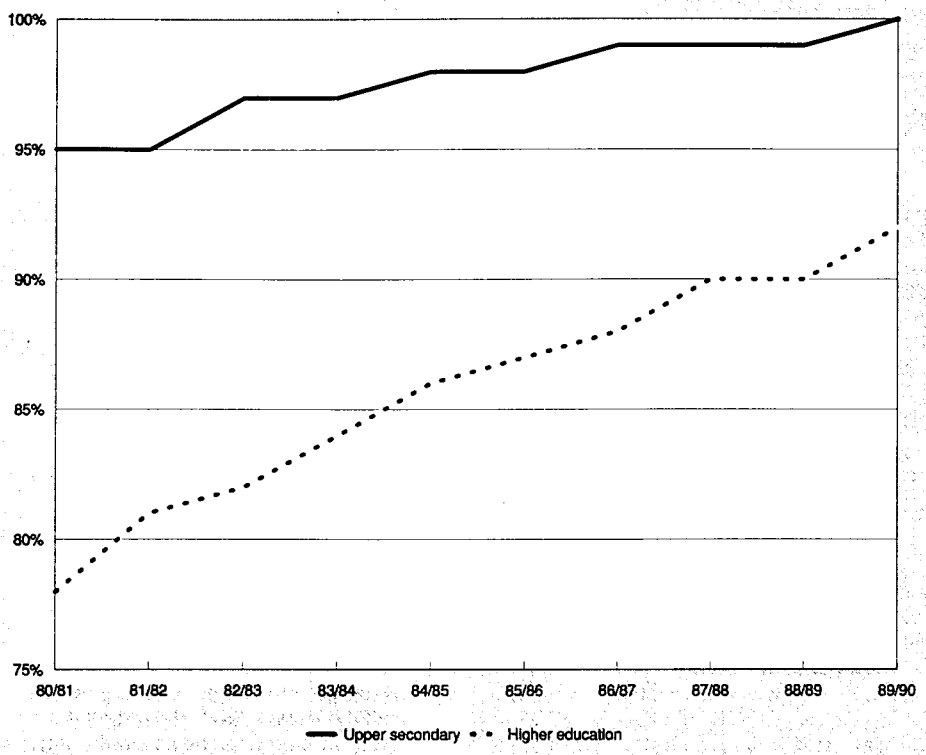
- the historical and cultural aspect which partly explains the ratio that each country assigns to engineering sciences and natural sciences in university education compared with the total number of programs, and the ratio for each of these sciences.
- the socio-economic aspect concerning the importance given to engineers in economic activities: as this increases, the engineering function is better recognised and rewarded; the case of Japan is significant in this respect.

Overseas students

There is a very big difference concerning the presence of foreign students in higher education, both in absolute and relative terms.

There is a very strong correlation in terms of origin, between the representation of some continents and the history of the country (former colonies, common language, which is obvious in the case of France, Belgium, The Netherlands, where the geographic mobility of students is still low, both globally and among countries in the community. In this case, origin is undoubtedly related to:

Figure 3: Education
Girls per 100 boys in full-time education



Source: Eurostat (Working conditions)

- the fairly limited knowledge of the characteristics and possibilities of higher education in other countries;
- the non-existence of a genuine community work market;
- the fear of additional financial costs;
- lack of understanding of the language.

ECONOMIC FACTORS

Education is generally considered as a public consumer item, with a price close to zero and which, in any case, does not reflect the costs to produce it. However, it is sometimes considered as a private consumer item for which the price is fixed freely by schools.

Education is also an investment item since it prepares the future of the individual and the nation.

The two main indicators that are used are the total public expenditures for education per student as a percentage of the GDP, and the total public expenditure for education as a percentage of the total public expenditure.

In general, public teaching expenditures are proportional to the Gross Domestic Product (7.4% for Denmark, 6.5% for The Netherlands, 4.7% for the United Kingdom, 2.8% for Greece). However these major differences are influenced by the catching up trend for less developed countries in which the demographic component has had a real influence on educational expenditures up to the end of the 1980s. Another influence to reckon with, is the change in compulsory education.

Table 4: Education
Participation in education (excluding pre-primary)

(thousands)	75/76	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90
Population aged 5 - 24	98 597	99 382	99 989	98 271	97 606	96 655	95 747	94 664	93 357	91 976	90 731
Pupils and students	65 843	66 247	65 874	65 381	64 861	64 547	64 158	63 656	63 175	63 029	63 017
Participation rate	67	67	66	67	66	67	67	67	68	69	69
Index 1980/81 = 100											
Population aged 5 - 24	99	100	101	99	98	97	96	95	94	93	91
Pupils and students	99	100	99	99	98	97	97	96	95	95	95
1st level	110	100	97	95	92	90	89	88	87	86	85
2nd level	93	100	100	100	100	99	99	98	97	96	95
3rd level	86	100	103	108	113	117	120	122	126	131	138

Source: Eurostat (Rapid Reports - Population and social conditions no. 1, 1992)

Table 5: Education
Change in the number of students per teacher

	Primary			Secondary	
	1980	1988	1989	1980	1988
Belgique/België	18	14	15	10	6
Danmark	12	12	N/A	11	9
BR Deutschland	17	18	18	14	12
Hellas	24	23	N/A	20	16
España	28	25	22	21	21
France	21	19	17	13	14
Ireland	29	27	27	16	16
Italia	16	13	12	11	9
Luxembourg	14	12	13 (1)	12	10
Nederland	23	17	17	15	14
Portugal	18	16	N/A	12	12
United Kingdom	20	20	20	15	14
USA	23	26	N/A	25	20
Japan	25	22	21	17	18
Canada	18	17	16	17	18

(1) 1990
Source: UNESCO 1991 (National report on education)

In general, the table shows a wide dispersion for this indicator, however, this is not surprising considering the difference in the development level of the observed countries. It is interesting to note that the countries with the highest levels in the early 1970s (the United Kingdom, and the United States and Canada on the other part) are precisely those which dropped during the period under consideration. The reverse phenomenon is true for countries with the lowest ratios, particularly Greece and Portugal. It is therefore possible to talk about a catch up phenomenon for the countries lagging behind, itself contributing to convergence of the observed ratios since differences are reduced.

These countries would therefore increase their efforts in the educational field as a function of the economic development level achieved.

It is interesting to consider the differences in expenditures for primary and secondary versus tertiary education. The ratio for public budgets for tertiary education as a proportion of earlier stages is very low in Luxembourg: 3.5% and in Japan 9.5%. In Japan, however, a lot of private money is invested in tertiary education. Looking at these budgets too, the ratio is 25%. High ratios are in The Netherlands: 51% and Canada 53%. Including private funds, the Canadian ratio is even higher: 55%.

Comparison by PPP

The complexity of the education concept and the various perceptions that it covers make economic and qualitative evaluations difficult and inaccurate, and also make comparisons among countries difficult.

In order to compare educational expenditures among countries, some common points are needed: the concept of Purchasing Power Parity (PPP) specific to education, recently developed by the OECD, allows to convert different foreign currencies into a same unit by taking into account the relative purchasing power of different currencies. Using this method, the relative

Table 6: Education
Student population in upper secondary education, 1991

	General (thousands)	Share (%)	Technical/ Professional (thousands)	Share (%)	Total (thousands)
Belgique/België	213.5	36.8	366.4	63.2	579.9
Danmark	74.3	33.5	147.8	66.5	222.1
BR Deutschland (1)	569.4	19.7	2 318.4	80.3	2 887.8
Hellas	274.9	67.5	132.6	32.5	407.5
España	1 589.8	55.2	1 290.8	44.8	2 880.6
France	1 571.0	62.9	926.0	37.1	2 497.0
Ireland	120.4	75.0	40.1	25.0	160.5
Italia	733.4	25.7	2 122.9	74.3	2 856.3
Luxembourg	N/A	N/A	N/A	N/A	N/A
Nederland	239.5	32.0	508.7	68.0	748.2
Portugal	276.6	86.1	44.8	13.9	321.4
United Kingdom	1 883.2	48.1	2 034.2	51.9	3 917.4
EC (2)	7 546.0	43.2	9 932.7	56.8	17 478.7

(1) Figures include new Länder
(2) Excluding Luxembourg
Source: Eurostat (Working conditions)

Table 7: Education
Number of higher education students per 100 000 inhabitants

	1981	1986	1990	1991
Belgique/België	2 174	2 511	2 724	2 766
Danmark	2 069	2 267	2 624	2 778
BR Deutschland (1)	1 984	2 540	2 744	2 569
Hellas	1 248	1 829	1 935	1 929
España	1 855	2 421	2 995	3 134
France	2 177	2 455	2 813	2 986
Ireland	1 602	1 977	2 428	2 566
Italia	1 994	2 084	2 385	2 515
Luxembourg	N/A	N/A	N/A	N/A
Nederland	2 562	2 794	2 941	3 190
Portugal	917	1 001	1 267	1 884
United Kingdom	1 470	1 822	2 056	2 187
EC (2)	1 885	2 231	2 531	2 623

(1) Until 1990 figures include only former West-Germany
(2) Excluding Luxembourg
Source: Eurostat (Working conditions)

effects of educational expenditures and their changes may be analysed more precisely.

The first indicator shows a difference between less developed countries in the EC and the more economically advanced countries, although the difference between these two groups tended to reduce between 1970 and 1988. The fundamental reasons are unchanged - demographic changes and efforts made to reduce the differential by countries such as Portugal which increased by 100% between 1973 and 1988. Greece only maintains its level 50% relative to the Netherlands. This indicator has been fairly stable in other countries, except the United Kingdom which experienced a major drop, representing the relative disengagement of the government of this country from financing education in general, almost since the middle of the 1980s.

It also appears -taking account of the Purchasing Power Parity method- that a fairly constant relation has been maintained in recent years between public expenditures per student and the GDP per capita.

The second indicator shows another approach to public educational expenditures. The trend of the European countries studied is almost always downward, which would no doubt be a concern if part of this trend were not due to the influence of a relative reduction in the educated population.

EC countries classified as less developed generally have lower values than the other Member States or than the USA and Canada. This also confirms the fact that educational expenditures are a function not only for the development level, but also of priorities and choices defined by governments. The case of West Germany is undoubtedly partly a result of demographic changes and of efforts made in education in the 1960s. Convergence of this indicator over the same observation period (1970-1988) is a result of lower values recorded for all countries. This variation is also due to a less important relative increase in educational expenditures relative to other items in national budgets. Considering demographic changes in the EC countries and the ratio of 18 to 25 years old within the total population, it is interesting to note the attitude of the various governments towards higher education. This comment is particularly important because of the fact that European institutions are strongly encouraging the development of higher education and the mobility of European students by the implementation of EC programs.

Three trends have developed over a long period (1970 - 1988): the trend characterised by Portugal which made a major effort

Table 8: Education
Higher education diplomas

	1988/89	1989/90
Belgique/België	51 803	55 897
Danmark	19 413	20 329
BR Deutschland	246 448	250 329
Hellas	26 076	28 504
España	121 004	126 779
France	390 804	442 926
Ireland	17 778	20 544
Italia	103 110	107 024
Luxembourg	N/A	N/A
Nederland	64 422	62 354
Portugal	11 034	N/A
United Kingdom	322 425	347 226
EC	1 374 317	N/A

Source: Eurostat (Working conditions)

in its higher education and with an average ratio over this period of 11.4%, the trend in Ireland, Greece and Italy where the ratios were between 5.5% and 7.3%, and finally the one typical of other countries with ratios of between 1.5% and 2.1% which appears to characterise an apparent maturity of financial efforts made for this level of education.

In as much as higher education is increasing in all countries studied, this would appear to mean that -still using the Purchasing Power Parity method- it is difficult to place real expenditures in a genuine continuum; there are signs of individual efforts (major infrastructure or education projects) succeeded by periods of stability. Faced with the importance of the challenges to countries, it may be important to consider the public financial effect dedicated to higher education within a long term view essential to its effectiveness. Unfortunately, measurements of this effectiveness can often only be made based on economic and social results observed several years after the expenditures were made.

EC POLICIES AND FINANCING

The developed world is inexorably advancing into a society where everyone seeking secure employment will require a

Table 9: Education
Relative importance of engineering and natural sciences (begining of the 80's)

(in % of students)	Proportion of engineering courses in universities	Proportion of natural sciences in universities	Total	Proportion of engineers in the total workforce (in %) (1)
Belgique/België	11.4	10.3	21.6	2.0
Danmark	20.1	9.8	29.9	1.4
BR Deutschland	14.1	18.1	32.2	2.2
Hellas	16.1	15.1	31.2	N/A
España	10.5	11.5	22.0	N/A
France	7.1	12.9	18.7	1.2
Ireland	17.1	14.3	31.4	N/A
Italia	18.3	12.9	31.2	0.4
Nederland	16.3	12.0	28.3	1.8
Portugal	18.5	7.0	25.5	N/A
United Kingdom	16.7	22.8	39.3	1.0
EC (2)	15.0	13.0	28.0	1.4
USA	5.9	11.6	17.5	1.4
Japan	21.6	3.2	24.8	2.5

(1) Regardless of the source: universities, schools (University level)
(2) Excluding Luxembourg
Source: IRDAC, Qualification deficit in Europe

qualification, where activities which in the past did not require special skills or knowledge now require such, and where the unqualified will largely be excluded from the labour market. The Community has taken into account these radical changes as well as the special needs of the post-1992 workforce when it decided on a number of strategic policy actions and programs.

In this context, the Community has implemented a number of programs to stimulate and encourage the provision of education and training and to improve its quality. The activities include support for joint European production of learning materials and learning technology solutions, exchanges of information and experience and encouraging mobility of learners and knowledge.

Up to now, community education and training measures have proved very successful. This year they have enabled around 100 000 students to take part in exchanges involving more than half of the universities and other institutions of higher education in the Community.

The major EC industrial training programs are:

- COMETT, which assists with the development of transnational education by cooperation between companies (particularly small and medium-sized companies) and universities in industrial and technological fields. COMETT aims to exploit, in particular, the continental dimensions of the Internal Market, plus EFTA, in an area characterised by increasing economies of scale, particularly via transnational, sectoral and regional networks and training projects. The program has so far financed 7 000 training courses, involving 150 000 persons, 10 000 firms, 2 400 universities and 4 000 other organisations. In 1993, 205 university busi-

Table 10: Education
Foreign students in community higher education, 1990/91

	Number of students	In % of all students	EC students in % of the total number of foreign students
Belgique/België	27 387	10	45 (1)
Danmark	6 728	5	13 (1)
BR Deutschland	107 005	6	23
Hellas (2)	1 456	1	8
España	10 268	1	31 (1)
France	161 108	9	16
Ireland	3 282	5	46
Italia (3)	21 788	2	40
Luxembourg	N/A	N/A	N/A
Nederland	8 876	2	40
Portugal	5 835	4	14 (1)
United Kingdom	88 900	8	30
EC (4)	442 633	5	25

(1) Data refer to 1989/90
(2) All data refer 1989/90
(3) Data cover universities only
(4) Excluding Luxembourg
Source: Eurostat (Working conditions)

Table 11: Education
Educational expenditure

(%)	Share of GNP			Share of public expenditure		
	1980	1985	1989	1980	1985	1989
Belgique/België	6.1	6.2	5.2	16	15.2	N/A
Danmark	6.9	7.2	7.4	9.5	N/A	13.0
BR Deutschland	4.7	4.5	4.1	9.5	9.2	8.8
Hellas	2.2 (1)	2.9	2.8 (3)	8.4 (1)	7.5	5.6 (3)
España	2.6 (1)	3.3	4.8	16.4 (1)	14.1	N/A
France	5.0	5.8	5.4	N/A	N/A	N/A
Ireland	6.6	6.7	6.6 (3)	N/A	8.9	8.4 (3)
Italia	6.6	5.0	N/A	N/A	8.3	N/A
Luxembourg	6.1	4.0 (2)	4.4	14.9	15.7	N/A
Nederland	7.9	6.8	6.5	N/A	N/A	N/A
Portugal	4.4	4.6	4.9	N/A	N/A	N/A
United Kingdom	5.6	4.9	4.7 (3)	13.9	N/A	N/A
Suisse	5.0	4.8	4.8	18.8	18.6	18.7
USA	6.7	5.0	5.3	N/A	15.5	12.4
Japan	5.8	5.0	4.7 (3)	19.6	17.9	16.2 (3)
Canada	7.4	7.1	7.1	17.3	12.7	15.3

(1) 1979
(2) 1986
(3) 1988
Source: UNESCO (Statistical yearbook 1992, Paris 1992)

ness associations are currently helping to forge extensive links between industry and universities.

