Enterprise policy

European competitiveness report

2000

European Commission

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European competitiveness report 2000

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Parts of the report draw on background papers prepared for the European Commission by IFO (Institut für Wirtschaftsforschung), NEI (Nederlands Economisch Instituut) and WIFO (Österreichisches Institut für Wirtschaftsforschung).

European Commission

A great deal of additional information on the European Union is available on the Internet.
It can be accessed through the Europa server (http://europa.eu.int)

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Executive summary

The purpose of the Competitiveness Report is to provide an analytical contribution to the policy debate on how to make Europe a more dynamic and competitive economy.

Over the last decade, the European Union has taken major steps forward in terms of institutional and economic reform. The completion of the Internal Market and the introduction of the Euro speak for themselves. Yet, in comparison with our past performance or with the performance of our main partner and competitor, the United States, the impression that Europe "could do better" remains.

The first part of the report deals with the overall economic performance of the European Union *vis-à-vis* the United States and Japan. In clarifying the causes of the weaker growth record of the EU, when compared with the US, in recent years, the analysis moves successively from productivity developments to investment and, particularly, to patterns of information and communication technology adoption. The second part takes stock of the structural changes in recent decades and gives particular emphasis to the services sector, underlining its role as a source of growth and competitive performance. It assesses the penetration of services in the productive system and evaluates progress in their internationalisation. The last section of the report takes stock of business to business electronic commerce developments and prospects as well as of the policy issues it raises.

Performance of Europe relative to the US and Japan

Measured by GDP per capita at purchasing power standards, the EU lags well behind the US in its standards of living (35 % lower) and ranks lower than Japan. The European economy also offers its population significantly fewer jobs (see Table 1). Despite considerable progress in some Member States, employment rates in all EU countries are well below those in the US and Japan.

Europe fares better when aspects of living standards other than GDP per capita are taken into account. The employed population in Europe enjoys more leisure time than in America due to shorter weekly working hours and longer holidays.[1]

1 As GDP "lost" due to extra leisure time in Europe amounts to only 6-7% of total GDP at current levels of labour productivity, the pronounced gap with the US in terms of standards of living remains even after adjustments for differences in leisure time are made.

Table 1 GDP per capita and employment rates in 1999

Country/Region	Total population[a]	GDP per capita 1000 PPS[b]	GDP per capita Growth[c]	Employment rate[d]
EU	375.8	19.11	1.6	63.4
US	271.4	29.52	2.1	81.7
Japan	126.7	21.12	1.4	76.3

Notes:
a Million inhabitants.
b Purchasing Power Standards at 1995 market prices.
c Average annual % change of GDP per capita at 1995 market prices (1989-99).
d Total employment as % of population aged 15-64.
Source: European Commission.

Catching-up process interrupted

Since the 1950s, European GDP per capita had been catching up with the level in the United States. This process has come to an end (Figure 1). Since the beginning of the 1990s, the living standards of the European Union have increased more slowly than that of the United States. The same has been true for Japan, which had outstripped Europe by the end of the 1970s.

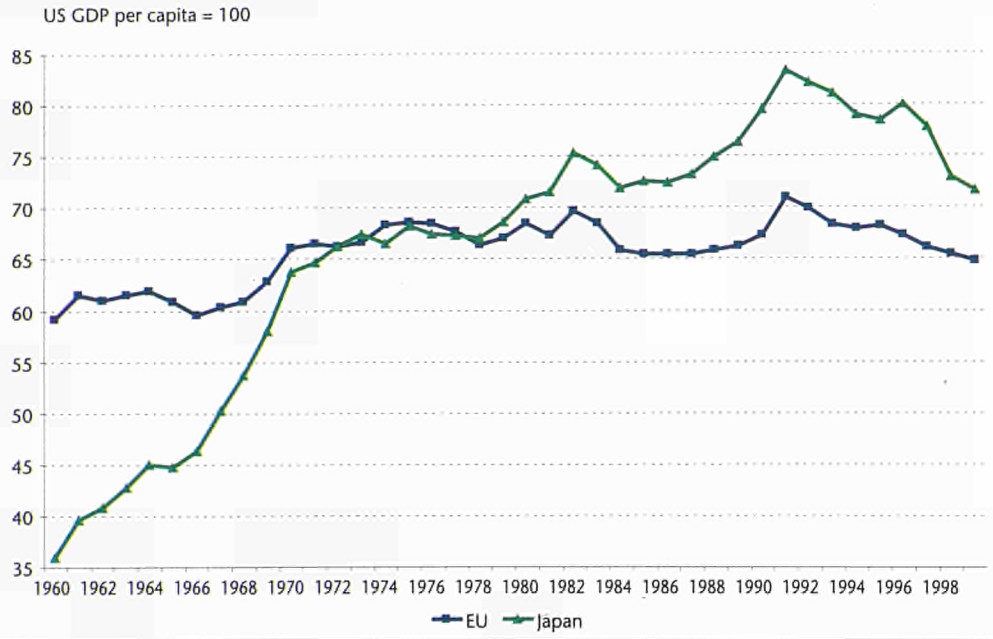
This turnaround is not due to a decline in living standards in Europe; GDP per capita continued to grow during the 1990s (Table 2), and even accelerated in the second half of the decade. However, this was even more the case in the US, where, in the second half of the 1990s, GDP per capita grew not only more than in the EU but also faster than in the previous two decades.

Factors behind the new trends in living standards

A country's GDP performance can be decomposed into employment performance and productivity performance. In the 1980s and early 1990s, the main source of greater growth in the US standard of living was better employment performance. Total employment expanded rapidly, and the employment ratio increased considerably, overcoming Japanese levels by the end of the 1980s.

Over the entire period, the European economy has failed to provide as many jobs in relation to the population of working age as the US economy. While Europe has managed to increase its employment rate since 1995, the increase has been insufficient to close the gap with the US. As the difference between employment growth in the US and Europe shrank in the 1990s compared to previous decades, the employment performance alone does not

Figure 1 GDP per capita relative to the United States



Source: European Commission.

Table 2 Growth of GDP per capita, 1960-1999

	1960-75	1975-85	1985-90	1990-95	1995-99
EU	3.4	2.0	2.8	1.0	2.0
US	2.5	2.4	2.3	1.4	3.4
Japan	7.0	3.1	4.2	1.1	0.8

Source: European Commission.

Table 3 Growth rate of labour productivity per employee, 1960-1999

	1960-75	1975-85	1985-90	1990-95	1995-99
EU	3.9	2.2	1.7	1.9	1.3
US	1.9	1.2	1.0	1.3	2.2
Japan	7.0	3.0	3.6	0.7	1.0

Source: European Commission.

explain why the US economy grew faster during the 1990s.[2]

The second reason for the higher GDP per capita of the US is a higher level of labour productivity. Until the 1990s, Europe raised its output per employee faster than the US economy (see Table 3). Since the second half of the 1990s, however, this pattern has changed, and the US economy has been leading in terms of labour productivity growth. These gains took place at a time when US labour productivity was still significantly higher than in Europe and Japan.

Factors behind changes in productivity patterns

In the past, the increase of labour productivity in Japan and Europe was, to a large extent, due to higher capital expenditures for rationalisation. The lower growth of labour productivity in the US reflected a lower rate of substitution of capital for labour, which, in turn, resulted from lower wage costs and a stagnating real wage. Did the approach of full employment in the US induce companies to put more emphasis on rationalisation and to increase the rate of substitution of capital for labour?

Estimates presented in Figure 2, upper part, confirm the increase in the rate of substitution of capital for labour in the US. After fifteen years of very low values, the rate of substitution of capital for labour increased significantly in the US in the 1990s. In the second half of the 1990s, it was, for the first time, slightly stronger than in Europe.

The second and more important element was the acceleration of the rate of total factor productivity (TFP) in the second half of the 1990s in the US (Figure 2, lower part), while in Europe, total factor productivity in the 1990s slowed down. It is, therefore, the better performance in total factor productivity that explains the rise in US competitiveness and the "new" pattern of improvement in living standards.

Although the difference in the pace of capital deepening was not the key factor in the turnaround in the relative growth of labour productivity, it is worthwhile to have a closer look at investment activity.

In fact, the composition of gross fixed capital formation (GFCF) in the US points to a higher content of new technologies. No such shift took place in Europe or Japan. As such, the observed acceleration of TFP growth may be partly linked to the different investment patterns.

Measured by the ratio of gross fixed capital formation to GDP in the period 1960 to 1990, the US consistently invested less in physical capital than did Europe and Japan. However, deceleration of capital expenditures in Europe and acceleration in the US during the 1990s brought about a convergence. Moreover, US investment in machinery and equipment increased much faster than residential and nonresidential investment during the 1990s, whilst in Europe the ratio of equipment investment to GDP dropped to levels lower than in the 1980s. This trend is even more striking in terms of evolution of GFCF in equipment, which shows a significant acceleration in the US relative to the EU.

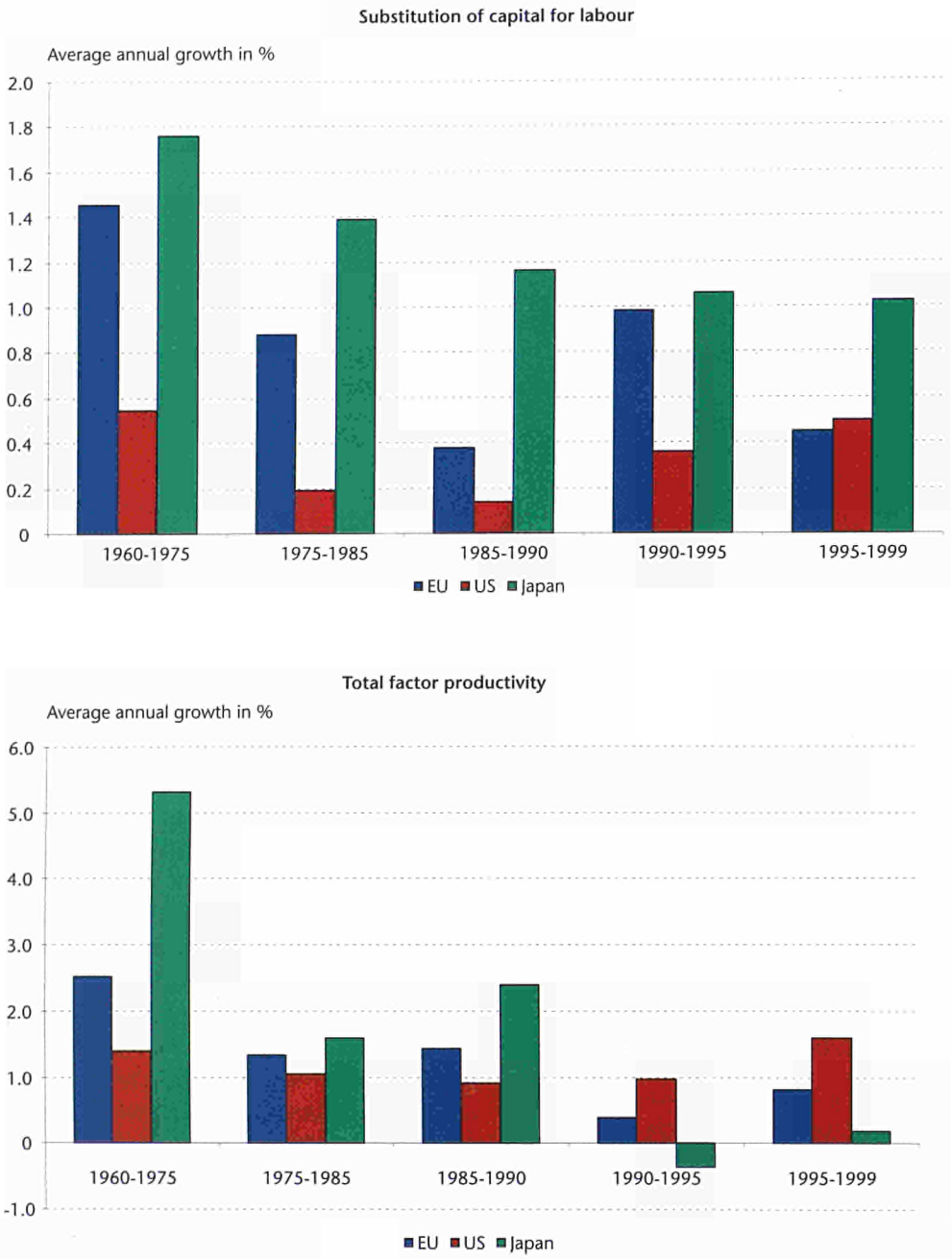
New equipment is often viewed as a carrier of new production technologies. Thus, the rise in the US investment ratio may reflect an increased propensity of all industries to invest in new technologies.

This brings us to the key issue of information and communication technology (ICT), which is now widely believed to be a major factor in productivity growth. The fact that, during the 1990s, US industry spent more in absolute and relative terms on the diffusion of information technology than did its European (and Japanese) counterparts supports this conjecture.

In 1999, ICT expenditure represented 5.8 % of GDP in the EU, 7.3 % in the US and 5 % in Japan (see

2 European GDP per capita would be higher by more than 10 % if the European economic system could generate the same employment ratio as the US (under the hypothesis that the additional jobs would have only half of the average level of European labour productivity to date).

Figure 2 Determinants of labour productivity growth

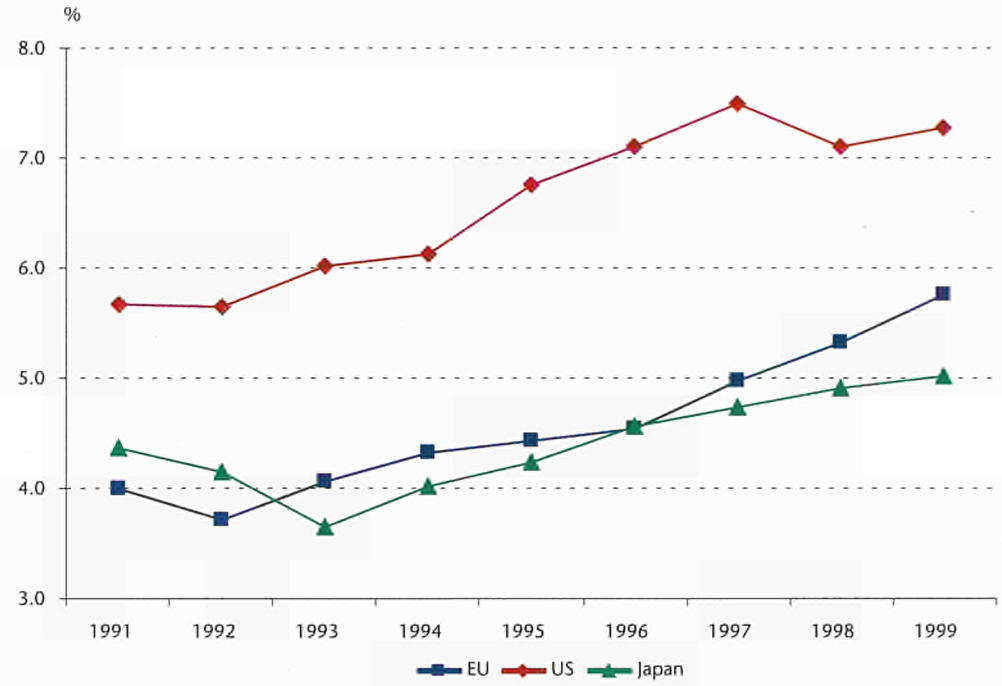


Source: European Commission.

Figure 3). The evolution of ICT in relation to GDP exhibits different patterns in the three geographical areas. The EU followed the growth path of the US until 1997 and since then has been catching up slowly. The EU market size relative to the US increased between 1991 and 1999. During the 1990s, the US retained its position as the largest spender in ICTs but Europe registered the fastest growth. Nevertheless, the gap between the US and Europe still remains significant. Japan followed an upward path similar to the EU pattern but at a slower pace.

Looking beyond the effects of ICT, it should be stressed that total factor productivity is a catch-all variable. International differences in TFP growth may reflect a variety of factors, including different capacities of economic systems to innovate and to adjust to the effects of external shocks and to the

Figure 3 ICT intensity in the Triad



Source: EITO.

effect of changes in the economic system and in the policy framework. The 1990s were not only characterised by the emergence of basic new technologies, but also by far-reaching political changes and the frictions of the globalising economy. The EU economies endured the tension and financial market turbulence following German unification, the effects of labour market rigidities and, more recently, the adverse trade effects of the financial crisis in emerging countries. They also had to cope with the painful, if ultimately beneficial, experience of budgetary stabilisation in the approach to monetary union.

The combination of more rigidities in their economic systems and, arguably, a greater exposure to external shocks may go some way to explain why the European economy suffered more from growth frictions than the US economy during the 1990s. This may be an element in explaining why TFP growth slowed down in Europe.

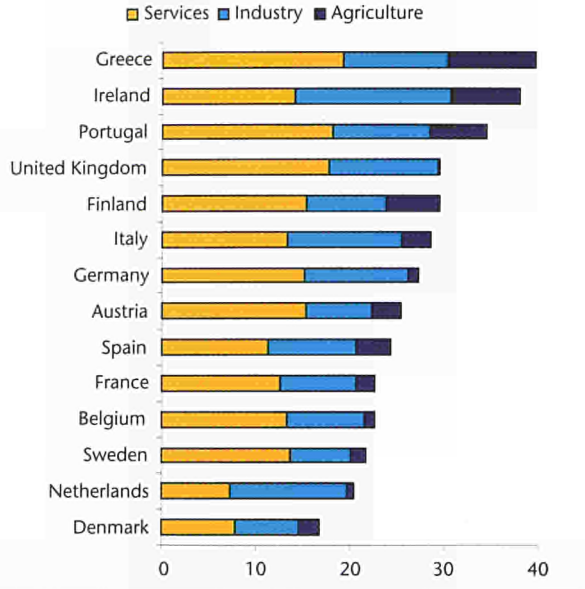
Structural change in the European economy

In a changing environment, the competitiveness of firms, industries and nations depends on their ability to react quickly to new opportunities and challenges. In other words, the speed at which production reacts to changes in demand or to changes in the comparative advantages of a country is an indicator of competitiveness. An indicator of the overall structural change for each country – the macro speed of change – shows that change was considerable between 1980 and 1997.[3]

Figure 4 shows the contributions of the agriculture, industry and service sectors to overall structural change. Approximately one half of the change occurred in the service sector, while the lion's share of the other half took place in industry. The change in agriculture – a decline in all countries – averaged less than one tenth of the total change, but with very large differences across countries.

Among the 25 sectors analysed, the greatest change is the increase in "market services", the share of which increased by about one quarter for the EU. If competitiveness depends on the ability of productive systems to adapt to new opportunities, and if the speed of change indicator is a good measure of this ability, we would expect to find a positive link between growth rates and this indicator. Indeed, data show that countries with higher speed of change also tend to achieve higher growth rates.

Figure 4 Contributions to macro speed of change 1980 - 1997



Source: WIFO calculations using National Accounts ESA, EUROSTAT.

In general, the share of technology-driven industries, of high skill industries and of industries with high content of knowledge-based services increased, while the share of labour-intensive and of low-skill industries decreased. Furthermore, growth is higher in countries with a large share of advertising-intensive industries and in countries where the share of high skilled employees rose.

Industrial change and input use

Structural change within the industrial sector is evaluated by computing the speed of change at the level of 93 industries over the period 1985-1998. The industry speed of change is lower in Europe than in Japan and the US. The indicator is 17.9 for Europe, 19.1 for Japan and 19.3 for the US.[4] This suggests that structural change in Europe may be insufficient; a situation that has been analysed, with regard to specialisation and concentration patterns, in last year's report.

Assessing the adaptability of supply to demand requires a more comprehensive evaluation of economic activity than a single indicator. Three additional indicators of structural change were constructed based on the main input used.

3 This indicator sums the absolute changes in the value added shares of 25 broad sectors, including agriculture, industry and services. It would be zero if no industry changed its share of total value added, and increases the more industries change their relative position.

4 In the US and Japan the data end in 1997.

Europe's position in quality competition

The European Union is a high wage region. The wage differential with respect to lower wage countries is compensated by higher productivity, but only partially. A way of responding to this higher labour cost is for firms and industries to bet on quality rather than low prices. By competing in quality, pressure from the cost side is mitigated and high-cost firms are able to remain competitive. Focusing on quality is a promising strategy, since Europe has a competitive advantage in quality competition relative to new competitors with cheap labour costs: high incomes favour product differentiation and boost demand for goods in the upper quality segments, skilled labour, training, stable labour relations, research input and the use of information technology support innovation and improve the quality of processes and products.

Is Europe a provider of quality? A contested quality premium

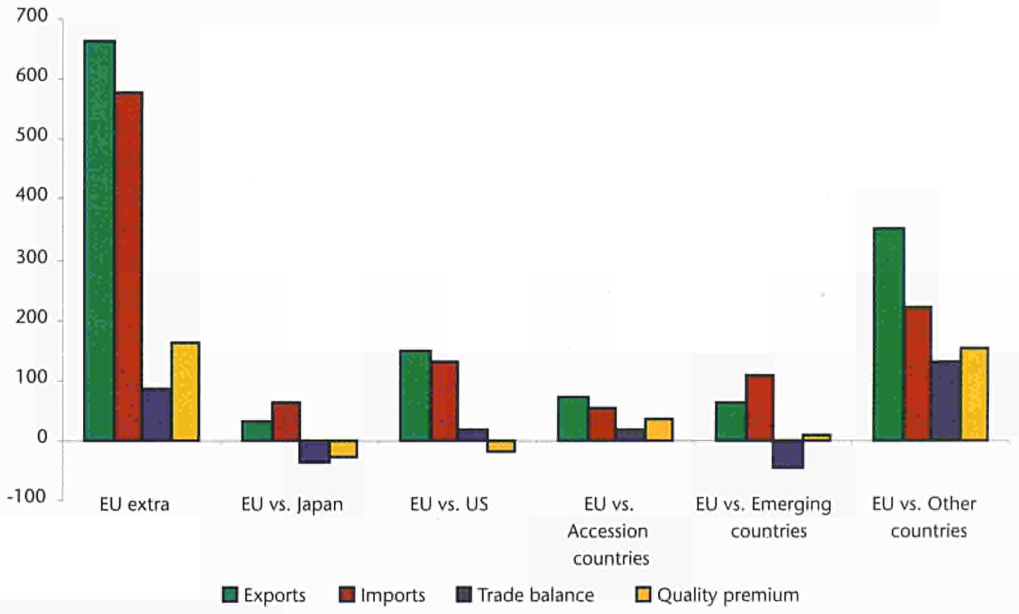
A first assessment of the position and evolution of the EU in terms of quality is made by using "unit values".[6] Increases in unit values may be due to rising demand or to rising costs. But they also reflect changes in quality, shifts to higher price segments and to more specific value-enhancing features. Unit values differ widely across Europe and in general increased over time. The dispersion of unit values across countries also increased over the last ten years.

European exports in manufacturing (extra-EU trade) amounted to 665 bn Euro in 1998 and imports to only 579 bn Euro. This resulted in an export surplus of 86 bn Euro, which is more than three times as high as ten years before (25 bn Euro). In 1998, the export surplus can be attributed to a quality premium in exports: the export unit value is higher by almost one third than the import unit value. If exports were priced as low as imports, European exports would decrease by 161 bn Euro. Roughly half of this "quality premium" in European trade comes from specialisation in high unit value industries, while the other half is due to higher unit values within the same industries.

The premium comes from trade with non-Triad countries (see Figure 5). In trade with the US, Europe has a surplus, but exports are priced 12 % lower than imports. Half of this bilateral trade is in technology-driven industries, where the unit value of European exports is 40 % lower than that of imports from the US.

6 The unit value is defined as nominal value divided by physical volume.

Figure 5 Regional destination of exports and quality premium, 1998, bn Euro



Source: WIFO calculations using EUROSTAT.

Compared to 1988, the ratio of export to import unit values for European manufacturing was lower in 1998, and hence the relative premium fell roughly from two thirds to one third. This mirrors the catching-up process, for example, of the accession countries, whose export unit value is now about half of Europe's, whereas ten years earlier it was only one fifth. On the other side of the quality spectrum, the US has increased its unit value more than Europe in bilateral trade, while Europe has reduced a small part of its large trade gap with Japan.

Quality upgrading strategies: comparing Europe to the United States

In assessing the quality position and upgrading effort of a country, two strategies can be considered. One strategy, intra-industry upgrading, is for firms to move into higher price segments within a given industry. Under this strategy, the quality level of an industry is revealed by its position within price segments.

An alternative strategy, inter-industry upgrading, requires a switch from price sensitive industries to quality sensitive ones.

Looking at trade data with these two strategies in mind, it is found that:

- The trade surplus of the EU comes from the quality sensitive sector.
- More than half of EU exports (51.3 %) are in the high price segment.
- Over the past 10 years, the EU increased its share in the high price segments for exports and decreased its share of low quality exports. There is a slight indication of convergence across countries in the quality position.

Europe has a strong quality position, attained over the last ten years. However, the US has a lower share of price sensitive industries in production, and is shifting its exports and imports more quickly from price to quality sensitive sectors. This suggests that demand in the US may be shifting to quality sensitive industries faster than in Europe.

Further, the favourable picture for quality is in contrast to that drawn by the share of technology-driven industries, where European imports from the US are higher than exports, and where unit values are shown to be unfavourable for Europe. The high shares of technology-driven industries in the US, their high unit value and their increasing share in domestic demand may challenge the future competitiveness of Europe in the high quality sectors.

In conclusion, the main result is that Europe is positioned as a provider of high quality; it upgrades quality continuously, as is needed by a high wage area. However, the long-term position in quality competition is contested at both ends of the quality spectrum: first by economies that are catching up and, secondly, by competitors at the technological cutting-edge.

Quality upgrading has many dimensions. Besides shifting into less price sensitive industries, or positioning in higher quality segments, a quality increasing strategy requires increasing the skills of the workforce, strong clusters of firms in fast moving industries, adding service components and specifically knowledge-based service inputs.

External services, structural change and industrial performance

The rise of the service economy was the predominant structural change of the 20th century. A major determinant of this tertiarisation process was the increasing demand of producers for external service inputs provided by specialised suppliers (as opposed to in-house activities). The underlying sources of this process are revealed by the decomposition of output growth into its components: demand side effects, changes in technology and shifts in international patterns of comparative advantage.

Decomposition of output growth shows that:

- *Since the 1970s, the process of tertiarisation has been driven primarily by the growth of knowledge-based services.* Knowledge-based services (comprising financial services, business-related services, and communications) have consistently been the fastest growing sector, outperforming manufacturing growth. However, the same cannot be said of the other service categories, in which average annual growth of gross output is closer to that of the manufacturing sector and in some cases even lags behind.
- *Among the sources of structural development, the increase of domestic demand has had the most pronounced impact on growth.* Besides knowledge-based services, personal and social services benefited most from this rise in consumption.
- *The technology effect has been most pronounced in knowledge-based services.*

Thus, the general shift of economic activities in favour of the tertiary sector has not occurred uniformly across industries. There is one particular group, knowledge-based services, which has benefited most from technological change and increases in demand. What makes this group different is the specific role that it can play as source of innovation, product differentiation and productivity growth for the rest of the economy.

Knowledge-based services contribute to economic development, not only through their own growth in employment and income, but also through their potential to improve performance in the economic system via knowledge transfer and progressive specialisation. They are capable of stimulating productivity growth through various sources of competitive advantage.

The data leave no doubt that the rise of the knowledge-based economy is under way.

External service inputs and competitive performance

Different levels of demand for inputs of various types of external services affect the competitive performance of manufacturing industries. Analysis for the EU, the US and Japan shows that industries with high shares of inputs from knowledge-based services:

- Appear at the top of the labour productivity rankings in all three regions.
- Grew above the average for total manufacturing.
- Had the lowest decline of employment in the EU and in Japan, while the US experienced large-scale reductions of the labour force in these industries, which are not observed in other industry groups.
- Rank first in quality differentiation.

In other words, high demand for knowledge-based services is associated with higher labour productivity, higher growth, more stable employment and higher quality differentiation.

Patterns of production and export specialisation within the Triad show that the US is strong in industries characterised by high shares of inputs from external knowledge-based services. In contrast, the EU is more specialised in the group of industries which are less dependent on external service inputs. These exhibit low potential for product differentiation, the most severe decline in employment, below average growth of value added and the lowest level of labour productivity.

The internationalisation of European services

In a world of increasing globalisation, where political, economic and technological barriers are rapidly disappearing, the ability of a country to participate in global activity is an important indicator of its economic health. Given the growing importance of the services sector on the one hand, and the ongoing liberalisation of services markets on the other, it is natural to inquire about the extent of internationalisation of European services.

From a broad perspective, internationalisation can be seen not only as a phenomenon that affects individual firms or sectors, but also as one that has wider reaching implications for regions and countries. Success in internationalisation, and, in turn, the economic growth that it engenders, depends not only on the collective ability of firms to compete internationally, but also on their ability to forge partnerships with internationally successful firms. Thus, the potential benefits, and risks, for countries and regions may result from either, or both, outward internationalisation (i.e. by home-based firms) and inward internationalisation (i.e. by foreign-based firms). The theoretical discussion of the internationalisation of service activities stresses the importance of commercial presence as a means of undertaking international trade in services. In this respect, data show that:

- Conventional trade is less important for services than for goods, while foreign direct investment (FDI) is more important for services than for manufacturing.
- FDI in services is expanding more rapidly than conventional trade and both are increasing faster than GDP.
- Compared to conventional trade in goods and FDI in manufacturing, services are growing faster, and, in particular, the share of services in total FDI flows and positions is increasing substantially.

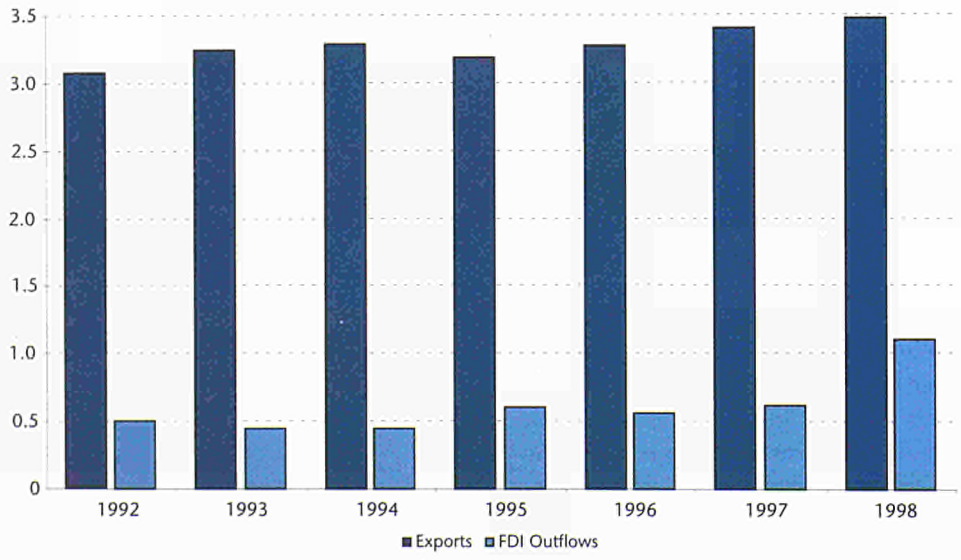
These findings point to an increasing internationalisation of European services, with commercial presence becoming the preferred mode of international expansion.

Concerning the importance of European integration, relative to the integration of Europe in worldwide service markets (intra-EU versus extra-EU), data on trade and FDI convey a mixed message (see Figures 6 and 7):

- Data on conventional trade show that the share of services in total intra-EU trade has changed little during the 1990s, and the share of intra-EU trade in total services trade (both imports and exports) has been fairly stable.

Thus, although trade in services is growing, the Internal Market does not seem to have resulted in

Figure 6 Intra-EU trade and FDI flows in services as a percentage of GDP



Source: NEI calculations using NewCronos, EUROSTAT.

faster growth in services than in goods, or in higher service trade growth within the EU than with the rest of the world.

- By contrast, the share of services in total intra-EU FDI inflows has risen considerably, showing that commercial presence in services within the EU is expanding more rapidly than in other sectors.

This is an encouraging sign of service integration within Europe, since commercial presence is a potentially more important component of integration in services than in goods.

- At the same time, the data point to an increasingly outward orientation of European FDI, with the share of intra-EU outflows in total services outflows declining from three quarters to a half between 1992 and 1998 and the share of intra-EU inflows remaining fairly stable.

Thus, although integration of EU service markets through FDI is growing rapidly, there is an increasing emphasis on investment outside the EU by European investors.

Concerning the geographical composition of extra-EU transactions, the US is undoubtedly the most important partner in service transactions (both inward and outward). On the basis of current trends, this situation looks set to continue in the future. Nonetheless, European Union FDI outflows to regions other that the US and EFTA, traditionally important partners, are the fastest growing regional component of total FDI outflows for services, pointing to an increasingly global dimension in the development of EU service providers.

Cross-country comparisons

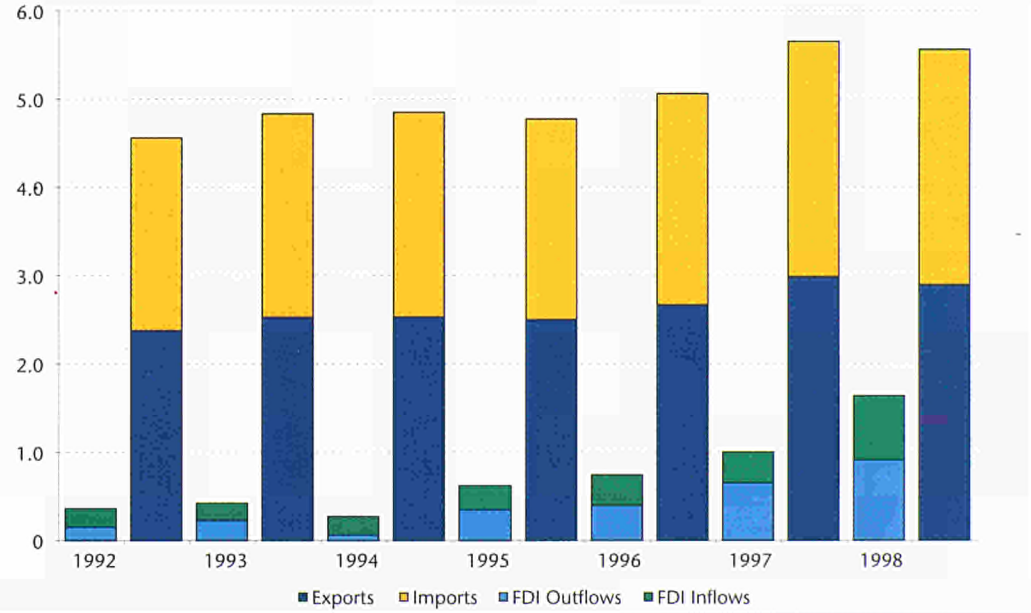
Analysis of the relative importance of service trade for EU Member States indicates that smaller countries tend to trade more intensively and to have a higher ratio of intra-EU trade to total trade.

Overall, the evidence from trade, FDI and mergers and acquisitions data suggests that economies of scale are important for services and, thus, service sectors in smaller countries with correspondingly small domestic markets are more "open" to internationalisation. At the same time, however, service sectors in the larger economies are more outwardly (i.e. extra-EU) orientated.

Cross-sectoral comparisons

Across sectors, patterns of international transactions vary considerably. In communication services and computer and information services, conventional trade is growing extremely rapidly, both inside and outside the EU, with the share of intra-EU trade in total trade rising, thus hinting at greater integration of EU services in these sectors.

Figure 7 Extra-EU trade and FDI flows in services as a percentage of GDP



Source: NEI calculations using NewCronos, EUROSTAT.

The wholesale trade sector, as well as a number of knowledge-intensive service sectors, displays a relatively large commercial presence of nonnational companies. Air transport and wholesale distribution are both sectors with a high share of cross-border operations and, within these, a high share of operations within the EU. This indicates that internalisation is important for these sectors, and that restructuring is currently focussed on the integration of markets within the EU, rather than being more outwardly orientated. Extra-EU international operations appear most important for advertising, sea transport and research and development.

Business to business e-commerce

It is in the business to business domain (B2B) that the real e-commerce revolution is happening. B2B is the core of the "e-market" with more than 80 % of total e-commerce activities and the fastest growing area. In addition to its direct impact, B2B e-commerce also has effects that reach far beyond the total amount of trade. It impacts on company and market structures and affects the competitiveness of individual firms as well as of entire sectors of the economy. B2B is changing traditional patterns of economic behaviour and shaping a new business culture.

According to various estimates, B2B is already big – according to Goldman Sachs it reached 135.3 billion USD in 1999 and it is growing fast, expected to reach 1304 billion USD in 2002 (Figure 8).

If quantitative measurements remain imprecise, qualitative assessment of the B2B revolution is more reliable. Complex and accelerating structural changes in companies and markets are taking place.

From cutting costs to shaping marketplaces

Cutting costs has been a powerful initial driver of B2B. Cost savings represent up to 40 % on purchasing and procurement. This has a measurable impact on individual companies, and on the economy as a whole. It may either result in higher profits or in lower prices – thus channelling growth through different mechanisms and with a different sectoral impact.

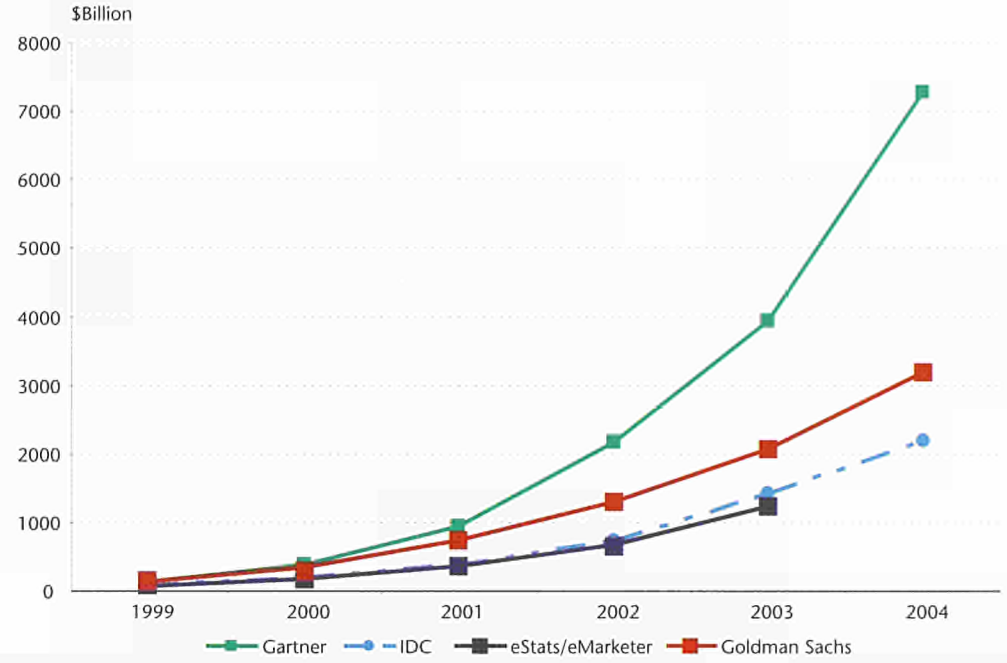
From closed to open markets, from linear to multidimensional relationships

The evolution is from "basic" e-commerce, with its focus on reducing costs, on control of the supply chain, and on trading tangibles, to "full" e-commerce, centred on maximising value, on creative and proactive strategies and on adding value through service and relationships.