- ERASMUS, contributing to increased mobility of students receiving higher education with recognition of study credits within the Community, and cooperation between universities (university cooperation programs, the implementation of the "ECTS" (European Capitalisable Credit Transfer System" experiment with a 1990-1992 budget of 192 million ECU. In 1993, more than 70 000 students are allowed to study in another country than their own.
- LINGUA, designed for the promotion of foreign languages through teachers and relations between students: 200 million ECU for the 1990-1994 period.
- EUROTECNET is an innovation promotion program within the professional training field, taking account of technological transfers and their consequences on employment, work and qualifications. It contributes to the development of new abilities and qualifications. EC support was 7.5 million ECU for 1990-1993.
- FORCE, which provides incentives for institutions and enterprises in the Member States to invest in continuing vocational training and the promotion of wider access to training and development of transnational measures at the EC level. It is organised to work interactively with the objectives and actions carried out by ESF (European Social Fund), the EUROTECNET and COMETT programs, IRIS

Table 12: Education
Shares of public expenditure on education by school level, 1988

(%)	Primary + secondary	Tertiary	Undistributed
Belgique/België	73.5	14.9	11.6
Danmark	70.2	29.8	0.0
BR Deutschland	64.4	22.3	13.4
Hellas	N/A	N/A	N/A
España	84.7	14.0	1.3
France	73.5	13.6	12.9
Ireland	78.2	19.4	2.4
Italia	73.8	14.8	11.5
Luxembourg	86.1	3.5	10.3
Nederland	55.7	28.8	15.5
Portugal	79.7	17.3	3.0
United Kingdom	74.1	19.2	6.6
Switzerland	80.1	19.8	0.0
USA	73.2	26.8	0.0
Japan	79.7	9.5	10.8
Canada	65.2	32.7	2.7

Source: OECD Indicators

Table 13: Education
Total public expenditures for education per student (1)

(%)	1980	1981	1982	1983	1984	1985	1986	1987	1988
Belgique/België	N/A	N/A	N/A	25.0	24.4	25.0	25.0	24.1	N/A
Danmark	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BR Deutschland	20.4	20.7	20.0	20.4	19.7	20.0	20.1	20.2	N/A
Hellas	16.1	16.8	10.3	18.0	18.6	19.5	18.6	18.6	16.8
España	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
France	21.0	22.8	23.4	23.7	23.6	23.8	23.7	23.5	22.7
Ireland	24.2	24.8	22.9	23.4	22.3	22.1	23.1	22.8	N/A
Italia	20.2	21.1	21.6	22.2	23.9	23.9	24.7	N/A	N/A
Luxembourg	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nederland	29.2	30.4	30.9	30.6	29.1	29.5	31.1	32.8	N/A
Portugal	18.1	10.8	18.2	18.7	18.4	18.4	19.7	19.4	N/A
United Kingdom	28.3	28.2	27.8	27.3	26.6	21.9	22.9	22.6	N/A
USA	20.8	20.5	21.4	21.3	20.7	21.2	22.2	22.3	N/A
Japan	26.0	24.1	23.2	22.9	22.1	21.4	21.6	21.1	20.7
Canada	32.3	32.6	33.7	32.6	31.4	30.5	31.1	30.7	30.3

(1) As a percentage of GDP per capita, taking into account of purchasing power parities
Source: OECD (Education expenditures, cost and financing trench analysis, 1970 - 1988)

networks. Some 24 million ECU were allocated for 1990-1991, plus 61 million ECU from the ESF.

- EURYDICE, an information network about education within the EC for which the public consists of responsible national, regional and local authorities.
- YOUTH FOR PEOPLE which facilitates student exchanges.
- YOUNG WORKER EXCHANGES (18 to 28 years old), designed to complement and enrich their professional training in other Community countries.
- IRIS, European youth training program network.
- PETRA, an action program for training and the preparation of young persons for adult and professional life (transnational partnership projects, youth initiation projects). This program had a financial budget over 40 million ECU for the 1987-1992 period. It enables 900 young people per year to incorporate a European dimension into their apprenticeships.
- DELTA (Telematic Systems for Flexible and Distance learning) is a strategic R&D programme, part of the series of programmes "Telematic systems in Areas of General Interest" funded by the EC under the Third Framework Programme. The aim of the programme is to support the design and implementation of new telematic systems and services that will improve education and training provisions in Europe by making them more efficient, more widely available and able to meet the needs of individuals and industry. This phase of the DELTA programme began in 1992 and will run until January 1st 1995. The overall budget is 62 million ECU. Some 200 organisations (39% of which are SMEs) are active in DELTA projects. The DELTA budget funds a total of 30 R&D projects and 10 "Concerted Actions" (these are separate horizontal actions in areas such as language learning and the economics of distance learning.

OUTLOOK

The above information and comments raise a number of questions about future developments in this sector.

The first development initiated throughout the Community concerns developments in higher education. In this respect, it is worth mentioning the obligation of European education systems to:

- increase the proportion assigned to scientific and technical programs in order to satisfy the needs of senior technicians and engineers in the various economic sectors;
- increase relations between these economic sectors by making more use of engineers and research workers form industry in education or by increasing common projects;
- search for more harmonisation projects between universities and countries, while maintaining individuality, on syllabuses and teaching programs in order to improve collective vitality.

Some progress has already been made in these various fields, and this must not be only increased and consolidated, but also made better known and shared; the various EC projects contribute towards this.

The second development concerns globally improving the efficiency of education systems.

It is obvious that this efficiency may be measured individually by granting diplomas; in reality its effect as investment will be felt throughout the subsequent career.

A major effort must be undertaken concerning these two dimensions in order to integrate all education techniques as far as possible (remote education, interactive computer assisted education..), to allow teachers to concentrate more on their main objective that is to take the necessary steps to ensure that future workers learn how to learn and make a self-training effort that will stand them in good stead for self adaptation throughout their professional careers.

In regard to the above point, and taking into account the actual difficulties generated by viscosity in the educational system related to the labour market and resulting in about 15 million unemployed in 1990 (annual average), there is a more and more urgent need to make efforts in two directions. For the young, methods of reinserting them into school activities (giving the opportunity to approach, or to be comparable with those that have been able to follow standard syllabuses), or to include them in training programs to make them operational and satisfy the needs of various economic sectors. Major efforts have been made, frequently encouraged by the necessity to cope with practical situations and with a

Table 14: Education
Total public expenditures for education as percentage of total public expenditures

(%)	1980	1981	1982	1983	1984	1985	1986	1987	1988
Belgique/België	11.4	10.8	10.8	10.4	10.3	10.4	10.1	9.7	9.6
Danmark	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BR Deutschland	9.7	9.6	9.3	9.1	8.6	0.6	8.6	8.4	N/A
Hellas	9.4	8.6	9.0	8.8	9.0	9.2	8.6	8.2	7.4
España	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
France	11.0	11.4	11.4	11.2	11.1	11.0	10.9	10.7	10.6
Ireland	12.6	12.9	11.0	11.0	11.1	10.8	11.2	11.8	N/A
Italia	10.5	10.4	10.0	9.8	10.3	9.0	9.7	N/A	N/A
Luxembourg	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nederland	13.4	12.8	12.1	11.6	10.9	11.0	11.1	11.4	N/A
Portugal	15.8	9.7	9.8	8.8	9.1	9.2	9.3	N/A	N/A
United Kingdom	12.5	11.7	11.5	11.2	10.9	10.7	11.1	11.6	N/A
USA	14.1	13.6	13.0	12.7	12.7	12.6	12.9	13.0	N/A
Japan	17.7	16.0	5.3	14.9	14.7	14.5	13.9	13.6	13.4
Canada	17.7	17.4	16.3	15.7	15.2	14.7	15.2	15.2	15.3

Source: OECD (Education expenditures, cost and financing trench analysis, 1970 - 1988)

real concern for foresight. For other job seekers who have already had a professional activity, experience has shown that reconversion problems are better solved when they are anticipated.

The example of a number of companies who have implemented reconversion operations (possibly leading to diplomas), sometimes months or years before a reduction in the workforce materialises, demonstrates the benefits of formulas which undoubtedly require public assistance, but also a confirmation of their will and commitment.

Finally, we should emphasise the influence, which will increase in the future years, of the arrival into the secondary educational systems of the smaller numbers of students currently in the primary educational system. The question of a reorganisation or redeployment of infrastructures and teaching facilities, and in terms of numbers and abilities of teachers, has already arisen in some countries and will arise in others. It is a controlling factor in the ability of all education systems to efficiently manage the situation with respect to the qualitative an quantitative development of higher education. In short, capital education resources and teachers must be provided to match these needs as well as possible, reducing differences among EC countries in order to optimise competitiveness and social harmony within the EC.

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Health care services
NACE 95B1, 95C1

Health care expenditure amounted to 390 billion ECU in the EC in 1991. The industry provides employment to approximately 6.9 million people. Health care expenditure in the EC countries has increased dramatically. This fact together with the overall economic slowdown has resulted in incisive cost containment programmes being implemented throughout the EC. Governments face the challenge of increasing services, without reducing quality, and containing costs at the same time. In order to achieve this, new management techniques as well as effective policies must be implemented in the next few years. The 12 EC Member States have different health care systems with specific idiosyncrasies. In some cases common cost containment measures or solutions to problems are applicable to all Member States, but in other cases nationally tailored measures and actions should be undertaken.
During the 1990s, emphasis will be placed on transferring part of the institutional sector budget to the more cost effective home care and community care sector. In some Member States, there is still a need for substantial investment in health care. Even in the countries with the best developed health care systems, additional money will be required to provide for services in areas where the system has always been lacking, e.g. full reimbursement of medical supplies for the chronically ill.

INDUSTRY PROFILE

Description of the sector

Health care services include a wide variety of services such as: hospitals and clinics, registered nursing homes, special treatment centres, polyclinics, first-aid centres, health centres, dentists, paramedical centres, home medical supplies and nursing services, mobile medical equipment services, leased nursing care services, primary care provided by general practitioners, specialist medical and surgical cabinets, psychiatric institutions, rehabilitation services, community nurses, chemists, drug stores, pharmacies and parapharma medical supplies services, etceteras.

Because health care and social care services often overlap, it is difficult to draw a line between both. This also poses a major problem when it comes to assessing health care expenditure. This is the reason why health care expenditure data often differ from one official source to another.

Private hospitals account for an important percentage of institutional care services in most EC countries. Many had their roots as charitable hospitals, found by religious bodies, when the institutional system was in its infancy. Today many of them are included in national health systems.

Private commercial enterprises are newer to the system and provide additional hospital, clinic, day centre, and nursing home facilities (in the United Kingdom almost entirely private); they are mainly a result of developments in health insurance paid to private sickness funds or commercial insurance companies. In most European community countries they are an important part of the health care system, which would be unable to cope without them. In Italy private hospitals are an important part of the hospital system working under convention (law 833/78) within the national health service (SSN).

The home-care and primary care sector is new in its present form. Home-care probably existed before hospitals. Family doctor practices, which provided almost all primary care in the 1960s, are being replaced by health centres. There is also an important trend of specialised physicians leaving the institutional environment and opening practices in the community.

Day hospital care, enabling the patient to be sent home after a minor operation, is slowly spreading in the EC. More recently, some public hospitals in France have expressed interest in working with hotel groups. These would provide facilities next to hospital complexes to cater for aftercare of patients who have undergone minimally invasive surgery such as laparoscopic surgery.

Institutions which provide care for chronically ill patients and the elderly have had a sharp increase, corresponding to rising needs of an ageing population.

This monograph will concentrate the analysis mostly on private hospitals.

Recent trends

The main sources of revenue for the sector are national public health insurance plans and private health insurance contribu-

Table 1: Health care services
Employment, 1991 (1)

(thousands)	Total	Males	Females	Employees	Non-employees	Full-time	Part-time	Permanent-employees	Temporary-employees
Belgique/België	225.0	71.5	153.4	166.0	59.0	166.5	58.5	156.9	9.1
Danmark	167.5	32.4	135.1	156.2	11.2	109.2	58.3	129.5	26.8
BR Deutschland	1 667.9	403.8	1 264.1	1 481.0	186.8	1 249.9	418.0	1 241.6	211.2
Hellas	123.7	52.5	71.2	105.2	18.5	121.4	2.3	99.5	5.7
España	466.7	153.0	313.7	441.4	24.2	450.8	15.9	342.2	99.3
France	1 310.2	371.0	939.2	1 079.4	230.8	1 093.0	217.2	943.5	126.4
Ireland	72.1	18.3	53.7	67.3	4.8	60.9	11.2	57.7	9.5
Italia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Luxembourg	6.4	1.7	4.7	5.6	0.8	5.4	0.9	5.3	0.2
Nederland	508.9	141.7	367.1	461.8	47.1	261.5	246.7	424.9	36.9
Portugal	129.4	37.4	92.0	123.2	6.2	126.9	2.5	110.0	13.2
United Kingdom	1 428.7	300.4	1 128.3	1 332.2	93.2	840.7	581.5	1 264.4	63.1
EC (2)	6 106.5	1 583.7	4 522.5	5 419.3	682.6	4 486.2	1 613.0	4 775.5	601.4

(1) Includes medical and other health service; veterinary services
(2) Excluding Italy
Source: Eurostat (Labour force survey)

Table 2: Health care services
Expenditure, 1991

	Expenditure (1) (billion ECU)	Per capita (ECU)
Belgique/België	11.1	1 116
Danmark	5.7	1 113
BR Deutschland	128.9	1 640
Hellas	2.9	289
España	20.1	517
France (2)	85.1	1 484
Ireland	2.2	625
Italia (2)	51.2	908
Luxembourg	0.4	1 053
Nederland	17.3	1 165
Portugal	2.9	281
United Kingdom	53.2	924
EC	389.2	1 141
Japan	150.0	1 219
USA	470.0	1 900

(1) Estimates
(2) 1992 figures
Source: OECD estimates, CEHP

tions. Organisation of the former is very disparate across the EC. Public health funds are collected through sickness fund agencies (e.g. ziekenfondsen and mutuelles), national insurance contributions or by taxation. Private health insurances are paid by people who opt for additional or alternative coverage to national health provision.

Other sources of revenue are non-reimbursable contributions, made by patients directly to care providers or drug and medical supplies dispensaries. These payments amount to a substantial sum, and often are not accounted in estimations of health care expenditure. In some countries it is not necessary to make payments for most health services whereas in other payments must be made by the patients or their relatives and then reclaimed through sickness funds.

Private health insurances work in a similar way. Sometimes there are agreements between private and publicly owned hospitals to settle accounts directly, and in other instances the patient must pay directly and then claim from a private insurance body retrospectively.

There is still a long way to go before some categories of European society receive fair treatment. This applies to the chronically ill such as diabetics, ostomates, and incontinent people. Diabetes, the major chronic disease, is often poorly diagnosed according to health experts due to inadequate screening. Recently many national screening programmes have incorporated blood glucose monitoring. However, the majority of insulin dependent diabetics in the EC do not receive full reimbursement for all of the supplies they use, while other chronically ill people, get the whole or majority of the cost paid by the health care system.

Clearly the very high cost of health care has prevented some authorities from providing full support. The United Kingdom has one of the best programmes for people with chronic health and hygiene problems in terms of allowing them access to necessary supplies free of charge. Some sickness fund based health care systems act poorly in this area, e.g. those of Belgium and Germany.

Health care expenditure in total figures and per capita are highest in Germany, followed by France. Small countries such as Belgium, Denmark and the Netherlands have high per capital expenditure: 1 116, 1 113 and 1 165 ECU respectively. Health care expenditure in the EC has been growing at a rapid rate in the 1980s and early 1990s. In 1991 total health care expenditure increased by 14%.

International comparison

EC health care total expenditure reached in 1991, 389.3 billion ECU, well above Japan (150 billion ECU) and under the USA (470 billion ECU). Nevertheless, in 1991 per capita expenditure in the EC was lower than in Japan and the USA. Exchange rates affected the comparison, however. Expenditures per GDP are also not particularly good indicators of the state of nations' health care programmes, but can be used to show how health care expenditure is developing. In 1991 EC health care services provided more jobs, close to 7 million (see Table 7), than the United States and Japanese health care systems. In 1989 the EC and USA had an equal level of employment, slightly over 6 million people.

Ironically, the better health care systems become at treating people affected by life threatening illnesses, the more often these people will go through the system. In the 1950s for instance, when many health care systems were at an early stage of development, patients with heart disease, cancer, chronic kidney failure, and diabetes often died early. In the 1990s they can be successfully treated and sometimes cured. The health care system has thus tended to become more expensive, and more difficult to fund. Moreover, as more new treatments become available, some requiring high cost technology, a greater demand for medical care is created, and this adds to the problem of spiralling costs.

Table 3: Health care services
Heath care expenditure in current prices

(billion ECU)	1980	1985	1986	1987	1988	1989	1990	1991
Belgique/België	5.7	7.7	8.4	9.0	9.5	10.1	10.8	11.1
Danmark	3.3	4.0	5.0	5.3	5.4	5.6	5.7	5.7
BR Deutschland	45.7	69.5	75.9	81.2	84.5	87.9	94.1	128.9
Hellas	1.3	2.2	2.1	2.1	2.3	2.4	2.8	2.9
España	8.4	12.9	13.7	14.3	16.2	17.8	18.3	20.1
France	36.2	58.7	63.0	64.7	66.3	70.2	75.0	79.8
Ireland	1.1	1.7	1.9	1.9	1.9	1.9	2.0	2.2
Italia	21.2	37.7	41.0	46.5	50.6	57.5	63.0	64.7
Luxembourg	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4
Nederland	10.2	13.9	14.9	15.6	16.6	16.6	17.1	17.3
Portugal	1.1	1.9	2.0	2.0	2.2	2.5	2.8	2.9
United Kingdom	21.6	35.1	33.9	35.4	45.1	48.6	48.8	53.2
EC	157.8	246.5	262.2	278.6	300.6	321.5	341.0	389.2

Source: OECD estimates

Table 4: Health care services
Number of beds per general hospital, 1991

	Public	Private
Belgique/België	200	203
Hellas (1)	175	58
France	223	73
Ireland	132	100
Italia (2)	286	104
United Kingdom	168	51 (3)

(1) 1989
(2) 1990
(3) 1992
Source: CEHP

However, even with these improvements a large group of people still fail to get full treatment. This is another important measurement of health care quality. Apparently, a minority of people fail to obtain treatment in some health and social security systems because of their financial condition. Whereas most people receive excellent care, some minorities get virtually none. This applies both to Europe and to the USA.

Foreign trade

It is difficult to assess extra- and intra-EC exports of health care services, i.e. facilities for the benefit of non-residents, when they pay for this out of their own purse. The export of health care services payable by social security organisations within the EC is limited by Community regulations. It includes migrants and patients located near borders, emergency care during international transits (E111), and where treatment is authorised by the patient's own social security organisation (E112) because it is not available locally. Some centres of excellence rely upon patients travelling internationally to be able to maintain continuous specialty services or further develop pioneering work.

Private clinics provide services for residents of many extra-EC countries. These are either covered by international agreements or individual financing. Often they are related to historic relationships, especially with ex-colonies. Examples include Algerians and Moroccans treated in France, Libyans in Italy, and Latin Americans in Spain. These patients seek particularly the services of highly specialised private clinics that offer superior treatments to those found in hospitals in their own countries. Usually they are affluent members of society in those countries.

MARKET FORCES

Demand

Demand for continued improvements in health services, mainly by health care professionals, is one major reason for cost increases in health care in every country within the EC. This has resulted in improved quality of life and an increased life expectancy of individuals living in the EC, which is the system's main aim.

Health care in the 1990s often makes routine use of technologies unimaginable only two decades ago, and could not have been achieved without sending costs spiralling up. Other factors contributing to growth in health expenditure are multiple. Some important ones are: the public seeking more health services from the system, the development of new services including screening programmes, the development of professional personnel in the sector, increasing capital investments, and increasing costs of better treatments and medical supplies.

In some countries commercial enterprises are encouraged to participate in the provision of all aspects of health care (France, Spain, Germany, Greece, and more recently, the United Kingdom and Ireland). In other they are prevented by law or de facto from hospital ownership, (Belgium, Luxembourg, and the Netherlands). In the remaining countries (Denmark, Portugal and Italy) commercial clinics have to compete in environments where the major emphasis is on developing national health care through the establishment of publicly owned hospitals.

Private hospital chains probably consider the obvious barriers against them in some countries to be unfair, and not in the spirit of the single European market. Since state monopolies are being dismantled elsewhere the private professional hospitals could consider that they are being unfairly discriminated against.

The control of quality should be instituted by legislation, which is the direction currently being taken in most countries to ensure good practice. Throughout the 1990s the legal profession has increased its participation in discussions and conferences on this subjects. Health authorities are having to dismantle some protection they have built up for hospital staff, and make them accountable for all of their actions. In the United Kingdom, Crown protection of the national health service (NHS) is no longer in force; formerly no patient in the United Kingdom could sue the NHS.

Cost containment of health care in Germany was attempted in 1987 when the Bundesrat passed a law forbidding hospitals to have retrospective calculated claims for medical acts. It was thought by many observers that several less efficient hospitals would go out of business after this act. However, most were saved because of oil prices falling. This had the consequence of reducing heating bills, which is an important part of hospital expenditure for hospitals in the northern part of Europe. Many German hospitals still rely heavily on making profits on the sums they get for convalescence following surgery. Even patients that have undergone only minimally invasive surgery are kept more than eight days following surgery in most German hospitals, in stark contrast to other countries where patients that are treated using the same technique are sent home after two or three days.

Developments in the United Kingdom are currently providing important opportunities for private enterprises. After many years strongly supporting centrally controlled publicly owned facilities, the conservative government has opted for a decentralised system. It aims at achieving greater efficiency by allowing market forces to find some more efficient organisation, and do away with nugatory practices of the civil service based system. Hospitals that can fulfil certain conditions, which prove they can be self-governing, have the option of becoming trusts within the NHS.

Already more than 150 hospitals and other services have become NHS Trusts, and many primary health centres are now fund budget holders on a per capita basis. Services remain available to all, paid for mainly out of general taxation and mostly free at the point of use. Local health authorities are now purchasers of services and hospitals public or private are providers.

NHS Trust hospitals have the power to make all of their own managerial and financial decisions, and must compete for business against other hospitals, although central government is still setting targets for patient waiting lists and national returns on the capital employed. Units providing high quality, value for money, services will be more successful in attracting contracts and funds to provide services to patients. They may even choose to make subcontracts for some services. If a service offered by private initiative is less costly than the equivalent national health services facility it would be selected. Patients would be transferred from the later to the former by the budget holder, or by the NHS Trust hospitals' managers.

Supply and competition

There are very few recent EC figures on health care services. Nevertheless, more data are available for some sectors such as hospitals.

In all of the analysed countries, except Belgium, public general hospitals had a larger number of beds than private general hospitals. This is normal because private hospitals tend to specialise in short stay patients, which provide higher profitability. Italy has the largest public general hospitals and Belgium the largest private general hospitals, of the analysed countries.

Average length of stay of EC patients in general hospitals varies widely. In the general hospitals in Belgium the average length of stay was 10.39 days in 1991. On the other hand in public general hospitals in the United Kingdom, average stay was only 6.10 days in 1990/91. Attendance rate to general hospitals, was much more similar in the analysed countries, around 80%, with the exception of Italy's public general hospitals which had a very low attendance rate, 66.96% (see Table 5).

In 1991 the 12 EC health care systems employed a total of 935 000 physicians. Germany (including former East Germany) is the country with the highest number, 280 000 in 1991, followed by France and Spain with 150 000 each.

The total number of nurses and midwives in 1991 in the EC reached 1 927 300. Most nurses and midwives worked in Germany (including former East Germany) (490 000), the United Kingdom (425 000) and France (335 000)

The number of dentists in the EC, 166 300 in 1991, was higher than in Japan or the USA. Germany (including former East Germany) had 55 000 dentists followed by France and the United Kingdom with 38 500 and 20 500 respectively (see table 7).

In early 1993 there were 107 340 pharmacies in the EC, based on a survey of the Pharmaceutical Group of the European Community. France houses the largest number of pharmacies in the EC, 22 325, followed by Germany with 20 296. The total number of Community pharmacists in early 1993 reached 187 510. Again France had the most pharmacists, 43 221, followed by Germany with 40 480 (see Table 9).

In early 1993 the total number of optometrists and opticians in the EC reached 49 426 (according to figures of the European Council of Optometry and Optics). The United Kingdom and Germany had the highest number: 10 544 and 10 500 respectively.

INDUSTRY STRUCTURE

Companies

There are currently more than three thousand owners of commercial enterprise health care services. Most have been formed by small groups of medical professionals. In Italy there are almost 700 owners (natural and juridical persons) of commercial enterprise health care services. However, bigger investors are getting involved. The earliest were health insurance companies, but now they include all types of companies, from venture capital groups to water companies. Several private hospital chains have been established within the EC that are run by financial groups, which draw funds from finance centres or insurance companies.

The largest EC private health care group is the French chain Compagnie Générale des Eaux (CGE), which owns 60 institutions. With Clinivest and Alphamed, this chain owns almost 7% of all private clinic beds in France. Through its subsidiary, American Medical International, it has acquired 18 institutions located in England.

The combined turnover of more than 435 million ECU placed CGE just ahead of the British company, BUPA. BUPA had a turnover from health services of just over 290 millions ECU in 1991. BUPA has expanded its health service and insurance operations in Spain through the acquisition of Sanitas which had a turnover of 245 million ECU in 1991.

Table 5: Health care services
Structure of professional general hospitals sector in the EC

	Number of hospitals		Number of beds		Number of days		Admissions		Length of stay	Attendance rate
	Total	General hospitals	Total	General hospitals	Total	General hospitals	Total	Critical care		
Belgique/België (2)										
Public	140 (3)	127 (3)	77 868 (3)	59 929 (3)	25 411 935	18 446 899	1 665 032	1 627 255	10.39	83.13
Private	228 (3)	170 (3)								
France (3)										
Public	1 062	809	353 115	180 337	99 679 773	47 158 308	7 731 055	7 001 063	6.70	71.60
ASBL	915	299	85 598	32 385	24 707 300	8 845 299	1 389 798	1 075 222	8.20	74.80
Professionnal	1 445	1 035	107 710	75 589	35 989 348	25 287 506	4 313 147	4 057 349	6.20	92.60
Italia (2)										
Public	1 024	N/A	289 207	256 998	72 240 495	62 811 347	7 133 393	7 040 144	8.92	66.96
ASBL	90	N/A	29 659	28 127	8 280 395	7 831 815	713 402	710 517	11.02	76.29
Proffesional	747	N/A	69 285	41 491	19 423 936	11 543 606	1 044 557	940 068	12.28	76.22
Ireland (3)										
Public	104	104	13 806	13 806	4 079 664	4 079 664	522 353	N/A	6.85 (4)	83.69
Private	22	18	2 500	800	730 000	525 600	N/A	N/A	5.00	80.00
United Kingdom (5)										
Public	N/A	1 147	N/A	192 148	N/A	N/A	7 524 192	N/A	6.10	N/A
Independent	N/A	N/A	N/A	N/A	N/A	N/A	600 000 (1)	N/A	N/A	N/A

(1) United Kingdom. Estimate 1988
(2) 1990
(3) 1991
(4) Excluding district hospitals
(5) England only. 1990/91
Source: CEHP

Table 6: Health care services
Number of cases treated by day hospitalization, 1991

	Total	Public	Private
Belgique/België	942 090	N/A	N/A
France	4 432 816	4 197 946	234 870
Ireland	N/A	144 521	N/A
Italia (2)	444 009	400 618	43 391
United Kingdom	N/A	1 261 060 (3)	72 100 (1)

(1) 1986
(2) 1990
(3) England only
Source: CEHP

REGIONAL DISTRIBUTION

The EC health care institutional environment contains a panoply of facilities. They have the titles of hospital or clinic. They range from large high tech purpose-built hospitals to an older generation of hospitals housed in buildings of a bygone age (sometimes even former workhouses). Clinics vary in character. Often they are indistinguishable from hospitals (sometimes they are prevented by law from being called hospitals).

It would be inaccurate to say that private clinics are generally inferior or subordinate to public hospitals. Where inferiority exists, it is often one of size or the variety of services. However, many well equipped major facilities in Europe are privately run.

Hospitals have obtained fair compensation per medical act or for bed occupancy from the health (or sickness) insurance funds. In these systems, most health care costs are funded through employees' and workers' and their employer's health care insurance contributions. Individuals who are self-employed are encouraged to cover themselves adequately for hospitalisation. Sometimes an obligatory minimum hospitalisation coverage is imposed, while primary care coverage can be optional.

The sections below describe the health care industry structure by country.

Belgium

In theory all Belgians have health coverage through social security. Social insurance has two general schemes: for paid workers and for self-employed. Self-employed have the choice of whether they wish to have full or partial coverage. Companies in Belgium are increasingly offering group insurances to their employees, included in employment benefit packages. These cover extra hospital costs, such as private rooms, other comforts, plus all non reimbursed medical products.

Almost all hospitals in Belgium are non-profit public or private organisations. Most of the private hospitals were founded by religious bodies. A minority were started by groups of doctors or associations. Private "for profit" hospitals have been largely forced out of the system by hospital funding regulations which prevent them from benefiting from state subsidies for equipment and construction.

Considerable investments have been made to rebuild the Belgian hospital system. The average size of hospitals has increased. This is largely due to a cost containment measure, taken by the Ministry of Health and Social Affairs in 1987, to close the smaller hospitals. In early 1992 there were 77 868 beds in Belgium hospitals; 45 008 of them were acute beds. The total number of private beds in early 1992 was 48 112 (61.8% of total beds). At primary care level general practitioners, the Yellow and White Cross association and others offer community services. Paramedical and primary care services are increasingly being organised by private professional groups.

In Belgium, hospital physicians, general practitioners and specialists in the community are paid on a fee basis, which can be a fee for service or a fee per capita. Some physicians choose to supplement their income from hospitals by running their own practice in the community. Other hospital staff are salaried. Sick fund societies manage reimbursement claims for most of the population.

Luxembourg

The public health system in Luxembourg is organised through a national compulsory social security scheme. The distribution of hospital beds by service between the three regions (northern, central and southern) is determined by law. Approximately 40% of the private hospitals in Luxembourg are "not for profit" enterprises. Private health insurance in Luxembourg amounts to a few percent of the total health care expenditure. Hospital staff are employed on a salary basis, whereas general practitioners work on a fee per act basis. The patient is free to select any physician, any service and any hospital. The public also uses the services of some hospitals in countries surrounding Luxembourg, particularly Germany.

Denmark

Denmark has an universal national health service funded by general taxation. The Danish public health scheme covers the entire population and practically all treatment is provided by publicly owned hospitals. In 1989 there were a total of 111 hospitals. There are only two private fee-charging hospitals with 70 and 32 beds respectively, which represent 0.3% of total hospital beds. The private insurance market has declined because practically the whole population has its complete hospital costs paid. Most primary care is provided by general practitioners, who usually work in group practices. Hospital personnel are salaried whereas medical professionals working in the primary health sector charge fees per act.

France

Almost every person in France is covered by health insurance. Some workers pay additional health insurance schemes to have full reimbursement for all services.

The French state's commitment to the national hospital programme is revealed in the public hospitals (centres hospitaliers) in every major town in France. About 40 of these are very large complexes with university affiliations. Public hospitals are autonomous and can try to borrow money from private companies for capital investments. They often apply for government subsidies when they run into liquidity problems.

In France, hospital doctors can be salaried or charge fees per service. Many work for several establishments simultaneously, and some also practice in the community. However, the level

of fees they earn is regulated for about 95% of them. Patients are free to select the doctor of their choice.

France has the largest number of private hospitals in Europe and also the largest number of commercial enterprise private hospitals. The health private sector has one third of all health facilities. Roughly 54%, of the approximately 200 000 beds in the private hospital sector, are owned by commercial enterprises (2% of these are psychiatric institutions). Private hospitals tend to be much smaller than public hospitals in size, and it has often been said they are less intimidating for some people.

Private hospitals tend to concentrate on offering specific therapies which provide sufficient profitability. This is illustrated by the very low percentage of long stay beds in the private sector. But here is a trend to increase the private sector in this area. The data for medium stay patient entries, from the Ministry of Social Affairs and Employment, shows that more patients are treated in private hospitals than in public hospitals.

Germany

Approximately 90% of the population is insured under GKV, the statutory health insurance system, which covers all the low and medium employees. High income employees may join voluntary. In fact the rest of the population, roughly seven million (10%), are either privately insured or receive supplementary benefits with automatic health insurance cover. Patients are free to select the doctor and hospital of their choice.

The German health system is undergoing a difficult adaptation process, trying to harmonise the Western system with that of East Germany. Full harmonisation will take several years.

The state and local governments account for less than half of the hospitals. In 1989, Germany (West) had 3 046 hospitals. The number of hospitals is declining. Private hospitals compete on an equal footing. They obtain funds through a dual financing system. Funds for capital items are provided by the state and local governments, and other income comes from earnings against treatments. The fees are agreed between hospitals and local sickness fund organisations and are calculated on a sum per day basis. Many hospitals, public and private alike, compete for specific surgery or medicine services.

Less than a third of the German private acute care hospitals are commercial enterprises. Many are small and specialised clinics. There is an evolution in the number of parapharma hospitals run by commercial enterprises. The private sector is now expected to rapidly develop home-care services. Home dialysis, including nursing assistance, is now provided by medical supply companies.

Hospital doctors are either paid salaries or fees per medical procedure or surgical act; the hospital they work for decides its payment policy. General practitioners charge fees which vary according to the nature of the service they are providing, on a fee per act basis.

Greece

Greece has a health insurance system similar to that of Portugal. Approximately 95% of the population is covered by an insurance fund. There are 80 funds that provide health coverage, four of them major. The largest is the IKA (2.56 million employees and workers and 2.62 million of their families). Second is the OGA (1.91 million agricultural workers and 0.59 million members of their families). TEBE follows (0.48 million artisans and 0.82 million members of their families), and the government has the fourth largest fund (0.19 million directly insured plus 0.27 million members of their families and retired civil servants). Voluntary hospitals and private clinics are licensed to provide additional health care services. Provision of health care services in Greece is improving, as a result of legislation in 1983.

The Greek Ministry of Health reimburses hospitals on a fee basis. Fees only reached 10% of the real cost. The remaining amount is financed by the state budget. New legislation authorises physicians who work for the public health system to practice privately.

Ireland

Ireland's national health care system is financed from general taxation and covers its entire population. One fifth of the population is covered by additional private health insurance besides national health insurance. In recent years the Irish national health care system has made efforts to contain health care costs. Ireland's very young population has a very different demand to that of countries with older populations: instead of geriatric facilities it needs paediatric centres.