Impact on inter-enterprise relations: outsourcing and "intangible" assets

B2B not only affects the internal organisation of companies; it has a strong impact on inter-enterprise relations – e.g. subcontracting, supply chain management, procurement, product develop-

Figure 8 Business to business e-commerce world revenues



Source: Gartner group (2000), IDC (2000), eMarketer (2000) and Goldman Sachs (2000).

ments, marketing and distribution. B2B is accelerating the move to outsourcing, paving the way for innovative, dynamic and flexible forms of inter-enterprise relations. This is reinforced by the emergence of increasingly complex, intangible products (software, services, etc.).

Impact on market structures: electronic exchanges

A specific aspect of such new relationships is the fast-growing phenomenon of electronic marketplaces (e-exchanges). Over the past year, more than 1000 such electronic marketplaces were launched and this number is expected to triple until 2003. E-marketplaces establish communities of buyers and sellers, as well as mechanisms that allow business to participate cost-effectively in national and global markets. Electronic marketplaces could be the "small business' ticket to B2B e-commerce". In fact, in many areas, SMEs are already key users of such marketplaces.

Enterprise policy issues

The development of B2B has crucial implications for the EU's enterprise policy. It has a direct impact on a number of key areas, such as competitiveness issues, SME policies and standardisation. The EU's policy has traditionally focused on removing inhibitors and barriers in order to foster a market-driven process. This has been done, primarily, by guaranteeing undistorted competition, preventing anti-competitive market developments, and ensuring the right conditions for entrepreneurship to develop. Consensus building (e.g. through standardisation, or through the promotion of self-regulation and co-regulation) has also played a key role.

In this perspective, a number of new questions and challenges may arise. These concern the impact of B2B on productivity, prices and growth, the means ensuring a broad participation of SMEs in B2B, the role of standardisation in shaping open electronic marketplaces, the development of better synergies between SME policies, research, innovation and standardisation to promote the take-up of B2B and finally how to encourage traditional sectors to embrace fully the new opportunities.

Introduction

Over the last decade, the European Union has taken major steps forward in terms of institutional and economic reform. The completion of the Internal Market and the introduction of the Euro speak for themselves. Intensive efforts brought about an impressive macroeconomic turnaround. The current favourable outlook is based on sound and robust grounds, thus allowing prospects for a virtuous circle and a growth dividend. Yet, in comparison with our past performance or with the performance of our main partner and competitor, the United States, the impression that Europe "could do better" remains.

In this context, the Lisbon European Council (23-24 March 2000) set the European Union a new strategic goal for the next decade: to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion.

The purpose of the Competitiveness Report is to provide an analytical contribution to the policy debate on how to make Europe a more dynamic economy. It is being produced yearly at the invitation of the Council in its Resolution of 21th November 1994 on strengthening the competitiveness of European industry.

Last year's report focused on structural change in European manufacturing – specialisation and concentration – and on its prime determinants, tangible and intangible investment and organisational change. Change, as a proxy for adaptation, remains the underlying theme that holds together the various parts of the present report. However, policy does not pursue change *per se*. Following Lisbon, the policies that contribute to the new strategy have as an overriding objective the acceleration of the transition towards the knowledge-based economy. The present report examines in detail some of the elements that determine this transition: productivity, take-up of information and communication technology (ICT), role of knowledge-based services in the economy and the emergence of business to business electronic commerce (B2B).

The report is structured as follows: a first, introductory chapter deals with the overall economic performance of the European Union *vis-à-vis* the US and Japan. In trying to understand the reasons behind the weaker growth record of the EU over the US in the recent years, the analysis moves successively from productivity developments to investment and, particularly, to ICT adoption patterns. An annex to this chapter presents the key policy developments of the year from the point of view of the competitiveness of the whole economy. It is a reminder that action is the ultimate purpose of research, of analysis and of debate.

In investigating structural change this year's report takes a broader perspective than last year, looking at the overall productive system. The correlation between growth and speed of change is confirmed once again.

A study of the extent and role of quality upgrading in European manufacturing answers the question on how, over the long run, a high wage region can maintain a healthy exports record, in a competitive environment. In doing so, it reveals the importance of a subclass of services, specifically the knowledge based services (KBS).

This observation makes the linkage with a more detailed study of the service sector, set in motion at the request of the Council.[1] A first chapter provides

1 Council (Industry) conclusions of 9.11.1999 on Competitiveness and entrepreneurial policy of the European Union.

a long view on services, their growing importance and their penetration in the various sectors of the productive system. It also searches for a possible link between the use of knowledge based services as inputs and sources of competitive performance. On this question, data show that KBS-intensive industries rank first in terms of labour productivity, average annual growth, level of product differentiation and quality premium in exports. Further trade data analysis discloses a possible source of worry: the EU displays a weakness, relative to the US, in the specialisation in KBS-intensive industries, both in terms of shares of value added and in terms of exports.

In a world of increasing globalisation, where political, economic and technological barriers disappear at a fast pace, the ability of a country to participate in global activity is an important indicator of its good economic health. Following this line, a second chapter has been dedicated to the internationalisation of the services sector. In doing so, "classical" trans-border trade data have been integrated with data from foreign direct investment, mergers and acquisitions and foreign affiliates' activities.

Structural change can sometimes be spectacularly fast. Business to business electronic commerce is revolutionising the organisation of the supply chains of several sectors. In a last section, the report takes stock of B2B developments and perspectives as well as of the policy issues that it raises.

Part 1
Developments in European competitiveness

Chapter 1
Macroeconomic performance

This chapter analyses the evolution of the European economy and confronts it with that of the United States and Japan.

The EU is still significantly behind the US in terms of its standard of living and its employment performance. The catching-up process that has taken place since the 1950s has come to an end, and seems even to have reversed. Since the 1990s, living standards and wealth have increased at a faster rate in the US than in Europe.

The reason for the turnaround is a new pattern of productivity trends. In the past, Europe managed to increase labour productivity at a higher rate than the US, through a greater substitution of capital for labour. Since the 1990s, however, the US economy has overtaken that of Europe in labour productivity growth. As it approached full employment, the US increased capital investment. More importantly, the US economy also managed to speed up the growth of total factor productivity.

It is difficult to identify the exact reasons behind this new total factor productivity pattern. Various interrelated factors seem to explain why the growth in total factor productivity decreased in Europe and accelerated in the US. It is now widely accepted that the acceleration of US productivity growth results partly from the quicker and deeper diffusion of information and communication technologies (ICT). The efficiency gains brought about by this technology pave the way for reorganisation not only in factories, but also in distribution, services and administration.

1. Wealth and growth performance

An economy is competitive if its population can enjoy high and raising standards of living and high rates of employment on a sustainable basis.[1] More precisely, the level of economic activity should not cause an unsustainable external balance of the economy nor should it compromise the welfare of future generations.[2]

The external balance approach to competitiveness focuses on the trade surplus situation and on indicators of price and cost competitiveness. A large and positive trade surplus is often seen as a reassuring sign of competitiveness (in this respect the EU has been performing well) but one might, nevertheless, wonder whether higher growth would not have eroded the existing trade surplus.

As far as cost competitiveness indicators are concerned, there have been gains in competitiveness for the EU producers against their US competitors over the last five years.[3] Thus, a country whose competitiveness is increasing according to these indicators may nevertheless be losing ground in terms of standards of living measures – as illustrated by the position of the EU *vis-à-vis* the US in the second half of the 1990s.

Following the definition presented here, competitiveness of countries concerns primarily their ability to provide goods and services to their citizens; in

1 A concept of competitiveness along the same line is presented in European Commission (1996a) as well as in European Economy (1998). For a discussion on the concepts of competitiveness, see the special issue on international competitiveness of the Oxford Review of Economic Policy (1996).

2 To some extent, the containment of the public debt imposed by the Maastricht Treaty limits the possibility of increasing the welfare of the present generation at the expense of future generations.

3 See European Commission (2000a).

Table 1.1 GDP per capita and employment rates in 1999

Country/Region	Total population[a]	GDP per capita 1000 PPS[b]	GDP per capita Growth[c]	Employment rate[d]
EU	375.8	19.11	1.6	63.4
US	271.4	29.52	2.1	81.7
Japan	126.7	21.12	1.4	76.3

Notes:
a Million inhabitants.
b Purchasing Power Standards at 1995 market prices.
c Average annual % change of GDP per capita at 1995 market prices (1989-99).
d Total employment as % of population aged 15-64.
Source: European Commission.

other words, it concerns the countries' performance in terms of wealth creation.

Gross domestic product (GDP) per capita is the main yardstick of living standards. Nevertheless, the welfare of a population is further affected, for instance, by the amount of leisure time available, by the level of social security and by the quality of the natural environment.[4] As there are no accepted international standards for measuring the position in terms of these supplementary characteristics, the discussion will focus on GDP per capita.

Europe's competitive position[5]

Measured by GDP per capita at the purchasing power standards (PPS) of 1995, the standards of living in the European Union rank behind Japan and well below the level achieved in the United States (Table 1.1). The European economy also offers its population significantly fewer jobs.

Compared to the US economy, the differences are pronounced. Except for Luxembourg, which benefits from its specialisation in financial services, no EU Member State managed to create a higher per capita income than the US. Despite considerable progress in some Member States, employment rates in all EU countries are well below those in the US and Japan.

The lower employment rate in Europe does not reflect only higher unemployment compared to the US and Japan. In fact, this factor only accounts for about a third of the observed difference between the US and the EU. The greater part of the difference is due to higher activity rates in the US, especially in the female population.[6] In addition, Americans tend to start working at a younger age and to work longer. The activity rates of Americans in the age brackets 15 to 25 and 55 to 64 are significantly higher than the corresponding rates for Europeans.[7] In the case of Japan, the higher employment rate is due, to a larger extent, to lower unemployment.

Europe fares better when aspects other than GDP per capita are taken into consideration. The employed population in Europe enjoys more leisure time than its American counterpart because weekly working hours are shorter and holidays are longer. In addition, early retirement is more widespread in the EU than in the US. As GDP "lost" due to extra leisure time in Europe amounts to only 6-7% of total GDP at current levels of labour productivity, the pronounced gap with the US in terms of standard of living remains, even after adjustments for differences in leisure time are made.

Catching-up process interrupted

Since the 1950s, European GDP per capita has been catching up with the level in the United States. This process has come to an end (Figure 1.1). Since the beginning of the 1990s, the living standard of the European Union has increased more slowly than that of the United States. The same has been true for Japan, which had outstripped Europe by the end of the 1970s.

The position of the EU and Japan relative to the US varied also due to differences in business cycles. In addition, Europe's position was depressed by the

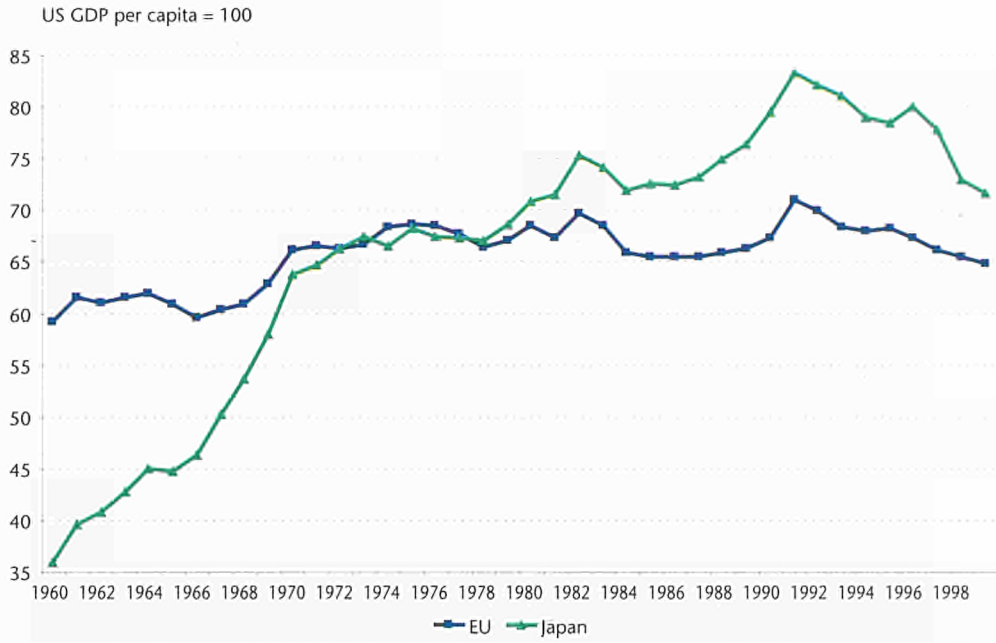
4 These supplementary factors correlate with the level of GDP per capita, but the relationship is not necessarily positive. The level of social security affects the distribution of income. Given two economies with identical GDP per capita, the economy with the more unequal income distribution is typically believed to suffer from more widespread poverty and lack of social cohesion. As higher GDP still tends to imply greater environmental pollution, one may even suspect a trade-off between GDP per capita and the quality of the natural environment.

5 Throughout this chapter, the European Union is treated as a whole. The economic situation varies considerably across Member States; issues arising from this diversity are treated in detail in other Commission documents (e.g. the Second Cohesion report, under preparation).

6 Activity rates measure how many people of working age (15-64) are employed or looking for a job. The activity rate is calculated as a ratio between the labour force (sum of the number of employed people and the number of registered unemployed) and the population of working age.

7 For details, see OECD (1999).

Figure 1.1 GDP per capita relative to the United States



Source: European Commission.

Table 1.2 Growth of GDP per capita, 1960-1999

	1960-75	1975-85	1985-90	1990-95	1995-99
EU	3.4	2.0	2.8	1.0	2.0
US	2.5	2.4	2.3	1.4	3.4
Japan	7.0	3.1	4.2	1.1	0.8

Source: European Commission.

impact of German unification in the early 1990s: GDP per capita in Eastern Germany has been significantly below the EU average. However, the gap has also widened steadily since then.

A new pattern seems to have emerged: the richest economy is able to increase its standard of living faster than its competitors. This turnaround is not due to a decline in living standards in Europe; GDP per capita continued to increase during the 1990s (Table 1.2), and even accelerated in the second half of the decade. This was even more the case in the US where, in the second part of the 1990s, GDP per capita grew not only more than in the EU but also faster than in the previous two decades; while the European economy lagged behind past growth rates.

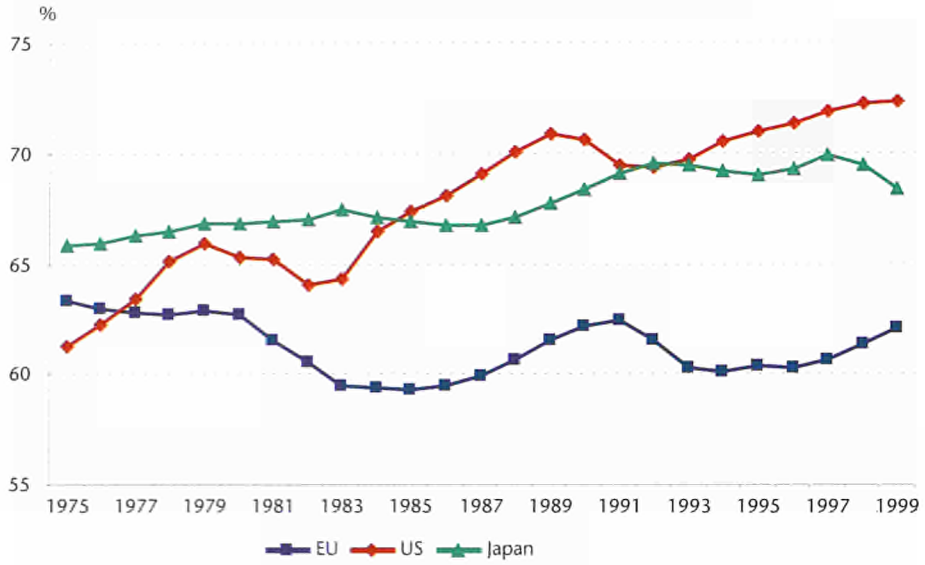
2. Factors behind the new trends in living standards

A country's GDP and GDP growth are determined by two components. One component is employment performance, e.g. how many people can find a job in relation to the population, and how much this ratio can be increased over time. The other component is productivity performance. The higher the value added per employee, i.e. labour productivity, and the higher its growth, the higher is the level and growth of the standard of living.

In the 1980s and early 1990s, the main source of greater growth in the US standard of living was better employment performance. Total employment expanded rapidly, and the employment ratio increased considerably, overcoming Japanese levels by the end of the 1980s (Figure 1.2).

This trend continued in the second half of the 1990s. Over the entire period, the European econ-

Figure 1.2 Evolution of employment rate
(total employment divided by population at working age 15-64)



Source: European Commission.

Table 1.3 Growth in total employment, 1960-1999

	1960-75	1975-85	1985-90	1990-95	1995-99
EU	0.3	0.1	1.4	-0.4	1.0
US	1.8	2.2	2.2	1.1	1.9
Japan	1.1	0.9	1.0	0.7	0.0

Source: European Commission.

omy failed to provide as many jobs in relation to the population of working age as the US economy. Even assuming that the additional jobs would have only half the average level of European labour productivity to date, because of declining marginal labour productivity, European GDP per capita would be higher by more than 10% if Europe could generate as high an employment ratio as the US.

As was the case in the second half of the 1980s, Europe has managed to increase its employment rate since 1995. The increase was not strong enough, however, to close the gap with the US. In the second half of the last decade, the number of jobs expanded faster in the US than in Europe (Table 1.3). Therefore, the superior ability of the US economy to create jobs continued to be a source of improvement of its standard of living. However, taking into account the very low level of the US unemployment rate by historical standards, this contribution to the improvement of living standards might dry up in the near future.

As the difference between employment growth in the US and Europe shrank in the 1990s compared to previous decades, the employment performance cannot explain why the US economy gained competitiveness during the 1990s.

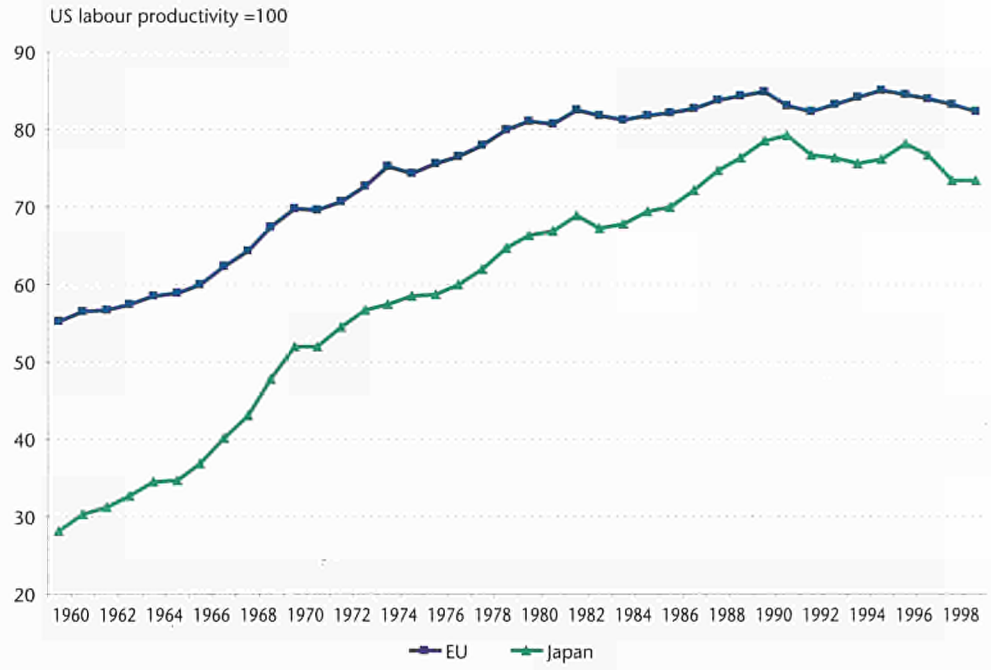
The second reason for the higher GDP per capita of the US is a higher level of labour productivity. In the beginning of the 1960s, Europe's level of labour productivity was only half as high as that of the US. However, in terms of productivity, Europe managed to catch up. During the following three decades, Europe raised its output per employee (in real terms) faster than the US economy (Table 1.4). This is true both for labour productivity calculated as output in real terms per person employed as well as per total hours worked.

Table 1.4 Growth of labour productivity, 1960-1999

	1960-75	1975-85	1985-90	1990-95	1995-99
EU	3.9	2.2	1.7	1.9	1.3
US	1.9	1.2	1.0	1.3	2.2
Japan	7.0	3.0	3.6	0.7	1.0

Note: Labour productivity is defined as GDP per employee.
Source: European Commission.

Figure 1.3 Labour productivity levels relative to the United States



Source: European Commission.

Since the second half of the 1990s, this pattern has changed, and the US economy has been leading in terms of labour productivity growth. These gains took place at a time when US labour productivity was still significantly higher than in Europe and Japan (Figure 1.3).[8]

European and Japanese growth in labour productivity has lost ground since the beginning of the 1990s. Except in Luxembourg, no EU Member State managed to keep pace with the productivity gains achieved by the US economy.

The trend reversal was especially pronounced in manufacturing.[9] In this sector, the higher productivity growth also reflected the stronger expansion of demand for manufactured products in the US. The relationship between growth and labour productivity or employment over time was not stable over a long period. In the early 1990s, a structural break occurred, and productivity growth gained momentum in US manufacturing.

8 With productivity measured in terms of total hours worked, the gaps would be less sharp. Still, in the second half of the 1990s, per hour productivity grew faster in the US than in the EU, see European Commission (2000b).
9 For details see Aiginger et al. (1999).

3. Factors behind changes in productivity patterns

In the past, the increase of labour productivity in Japan and Europe was to a large extent due to higher capital expenditures for rationalisation. The lower growth of labour productivity in the US reflected a lower rate of substitution of capital for labour which, in turn, resulted from lower wage costs and a stagnating real wage. Did the approach of full employment in the US induce companies to put more emphasis on rationalisation and to increase the rate of substitution of capital for labour?

To answer this question, the increase in labour productivity has to be broken down into the impact of total factor productivity (TFP) and the impact of capital deepening.

Estimates presented in Figure 1.4, upper part, confirm the supposed increase in the rate of substitution of capital for labour in the US. After fifteen years of very low values, the rate of substitution of capital for labour increased significantly in the US in the 1990s and in the second half of the 1990s was, for the first time, slightly stronger than in Europe.

The acceleration of the rate of substitution of capital for labour can only partially explain the higher growth of US labour productivity. More important was the acceleration of the rate of total factor productivity in the second half of the 1990s (Figure 1.4, lower part). In Japan, this rate was negative in the first half of the 1990s and very low in the second half. In Europe, total factor productivity in the 1990s rose at a significantly slower pace than in the past. It is, therefore, the better performance in total factor productivity that explains the rise in US competitiveness and the "new" pattern of improvement in living standards.

One should bear in mind that the above calculations do not take into account qualitative changes in the inputs. As a consequence, the impact of intangible investment such as in human resources, knowledge and innovation is implicitly accounted for in total factor productivity.

Without innovation the new industries and the technical and organisational solutions necessary to increase labour productivity will not emerge. R&D expenditures, the number of researchers and investment in equipment give an indication of a country's innovation capability. New solutions have to be researched, developed and implemented through investment. R&D expenditures measure the R&D efforts from the input side while equipment investment measures the speed at which new capacities are created and the economy is modernised.

Measured by the R&D expenditures of business in relation to GDP, European R&D efforts have continued to decline until recently (Figure 1.5). In contrast to the falling trend in Europe a revival of R&D expenditures can be observed both in the United States and in Japan. The pronounced difference in R&D effort is confirmed by employment figures. Whereas in the United States and in Japan 6 to 7 out of 1000 employees are researchers, European companies employ only 2 to 3 researchers. Europe lags behind, even when the role of government financed research is taken into account, but the difference narrows.

Box 1.1 Decomposition of labour productivity growth

The rate of growth of TFP is by definition the difference between output growth and a weighted average of the growth of inputs necessary for production. At the macroeconomic level, only labour and capital are taken into account. The relationship between output and inputs is described by a macroeconomic production function. Assuming a simple production function, the Cobb-Douglas, the rate of growth of output (y) depends on the rate of growth of labour inputs (e) measured by the growth in total employment, the rate of growth of capital inputs (k) measured by the growth of the capital stock and the rate of change in technical progress i.e. total factor productivity (tfp). The equation reads:

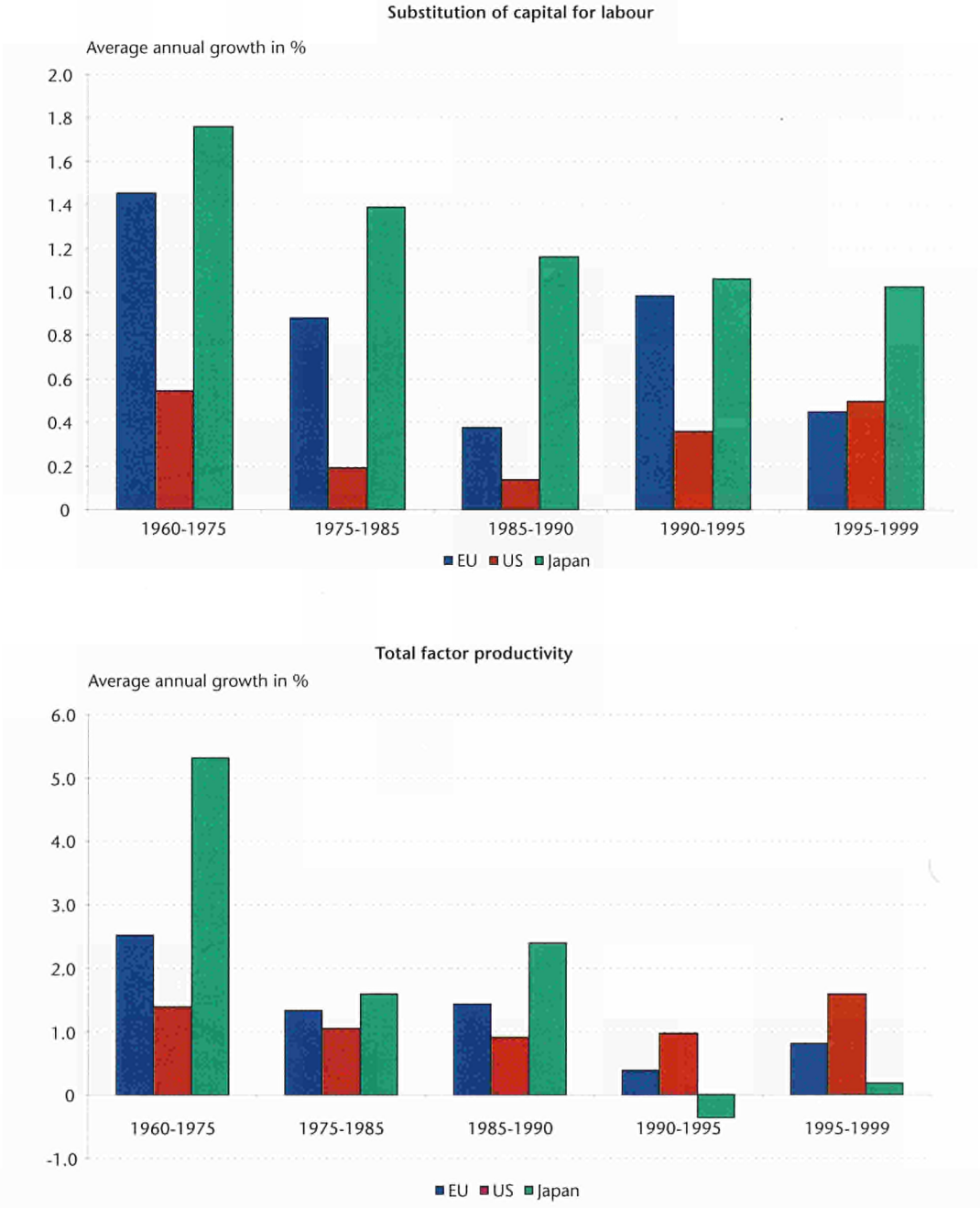
$$y = tfp + \alpha e + (1-\alpha) k$$

where α denotes the partial elasticity of output with respect to labour. As the rate of growth of labour productivity corresponds to the difference between the growth of output (y) and of labour (e), subtracting (e) from both sides of the equation yields the desired division of the rate of growth of labour productivity:

$$y - e = tfp + (1-\alpha)(k - e)$$

where (k-e) corresponds to the rate of growth of the capital-labour ratio and measures the speed of capital deepening. Multiplied by (1- α), this expression measures the effect of the substitution of capital for labour.

Figure 1.4 Determinants of labour productivity growth



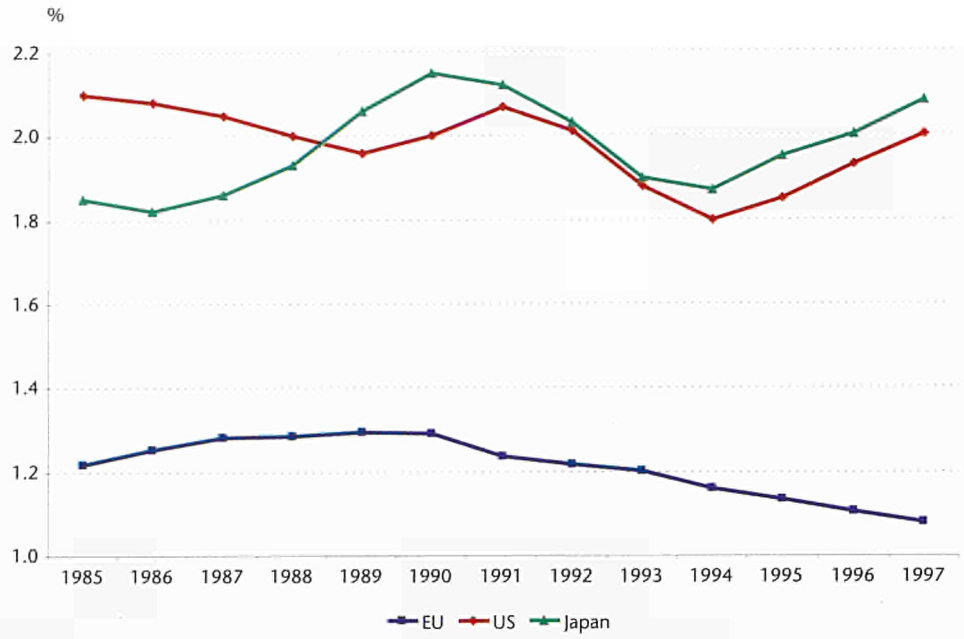
Source: European Commission.

In general, fixed capital embodies technological components resulting from innovation. Indeed, very often, capital investment is a necessary condition to fully exploit the returns from R&D expenditures.

The composition of gross fixed capital formation (GFCF) points to a higher content of new technologies of the vintages that were added to the US capital stock during the 1990s. No such shift took place in Europe or Japan. Thus, the acceleration of TFP growth observed may be partly linked to the different investment patterns in the United States on the one hand and in Europe and Japan on the other.

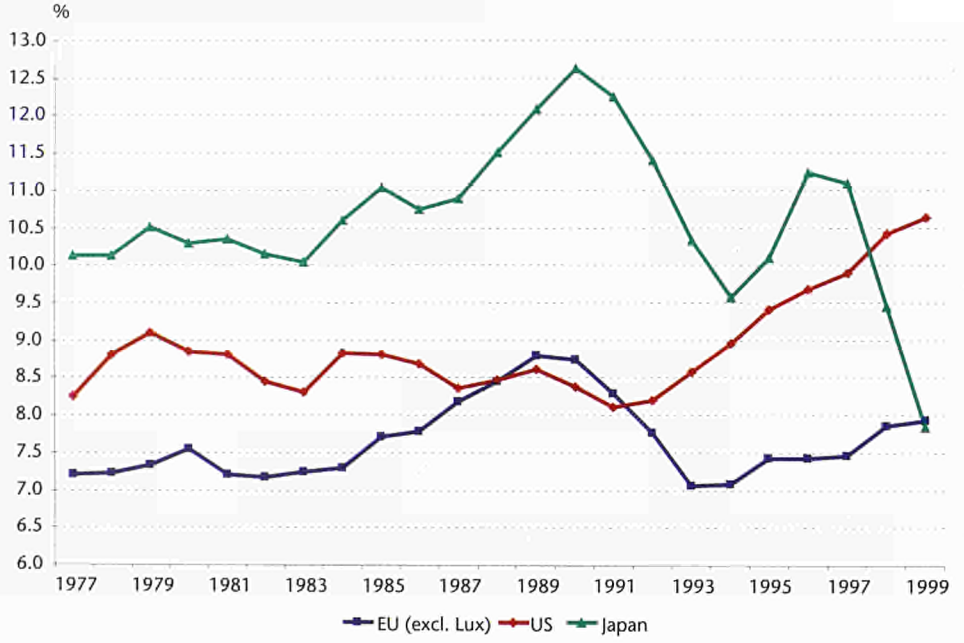
The previous Competitiveness Report already pointed out the change in the investment pattern. Measured by the ratio of GFCF to GDP in the period 1960 to 1990, the US consistently invested less in physical capital than Europe and Japan. Because the growth of capital expenditures slowed down in

Figure 1.5 Business R&D expenditures per unit GDP in percentage



Source: EUROSTAT.

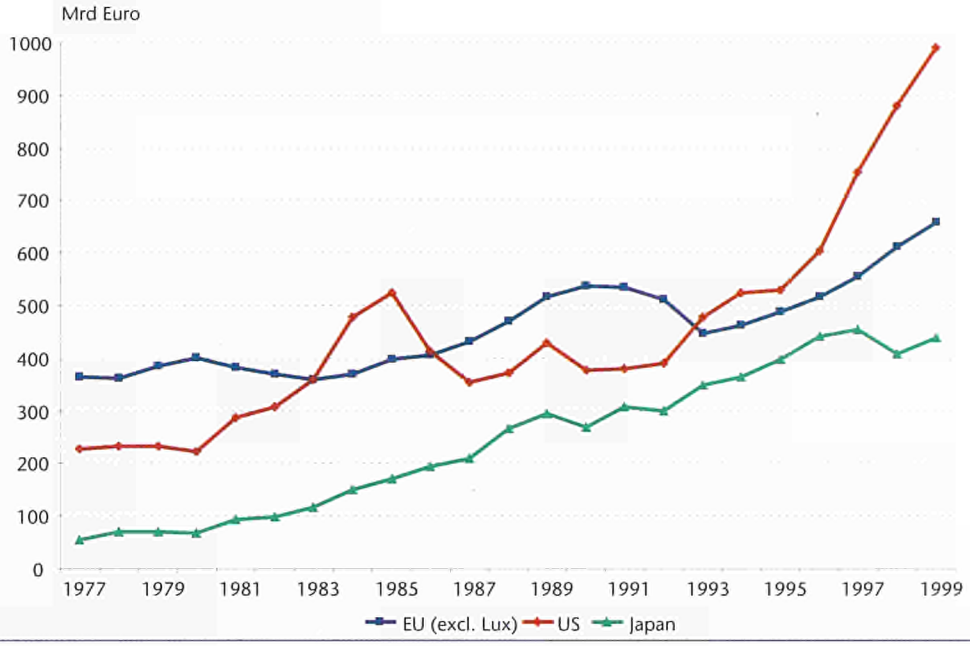
Figure 1.6 Gross fixed capital formation in equipment as a percentage of GDP (current prices – national currency)



Source: European Commission.

Europe and accelerated in the US during the 1990s, the amount of GDP invested in new plant and equipment approached European levels during the 1990s. This can be observed with data in nominal and in volume terms. The increase in the investment ratio of the US economy during the 1990s did not reflect an increased propensity to invest in specific industries; the propensity to invest rose both in manufacturing and in market-oriented services.

Figure 1.7 Evolution of gross fixed capital formation in equipment (constant 1995 prices)



Source: European Commission.

Whereas the upswing in GFCF in the US was not propelled by specific industries at the observable level of breakdown, it did have pronounced product-specific features. The growth of the US investment ratio was mainly induced by an increased demand from machinery and equipment industries. Indeed, investment in machinery and equipment increased much faster than residential and non-residential investment.

In contrast to the markedly rising propensity to invest in new equipment in the US during the 1990s, the recovery of the investment ratio after the setback caused by the European recession of 1993 was not pronounced enough to regain the level achieved previously (Figure 1.6). The gap between Europe and the US, which had emerged in the first half of the 1990s, even widened in the second half. This trend is even more striking in terms of evolution of GFCF in equipment which shows a significant acceleration in the US relative to the EU (Figure 1.7).

As mentioned above, new equipment is often a carrier of new production technologies. Thus the rise in the US investment ratio may reflect an increased propensity of all industries there to invest in new technologies.[10]

Information and communication technologies (ICTs) are now widely believed to be a major factor in productivity growth. Given the importance of this debate, the extent of diffusion of ICTs in the EU and in the US is presented in Annex 1.

Despite the consistency between the shifts in investment patterns and the changes in TFP growth that occurred in the United States, Europe and Japan, and despite the US lead in applying ICTs, additional factors may have been at work to bring about the observed change in the patterns of TFP growth. As TFP is a catch-all variable, international differences in TFP growth can also reflect different capacities of economic systems to innovate and to adjust, the effects of shocks to economies, and the effect of changes in the economic system and in the policy framework.

The 1990s are not only characterised by the emergence of basic new technologies, but also by far-reaching political changes and the frictions of the globalising economy. The EU economies endured the tension and the financial market turbulence following German unification, the effects of labour market rigidities and, more recently, the adverse trade effects of the financial crisis in emerging countries. They had to cope with the painful, if ultimately beneficial, experience of budgetary stabilisation in the approach to monetary union. Japan suffered, in

10 The fact that, during the 1990s, US industry spent more in absolute and relative terms on the diffusion of information technology than did its European (and Japanese) counterparts supports this conjecture.

addition, by the burst of its so-called "financial bubble" at the beginning of the 1990s. Also, for geographical reasons, it was more strongly affected by the "Asian crisis" at the end of the 1990s.

The combination of more rigidities in their economic systems and, arguably, a greater exposure to external shocks may go some way to explain why the European and Japanese economies suffered more from growth frictions than the US economy during the 1990s. This may be an element in explaining why TFP growth slowed down in Europe and was even partly negative in Japan.

Summarising, two sets of factors may have worked together to turn around the growth pattern of total factor productivity. On the one hand, the US economy has profited from its head-start in the application of information and communication technologies and from heavier investment in modern equipment, leading to increased TFP growth in the 1990s. On the other hand, Europe and Japan suffered more from the external shocks of the 1990s because they were affected more strongly and because their economic systems are less flexible and less adaptable than the US economy.

The reform puzzle

Puzzling in this context is the question of why the structural reforms designed to reduce the rigidities of the European economic system and to improve its innovative capacity failed to prevent this result. European policy has addressed the weak points diagnosed as "Eurosclerosis" back in the 1980s. The implementation of the Internal Market programme, the opening up to competition of the energy and transportation sectors, the liberalisation and privatisation of telecommunications, the deregulation of financial markets and the introduction of the euro aimed at increasing competition and economic dynamism in Europe. Some European countries also undertook steps to deregulate their labour markets. Such changes to the economic system were deemed to be capable of increasing the efficiency of the economy.[11]

Why, then, did the rate of growth in total factor productivity decline in the 1990s despite the pronounced reform efforts in Europe? Several arguments may reconcile this observation with the many economic reforms that took place in Europe. Time lags in the productivity effects of economic reforms[12] and the overshadowing effects of the external shocks might offer one explanation. In view of the lower flexibility of labour and capital markets, and the less positive attitude in Europe towards economic and social change, an alternative explanation could be that the volume of reforms has simply overtaxed the capacity to adjust. On the other hand, one could argue that the reforms were simply not radical enough, or that they could not produce any positive effects because their implementation was delayed.

The consensual view of the European Union on this issue is that "the fact that the improvements in the framework conditions are not reflected in a stronger economic performance is indicative of the severity of the macroeconomic imbalances and structural rigidities prevalent at the start of the previous decade. In part, it also reflects the late start to economic reforms in many Member States and the time it takes before an appropriate policy mix starts to bear fruit."[13]

The key policy developments of the year bearing on the competitiveness of the whole economy are presented in Annex 2.

11 See Cecchini et al. (1988).

12 Time lags occur for several reasons: The reforms must first be designed in detail and implemented, and economic actors have to adjust their expectations and behaviour to the changed framework. Changes in the business and investment strategy of companies take time to materialise and to affect market structures. Further time passes until competition processes result in new market structures and a new organisation of production. As the competition process need not end in stable results, the measured productivity numbers might not reflect the full effects of reforms.

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Annex 1
Information and communication technologies in the EU during the 1990s

Information and communication technology (ICT) has often been described as an area of special importance for the economy, resulting in new economic structures and even in new economic laws. Meanwhile, the concept of the "new economy" has not only entered the scientific and public debate but is also being discussed at political level. Indeed, there is enough evidence to suggest that ICTs will have a profound impact on competitiveness and business practises.

Computer prices have fallen constantly over the past thirty years; computer capabilities have risen and the use of computers in the economy has expanded. Beyond their potential importance, the impressive feature of computers, however, is the speed of change. According to the so-called Moore's law,[1] microchip capabilities double every 18 months.

The objective of this Annex is to present a consolidate view of where Europe stands in ICT adoption.

Information and communication technologies: a definition

For the purpose of this analysis, information and communication technologies are defined as the output of telecommunications, computer hardware and software and office equipment industries. This is a rather narrow definition of the ICT sector, given that large groups of products are omitted (electronic components, measurement instruments, medical devices, TV, video and audio equipment, etc.). Many of these products constitute areas of strength for the European economy and therefore the estimates are likely to underestimate systematically the strength of Europe in the area of ICTs.

This narrow definition of ICTs has nevertheless a substantial advantage. The strategic importance of ICTs stems from its potential to optimise the flow of information, to reduce transaction costs, and as a result, to raise the productivity of economic sectors and the efficiency of markets. Following the definition of ICT, it is mainly this "horizontal" impact which is covered by this analysis. Other categories of ICT output, such as components, may induce further productivity improvements or generate innovations in products and services for specific industries, but they are likely to have a rather limited impact on businesses and market institutions in the economy as a whole. In short, the selection of this definition (i.e. essentially office machinery and telecommunications) facilitates to focus on the core areas of ICTs.

ICT expenditure does not refer only to purchases of computers or telecommunication hardware; it also includes expenditures on software, telecom services and IT services such as the implementation of IT solutions, consulting and support. Thus, the definition used here is broader than the definition of gross fixed capital formation in equipment, which only covers purchases of hardware. The broader definition seems to be more appropriate for discussing issues of new technologies. The implementation of new IT solutions does not only call for new computers, peripherals and telecommunication hardware. Without the software and the other services, the profound changes in business processes, and therefore the macroeconomic effects of ICT investment, would not have taken place.

1 The consistency of this trend led to its being named after Gordon Moore, an executive and founder of Intel who first observed the trend in 1964.

ICT as a general-purpose technology

In 1993, IT represented, in nominal terms, just 2% of the capital stock of the US economy.[2] Although this may appear as a small fraction of the overall investment, IT is at the centre of both public and academic interest. One reason for this is that the impact of ICT is directly visible to consumers, e.g. through the Internet, cheaper telecommunications services, new computer-enabled services, quality improvements, wider choice, etc. But there is also another, economically more important reason: ICT is a generic technology that is affecting practically all economic activities.

A generic technology has, by definition, the potential to impact, at maturity, all sectors and business practises. ICTs are generic technologies not only because they are embedded in all types of machinery, but also because ICTs are related to management and information systems and applications that are used across industries. These systems are not only among the fastest growing segments of ICTs but they also constitute the part that generates the most important overall impact, namely, the emergence of new business organisational structures in a way similar to the impact that the telephone, the railways and the electric motor had on the business structures of the late 19th century.[3]

The advent of the Internet as a tool to reorganise business and to shape new electronic marketplaces is further fostering the economic impact of ICT. First, the use of Internet has the potential to open new business opportunities, which may make processes more efficient, but also allows for the development of new business models, making possible new forms of partnership, and creating new types of business. Secondly, the Internet has important "network effects": the more users are connected to the network and exchange transactions, the greater is the economic benefit for all of them. Connectivity is thus becoming the most important feature of present ICT. The importance of connectivity as the cutting edge of today's ICTs is demonstrated also in the area of mobile telephony where Europe has demonstrated a significant lead during the 1990s. The European technological lead showed how technology has the potential to affect both business processes and social patterns.

ICT impact on performance: the productivity issue

Most scientific breakthroughs, in biology, medicine or space exploration, became possible thanks to the computer. Personal computers have become the main office tools. Computers affect radically almost every aspect of everyday life, from normal products in supermarkets to the design of cars. The Internet, the most visible society-wide spin off of the computer and telecommunications industry is rapidly reaching broad household penetration.

Computers, in short, have been everywhere, but, as R. Solow remarked in 1987,[4] everywhere except in productivity statistics. In fact, long after computers became visible everywhere in society, they still had little measurable impact on performance according to the statistics – the so-called "productivity paradox".[5] Substantial research efforts in microeconomics in the last decade resulted in a number of conclusions that unravelled, to a large extent, the productivity paradox and proposed reasonable explanations.

There is a vast literature on the productivity paradox. The recent evidence suggests that there is, after all, a positive relationship between ICT investment and productivity.[6] A recent report of the U.S. Department of Commerce, for example, refers to empirical findings which conclude "that surging use of IT (including computer hardware, software and communications equipment) in the second half of the 1990s, together with advances in the production of computers and semiconductors, contributed about two-thirds of an estimated 1.06 percentage point acceleration in productivity growth between the first and second half of the decade".[7] However, there is still little statistical evidence available for Europe on this issue.

One should bear in mind that in the EU and in the US different methods are used to measure price and quantity developments in computer production and spending. In particular, in the US, quality adjust-

2 See Sichel and Oliner (1994).
3 See David (1990).
4 See Tripplett (1999).
5 Productivity (total factor) is defined as the increase in output while holding inputs constant. The increased use of ICT-related goods and services in the economy has as its primary effect, the substitution of labour and other inputs for computers and ICT related inputs. Another effect of ICTs (especially of the part of ICTs that affect managerial functions and market transactions) is to combine more effectively the production inputs, thereby generating productivity increases.
6 See e.g., Berndt and Morisson (1995), Brynjolfsson and Hitt (1998 a, b), Mairesse and Greenan (1996), Mairesse et al. (1998), Gordon (1999) and Triplett (1999).
7 See U.S. Department of Commerce (2000), p. 37.

ments are made based on hedonic methods, while many European countries rely on more conventional methods. This suggests that quantity produced and productivity trends are underestimated in these countries. The extent to which GDP measures are influenced by the statistical method used depends on the size of the country's ICT sectors and on its propensity to import ICT equipment.[8]

Growth and market shares of ICTs

The figures for this and the following sections are from the 1993-2000 European Information Technology Observatory (EITO) Annual Reports and represent an analytical estimate produced by industry experts.[9] EITO's figures on ICT refer to the final residential, business and government consumption together with the intermediate demand of businesses. The final business demand is essentially investment in new hardware and software systems, while the intermediate demand represents functioning costs for the installed stock of ICTs.[10]

In 1999, the European Union represented 38% of the combined ICT market of the Triad (EU, US and Japan), in comparison with 48% of the US and 14% of Japan. During the 1990s, the European share remained constant while the US share increased by approximately 5% from 1991 to 1999 at the expense of Japan.

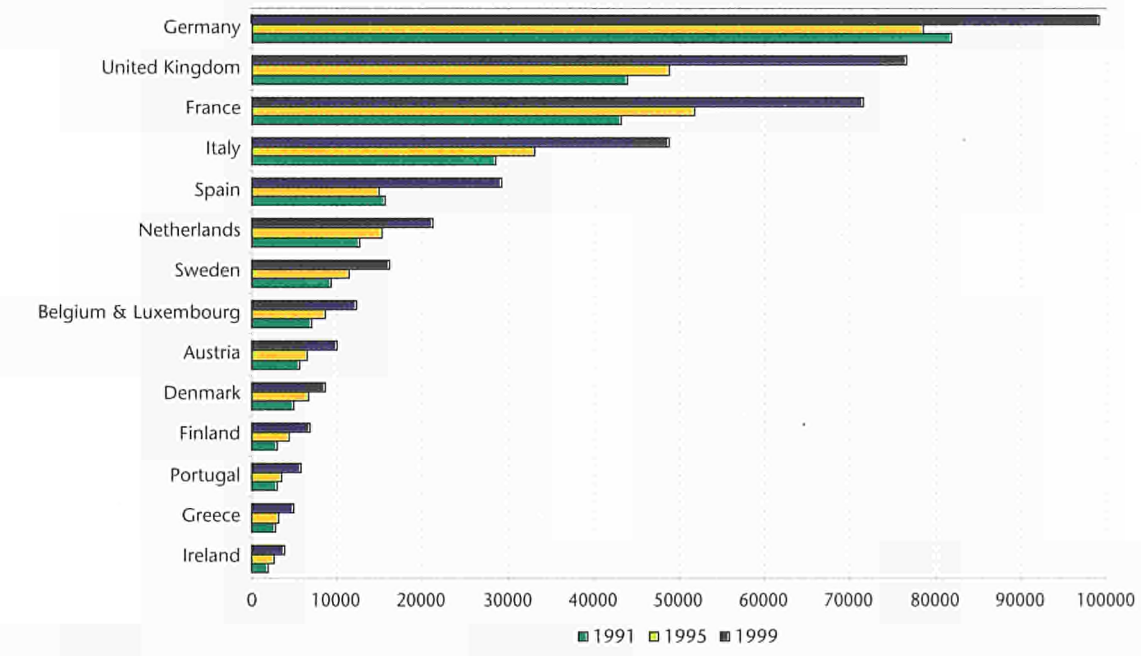
The total market for information and communication technologies in Europe in 1999 was 415 billion Euro (at 1995 prices). This estimate includes computer hardware and software (28%), office equipment (2%), computer related services (16%), telecommunication equipment (12%) and carrier services (41%). Three European countries represented almost 60% of the European market for ICT in 1999, namely Germany (27%), the United Kingdom (18,5%) and France (17%). In real terms, all European markets have grown at a very similar rate of 11% per annum, with very little (less than 0,5%) variation across countries. Data from other sources (Dataquest/Gartnergroup 1999) confirm these growth rates (see Figure 1).

8 For a detailed discussion of these issues see OECD (2000b) and Schreyer (2000).

9 The report uses data from market research companies (IDC and others) and is produced by a consortium of the main ICT manufacturing associations. Only recently, OECD (2000c) published the report "Measuring the ICT sector" which provides a set of statistics that measure the output of the ICT sector in different OECD member countries. This is a very important first step in providing data drawn from official sources in a consistent manner and using a common international definition. This kind of data is a very useful addition to the existing non official market sources.

10 In order to give an idea of the size of expenditure, it is worth noting that business spending on new computers in the US was over USD 160 billion (in 1992 dollars) compared to consumer spending of USD 52,7 billion, see Jorgenson and Stiroh (1999).

Figure 1 ICT market by EU Member State (million Euro at constant 1995 prices)



Source: European Commission calculations using EITO Annual Report (1993-2000).

Such a strong and continuous growth is without precedent in recent economic history. In the 1990s, after a period of slow evolution at the beginning of the decade, the growth has strongly accelerated in the most recent years, with yearly rates above 10 %.

The evolution of ICT expenditure per capita

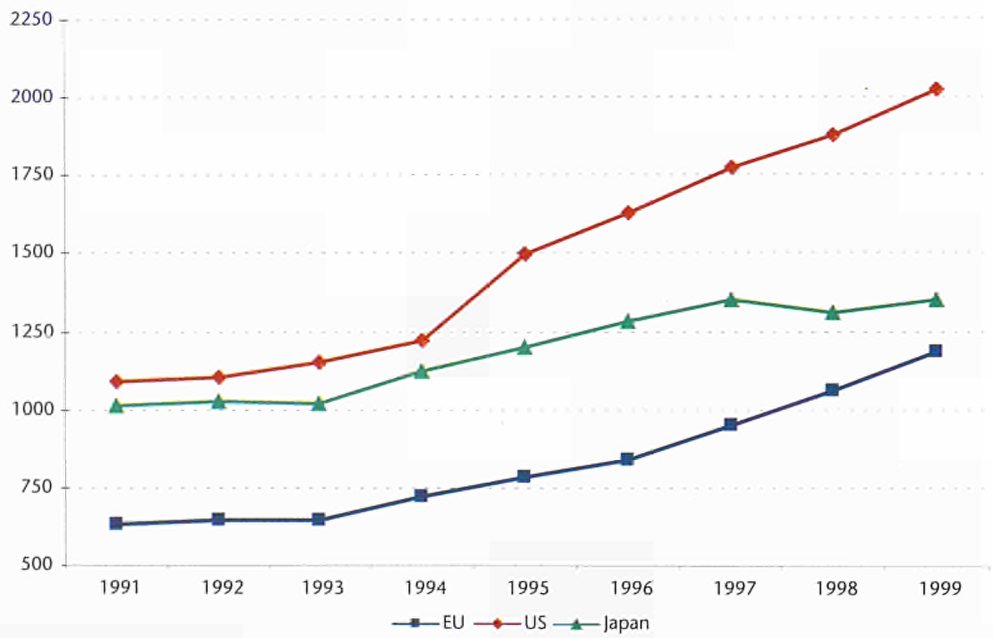
During the period 1991-1999, the ICT expenditure per capita rose by 188% in the EU (from 632 in 1991 to 1187 Euro), 186% in the US (from 1086 to 2023 Euro) and 133% in Japan (from 1010 to 1349 Euro), (see Figure 2). The evolution of ICT spending per capita was relatively stable between 1991 and 1994 in the three geographic areas. After 1994, though, each area followed a different pattern. The US experienced, as a result of the Internet revolution, the fastest growth among the three. Japan followed a similarly upward path but decelerated substantially after 1998. The EU evolved upwards at a stable pace and caught up partially with Japan while the gap with the US remains the same: the European ICT spending per capita is still only 58% of the corresponding US figure.

There are important disparities in ICT spending per capita in different Member States. The top division in Europe is composed of Sweden and Denmark followed at some distance by the Netherlands, Finland, the United Kingdom, Austria, France, Germany and Belgium. All Southern European countries as well as Ireland are below the EU average. It should be noted that, during the period 1991-1999, divergences have increased. The gap between the country with the lowest per capita ICT spending and the highest spender rose from 800 to 1357 Euro in constant 1995 prices. Scandinavia, Central European countries and Mediterranean countries form three distinct groups (see Figure 3).

Penetration of ICT

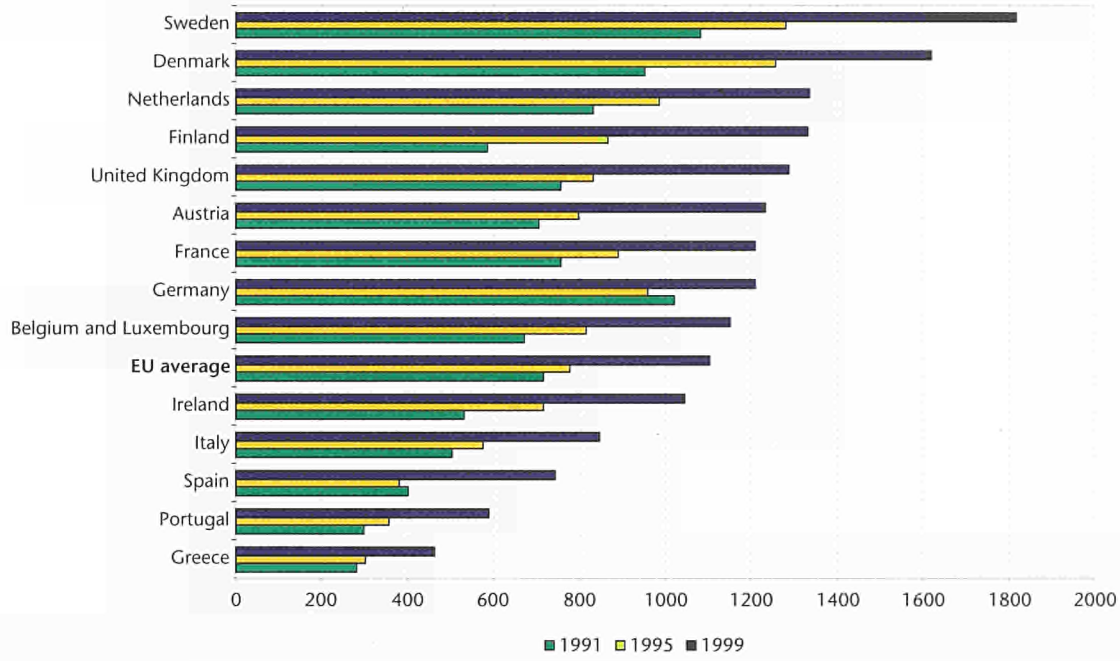
The US lead in the "new economy", which is knowledge based, highly computerised and globally connected by the Internet, is also apparent through indicators other than ICT expenditures. More Americans, both in absolute and relative terms, work in ICT industries like the production of chips, computers, software and website design. US industry uses ICT services more intensively. In the US, more people own basic elements for using ICT based services, such as PCs and Internet access both at work and at home (see Table 1). Within Europe,

Figure 2 ICT expenditure per capita in the Triad (Euro)



Source: EITO Annual Report (1993-2000).

Figure 3 ICT expenditure per capita in the Member States of the European Union - constant 1995 prices (Euro)



Source: European Commission calculations using EITO Annual Report (1993-2000).

Table 1 Penetration of ICT (per 100 inhabitants – 1999)

	EU	US	Japan
Number of business PCs (1998)			
(per 100 white-collar workers)	60	118	27
Number of PCs (1998)	20	51	13
Internet hosts	30	120	18
Mobile phone subscribers (ITU)	39	31	45

Sources: EITO Annual Report 1999, OECD 2000 and International Telecommunications Union.

the Scandinavian countries are the leaders, with an ICT infrastructure comparable to that of the US. Except for mobile phones, the Southern members of the EU lag behind considerably.

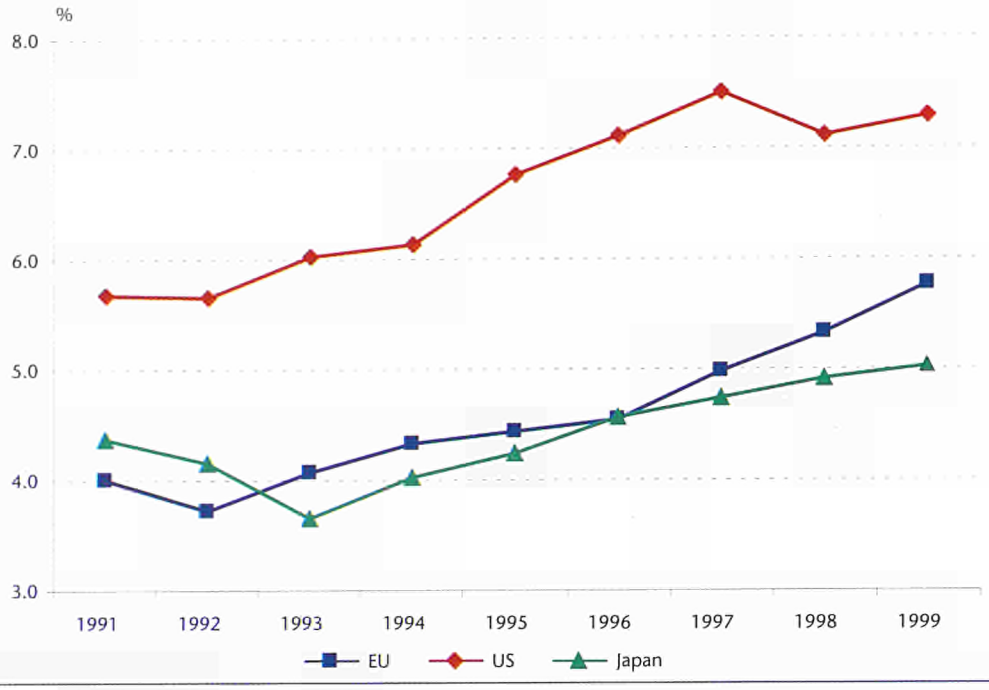
The evolution of ICT intensity

ICT expenditure in relation to GDP (ITC intensity) rose from 4% in 1991 to 5,8% in 1999 in the EU, from 5,7% to 7,3% in the US and from 4,4% to 5% in Japan (see Figure 4). The evolution of ICT in relation to GDP reflects different patterns in the three geographical areas. The US has reached a peak in 1997 (7,5%) and since then fluctuates around 7%. The EU followed the growth path of the US until 1997 and is since then catching up slowly. The EU relative size increased from 70% of the US equivalent in 1991 to 79% in 1999. During the 1990s, the US kept its position as the first spender in ICTs while Europe registered the fastest growth. Japan followed an upward path similar to the EU pattern but at a slower pace.

Overall, in the EU countries there is a substantial increase in the volumes of ICT spending. This growth is an indication of substantial qualitative transformation in the business processes in the European economies during the decade. In this context, it is interesting to note that three-quarters of this increase in ICT intensity took place in the last four years of the period under examination. More promising even than the growth itself is its ongoing acceleration over the years.

With respect to the percentage of GDP devoted to ICTs, Sweden, the United Kingdom and the

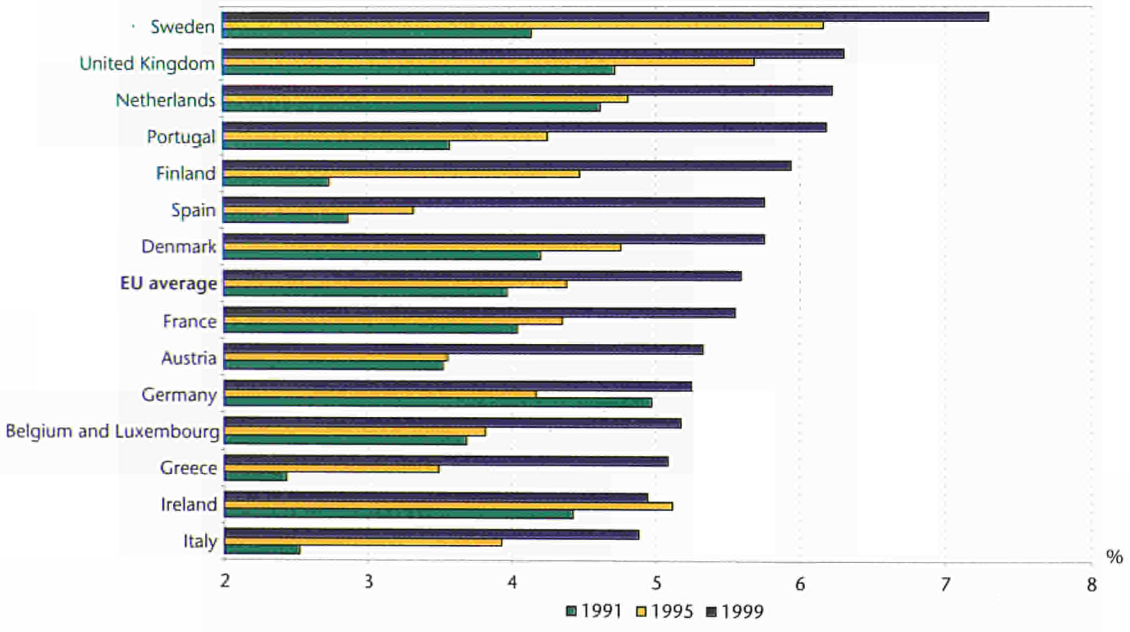
Figure 4 ICT intensity in the Triad



Note: ICT intensity is defined as ICT expenditure as % of GDP.
Source: EITO Annual Report (1993-2000).

Netherlands represent the top league. Portugal and Spain follow only closely behind. Greece and Italy have the smallest fractions of their GDP devoted to ICTs, but they present the highest rates of growth over the period. Overall, the south of Europe shows strong evidence of convergence with the rest of Europe. Continental European countries (namely France, Austria, Germany and Belgium) are below the EU average for the ICT to GDP ratio (see Figure 5).

Figure 5 ICT intensity in the Member States of the European Union



Note: ICT intensity is defined as ICT expenditure as % of GDP.
Source: European Commission calculations using EITO Annual Report (1993-2000).

Impact of ICT on the economy

During the 1990s, the US spent a greater share of GDP than Europe on ICT. This lead was more pronounced in IT than in telecommunications. In any case, it can be concluded that the US has invested more than Europe in modernising business processes and making them more efficient and competitive. ICTs do not have only efficiency-increasing properties. They also have the potential to bring about radical changes in the organisation of production and distribution of goods and services, and to create new markets and business opportunities.

The clear lead of the US economy in the application of ICT implies a greater potential to increase efficiency. This may be the reason why macroeconomic effects of ICT application could first be observed in the US. The acceleration of total factory productivity growth in the US indicates that the paradox "computers are everywhere except in the productivity numbers" probably no longer holds.

The productivity effects of investment in ICT can only be reaped by further organisational changes. Such organisational changes are, however, often difficult to implement because different skills are required and rigidities may slow down the process. In addition, such improvements often result in better quality and consumer satisfaction rather than in a measurable increase of output. That is why effects on productivity only emerge with sometimes considerable time lags.

This is especially true in cases where organisational changes depend on a cooperation among companies and between companies and private households. Taking into account such time lags and the fact that the necessary technical infrastructure (diffusion of PCs and Internet access) has only become widespread recently, one can expect substantial productivity gains for the industries applying ICT to networking in the near future. This constitutes a possible avenue for higher productivity growth in the EU, in the future. With the liberalisation of telecommunications markets, and with the improvement of the legal framework for e-commerce, the environment in which European ICT industry can grasp this chance has been improved considerably.

Impact of the ICT sector

The performance of the ICT-producing industry is in itself a very important element of the overall impact of ICT on the economy. This industry is not only one of the largest sectors of the economy, but also one of the most dynamic. Analysis carried out for the US[11] indicates that, while producing about 10% of total US output, US ICT industry accounted between 1995 and 1999 for about 30% of total real economic growth, as a result of very rapid growth and falling prices.

In spite of the unquestionable technological and market leadership of the US ICT industry and firms, there are however more similarities than disparities between the structural role of the US and European ICT industries in the respective economies. Both economies have large deficits in trade of ICT goods: this was 31 billion Euro in the EU (1998), and nearly double in the US (59 billion Euro).[12] For both economies, ICT services, typically produced and consumed in the same geographical area, represent the largest part - about two thirds of the total. There are nevertheless clear and strong differences in the dynamism of the ICT industry in Europe and in the US. Firstly, in terms of market, the level of ICT expenditure, both in absolute terms and as a percentage of GDP, is definitely lower in Europe. Secondly, the slower readiness of the EU market to accept new products and solutions results in time delay in grasping the benefits, both for the users and the ICT industry itself. Europe has the lead, though, in key areas like mobile telephony and has the potential to reduce or even close the gap with the US in the forthcoming years.

11 US Department of Commerce, (2000).

12 The technology trade balance has limitations as a measure of ICT performance. It fails to account for technology transfer through consulting services, labour mobility and foreign direct investment. Moreover, it does not consider within-corporation R&D nor production in affiliated companies abroad.

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Annex 2
Recent policy developments in the area of competitiveness

The following chapter aims to offer the reader a means of keeping abreast of key policy developments at EU level that are expected to contribute towards enhancing European competitiveness. It covers the last twelve months, and is not, of course, a substitute for dedicated information instruments.

The major policy event during this period was the special European Council in Lisbon[1] (23-24 March 2000), which set the European Union a new strategic goal for the next decade: to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion. Community policies that have a bearing upon competitiveness have started adjusting to this goal, thereby gradually putting this strategy into practice.

From this perspective, and having now mostly achieved a sound and robust macro-economic foundation, the emphasis of economic policy is shifting towards breathing more dynamism into the European economy. Raising the Union's growth potential by pressing ahead with the reforms needed to build efficient and integrated markets became an important ingredient of economic strategy, as expressed in this year's Broad Economic Policy Guidelines[2].

The past year also saw a number of policy developments aimed at accelerating Europe's transformation into an Information Society. The eEurope initiative, launched in December 1999, proposed priority areas for joint action by the European Commission, Member States and industry, with ambitious targets, from education to transport and from healthcare to the disabled.

In support of eEurope, the Commission adopted more detailed policy papers in other areas. "Strategies for Jobs in the Information Society"[3] proposed strategies for fully exploiting the employment potential of the Information Society, based on best practices already in use across the Member States. The proposal adjusting the employment guidelines to the priorities agreed upon at the Lisbon Summit was adopted by the Commission in September 2000[4]. The eLearning[5] initiative, adopted in May, aims to adapt Europe's education and training systems to the use of new information and communication technologies. It set specific objectives in the area of infrastructures and of educational and training content.

To address the main barriers to the achievement of the targets of the eEurope initiative, the Commission launched the eEurope 2002 Action Plan[6], endorsed by the European Council in Santa Maria da Feira (19-20 June 2000). Focused on the Internet, the thrust of the plan is to accelerate legislation and to roll out infrastructure and services across Europe.

Along the same line, the Commission issued a package of legislative proposals[7] in July designed to strengthen competition in the electronic communi-

1 The Conclusions of European Councils can be found in: http://ue.eu.int/en/Info/eurocouncil/index.htm.
2 Council Recommendation of 19.6.2000 on the Broad Guidelines of the Economic Policies of the Member States and the Community (2000/517/EC), JO N°L210 of 21.8.2000.
3 Communication from the Commission, COM(2000) 48 final of 4.2.2000.
4 Proposal for a Council Decision on Guidelines for Member States' employment policies for the year 2001; COM(2000)548 – 06.09.2000.
5 Communication from the Commission "eLearning – Designing Tomorrow's Education" (COM/2000/318 final).
6 "eEurope 2002 – An Information Society for All" – Draft Action Plan prepared by the European Commission for the European Council in Feira (COM/2000/330 final).
7 Six draft Directives, one draft Regulation and one Decision. For a short description see Press Release N°IP/00/749 of 12.7.2000.

cations markets in the EU and to adapt existing regulations to the requirements of the Information Society. The package puts particular emphasis on the stimulation of affordable high speed Internet access and proposes a new, light-touch, regulatory framework for telecommunications in Europe.

The final adoption by the European Parliament of the Electronic Commerce Legal Framework Directive[8] in May 2000 constituted another major development in Europe's transition towards a knowledge based economy. The Directive brings providers of Information Society services, both business to business and business to consumer, under the Internal Market principles of the free movement of services and freedom of establishment.

The establishment of a European Research Area will constitute a major contribution to the Lisbon strategy. Proposals to this end were put forward by the Commission at the beginning of the year[9]. The Council endorsed them in June[10].

The Internal Market constitutes one of the main engines of economic reform in the EU. The Internal Market Strategy[11], endorsed at the Helsinki European Council, outlined the strategic objectives for the Internal Market over the next five years and set up mechanisms for tracking and updating target actions. Enhancing the efficiency of product and capital markets and improving the business environment were two of its four strategic objectives. The 2000 Review[12] of that programme took it a step further by targeting specific policies necessary to exploit, in particular, the benefits of new technology and innovation, such as reaching agreement over the Community Patent, further liberalisation of energy markets, acceleration of capital and service markets integration, further liberalisation of public procurement, regulatory simplification and elimination of tax distortions.

In the wake of Lisbon, the European Commission adopted a Communication setting out how Enterprise policy will enable European enterprises and entrepreneurs to respond to the challenges they face in the new economy. The main elements of the new approach are encouraging entrepreneurship and risk taking, fostering innovation, stimulating new business models in the knowledge-driven economy, getting still more from the Internal Market and cutting red tape. At the same time, the Commission put forward a proposal for a new Multi-annual Programme for the period 2001-2005, in support of the objectives of the Communication, with emphasis on the specific needs of small and medium-sized enterprises and, especially, on improving their access to finance. The identification and dissemination of best practice constitutes an essential component of the approach. The framework for Enterprise policy was further reinforced by the adoption of the European Charter for Small Enterprises by the Council.[13]

A separate Communication[14] by the Commission fleshed out the Innovation pillar of Enterprise policy. It proposes five priority objectives for public action: coherence of innovation policies, a regulatory framework conducive to innovation, encouraging the creation and growth of innovative enterprises, improving key interfaces in the innovation system and a society that is open to innovation. The Commission articulates these objectives via recommendations addressed to the Member States and actions to be implemented under its own responsibilities.

8 Directive 2000/31/EC of the European Parliament and of the Council of 8.6.2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market ("Directive on Electronic Commerce"), JO N°L178 of 17.7.2000.

9 "Towards a European Research Area", Communication from the Commission, COM(2000) 6 final, 18.1.2000.

10 Council (Research) Resolution of 15.6.2000, see Press Release N°9411/00

11 "The Strategy for Europe's Internal Market", Communication from the Commission, COM(1999) 464 final of 5.10.1999.

12 "2000 Review of the Internal Market Strategy", Communication from the Commission, COM(2000) 257 final of 3.5.2000.

13 Adopted by the Council on 13.6.2000, annexed to the Conclusions of the European Council in Feira.

14 "Innovation in a knowledge-driven economy", Communication from the Commission to the Council and the European Parliament, COM(2000)567 final – 20.09.2000.

Part 2
Structural change, competitiveness and the role of services

Chapter 2
Structural change in the European economy

Competitiveness depends crucially on the speed at which production reacts to changes in demand or to changes in the comparative advantages of a country. The 1999 Competitiveness Report pointed out that adaptability might be more important for growth than the degree of specialisation and its change over time. This chapter evaluates the ability of countries to adapt to new opportunities by measuring the change in the production structure between 1980 and 1997. It also presents specific indicators that measure the importance of industry shifts across factor input classes, across skill classes and across service input classes.[1]

1 This chapter is based on Aiginger (2000).

1. Measuring structural change

As is usual for complex processes, it is difficult to measure structural adaptability by simple indicators. An indicator of the overall structural change for each country has been constructed by summing the absolute changes in the value added shares of each sector. This indicator would be zero if no industry changed its share of total value added, and increases the more industries change their relative position. Clearly, this is but an imperfect indicator of adaptability since, for instance, a high speed of change may be due to deterioration in a country's competitiveness. (see Box 2.1).

Box 2.1 Measuring structural change: the speed of change

The sum of all the differences between shares in an aggregate between two given years (1980 and 1997) has been used as an indicator of structural change. Each change contributes to this indicator, independently of its direction (plus or minus) and independently of whether it originates from mature or dynamic industries. The variable used is nominal value added, and the shares are calculated as part of the total economy (macro speed of change) or of total manufacturing (all other indicators). The shortcomings of this indicator should be borne in mind. Some problems relate to statistical issues, others to the economic content or its interpretation.

Statistical caveats:

- The sum of absolute changes in shares is sensitive to the degree of disaggregation. A classification with a larger number of classes yields a higher measured speed of change. The speed of change in Figure 2.2 has therefore been normalised so as to prevent the influence of differences in the number of sectors on the indicators. In particular, comparisons across countries have to be made for identically classified sectors.
- A sector representing a small share of the total is bound to contribute less to the speed of change than a large sector. This has to be kept in mind when comparing contributions of sectors with very different sizes. For the same reason, comparing contributions of a sector across countries may be misleading if the countries have very different sectoral structures.
- Stochastic elements and errors in the variable give further scope for bias. Large countries will exhibit a lower value for this indicator than small countries, since a stochastic influence, such as the entry or exit of a firm of a given size, will change shares less in larger countries. Growing countries will tend to have somewhat larger stochastic changes than stagnating countries.

.../...

.../...