Table 7: Health care services
Distribution of manpower, 1991 (1)

(thousand)	Physicians	Nurses & Midwives	Pharmacists	Dentists	Others	Total
Belgiqhe/België	35.0	63.0	12.6	7.2	92.2	210.0
Danmark	13.6	33.3	1.5	5.0	80.0	133.4
BR Deutschland(2)	280.8	490.0	41.0	55.2	1 149.9	2 016.9
España	150.0	175.0	36.6	8.0	150.0	519.6
France	150.0	335.0	55.0	38.5	901.5	1 480.0
Hellas	44.0	28.0	8.4	9.2	50.4	140.0
Ireland	5.0	24.0	1.1	1.2	25.9	57.2
Italia	65.0	225.0	20.0	12.0	360.0	682.0
Luxembourg	0.8	1.0	0.3	0.2	2.2	4.5
Nederland	36.8	100.0	2.2	8.5	209.7	357.2
Portugal	29.0	28.0	12.7	0.8	49.5	120.0
United Kingdom	125.0	425.0	12.6	20.5	640.0	1 223.1
EC	935.0	1 927.3	204.0	166.3	3 711.3	6 943.9
Japan	225.0	725.0	85.0	75.0	795.0	1 905.0
USA	635.0	1 725.0	170.0	155.0	4 065.0	6 750.0

(1) Estimates
(2) Includes former East Germany
Source: OECD

Table 8: Health care services
Personnel employed in general hospitals, 1991

	Total	Public	Private
Belgique/België (2)	113 486	43 586	69 900
France	932 247	764 957	167 290
Italia (3)	617 004	539 088	77 916
United Kingdom	N/A	800 500	15 688 (1)

(1) 1988
(2) 1989
(3) 1990
Source: CEHP

Italy

The Italian National Health service came into being in 1979, replacing a sickness fund service. Sickness fund offices still have an involvement in collecting contribution for old-age pensions, but sickness social insurance INPS (Istituto Nazionale Previdenza Sociale) is the only state organisation entitled to collect contributions. Health care is organised on a regional level. Of the private hospitals, 90% are permitted by the national health system to provide services to national health service patients. They work within a convention made by local health units (USL).

The process of reorganisation of the Italian NHS has been achieved with the issue of two legislative measures: the Law 421 and the Law by Decree 502. These legislative measures are bound to modify the global organisation of the Italian NHS and the function of private institutions within the Service. On the one hand, the legislator has considerably increased the number of persons qualified to work within the Service, among which citizens can freely choose; on the other hand, a uniform system is adopted for the payment of the above mentioned persons. The passage to the new model of distribution is bound to introduce in the NHS gears of competition among the subjects offering medical services in such a way to allow an improvement in the use of resources.

An Italian law of December 1991 requires that for 1 000 inhabitants there must be 6 beds, one of which must be for rehabilitation or long-stay. The standard applies to public and private hospitals. But private hospital bed numbers are calculated at 50%, to avoid reducing too much of the system's flexibility assured by their essential contribution. These private hospitals are paid on a daily rate basis and must be profitable to continue.

Italian private hospitals that are accepted in the plan are reimbursed by local health units for services that they provide to patients insured under the national health service plan. By law this payment should take 90 days to be reimbursed. However, payment can take seven months in some areas of the country. Private insurance patients are a valuable source of additional funds to private hospitals and clinics. The 10% of private health care institutions providing specialised and general acute care treatments are licensed to provide services within the Italian national health service plan, but not within the convention. These hospitals have to comply with the relevant laws to be licensed, but not with the requirements to obtain a convention with a local health unit.

Many Italians are increasing their health care coverage through private insurance. There are approximately 1.5 million private polices providing coverage, for approximately 3.7 million people. Generali is the main insurance group involved in the private insurance system in Italy. It accounts for roughly 14% of private policies. RAS, SAI, and Fondiaria have respectively 9%, 7% and 5%.. The remaining polices are distributed among many insurance companies.

Netherlands

Health care in the Netherlands is decentralised and organised to a large extent by sickness funds and local authorities. There are more than 70 of these funds. The entire population is covered. Public and privately owned hospitals operate under the same conditions. A part of their budget is provided by the Ministry of Health, and the rest comes from reimbursement given by ziekenfondsen (sickness funds).

The Netherlands has 752 hospitals, most of them private, although most are owned by religious groups or non-profit organisations.

Most new major private hospital investments have been made by Dutch universities. Community care is provided mainly by the Cross Associations (private and religious in character), which run many nursing homes (verpleeghuis). The Netherlands has the most developed nursing home system in the EC. General practitioners provide most primary care. They are nearly all self-employed. Some have grouped to form health centres, and obtain subsidies from the central and local governments.

Not every person has the same rights concerning coverage. Persons with higher than average incomes are not entitled to full reimbursement by the national system; however, their hospitalisation is mostly free of charge. Regarding payments, fees and costs of products must be paid by the patients, but most are recoverable from the ziekenfonds retrospectively. Reimbursement rules also vary from one locality to another.

Portugal

The Portuguese health care system is largely run by the public authorities. In the 1980s significant investments were made in upgrading the hospital sector. Several new major hospitals were built during the 1980s to ensure the Portuguese population a health service comparable with the rest of Europe.

Private hospitals contribute about 20% of the total number of beds which amounted to about 54 090 in 1990. A significant number of hospital beds in the Portuguese private clinic sector belong to institutions of religious and social security character. Some specialised services such as dialysis centres have been set up by private companies, e.g. WR Grace; these do not have beds. More than 200 health centres and more than 1 500 medico-social clinics provide the country's primary care services.

Spain

Spain has a widespread public health care system which covers approximately 97% of the population. Dental care (except extractions) is not covered by the public system. There is also a strong private system which provides secondary coverage to millions of people. The public system often contracts services with the private system.

Physicians in Spain are paid salaries or fees per service. There is a well developed family doctor establishment, working either

for social security or privately. Primary care is also provided by private centres, emergency centres and outpatient clinics. Some dialysis centres are run by commercial companies, and the Ministry of Health and Social Security allows companies to provide a peritoneal dialysis home service on a fee per day basis.

The major Spanish publicly owned hospitals have either regional or municipal status. These are supplemented by private hospitals owned by the Red Cross, universities, religious concerns and private companies. The number of private hospitals is much greater than the number of public ones. However, in terms of number of beds they account for only about one third.

Private enterprise hospitals in Spain, of foreign and local ownership, account for about 15% of all beds. Many have closed since the late 1980s owing to the Ministry of Public Health and Social Security's policy to make the public hospitals more efficient by increasing bed occupancy rates. However, this has allowed many new investors to establish themselves by buying up failing private hospitals.

Towards the end of the 1989s the British private health group, BUPA (a provident society), decided to invest in Spain. It owns, Sanitas, one of Spain's major private health care groups. Another major group is Agbar-Salud.

United Kingdom

The United Kingdom has a national health care service (NHS) which provides for the whole British population. NHS services are free at the point of use (only a few patient charges are levied on such items as drugs and eye tests). The system is mainly funded by the central government, from general taxation. The public health care sector is going through a process of decentralisation of hospital management, by offering many hospitals "trust status". The private and "not for profit" (independent) sector is now able to compete for services against publicly owned hospitals.

Primary care in the United Kingdom is being organised into health centres. These are rapidly replacing specialist practices. Most general practitioners are paid fees on a per capita basis, but a few are salaried. However, in health centres they can also apply to become fund holders. This allows the doctors to keep budgets and select where their patients should go for treatment.

Medical supply companies offer home care services such as parenteral nutrition, and peritoneal dialysis, e.g. Baxter Healthcare and Fresenius. Baxter also owns some dialysis centres through a subsidiary company.

BUPA, Britain's largest health insurance company (with about 50% of the UK's private health care market), has increased its scope. Besides offering health insurance for private treatment it now has its own hospital and nursing homes. Among others, manufacturers of commodity products such as alcoholic beverage and hotel groups are participating in the rapidly growing registered nursing homes' sector, which caters for Britain's old and infirm.

Table 9: Health care services
Number of pharmacies and pharmacists, 1993

	Number of pharmacies	Number of pharmacists
Belgique/België	5 237	8 637
Danmark	300	1 127
BR Deutschland	20 296	40 480
Hellas	7 800	8 000
España	18 217	21 687
France	22 325	43 221
Ireland	1 140	1 250
Italia	16 000	37 000
Luxembourg	76	260
Nederland	1 496	2 076
Portugal	2 485	2 772
United Kingdom	11 968	21 000
EC	107 340	187 510

Source: Pharmaceutical Group of the European Community (1993 survey)

REGULATIONS

Laws forbid hospitals to make profits in Belgium, the Netherlands, and Luxembourg. There are no small private cooperative hospitals in Belgium or in the Netherlands. In the case of Belgium, this is a result of a regulation which says that the minimum number of beds a hospital can have is 150. It must also provide a certain minimum in terms of the scope of services. In the Netherlands, hospitals must have a minimum of 180 beds, unless they are within 15 km of another hospital, in which case they must have a minimum of 120.

In Italy private hospitals are accepted within the national health care hospital plan which works according to a convention of six beds per 1 000 patients per annum. This is not aimed to limit short-term treatments, but to control the number of beds in areas of over capacity. Private hospital beds are counted at only 50% because their presence is judged essential. This rule may seem out of place within the next few years as laparoscopic surgery and other minimally invasive therapies replace traditional surgery which required more time to convalesce.

Private clinics in Greece, which account for about one fifth of the country's health care expenditure, are facing a law which threatens to close about 95% of them, according to the Greek private clinic association. Greek law did forbid the establishment of further private clinics between 1982 and September 1990. The same law prevented existing clinics from increasing their number of beds. For economic reasons, Greece private clinics had to reduce their overall bed number by 8 000 beds to 15 512 beds by the end of 1982. During this period the public hospital sector only increased its number of beds by 2 900 beds. The law, since December 1991, authorises the establishment of new private clinics, but the minimum requirements of services which must be provided are roughly three times greater than those before the regulation. The investment necessary, being so large, resulted in no new registrations before June 1992. The current private clinics must also increase services to meet the new standards within 18 months of the December 1991 law.

The CEHP, UEHP, and UIHP would like to see more freedom for patients to seek hospitalisation at a hospital of their choice within the EC. An obvious problem is the disparities existing among health insurance systems within the 12 Member States. In the short term it is unrealistic to expect someone in Portugal to make the same contribution to health insurance as someone in Germany. It is also unrealistic to accept massive movements of patients within the European Free Space until greater equality of health provision has been achieved. On the other hand patients should not be prevented from seeking treatment anywhere in the EC, after having their national health insurance cover considered. Agreements already exist between countries, although these contain cumbersome administration formalities and restrictions for the main part.

OUTLOOK

In the early 1980s governments in Europe and the USA began closer monitoring of the mounting costs, and most implemented health care cost containment measures. These have

affected many aspects of health care provision programmes. In particular they have led to the rationalisation of some services and a greater control of expenditure. Circumstances vary significantly from one country to another, and demand is tied to factors such as age structure and general nutritional status of a population.

Future demands on health care systems will depend mainly on these two factors. By 1990 a great deal had been learned about controlling health care costs. One major finding was that the systems needed better management. This management needed to focus on value for money. The idea is being developed even further.

Another important consideration is that de institutionalisation can bring benefits to patients able to convalesce at home; it allows them to recover in often more agreeable surroundings, and hence reduces institutional costs significantly. This is at an early stage of development in Europe. In contrast, the USA is far ahead in this field.

Changing policies of health ministries will increasingly allow private enterprises to become involved in the provision of certain health-related services, although they are not being given the same consideration in every country. The clearest example of a country with a very positive interest in the development of the private health care sector is the United Kingdom's NHS. It is undergoing the most radical change since its formation. The idea of "money following patients" is a radical departure from earlier arrangements. The other major EC countries, Italy, France and Germany all appear to favour the development of private health care.

Evidently, privately run health-related services are increasing in scope and also in number. A new direction for private enterprise will be to examine niche opportunities in the acute care sector. They would protect their stake by investing in the best technology available.

Health care services need not be stationary structures, nor do they need to be capital intensive. A good example of the former is the mobile screening service of BUPA in the United Kingdom. The General Electric Company has participated in a similar venture in Germany. Smaller scale hospitals can achieve savings by hiring the services of mobile units. This may be a good business strategy for the short-to-medium-term, but could have limitations in the longer-term if there is a concerted trend toward closing small hospitals.

On the other hand, home intravenous therapy and peritoneal dialysis programmes organised by medical supplies companies Kabi Pharmacia, Baxter, and Fresenius, appear to have better longer-term potential. The home-care sector, which is only at its initial stages of development, will continue to expand in the EC.

A new peer infrastructure is needed for doctors, and it may be difficult to change professional habits. Some hospital physicians will not wish to temporarily pass the control of some patients to doctors in the community, while the patient is still under the care of the hospital. It may also be difficult for some physicians to accept to place high-tech medicine in the hands of primary care doctors and community nurses.

The primary health care sector will need a good overhaul to cope with secondary care. There is a need for greater professional competence at community level. Some retraining will be necessary. Doctors in the community will need to have greater contact and guidance from central hospitals. Dismantling more of present institutional structure and consolidating it into broader units will continue in the future with resistance of hospital personnel.

The idea of having large supra-regional centres of excellence supported by many dependent hospitals has a great deal of merit, but small specialised surgery and medicine clinics can also play an important role. The private sector will continue to invest in the expansion of registered nursing home facilities across the EC. More than 100% growth can be expected in this service over the next five-year period.

The UEHP states that "the European private hospitals', clinics', and nursing homes' sector must maintain and strengthen its commitment to provide its patients with the high quality medical technical and human assistance, performing quality control and revision (quality assurance) within its structure, according to standard methods designed to guarantee homogeneous results".

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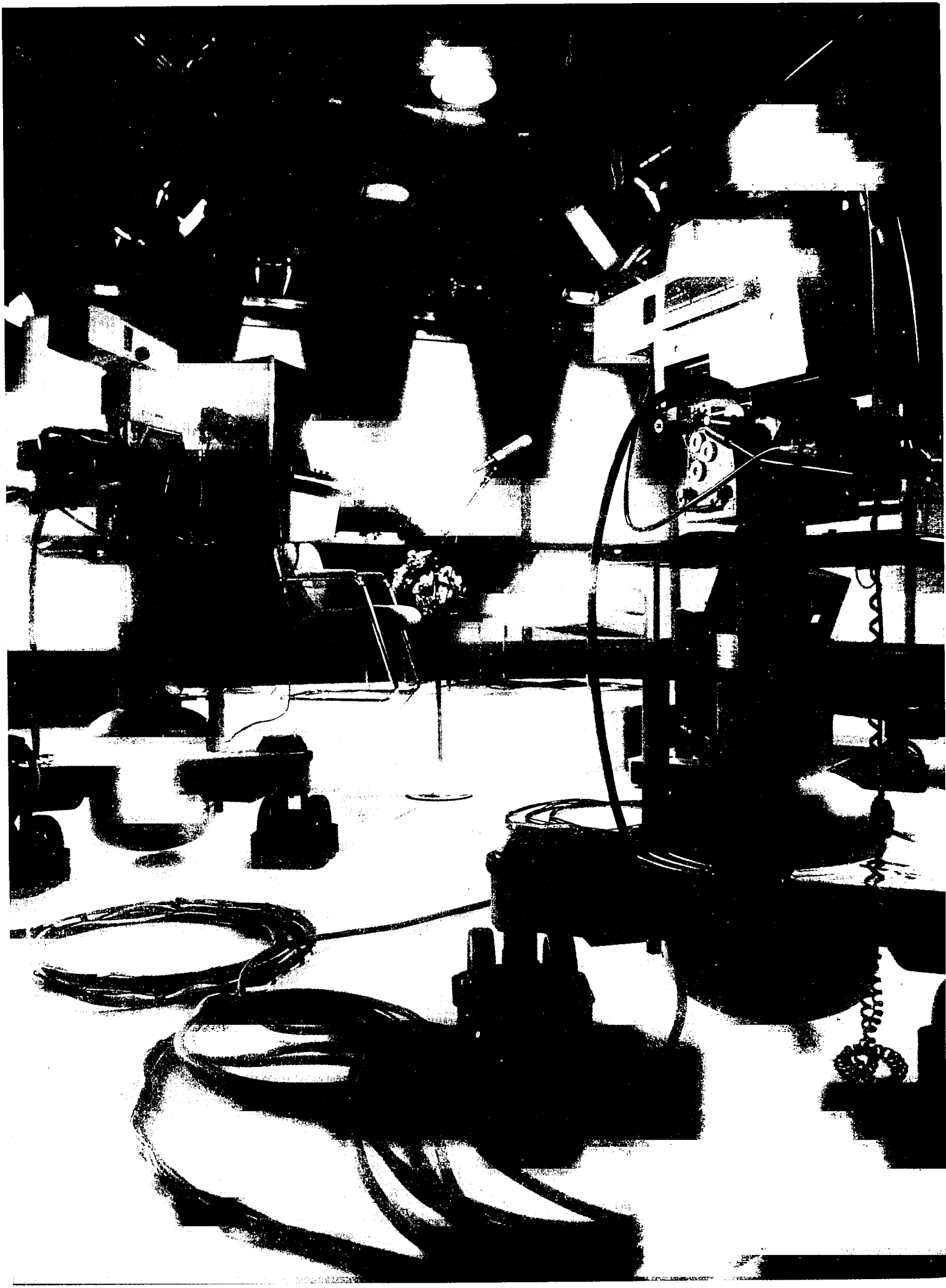

Overview

NACE 971, 972, 973, 974, 345.2

Demand in the audio-visual sector has experienced double-digit growth during the past decade despite recent effects from the economic downturn. Future prospects remain very positive in continued growth.
The EC music recording industry remains the global leader, but it still suffers from a weak economy, maturing CD markets and competition from new entertainment media (video games). Sales in 1992 grew by only 0.8% from 1991.
The European audio-visual industry continues to feel the effects of further growth of extra-EC imports (mainly from the USA) in film and television productions. Growth in film production remained stagnant while decreases in both cinema attendance and the number of cinemas further weakened prospects for an EC industry upsurge.

INDUSTRY PROFILE

Description of the sector

The audio-visual sector contains four main sub-sectors: film production (NACE 971); film distribution (NACE 972); cinemas (NACE 973) and radio and television broadcasting (NACE 974). The music recording sector, although being part of NACE 345, is also considered within this chapter.

Recent trends

Although information abounds on the audio-visual sectors, consistent data is rare. However, it is estimated that the leading 100 audio-visual companies worldwide had achieved global sales of 102 ECU billion in 1991.

Broadcasting represented the bulk of the market (68%), followed by cinema distribution (15%) and integrated companies (in both broadcasting and cinema). Music recording holds approximately 4% of the global audio-visual market.

There has been an increasing move towards television film viewing. As a result, cinema attendance, as well as the number of cinemas, has decreased while TV and VCR penetration has increased slightly. The decline in cinema viewing appears to have slowed down with the main markets (France, Germany, Italy and the United Kingdom) stabilising at around 100 million spectators per year each.

The development of TV films and videos is at the heart of the difficulties the cinema industry has encountered over the past few years. This phenomenon is accelerated by growing VCR penetration across Europe and by the explosion of private TV channels (notably pre-paid and cable) in many countries. A more recent "bridge" has appeared through video-disks, a medium that allows the music recording sector (and its key European players) to offer complete audio-visual entertainment to its existing customers. There is a growing interconnection between these two activities which points towards the future of the audio-visual industries.

Film production has been slow to develop in Europe. European production continues to be affected by the growing importance of American films, which today represent 73% of EC's cinema revenues.

By contrast, a real explosion of TV broadcasting has occurred in Europe following deregulation in the 1980's. The number of TV channels grew from 40 in 1981 to more than 140 in 1991, 50% of which were private.

Although 1992 was a more difficult year for the music industry, growth is still to be found in markets where CD penetration remains low (Italy and Spain). Significant hopes have also been placed in the maturity of new media such as Philips' (NL) Digital Compact Cassette (DCC) or the Sony (JPN) MiniDisk.

International comparison

In 1991, the EC had a 39% share of the world audio-visual market, followed by the USA (31%) and Japan (6%). Broadcasting in Europe represented almost a third of the global audio-visual market (this may be explained by the high fragmentation of EC markets and the multiplication of channels). American cinema held two-thirds of the world cinema market.

Foreign trade

Overall, the European audio-visual industry has a heavy negative trade balance with the United States:

Table 1: Audio-visual services
Market strength by region, 1991

(million ECU)	Companies	Audio-visual turnover	% of total
EC (1)	39	33 805	35.0
USA	31	31 874	33.0
Japan	15	22 215	23.0
Australia	3	2 898	3.0
Other europe	5	1 932	2.0
Canada	2	966	1.0
Other	5	2 897	3.0
(1) of which			
Benelux	5	5 177	5.4
BR Deutschland	6	7 901	8.2
España	4	1 883	2.0
France	6	3 757	3.9
Italia	2	4 994	5.2
United Kingdom	15	9 726	10.1
Other	1	367	0.4

Source: Screen Digest

Table 2: Audiovisual services
Market shares of major audiovisual trading blocks and number of enterprises, 1991

(Based on top 100 companies)	EC	Other Europe	USA	Japan	Other	Total
Total value (million ECU)	33 805	1 932	31 874	22 215	6 761	96 587
Share (%)	35	2	33	23	7	100
Number of companies	39	5	31	15	10	100

Source: Screen Digest

In the case of film production, this has partly been the result of insufficient European supply and the inability of European producers to match growing internal demand.

For some sectors of the industry, customs figures are less relevant; music recording companies, for example, organise manufacturing independently of market locations. In addition, individual country situations vary. For example, in France, Greece, Spain and Italy national recording artists make up 40-50% of the market, while in others, local talent claims much less of a market share.

Intra-EC trade remains relatively limited, though some countries are more favourable to European products than others: France and Spain are significant importers of other European films (10% of their respective markets).

MARKET FORCES

Demand

The world audio-visual market has grown by more than 11% since 1990. In Europe, this growth has been fuelled by a number of factors that include: increasing penetration of equipment (still below US levels); technology changes bringing in new equipment (CD's) or new transmission methods (cable and HDTV); more hours per day dedicated to audio-visual entertainment (though films, TV and music demand is increasingly undermined by the rise of electronic games); and the commercial dynamism of producers (particularly the Americans) and the aggressive marketing of distributors such as Virgin Megastores (UK) which have helped push music/video demand.

In addition, consumer demand is characterised by an increasing sophistication in terms of quality of service and levels of choice. This development is in turn being encouraged by the revolution in equipment types, transmission and reception methods.

While audio-visual sales have grown overall, there has been a shift in the balance of sales which reflect evolving consumer tastes, technology changes and price/quality trade-off. Between 1981 and 1991, cinema film receipts dropped by up to 50% in most European countries and represented only a tenth of TV film consumption in 1991. Similarly, music recording sales grew by 11% per annum between 1989 and 1991, driven by a 25% per annum increase in CDs compared to a 41% decrease in LP's.

Supply and competition

Major changes in the industry's environment are leading to a restructuring of supply within the European audio-visual market.

These developments include deregulation (for example, that of television in the 1980's), technological innovation (development of cable and satellite TV, as well as HDTV in the future) and the increasing capital intensity of the audio-visual industry.

High growth sectors attract new entrants, often from other media sectors. A striking example of this has been the explosion in the number of broadcasting channels - in particular private, cable and specialist stations - since deregulation.

In addition, investment requirements and economies of scale are increasingly driving industry consolidation across Europe, despite the continued existence of specialised independent companies. There is an increasing development of multi-media audio-visual groups emulating the US "majors" (Bertelsmann, D) and large industrial groups (Bouygues, F) investing in the sector.

Production process

The production process and technological development play a key role in the audio-visual industry as major drivers of future demand.

An innovation that already has a major impact on the different media, and that will have a significant influence on developments in the next decade, is the introduction of digitised pictures and sound.

In the music industry, the DCC, the Sony MiniDisk and digital cable radio transmitted directly along cables are important new technologies being developed to rival the CD.

Table 3: Audiovisual services
Market shares of major trading blocks in the worldwide electronics industry, 1991

(%)	EC	USA	Japan	Other	Total
Consumer electronic products	16	6	55	23	100
Electronics components	13	29	52	6	100
Telecommunication (1)	35	26	23	16	100
Computer hardware materials	10	58	25	7	100
Computer software and related services	22	57	12	9	100

(1) Includes telecommunication goods and services.
Source: Screen Digest

Table 4: Audiovisual services
Number of audiovisual companies by sector and by region, 1991

(Based on top 100 companies)

	EC	Other Europe	USA	Japan	Other	Total
Broadcasting	30	5	18	7	8	68
Cinema	1	0	10	3	1	15
Integrated (1)	3	0	1	2	1	7
TV production	1	0	1	0	0	2
Music	3	0	0	1	0	4
Video	0	0	1	0	0	1
Video games	0	0	0	2	0	2
Services	1	0	0	0	0	1
Total	39	5	31	15	10	100

(1) This includes production and broadcasting
Source: Screen Digest

The next few months will see the broadcasting in the wide-screen 16:9 format in standard definition, using analogue transmission systems like PAL Plus and D2-MAC initially, then digital ones when available. The Community has its Action Plan for the Introduction of Advanced Television Services in Europe to assist broadcasters and producers in the transition to wide-screen. The rationale behind this plan is both commercial (movie screen format interests broadcasters and manufacturers) and technical (wide-screen receiver installed base would make HDTV introduction easier).

Innovations in the audio-visual industry also have an impact on large computer groups which have, for some time, been operating digital systems. These groups are currently investing in research and development for a new tool, the multi-media, capable of treating sound, image and text. Apple, for example, has already joined forces with Sony and IBM for research into a product combining video with the microcomputer.

INDUSTRY STRUCTURE

Companies

The EC accounted for 34.5% of the top 100 companies in turnover terms. Within the EC, the United Kingdom is in the lead position with a 10% share, closely followed by the Germans who account for 8% of turnover of the top 100 audio-visual companies.

Table 5: Audiovisual services
World music market, 1991

(billion ECU)		Music turnover	Share (%)
Polygram	NL	2.9	18.7
Sony	JPN	2.8	18.0
Time Warner	USA	2.6	16.4
Thorn EMI	UK	2.2	13.9
Bertelsmann	D	2.0	13.1
Matsushita	JPN	1.7	11.1
Virgin Music	UK	0.5	3.4
Other		0.9	5.5
Total		15.6	100.0

Source: Screen Digest

Within the different European countries, levels of industry consolidation vary. Italy derives a 5% share from two large groups, Fininvest and RAI, whereas 6 companies in France make up just under 4%. Germany has 6 companies in the top 100 and the United Kingdom has 15. Indeed, two German groups, ARD and Bertelsmann, rank among the top 10 audio-visual enterprises worldwide.

The increasing importance of European groups - which, as a block, have overtaken the US - is in part due to the growing importance of private broadcasting. Nevertheless, not one group in the European film, video or TV sectors as yet can rival the global approach and the easier access to (or even control of) the distribution chain of the US "majors", which in part explains the EC trade deficit in this sector.

In the music recording sector, however, European companies have not only been successful in taking a significant share of the world market (49%) but they also account for 4 of the top 6 global companies after Sony and Time Warner.

Strategies

Strategies of the major European audio-visual groups have focused around the need to achieve critical mass, the desire to diversify into new growth areas and the aim to secure access to larger international markets. A series of important mergers and acquisitions have taken place, though many have been limited to a national scale (those of Bertelsmann and Fininvest).

Within each media segment, the specific drivers behind this consolidation have varied. In music recording (Polygram, NL or Thorn EMI, UK) and in cinema film distribution (UFA, D and Rank Odean, UK) expansion strategies have derived from the need to secure a strong local and international European network. In TV and film production, a recognition of the need to counter American professionalism and domination has prompted much of the restructuring.

OUTLOOK

While economic recession has undoubtedly had some impact on growth in demand, the audio-visual industry overall has enjoyed double digit growth over the last decade. Rapid technological change and the increasing convergence of the audio-visual market with other sectors such as electronics and information technology make precise forecasts difficult, though prospects continue to look very positive.

The European audio-visual industry is facing a number of key challenges in the countdown to the twenty-first century. These include the need to build a European production industry

which can seriously compete with the commercial and technical professionalism of its American counterparts; capitalise on the strong positions in the home and global markets of the broadcasting and music recording industries, respectively, and remain at the forefront of the technological revolution in transmission and reception (including digital systems, HDTV and multi-media tools).

Written by: LEK

Film and video
NACE 971, 972

The European film industry is dominated by two long-term trends which deeply influence its current and prospective financial situation. One is that the supply of feature-length motion pictures, as well as fictional TV works, is facing ever increasing competition from American producers with their strong marketing edge in both cost and quality of releases and public acceptance. Number two is that demand for films is moving steadily away from public consumption in cinemas to more individual access via TV or VCR.
As a result of these two developments over the past few decades, the European film and video industry has been faced with rapidly evolving rules in the marketplace such as: the decline in global marketable film output, lower short-term returns from diminishing attendance in cinema houses, deferred revenues from TV and Video sales and the reduction of production costs to levels offered by competing countries.
In response to these changes, most European players in the industry are currently restructuring their activities by country, with specific patterns such as: defining the financial and legal framework for government support of national production as a vehicle for national culture; merging or associating to set-up European groups with international leverage; integrating the process of financing, manufacturing and distributing movies; integrating international trade (importing and exporting films or technical skills) into local operations; and monitoring the commercial and financial impact of distributing through channels as different as the cinema, TV or video.

INDUSTRY PROFILE

Description of the sector

The film and video industries operate three types of activity: production, manufacturing and distribution. Production is the financial and artistic conception of motion pictures and TV presentations and is project-managed by "producers" from inception to release. European producers are concentrating both horizontally (through alliances) and downstream (through integration of operational/commercial activities).

Manufacturing is the physical making of films and is supported by a host of specialised technical contractors: studios, laboratories, equipment manufacturers, sound specialists.

Distribution is the commercial release of films and is performed by cinema operators (either networked or independent), by video publishing companies and through portfolio management of stocked works.

These activities are today frequently consolidated through the development of large groups combining production and technical capabilities (Granada, UK; Bavaria, D; and SFP, F) or production and distribution (Gaumont, F; and MGM, USA). Multi-media conglomerates are also seeking to add value to their distribution assets by entering into production (Bertelsmann, D; Canal+ and Bouygues, F; Polygram, UK/NL; and Fininvest, I).

Recent trends

Overall, the European film industry had estimated total sales of 2 billion ECU, second only to the American movie industry that had estimated sales of 3.9 billion ECU.

The European film and video industries continue to be affected in a number of different ways by two long-term trends: the

Table 1: Film and video
Worldwide cinema industry, 1991 (compared with 1985)

	D	91/85 (in %)	E	91/85 (in %)	F	91/85 (in %)	I	91/85 (in %)	UK	91/85 (in %)	EC	91/85 (in %)	USA	91/85 (in %)	Japan	91/85 (in %)
Production																
Number of films produced	72	13	64	-17	156	3	129	(1)14.0	51	-7	499	2	435	32	230	28
Exhibitions																
Films broadcasted	334	8	226	-28	438	-4	495	40	341	-3	2 700	N/A	436	-4	697	20
Screens	3 258	-5	1 806	-40	4 441	-14	3 100	-27	1 770	39	16 492	-20	24 000	20	1 804	-16
Audience (million)	106.9	2.5	79.1	-22	117.4	-32	88.6	-28	100.6	43	566	-16	981.9	-7	138.3	-11
Inhabitants (million)	61.8	1.6	39	1.3	56.9	3.6	57.8	1.8	57.7	0.7	327.8	1.9	249	N/A	124	N/A
Number of films viewed per capita	1.7	1.7	2	2.7	2.1	3	1.5	2.2	1.7	1.3	1.7	2.1	3.9	4.4	1.1	1.3
Number of tickets sold by cinema	32 800	N/A	43 800	N/A	26 400	N/A	28 600	N/A	56 800	N/A	34 000	4	40 900	N/A	76 700	N/A
Cinema revenues (million ECU)	444	18	208	-22	554	-10	329	31	317	123	2 034	N/A	3 880	29	1 097	-5
Market share of domestic films (%)	13.6	-40	11	-31	30.6	-31	24	-25	5.5	-60	17	N/A	97	=	41.9	-18
Market share of USA films	80.2	N/A	68.7	N/A	58	N/A	68	N/A	93	N/A	73	N/A	97	N/A	55.2	N/A
Television																
Television sets (million)	25	10	15	50	31	68	15	3.5	21.8	2.3	127	N/A	200	18	60	18
Households (million)	27	N/A	11	N/A	23	N/A	21	N/A	23	N/A	122	N/A	85	N/A	39	N/A
Films broadcasted to national TV	2 301	1 716	7 241	405	1374	500	9 781	N/A	1 969	1509	23 000	N/A	N/A	N/A	N/A	N/A
Video cassette recorder																
VCR (million)	13	N/A	4.6	N/A	11.9	N/A	6.4	N/A	15.4	N/A	63	N/A	70	N/A	30	N/A
Penetration rate of VCR/number of households (%) (2)	54	65	43.7	18	50.2	43	31	N/A	70.8	20	50	35	76.6	N/A	80.5	N/A

(1) Comparison with the average of the last decade
(2) Comparison with 1989
Source: CNC, Eurostat

Table 2: Film and video
Number of films produced and market share of American and national films in the EC

	1980	1985	1989	1990	1992
USA					
Market share (%)	42	54.5	67	70	75
Productions (number of films)	205	330	345	358	389
National film					
Market share (%)	28	27.5	20	19.5	18
Productions (number of films)	469	488	419	421	N/A

Source: CNC, Screen digest, Eurostat

increase in international competition and the move towards more individual viewing on TV screens.

Production

The overall production of feature-length motion pictures in the EC is stagnating below 500 films per year, a level similar to that of USA output.

In turnover terms, however, European production yields only half that of its US counterpart. Diminishing attendance (-18% between 1982 and 1991) and the related reduction in the number of cinemas (-14%) undermine prospects for a much larger European offering. Indeed, latest attendance reports for 1992 confirm that only the United Kingdom had a steady upturn, with a 57% increase over 10 years.

The market share of imported works is huge (83%) and still increasing. Over the last ten years, American films have doubled their market share in France and Italy, while increasing it by more than half in Germany, Belgium and Spain. Currently, American productions represent 73% of EC cinema revenues, with more than 80% of the proceeds in Germany and the United Kingdom.

This decline runs parallel to an increase in the production of fictional works for television (e.g., a doubling over the last ten years in France), which in turn has been a vector for a growing involvement of multi-media groups in movie production.

Manufacturing

The technical manufacturing of films is a sector which has remained relatively resistant to the changing market-place. On the one hand, the turnover of contractors of feature-length pictures is stagnant at an estimated 350 million ECU, of which 70% is derived from French and Italian producers. On the other hand, an increasing share of revenue is coming from fiction TV: for example, the latter accounts for 55% of United Kingdom producers' expenditure in 1992 - an increase of 11 percentage points over 1991. Non TV-oriented contractors have frequently run into financial trouble (e.g. Cinecittà, I). Although it is still a sector characterised by small to medium sized specialised companies, technical contractors (studios, visual and sound laboratories) are frequently being purchased by large financial holdings (Arnold & Richter, D; Rank, Virgin and Brent Walker, UK; Tectis, F; and VDM, F) or integrated into production or distribution groups as capital expenditure requirements are growing.

Distribution

The distribution of films reflects the shift towards TV screen viewing. Television is overtaking the traditional cinema houses as a channel of access to movies.

Europeans are being offered ten times more films by TV networks than by cinemas (23 000 films compared to 2 700 films, respectively, in 1991); Italians and Germans are offered an average of 15 to 20 films a day, the French and British an average of 4 or 5. From 1985-1995 the average global EC offering on all networks is expected to have grown from 30 to 100 films per day. A similar growth rate is observed for TV fictions.