Economic caveats:

- Changes in the share of an industry can have different causes and are of varying importance for long-term competitiveness. Changes coming from firms that are losing competitiveness in a mature industry will have a different impact, compared to changes coming from firms that are switching into dynamic, innovative industries. While no direct distinction is made here between positive and destructive changes, a suggestion is nevertheless made as to the direction of change and its importance for long-term competitiveness by stressing changes according to factor inputs, skills and service content.
- Adaptability is a complex process, where the speed of change of shares can highlight only one aspect. A more comprehensive picture would require an investigation of the entry and exit process and the financing of small, high-risk, high-growth firms. Finally, any proof or hints that speed of change and competitiveness or growth are interrelated – be it suggested by graphs or econometrically by correlations and regressions – involve problems. The main problem is that of causality, since we expect that growth needs adaptability but measured speed of change is higher if growth accelerates (two-way causality). With these reservations in mind, this indicator can still be used to provide information about an important characteristic of economies.

2. Macro speed of change compared across Member States

The first evaluation relates to structural change across 25 broad sectors, including agriculture, industry (manufacturing, construction and energy) and services (Table 2.1). The macro speed of change – as we call the dynamics of change at this rather aggregated level – was considerable between 1980 and 1997.

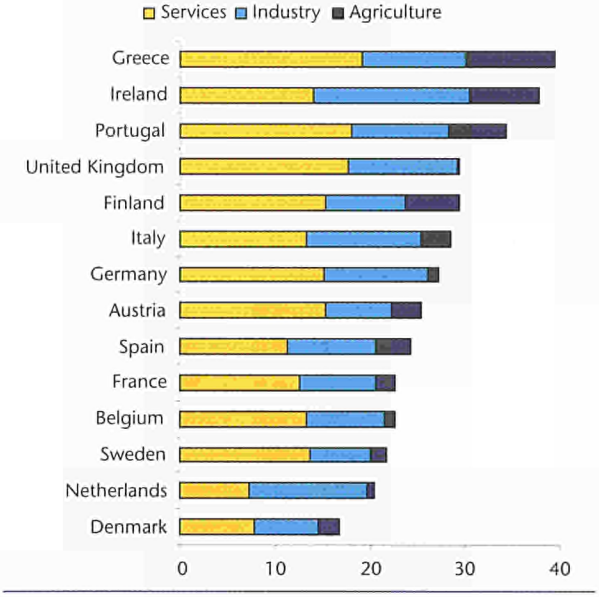
Figure 2.1 shows the contributions of the agriculture, industry and services sectors to overall structural change. Approximately one half of the change occurred in the service sector, while the lion's share of the other half took place in industry. The change in agriculture – a decline in all countries – averaged less than one tenth of the total change, but with very large differences between countries. In Greece, the agricultural share contracted by 9 percentage points and in Ireland and Portugal by 6 percentage points each, although these three countries con-

Table 2.1 Macro speed of change 1980-1997

Country	Macro speed of change 1980-1997	Shares of GDP						Growth p.a. 1980-1997
		Agriculture		Industry		Services		Total economy nominal terms
		1980	1997	1980	1997	1980	1997	
Belgium	22.6	2.2	1.2	35.3	28.8	62.5	70.0	5.5
Denmark	16.9	5.5	3.2	28.7	27.2	65.8	69.6	6.7
Germany	27.1	2.1	1.0	42.7	31.8	55.2	67.2	6.2
Greece	39.5	17.3	8.1	30.4	23.0	52.3	68.9	6.7
Spain	24.3	6.9	3.3	38.0	31.1	55.1	65.6	6.8
France	22.7	4.5	2.4	35.5	27.5	60.0	70.1	5.7
Ireland	37.8	11.7	4.5	38.8	40.9	49.5	54.6	10.0
Italy	28.5	5.8	2.7	39.6	31.1	54.5	66.3	6.9
Luxembourg	46.5	2.4	0.8	37.6	21.1	60.0	78.1	9.0
Netherlands	20.4	3.7	3.0	34.0	28.5	62.3	68.5	5.8
Austria	25.3	4.6	1.4	37.7	32.3	57.7	66.3	7.2
Portugal	34.3	10.0	4.1	37.8	33.6	52.2	62.3	9.3
Finland	29.4	9.7	4.1	37.8	31.6	52.5	64.2	6.0
Sweden	21.8	3.5	1.8	31.7	28.9	64.8	69.3	4.8
United Kingdom	29.5	1.7	1.5	42.1	31.6	56.2	66.9	6.5
EU	**21.4**	**4.0**	**2.1**	**38.7**	**30.4**	**57.3**	**67.5**	**6.3**

Note: For the definition of "Macro speed of change", see Box 2.1.
Source: WIFO calculations using National accounts ESA, EUROSTAT.

Figure 2.1 Contributions to macro speed of change, 1980-1997



Source: WIFO calculations using National Accounts ESA, EUROSTAT.

tinue to hold the largest shares of agriculture. In the Netherlands and Ireland, structural change in industry is higher than that in services. In Austria, Portugal, Finland and Sweden, structural change in services is double that in industry. These are all small countries, with high growth, which are situated at the periphery of the EU. Austria, Finland and Sweden were not yet members at the beginning of the period analysed.

The macro speed of change is highest in Greece, Ireland and Portugal, partly because of the large decrease in the share of agriculture. However, these countries are also amongst the top four in terms of speed of change in services. Ireland exhibits the highest speed of change within the industrial sector, while the slowest change occurred in France, Italy and the United Kingdom. Germany shows a rather large degree of change in broad sectors, with services making a strong contribution, while the speed of change in industry (and specifically manufacturing) has been lower.

Among the 25 sectors, the greatest change is the increase in "market services", the share of which increased by about one quarter for the EU. In the industrial sector, the largest changes are the drop in the value added share of the construction industry, and, within manufacturing, that of the textile industry.

If competitiveness depends on the ability of productive systems to adapt to new opportunities, and if the speed of change indicator is a good measure of this ability, one should expect to find a positive link between growth rates and this indicator. Indeed, correlation analysis indicates that macro growth is significantly related to the macro speed of change. Growth is higher in countries where the industry share is larger and the service share is smaller, although this relation is not significant. Furthermore, the result is a corollary of the catching-up process. Growth is significantly related to the speed of change within industry, not to the speed of change within services.[2]

3. Industrial change and input use

Structural change within the industrial sector was evaluated by computing the speed of change at the level of 93 industries over the period 1985-1998. The absolute differences of value added shares between these years are summarised as the "industry speed of change".[3]

The industry speed of change is lower in Europe than in Japan and the US. The indicator is 17.9 for Europe, 19.1 for Japan and 19.3 for the US.[4] This suggests that structural change in Europe may be insufficient, a situation that has been analysed, with regard to specialisation and concentration patterns, in last year's report.[5]

There are some limitations to assessing the level of structural change by a single indicator. A changing structure can be the result of firms' strategies to restructure into dynamic and promising industries or of a loss of competitiveness by existing firms. Assessing the adaptability of supply to demand requires a more comprehensive evaluation of economic activity and a link to policy factors. This is done by investigating structural change according to the main input factor used, according to skill classes and according to the type of services used. These three additional indicators of structural change hint at the sources and directions of change.

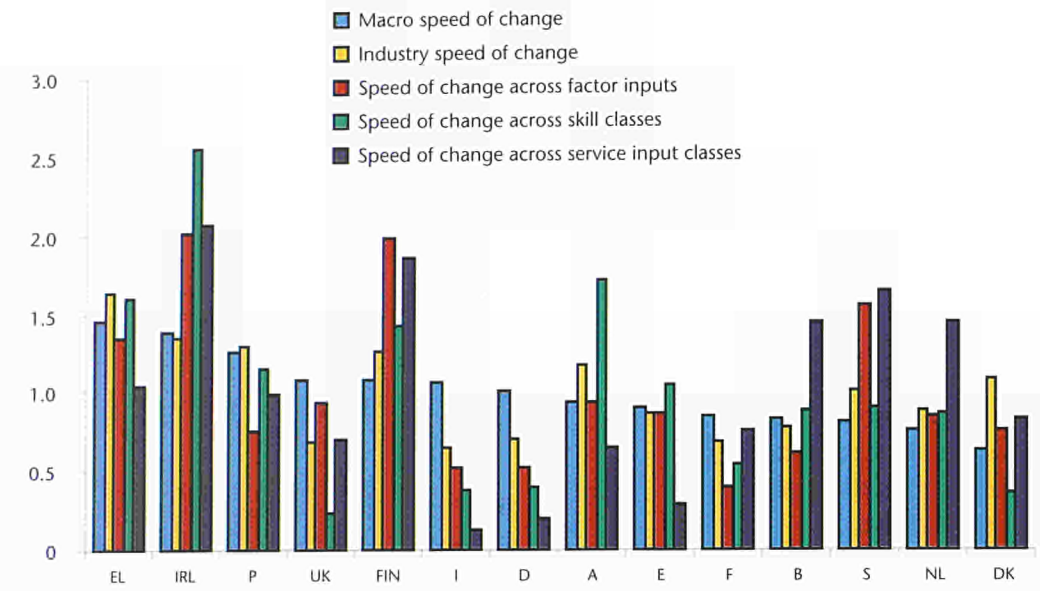
2 Correlation can reveal relations but cannot detect causalities. The rank correlation between the macro speed of change and the growth of value added for all sectors is 0.64. Growth is correlated closely with changes in agriculture (R= 0.60) and industry (R=0.59), and less with changes in the service sectors (R=0.29). The first two relationships are statistically significant by usual statistical standards.

3 This is calculated for manufacturing industries (NACE 15-36) excluding construction and energy.

4 For Japan and the US the data end in 1997.

5 Aiginger (1999), Aiginger et al. (1999), European Commission (1999), Peneder (2000).

Figure 2.2 Speed of change according to the level of aggregation (normalised)



Note: Countries are ranked according to macro speed of change. Values are divided by the mean to allow comparability.
Source: WIFO calculations, using EUROSTAT, National accounts ESA for macro speed of change, SBS for industry speed, WIFO typology for industry types.

Figure 2.2 shows the position of each country with respect to each of the five structural change indicators. The second column shows the speed of change in manufacturing. The third column shows the speed of change according to factor inputs.[6] The next column concentrates on change in skill classes[7] and the final bar shows how structure changed across service input classes.[8]

These indicators are neutral between losses and gains in the specific sectors, nevertheless, in the examples mentioned below, the increased share of technology driven industries, of high skill industries and of industries relying on knowledge-based services dominates the picture. Thus allowing, to some extent, to identify the speed of change with the changes most favourable for long term competitiveness.[9]

The industry speed of change is highest in Greece, followed by Ireland and Portugal. Finland is again very close to the top three. Germany, France and Italy exhibit the slowest speed of change. The relationship between "macro speed of change" and "industry speed of change" is fairly close; the greatest differences are the slower speed of change for Germany and the higher ranks for Denmark and Austria at the industry level.

Among the countries undergoing rapid change, Greece and Portugal still have a high share of labour intensive industries. Speed of change according to input factors and service types is lower than macro speed of change. Ireland is a long way ahead in terms of speed of change in industry types, since it has been shifting resources from labour intensive into research intensive industries. Portugal and Greece did change their share in broad sectors, but did not achieve a large increase in technology oriented industries. Sweden and Finland outperformed all other countries in their ability to increase their shares of technological industries, hinting at the importance of technology policy and successful firm clusters in the field of information technologies. Finland, Sweden, Ireland, and also the Netherlands shifted their structure towards industries that make intensive use of knowledge-based services.

6 This indicator uses WIFO industrial taxonomy I, which classifies industries into 5 groups: advertising intensive (marketing driven), research intensive (technology driven), labour intensive, capital intensive and a fifth residual class (mainstream industries) with no particular reliance on any of the previous input variables, see European Commission (1999).

7 This indicator uses WIFO taxonomy II, which classifies industries according to their labour-skill requirements, see European Commission (1999).

8 This indicator uses a new taxonomy developed for this year's Report, which classifies industries according to their demand intensity of different service inputs. This taxonomy comprises 4 groups of industries: transport services intensive, retail and advertising intensive, knowledge-based services intensive and a fourth residual group with no particular reliance on any type of services, see chapter 4.

9 For information on the direction of change see Aiginger (2000).

Table 2.2 Speed of change in manufacturing according to industries and industry types, 1985-1998

Country	Industry speed of change (93 industries)	Speed of change across factor inputs	Speed of change across skill classes	Speed of change across service input classes	Growth of manufacturing[a]
Belgium	26.3	7.2	11.9	15.2	4.2
Denmark	36.7	8.9	4.8	8.8	4.8
Germany	23.7	6.1	5.3	2.2	3.9
Greece	56.0	16.0	21.3	11.0	3.3
Spain	29.6	10.3	13.8	2.9	4.7
France	23.3	4.7	7.3	7.9	3.0
Ireland	46.3	23.8	34.1	21.8	7.9
Italy	22.2	6.2	5.1	1.4	3.8
Netherlands	29.8	10.0	11.6	15.3	4.9
Austria	39.7	11.0	22.8	6.8	5.7
Portugal	44.3	9.0	15.4	10.4	8.2
Finland	43.0	23.3	19.1	19.5	3.1
Sweden	34.6	18.2	11.9	17.3	0.9
United Kingdom	23.1	11.0	3.0	7.5	3.1
EU excl. Lux.	**34.2**	**11.8**	**13.4**	**3.6**	**3.8**

a Annual growth rate of nominal value added.
Source: WIFO calculations using SBS, EUROSTAT.

How is growth in manufacturing related to these indicators of specific industrial structure? Data analysis shows that growth is higher in countries with a large share of advertising intensive industries. It is also stronger in countries in which the share of low-skill industries decreased and higher where the share of high-skill industries increased (see Table 2.2). This could hint that part of the growth potential, as well as part of broad structural change, represents the catching-up process of countries with a formerly large share in the agricultural sector and reliance on less qualified labour. Furthermore, growth is related to changes in the skills of workers in manufacturing, and increases as the share of high skilled employees rises and the share of untrained workers declines. The highest speed of change in skill classes is observed in Ireland, followed by Austria. Both countries have experienced high rates of growth, indicating the close relationship between the quality of factor inputs and growth.

4. Summary

The economic environment affecting firms has changed dramatically over the past two decades. We have seen that growth is related to the speed of change, both at the macro-level and at the level of manufacturing. Growth is further stimulated if research intensity, skills and the use of knowledge intensive services are high and rising. The speed of adjustment to a changing economic environment, as well as the use of inputs specifically important for growth, are, therefore, crucial for competitiveness.

Comparisons between Europe, the US and Japan have suggested that change in European manufacturing may not have been fast enough in relation to changes in demand and technology. This may be one factor explaining the deterioration in Europe's competitive position relative to the US.

Adaptability, rather than structural change *per se,* is important for competitiveness. Policies generally believed to promote adaptability cover a large spectrum of fields such as access to finance, human resources and innovation. Mobilising financial resources for new, fast growing firms, fostering innovation in new technologies, intensifying training, retraining and education, upgrading quality and promoting knowledge-based services are among the policy measures most called for in this context. A prerequisite for the success of such measures is, however, an economic framework for business that is conducive to innovation, change and growth. This implies, in particular, open markets for goods and services, flexible labour and capital markets, a regulatory framework that enhances innovation and a system of taxes and social security contributions that encourages entrepreneurship.

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Chapter 3
Quality-based competitiveness

This chapter investigates how European manufacturing is positioned in quality competition and analyses differences in strategies across countries. The data indicate that there is no immediate danger of European industries losing their mostly quality-based competitive advantages in foreign trade vis-à-vis low cost providers. Europe has a surplus in manufacturing and a large trade surplus with the accession countries and many emerging economies. Much of this surplus can be attributed to Europe's ability to sell goods of a higher quality. Within the Triad in general, it is goods of high quality that are traded. Europe is making progress in selling high quality goods and is making inroads in important areas, although it still has a deficit in fast moving industries and productivity, and a slow speed of change. To increase income, Europe has to boost quality and productivity and increases its share of technology driven industries.[1]

1. Why is quality competition important for the EU?

The EU is a high wage region. A substantial portion of high wages, as well as of the costs of the social security system, education, health and the environment is balanced by high productivity. Cost increases have been successfully curbed by increasing the efficiency of institutions and markets through the reduction of transport costs, trade barriers and currency costs. Nevertheless, cost restraints have a limit, and – as far as factor rewards (wages, profits) are concerned – to a certain extent also contradict the final goal of competitiveness, namely to increase the welfare of European citizens. In addition, new competitors with much lower costs are arriving, be it the emerging economies or the accession countries. These competitors have lower absolute costs, and, even after correcting for productivity differences, also generally have lower unit labour costs. The consequence for a high wage country is the need to compete on quality. Here, pressure from the cost side is mitigated, since high wage countries have a competitive advantage. Demand for high quality goods depends on disposable income and is therefore stronger in rich countries, providing them with a first mover advantage. In addition, resources in research and skilled labour support innovation. For firms, quality competition has the advantage that it enables firms to remain competitive while keeping the margins needed for innovation. For countries, high wages become compatible with competitiveness.

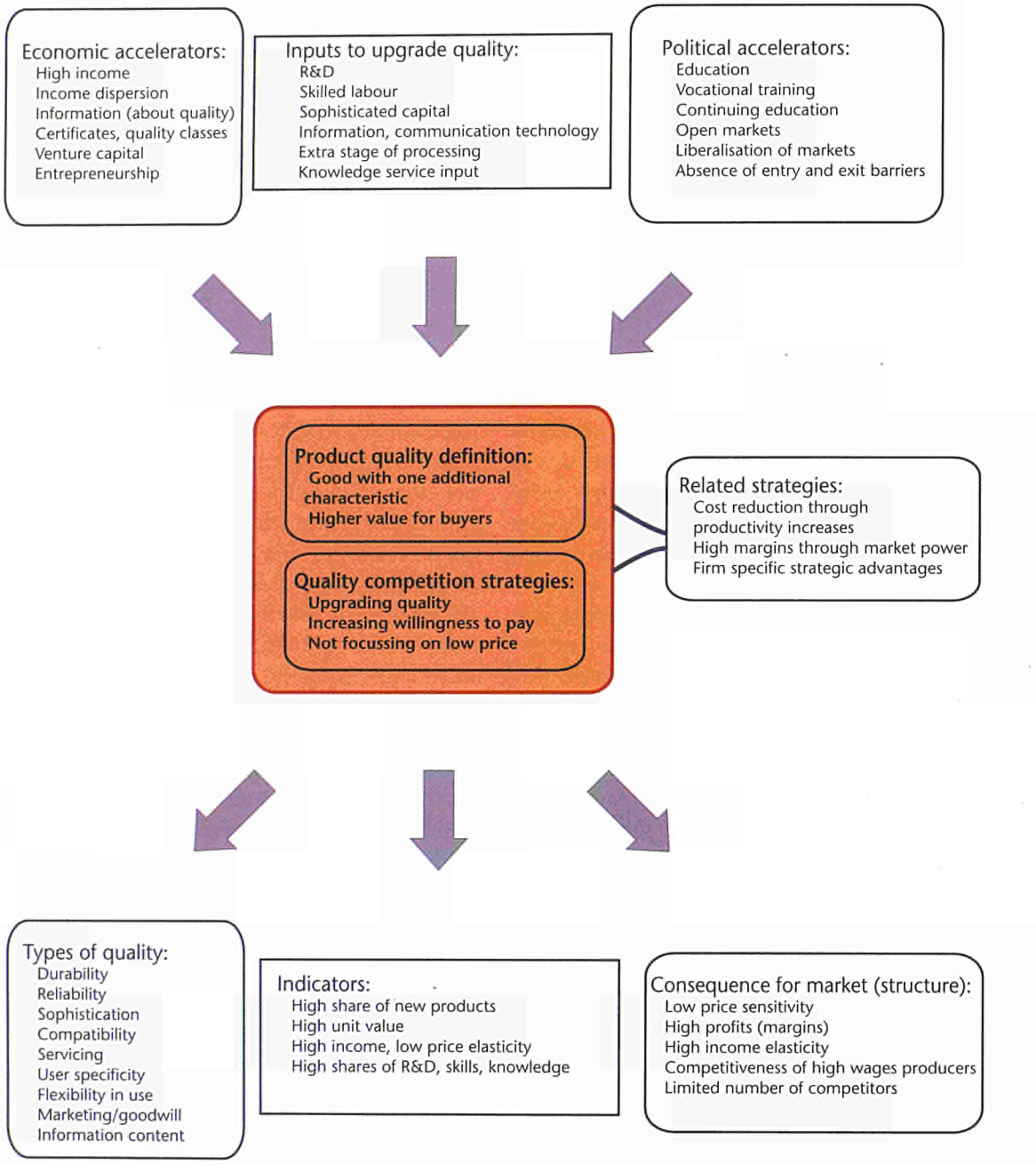
What is quality?

Quality is a complex notion and there exists no generally accepted definition that covers all the complexities of real economies. For the purposes of this report, a high quality product is defined as one that possesses one or more additional characteristics that are valued by buyers. The characteristics that increase the willingness to pay may be either physically measurable, like speed, capacity, size and durability, or they may be intangible, like reliability, design, goodwill and trust. Quality may also arise simply through flexibility in use, compatibility, maintenance contracts, etc. Higher quality allows for a higher price without losing the market.

Quality can be upgraded through research and development, more or better skilled labour, more sophisticated material inputs or superior organisation at the plant or firm level. Marketing may increase the willingness to pay by providing information about the capabilities of the product or by changing the tastes of consumers. Adding a further

1 This chapter is based on Aiginger (2000).

Figure 3.1 Quality competition: Preconditions, types and consequences



stage of processing usually increases the quality of the product.[2] Submitting to certifications, setting standards and benchmarking are other techniques of upgrading the quality of processes and products.

The inputs that help to upgrade quality, the economic and political accelerators, the indicators that signal quality and the consequences for market structure are summarised in Figure 3.1.

Quality and profitability are closely related, insofar as the quality of products will usually raise profitability, both by decreasing the competitive pressure and by increasing the willingness to pay. The quality of products should be reflected in the profits and specifically in the persistence of supernormal profits.[3]

2 A further stage of processing can result from combining hardware with software or a tangible product with a service or information.

3 If the market is not regulated or characterised by entry barriers, each advantage of a specific firm will be contested rapidly by other firms. Only firms which can consistently upgrade quality or which possess a specific non-imitable advantage can accrue higher profits in the long run.

Higher quality is a necessary precondition for high cost producers to stay competitive. It may be possible to cope with higher wages by increasing productivity but, since technology and managerial skills are also spreading due to the investment of multinational firms, this strategy is not always feasible. Producing higher quality is an alternative as well as a complement to higher productivity. However, this strategy is easier in those industries, in which buyers differentiate between quality types while there are other markets in which price competition is the prime competitive mode. We define as "quality competition" a competitive environment in which upgrading quality, and increasing the willingness to pay, is important relative to competing at low prices. Quality sensitive industries are those in which quality upgrading rather than low prices defines the competitive edge.

2. Is Europe a provider of quality? A contested quality premium

The most comprehensive measure of quality available for empirical research is the "unit value". The unit value is defined as nominal value divided by physical volume.[4] Increases in unit values may be due to rising demand or to rising costs. But they also reflect changes in quality, shifts to higher price segments and to more specific value-enhancing features. Unit values as indicators of quality have been widely used in industry studies for assessing qualitative competitiveness and for discriminating between different components of intra-industry trade.[5]

Unit values differ widely across Europe

Figure 3.2 shows that unit values of exports in manufacturing[6] vary between 5.5 Euro/kg in Ireland and 0.43 Euro/kg in Greece (for 1998).[7] This high amplitude can be attributed to the combined result of the specialisation of countries in particular industries and the position of countries in price segments within the individual industries. Countries specialising in capital intensive industries and in less

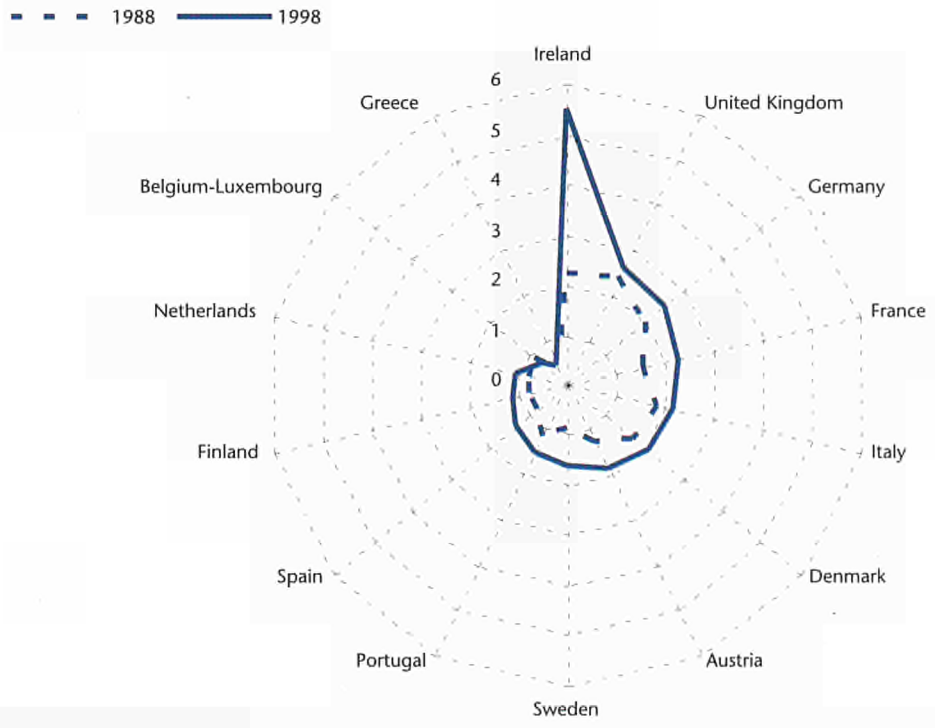
4 For the data used in this report, it is the gross value of exports or imports in Euro divided by kilogram.

5 The advantages of the indicator, its limits, existing statistical problems and the relation of unit values to other concepts are discussed in Aiginger (2000).

6 This analysis focus on manufacturing, since the methods used to differentiate between high quality and high costs rely on the ability to measure the product physically (by weight).

7 This range of ten to one is much higher than that for per capita GDP, which differs by less than three to one between European countries.

Figure 3.2 Export unit value in member countries, 1988 and 1998



Source: WIFO calculations using COMEXT, EUROSTAT.

processed goods have lower unit values than countries with high shares in technology driven industries and in upper price segments within industries.

Ireland combines a high share of technology driven industries (60% of exports) with 78% positioning in the highest price segment (see section 4 for a definition of price segments). The UK achieves the second highest export unit value, through concentration in engineering industries (technology driven industries and the machinery industry). Three other large countries follow, each having export unit values close to one another: Germany, France and Italy report unit values between 2.1 and 2.5 Euro/kg. Denmark, Austria and Sweden all hold moderate positions. Belgium/Luxembourg and the Netherlands had – together with Greece – unit values of about or below 2 Euro/kg in 1998.

Greece is specialised in fairly heavy, capital intensive products, with lower unit values: basic metals, mineral products, petroleum and chemicals have unit values below 0.5 Euro/kg and amount to one third of Greek exports. In addition, 75% of these exports are in the medium and low price segments. The positions of the Netherlands and Belgium/Luxembourg are also biased downward by chemicals, petroleum and steel, although these countries have higher shares in the high price segments and in technology driven industries.

In general, unit values increased over time. The largest increase was registered in Ireland, which was second to the UK in 1988 and is now the leader. Next in the dynamics of export unit value is Sweden, which doubled its export unit value, and shifted from the lower end of country rankings to a position in the middle. Greece and the Netherlands increased their unit values less than other countries, while Belgium/Luxembourg is the only area in which the unit value decreased in absolute terms. The standard deviation of unit value across countries also increased over the last ten years.[8]

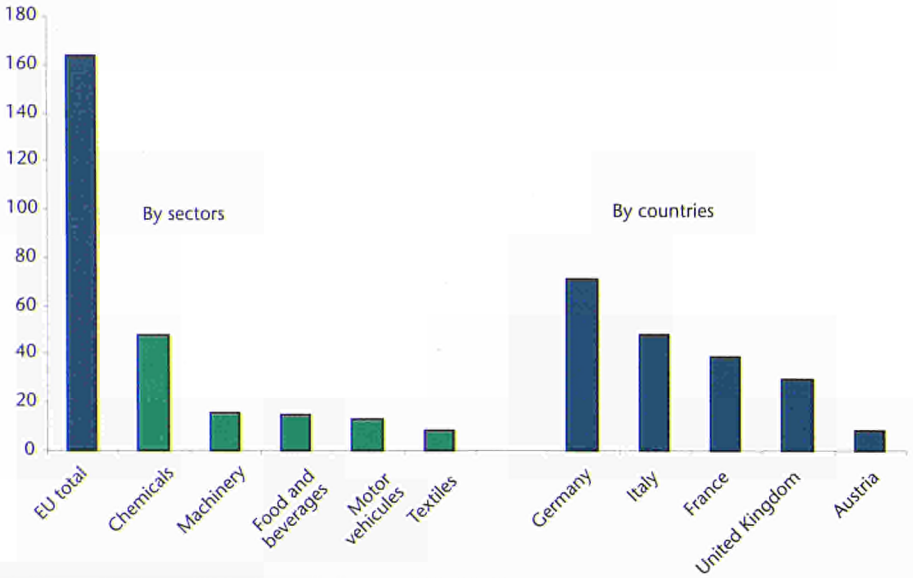
If we compare changes in the unit value with the indicators of structural change from the previous chapter, we see that approximately the same speed of change between sectors (macro and industry speed of change) can, nevertheless, support different strategies concerning quality position (Ireland vs. Greece).

The quality premium in European exports

European exports in manufacturing (extra-EU trade) amounted to 665 bn Euro in 1998 and imports to only 579 bn Euro. This resulted in an export surplus of 86 bn Euro, which is more than three times as high as ten years before (25 bn Euro). In 1998, the export surplus can be attributed to a quality premium in exports: the export unit value, 2.25 Euro/kg, was 31% higher than the import unit

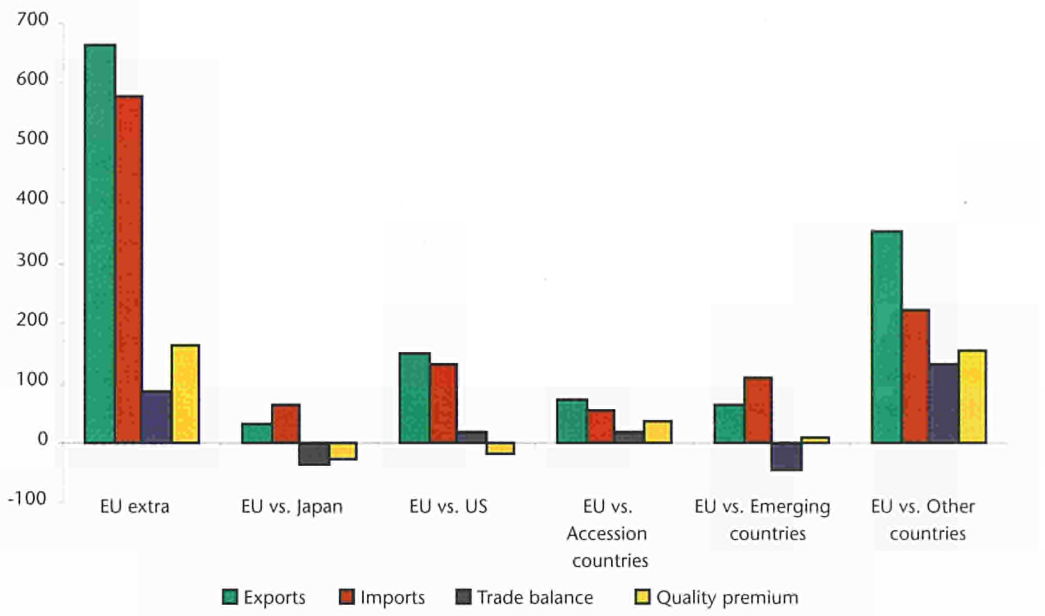
8 Unit value is higher in the Northern countries as compared to the Southern countries, due to the positions of Ireland and the UK. It does not differ between the core and periphery or between high and low income countries. This is the result of placing Ireland among the low-income countries and the fact that the positions of Spain and Portugal are more favourable in this indicator due to the importance of the textile industries. It is slightly higher in large countries than in small countries.

Figure 3.3 Creation of quality premium by selected sectors and countries, 1998, bn Euro



Source: WIFO calculations using COMEXT, EUROSTAT.

Figure 3.4 Regional destination of exports and quality premium, 1998, bn Euro



Source: WIFO calculations using COMEXT, EUROSTAT.

value. The quality premium can be assessed by a hypothetical calculation: if exports were priced as low as imports, European exports would have decrease by 161 bn Euro.

Roughly, half of this "quality premium" in European trade comes from specialisation in high unit value industries while the other half is due to higher unit values within the same industries. The largest part of the quality premium accrues from the chemical industry (47.5 bn Euro), followed by machinery, food, motor vehicles and textiles (see Figure 3.3). The quality premium is highest in marketing driven and labour intensive industries. On the contrary, in technology driven industries,[9] exports are valued 15% lower than imports. Seen from the national perspective, 11 of the 14 countries have higher export unit values (in extra-EU trade); the largest differences are for Germany, Italy, France, the United Kingdom and Austria.

The premium comes from trade with non-Triad countries (see Figure 3.4). Export unit values are twice as high as the import unit values in the trade with accession countries and are large in trade with emerging countries. In trade with the US, Europe has a surplus, but exports are priced 12% lower than imports. Half of this bilateral trade is in technology driven industries where the unit value of European exports is 40% lower than that of imports from the US. In 47 out of 93 industries, European exports are more highly valued, specifically in labour intensive and marketing driven industries. However, these two groups account for only one fifth of exports. The export unit value for Europe as against Japan is only half of the import unit value. This is due to the extreme concentration of Japanese exports in industries with high unit values (e.g. engineering industries).

Compared to 1988, the ratio of export unit value to import unit values for European manufacturing was lower in 1998, and hence the relative premium fell from 68% to 31%. This mirrors the catching- up process, for example, of the accession countries, whose export unit value is now about half of Europe's, while ten years earlier it was only one fifth. On the other side of the quality spectrum, the US has increased its unit value more than Europe in bilateral trade, while Europe has reduced a small part of its large trade gap with Japan.

Unit values are a comprehensive primary indicator of quality but must be complemented with data on the structure of industries, the position within industries, the nature and quality of inputs, as well as patents, certificates or shares of differentiated products as indicators of the quality of outputs. The next sections deal with these issues.

9 WIFO taxonomy, see European Commission (1999).

3. Quality sensitivity

The importance of quality competition differs across industries. In homogeneous markets, consumers and firms buy the goods from the cheapest source; any firm which undercuts the price will boost demand for its products (demand is price elastic). On the contrary, in heterogeneous markets, goods are differentiated by locations and product characteristics. The heterogeneity may come from a variety of tastes or specific demand characteristics. If prices are important in an industry, countries with high prices should sell small quantities and those with low prices should sell large quantities. On the other hand, if countries charge high prices and are nevertheless able to sell large quantities, the product must have some specificities (design, service, reliability etc.) which create a willingness to pay. Here, this simple idea is applied to the existing trade data and industries are split into three groups: group one, in which quality is revealed to play an important role (high revealed quality elasticity, RQE); group two, with moderate quality elasticity and group three, in which price dominates (low RQE). For the method applied, see Box 3.1.

In the majority of industries, price competition dominates. The range of our indicator is between 25% in the cement industry and 53.5% in general purpose machinery (see Fig. 3.5). This means that in the cement industry 25% of bilateral relations in the reporting countries are not dominated by price. In general purpose machinery (a still heterogeneous sub-industry of the machinery sector), a slight majority of bilateral trade relations is dominated by quality.

Many of the industries in which quality dominates are engineering industries, such as machinery, equipment, instruments, motor vehicles and others. Of the 11 technology driven industries, 8 fall into the high RQE category. RQE is 42.7% in this group. The three research-intensive industries not classified as quality elastic are computers, audio and video apparatus and electronic components. The common characteristic of these three industries is that they have reached the stage of development in which the production of standard products has, to a large extent, been shifted to low cost suppliers,[10] and price competition increases for the best selling products. These industries are characterised by high globalisation and a fairly low share of intra-EU imports. Fourteen of the 23 marketing driven industries are revealed to be quality elastic, while only four are revealed to be price elastic. Quality is revealed to be of greatest importance in footwear, games and toys, tobacco and watches.

At the bottom end of the list – industries revealed as price elastic – are capital intensive industries: concrete, cement, steel, mineral products and sawmills rank as the bottom five. Of the 11 capital-intensive industries, only one (motor vehicle parts) is revealed as quality elastic.

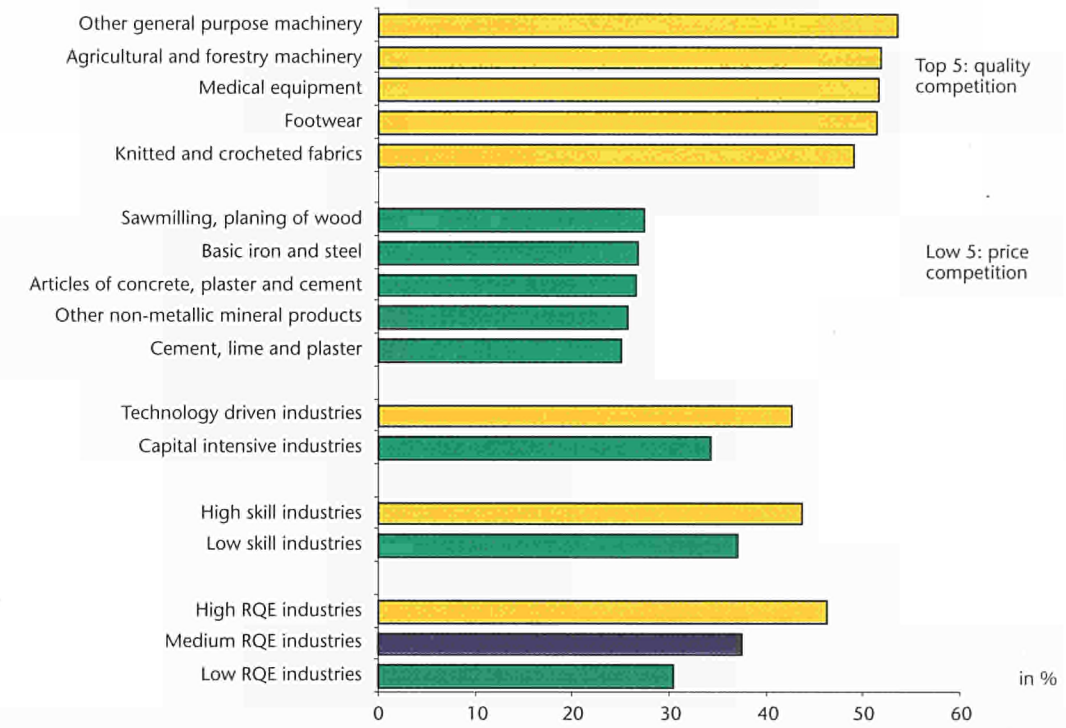
10 This does not mean that the bulk of research and product development and the production of new products do not remain in high-income countries.