Video sales are increasing in line with VCR sales. With a 50% penetration rate of VCR equipment, European households spend an average 70 ECU per year on video cassettes: twice the amount devoted to cinema tickets (25 ECU).

Cinema houses have stabilised their decline after a drastic reduction of both average attendance and number of cinemas. In 1991, seat sales per cinema had dropped 30% over the early 1980s in France, Germany and the Netherlands. Per capita film consumption at cinemas in this period dropped by between 20% and 50% in all countries but the United Kingdom where the decline had taken place earlier. These figures, however, when put in perspective over the last three decades show a marked slowdown of the decline, not to mention a resumption in attendance in the United Kingdom. Each of the major markets (France, Germany, Italy and the United Kingdom) seems to be converging towards the 100 million spectators per year mark.

Table 3: Film and video
TV fictions and films in the EC

	1985	1990	1995(1)
Total hourly volume broadcasted in the EC per year	200 000	560 000	650 000
- Of which:			
Films (2)	18 000	50 400	45 500
TV fictions	40 000	112 000	143 000

(1) Estimated by LEK.
(2) 30 films/day in 1985; 85 films/day in 1995"
Source: CNC

Table 4: Film and video
Evolution of video and cinema market in the EC

	VCR receipts penetration rate (%) 1991	Video receipts 1990	Market shares (billion ECU) 1991	Market shares EC (%) 1991	Box office of cinemas (billion ECU) 1990	Box office of cinemas (billion ECU) 1991	Growth rate 1992/1991 (%) Rental	Growth rate 1992/1991 (%) Sales
BR Deutschland	54.0	0.6	0.9	18.4	0.4	0.4	-1.9	N/A
España	43.7	0.3	0.3	6.3	0.2	0.2	29.2	N/A
France	50.2	0.5	0.7	14.4	0.5	0.5	13.4	-11.7
Italia	31.0	0.4	0.5	11.4	0.4	0.3		
Nederland		4.0	4.5	4.0				
United Kingdom	70.8	1.2	1.3	28.5	0.3	0.3	11.0	4.9
EC	50.0	3.6	4.3	100.0	2.0	2.1	N/A	N/A

Source: CNC, The European video review

International comparison

The European situation is not unlike that observed in Japan and the USA with regard to TV screen viewing, despite a different industrial outlook in the USA. In both countries, progressive TV and VCR penetration of households has been accompanied by a decline of cinema attendance. However, in the USA and Japan, cinema attendance began to stabilise in the early 1970s, a process which did not occur until recently in all European markets except for the United Kingdom. The share of Western Europe in the world market for cinema film consumption moved from a peak of 48% during the 1960s to approximately 30% in the early 1990s.

The USA film industry has aggressively expanded its export sales during the 1980s. Its market share in the EC progressed from 45% to 73% in ten years. In 1992, domestic sales in the USA (4.2 billion USD) accounted for just less than half of industry revenues. Overall, worldwide market share of the major producing EC Member States has fallen slightly from 1980 to 1990. From 1960 to 1990, the picture is much different; over that period, cinema production originating in France was the only EC Member State industry to gain market share (24% increase). Germany suffered a decrease in their world market share of 43% and Italy and the United Kingdom both lost about 54% each.

Foreign trade

Intra-EC trade (150 million ECU) is limited in comparison with the bulk of film imports from the USA: USA audio-visual (films and TV fictions) sales to the EC amounted to 3.2 billion ECU or 13 times the EC sales to the USA.

Intra-EC trade is unevenly shared between countries: France and Spain are strong importers of other European films (10% of each market); other countries (e.g. Germany, Italy and the United Kingdom) devote less than 5% of their markets to their neighbours' productions. French and British movies are favourites among Europeans, whereas Italian and German movie-makers have lost ground during the last decade. In all countries (except France), demand for European films has collapsed over the past few years.

MARKET FORCES

Demand

While the global demand for movies has never been as strong as today, European consumer preferences in terms of product content and viewing mode do not favour a strengthening of national film and video industries in the EC in their current state of operation. Faced with a need for wider geographical diffusion to compensate for restricted national audiences, European producers are failing to foster an appropriate product-policy.

The European audio-visual consumer, provided with an unprecedented offering of movies on TV screens, has considerably increased his consumption. It is estimated that the individual spectator watches 50 movies per year on his TV as opposed to 2 in a cinema.

This dominance of the television offering (most of it free of variable charge) is reinforced by the increase in cinema seat prices. Ticket prices have tripled in real terms in most European countries since 1955. While this has softened the impact of

Table 5: Film and video
International comparisons

	Audience (1) D	F	I	UK	USA	TV penetration rate (million) D	F	I	UK	USA
1955	100	100	100	100	100	0	0	0.5	5	8
1970	33	49	69	11	34	16	12	9	16	85
1990	13	29	13	7	40	24	30	158	22	200
	Average ticket price of cinema seats (1) D	F	I	UK	USA	Box office receipts (1) D	F	I	UK	USA
1955	100	100	100	100	100	100	100	100	100	100
1970	148	161	125	210	208	48	78	90	38	66
1990	240	250	300	300	190	33	71	34	24	76

(1) Base 100 for each country (except for the USA in 1950)
Source: Carat TV

Table 6: Film and video
Market share of production by origin in the worldwide cinema industry

(%)	1960	1970	1980	1990
BR Deutschland	8.8	4.9	5.5	5.4
España	3.3	4.9	5.5	3.2
France	5.8	5.8	8.9	7.2
Italia	11.7	11.2	8.1	5.4
United Kingdom	10.3	7.4	5.1	4.7
Canada	3.1	4.1	4.2	4.7
USA	34.7	45.9	46.1	52
Japan	13.5	8.3	9.3	12.5
Other	8.8	7.4	7.3	5.2
Total	100	100	100	100

Source: Carat TV

attendance decline on cinema revenues, notably in France, it has rendered cinema an expensive access to films, thus perpetuating the vicious circle of declining attendance.

Faced with a limited customer base in households, distributors tend to favour film releases which fit best with customer demand: most analysts of the industry acknowledge the fact that the marketing and financing techniques used by American producers are the key to their obvious competitive edge with the public. The high budgets invested call for careful market research and testing to be integrated into film conception; the making of American box office successes is therefore closer to an industrial product policy approach as it takes into consideration the commercial appeal of speed of action, dialogue efficiency, special effects and empathy with characters. Most European surveys indicate that the final impact of such commercial care is reflected in public acceptance of American releases, with slight nuances in France and Italy where the public seems more attached to films specific to their culture (in both countries, the share of indigenous releases is consistent with their share of box office ratings).

Supply and competition

As the economics of film-making change with the diversification of distribution channels, players in the industry adjust their approaches to multimodal viewing and the necessity to reduce financial risk through international distribution. During the 1970s, American producers restructured their approach and are now reaping the dividends. The Europeans began the same process in the late 1980s and are accelerating it in the 1990s.

The key challenge to European film-makers is to develop a capacity to engineer films likely to attract a large international audience. Many obstacles have delayed the acquisition of such a skill: language barriers for films shot in German, Spanish, Italian or French which have to be dubbed before international release; conservative financing that prevents producers from integrating some ingredients of a commercial approach (expensive casting, special effects, market testing); dependence on government support (especially in France, Germany and Spain); and the favouring of films with a more artistic and cultural content.

However, the industry outlook is rapidly evolving in the 1990s and the formation of large, integrated, multi-media groups as key players is likely to increase European producers' ability to offer works with large geographical and access mode potential. Groups that integrate the various production through distribution stages can plan the return on their investment with due knowledge of the spread over time of modern film exploitation . If ticket sales are the major constituent of cash flow during the first year of a box office release, there is a gradual diversification as the film is exploited in various channels (Video, Pay-TV, Pay per view, and international sales). Thus, achieving pay-back of invested capital is easier for financially strong conglomerates.

As a result, the European film offering is likely to be more focused on two concepts in the future. One focal point will be low-budget, low-revenue movies reflecting the personal talent of a director (such movies also co-exist with blockbusters in American production) or a particular element of national culture. The other focal point is that commercially conceived works are adequately financed to sustain both the cost of commercial ingredients and a large life-cycle with a wide and international audience. The financing, casting, directing, technical making and marketing of such products are likely to lose much of their national root and will become European or European/American ventures.

Table 7: Film and video
Audiovisual trade balance between the EC and the USA, 1992

	USA receipts from the EC			EC receipts	
(million ECU)	MPEAA (1)	AFEA (2)	Total	from the USA	intra-EC
Cinema	567	158	725	63	150
Television	1 142	259	1 401	81	N/A
Video	808	180	988	101	N/A
Total	2 516	598	3 114	245	N/A
EC trade balance with the USA				-2 869	

(1) MPEAA: Motion Picture Export Association of America.
(2) AFEA: American Film Export Association.
Source: Estimated by IDATE

Table 8: Film and video
Public subsidies for the production of films in the EC

	Systematic subsidies	Selective subsidies		
		Writing	Development	Production
Belgique/België	(3)	(2)	(2)	(2)
Danmark		(2)	(2)	(2)
BR Deutschland	(1)	(3)		(2)
Hellas	(3)	(2)		(2) (3)
España	(3)	(3)		
France	(1)	(3)	(3)	(2) (3)
Italia	(3)			
Nederland		(3)		(2)
United Kingdom		(2) (3)	(3)	(2)

(1) Obligation to reinvest.
(2) Repayable.
(3) Not repayable.
Source: CNC

Production process

New technologies (video, digitalisation, HDTV) are being progressively integrated into the production process (e.g., synthetic imaging). They tend to reduce the technical difference between cinema and TV work. Their final impact is therefore likely to strengthen the move towards private viewing on TV screens.

The reduction in production costs is a matter of concern for producers and is a prime cause for the delocalisation of some contracted activities. The latter, when labour intensive (e.g., studio work) are sensitive to the differential in wage levels in Southern and Eastern Europe. Productivity gains in the classical sense are not expected outside limited technical operations (computer-assisted special effects and final cut and video sequences).

Rationalisation is also being forced upon distribution: operating costs are better spread in multiplex theatres, advertising and marketing expenses are syndicated by the large networks and a possible future transfer to digitised copies will reduce the celluloid duplication cost inherent to a large and simultaneous distribution.

INDUSTRY STRUCTURE

Companies

In reaction to their loss of market share, European producers are tending to organise into larger groups with some degree of control on distribution or production facilities:

Although it is premature to speak of European entities, significant national groups are being created through mergers and acquisitions integrating production and technical contracting: Granada in the United Kingdom (sales of 2.1 billion ECU), Bavaria in Germany (46 million ECU) and SFP in France (205 million ECU). A far cry from the American "majors" such as Time Warner, MGM or Viacom Paramount, they are nevertheless close to the stage where they can offer the financial and technical backing for truly international products.

Other large production groups have developed from the growing interest of industrial, financial or audio-visual companies in cinema investment: Canal+, Bouygues and Chargeurs in France, Kirch, Bertelsmann, Scriba & Deyhle, Neue Constantin in Germany, Polygram in the United Kingdom and the Netherlands and Penta and RCS in Italy.

Distribution and exhibition are also areas of important concentration: MGM-Pathé-Nordisk-Canon (536 screens), UFA cinema (445 screens), UGC (374 screens), Pathé Cinema (331 screens), UCI/Cinesa (319 screens) and Rank Odeon (309 screens). Many of these chains are offspring of American producers who seek to secure access to the European spectator. This concentration is having the beneficial effect of modernising and upgrading the theatres, the dereliction of which had been an effect as well as a cause of the attendance decline.

Strategies

The strategies of the key players and the resulting consolidation process are still very much limited to a national scale. In Italy, Fininvest (the largest communication group in Europe) has fostered Penta which can be considered as the first European " major" with a strategy of expanding into production and distribution throughout Europe and North America.

In the United Kingdom, the TV companies diversified early into film production: BBC Films, Channel 4, Zenith, Granada, Euston and LWT concentrate, with the music giant Polygram, much of the capacity to produce international movies, in some cases in close association with American interests (e.g., Island's World).

In France, Canal+ (with Studio Canal+) and Bouygues (with Ciby 2000) follow the same strategy of vertical integration to produce a larger share of the films and TV presentations needed to fill their programs and thus cumulate production and distribution margins. Their ultimate target is also the North American market where Canal+ is already producing movies.

In Germany, large groups such as Kirch and Bertelsmann are following a more prudent strategy than Penta and Canal+, keeping a lower profile on the international scene. Independent producers (e.g.,. Neue Constantin and Scriba u. Deyhle) participate financially in international (American) works without yet producing directly at that level. The latter also reinforce their integration of a distribution network in Germany.

Overall, the strategies aimed at expanding the network of modern, multiplex cinemas are likely to boost growth in cinema attendance, as was the case in the United Kingdom. In this respect, Pathé Cinema and Gaumont (Seydoux family), UFA Theatre, Warner Bros and MGM/Pathé are voicing the most ambitious strategies: their planned investment implies a growth of 37% in European multiplex theatres in the next two years.

REGULATIONS

Public financing was introduced as early as the 1960s (the Golden Age of European film industry) in several countries to help cinema resist the new competition from TV and later its competitive disadvantage against the US "majors".

Goals assigned to public funding vary between countries: Germany, Luxembourg and Greece primarily seek to support the technical industries associated with film-making; Italy, Belgium, the Netherlands and Portugal try to foster artistic creation; and Spain and France aim at both the industrial and creative goals.

Two European bodies enact policies vis-à-vis the film industry: the European Commission through the five years MEDIA Programme (200 million ECU) and the Council of Europe through the EURIMAGES scheme.

OUTLOOK

The issues that the European film and video industries will be facing in 1994 and beyond are already clearly perceptible. There is a need for pan-European alliances between the key players to enable production risks for films with international potential to be better supported. Producers, authors and technicians must create a new team approach and jointly strive to achieve a balance between the commercialism sought by producers, while retaining the quality and personality of European films.

The motivations behind state incentives need to move from a defensive to a more offensive stance on the international scene, albeit continuing to support the expression of national cultures.

Cinema distribution must continue to upgrade its service, offering a competitive alternative to TV viewing. Distributors need to adjust to a longer product life-cycle by better monitoring the long term marketing of a film through its various channels.

Written by: LEK

Television
NACE 974

The television market encompasses three main activities: production, methods of transmission and reception and finally, broadcasting. Programme production, undermined by the competitiveness of American imports, is a poorly developed sector in Europe despite support from both the EC and national levels. Transmission and reception systems are constantly evolving through technological development in areas such as cable or satellite and High Definition Television (HDTV). The broadcasting industry is extremely competitive following deregulation in the 80's and the explosion in the number of private channels.

INDUSTRY PROFILE

Description of the sector

Production

Films, game shows, documentaries, series, cartoons - the television programmes which count for more than three and a half hours of European viewing time daily - are produced by independent companies and multimedia groups. The smaller independents rely extensively on service providers and specialists in audio-visual equipment to whom they subcontract the technical aspects of production.

Transmission and reception

Televisions operate on analogue transmission systems using three different norms (NTSC in North America, PAL in most of Europe and SECAM in France and Francophone countries). Hertz transmission is the most widely used in Europe but poor reception and problems of frequency capacity have led to the development of cable and satellite. Among wide-screen systems, one can recall D2-MAC and PAL Plus.

Broadcasting

This is the responsibility of the television channels. In the 1980's, technological developments and deregulation led to the increasing emergence of private channels in Europe. The number of national broadcasting stations grew from 40 in 1981 to more than 140 in 1991, of which more than 50% were private. These include pay and specialised channels, as well as private generalist channels competing directly with their public counterparts.

Recent trends

Production

The production industry in Europe has suffered from structural weaknesses (few large companies that are all too often undercapitalised) that have prevented it from keeping up with the rapid growth in broadcasting demand. Between 1985 and 1990, the hourly volume of programmes broadcast increased by 175% while the available European supply increased by a mere 60%. This explains the important share of repeat showings (27% in 1990) and the significant development of purchases outside the Community (38% in 1990).

Transmission and reception

There are 122 million households in Europe housing 127 million television sets. Of these, 15% receive television by cable and 5% by satellite. Major differences exist between Southern Europe, where cable penetration is low (only 23% of Greek households in cabled areas are connected, while in Spain, Italy and Portugal, cabling is practically non-existent), and more northerly Member States (Belgium has a 99% penetration in cabled areas; Holland, 95%). Satellite penetration follows a similar geographical pattern.

Finally, HDTV, the new standard of television reception, promises to be one of the major developments of the future, together with digital techniques and multimedia.

Broadcasting

Since the end of the 1980's, increased competition has led to growing financial problems for the broadcasting channels, which have been faced with a reduction in their shares of advertising revenue. This in turn led to the development of new services such as pay channels and specialised channels.