Box 3.1 Classifying industries according to Revealed Quality Elasticity (RQE)

The following method has been used to gain information about the relative role of quality and prices. Industries in which higher prices (higher unit values in exports relative to imports) are associated with lower quantities (lower exported quantities relative to imported quantities) are revealed to be price elastic. Industries in which the signs of (net) prices and (net) quantities are the same are revealed to be quality elastic. The signs are calculated for the bilateral trade of the EU Member States *vis-à-vis* thirty countries (including the EU members, the US, Japan, 8 emerging countries and 6 accession countries) in 1998. The share of identical signs indicates the importance of quality. The revealed quality elasticity (RQE) indicator can theoretically lie between 100 (all bilateral relations of prices and quantities have an identical sign) and 0 (all have opposite signs). Empirically, the indicator ranges from 53.5% to 25.0%.

The indicator is fairly smooth, in the sense that there seems to be no critical value separating different modes. Exactly one third of the industries are grouped into a category which is called industries with "high Revealed Quality Elasticity" (high RQE, for short), one third into a middle category (medium RQE or moderately price elastic industries) and the last 31 industries into a price elastic group (low RQE). The cut-off points are 42.3% between high and medium and 34.5% between medium and low. These cut-off points are determined according to the symmetry in the number of industries in each category and have no intrinsic interpretation. Subtracting the share of price elastic industries from that of quality elastic industries yields a balance indicator (net RQE = high RQE – low RQE). The indicator is derived from export data, but is used to characterise the competitive mode typical for all sales.

Figure 3.5 The importance of quality in different industries: Revealed Quality Elasticity (RQE)



Note: For the definition of RQE, see Box 3.1.
Source: WIFO calculations using COMEXT, EUROSTAT.

For labour intensive industries, a slight majority is classified as price elastic. Of the 22 labour intensive industries, nine fall into the low RQE sector. Some of these are from the textile sector, and some from industries that produce building materials with high labour cost shares. Labour intensive industries that produce metal-based investment goods (machine tools, motor parts) are classified as high RQE industries.[11]

Industry characteristics and the competitive mode (quality vs. price)

Theory predicts that quality competition will be more important for more sophisticated products, for higher product differentiation, for industries with sunk costs and for industries under high pressure from globalisation. Rank correlations[12] are used to show whether the industries revealed as quality sensitive fit these expectations.

The strongest correlation exists between RQE and the degree of product sophistication, as measured by unit value (see Figure 3.6). Also significant is the relationship to product differentiation.[13] Quality competition is also positively related to the degree of globalisation.[14] This is partly due to the fact that highly globalised industries are dominated by quality competition (games and toys, watches, instruments), but even more to the fact that capital intensive industries with high transport costs (like cement, bricks, glass, furniture and domestic appliances) are dominated by price competition. Industries classified as sensitive to Internal Market effects are dominated by quality competition.[15]

11 For a classification of industries according to competitive mode and taxonomy classes see Aiginger (2000), chapter 4 and European Commission (1998).

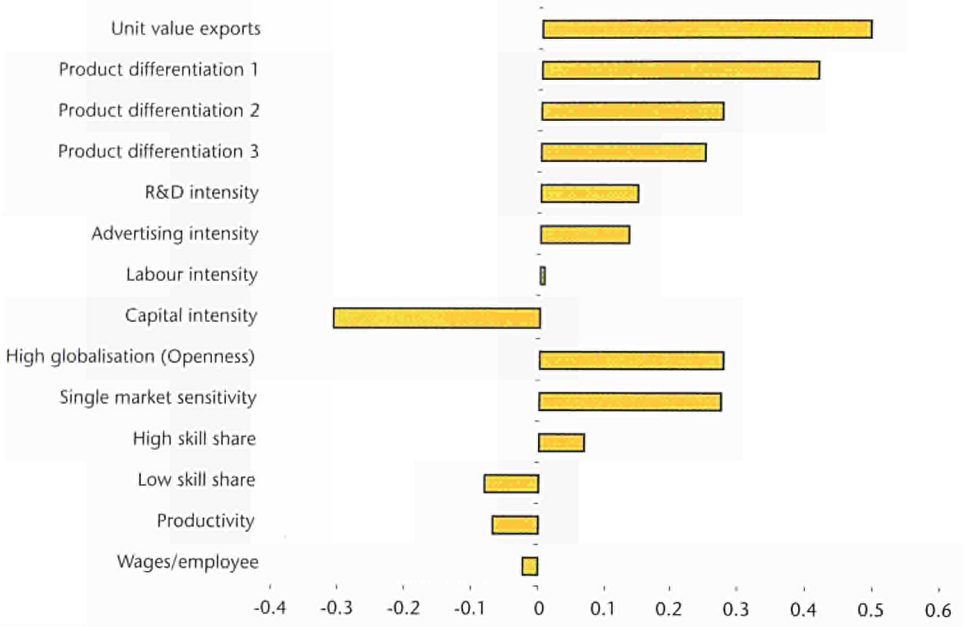
12 Rank correlations are more robust since some variables are considerably skewed. It must be stressed that correlation reveals whether phenomena are related, but does not impose a direction of causality.

13 Three indicators of product differentiation were tested. The first indicator calculates the standard deviation of export unit values of each 3-digit industry across the 14 member countries. This indicator represents the model according to which each country could be considered as one firm, each producing a different quality of, say, steel. This standard deviation measures the width of the vertical differentiation. The second indicator calculates the standard deviation across 6-digit products within an industry. This indicator assumes that the EU is one large region producing many different products in a specific industry, maybe in decentralised plants. The third indicator combines both aspects and calculates the standard deviation across countries and product groups. It combines aspects of geographical and product specific heterogeneity.

14 Globalisation or openness is defined as the share of imports plus exports to value added in the Triad (as a proxy for production).

15 Beverages and pharmaceuticals are highly differentiated industries and had lower trade volumes than typical capital intensive industries like pulp and paper, and steel, in which trade surged during the first stage following the elimination of customs.

Figure 3.6 Determinants of the importance of quality competition (RQE)



Note: Rank correlations with RQE indicators; R=0.173 (resp. 0.250) denotes 90% (resp. 95%) degree of significance.
Source: WIFO calculations using EUROSTAT.

A positive relationship between quality competition and research and skill inputs exists, but is not significant.[16] Price competition is higher than might be expected in capital intensive sectors.

It is equally interesting to see which industry characteristics are not related to the indicator on quality competition. First and foremost, there is no smooth relationship between the importance of quality and productivity or high wages. The reason for this is that quality is related to skills, particularly in research intensive industries. However, value added per hour and wages per employee are also high in capital intensive industries, in which price competition is of significant importance. Cement, steel and basic chemicals are industries with high wages, but which are classified as price elastic.[17]

Europe's trade surplus comes from quality sensitive industries

The total trade surplus of the EU comes from the quality elastic sector. This total trade surplus was 134 bn Euro in 1998. The sector of quality sensitive industries created a surplus of 149 bn Euro, while trade in moderately price elastic industries was balanced. In price elastic industries, the EU suffered a trade deficit of 18 bn Euro. Thus, the surplus in quality competition covered the deficit in price elastic industries and created a trade surplus (see Table 3.1).

Differences across countries

The positions of countries differ according to their individual income positions, competitive advantages and industry structures.

Germany and France have an overall trade surplus, which is completely attributable to surpluses in the high RQE sectors, with deficits or balanced trade in the others. In both countries, the car industry makes a significant contribution to this surplus. In Germany, machinery is the next largest sector, dominated by quality competition; aircraft and beverages assume the corresponding position in France.

16 As far as research is concerned, audio video apparatus, office machinery and valves are research intensive but price elastic, while some textile products, as well as tobacco and pesticides, are revealed as quality elastic but have low research inputs. High skill industries in which price competition is of great importance are office machinery and weapons and ammunition. Low skill industries in which quality is of great importance are certain food industries and some textile industries (in which fashion, as well as reprocessing, plays a leading role).

17 In addition, the – possibly misleading – classification of certain textile industries as high quality industries prevents a closer relationship, since these products are produced on cheap wages in low productivity plants.

Table 3.1 Trade balance, mio Euro

	1988				1998			
	High RQE	Medium RQE	Low RQE	Total balance	High RQE	Medium RQE	Low RQE	Total balance
Belgium-Luxembourg	3882.6	-518.4	1944.1	5308.3	3374.0	3145.5	5458.6	11978.0
Denmark	291.7	2388.9	-3493.4	-812.8	297.5	3760.8	-3995.0	63.3
Germany	60300.3	16223.5	8794.8	85318.6	96192.9	-3055.9	1111.1	94248.2
Greece	-2255.3	-2793.9	-1315.4	-6364.5	-7541.1	-3798.4	-2745.5	-14085.0
Spain	-3733.7	-3961.1	-1032.7	-8727.4	-5059.4	-2756.6	-4384.3	-12200.3
France	5481.6	-9221.3	-8103.3	-11842.9	23573.5	-1491.0	-8597.0	13485.4
Ireland	490.7	2994.5	-630.5	2854.7	7341.8	6746.8	3919.2	18007.7
Italy	13819.5	-623.0	-8211.7	4984.8	30686.8	17404.1	-7128.8	40962.2
Netherlands	-4027.1	5227.4	-546.8	653.5	-590.1	6790.3	672.0	6872.2
Austria	-3592.4	-1182.8	875.8	-3899.4	-2774.1	-3088.3	-740.7	-6603.0
Portugal	-1902.6	-2038.4	-143.5	-4084.5	-3922.2	-3690.7	-1104.0	-8716.9
Finland	-794.2	-2552.1	3935.9	589.7	11380.7	-3400.2	7275.8	15256.3
Sweden	-2262.3	-1688.3	6023.2	2072.6	2678.8	-1420.3	11773.4	13031.9
United Kingdom	-11764.6	-10505.9	-21754.9	-44025.4	-7120.4	-11832.4	-19501.0	-38453.7
EU	**53934.2**	**-8250.9**	**-23658.4**	**22025.3**	**148518.8**	**3313.8**	**-17986.1**	**133846.4**

Source: WIFO calculations using COMEXT, EUROSTAT.

Ireland enjoys a surplus, which is roughly the same in high and medium quality industries.

Belgium/Luxembourg, the Netherlands and Denmark had a trade surplus in 1998, but are specialised in industries with medium or high price elasticity. The UK has a deficit in all three sectors, the smallest in the quality sensitive sector, the highest in the price sensitive sector. All four are thus specialised in quality sensitive industries.

Spain, Portugal, Austria and Greece have deficits in all three sectors, with the highest deficit in industries in which quality competition is important (in the case of Austria, in the moderate price sensitive sector).

Sweden and Finland enjoy surpluses in the high and low quality sectors, but have less favourable positions in the moderately price elastic industries. While Finland has its largest surplus in the price sensitive industries (due to its pulp and paper industries), Sweden has its greatest surplus in the quality sensitive industries (telecom apparatus).

Increasing surplus, slightly converging structure

Between 1988 and 1998, Europe's overall trade surplus increased from 22 bn Euro to 134 bn Euro. The lion's share came from the increase in the surplus of the high RQE sector from 53.9 bn Euro to 148 bn Euro. The deficit in the low RQE sector was reduced, and a small deficit in the medium RQE sector turned into a small surplus. The most significant switch towards the high quality sector occurred in Ireland and Spain, while the trade surplus in the quality sector decreased in Belgium/Luxembourg and Italy. Sweden decreased its specialisation in the price intensive sector most sharply, followed by Austria and Finland. All three contributed to a decline in the country differences according to this indicator.

4. Within-industry quality

Upgrading quality within industries

In the previous section, industries were classified according to their sensitivity to quality and price, as if the competitive mode were predetermined. According to this concept, quality upgrading requires a switch to other industries – *inter-industry upgrading*. An alternative strategy for firms is to move into the highest price segment within a given industry. This can be achieved through a further stage of processing, or by offering a service or a new design which makes the product distinguishable from that of competitors. This strategy of *intra-industry upgrading* may involve lower costs and a lighter burden of structural change, since it can be performed within existing firms, often with the existing labour force, management and goodwill. The quality level of an industry is revealed by its position within price segments.

This section considers whether countries are specialising in the high, medium or low price segments, and how specialisation in these segments has changed over time. The price segments are defined for very detailed industries, using import prices as proxies for demand prices. The boundaries between the segments are different for 1988 and 1998, but identical for all countries (see Box 3.2).[18]

Export specialisation in price segments

More than half of EU exports (51.3%) are in the high price segment, 30.7% in the medium segment and 18% in the low segment (see Figure 3.7).

Ireland and Germany enjoy the highest share of exports in high quality. 78.1% of Ireland's exports are in the high price segment; Germany is second with 61.8%. Both countries exported less than 10% in the low segment in 1998. Sweden, Denmark and the United Kingdom specialised more than other countries in high quality. At the other end of the scale, only one fourth of the exports from Spain and Greece were in the high price segment, while more than one third were in the low segment. Belgium/Luxembourg is the second area with a larger amount of exports in the low price segment, due to its large share of capital intensive industries. Portugal is a country with a relatively low net income, but it has a surplus of high price segments and is in 11th position according to this ranking. One of the reasons for this is that its exports in labour intensive sectors are, to a large extent, in the high quality sector.

Over the past 10 years, the EU increased its share of high price segments for exports by 4.5% and decreased its share of low quality exports by 1.7%.

All countries participated in this upgrading.[19] The largest jump into the high price segment was achieved by Ireland, with an increase of 20.5%, and

18 In contrast to the method of RQE, which fixes the competitive mode of industries and is identical for all countries, this method highlights the possibility that firms and countries specialise in different price segments within an industry. A firm producing in an industry dominated by price competition may nevertheless assume a position in the high price segment.

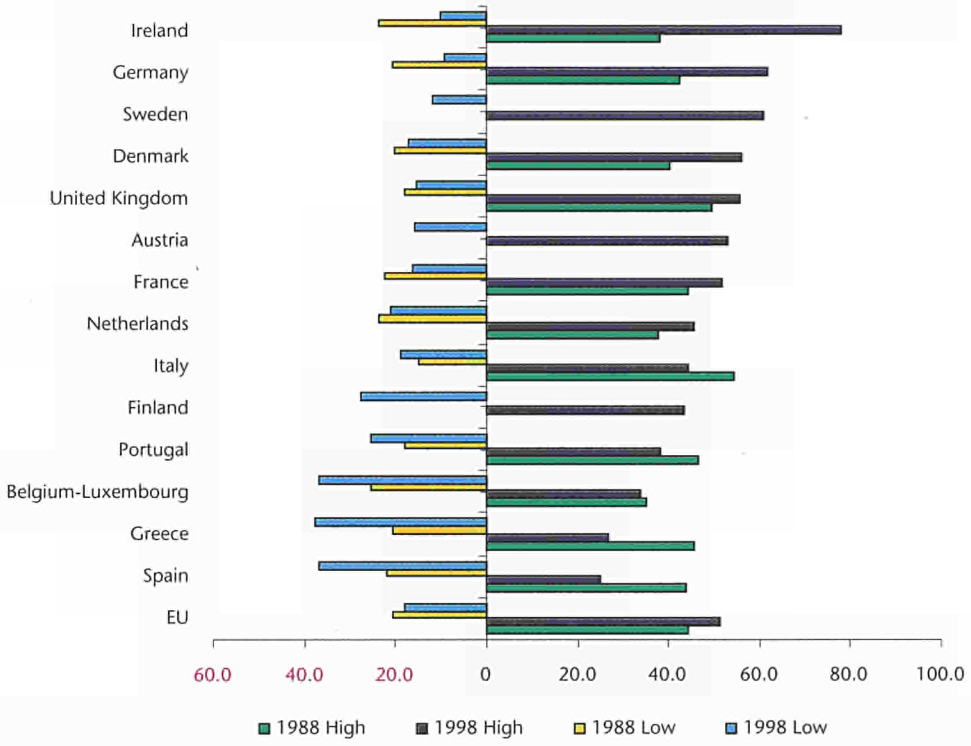
19 Spain is the only country in which the HPS decreased, it was also able to reduce its share of low quality exports, switching into the middle quality category. In 3 countries – the new members Sweden, Finland, and Austria – data on unit values, and therefore on price position, are not available for 1988.

Box 3.2 Position in Price Segments (PPS)

The following method is used to classify industries with respect to different price segments. The unit values are calculated for EU imports from 30 different countries (one destination, the EU, 30 sources of imports). The countries are the same as for the calculation of the competitive mode in the previous section. If the imports from all countries are reported, this results in a total of 30 import prices for each 6-digit industry. These "EU import price vectors" – one vector for each 6-digit industry comprising 30 prices – is divided into three terciles. The boundaries of the terciles define the segments. For example, if all 30 unit values are reported, the boundary between the low and the medium price segment is the interpolated value of the 21st and 20th highest prices. Note that these boundaries have been calculated at a very disaggregated level of 1400 6-digit product groups.

Exports (or imports) of the 30 countries are summed up for each price category. These are aggregated firstly to the 3-digit level – at which the bulk of analyses are made – to get the shares of exports (or imports) in the price segments for each 3-digit industry. Then the results are added at country level, and export shares (according to price segments) are determined for total manufacturing for each country. All of a country's exports that are in the high price segment at the disaggregated level of the 1400 industries are now High Price Segment exports (HPS); the others are Medium Price Segment exports (MPS) and Low Price Segment exports (LPS). A country's share in the HPS minus its share in the LPS is called the net Position in Price Segments (net PPS = HPS - LPS).

Figure 3.7 Export shares in price segments (countries ranked according to share in high quality segment in 1998)



Note: For a definition of price segments, see Box 3.2.
Source: WIFO calculations using COMEXT, EUROSTAT.

a decline in the low quality sector of 13%. Greece increased its HPS and decreased its low segment quite significantly, although it is still the country with the smallest HPS.

There is a slight indication of convergence in the quality position. Of the three countries with the least favourable position in 1988, two improved considerably and the other performed below average. Of the three countries with the best position in 1988, one further improved its advantageous position (Ireland) while the other two performed below average (UK, Germany).

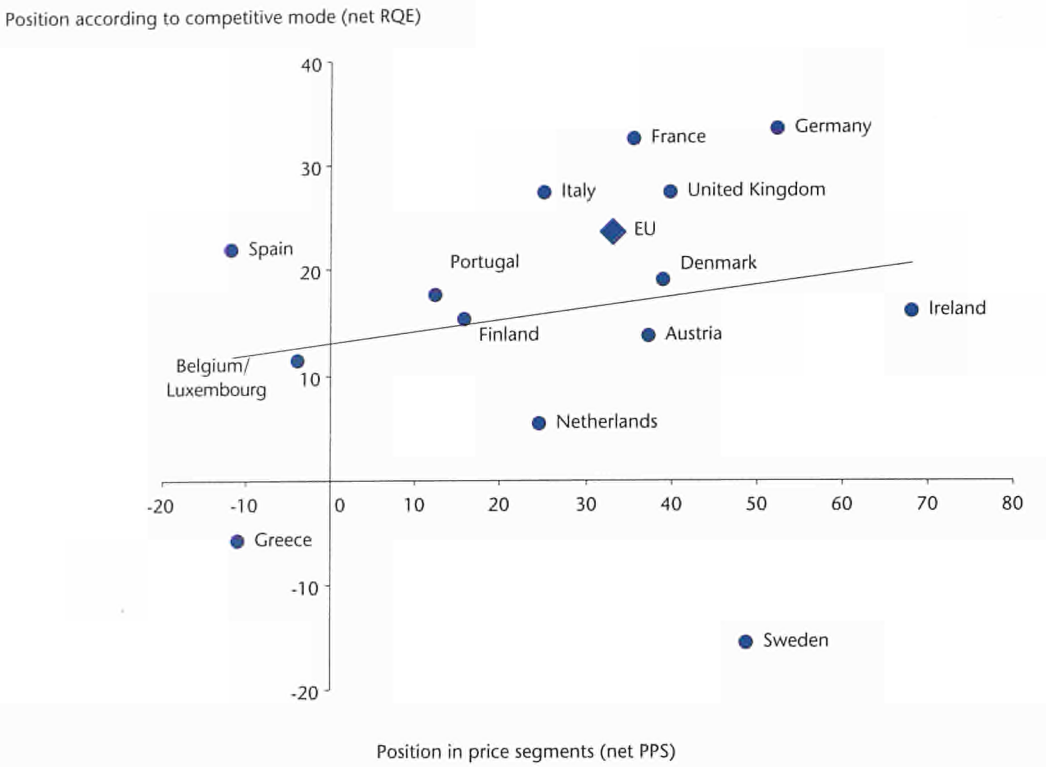
5. Towards a better understanding of competition in quality

Quality competition is the result of opportunities and challenges. The competitive environment depends on the inherited industrial structure, on the strategic choices of firms and on the socio-political environment. The three quality indicators introduced in the previous sections (the size of quality sensitive industries, the position in the price segment and unit values), highlight different aspects of competition in quality. In this section, quality competition is related to country characteristics, such as per capita GDP, skills and policy indicators.

Quality and strategy

The indicators for the share of quality elastic industries (RQE) and for the share of exports in the upper price segment (PPS) highlight different strategies for mitigating price competition. Defining the size of quality sensitive industries implicitly emphasises structural change away from industries relying on

Figure 3.8 Quality strategies, 1998



Source: WIFO calculations using COMEXT, EUROSTAT.

price towards those in which quality is important. Alternatively, calculating the share of country exports in the upper price segment emphasises intra-industry change. A comparison of export shifts according to the "inter-industry" and the "intra-industry" strategy shows similarities as well as differences in the country rankings.

Germany is among the leading countries in quality competition according to both strategies (rank 2 in net PPS, and 1 in net RQE); Greece has a large sector of price elastic exports and is positioned in the lower price segments (see Figure 3.8). The largest difference between the two indicators exists for Spain, Ireland and Sweden.

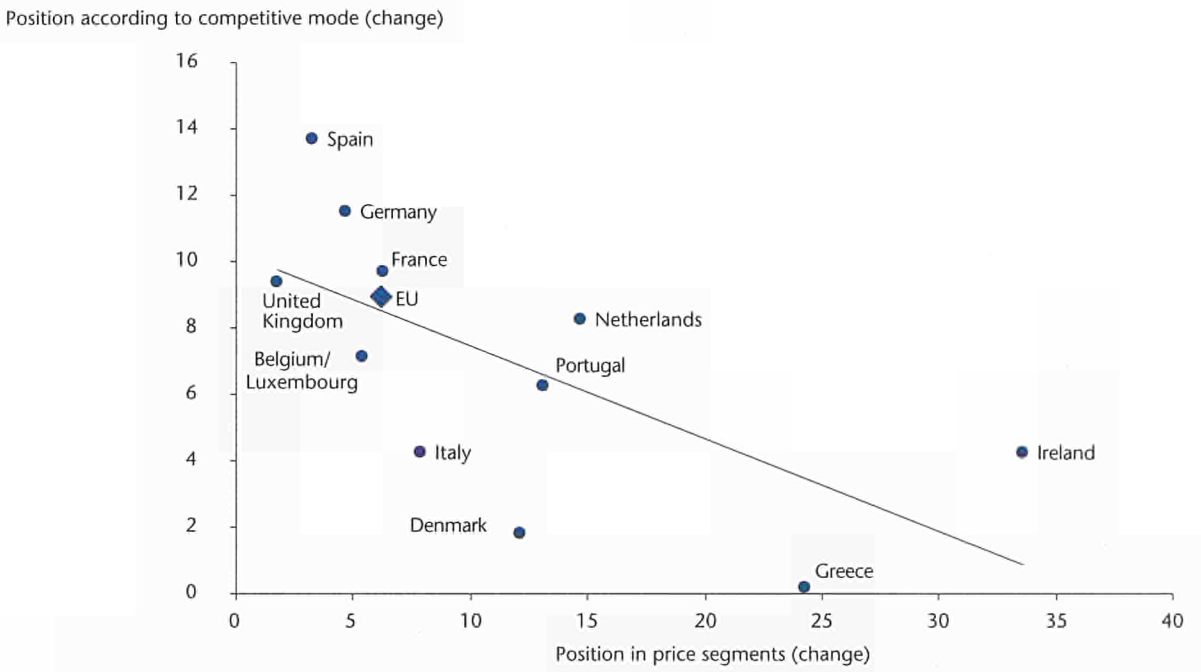
Spain has a rather high share of industries in which quality is important, but in general its exports are in the low price segment of the individual industries. The driving force for this dichotomy is the motor vehicles industry, which supplies 25% of exports. The motor industry is classified as quality sensitive; however, motor vehicles as well as parts produced in Spain are in the lower price range.

Ireland's exports are positioned in the highest price segment in all important export industries,[20] and it enjoys the highest share in the upper price segment (78% of exports). Ireland achieved only an average position in quality elastic industries, since the computer industry and audio and video apparatus are classified as partly sensitive to prices, and electronic components as very sensitive. In each of these industries, Ireland is again positioned in the highest price segment; they amount to one third of exports.

In general, Sweden supplies goods in the high price segment, but capital intensive industries like pulp and paper, wood, steel and basic chemicals (making up one quarter of Swedish exports) are price elastic. Besides Sweden and Ireland, Austria, Denmark and the Netherlands are leaning towards a strategy of upgrading within industries. In addition to Spain, large shares in quality intensive industries are also held by France, Italy and Portugal.

20 The position of Ireland in the high price segment is far stronger than any effect that could come from transfer prices alone.

Figure 3.9 Change in the positions, 1988 to 1998



Source: WIFO calculations using COMEXT, EUROSTAT.

Focusing on change (Figure 3.9), one can see three groups:

- Two countries – Ireland and Greece – increased their position in the price spectrum by more than 25 percentage points, but did not increase (Greece) or only slightly increased (Ireland) the share of industries competing in quality. However, intra-industry upgrading started from very different positions. Greece is still the country with the highest share of the low price segment, whereas Ireland has the highest share in the upper price segment.
- In a second group, intra-industry change dominates only slightly; in the Netherlands and Portugal there is considerable upgrading in both dimensions; in Italy and Denmark developments are less dynamic.
- Four countries increased substantially their shares of quality elastic industries but improved only moderately their position in price segments: Spain, Germany, the UK and France. These are all large countries, three of which already had a large quality elastic sector in 1988. The exception is Spain, which jumped level with the EU average.

Country characteristics and quality indicators

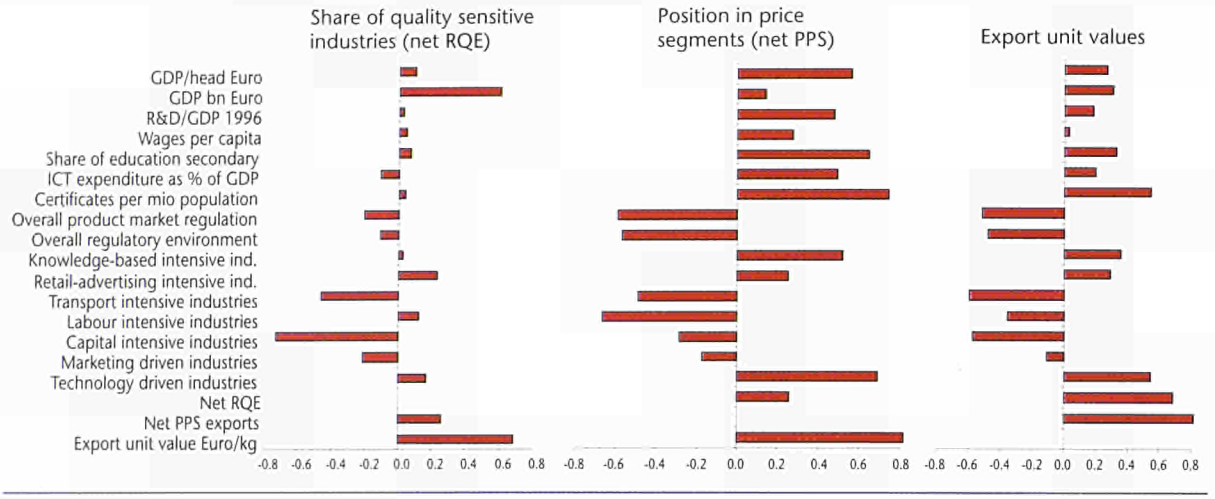
Figure 3.10 illustrates which country characteristics are related to the different indicators of quality and how these indicators relate to each other.

The unit value summarises to some extent intra-industry and inter-industry change. It increases if activities shift from low unit value industries to high unit value industries and if countries switch into the high price segment. It is therefore significantly correlated with each of the other quality indicators, while these indicators themselves are not too closely related to each other, since they focus on different aspects of quality competition.

Endowments and demanded quality rise with income and productivity. Therefore, all three indicators for the quality position are positively related to GDP per capita.[21] The closest correlation exists between the GDP per capita and the price position in segments; the weakest correlation is with the size of the quality sensitive sector.[22] Correlation of the quality indicators (specifically net PPS) with skills

21 Wages per capita in manufacturing are also positively related to the quality position of countries, but not significantly.
22 However, this is greater between the change in GDP and net RQE.

Figure 3.10 Rank correlation of quality indicators with country characteristics



Note: R=0.46 (resp. 0.65) denotes 90% (resp 95%) of significance.
Source: WIFO calculations using EUROSTAT, OECD.

(measured by secondary education), the share of the information and communication technology (ICT) sectors and R&D ratios confirms the importance of endowments. Quality is therefore related to those factors predicted by the theory, such as skills, research and information technologies, which provide opportunities to gain the competitive edge in quality.

Countries in which the share of capital or labour intensive industries is large are placed lower in the quality ranking; the former is better reflected in the net RQE and unit value indicators, and the latter in the price position. Also, countries with high shares of industries that make intensive use of transport services as inputs (transport intensive) rank low in the three measures of quality.

The share of technology driven industries correlates with the quality position (measured by unit value and the position in price segments), as does the share of industries that make intensive use of knowledge-based services as inputs.

Concerning policy variables, there is a strong correlation between quality position and quality certificates. This may run in two directions: certification processes may increase quality and the ability to charge higher prices. Alternatively, countries supplying high quality may want to prove this in a world of uncertain information. The regulation of product markets and of economic activity in general – as measured by OECD indicators – is negatively related to quality.[23]

There is a surprisingly strong relationship between the share of industries with quality competition and absolute country size (measured by GDP). This could mean that large countries have industries with large research bases, high linkages and spillovers that permit specialisation in industries with quality competition, since knowledge research and spillovers are also the factors that allow a switch away from price competition.

6. Comparing Europe to the US and Japan

This section compares the EU to the US and Japan as a means of further revealing the underlying forces and competitive strength in quality upgrading.

Figure 3.11 compares Europe's share of quality sensitive industries to those of the US and Japan in terms of value added, exports and imports.

Europe has the highest share in quality sensitive industries in production and exports. As far as production is concerned, Europe attained this position over the last ten years by slowly extending its share in quality elastic industries and by reducing its share in price elastic industries. The net RQE is 13.5 for Europe vs. 2.8 for Japan and 11.7 for the US. However, within this generally positive picture, there are signs that change in Europe may be insufficient. The US has a lower share of price elastic

23 All twelve correlations are positive (2 years, 2 indicators for regulation, 3 quality indicators), indicating that the results are not products of chance. All rank correlations are univariate; there are no multivariate regressions, since, for most variables, one cannot expect one-sided causality.

industries in production, and is shifting its exports and imports more quickly from price to quality sensitive sectors. 48% of US imports are in quality sensitive industries, while only 41% of European imports and 35.9% of Japanese imports are in these industries. This indicates that demand in the US may be shifting to quality sensitive industries faster than in Europe and Japan.

Furthermore, the favourable picture for quality competition projected by the share of quality sensitive industries is in contrast to that drawn by the share of technology driven industries, where European imports from the US are higher than exports, and where unit values are shown to be unfavourable for Europe (see Figure 3.12).[24]

The high shares of technology driven industries in the US, their high unit value and their increasing share in domestic demand may challenge the future competitiveness of Europe in the high quality sectors.

24 The difference comes from classifying several machinery and car industries as quality elastic.

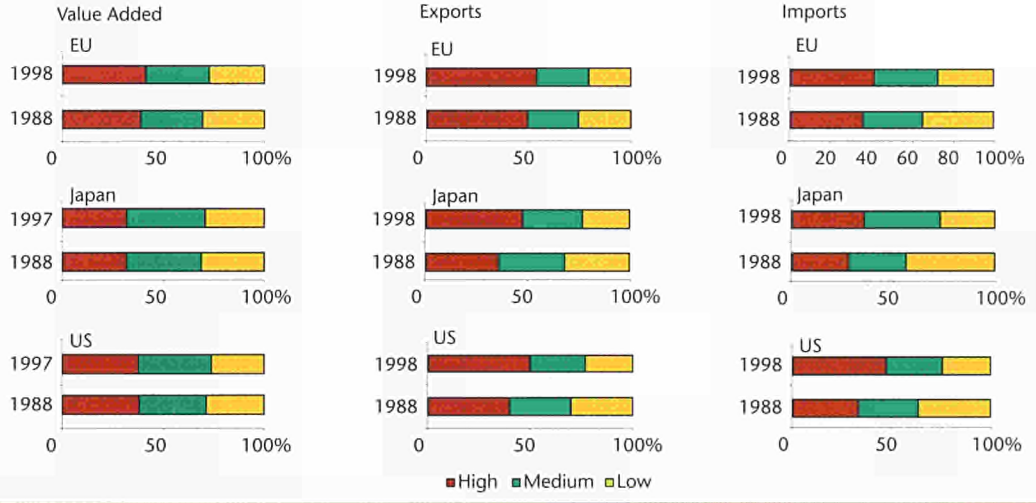
7. Summary

The ability of an economy to produce goods appreciated for their quality determines, to a large extent, the potential for further increases in living standards and decreases the overall exposure to low cost producers. The EU, being a high wage area, has to upgrade quality by shifting into less price sensitive industries – *inter-industry upgrading* – or into higher priced segments – *intra-industry upgrading*. Of importance for both strategies is the openness of economies as well as the functioning of input and output markets.

Europe is a provider of high quality products with a trade surplus that originates in quality sensitive industries. However, its long-term position in quality competition is being contested at both ends of the quality spectrum: by economies that are catching up and by competitors at the technological cutting edge, in particular the US.

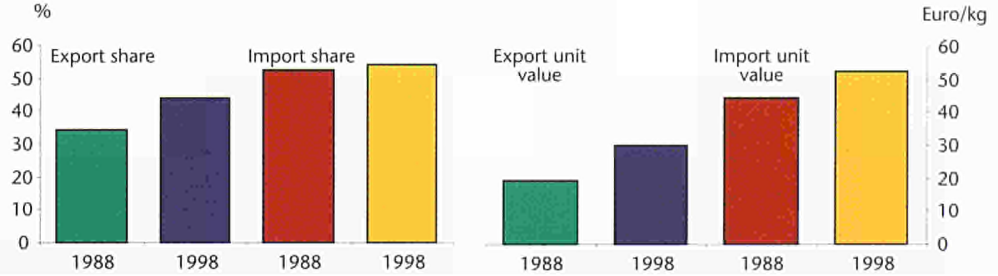
Europe's position within the Triad, as seen from the quality indicators, is better than that seen from the

Figure 3.11 Share of quality sensitive industries (RQE) in the Triad, 1998



Source: WIFO calculations using COMEXT, EUROSTAT.

Figure 3.12 Bilateral trade: Europe vs. the US in technology driven industries



Source: WIFO calculations using COMEXT, EUROSTAT.

perspective of productivity comparisons or from the share of high-tech industries. As expected, in technology driven industries, as well as in high skill industries, price competition has been mitigated. The change away from price sensitive sectors is, however, slower than in the US, specifically in imports, indicating that shifts in consumption may be faster in the US. This trend is stronger in technology driven industries. This chapter has shown that research, innovation, skilled labour, information and communication technologies and knowledge intensive services are all important factors in quality upgrading.

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Chapter 4
External services and industrial performance

The rise of the service economy characterises the predominant pattern of structural change in the 20th century. A major determinant of this process has been the increasing demand of producers for external service inputs provided by specialised suppliers (as opposed to in-house activities).

This chapter studies the evolution of the services sector and its relationship with other sectors in the economy. The main focus is on the input-output relationship of services with other industries within a given economic territory.[1] There is also an investigation into the process of tertiarisation, comparing growth across different services sectors. The conclusion is that the general dynamics of structural change are particularly confined to a subgroup of knowledge and information-based services. In order to evaluate the impact of inputs from external services on the competitive performance of European industries, the chapter contains an analysis of the extent to which the provision of specific classes of services is spread throughout the economic system and an appraisal of the competitive performance of manufacturing sectors as a function of their intensive use of different service inputs.[2]

1. Evolution of the service sector

Services lie at the heart of any economic process, and no material goods can be manufactured without the combination of various services drawn from a company's disposable resources. The common distinction between services and material goods is nevertheless apparent in the general classification of economic branches, where activities with no clear relationship to material products are classified under the more or less residual category of services *(tertiary sector)*. As a direct consequence, activities included in the tertiary sector are extremely heterogeneous. In order to arrange this vast and heterogeneous category more clearly, a proposal has been made to single out the comparatively new and fast growing branches of knowledge-based and informational services as a fourth class of activities, called the *"quaternary sector"* (see deBandt (1999)).

Despite frequent exceptions, the distinction between service industries and manufacturing nevertheless highlights an important difference between the organisation of the two markets: in manufacturing, the economic value which has been created can be appropriated through the exchange of material goods, most of which can be stored and spatially transferred. In contrast, services involve immaterial outcomes, characterised in terms of specific transformations of the tangible or intangible conditions of human life. These differences in the appropriability of the value produced have a decisive impact on the modes of interaction between buyers and sellers on the market and affect the prevalent sources of competitive advantage. Due to the immaterial, non-storable and transient nature of supply, business success requires direct interaction with consumers and, consequently, a high degree of

1 The next chapter will deal with the international dimension of services.
2 This chapter is based on Peneder (2000).

coincidence of consumption and production, both in time and space.