International comparison

The Americans have the highest rate of penetration of televisual equipment in the world: 2.4 television sets per household and a penetration rate of 77% for video recorders. Close behind are the Japanese, with 1.5 television sets per household and a penetration rate of 81% for video recorders. By contrast, the EC averages just over 1 television per household. Video recorder penetration is only 50%, though there are significant country variations (Italy with 31% and the United Kingdom

Table 1: Television
Penetration of cable and satellite in the EC, September 1991

	Households with TV (million)	Households with satellite dish (million)	Penetration rate (%)	Households in cabled areas (thousand)	Cable subscribers (thousand)	Penetration rate (% of subscribers
Belgique/België	3.53	0.01	0.4	3 300	3 262	98.8
Danmark	2.22	0.03	1.4	N/A	N/A	N/A
BR Deutschland	31.35	2.30	7.3	16 597	8 953	53.9
Hellas	3.20	0.01	0.2	N/A	N/A	N/A
España	10.94	0.10	0.9	N/A	1	N/A
France	20.25	0.04	0.2	3 214	1	20.1
Ireland	0.99	0.02	2.0	0	0	82.2
Italia	20.25	0.00	0.0	0	0	0.0
Nederland	5.87	0.15	2.6	4 800	4 580	95.4
Portugal	2.86	0.01	0.3	0	0	0.0
United Kingdom	21.45	2.00	9.3	2 059	0	22.4
EUR 11	122.90	4.67	3.8	N/A	N/A	N/A

Source: Screen digest

Table 2: Television Broadcasting Incomes in the EC

	1985		1990	
	(billion ECU)	% of total	(billion ECU)	% of total
Televisions	11.8	89	18.9	83
Video	1.4	11	3.7	17
Total	13.2	100	22.6	100
TV incomes	(billion ECU)	% of total	(billion ECU)	% of total
Licence fees	5.5	47	6.6	35
Advertising	5.4	46	10.2	54
Other (1)	0.9	7	2.5	11
Total	11.8	100	18.9	100
(1) Detail of other	(million ECU)	% of total	(million ECU)	% of total
Cable	383	455	52	22
Pay TV	85	10	1 318	53
Other	382	45	595	24
Total	850	100	2 465	100

Source: Observatoire européen des systèmes de communication, European Institute for Media, CIT Research

with 71%). The high level of household penetration in the UK is presumably partly a function of the availability of imported software from the USA in its original language, without dubbing or subtitle costs. The availability of imported software can have a positive impact on sales of hardware (hence on the European manufacturing industry).

Foreign trade

The EC trade deficit for programme production was 0.5 billion ECU in 1990. On average, European countries import around two thirds of fictional broadcasts.

American producers control a significant share of the fictional programming in Europe, though the presence of the Japanese is increasingly felt, particularly in cartoons. In 1990, the Americans exported 2.4 billion ECU of programmes of which 62% was destined for the EC. By contrast, American imports from the EC represented a mere 221 million ECU.

The trade deficit in production revolves around European producers' dependence on programme demand from the national broadcasting channels, a function of their insufficient size and inability to risk investing in more speculative projects. Broadcasters in turn are hostage to the needs of audience maximisation, limiting the possibilities for development of programmes with international appeal. European producers have therefore been unable to build up a sufficient stock of programmes to promote the export market as well as to meet growing internal demand.

MARKET FORCES

Demand

Despite the fact that penetration of television sets already exceeds 100% in European households, there remains potential for growth in the installed base owing to the advent of video games and the decrease in equipment prices. This phenomenon

Table 3: Television Public and private TV in the EC

(% of channels)	Public TV 1985	Private TV 1985	Public TV 1990	Private TV 1990	Public TV 1993	Private TV 1993
Belgique/België	85	15	56	44	58	42
Danmark	100	0	100	0	N/A	N/A
BR Deutschland	100	0	71	29	50	50
Hellas	100	0	32	68	N/A	N/A
España	100	0	85	15	62	38
France	100	0	33	67	38	62
Ireland	100	0	75	25	N/A	N/A
Italia	91	9	50	50	46	54
Luxembourg	0	100	0	100	N/A	N/A
Nederland	100	0	75	25	N/A	N/A
Portugal	100	0	100	0	N/A	N/A
United Kingdom	52	48	47	53	44	56
EUR 12 (1)	11	4	11	10	N/A	N/A

(1) Number of countries which have a public/private TV sector.
Source: CSA, Ambassade de France, Médiamétrie

Table 4: Television
Origin of TV fictions, 1990

(%)	Domestic production	Other EC production	USA production	Other	Total
Belgique/België	2	20	61	17	100
BR Deutschland	22	7	63	8	100
España	4	12	46	38	100
France	35	9	47	9	100
Italia	6	2	78	14	100
Nederland	10	17	50	23	100
Portugal	N/A	12	43	N/A	N/A
United Kingdom	30	1	47	22	100

Source: INA

is already manifesting itself in countries such as the United Kingdom and Spain where 50% and 39% of households, respectively, possess a second television.

In more recent times, the video recorder has shown a rapid growth (between 1989 and 1991, penetration moved from 40 to 54% in Germany, from 59 to 71% in the United Kingdom and from 35 to 50% in France).

The effect of this development in the installed base of audio-visual equipment on demand for television may in part be counterbalanced by other factors. For example, the Institute Médiamat has noted a 20% reduction in viewing time in the last three years by young Europeans of 14 to 20 years. This may be the result of the development of the electronic games market.

Television viewers are increasingly sensitive to the choice and diversity of programmes (hence, the success of pay TV and specialist channels such as MTV and Eurosport) and the possibility of customising their viewing (e.g. through development of interactive systems).

Supply and competition

The deregulation of the 1980's has led to a wide diversity of channels (3.5 times more channels in 1991 than in 1981) and to a number of pan-European broadcasters resulting from the development of cable and satellite TV. According to a study carried out by the CSA (Centre Supérieur de l'Audiovisuel) in 1992, these can be grouped into the categories discussed below.

The "Generalists" (ARD, DK; BBC1, UK; RAI1, I; FR3, F; and TVE2, E) are principally public channels in competition with the private stations, aiming for a balance between public service (information, education, culture) and commercial appeal for the sake of audience maximisation. The "Americans" (RTL, L; Rete4, I; M6, F; Antenna, GR; and TELE 5, E) were created in the 1980's. These channels have a commercial emphasis and are mainly dedicated to fictional programmes imported from the USA. The "Fighters" (TF1, F; Canale 5, I; and RTL4, NL) attempt to compete with the supremacy of the public channels by an aggressive choice of entertainment programmes.

The "Culturals" (La 7, F; Eins+, DK; and Channel 4, UK) aim to promote a national audio-visual cultural heritage. The "Educationals" (BBC2, UK and Nederland 3, NL) show programmes with primarily an educational emphasis. And finally, the "Basics" (TV1/2, SF; DR & TV2, DK; and Kanal 1, S) have low viewing figures, devote much time to supply of information, show a high percentage of repeats and survive essentially on television licence fees.

The new areas of research and development in the supply of televisual products centre around three main axes: the search for increased viewing comfort and perfection with HDTV; the increase in supply of programmes through the multiplication of channels as a result of digital methods; and the development of interactive methods, a veritable combination of micro-computer and CD technology.

Production process

The digital system has numerous advantages. It is possible to compress up to one hundred times more information on a channel, i.e. between three to eight programmes. The immediate result is a reduction in the cost of transmission of these programmes. The information is evenly recorded (unlike with analogue systems) and blurring between channels presents less of a problem. This creates the possibility of broadcasting the same programme on the same frequency from different

Table 5: Television
Audiovisual trade balance between the EC and the USA (1), 1992

(million ECU)	USA receipts from the EC			EC receipts	
	MPEAA (2)	AFEA (3)	Total	from the USA	intra-EC
Cinema	567	158	725	63	150
Television	1 142	259	1 401	81	N/A
Video	808	180	988	101	N/A
Total	2 516	598	3 114	245	N/A
EC trade balance with the USA				-2 869	

(1) Estimation by IDATE.
(2) MPEAA: Motion Picture Export Association of America.
(3) AFEA: American Film Export Association.
Source: IDATE

Table 6: Television
EC TV programmes exported, 1990

(million ECU)		Total
BR Deutschland (1)	ZDF	19
España (2)	RTVE	4
France (3)	Prod. cinéma	67
Italia (4)	Ens. Producteurs	59
United Kingdom (5)	Soc TV	209
	Soc Cinéma	498

Sources: (1) ZDF (1989); (2) RTVE; (3) CNC; (4) ANICA (1988); (5) CSO

points. Digital production, transmission and reception offer a better and more constant quality of image; and with digital TV, it is possible to transmit programmes on mobile and portable TV sets via hertz transmission.

Despite financial and technical obstacles, the race for high definition television has started. This revolution owes much to the development of digital technology, a process of codification and transmission of binary elements. The stakes are high, involving the replacement by the years 2000 to 2010 of 800 million television sets and 250 million video recorders: a jackpot of 250 billion USD.

INDUSTRY STRUCTURE

Companies

Production

The three main independent producers in Europe are Granada in the United Kingdom (270 million ECU turnover in production in 1991), SFP in France (205 million ECU total turnover in 1991) and Bavaria from Germany (46 million ECU total turnover in 1990). They are able to invest more heavily than their smaller competitors, but nevertheless suffer from a high level of indebtedness that has limited their development.

In partial response to this, large communications groups such as Fininvest, News Corp. and Canal Plus, already involved in broadcasting networks, have vertically integrated into programme production.

Transmission and reception

Two main types of companies are involved in the development of new technologies of transmission and reception: electronic groups such as Philips (NL, 11.9 billion ECU of turnover in consumer electronics in 1991), Thomson (F, 4.4 billion ECU), Nokia (SF, 1.1 billion ECU) in the area of HDTV equipment; and cable operators such as France Telecom that are developing future techniques of transmission.

Table 7: Television
Demand for TV programmes (per year) in the EC, 1990

	Number of hours broadcasted
Movies	50 400
TV fictions	112 000
Other stocked programmes (1)	61 600
Current programmes (2)	336 000
Total	560 000

(1) This includes cultural and documentary works ... (art. 4 and 5, directive "Television Without Frontiers").
(2) This includes sports events, news programmes, shows, gameshows (art. 4 and 5, directive "Television Without Frontiers").
Source: FEMIS (Institut de Formation et d'Enseignement pour les Metiers de l'Image et du Son)

Broadcasting

In Europe, a hundred or so broadcasting stations figure among the 6 diversified communications groups: Bertelsmann (D, 2.7 billion ECU of audio-visual turnover in 1991) with three channels (RTL Plus, Premier and Vox), focused on the German market; the group Kirch (D), which holds stakes in Sat 1, Premiere, DSF, Pro 7 and Kanelkanal, is also focused on the German market; Fininvest, belonging to Silvio Berlusconi (2.8 billion ECU of audio-visual turnover in 1991) controls 3 channels in Italy (100% of Canale 5 and Rete 4 and 55% of Italia 1)-it also has involvement in the German market (21% of Tele 5) and the Spanish market (25% of Tele Cinco); and the CLT (L, 1.1 billion ECU of audio-visual turnover in 1991) remains the group with the most extensive presence in Europe: 66% of the Belgian channel RTL TV1, 25% of RTL 4 (NL), 25% of M6 (F), 46% of RTL Plus (D) and 29% of RTL Luxembourg. The last two groups are present in the pay television market. They are: (1) Canal Plus (F) with 1.13 billion ECU of turnover in 1992, which owns 25% of Canal Plus Espagne, 42.7% of Canal Plus Belgique and 37.5% of Premiere in Germany and (2) the Murdoch group (News Corp., 2.3 billion ECU of audio-visual turnover in 1991) has a quasi-monopoly in the United Kingdom with BSkyB.

Strategies

Production

Aware of American leadership in the area of programme production, European producers have increasingly aligned themselves with groups in the United States. Since 1989, the number of joint ventures has developed steadily.

Transmission and reception

France Telecom, having launched the satellite Telecom 2 for broadcasting programmes in D2 MAC, is currently working on digital television transmission systems and HDTV.

In the equipment market, smaller European players such as the Finnish group Nokia are hard pressed to compete with the Japanese electronics giants (Matsushita with 43 billion ECU audio-visual turnover in 1991, Hitachi with 21 billion ECU and Sony with 22 billion ECU). Philips have made a major commitment to the interactive compact disk. Thomson is looking to develop digital technology while still continuing to support D2-MAC.

Broadcasting

Already present in newspapers and publishing, the Bertelsmann group has taken advantage of the opportunities presented by the appearance of the private television channels in Europe.

Kirch, which supplies most of the public German channels with films and series has also followed a strategy of moving into broadcasting via the private channels.

The lead position of the group Fininvest in private Italian television allowed Silvio Berlusconi to invest rapidly in related activities - private channels elsewhere in Europe, international film production and advertising - and to diversify into other media forms such as newspapers and publishing.

The CLT, with its eight channels in five European countries, has a clearly stated strategy: to develop its presence abroad through the profitable specialist channel segment.

Canal Plus (F) is the only operator to have concentrated principally on its original core business: pay television. Today, its strategy is one of vertical integration into cinema production

Table 8: Television
Origin of TV programmes in the EC

(%)	1990 Hourly volume	1990 Broadcaster budget	1995 (1) Hourly volume	1995 (1) Broadcaster budget
Internal productions	30	54	29	49
Repeat showings	27	0	28	0
Purchases	38	30	37	29
Co-productions	5	16	6	22
Total	100	100	100	100

(1) Estimated
Source: FEMIS

and a search for partners in the development of new technologies.

The other pay TV group, Murdoch's BSkyB bases its strategy on the emulation of the great American success stories (MTV, CNN and ESPN).

REGULATIONS

Production obligations

These vary according to Member States. For example, British channels are obliged to obtain 25% of their hourly volume from independent producers. At the same time, the EC Directive on "Television Without Frontiers" (89/552/EEC) stipulates that "where practicable and by appropriate means, that broadcasters reserve at least 10% of their transmission time, excluding the time appointed to news, sports events, games, advertising and teletext services, or alternatively, at the discretion of the Member States, at least 10% of their programming budget, for European works created by producers who are independent of broadcasters.".

Broadcasting obligations

Various national obligations fix European broadcasting volume at between 25 and 60% of total volume depending on the Member State. The "Television Without Frontiers" Directive stipulates that, where practicable, Member States should ensure that broadcasters "reserve for European works, ..., a majority proportion of their transmission time, excluding the time appointed to news, sports events, games, advertising and teletext services.".

The Media programme, adopted in December 1990, has 200 million ECU dedicated over 5 years to the European audiovisual industry: up to 85 million ECU in support of distribution, up to 65 million ECU in support of production, 20 million ECU in support of developers of new technologies in audiovisual production, 10 million ECU for professional development and 15 million ECU for development in countries with limited production capacity. It is implemented by the European Commission.

OUTLOOK

Continued European efforts to make headway in the programme production industry may begin to reap rewards in the coming decade, though the battle is by no means won. It is likely that increasing cooperation with American groups will assist in this process, as would the development of a system of centralised production, favouring the emergence of a major European production group.

Digital technology seems to have found its place as the transmission system for the future due to its numerous advantages. Cable operators, electronics groups and computer giants are set for the race for HDTV and multichannel digital TV. In addition, computer groups are developing multi-media tools integrating voice, text and image.

As for the broadcasters, the market will continue to be competitive, with public channels increasingly unable to survive on licence fees, and TV stations generally suffering from a drop in advertising revenues. In parallel, the trend towards pay stations and particularly, specialist stations (with narrower targets and smaller market shares) is expected to continue.

Written by: LEK

Table 9: Television
TV advertising expenditure in Europe

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
BR Deutschland	617	666	713	772	827	919	1 040	1 283	1 585	2 125
España	316	308	376	433	549	685	879	1 123	1 415	N/A
France	450	532	538	681	866	1 155	1 441	1 632	1 823	1 917
Italia	516	806	1 103	1 293	1 451	1 669	1 890	2 067	2 288	2 528
United Kingdom	1 463	1 664	1 844	2 017	2 146	2 303	2 783	2 956	2 791	2 816
EC	3 602								10 882	
Channels	41								143	
Income /Channel	88								76	

Source: European Advertising Tripartite

Music recording
NACE 345.2

The combination of difficult economic conditions, maturing compact disc (CD) markets and increased competition from new media (e.g. computer games) have adversely affected sales in the EC for the recorded music sector in 1992. Sales grew by only 0.8% (in nominal terms) compared with 1991. But the few European corporations that lead the industry are building their hopes on the development of new recording media such as the DCC (Digital Compact Cassette) and the MiniDisk.

INDUSTRY PROFILE

Description of the sector

The recording industry ranges from the selection, management and production of artists to the manufacturing, marketing and distribution of "Long Play" or "Singles" recorded on media such as Compact Discs, Vinyl Discs and Compact Cassettes. This sector represented 7.9 billion ECU in 1992 for the EC as a whole. Three European groups, PolyGram (NL), Thorn EMI (UK) and BMG (D), captured close to 50% of the world market; Germany, the United Kingdom and France represent 70% of EC consumption and 23% of the global market.

Recent trends

This sector follows a long term cyclical variation closely correlated to the introduction of new technologies. Vinyl LPs peaked (with 1.2 billion units worldwide) in 1981; cassettes reached a plateau in 1989 (1.5 billion units), and further growth is still expected from CDs (1.2 billion units in 1992). Philips's (NL) DCC and Sony's (JPN) MiniDisk are expected to capture, in their turn, most of the momentum gradually lost by cassettes.

Another underlying trend is industry consolidation in a market where production economies of scale are critical. The acquisition of Virgin records (production and distribution) by Thorn EMI in 1992 was a clear illustration of this trend. Indeed, a large number of independent EC record companies have been acquired by the "majors" over the past years such as Vogue (F) and Avrep (F).

International comparison

In 1992, the EC represented 32% of world sales, ahead of the USA (31%) and Japan (15%). Consumption patterns remain quite different in these markets; the importance of record rentals in Japan (where there are as many rental shops as record retail outlets) is combined with the highest CD hardware penetration in the world (90%). In the USA, CD penetration is much lower (45%) but portability has proved a key growth factor (the success of the "Walkman" pushed cassette player penetration in American homes to a peak 3.2 units versus 2.3 in the EC).

EC Member States offer a very contrasted picture. In 1992, Dutch consumers spent on average 37 ECU per capita on music recording, benefiting from high CD penetration at an EC record 64%; in contrast, Greek consumers only parted with some 5 ECU per head with 10% CD penetration.

The three leading EC markets, Germany (2.05 billion ECU), the United Kingdom (1.7 billion ECU) and France (1.6 billion ECU) today rank among the top five in the world.

Foreign trade

Because of their trans-national market positions (and the low cost of transport), record companies tend to organise manufacturing independently of market locations; custom statistics are therefore not meaningful. However, two patterns are worth noting. The first one is that most European markets are heavily penetrated by the "international pop" repertoire. This category typically represents 60% of national sales, despite notable exceptions such as Greece, Spain, Italy or even France where national artists make up 40-50% of the markets. Classical recordings fill the remaining 10%. The second pattern is that beyond visible trade of records and tapes, the impact of invisible exports is extremely significant for exporting countries; the Policy Studies Institute in the United Kingdom estimated in 1988 that the ratio of invisible to visible exports for the United Kingdom was 7, thereby generating over one billion Pounds Sterling, i.e. twice as much as films, video and broadcasting combined.

Table 1: Music recording
Consumption by country, 1992

	(million ECU)	% share in EC total	% share in world total
Belgique/België	273.9	3.5	1.1
Danmark	164.1	2.1	0.7
BR Deutschland	2 253.8	28.8	9.2
Hellas	52.6	0.7	0.2
España	501.5	6.4	2.0
France	1 654.2	21.1	6.7
Ireland	52.6	0.7	0.2
Italia	558.8	7.1	2.3
Nederland	553.3	7.1	2.3
Portugal	63.2	0.8	0.3
United Kingdom	1 707.9	21.8	7.0
EC (1)	7 835.9	100.0	31.9
USA	7 578.3	N/A	30.9
Japan	3 699.6	N/A	15.1
World	24 534.2	N/A	100.0

(1) Excluding Luxembourg.
Source: IFPI

Table2: Music recording
Evolution of the share of different media

(%)	1980	1985	1992
Singles	34	36	15
LPs	46	35	4
MCs	20	27	28
CDs	0	2	52

Source: IFPI

MARKET FORCES

Demand

In value terms, music recording is one of the few economic sectors that has enjoyed two-digit compound growth across Europe since 1989 (annual growth was even higher than 20% in Portugal and Belgium). A number of factors have an impact on this level of demand. General economic conditions obviously prevail. Hoare and Govett Investment Research have recently illustrated the close correlation between GDP growth and "music value growth" in Europe over the past 10 years. In addition, it is often believed that younger age groups represent key buyers for this sector. It appears that this was indeed true when older generations had not had the opportunity to buy records in their youth. Recent USA data suggests that music buying habits are carried up the age profile (the share of USA music sales taken by the 15-19 year group has already fallen from 24% to 17% in the four years to 1991, while the amount accounted for by the 30-39 year old group increased from 19% to 23% over the same time period. Europe's ageing population is therefore expected to follow a similar pattern and not to have too negative an impact on the sector's future growth.

Technology changes are obviously critical. The "technological cycle" described earlier seems to peg demand to new hardware development (CD, soon DCC & MiniDisk). The move to CDs has radically altered the balance of sales by media; CDs have grown in the EC by 25% (compounded annually) since 1989 while LPs annually decreased by 41%. The impact of the switch has led to an annual value growth of 11% over the same period.

Indeed, the CD segment still grows very fast in countries where CD hardware penetration is still low (Greece, Portugal and Spain), but strong growth has also been recorded over the past 4 years in the more "penetrated" countries of Belgium, Denmark and Germany.

Another positive impact from new media is that they allow enhanced price realisation for record producers (although this is not true on a per minute basis with CDs lasting much longer than old vinyl LPs). Increased value-added has led to much higher price points thus helping to increase market values in spite of sluggish volume growth.

Lastly, commercial dynamism cannot be underestimated. Record marketing has become more professional in the EC (e.g. owing to TV advertising, which provided a welcome boost to the French market in 1988). More recently, distribution has played a significant role in helping to build up markets, often competing on prices; Virgin Megastores have opened in most EC countries, and mass retailers such as hyper/supermarkets (which represent 50% of retail market in France) have helped push demand.

Supply and competition

Some 60 CD production plants exist today within the EC. Most of them are owned by major record companies, although some independent companies remain active such as MPO (F) and Nimbus (UK). The music recording industry has obviously become a highly capital intensive business where competitiveness is a direct function of economies of scale, thus driving industry consolidation across Europe.

With retailers gaining in influence on buying decisions, price positioning becomes a more critical element of the marketing-mix. Beyond exchange rate fluctuations (particularly with the USD), a CD could be purchased in November 1992 at £ 12.78 in the United Kingdom, against some 34% more (£ 17.13) in Ireland. This in turn was then 71% more expensive than the equivalent cost in the USA (£ 10.00). Yet, by early 1993, member countries had largely succeeded in realigning VAT rates so that their range has become much narrower. Italy has the lowest rate (12%) and Belgium the highest (19.5%). France experienced a very favourable boost when the rate was brought down from 33.3% to 18.6%, in 1987.

Production process

Technological development is a key driver for this industry. The impact of CDs has considerably rejuvenated the market, fast offsetting the LP's rapid decline. It is generally believed that CD growth is not about to disappear in Europe. This is true even for highly penetrated markets such as the Netherlands. For example, estimates expect CD hardware penetration in Japan to grow from a current 90% to over 140%. A similar revolution is under way with the take-off of two new technologies promoted by two of the electronics giants.

The cassette had become a fantastic worldwide success (in 1988, cassettes attained volumes in the world 50% larger than those of LPs and CDs combined; in Western Europe, cassette recorders reached 230% penetration), which industrialists hope to emulate with new media forms.

DCC (Digital Compact Cassette) has been developed to offer digital quality on a medium very close to the traditional analogue cassette. Its real portability (superior to CD) is key, as is its "back-compatibility" (traditional cassettes can be played on DCC hardware). The Dutch group Philips, allied to Mat-

Table 3: Music recording
Breakdown by sector, 1992

(million units)	B	DK	D	GR	E	F	IRL	I	NL	P	UK	EC (1)
Singles	4.1	0.8	26.6	0.0	1.3	16.8	0.8	1.1	4.2	0.0	52.9	108.6
LPs	0.0	2.0	5.0	4.1	9.6	0.3	0.1	3.1	0.6	0.8	6.7	32.3
MCs	2.5	1.5	55.6	1.9	21.3	35.5	2.3	21.2	1.8	1.7	56.4	201.7
CDs	14.1	6.5	123.7	1.8	20.1	78.5	1.1	23.6	33.2	2.8	70.5	375.9
Total value (2)	273.9	164.1	2 253.8	52.6	501.5	1 654.2	52.6	558.8	553.3	63.2	1 707.9	7 835.9

(1) Excluding Luxembourg.
(2) In millions of ECU
Source: IFPI

Table 4: Music recording
Breakdown of EC markets by musical repertoire, 1992 (1)

(%)	B	DK	D	GR	E	F	IRL	I	NL	P	UK
International pop	80	69	92	46	47	50	60	44	70	74	86
Classical	10	6	8	N/A	10	10	N/A	8	14	9	9
National	10	25	N/A	54	43	40	40	48	16	17	5

(1) Germany and the United Kingdom include local music in international pop; Greece includes classical music in International pop;
Ireland excludes classical music.
Source: IFPI

sushita (JPN), is the contender for this system. It is estimated that some 26 000 DCC were sold worldwide in 1992, growing to over 157 000 by 1995. Multiple copies are prevented by way of an internal "deteriorating" device. The Minidisk (developed by Sony) also offers recording capabilities (and multiple copying prevention) but is not back-compatible.

Another technology worth mentioning is direct transmission of recorded music along cables, telephone lines or via satellites. Such systems (e.g. DMX/BSkyB or Digital Cable Radio Associates/Warner/Sony), are already operative in the USA.

INDUSTRY STRUCTURE

Companies

The recorded music industry is highly concentrated, with five multinational groups sharing more than 80% of the world market. However, beyond the few independent companies that have managed to survive (e.g. Harmonia Mundi, F or Nimbus, UK), the majors are careful to expand through carefully positioned local presence (for example, Thorn EMI, UK, own 61 record companies in 37 countries). Local labels generally enjoy a large degree of freedom in their management. Overall, the International Federation of Phonographic Industries (IFPI) comprises some 600 members in the EC, 250 in Germany alone.

The five leading groups in the music industry are generally vertically integrated in hardware and/or retail. They are Warner (Time Warner, USA), PolyGram (80% controlled by Philips, NL), Thorn EMI (UK), Sony Music (JPN) and BMG (Bertelsmann Music Group, D).

European dominance is striking: three of the 5 world leaders are EC companies, together representing close to 50% of the world market.

Strategies

The combination of capital intensity with market internationalisation (the majority of European markets are dominated by international pop and classical), means that economies of scale are critical and, fortunately, achievable.

Most players have therefore sought to secure a wider international position, as well as to enrich their repertoire. Vertical integration upstream brings substantial marketing power and flexibility (e.g. Virgin/EMI). Technologically, synergies between Sony Music and Sony's MiniDisk or PolyGram and Philips' DCC are not less significant.

PolyGram

It is the "purest" of all competitors with 83% of its sales in music. Its position is particularly strong in Europe (22% market share, up to 34% in France). PolyGram has been busy building up its international network recently, through the acquisition of several USA companies (A&M, Island Records and, more recently with Motown). PolyGram is strong in the classical department with international labels such as Decca. Philips Classic or Deutsche Gramophon.

It is also one active in the European music mail order business through Britannia Music (UK), Dial (F), Karussel (D) and PolyMond (I). The group has recently started building a position in the music publishing business, as well as in the video production and distribution, with a 6% shareholding in the USA retailer "Blockbuster".

Thorn EMI

The much-publicised Virgin acquisition in June 1992 boosted Thorn EMI's global market share to 17%, thus giving them the third position in front of Sony Music. Thorn EMI is more diversified than PolyGram and only derived a third of its £ 4.4 billion revenues from music in 1993. It employs over 8 000 people.

The group benefits from a strong presence in the very profitable activity of music publishing (EMI Music is a world leader with 25% market share). It is also diversified in TV, VCR and other electronic hardware rental, as well as lighting fittings and security electronics.

One of Thorn EMI's objectives is also to balance its international portfolio, which led them to acquire Chrysalis in 1990.

Bertelsmann Music Group (BMG)

With 11% of the world market, BMG is the third largest European music record company and ranks 5th in the world. Of its 4 billion DM of sales, 50% were achieved in Europe in 1992 compared to 29% in North America. International expansion has, over the recent years, remained a key objective owing to acquisitions such as Vogue and Avrep (F), or joint ventures with Pressing (I) or Stageway and Norsk (N).

More recently, BMG has been expanding its lead in the low-priced CD segment - of particular relevance in eastern Germany - through Ariola Express and Europa labels.

Table 5: Music recording
CD hardware penetration and production facilities, 1992

	Hardware pentration (%)	Production facilities (units)
Belgique/België	50	2
Danmark	20	1
BR Deutschland	45	15
Hellas	10	2
España	16	5
France	38	7
Ireland	9	0
Italia	14	9
Nederland	64	7
Portugal	10	1
United Kingdom	45	7

Source: IFPI

Table 6: Music recording
CD prices and VAT rates by country

(ECU)	CD prices - November 1992	VAT rates - April 1993 (%)
Belgique/België	18.6	19.5
Danmark	20.6	15.0
BR Deutschland	16.2	15.0
Hellas	15.9	18.0
España	17.9	15.0
France	19.0	18.6
Ireland	21.1	23.0
Italia	16.5	12.0
Nederland	18.4	17.5
Portugal	18.6	16.0
United Kingdom	15.8	17.5

Source: IFPI, Employment Conditions Abroad

ENVIRONMENT

It is worth noting that the main environmentally related issue in the music recording industry only recently surfaced in the USA where the conventional "longbox" CD packaging (an anti-theft measure), unknown in Europe, was recently dropped (April 1993), following an initiative from the Recording Industry Association of America (RIAA). This will considerably reduce consumption and disposal of packaging material.

REGULATIONS

Piracy is the major problem for the industry. It is estimated that, over the last decade, some 10.2 billion ECU were lost in the world as a direct result of piracy, mostly through cassettes but increasingly with CDs.

Although this issue is more relevant in some developing countries and Central and Eastern Europe, the problem has also affected Europe. A major battle was fought and won in Greece where a 1983 Supreme Court decision has led to a reduction in piracy from 75% down to 20% in 1992. Piracy rates are much lower in other EC countries, but its annual cost to German industry was still estimated in 1990 to be close to 68.4 million ECU.

The second largest problem for the industry is related to technological development associated with digital technology. The industry is faced with the challenge of maintaining control of the use made of their property as cable and satellite systems provide new methods of distribution of pre-recorded music. The combination of electronic delivery and the phenomenon of private copying, if left unregulated, will have a dramatic impact on the industry.

The European Community has recently adopted or is in the process of adopting harmonisation measures to strengthen the protection afforded to rightowners, including phonogram producers. These measures include the following:

- Council Resolution of 14 May 1992, on increased protection for copyright and neighbouring rights, by which the Member States have committed themselves to become parties by 1 January 1995, to the Paris Act of the Berne Convention for the protection of literary and artistic works and to the Rome Convention for the protection of performing artists, phonogram producers and broadcasting organisations which guarantee certain minimum levels of protection;
- Council Directive 92/100/EEC of 19 November 1992, on rental right, lending right, and on certain rights related to copyright, which grants to authors, performers, phonogram and film producers an exclusive right to control rental of copies of phonograms and also harmonises at EC level

Table 7: Music recording
Share of the world market

(%)	1987	1992
WEA	14.1	19.0
PolyGram	17.3	18.5
Thorn EMI	15.9	17.0
CBS	19.5	16.0
BMG	11.0	11.0
Others	22.2	18.5

Source: Hoare Govett UK Investment Research

protection in relation to public lending, the fixation of performances, the rights of reproduction and distribution for neighbouring rightsholders. The date for entry into force in the Member States is 1 July 1994;

- Council Directive 93/98/EEC of 29 October 1993, harmonising the term of protection of copyright and certain related rights by which authors' rights will last the lifetime of the author plus 70 years and phonogram producers', performing artists' and broadcasting organisations' rights will last 50 years. The date of entry into force is 1 July 1995;
- The proposal for a Council Regulation laying measures to prohibit the release for free circulation, export or transit of counterfeit and pirated goods (COM(93)329) of 13 August 1993. This proposal aims at enabling owners of author's rights and phonogram producers', performing artists' and broadcasting organisations' rights to request the customs authorities to seize for a limited period of time goods which infringe their rights, until an action is brought to court. The proposal is presently being considered by the European Parliament and the Council of the European Union.

The EC has also sought to obtain in its international negotiations with third countries either in the multilateral forums (World Intellectual Property Organisation, or the GATT) or on a bilateral basis (Association agreements with Central and Eastern European countries, partnership agreement with Russia), adequate and effective protection for intellectual property rights.

OUTLOOK

The recent impact of generally poor economic conditions has slowed down the traditionally buoyant growth of the music recording sector in Europe. This is unlikely to last and technological development should offer very positive prospects for the music recording industry in the coming years.

Table 8: Music recording
Piracy rates by country, 1992

(%)	
Belgique/België	4
Danmark	1
BR Deutschland	7
Hellas	20
España	2
France	3
Ireland	7
Italia	15
Nederland	9
Portugal	8
United Kingdom	3

Source: IFPI

In geographical terms, European firms have clearly anticipated competitive developments. They have built a strong worldwide position, and appear concerned to build upon the local strengths of their previously independent acquisitions.

Continuing progress in CD penetration for many Member States will probably be reinforced by the explosion of new "recording" digital media. The opening of substantial new markets (e.g. Eastern Europe) will also benefit European producers.

Written by: LEK

The industry is represented at the EC level by: International Federation of the Phonographic Industry (IFPI). Address: rue Belle-Vue 20 Bte 2, B-1050, Brussels; tel: (32 2) 646 7300; fax: (32 2) 646 5395.

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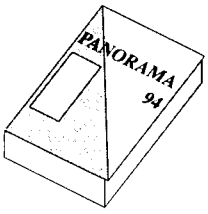
☐ **Please send me ... copy/ies of the Panorama**  **in ..... (language)**

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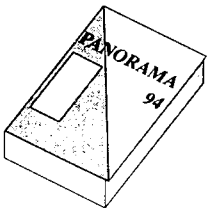

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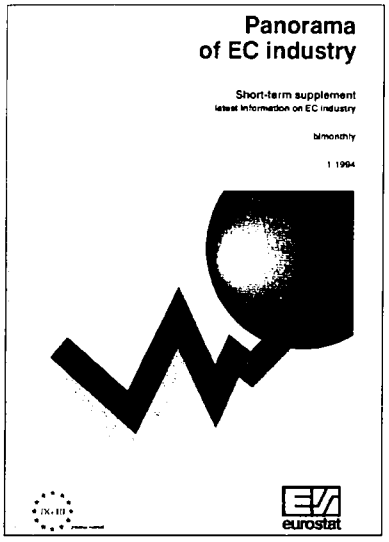

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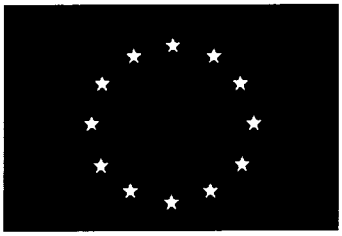

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