Mobility and organisation thus become key assets for successful customer relations and the quality and efficiency of the supply of services is highly affected by territorial barriers. Economic integration and the harmonisation of rules for market access are therefore an important means of overcoming such restrictions and establishing a supportive environment for service businesses.

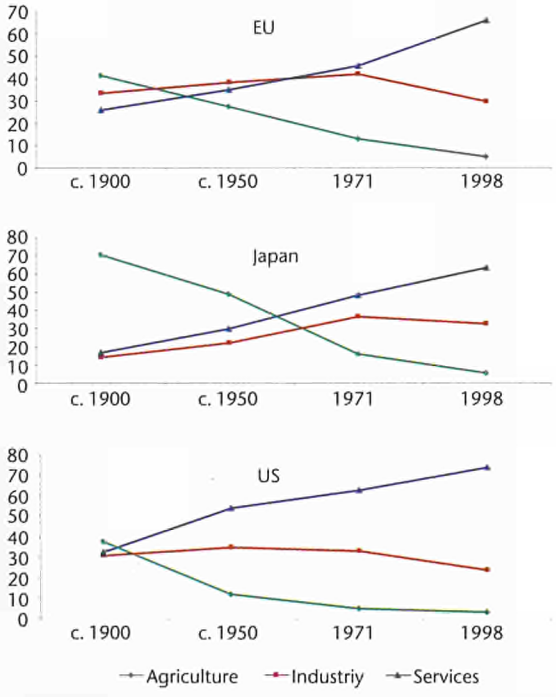
The historical record[3]

Measured in terms of labour force reallocations, the scope of structural change that has occurred throughout the 20th century is impressive. According to estimates for 25 developed economies, at the turn of the century about half of total civil employment was in the agricultural sector, a quarter in manufacturing and only a quarter in services. Up to 1950, structural change was mainly characterised by the rapid decline of the agricultural sector, in which employment fell by a half. New jobs were created in both manufacturing and services; employment in services grew slightly faster than in manufacturing. In the postwar period, this tendency continued to gain strength and until the early 1970s most of the ongoing decline in primary sector employment (13% in 1971) was absorbed by growth in services (49% in 1971). The structural shift in favour of manufacturing industries was levelling off, increasing modestly to a share of 38% of total civil employment. From the 1970s onwards, the process of *tertiarisation* in employment patterns accelerated; the share of service industries in total civil employment eventually reached 67.4% in 1998. In most developed nations, the share of manufacturing in total employment peaked between the years 1964 and 1975. For the total sample of 25 OECD countries, the decline that followed resulted in an employment share for the secondary sector of 27.8% in 1998. At the same time, the primary sector contracted further to a level of only 4.8%.

Comparing long-term structural change in the countries which are now members of the EU with that of Japan and the US (Figure 4.1), one can observe that in the US the process of tertiarisation began much earlier than in the two other economic areas. In contrast to both, the service sector in the US had already gained a substantial lead in terms of employment share by the middle of the century. In Japan, the most pronounced differences appear in the agricultural sector, which did not lose its dominant position until the postwar period. Although, by the end of the century, employment structure in the three economic areas has converged to more similar patterns of specialisation, in 1998 the US was still characterised by the highest employment share for the service sector (73.7%), followed by the European Union (65.7%) and Japan (62.7%).

The overall picture is also consistent with a comparison of the shares in value added, where comparable data are available only from 1970 onwards. The size of the tertiary sector is again largest in the US (72.8% in 1997), followed by the EU (66.8% in 1995) and Japan (61.8%). Among the individual Member States of the EU, the share of the service sector typically falls into a range between 65% and 70%. With a share for the service sector well below the average for the EU, Ireland (where the data mirror the remarkable expansion of manufacturing production during the 1990s) and Portugal are the only pronounced exceptions to this rule. Within the EU, the value added shares of the service sector are highest in France and Belgium.

Figures 4.1 Shares in total civil employment, percentage points



Source:Feinstein, 1999.

3 All the data in this section are taken from Feinstein (1999).

2. The sources of structural change

As historical data have demonstrated, *tertiarisation* is a tremendously powerful process of structural change, characterised by the shift of economic activities away from such traditional areas as agriculture and manufacturing towards the tertiary sector. The underlying sources of this process can be revealed by the decomposition of output growth into its constitutive components, using input-output data.

In general, there are three possible explanations of why, in developed economies, changes in industrial structures systematically favour services rather than manufactured goods. The first explanation focuses on effects from the demand side, the second on changes in technology, and the third on shifts in international patterns of comparative advantage:

• *Increasing demand for services*

Tertiarisation is often explained in terms of a general shift in tastes and preferences towards intangible components of consumer satisfaction, which become evident as income levels and standards of living rise. The income elasticity of demand is believed to be high for immaterial sources of well -being, often associated with increasing leisure, entertainment and luxury. Conversely, private expenditure on material goods is presumed to be more quickly affected by the saturation of markets. The argument is that raw materials and basic manufactured products, which, by and large, are associated with their respective physical quantities, have fewer opportunities to raise demand in correspondence with increases in disposable income per capita.

• *Technological and organisational change*

The second major force towards tertiarisation is a result of changes in technology and organisation. In contrast to the above argument, based upon differential shifts in the level of intermediary demand for various industries (i.e. holding constant the technology coefficient in the matrix of intermediary inputs), the technology effect results from a change in the intermediary demand per unit of output. Positive impulses for tertiarisation would then correspond to the common observation of increasing differentiation and "complexification" of production. Efficient organisation, innovation, brand creation and customised services become the primary sources of competitive advantage, all of them exerting a certain tendency towards raising the level of required inputs from specialised services. Organisational change in terms of the contracting-out of activities previously carried out in-house is another source from which external service industries are arising. Organisational and technological changes are strongly intertwined, and both result in similar changes of coefficients in the matrix of intermediary inputs.

• *Shifts in the international patterns of comparative advantage*

It is sometimes argued that tertiarisation stems from a loss of competitiveness due to the increasing competition of economically less developed, low wage countries, which benefit from the global integration of markets for manufactured products. Conversely, in those economies where high wages and free trade drive out price sensitive segments of production, employment shifts towards the service industries. The underlying reason is presumed to be that, relative to manufacturing goods, most service industries are more closely tied to their locations and are therefore less exposed to the competitive pressures of global trade. Although this traditional explanation emphasises only the negative impact of decreases in comparative advantage in manufactured goods, one must also consider the role of positive shifts in comparative advantage in favour of (for example, ICT related) services which become increasingly tradable.[4]

• *Decomposition of output growth*

The empirical investigation consists of a simple decomposition of the overall growth in output of five broad sectoral aggregates into their three constitutive components: (i) changes in the *technology coefficients* (which give the amount of each category of intermediary inputs required per unit of output); (ii) changes in *domestic demand*, comprising public and private consumption as well as investment outlays (the latter reported separately and including variations in stock); and, finally, (iii) changes in net exports, reflecting shifts in demand which become effective through *foreign trade* relationships. For a more detailed discussion of the method used, see Box 4.1.

4 This increased tradability is discussed in the next chapter.

Box 4.1 Decomposition of output growth

Input-output tables attempt to provide a complete record of all transactions of goods and services in the economy, including separate matrices for intermediary demand *(X)* and the various components of final demand *(Y)*. Gross output *(Q)* is the sum of these two components. Final demand (net of imports) consists of private and public consumption (C), investments (I) (here also including changes in stocks), and net exports *(F)*; hence, $Y=C+I+F$. For the purpose of this decomposition, the basic relationship, $X+Y=Q$, can be converted into $(E-A)^{-1} * Y = Q$, with Q representing gross output, A the direct input coefficients of the matrix for intermediary demand and E the identity matrix. The term $(E-A)^{-1}$ is called the Leontief-inverse matrix *(L)*. Thus, we get the relationship $Q=LY=L(C+I+F)$. Growth of gross output between two points in time (t and $t-z$ years) can now be decomposed into its technological component, i.e. growth due to changes in the Leontief-inverse matrix of technology coefficients (holding final demand Y_t constant); and changes resulting from shifts in any of the individual components of final demand, i.e. domestic consumption, investment and net exports (while holding the matrix of technology coefficients L_{t-z} constant):

$$\frac{Q_t - Q_{t-z}}{zQ_{t-z}} = \frac{(L_t - L_{t-z})Y_t}{zQ_{t-z}} + \frac{L_{t-z}(C_t - C_{t-z})}{zQ_{t-z}} + \frac{L_{t-z}(I_t - I_{t-z})}{zQ_{t-z}} + \frac{L_{t-z}(F_t - F_{t-z})}{zQ_{t-z}}$$

In the tables, the first column gives average annual output growth and the four other columns express the contribution to output growth of each individual component. The contribution of the individual components sums up to output growth.

Industries are aggregated into five broad sectors: *manufacturing* (ISIC 3), *distributive services* (wholesale and retail trade, transport; ISIC 61, 62, 71), *knowledge-based services* (communications, financial services, real estate and business services; ISIC 72, 81, 82, 83), *personal and social services* (restaurants and hotels, community services, etc.; ISIC 9 and 63), and *other* sectors (agriculture, mining, construction, utilities; ISIC 1, 2, 4, 5).

The data have been collected from national statistical offices, as well as a set of harmonised input-output tables provided by the OECD. The OECD data cover the period from the early 1970s up to 1990 and are available, in constant and current national currencies, for the following five European countries: Denmark, France, Germany, the Netherlands and the United Kingdom, as well as for the US and Japan. The government sector (including public investment) is generally treated as a part of final consumption. Data from 1990 onwards stem from national statistical offices and are not harmonised. In most cases, they are only available in current prices.

Conclusions must be drawn with care, as the methods of data generation and classification, as well as the construction of input-output tables, vary between countries and can introduce considerable distortions with respect to the sources of tertiarisation. Consequently, an interpretation should put less emphasis on specific numbers and concentrate more on the general picture, which is revealed by the decomposition.

The data presented in Tables 4.1 and 4.2 show that:

- *Since the 1970s, the process of tertiarisation has been driven primarily by the growth of knowledge-based services.* Apart from a few minor exceptions, knowledge-based services (comprising financial services, business related services[5] and communications) have consistently been the fastest growing sector of all five aggregates, outperforming manufacturing growth in every single observation available. In many cases, the growth differential is substantial. However, the same cannot be said of the other service categories, in which average annual growth of gross output differs much less from that of the manufacturing sector and in some cases even falls behind.
- *Among the sources of structural development, the increase of domestic demand has had the most pronounced impact on growth* in the five broad sectors. Besides knowledge-based services, personal and social services benefited most from this rise in consumption. In France, the UK and the US, the negative contributions of net exports to average annual output growth suggest that comparative advantage has shifted away from manufacturing towards service industries. This effect was most pronounced in the UK before the 1990s. This tendency, however, cannot be characterised as a general trend for developed economies; manufacturing growth in other nations, such as Germany, the Netherlands, Denmark and Japan, has consistently enjoyed positive impulses generated by foreign trade. In France and the US, an improving foreign trade position has contributed positively to output growth in distribution related services (comprising transport as well as wholesale and retail trade). In the UK, at least from 1992 onwards, a similar shift in comparative advantage appears to have favoured the growth in knowledge-based services.

5 In the OECD and many national data bases this also comprises real estate.

Table 4.1 Decomposition of average annual output growth: percentage points, constant prices

	Gross output	Technology	Consumption	Investment	Net exports
Denmark 1972-1990 (prices 1980)					
Manufacturing industries	1.38	-0.61	0.83	0.44	0.73
Distributive services	1.87	-0.23	0.63	0.16	1.32
Knowledge-based services	2.64	0.87	1.50	0.05	0.22
Personal and social services	1.40	-0.06	1.27	0.02	0.16
Other Sectors	1.48	-0.18	1.43	-0.34	0.57
France 1972-1990 (prices 1980)					
Manufacturing industries	1.44	-0.28	1.69	0.51	-0.47
Distributive services	2.25	0.27	1.71	0.09	0.18
Knowledge-based services	3.49	1.75	1.78	-0.02	-0.02
Personal and social services	2.65	0.21	2.40	0.02	0.03
Other sectors	1.69	-0.45	2.13	-0.16	0.17
Germany 1978-1990 (prices 1985)					
Manufacturing industries	1.84	0.00	1.01	0.79	0.04
Distributive services	2.31	0.11	1.57	0.28	0.35
Knowledge-based services	3.82	1.79	1.80	0.21	0.02
Personal and social services	1.88	0.26	1.43	0.11	0.08
Other sectors	1.21	-0.65	1.38	0.50	-0.03
Netherlands 1972-1986 (prices 1980)					
Manufacturing industries	2.47	0.16	1.15	0.49	0.67
Distributive services	2.24	-0.07	0.83	0.23	1.25
Knowledge-based services	3.90	1.18	2.11	0.29	0.31
Personal and social services	2.47	-0.05	2.37	0.04	0.12
Other sectors	2.39	0.48	1.49	0.25	0.17
United Kingdom 1968-1990 (prices 1980)					
Manufacturing industries	1.03	1.46	1.24	0.60	-2.28
Distributive services	2.18	0.86	1.86	0.27	-0.81
Knowledge-based services	3.50	3.11	0.81	-0.11	-0.30
Personal and social services	3.56	0.57	3.26	0.04	-0.31
Other sectors	1.80	0.90	0.73	0.52	-0.35
Japan 1970-1990 (prices 1985)					
Manufacturing industries	2.79	-0.37	1.86	1.22	0.08
Distributive services	2.99	0.13	2.17	0.73	-0.04
Knowledge-based services	3.29	0.80	2.06	0.47	-0.04
Personal and social services	2.72	-0.31	2.79	0.38	-0.13
Other sectors	2.30	-1.52	2.08	1.86	-0.12
US 1972-1990 (prices 1982)					
Manufacturing industries	1.56	-0.38	1.58	0.64	-0.27
Distributive services	2.81	0.33	2.03	0.24	0.21
Knowledge-based services	2.74	0.51	2.00	0.17	0.06
Personal and social services	2.68	0.03	2.57	0.06	0.03
Other sectors	0.87	-0.59	1.54	0.38	-0.47

Sources: WIFO calculations using OECD, national statistical offices.

- *The technology effect* (as revealed by the change of coefficients in the matrix of intermediary inputs) *has been most pronounced in knowledge-based services.* When measured at constant prices, from the early 1970s to the 1990s, the technological component accounted for about half of the output growth in France and Germany, or about one third in Denmark and the Netherlands. For the UK, the technological component was unusually high, whereas in Japan and the US the growth of knowledge-based services appears to have been driven more strongly by domestic demand.

Table 4.2 Decomposition of average annual output growth: percentage points, current prices

	Gross output	Technology	Consumption	Investment	Net exports
Denmark 1972-1990					
Manufacturing industries	4.39	-0.37	3.38	1.34	0.05
Distributive services	4.48	0.08	2.41	0.44	1.55
Knowledge-based services	4.87	0.99	3.50	0.25	0.13
Personal and social services	4.55	0.23	4.10	0.11	0.11
Other sectors	4.42	-0.21	3.60	0.98	0.05
France 1972-1990					
Manufacturing industries	4.51	-1.14	4.45	1.45	-0.25
Distributive services	4.78	-0.11	4.26	0.41	0.22
Knowledge-based services	5.08	1.63	3.14	0.29	0.03
Personal and social services	4.93	0.26	4.55	0.09	0.04
Other sectors	4.87	-0.75	4.62	1.08	-0.08
Germany 1978-1990					
Manufacturing industries	3.54	-0.37	2.16	1.20	0.55
Distributive services	3.84	0.05	2.79	0.45	0.54
Knowledge-based services	5.19	1.87	2.88	0.35	0.10
Personal and social services	4.10	0.43	3.32	0.16	0.19
Other sectors	3.35	-0.86	2.85	1.30	0.06
Germany 1991-1995					
Manufacturing industries	0.40	-2.15	1.47	-0.04	1.11
Distributive services	3.32	0.35	2.88	-0.25	0.34
Knowledge-based services	9.50	-0.43	9.74	0.20	-0.02
Personal and social services	5.95	0.96	4.83	0.16	0.00
Other sectors	7.91	1.45	3.17	2.96	0.32
Netherlands 1972-1986					
Manufacturing industries	4.32	-0.04	2.87	1.11	0.37
Distributive services	4.49	0.03	2.26	0.49	1.72
Knowledge-based services	5.42	1.06	3.48	0.50	0.37
Personal and social services	4.93	0.08	4.63	0.07	0.15
Other sectors	4.56	0.41	2.77	0.92	0.46
Netherlands 1986-1990					
Manufacturing industries	4.77	-0.11	0.99	0.83	3.05
Distributive services	5.71	1.06	3.06	0.51	1.08
Knowledge-based services	7.61	2.14	3.74	0.64	1.09
Personal and social services	3.67	0.13	3.52	0.06	-0.03
Other sectors	1.49	-1.48	0.18	2.46	0.34
Netherlands 1990-1993					
Manufacturing industries	0.54	-0.90	1.88	-1.55	1.11
Distributive services	6.58	-0.11	4.29	0.26	2.14
Knowledge-based services	8.15	0.79	6.20	0.45	0.71
Personal and social services	5.93	0.16	5.74	0.04	-0.02
Other sectors	1.50	-0.65	1.65	0.02	0.49
Netherlands 1993-1995					
Manufacturing industries	5.12	-0.50	1.20	1.50	2.92
Distributive services	4.63	0.31	3.11	0.32	0.90
Knowledge-based services	8.06	1.59	5.03	0.77	0.67
Personal and social services	3.65	0.01	2.48	0.34	0.82
Other sectors	3.33	-0.95	1.34	1.74	1.19
Netherlands 1995-1998					
Manufacturing industries	4.16	-0.24	1.57	0.42	2.41
Distributive services	6.98	1.76	4.84	0.47	-0.08
Knowledge-based services	11.83	3.69	5.06	2.07	1.00
Personal and social services	3.87	-0.10	3.92	0.17	-0.13
Other sectors	3.86	-0.45	1.97	2.19	0.15

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United Kingdom 1968-1990					
Manufacturing industries	4.02	-0.15	3.58	1.36	-0.77
Distributive services	4.22	0.38	3.53	0.47	-0.16
Knowledge-based services	4.37	2.75	1.36	0.25	0.02
Personal and social services	4.43	0.48	3.99	0.08	-0.13
Other sectors	4.18	0.44	2.57	1.29	-0.12
United Kingdom 1992-1997					
Manufacturing industries	7.33	0.32	5.11	1.94	-0.04
Distributive services	9.19	2.48	5.86	0.62	0.22
Knowledge-based services	9.61	2.36	5.38	0.86	1.02
Personal and social services	8.47	3.07	5.24	0.16	0.00
Other sectors	4.38	-1.02	2.65	2.46	0.28
Japan 1970-1990					
Manufacturing industries	3.84	-0.91	2.80	1.72	0.23
Distributive services	4.20	0.24	2.89	0.96	0.10
Knowledge-based services	4.45	1.21	2.77	0.49	-0.02
Personal and social services	4.29	0.17	3.87	0.37	-0.12
Other sectors	3.98	-1.15	2.64	2.68	-0.19
US 1972-1990					
Manufacturing industries	4.07	-0.39	3.77	1.02	-0.33
Distributive services	4.45	0.21	3.54	0.42	0.27
Knowledge-based services	4.61	0.59	3.64	0.28	0.09
Personal and social services	4.69	0.13	4.44	0.08	0.04
Other sectors	4.17	-0.07	3.52	1.11	-0.40
US 1992-1996					
Manufacturing industries	6.08	0.88	3.41	3.08	-1.29
Distributive services	7.68	0.80	4.98	1.62	0.29
Knowledge-based services	8.72	1.09	5.15	2.31	0.16
Personal and social services	6.62	0.22	6.12	0.28	0.01
Other sectors	5.69	-0.56	3.39	3.60	-0.74

Sources: WIFO calculations using OECD, national statistical offices.

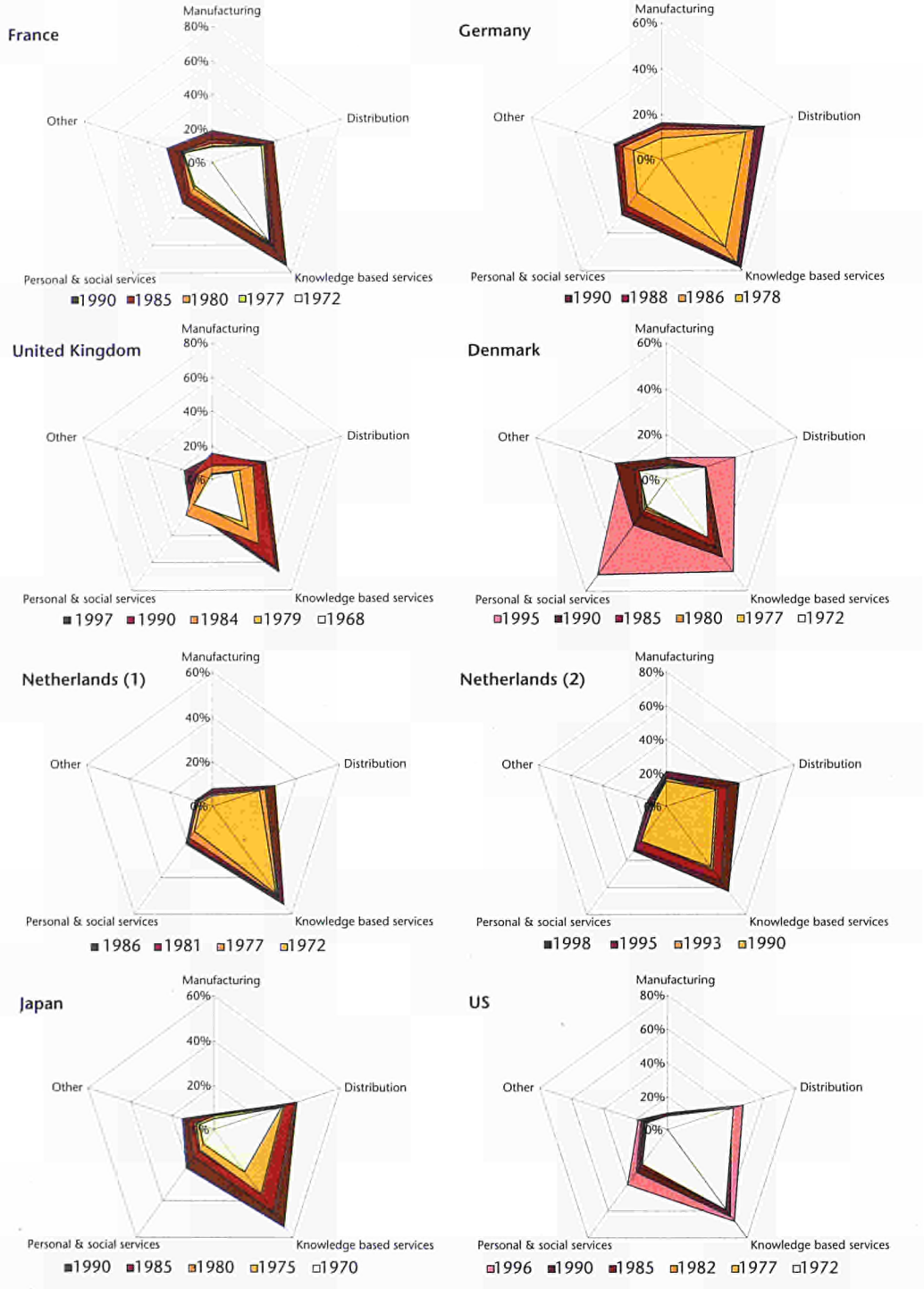
3. What follows tertiarisation? The penetration of knowledge-based services

Measured in terms of gross output, the general shift of economic activities away from the primary and secondary sectors, in favour of the tertiary sector, has not occurred uniformly across industries. As has been seen, there is the particular group of knowledge-based services, which has benefited most from technological change and general increases in demand. If tertiarisation was the dominant pattern of structural development, which began in the early 1900s and dominated most of the 20th century, we are now in the midst of what one might call a process of *quaternarisation*, distinctly defined by the steady rise of information and knowledge-based services.

The essential difference from traditional growth in services is the specific role knowledge-based services can play as sources of innovation, product differentiation and productivity growth for the rest of the economy.[6] The general fear regarding the so-called "cost disease"[7] in services appears primarily to be the story of "old" tertiarisation. This assumes that, because of the limited potential to increase labour productivity through technological progress and the cumulation of complementary inputs to production, industries – including most of the traditional personal, social and public services – cannot compensate for the rise in aggregate wage levels that is forced upon them by the more progressive industries with high productivity growth. This view projects, as a consequence, diminishing growth in productivity and income as the general long-term perspective for the economically most developed economies, which are characterised by high shares of service industries.

6 See Tomlinson (1997).
7 See Baumol (1967).

Figure 4.2 Share of knowledge-based services in total intermediary inputs (current prices)



Sources: WIFO calculations using OECD, national statistical offices.

However, the observed increase in knowledge-based, primarily business-related services, together with the vigorous and long-lasting economic upturn, which occurred in the US during the 1990s, suggests a different story. Knowledge-based services contribute to economic development not only through their own growth in employment and income, but also through their potential to improve performance in the economic system via "knowledge transfer and progressive specialisation". They are capable of stimulating productivity growth through various sources of competitive advantage[8]:

8 See Rubalcaba-Bermejo (1999).

(i) *technological innovation* (e.g. engineering services, computing, testing, R&D labs); (ii) *organisation*, as well as *corporate finance* and *strategy* (management consulting, audits, manpower services); and, (iii) *marketing* (market research, advertising, public relations, design services, fairs & exhibitions). In addition, external knowledge-based services offer flexible access to specialised expertise at more operational levels of business (e.g. linguistic or legal services). Hence, in contrast to the gloomy forecasts on productivity and income envisaged by many with respect to the traditional process of tertiarisation, the label *"quaternarisation"* attaches to a distinct process, in which the cumulative nature of information and knowledge as complementary factors of production raise the general prospects for entrepreneurial discovery and productivity growth.[9]

The numbers extracted from input-output tables leave no doubt that the rise of the knowledge-based economy is underway. For instance, in France the share of knowledge-based services in the intermediary inputs of the total economy has risen from 17% in 1970 to a level of 34% in 1990, which is the highest among the countries compared. Corresponding figures for the Netherlands are 9% (1972) and 33% (1997); United Kingdom: 5% (1968) and 30% (1997); US: 19% (1972) and 31% (1996); Denmark: 11% (1972) and 29% (1995); Germany: 16% (1978) and 26% (1990); and Japan: 8% (1970) and 17% (1990).

Compiled from input-output data, Figure 4.2 shows the importance and the evolution of the share of knowledge-based services in total intermediary inputs for the 5 broad sectors.[10]

Even if one abstains from comparisons of absolute levels between individual countries, the general picture is clear and surprisingly consistent, showing a steady *increase in the share of knowledge-based services,* measured as a percentage of total intermediary inputs. Another robust observation is that most of the intermediary demand for knowledge-based services originates in knowledge-based services themselves. Conversely, the demand for knowledge-based services is lowest in manufacturing and in the aggregate of "other" industries.

9 Still, one cannot preclude the possibility that, in some progressive services, high growth rates will only be of a transitory nature. See Baumol et al. (1985).

10 Comparability of input-output data both between countries and over the course of time is limited, as the methods used in compiling the tables might differ. One might also suspect that the rising share of knowledge-based services is partly due to improved statistics (although this in itself has been motivated by the growing awareness of their importance).

4. External service inputs and competitive performance

It is also interesting to look at whether any regularity can be observed in the relationship between differences in the intermediary demand for external services and the competitive performance of manufacturing industries. To this end, manufacturing industries are classified according to their relative dependence on different kinds of external service inputs (see Box 4.2) and divided into four mutually exclusive categories:

- *IKBS* - industries with high shares of inputs from knowledge based services (KBS), such as various business-related services, communications or financial intermediation (examples are publishing, electronic components, medical equipment, air- and spacecraft; see Box 4.3 at the end of this chapter);
- *IRAS* - industries with high shares of inputs from retail and advertising services (e.g. the manufacturing of food and beverages, pharmaceuticals, computers, sports goods);
- *ITRS* - industries with high shares of inputs from transport services (most basic goods industries, such as sawmilling, construction material or basic metals, but also motor vehicle bodies);
- *OTHER* industries - residual category, where the combination of external service inputs does not deviate in any pronounced way from the average of total manufacturing (various, from meat products to footwear, metal products and motor vehicles).

In what follows, the relative performance of these four groups of industries in terms of labour productivity, value added growth, employment growth and export unit values is ascertained, and the pattern in the EU is contrasted with those in the US and Japan.

• *Labour productivity*

Beginning with relative differences in labour productivity, industries with a high demand for inputs from external knowledge-based services appear at the top of the rankings in the European Union as well as in Japan and the US (Figure 4.3). Industries with high inputs from retail and advertising ranked second followed by transport intensive industries. The overall patterns for the European Union are largely consistent with the ones for Japan and the US, but the differences are somewhat less pronounced.

Box 4.2 The new taxonomy

This new industry classification ("taxonomy 3") complements the taxonomies 1 and 2 developed in previous reports, established in order to investigate industrial performance with respect to the intangible sources of competitive advantage (see Peneder (2000 and forthcoming)). This new classification concentrates on the differentiation of industries according to the varying degrees of demand for external service inputs, as extracted from input-output tables.

Statistical cluster analysis classifies individual observations, depending on their relative similarity with respect to an array of chosen variables. Its purpose is to divide a specific data profile into separate and mutually exclusive segments by creating maximum homogeneity within and maximum distance between groups. For the current analysis, one hundred NACE 3-digit manufacturing industries were taken as observations, while the vectors representing intermediary demand for external service inputs were used as discriminating variables. Due to the importance of a sufficiently high level of disaggregation in the initial data, US input-output tables were used (available for 1992) in a matrix disaggregated to 498 industries times products. The high level of disaggregation does not just allow for a refined differentiation of service inputs, it also enables a sufficiently accurate transformation of the respective service intensities into NACE 3-digit industries. Besides this technical need, the US is an attractive source of reference due to: (i) its status as one of the economically most advanced nations, whose general patterns in the division of labour constitute a good benchmark; and (ii) being a large economy, it accordingly presents lower risks of distortions in the data, accruing from highly particular local patterns of specialisation.

The classification was produced using a sequence of four analytical steps. Firstly, inputs from the various service industries were aggregated into 6 variables: (i) *"transportation"*(all of them related to the spatial transformation of goods and people; e.g. railroads, motor freight, air transport, etc. but also including pipelines and postal services); (ii) *"trade"* (wholesale- and retail); (iii) *"financial services"* (including insurance and real estate); (iv) *"advertising"*; (v) *"datcom"* (comprising data processing, communications and electronic broadcasting); and (vi) *"techserv"* (legal, engineering and accounting services, plus testing and research labs. Personal services (hotels, restaurants, theatres, laundry, cleaning, barber shops, etc.), social services (e.g. health and education), as well as very special sectors such as public administration, the defence sector or social security were not included. Among the remaining variables, correlation was still high, so in a second step, a *principal component analysis* was applied, leading to a 3-factor solution of uncorrelated variables, which were linear composites of the original vectors. The factor loadings of *variable 1* were highest for inputs from "financial services", "datcom" and "techserv". In contrast, *variable 2* captured the dimensions of the initial variables "trade" and "advertising", which appeared to be highly correlated. *Variable 3* was determined by "transportation" and to a lesser degree by the initial variable labelled "techserv". In a third step, a non-hierarchical algorithm produced a first partition of the data profile into ten broad clusters, which, in a fourth step, was further aggregated by means of hierarchical clustering, relying on the cosine of the vectors as a measure of distance and the average linkage between groups as a method of agglomeration.

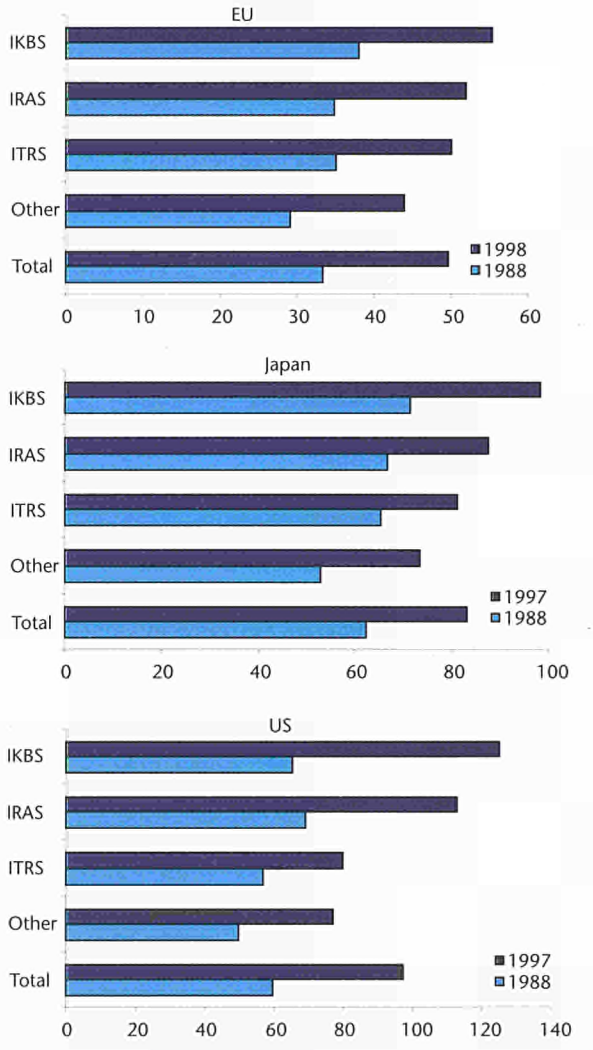
Analogous to the use of other classifications, one must remain aware of the fact that much heterogeneity within each individual category can still be found. In addition, one cannot assume complete consistency between different economic areas with respect to the typical combinations of external service inputs, especially since the latter can be much affected by national differences in the regulation of service markets. It is one of the advantages of the taxonomic approach that the latter is not a necessary assumption for international comparisons. It only requires consistency as far as membership within the broad boundaries of the final classification is concerned. This obviously is a much weaker assumption, and generally allows for more robust results.

Taking all three areas together, labour productivity in 1997 amounted to an average of 91,635 Euro per capita, far ahead and growing faster (+5.9% p.a. since 1988) than any other category. Industries with high inputs from retail and advertising ranked second (78 704 Euro/capita; +4.8% p.a.), followed by transport intensive industries (67 222 Euro/capita; and growth of 3.7% p.a.).

- ***Value added***

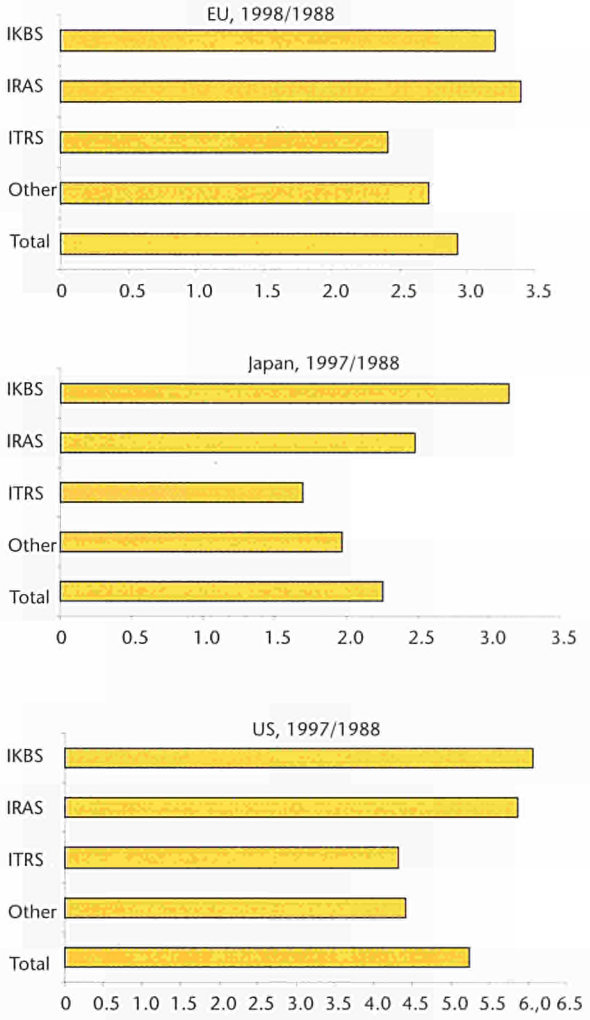
In Japan and the US, the value added of industries with high shares of inputs from knowledge based services grew the most of all four industry groups and well above the average for total manufacturing. In the European Union, average annual growth of 3.2% was also above the average for total manufacturing and was outperformed only by retail and advertising intensive industries with an average of 3.4% (Figure 4.4).

Figures 4.3 Labour productivity, 1000 Euro



Source: WIFO calculations using SBS, EUROSTAT.

Figures 4.4 Value added, annual nominal growth rate



Source: WIFO calculations using SBS, EUROSTAT.

• *Employment*

In the European Union, as well as in Japan, industries with high shares of knowledge-based services achieved their good productivity performance mostly by means of above average growth in value added, whereas the decline in employment was the lowest of all four categories. In contrast, the pattern is entirely different in the US, where productivity growth results from two simultaneous movements: high growth in value added and large-scale reductions of the labour force, which, at the same time, are not observed in other industry groups (Figure 4.5).[11]

11 A possible explanation for the large-scale reduction of the labour force in the KBS intensive industry in the US could be the refocusing in core competencies in these industries and the consequent tendency to outsource some of the activities previously carried out in-house. Arguably, in the period under consideration, outsourcing in the US was facilitated by the existence of developed service markets.

In Europe, industries characterised by high levels of knowledge-based and retail and advertising services appear to be less exposed to pressure for further job losses than the group of other industries, with no pronounced intermediary demand for any kind of external services, or transport intensive industries.

• *Unit values*

Regarding unit values in foreign trade, these are by far the highest in the group of industries, which are characterised by large external inputs from retail and advertising (Figure 4.6). An obvious reason is the generally low physical weight of final consumer goods. Turning to the degree of quality differentiation, as opposed to mere price competition, the standard deviation of unit values is highest in indus-

tries with high shares of inputs from knowledge-based services while industries with a high level of inputs from retail and advertising still come in second.

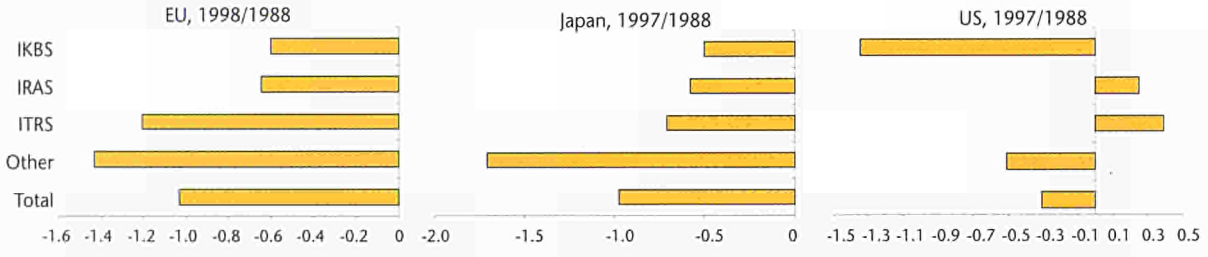
Corresponding to the findings on the European quality premium, unit values of exports are consistently higher than those of imported goods. In addition, the quality differential of exports relative to imports is most pronounced in the group of industries with shares of knowledge-based services.

5. Specialisation within the Triad

• *Production*

Applying this classification of industries to a comparison of the overall patterns of specialisation within the Triad, the general picture for the European Union reveals a pronounced structural imbalance, which has grown further between 1988 and 1997. In manufacturing industries with a particularly high level of inputs from knowledge-based services, the share of the EU in total value added of the Triad has fallen from 28.5% in 1988 to 25.2% in 1997. This share is by far the lowest of all the four categories. In the same year, the share was 31.1% for industries with a high level of inputs from retail and advertising, 31.7% for transport intensive industries and 35.6% in the group of "other" manufacturing (Figure 4.7). In contrast, the US enjoys precisely the reverse patterns of specialisation, with the highest share in the value added of the Triad in the group of industries with large inputs from knowledge-based services (57.2% in 1997, up from 51.2 in 1988), followed by industries with high intermediary demand for retail and advertising (45.3% in 1997), transport intensive production (44.3%), and the lowest specialisation in "other"

Figures 4.5 Employment, annual growth rate

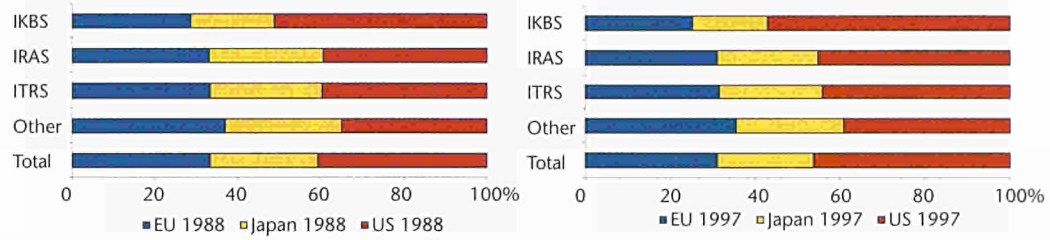


Source: WIFO calculations using SBS, EUROSTAT.

Figures 4.6 Indicators for product quality and differentiation in the EU

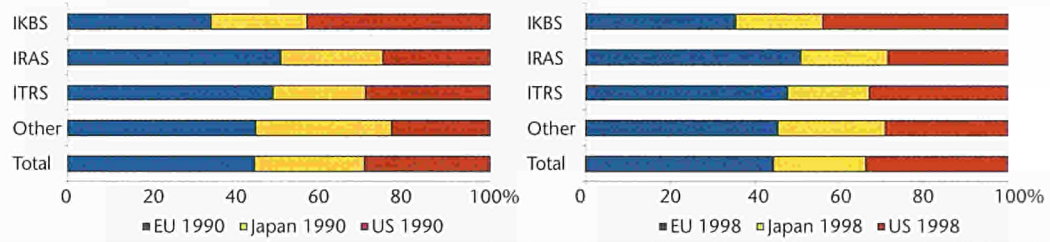
Source: WIFO calculations using COMEXT, EUROSTAT.

Figure 4.7 Specialisation; shares of value added in the Triad



Sources: WIFO calculations using SBS, EUROSTAT.

Figure 4.8 Specialisation; shares of export in the Triad



Sources: WIFO calculations using COMEXT, EUROSTAT.

manufacturing (39.2%). Similarly to the European Union, Japan is characterised by comparatively low shares in industries classified as having high intermediary demand for knowledge-based services (17.6%), but its value added shares are more evenly distributed (between 23.6% and 25.2%) in the three other categories.

• *Exports*

The same structural weaknesses in European manufacturing also come to the surface with reference to its shares in the Triad's total exports. In 1998 the export share of the EU were again lowest in industries with a particularly high level of inputs from knowledge-based services (Figure 4.8). Their share of 35.6% is rather modest, when compared to the 50.8% for industries with large inputs from retail and advertising, the 47.8% in transport intensive production and the 45.5% for the group of "other" manufacturing.

Analogously to the situation in terms of value added, the US pattern of export specialisation consistently mirrors the European pattern: industries with high shares of inputs from knowledge-based services rank highest (44.1%), and the export shares of all other types of industry are rather evenly distributed (between 28% and 33%). Japanese shares in the total exports of the Triad generally do not differ much between these categories (ca. 20%), except for the above average performance of the group of "other" manufacturing (ca. 25%).

These results can be briefly summarised as follows: the US is strongest in industries characterised by high shares of inputs from external knowledge-based services. This is precisely the group of industries, which tends to exhibit the highest levels of labour productivity and product differentiation. In contrast, the European Union is more specialised in the group of "other" industries, characterised not only by the lack of a pronounced reliance on external service inputs, but also – as has been seen in the figures above – by the lowest potential for product differentiation, the most severe decline in employment, below average growth of value added and the lowest level of labour productivity.

In order to overcome the structural deficit in industries that typically rely heavily on external inputs from knowledge-based services, the European Union must face concerns about the regulatory environment affecting the supply of these services. Although further research would be needed in order to claim a clear causal relationship, one might nevertheless suspect that the strength of the US in those industries is related to its earlier and more advanced development of the corresponding markets for services.

In the EU, service industries are in general highly affected by specific regulations, and "in many countries services are subject to more government inter-

ventions than most other activities".[12] Indeed, progress in the functioning of markets through the implementation of structural reforms has been slower in service markets.[13]

The analysis presented in this chapter provides further rationale for the economic policy recommendations concerning the measures to be taken in order to liberalise and improve the functioning of services markets. Clearly, due to the more local nature of competition and the heterogeneous regulatory approaches of individual Member States, the task of lifting existing restrictions and enabling effective competition in services markets amounts to a complex agenda.

Due to its context, specificity and highly customised nature, in many cases the quality of services is difficult to ascertain even after consumption. Consequently, information problems tend to be more severe in the exchange of services than on the more tangible, and therefore more transparent, goods markets. In their extreme form, such information problems can effectively hinder the emergence of certain markets for high-quality services.

Various specific institutional arrangements have arisen, which are intended to mitigate the economic effects of the uncertain provision of quality (e.g. guarantees and legal liabilities, quality controls or occupational licensing and certification). However, viewed from a dynamic perspective, some state interventions may obstruct private entrepreneurial initiative.

As a general rule, in competitive markets characterised by frequent interaction between buyers and sellers, one should not underestimate the scope of private solutions and creative entrepreneurial responses to problems posed by asymmetric information. The revision of the largely fragmented field of national regulations and restrictions to market access should acknowledge the private capacity of response to these information problems.

Due to their nature as intermediary inputs, the efficient supply of specialised external services fulfils important functions enabling and affecting the competitive performance of many other industries. Redesigning an effectively streamlined and coordinated regulatory environment would not only lift entrepreneurship and increase competition within the sector, but also would generate positive impulses for competitive performance and growth in the overall economy.

6. Summary

This chapter presents the evolution of the services sector and investigates its role in the economy.

Data show that:

- Since the 1970s, the process of tertiarisation has been driven primarily by the growth of knowledge-based services.
- Among the sources of structural development, the increase of domestic demand has had the most pronounced impact on growth. Knowledge-based services and personal and social services benefited the most from this rise in consumption.
- The technology effect (as revealed by the change of coefficients in the matrix of intermediary inputs) has been, in general, most pronounced in knowledge-based services. Exceptions are Japan and the US where the growth of knowledge-based services appears to have been driven more strongly by domestic demand.
- The share of knowledge-based services, measured as a percentage of total intermediary inputs, has steadily increased.

These findings point to a process of *quaternarisation*, defined by the steady rise of information and knowledge-based services. The essential difference from traditional growth in services is the specific role knowledge-based services can play as sources of innovation, product differentiation and productivity growth for the rest of the economy.

Concerning the impact of differences in the intensity of input demand of different types of external services on the competitive performance of manufacturing industries, the analysis for the EU the US and Japan shows that:

- In terms of labour productivity, industries with a high demand for inputs from external knowledge-based services appear at the top of the rankings in both the European Union and in Japan and the US. Industries with high inputs from retail and advertising rank second followed by transport intensive industries.
- In terms of value added, industries with high shares of inputs from knowledge based services grew above the average for total manufacturing and were outperformed only by retail and advertising intensive industries, in the EU. In the US

12 See Sapir et al. (1993).
13 Broad guidelines of economic policies (2000)

and Japan, these industries grew the most and well above the average for total manufacturing.

- In terms of employment, industries with high shares of inputs from knowledge based services had the lowest decline in the EU and in Japan. The US experienced large scale reductions of the labour force in these industries, which are not observed in other industry groups.
- In terms of degree of quality differentiation, industries with high shares of inputs from knowledge-based services rank first while industries with a high level of inputs from retail and advertising still come in second in the EU.

Comparison of patterns of production and export specialisation within the Triad reveals a pronounced and increasing structural deficit of the EU in industries with high level of inputs from knowledge-based service, and the highest specialisation in industries with no particular reliance on any kind of external services ("other"). The US enjoys the reverse patterns of specialisation, with the highest share in the value added of the Triad in this group of industries and the lowest specialisation in "other" industries. Japan has a pattern of specialisation similar to the EU but with less pronounced differences across industry types. In short, the US is strongest in industries characterised by high shares of inputs from external knowledge-based services, which exhibit the highest levels of labour productivity and product differentiation. In contrast, the EU is more specialised in the group of industries with a lack of pronounced reliance on external service inputs, which exhibit the lowest potential for product differentiation, the most severe decline in employment, below average growth of value added and the lowest level of labour productivity.

Box 4.3 WIFO taxonomy: industries clustered by intensity of external service inputs

Industries characterised by high level of inputs from...

	...transport services (ITRS)
1530	Fruits and vegetables
2010	Sawmilling, planing and impregnation of wood
2020	Panels and boards of wood
2030	Builders' carpentry and joinery
2040	Wooden containers
2110	Pulp, paper and paperboard
2120	Articles of paper and paperboard
2220	Printing
2420	Pesticides, other agro-chemical products
2430	Paints, coatings, printing ink
2460	Other chemical products
2510	Rubber products
2520	Plastic products
2610	Glass and glass products
2620	Ceramic goods
2630	Ceramic tiles and flags
2640	Bricks, tiles and construction products
2650	Cement, lime and plaster
2660	Articles of concret, plaster and cement
2680	Other non-metallic mineral products
2710	Basic iron and steel, ferro-alloys (ECSC)
2720	Tubes
2730	Other first processing of iron and steel
2740	Basic precious and non-ferrous metals
2750	Casting of metals
3420	Bodies for motor vehicles, trailers
	...retail and advertising (IR&S)
1560	Grain mill products and starches
1580	Other food products
1590	Beverages
1600	Tobacco products
2050	Other products of wood; articles of cork etc.
2440	Pharmaceuticals
2450	Detergents, cleaning and polishing, perfumes
2920	Other general purpose machinery
2930	Agricultural and forestry machinery
2940	Machine-tools
2950	Other special purpose machinery
3000	Office machinery and computers
3120	Electricity distribution and control apparatus
3140	Accumulators, primary cells and primary batteries
3150	Lighting equipment and electric lamps
3160	Electrical equipment n. e. c.
3350	Watches and clocks
3540	Motorcycles and bicycles
3610	Furniture
3620	Jewellery and related articles
3630	Musical instruments
3640	Sports goods
3650	Games and toys
3660	Miscellaneous manufacturing n. e. c.

	...knowledge based services (IKBS)
2210	Publishing
2230	Reproduction of recorded media
2410	Basic chemicals
2470	Man-made fibres
2670	Cutting, shaping, finishing of stone
2840	Forging, pressing, stamping and roll forming of metal
2850	Treatment and coating of metals
2860	Cutlery, tools and general hardware
2960	Weapons and ammunition
3210	Electronic valves and tubes, other electronic comp.
3220	TV, and radio transmitters, apparatus for line telephony
3310	Medical equipment
3320	Instruments for measuring, checking, testing, navigating
3330	Industrial process control equipment
3340	Optical instruments and photographic equipment
3510	Ships and boats
3530	Aircraft and spacecraft
3550	Other transport equipment n. e. c.
	...other industries
1510	Meat products
1520	Fish and fish products
1540	Vegetable and animal oils and fats
1550	Dairy products; ice cream
1570	Prepared animal feed
1710	Textile fibres
1720	Textile weaving
1730	Finishing of textiles
1740	Made-up textile articles
1750	Other textiles
1760	Knitted and crocheted fabrics
1770	Knitted and crocheted articles
1810	Leather clothes
1820	Other wearing apparel and accessories
1830	Dressing and dyeing of fur; articles of fur
1910	Tanning and dressing of leather
1920	Luggage, handbags, saddlery and harness
1930	Footwear
2320	Refined petroleum products
2810	Structural metal products
2820	Tanks, reservoirs, central heating radiators and boilers
2830	Steam generators
2870	Other fabricated metal products
2910	Machinery for production, use of mech. power
2970	Domestic appliances n. e. c.
3110	Electric motors, generators and transformers
3130	Isolated wire and cable
3230	TV, radio and recording apparatus
3410	Motor vehicles
3430	Parts and accessories for motor vehicles
3520	Railway locomotives and rolling stock

Source: WIFO calculations.

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Chapter 5
The internationalisation of European services

This chapter provides an assessment of the extent of internationalisation in the European services sector.

Analysis of services in Europe has to be set against the background of the ongoing liberalisation of service markets, the creation of the Internal Market and, more recently, the introduction of the single currency. A primary aim of the liberalisation of service sectors has been to introduce competition into these markets and, hence, to promote competitiveness; more open markets for services may be expected *a priori* to encourage quality improvements and product and process innovation. Moreover, as discussed in the previous chapter, many of the sectors subject to reform represent essential elements of the economic infrastructure and can have a significant impact on growth and efficiency across a wide range of other sectors of the economy and on overall economic performance. Liberalisation and initiatives towards the creation of the Internal Market bring an added international aspect to competition in service sectors through the removal of barriers to cross-border trade and foreign investment. As a consequence, potential market size is increased, as are opportunities to realise economies of scale and scope. Combined with the globalisation of client industries, these changes have the potential to boost growth in services trade and investment on a world scale.

1. Factors promoting an international environment for services: the role of deregulation and ICTs

Deregulation in sectors such as financial services, air transport and telecommunications has both promoted the international expansion of firms within these sectors and helped provide the necessary infrastructure for the globalisation of other industries. Regional initiatives towards the liberalisation and deregulation of service sectors have come from the EU's Internal Market programme and, elsewhere, from other new multilateral structures like North Atlantic Free Trade Agreement (NAFTA) and Mercosur. On a broader scale, negotiations at the World Trade Organisation (WTO) regarding the General Agreement on Trade in Services (GATS) aim to liberalise markets further and to promote competition in services.

The harmonisation of EU regulations is concerned with setting a minimum level of rules on some important features of the behaviour of service providers and on the control systems of Member States. Apart from this minimum set of rules, there is no market regulation policy for services at EU level, other than the general rules of EU competition

Table 5.1 Market structure in services

	Determinants			Degree of competition	
	Concentration	Sunk costs	Regulation	Before	After
Distribution	low	low	medium	medium	high
Hotels	low	low	low	high	high
Telecommunications	high	high	high	low	medium/ high
Banking, Insurance	medium	medium	high	low	medium
Business services	low	medium	low	medium	high

Source: European Commission (1993, 1996).

policy. However, national programmes aimed at further liberalisation have taken place or are underway, though the overall picture is less than unified with respect to the degree and speed of liberalisation. Nonetheless, the overall degree of openness of service markets has increased and opportunities for internationalisation have been created.

An indication of the market structure and level of competition prevailing prior to the Internal Market programme ("before" column) and an evaluation of the current situation ("after" column) is provided in Table 5.1. The first three columns show indicators of the importance of factors limiting the mobility of services across markets and firms within markets. Concentration refers to natural determinants of concentration such as economies of scale and scope; sunk costs may be either tangible (e.g. buildings or network infrastructures) or intangible (e.g. reputation); regulations may either affect the structure of the industry (e.g. entry of new firms) or impinge upon the conduct of existing firms. As a result of the completion of the Internal Market, competition has increased in all the branches identified.

A second impetus for internationalisation (globalisation) has been provided by new information and communication technologies (ICTs). In many cases, ICTs have made services more tradable by enabling new forms of storage and transmission of services and new means of producer-consumer interaction. The growth of the Internet has, for example, provided a vehicle for rapid and wide reaching delivery of certain services. Thus, for services for which the achievement of a critical mass in a foreign market required either the establishment of a network of branches or the acquisition of an existing local network, the Internet now provides a realistic alternative (e.g. banking, retail distribution, online news and entertainment services). The impact of electronic commerce can be seen as even more far reaching for some services than for goods.[1] ICTs not only have an impact on information flows but may also lead to the increased "commoditisation" or "standardisation" of certain types of services. Where ICTs increase the possibility for standardisation, they may also serve to increase the tradability of services. At the same time, standardisation points to the increased importance of economies of scale and potentially more price-based competition. This in turn suggests greater incentives for firms to expand their markets and, hence, to internationalise their activities. For network services (e.g. banks, insurance and telecommunications), as opposed to scale-intensive services (transport, wholesale trade and distribution), ICTs have facilitated the precision and quality of services and may actually increase the possibility for customisation.

Thus, the changes to the international environment brought about by deregulation and new ICTs provide a basis for explaining the acceleration of the process of internationalisation of services.

2. International services transactions: modes of supply

Many services are, by their very nature, intangible and, hence, non-tradable in a conventional sense. A defining feature of services that is frequently identified as determining their lack of "tradability" is the need for interaction between producer and consumer for a service transaction to take place. Cross-border supply alone is, generally speaking, only an option where the required level of supplier-customer interaction is low. The need for proximity between supplier and customer suggests a strong presumption in favour of local production of services (i.e. commercial presence) over exports of services. This presumption is strengthened by the existence of other forms of barriers to trade; these may be legal or regulatory but can also relate to natural or social factors and are generally recognised as being more important for services than for goods. Nonetheless, cross-border trade is important for some service sectors, which has led to various attempts to characterise international service transactions.[2] Essentially, these characterisations make a distinction between services that may be traded in a conventional sense (i.e. cross-border supply) and those that require factor movements (i.e. movement of the supplier, either temporarily or permanently, to the location of the client).

The importance of non-conventional modes of trade for services is reflected in the General Agreement on Trade in Services (GATS). Recognising the greater diversity of modes of service "trade" compared to that of goods, GATS developed a four-part typology (modes) of how producers and consumers may interact internationally:

1 Other specific attributes of e-commerce that may promote the internationalisation of services include the replacement of traditional intermediary functions (i.e. local representation may become less important) and the possibility for 24 hour trading (i.e. time-related geographical boundaries are eroded).

2 See for example: Sampson and Snape (1985), Vandermerwe and Chadwick (1989), and Sapir and Winter (1994).

- **cross-border supply** *(mode 1)*, covers flows of services from the territory of one country to another (e.g. banking or architectural services transmitted via telecommunications or mail).
- **consumption abroad** *(mode 2)*, refers to situations where a service consumer or his property moves into another country's territory to obtain a service (e.g. tourism, ship repair or aircraft maintenance).
- **commercial presence** *(mode 3)*, implies that a service supplier of one country establishes a territorial presence, including through ownership or lease of premises, in another country in order to provide a service (e.g. insurance companies or hotel chains).[3]
- **presence of natural persons** *(mode 4)*, consists of persons of one country entering the territory of another country to supply a service (e.g. accountants, doctors or teachers).

Karsenty (1999) gives an indication of the relative importance of the different modes of supply. Although the estimates should be treated with caution given the data sources used, they provide a rough indication of the value of trade in services. Karsenty's estimates indicate that trade in services amounted to roughly 30% of world trade, and that modes 1 and 2 (which represent the part of total trade in services covered by conventional trade statistics) account for roughly 60% of trade in services.

Two conclusions emerge: firstly, conventional trade in services (i.e. modes 1 and 2) is important; secondly, conventional trade significantly underestimates the importance of overall trade in services.

One obvious question that arises is to what extent recorded conventional trade in services is in fact conditional on the pre-establishment of commercial presence. In other words, does cross-border supply of services reflect intra-firm transactions, the result of franchising and other third party mechanisms or is it direct supply by the service provider to the final client? For many of the services that are widely traded (e.g. ICT services, banking, insurance etc.) intra-firm trade is often involved. Although a number of empirical studies have examined the general relationship between exports and foreign direct investment (FDI),[4] it would appear that this issue has not been addressed specifically for services. Nonetheless, given the nature of service transactions it seems reasonable to suppose greater complementarity, or at least conditionality, of trade and FDI in services than in goods.

The levels of FDI required to establish a viable foreign commercial presence vary across service sectors. While in sectors such as finance they may be considerable, for other services, that are not capital intensive and where firms' assets are mainly incorporated in their personnel, the cost of setting up a commercial presence may be low; in which case, the level of "exports" necessary to offset the costs of establishing a presence in a foreign market may also be low. For this reason, the relationship between cross-border trade and FDI, whether they are complements or substitutes, is even less well defined than for manufacturing.

Furthermore, relationships between FDI and trade are not limited to service-to-service interactions. There is, for example, a clear relationship between FDI in wholesaling services and trade in goods. The establishment of a foreign wholesaling affiliate for the product distribution of the parent company is a key mechanism for providing the parent with access to a foreign market, allowing economies of scale in both production and distribution.[5] One of the achievements of the Internal Market, through the reduction in intra-EU customs barriers, has been to greatly facilitate the achievement of such economies.

Client demand for service providers with an international reach, or the competitive advantage that is bestowed, for example, by economies of scale or scope, can explain why service firms seek to internationalise their activities. An alternative motivation for internationalisation, particularly of production processes, may stem from other positive externalities in foreign locations (e.g. highly skilled manpower, access to technology and knowledge or access to financial or physical infrastructure). It should not, however, be assumed that an increase in the international activities of firms is an unambiguous indicator of a high degree of competitiveness. Firms may adopt internationalisation as a defensive strategy in the face of a decline in their domestic market share resulting from their failure to compete with other domestic firms or foreign suppliers. Alternatively, international expansion may be prompted by unfavourable domestic factors such as skill and technology shortages or lack of access to complementary goods and services.

3 With regard to commercial presence (mode 3), this need not necessarily imply the need for foreign direct investment (FDI) by service providers. Commercial presence may also be achieved through third party methods such as franchising, licensing and joint-ventures.

4 See Fontagné (1999) for a recent summary.

5 In trade statistics, wholesale trade services that are incidental to the wholesaling of merchandise are indistinguishable from merchandise (goods) trade data. As a result the importance of trade in wholesale services is underestimated.

Within this general context, the wide heterogeneity of service activities and providers suggests that the process of internationalisation will differ considerably across sectors and firms. Moreover, the adoption of flexible strategies that is at the heart of the globalisation of industry may be even more important for service providers than goods producing firms. As noted before, the "non-tradability" of many service activities leads to the use of alternatives to the traditional mechanism of international delivery, namely exports.

Hence, foreign direct investment or the adoption of third party arrangements (e.g. franchising, licensing etc.) can be a prerequisite for service firms to internationalise their activities. The adoption of flexible firm strategies can be observed in service sectors such as telecommunications and air transport, where an international presence may be achieved through direct investment (especially mergers and acquisitions) and where, at the same time, international alliances are prominent.

3. Theoretical implications of internationalisation for growth and competitiveness

From a broad perspective, internationalisation can be seen not only as a phenomenon that affects individual firms or sectors, but also as one that has wider reaching implications for regions and countries. Success in internationalisation, and in turn the economic growth that it engenders, depends not only on the collective ability of firms to compete internationally, but also on their ability to attract internationally successful firms or to forge partnerships with them. Thus, the potential benefits, and risks, for countries and regions may result from either, or both, outward internationalisation (i.e. by home based firms) and inward internationalisation (i.e. by foreign based firms).

A considerable amount of economic literature exists on the benefits of trade and foreign direct investment, but services are treated explicitly[6] to a much lesser extent. The degree to which theories developed in the context of trade in goods are applicable to services is debatable. Nonetheless, it is broadly accepted that the application of the concept of comparative advantage is essentially limited to services that can be readily standardised and traded as identifiably separate units. The fundamental question appears, therefore, to be to determine the extent to which the characteristics of a given service are sufficiently close to those of goods for the same theoretical considerations to apply. For many services, their characteristics are such that greater importance is likely to attach to commercial presence and, hence, to FDI than to conventional cross-border trade. Here it is possible to draw on more general arguments of the implications of FDI for both host and source economies.

FDI, whether through mergers and acquisitions (M&A) or through green-field investments has important implications for both source and host economies, particularly for the latter as it affects both the control and characteristics of economic activity in a way that is different from cross-border trade. Typically, a distinction is made between production and financial implications of FDI.[7] The main financial implications of FDI relate to possible substitution between foreign and domestic investments, either because investing abroad may reduce investment in a firm's home location or because foreign investment crowds out domestic investment in the host location. Thus, in either location, there is a risk that internationalisation may reduce domestic investment and potentially have negative long-term impacts on competitiveness. Alternatively, for the host country, foreign investment may encourage matching or complementary investments by local suppliers and partners, or stimulate investment by domestic or other foreign incumbent firms in response to increased competition.

The main direct production related implication of FDI, as with conventional trade, is through the effect of intensified competition on domestic firms. New entrants will challenge the market power of existing firms and hence force them to improve their competitiveness through, for example, lower prices, higher quality and innovation or improved capital and labour productivity.

Inward investment by foreign firms, or international partnerships, may also result in beneficial spillovers, with either inter- or intra-industry effects. Because of market failures, spillovers brought about by knowledge and technology transfers between parent companies and their affiliates may represent an efficient means for filling technological gaps. The nature of many service activities suggests that where knowledge and technology gaps do occur, they

6 See for example: Hindley and Smith (1984), Deardorff (1985), Sampson and Snape (1985), and Francois (1990).

7 See Stevens and Lipsey (1992).

Box 5.1 Data and measurement issues

The analysis of the internationalisation and competitiveness of services is subject to severe limitations, both practical and conceptual.

Conceptual limitations relate to the definition of appropriate indicators of internationalisation and competitiveness. Given the interdependence of trade and investment for services, it is clear that analysis of competitiveness should not be limited to conventional cross-border trade. Observed patterns of (cross-border) trade can no longer be seen as the over-riding or all encompassing indicator of competitiveness in an environment in which globalisation leads to more complex patterns of international relations and organisation of firms. For services, this problem can be seen as even more acute than for goods given the variety of forms of international transactions in services and the fact that the presumed predominance of cross-border trade is even less well established for services. Furthermore, it is unclear whether a high presence of foreign affiliates should be read as a positive or negative indicator of domestic competitiveness[a].

Practical limitations relate primarily to the lack of harmonised data allowing for quantifiable and internationally comparable measures. Available statistical sources do not clearly identify nor precisely measure the different modes of services supply. In this chapter, four basic sources of statistical data are used: conventional trade statistics for services; foreign direct investment (FDI) data; foreign affiliates trade statistics (FATS) and mergers and acquisitions (M&A) data. These data can only provide a partial picture of international transactions, they provide partial information on *modes 1, 2* and *3* of trade in services but do not help to identify third-party means of obtaining commercial presence nor do they indicate the importance of *mode 4* (movement of personnel).

The approach has been to treat what data is available in a pragmatic manner, noting in the tables the most important disparities in data coverage.

Data on trade in services are taken from the Eurostat NewCronos Database. Two items listed as service sectors in the NewCronos Database are excluded from the analysis in this chapter: "government services, not included elsewhere" (its exclusion implies that only commercial services are under consideration) and "royalties and license fees" (excluded because they do not relate to a specific service *activity*). Transactions in the "travel" and "construction services" sectors, which can incorporate elements of trade in goods and are not "purely" services, are not excluded from the analysis, because they both contain important service activities.

With regard to commercial presence (*mode 3*), there is a distinction between statistics on foreign direct investment, those on mergers and acquisitions and those on the activities of foreign affiliates.

Foreign affiliates trade statistics relate to the activities of foreign companies and cover a wide variety of indicators on the domestic and foreign operations of multinational companies. The data used in this chapter are drawn from pilot studies initiated as part of a joint Eurostat/OECD project. They cover inward activities only, that is, activities of foreign affiliates in the domestic economy of the reporting country, but do not cover outward activities (i.e. activities of domestic enterprises of the country studied in foreign markets). An important distinction between FDI data and FATS relates to the population of enterprises covered. For FDI statistics, a minimum of 10% of foreign ownership is used as a cut-off point, while for FATS a minimum of 50% is used.

Availability of data on FDI in services is limited. This holds for services categories, Member States and partners. Data on FDI are taken from the Eurostat NewCronos Database. Direct investment flows (outflows and inflows) are defined as a sum of equity capital, other capital and re-invested earnings. However, since data on re-invested earnings are available only since 1995, they have been excluded from the FDI flows presented in this report.

It should be noted that both trade and FDI data are subject to asymmetry (e.g. what country A declares as outflows to country B differs from what country B declares as inflows from country A). Data asymmetries are noticeably apparent when considering intra-EU trade and FDI data. Also, due to revaluation, the FDI position differs from accumulated flows.

Data on M&A provide a further source of information on FDI equity investments. Data are taken from the AMDATA database, which mainly deals with acquisitions, including pending deals, and only covers operations that result in a change of control over an enterprise[b]. AMDATA data cover a wider range of companies, as defined by level of ownership, than FATS data, but are narrower in the sense that FATS data also cover affiliates that are not created via mergers and acquisitions. AMDATA tends to underreport domestic M&A operations and operations in the service sector.

a) Even if it is interpreted as a sign of weak domestic competition, potential spillovers from foreign affiliates may lead to improvements in future competitiveness and growth in the domestic economy.

b) A 30% cut-off rule is used. Mergers and acquisitions are recorded in the sector (activity) of the target company. It is to be noted that for 1998 data are available only for the first three-quarters of the year. Estimates made by the Directorate General- Economics and Finance (European Commission) are used to provide aggregates for 1998.

may only be overcome via the presence of owners of the technology concerned.[8]

Technology and knowledge related spillovers associated with foreign direct investment or other forms of collaboration, have the potential to stimulate endogenous growth in the host economy. Moreover, where economies of scale and scope in the production of technology and knowledge are important, the potential for technology gaps to occur may be greater for small economies. For this reason, small countries able to attract foreign investment or to trade intensively may benefit relatively more from spillovers.[9]

8 Many of the characteristics that are common to a range of service activities relate essentially to intangible and often non-codifiable assets (like reputation, human capital or the ability to access and analyse information). Despite the efforts of firms to protect their knowledge-based advantages, the fact that knowledge is only partially excludable suggests that spillovers will eventually occur.

9 Ireland is, for example, a case in point.

10 Owing to the year on year volatility of FDI flows, expansion rates are used rather than growth rates. For information, the approximate annualised values of the expansion rates shown in Table 4 are as follows: extra-EU services outflows 17%; extra-EU services inflows and intra-EU services outflows and inflows 14%; extra and intra-EU manufacturing outflows 14%; extra and intra-EU manufacturing inflows 9%.

4. Overview of service transactions for the EU

The relative importance of cross-border trade and FDI may be compared for goods and services. As discussed earlier, commercial presence for services can be expected *a priori* to be more important than for goods. Indeed, aggregate data confirm this conjecture. As shown in Table 5.2, cross-border trade is undoubtedly less important for services than for goods, while FDI is more important for services than for manufacturing. Moreover, over recent years, trade in services has been increasing more rapidly than in goods (with the exception of recorded intra-EU imports) and the expansion rate for FDI in services has been higher than for manufacturing (see Table 5.3).[10]

From the perspective of the EU as a whole, two dimensions of the international integration of services can be seen as relevant. Firstly, the integration of service markets within the EU and, secondly, the integration of the EU in world-wide markets for serv-

Table 5.2 EU trade and FDI, 1998, Billions of Euro

	Extra EU		Intra EU		Total	
	Credits	Debits	Credits	Debits	Credits	Debits
Trade						
Goods	702	675	1205	1108	1912	1789
Services[a]	220	202	264	258	487	462
FDI flows						
Manufacturing	56	28	43	22	99	50
Services	70	55	83	76	153	131
FDI stocks[b]						
Manufacturing	283	171	250	194	532	365
Services	305	277	395	374	700	651

Notes:
Credits: exports, FDI outflows, FDI assets of residents of the reporting economy held abroad.
Debits: imports, FDI inflows, FDI assets (liabilities) of non-residents held in the reporting economy.
a Excluding royalties and license payments, and government services n.i.e.
b 1997 values.
Source: NEI calculations using NewCronos, EUROSTAT.

Table 5.3 EU trade and FDI growth, 1996-1998, percentage points

	Extra EU		Intra EU		Total	
	Credits	Debits	Credits	Debits	Credits	Debits
Trade						
Goods	8.9	8.3	6.9	7.0	7.5	7.6
Services[a]	10.2	10.6	7.9	6.4	8.9	8.2
FDI flows[b]						
Manufacturing	44.0	30.0	43.9	31.0	43.9	30.5
Services	61.1	44.9	45.0	43.9	51.3	44.3

Notes:
Credits: exports, FDI outflows.
Debits: imports, FDI inflows.
a Excluding royalties and license payments, and government services n.i.e.
b Growth rates for FDI are given by the expansion rate, calculated as the sum of FDI flows for 1996 to 1998 as a share of FDI stocks in 1996.
Source: NEI calculations using NewCronos, EUROSTAT.

ices. The growing importance of both intra- and extra-EU trade and, in particular, investment flows in services relative to GDP (see Figures 5.1 and 5.2) provides evidence that both dimensions of integration are at play. Furthermore, in both the intra- and extra-EU case, FDI is growing more quickly than cross-border trade in services. This may provide an indication of the increasing importance of commercial presence for international service delivery and the possible gradual substitution of trade by FDI, with commercial presence becoming the preferred mode of international expansion.

Turning to the relative importance of European integration as compared to the integration of Europe into world-wide markets for services, analysis of aggregate trade and FDI flows data provides a mixed message. As shown in Table 5.2, trade in services is much less important than trade in goods. At less than 20% of total trade, the share of services in total intra-EU trade has changed little during the 1990s (see Table 5.4). Similarly, the share of intra-EU imports in total service imports and the share of intra-EU exports in total services exports are largely unchanged. Thus, although trade in services is growing, the Internal Market has not resulted in faster growth in trade within the EU than is the case for EU trade with the rest of the world.

In contrast, the share of services in total intra-EU FDI inflows has risen considerably, from 63.5% in 1992 to 74.7% in 1998. The increased importance of FDI in services provides an indication that integration in services within the EU may be increasing more rapidly than in other sectors. In fact, this is an encouraging sign, given that FDI flows provide an indicator of the establishment and strengthening of commercial presence in foreign markets, and that this is a potentially more important component of integration of services sectors than for goods producing sectors. At the same time, comparisons of intra- and extra-EU flows point to an increasingly outward orientation of EU FDI. Although the share of intra-EU flows has remained relatively stable, at around 60% of total FDI inflows for services, the share of intra-EU flows in total outflows for services has declined quite dramatically. In 1992 intra-EU FDI accounted for 75% of total FDI in services (outflows) by EU enterprises but fell to only 55% in 1998. Therefore, although integration of EU service markets through FDI is growing rapidly, there is an increasing emphasis on investment outside the EU by European investors.

Mergers and acquisitions represent the main component of FDI flows, and so a greater insight into the evolution of FDI in services can be obtained by examining mergers and acquisitions data. Here it is possible to distinguish four types of operations: national operations involving firms from the same Member State; community operations involving companies from different Member States; and two forms of "international" transactions, those where an EU company is the target for a bid from a company from outside the EU (international EU target) and those where an EU company is the bidder for a company from outside the EU (international EU bidder). Figures 5.3 and 5.4 show the evolution of the different forms of operations for services and industry respectively. Data are presented in indices with the average number of operations for the period between 1984 and 1986 taken as a base.

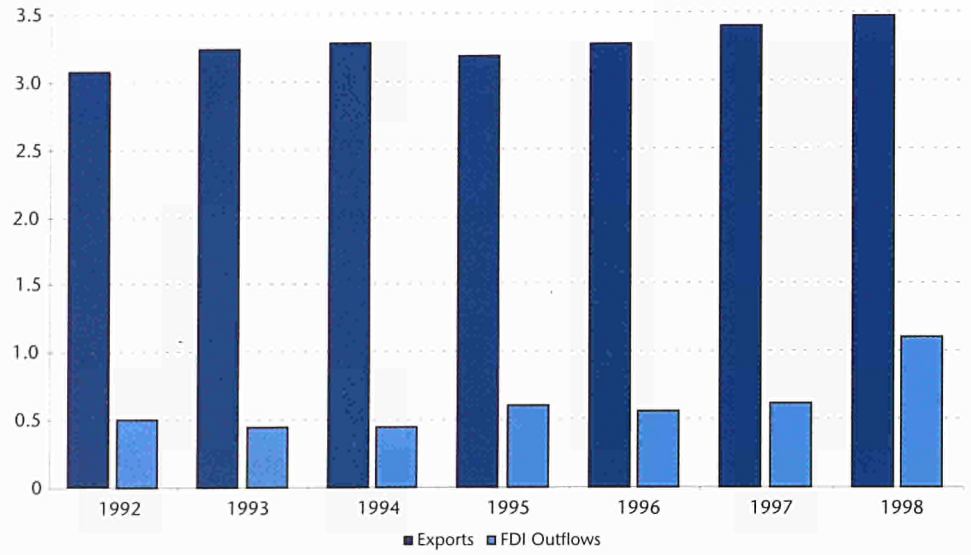
Although the number of national M&A operations for services has remained fairly stable over recent years, there has been an increase in all other forms

Table 5.4 Services vs. goods transactions and intra-EU vs. extra-EU transactions in services, percentage points

	1992	1993	1994	1995	1996	1997	1998
Services as a share of total intra-EU imports	19.6	21.5	20.6	19.1	19.3	19.2	18.9
Intra-EU imports as a share of total services imports	57.7	57.7	57.9	58.7	57.3	55.6	55.8
Intra-EU exports as a share of total services exports	54.8	55.5	55.7	55.8	54.9	53.0	54.2
Services as a share of total intra-EU FDI inflows	63.5	58.9	64.2	68.7	72.2	71.8	74.7
Intra-EU FDI inflows as a share of total services inflows	62.7	61.7	63.1	61.9	57.7	63.9	58.3
Intra-EU FDI outflows as a share of total services outflows	75.9	66.7	87.0	63.6	58.3	48.7	54.5

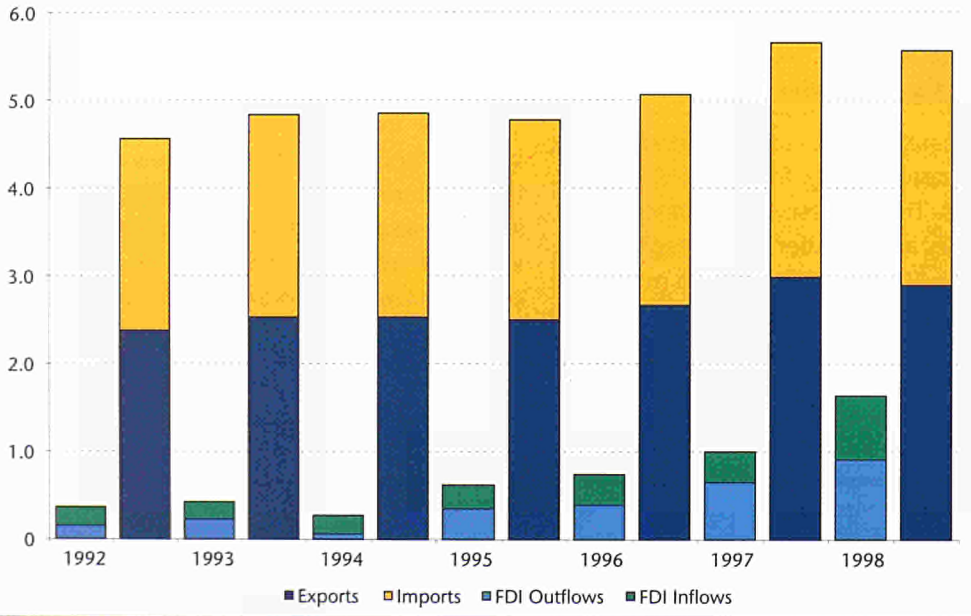
Note: Trade data exclude royalties and licence fees, and government services in the definition of services
Source: NEI calculations using NewCronos, EUROSTAT.

Figure 5.1 Intra-EU trade and FDI flows in services as a percentage of GDP



Source: NEI calculations using NewCronos, EUROSTAT.

Figure 5.2 Extra-EU trade and FDI flows in services as a percentage of GDP



Source: NEI calculations using NewCronos, EUROSTAT.

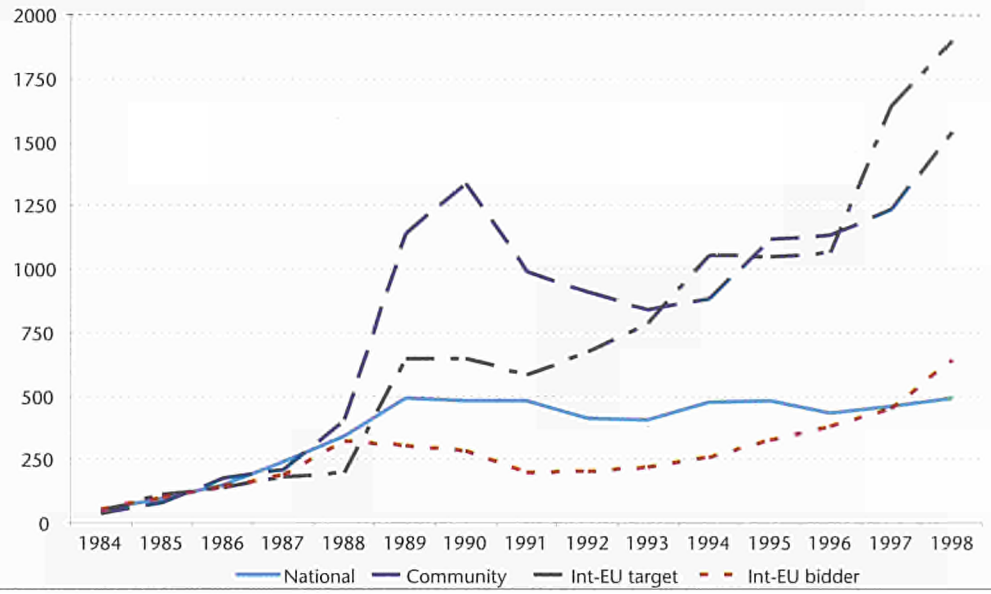
of operations, and these are now above the levels observed during the pre- Internal Market boom witnessed between 1988 and 1991. Compared to industry, the increase in the number of cross-border operations in recent years has been more pronounced, particularly for community operations. This points to an increasing importance of the international dimension of restructuring in services sectors. Moreover, even though the increase in the number of community operations has been impressive, it should be noted that the number of international operations, particularly where an EU company is the target, has been growing more quickly over the last couple of years for which data is available. This seems to point to an increasing extra-EU dimension in the internationalisation of EU services.

Table 5.5 Geographical composition of extra-EU transactions in services

Shares[b]	Trade[a] (1998)		FDI flows (1998)		FDI stocks (1997)		M&A's (1996-98)	
	Exports	Imports	Outflows	Inflows	Assets	Liabilities	EU bidder	EU target
US	32.5	32.5	29.1	59.9	45.7	45.2	34.0	55.9
Canada	2.3	2.4	2.1	0.7	3.9	1.7	3.9	3.3
Japan	5.9	3.7	0.2	3.1	1.6	10.1	1.2	2.7
EFTA[c]	15.8	14.5	19.8	21.6	11.4	25.6	11.7	11.0
Other Countries	43.5	47.0	48.7	14.7	37.4	17.5	49.2	27.0
Tot. value								
(Euro bn)[d]	220.3	202.0	69.5	54.8	305.4	277.0	1389	1792

Notes:
a Excluding royalties and license fees and government services n.i.e.
b Due to rounding, some columns may not add up to 100.
c For M&A, only Norway and Switzerland.
d For M&A, number of operations.
Source: NEI calculations using NewCronos (EUROSTAT) and AMDATA.

Figure 5.3 The evolution of services M&A's by type (average 1984-86 = 100)



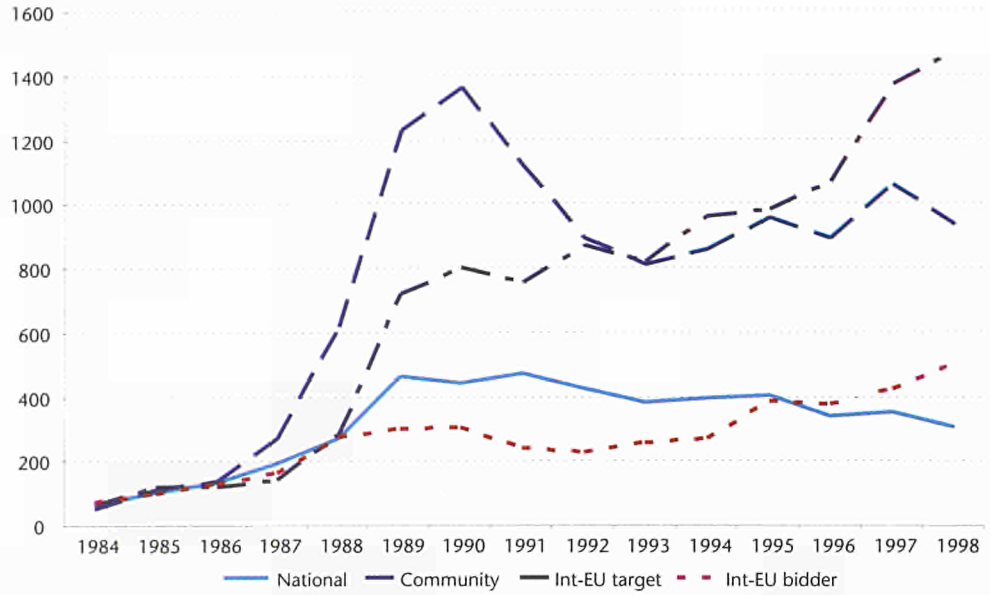
Source: NEI calculations using AMDATA, European Commission.

The geographical composition of EU services transactions with the rest of the world is shown in Table 5.5. As can be seen, the US is the single most important partner, most notably with respect to inward foreign direct investment, both for mergers and acquisitions (i.e. operations where an EU company is the target), and flows and stocks of FDI assets (i.e. EU liabilities). Certainly, the composition of inward transactions (including FDI stocks) indicate that developed countries/regions account for the vast majority of international activities of non-EU service providers within the EU. In contrast, the higher shares of other countries/regions for outward indicators point to a more diversified composition of the international activities of EU service providers. This points to an increasingly "global" dimension in the outward development of EU service sectors, which can largely be explained by the growing importance of EU relations with Central and Eastern European countries and also other industrialising regions (e.g. Latin America and South East Asia).

Services transactions by Member State

The discussion of the implications of internationalisation for growth and competitiveness suggested that there may be strong motivations for firms in smaller countries to trade more intensively and undertake proportionally higher levels of FDI, and for the governments of these countries to create incentives, either financial or through the creation of positive externalities, to encourage flows in FDI.

Figure 5.4 The evolution of industry M&A's by type (average 1984-86 = 100)



Source: NEI calculations using AMDATA, European Commission.

Table 5.6 The importance of trade in services in individual Member States, percentage points

	Trade in services/GDP			Service trade/ total trade	Intra-EU service trade/total service trade
	1992	1995	1998	1998	1998
Belgium/Luxembourg	24.1	21.9	25.3	18.5	66.8
Germany	7.4	7.8	9.1	16.3	54.7
Greece	15.6	13.8	15.1	41.1	59.6
Spain	8.7	10.2	12.7	23.7	68.0
France	11.7	9.2	10.0	19.5	49.6
Ireland	18.1	20.0	23.7	15.9	n.a.
Italy	8.9	10.5	10.7	22.0	52.2
Netherlands	21.4	20.8	23.7	22.3	60.1
Austria	23.5	24.9	28.8	32.0	63.9
Portugal	10.1	13.4	13.6	18.8	72.9
Finland	10.2	12.9	10.8	15.7	60.5
Sweden	12.9	12.8	15.8	19.8	n.a.
United Kingdom	9.6	11.4	11.5	21.8	41.2
EU	**11.3**	**11.4**	**12.6**	**20.6**	**54.4**

Note: excluding trade in royalties and license fees, and government services n.i.e.
Source: NEI calculations using NewCronos, EUROSTAT.

Analysis of the relative importance of trade in services for EU Member States supports the hypothesis that smaller countries will trade more intensively. For trade in services, it is the smaller Member States that reveal the highest trade (exports plus imports) to GDP ratios (see Table 5.6). There would appear to be a distinct group of five Member States – Ireland, the Netherlands, Belgium/Luxembourg and Austria, – with particularly high trade to GDP ratios.

It would also appear that there is a relationship between the size of the domestic economy and the ratio of intra-EU trade to total trade. The share of intra-EU trade is noticeably lower for the four largest European economies, indicating a greater orientation outside Europe. Spain and Portugal, by contrast, reveal the greatest orientation of trade in services within the EU.

Table 5.7 The importance of FDI flows in services in individual Member States, percentage points

	FDI flows in services/GDP			Service FDI/total FDI	Intra-EU service FDI/total service FDI
	1992	1995	1998	1998	1998
Denmark[a]	0.9	3.1	3.8	63.9	40.5
Germany[b]	0.7	1.4	2.4	49.9	60.0
Spain	0.7	1.0	3.3	63.7	43.0
France	1.6	0.9	3.2	71.4	59.2
Italy[c]	0.5	0.5	0.8	62.5	49.9
Netherlands	3.4	4.8	10.0	54.7	58.0
Austria	n.a.	n.a.	2.3	73.0	n.a.
Portugal	1.8	0.4	2.5	71.0	49.9
Finland	0.1	0.1	14.9	60.1	97.6
Sweden	1.2	0.7	8.8	64.1	89.1
United Kingdom	1.3	1.9	3.6	35.2	14.0
EU	**1.2**	**1.7**	**3.7**	**55.5**	**56.2**

Notes:
a Excluding: hotels and restaurants for 1998; excluding real estate and business activities, and other services for 1992.
b Excluding hotels and restaurants.
c Excluding real estate and business activities for 1998 and 1995.
Source: NEI calculations using NewCronos, EUROSTAT.

On the basis of the two indicators (trade to GDP and intra-EU to total trade), three groupings of countries appear to arise:[11]

- *Major economies,* characterised by low trade to GDP ratios and a balanced orientation between extra and intra-EU trade: Germany, France, Italy and the UK.
- *Small/central economies,* characterised by high trade to GDP ratios and a medium orientation towards intra-EU trade: the Netherlands, Belgium/Luxembourg and Austria.
- *Small/peripheral economies,* characterised by medium trade to GDP ratios and a high orientation towards intra-EU trade: Spain, Portugal and Greece.

The lack of available harmonised data limits the possibility of examining the relationship between FDI in services and the size of the domestic economy. Nonetheless, it would appear that geographical and cultural factors may be influential, as FDI flows tend to be proportionally more important for Nordic countries, the UK and, especially, the Netherlands, but low for Latin countries, Germany and Austria (see Table 5.7). However, the relatively low shares of services in total FDI indicates that it is not services that are specifically important for these countries but rather that they have high aggregate levels of FDI relative to GDP.

Evidence that country size is important in determining the relative importance of FDI and its orientation is provided by data on mergers and acquisitions of services firms.[12] Although absolute values and numbers of cross-border operations are, unsurprisingly, greater for large economies, the value of cross-border M&A operations relative to GDP is higher for smaller Member States.[13] Moreover, the share of cross border M&A operations in total (i.e. national plus cross-border) operations is higher for smaller countries (Luxembourg, Portugal, Ireland, Belgium, Denmark and Austria) and less important for the larger economies (UK, Italy, France and Germany), but also for Greece and Finland.

Community (i.e. intra-EU) operations are more important (in numbers) than international (i.e. extra-EU) operations for most countries, but generally large economies have a lower share of Community operations in total cross-border operations. More detailed examination of bilateral M&A relationships between Member States indicates that most Community operations are between neighbouring countries or involve one of the "big four" investing countries (the UK, the Netherlands, France and Germany).

Overall, the evidence from trade, FDI and M&A data tends to suggest that economies of scale are impor-

11 Unfortunately, data on the intra/extra-EU split is unavailable for Ireland and Sweden.
12 For more detailed information, see Baker (2000).
13 On this basis the UK has a disproportionately high ratio.

tant for services and, thus, services sectors in smaller countries with correspondingly small domestic markets are more "open" to internationalisation. However, at the same time, service sectors in the larger economies are more outwardly (i.e. extra-EU) orientated. This, most probably, is a reflection of two factors. Firstly, the larger Member States are home to the EU's largest multinational service firms and, in turn, these firms have the greatest world-wide reach. In other words, the domestic market size may be influential in determining the extent of the geographical projection of service sectors. Secondly, the size of the domestic market within Member States may still be influential in determining its attractiveness as a location for foreign company affiliates (whether they are acquired through mergers and acquisitions or result from green-field investments), especially by firms from outside the EU.

5. The sectoral dimension of international service transactions for the EU

The heterogeneous nature of service activities suggests that patterns of international transactions will vary considerably both in terms of the modes of supply and the importance of international activities relative to overall activity levels of sectors.

Table 5.8 considers two measures of the importance of nonnational enterprises, the share of turnover and of employment, by sector.[14] These data indicate that there are large differences in the importance of nonnational enterprises across service sectors.

In terms of their share of turnover, nonnational enterprises are particularly important, for example, in the wholesale trade, especially for the wholesale of non-food and non-household goods. For this latter sub-category, non-EU enterprises have a far greater share of turnover than EU enterprises, which account for only a third of turnover of all nonnational enterprises. A number of "knowledge intensive" service sectors, such as computer and related activities, advertising and architectural, engineering and technical testing services, exhibit a relatively large commercial presence of nonnational companies.[15]

Generally, shares of nonnational enterprises in the services sector in employment are positively correlated with shares in turnover, albeit the importance of nonnational enterprises in employment is generally lower than for turnover. There are some exceptions to this general rule, especially in the case of sectors where the share of nonnational enterprises in turnover is considerably greater than their share of employment. This is true, for example, in the motor trade, auxiliary transport and several other business services. This would tend to suggest that nonnational enterprises in these sectors have, on average, higher productivity and/or are active in higher value segments than national enterprises.

Table 5.9 provides an indication of the importance of trade in services to overall economic activity in services sectors in the EU.[16] For the purpose of measuring activity in service sectors, data on turnover have been used. This choice avoids some of the inherent problems associated with the use of production values for service activities. As more recent comparable data for turnover is unavailable, 1996 has been chosen as a base year.

The ratio of total exports to turnover provides a very approximate measure of the share of EU production of services that is traded.[17] With the exception of a few sectors, the figures do not exceed 10% and the same is true for imports. This finding tends to confirm the *a priori* expectation that conventional trade for most service activities is low relative to production.

To the extent that it is possible to make comparisons between Table 5.8 and Table 5.9, it is interesting to contrast the share of nonnational enterprises in turnover by sector and the ratio of imports of services to turnover. For sectors such as computer activities, renting of machinery and equipment and other business services (such as legal, architectural, and advertising services), imports as a share of turnover are generally revealed to be less important than the share of turnover of nonnational enterprises. This provides cautious support for the *a priori* expectation that commercial presence is a more

14 FATS on inward commercial presence are available on the basis of pilot studies covering a limited number of Member States; in Table 5.8 data are reported only where available from at least four Member States.

15 More recent information published by Eurostat (2000) for five Member States (Denmark, Finland, Sweden, the United Kingdom and the Netherlands) covering 1996, confirms the finding of the importance of foreign affiliates in the wholesale sector, in computer and related activities and in advertising.

16 The calculations are based on data only for those Member States where values for both turnover and trade are available. The sum of intra- and extra-EU figures do not necessarily equal those for total trade, due to differences in coverage of Member States.

17 These data are drawn from a variety of sources and are typically drawn from enterprise surveys; they are based on concepts and measurement methodologies that differ from those used for national accounts and balance of payments data. For these reasons, the ratios of trade to turnover presented here should be treated only as indicative of relative magnitudes and not as accurate estimates.

Table 5.8 Share of turnover and employment of nonnationally owned or controlled enterprises, 1994, 1995

NACE Rev.1 Activity code	Description	Share of nonnational enterprises (%)		Share of EU enterprises in total nonnational enterprises (%)		Countries covered
		Turnover	Employment	Turnover	Employment	
50 + 52	Retail and motor trades	11.1	6.3	59.7	51.5	DK, F, IRL, I, NL, S, UK
50	Motor trade; retail sale of automotive fuels	19.7	8.0	62.5	53.9	F, I, NL, S, UK
501 to 504	Motor trade	20.0	9.5			NL, S, FIN, UK
505	Retail sale of automotive fuels	5.9	8.7			NL, S, FIN, UK
52	Retail trade (except motor trade); repair of personal and household goods	6.8	5.8	53.6	47.9	F, IRL, I, NL, S, UK
51	Wholesale trade	25.1	18.3	39.2	51.8	DK, F, IRL, I, NL, S, UK
51 excl. 513 and 514	Wholesale trade except of food and household goods	28.4	18.2	32.7	51.3	DK, F, NL, FIN, S, UK
513 + 514	Wholesale trade of food and household goods	17.3	17.1	51.8	53.3	DK, F, FIN, S, UK
55	Hotels and restaurants	6.0	5.1	45.4	54.4	DK, E, NL, S, UK
63	Auxiliary transport activities; travel agencies	33.2	12.0	32.1	49.5	DK[a], NL, FIN, S, UK
71	Renting of machinery and equipment	18.6	16.6	49.4	30.5	E, NL, S, UK
72	Computer and related activities	21.4	18.1	42.2	35.8	DK[a], E, NL, S, UK
742 + 743	Architectural and engineering activities; technical testing and analysis	20.6	9.2			DK, NL, S, UK
744	Advertising	21.8	12.3	41.5	29.8	DK[a], E, NL, FIN, S, UK
746 + 747	Investigation and security activities; industrial cleaning	9.5	7.9			E (747 only)[a], NL, S, UK
748	Miscellaneous business activities n.e.c.	16.1	3.8			DK, NL, S, UK

Notes:
Due to the use of different reference years, different country groupings and the combination of various concepts and populations these statistics should only be taken as a rough indication of foreign ownership in the sectors. Data for the Netherlands is restricted to the largest 500 enterprise groups. Data for Italy and Ireland are, respectively, for companies with over 50 and 30 persons employed. Data use the ultimate beneficial owner (UBO) concept, except for Spain, the Netherlands and Ireland, where an immediate owner or first shot concept is used.
a Not included in the calculation of the split between intra and extra-EU shares.
Source: NEI calculations using EUROSTAT.

important mode for undertaking international transactions for these services than is conventional trade.

The distribution of the number of M&A by sector and type for the periods 1993-1995 and 1996-1998 shows that the share of national operations in the number of total operations has declined for most sectors. Also, for a few sectors this has been accompanied by a decline in the share of Community operations, notably for advertising, insurance and research and development. Figure 5.5 provides a description of the "orientation" of M&A operations for sectors based on the data for the period 1996-1998.[18]

Air transport and wholesale distribution are found to have both a high share of cross-border operations and, within these, a high share of Community operations. This would tend to indicate that internation-

18 Although the data refer to the number and not the value of transactions they do provide some indication of the relative importance across sectors of the different forms of cross-border M&A operations.

Table 5.9 Trade in services relative to turnover, 1996, percentage points

	Intra-EU		Extra-EU		Total trade	
	Exports	Imports	Exports	Imports	Exports	Imports
Mercantile and other trade-related services[a]	6.0	7.6	6.7	5.5	13.6	14.7
Transportation	10.4	10.8	10.6	10.7	20.6	21.1
Other transport[b]	4.5	3.7	1.6	1.5	5.8	5.1
Sea transport	55.2	66.8	62.3	74.9	112.3	132.9
Air transport	21.4	23.7	31.1	29.9	51.8	53.2
Communications services	1.8	1.8	1.9	2.1	3.6	3.9
Financial services[c]	0.7	0.5	0.7	0.3	1.4	0.8
Insurance services[d]	0.7	0.9	1.1	0.5	1.8	1.4
Computer and information services	3.6	3.2	3.1	2.6	6.4	5.8
Operational leasing services[e]	2.4	3.1	1.8	2.1	4.6	5.4
Research and development services	45.5	35.9	26.0	24.3	66.4	56.7
Other business services	2.7	3.2	2.0	2.0	4.8	5.4
Legal, accounting, management and public relations services	1.3	2.2	1.1	1.9	2.4	4.2
Architectural, engineering and other technical consultancy	4.9	5.8	4.3	3.2	8.8	8.9
Advertising, market research and public opinion polling	3.8	5.7	1.3	3.5	5.1	9.4
Other miscellaneous business, professional and technical services	3.1	1.6	2.7	1.1	5.9	3.1

Notes:
In general, for total trade figures and for the major categories the data cover all Member States with the exception of Greece. For mercantile and other trade-related services, research and development, as well as many of the sub-categories of other business services, the calculations exclude Spain, the Netherlands, Austria and the UK. For transport sub-categories, the calculations exclude Germany and Spain for sea transport and other transport, and Belgium/Luxembourg and the Netherlands for air transport. Finally, for the breakdown between intra- and extra-EU trade, no data are available for Ireland and Sweden.
a Turnover relates to wholesale on a fee or contract basis (Nace 511).
b Turnover relates to land transport (Nace 60) and support and auxiliary services (Nace 63).
c Turnover relates to interest and commissions received.
d Turnover relates to gross premiums written.
e Turnover relates to renting of machinery and equipment without an operator (Nace 71).
Source: NEI calculations using NewCronos (SBS), EUROSTAT.

Figure 5.5 Orientation of cross-border M&A for EU services sectors

		Share of cross-border operations in total operations (1996-98)		
		High	Medium	Low
Share of international operations in total cross-border operations	High	Advertising Sea transport Research and development		Legal services Accountants, auditors and tax experts
	Medium	Communication services Insurance Other business activities	Supporting transport services Banking and finance	Hotels and catering Recreational and cultural services Real estate
	Low	Air transport Wholesale distribution	Domestic retail distribution Repairs of personal and household goods Renting of moveables Inland transport Other transport and storage	Retail distribution of motor vehicles and fuel Other retail distribution

Source: NEI using AMDATA.

alisation is important for these sectors but, at the same time, restructuring is currently focussed on the integration of markets within the EU, rather than being more outwardly orientated. To a lesser extent, the same is true for other distribution activities in the retail segment (domestic retail distribution, repairs, renting of moveables). Extra-EU international operations appear to be most important for advertising, sea transport and research and development. International M&A operations are also important for legal services and accounting and related services, although cross-border operations, overall, account for only a low proportion of total operations.

In the period 1996-1998 and in most sectors, EU companies have been more important, in numbers, as a target than as a bidder for international (i.e. extra-EU) operations. Exceptions are domestic retail distribution, transport support services, banking and finance and insurance. This indicates that, on the whole, non-EU companies have expanded their presence in European markets more rapidly than European companies expanded their presence outside Europe.[19] Nevertheless, the large net-outflow of investment capital from the EU over the past year and a half suggests the possibility of a shift in this pattern.

19 This is particularly the case for real estate, accounting and auditing, air transport, research and development and retail distribution (except domestic retail) and repairs.

20 In this section we discuss the sector financial services, which can be split into insurance services and other financial services. Other financial services include non-insurance services (financial intermediation and auxiliary services) provided by banks, stock exchanges, factoring enterprises, credit-card enterprises, etc.

6. Selected sectors

Financial services (including insurance)

The financial services[20] sector accounts for roughly two-fifths of total services FDI stocks and for a similar proportion of FDI flows (see Table 5.10 and 5.11). The strong presence of EU insurers in markets outside the EU relative to that of non-EU companies within the EU is reflected by a positive net extra-EU FDI stock (i.e. assets less liabilities) of over 33 billion Euro. Although Eurostat estimates indicate a large disinvestment for the insurance sector in 1998, this is counter to previous years for which the data indicates a strengthening of the position of EU companies in markets outside the EU. By contrast, net FDI stocks for the financial services were negative in 1997 reflecting the importance of EU financial markets for companies from outside the EU.

By comparison to its overall importance in FDI, the share of financial services in total services trade is small, at around 6 percent of total services trade, but nonetheless far from insignificant (the financial services sector contributed a net surplus of 8.8 billion Euro in 1998). When compared to indicators of overall business conducted in the sector, international trade in financial services also appears to account for only a small proportion of total activities relative to many other services sectors. This would tend to indicate that trade in financial service is much less important than commercial presence for the internationalisation of the sector and accords

Table 5.10 Trade and FDI in insurance services

	Trade		FDI flows		FDI stocks[a]	
	Extra-EU	Intra-EU	Extra-EU	Intra-EU	Extra-EU	Intra-EU
Value 1998 (Euro bn.)						
Credits[b]	5.8	4.4	-8.6	18.5	52.7	50.0
Debits[c]	3.2	6.3	1.8	0.9	19.1	24.7
Share of Total Services[d]						
1996 –1998 (%)						
Credits	3.0	1.8	2.8	11.9	17.4	12.7
Debits	1.7	2.5	5.1	1.7	6.9	6.6
Growth rate 1996-1998 (%)[e]						
Credits	6.5	-1.0	10.8	42.1	-	-
Debits	17.2	2.6	51.0	10.8	-	-

Notes:
a FDI stocks in 1997.
b Credits: exports, FDI outflows, stock of FDI assets.
c Debits: imports, FDI inflows, stock of FDI liabilities.
d Excluding royalties and licence fees, and government services n.i.e. for trade.
e Growth rates for export and imports are calculated as the annual average growth rate for 1995-1998. Growth rates for FDI are given by the expansion rates, calculated as the sum of flows for 1996-98 as a share of FDI stocks in 1996.
Source: NEI calculations using NewCronos, EUROSTAT.

Table 5.11 Trade and FDI in banking services

	Trade		FDI flows		FDI stocks[a]	
	Extra-EU	Intra-EU	Extra-EU	Intra-EU	Extra-EU	Intra-EU
Value 1998 (Euro bn.)						
Credits[b]	12.0	12.5	37.2	30.6	74.6	129.7
Debits[c]	5.7	7.5	22.1	23.5	90.9	79.5
Share of Total Services[d] 1996 –1998 (%)						
Credits	5.4	4.7	39.6	34.1	24.6	32.8
Debits	2.9	3.0	33.0	24.2	32.7	21.3
Growth rate 1996-1998 (%)[e]						
Credits	14.2	12.9	96.6	44.8	-	-
Debits	9.3	6.8	40.8	44.2	-	-

Notes: see notes in Table 5.10.

Source: NEI calculations, using NewCronos, EUROSTAT.

with *a priori* presumptions relating, for example, to the high degree of producer-consumer interaction in some segments, the need to acquire country-specific information, security reasons and regulatory issues.

Growth rates for trade and, to a lesser extent, FDI indicate a relatively subdued development of intra-EU transactions in the insurance sector. The situation with regard to extra-EU imports and FDI inflows is more dynamic – a possible indication that more open European insurance markets are becoming increasingly attractive to non-EU providers. For the other financial services category, the expansion of extra-EU exports and outflows is proceeding more rapidly than that of inward transactions. This is also the case when comparing extra-EU versus intra-EU outflows. Mergers and acquisitions operations further suggest an increasing importance for the outward international dimension of the financial services sector. Over the last decade, the share of cross-border operations in total mergers and acquisitions operations involving EU companies in the financial services sector has increased significantly. This increase is largely attributable to an increasing number of operations where an EU company is the bidder for a company from outside the EU but there has also been a less pronounced increase in the number of such operations where an EU company is the target. Merger activity and other FDI underlie the significant increase in the size of the largest EU firms that has been seen over the last decade, with some EU firms now ranked among the world leaders in the industry (e.g. AXA (F), Allianz (D), ING/BBL (NL)).

Increased internationalisation of the financial services sector is an expected outcome of regulatory reform in the financial services sector that has, in principle, increased the possibility of establishment of foreign bank subsidiaries and other financial institutions in a number of countries. Moreover, advances in information technology increase the possibilities of providing new and more efficient services in the sector, leading some commentators to speak of a "virtual banking revolution".[21] These technological changes also increase the possibilities of remote transactions and thus of cross-border trade. However, despite regulatory reform, the financial services sector remains one of the most heavily regulated services sectors, especially since "re-regulation" has brought about stronger prudential and transparency rules and competition policy.

Telecommunications services

Stimulated by the liberalisation of telecommunications markets and rapidly growing demand for international services, growth in international trade and FDI reflects the underlying dynamism of the telecommunications sector (see Table 5.12). It is the second fastest growing sector for EU trade, after computer services, and the leading sector in terms of the expansion of FDI, most notably for foreign investments by EU companies outside of the EU. The expansion of FDI reflects both regulatory reforms that have dismantled the previously protected positions of (mainly state owned) national monopolies and the impact of new technologies that have made

21 WTO (1998).

Table 5.12 Trade and FDI in telecommunication services

	Trade*		FDI flows		FDI stocks[a]	
	Extra-EU	Intra-EU	Extra-EU	Intra-EU	Extra-EU	Intra-EU
Value 1998 (Euro bn.)						
Credits[b]	4.2	4.8	5.1	1.6	4.4	4.8
Debits[c]	5.4	5.7	4.4	3.2	3.1	7.1
Share of Total Services[d] 1996 –1998 (%)						
Credits	1.8	1.7	8.4	3.6	1.5	1.2
Debits	2.4	2.0	5.1	1.7	1.1	1.9
Growth rate 1996-1998 (%)[e]						
Credits	11.3	15.1	561.2	167.5	-	-
Debits	14.9	19.2	209.0	98.4	-	-

Notes: see notes in Table 5.10.

* All communication services, i.e. including postal and courier services.

Source: NEI calculations, using NewCronos, EUROSTAT.

it possible to deliver telecommunications without using fixed networks.

The above factors have led to a dramatic rise in the number of mergers and acquisition operations in the sector involving EU companies. Over recent years the majority of operations have been international and, of these, around 60 percent have involved companies from outside the EU. This activity reflects the increasing struggle of companies to become major players at the world level. Incumbent suppliers, which remain the major players on the EU market, have started to buy-up or acquire significant holdings in companies in countries other than their home market (e.g. the acquisition of One2one (UK) and SIRIS (F) by Deutsche Telecom (D); Airtouch (US) and Mannesmann (D) by Vodaphone (UK); Orange (UK) by France Telecom (F)). Although there has not as yet been a merger between incumbents from the bigger Member States, a movement between smaller ones has started (e.g. Telenor (NO) and Telia (S); and the now aborted talks between Telefonica (E) and KPN (NL)). Against the background of regulatory change, fast growing demand, and rapidly changing technology, the high level of M&A activity, combined with the search for strategic partners, can be expected to continue.

The rapidity with which the market dominance of incumbent national suppliers has been eroded in the telecommunications sector illustrates the impact that deregulation and the creation of a competitive environment can have in fast growing markets. Ten years ago, monopoly structures were the norm in most communications markets in EU and other developed countries. Full infrastructure and service competition is now the general rule in Member States' national markets; at the end of 1998 only Greece and Portugal maintained monopolies in some areas. Even so, limitations on foreign ownership exist in some Member States, with governments holding "golden shares" or similar provisions to ensure that the dominant operator does not come under the control of a single investor (foreign or domestic).

Computer and information services

Computer and information services[22] represent the fastest growing segment of recorded trade in services. It should be noted, moreover, that data on trade flows significantly underestimates the importance of international transactions of both embodied and non-embodied computer and information services.[23]

In recent years there has been an exceptional expansion rate of extra-EU FDI by EU companies; in 1998, over 90 percent of recorded FDI originating from the EU went to regions outside the EU. Despite this increase, the value of holdings of FDI assets by non-EU companies within the EU (i.e. EU liabilities) exceed assets held by EU companies outside the EU (see Table 5.13).

22 Trade data on computer services covers: computer consultancy, management, design and programming, customised software, maintenance and technical support, etc. Information services covers database services, online data dissemination and via magnetic media, news agency services, etc.

23 Cross border transactions of embodied computer services (e.g. software supplied on CD-ROM, diskettes etc.) are valued according to the physical support and not the content; trade statistics do not measure the value of copyrighted works sold in foreign markets; trade statistics do not measure the value of software electronically transmitted and subsequently sold by foreign affiliates (OECD, 2000). For example, US exports of computer and information services (i.e. excluding software) amounted to USD 3 billion in 1997 but this may be compared to sales of USD 28 billion by affiliates of US companies in 1996, a substantial part (around three-quarters) made within Europe.

Table 5.13 Trade and FDI in computer and related services

	Trade		FDI flows		FDI stocks	
	Extra-EU	Intra-EU	Extra-EU	Intra-EU	Extra-EU	Intra-EU
Value 1998 (Euro bn.)						
Credits	5.7	6.0	2.8	0.2	2.3	3.7
Debits	4.3	6.2	1.1	0.5	2.7	2.7
Share of Total Services[1] 1996 –1998 (%)						
Credits	2.2	2.0	2.6	0.7	0.8	1.0
Debits	1.9	2.1	1.6	0.6	1.0	0.7
Growth rate 1996-1998 (%)[1]						
Credits	24.4	23.4	649.9	82.0	-	-
Debits	9.3	21.1	65.2	86.3	-	-

Notes: see notes in Table 5.10.
Source: NEI calculations, using NewCronos, EUROSTAT.

The situation for FDI, which is increasingly "outwardly" orientated, contrasts with data on trade that shows an increasing share of EU trade (imports) of computer services is being sourced within the EU. However, production by affiliates of non-EU companies located within the EU may partly explaining the apparent increase in the share of intra-EU imports in total EU imports of computer and information services. It may well be the case that these affiliates are producing services for the EU market rather than purely local (i.e. Member State) markets and hence generating additional intra-EU trade. In this respect, the computer and information services sector within the EU appears to be characterised by a relatively large commercial presence of foreign companies. Data on nonnational enterprises (FATS) indicate that foreign affiliates account for around 20 percent of turnover and employment within the EU, of which maybe about a half is accounted for by non-EU enterprises (see Table 5.8).

The increasing importance of the Internet is leading in a shift towards services by IT hardware and telecommunications companies and some of the large media groups that are also entering the market. Consequently, the typically small IT service companies potentially face greatly increased competition from these much larger rivals. Restructuring has led to increasing M&A activity, especially by hardware companies eager to buy-up innovative firms providing Web-based or e-business services. However, the value of M&A activity involving firms from the computer services sector remains low when compared to other IT-related segments.

Finally, it should be mentioned that international alliances are an increasingly common feature of the computer services sector, especially where software providers seek out systems integrators, software developers, consultants and Internet or other on-line service providers. Here analogies can be drawn between manufacturing companies' relationships with R&D providers (i.e. for software development) and wholesaling or complementary distribution mechanisms (e.g. systems integrators, consultants, on-line service providers). Alliances of these types reflect the essential importance that proximity to the customer still retains the computer services sector, as is also the case with foreign affiliates.

Research and Development Services[24]

The internationalisation of R&D activities is a key component of the process of globalisation and is reflected in a rising trend, particularly among larger multinational companies, to locate R&D laboratories abroad. At the same time firms are increasingly willing to enter into (international) R&D alliances and co-operation agreements. These developments reflect factors such as the high costs of development, the adoption of international technical standards and the need to access complementary technologies. Internationalisation of R&D services also reflects a broader process of outsourcing of R&D activities, which has stemmed from a variety of factors (e.g. changing organisational focus of companies, lack of resources, increasing specialisation and expertise of R&D services).

For the reasons noted above, one would expected *a priori* the R&D services sector (and the R&D activities of firms classified in other sectors) to be highly

24 The research and development services sector covers the provision of basic and applied research, experimental development of new products and processes, and the development of operating systems that represent technological advances.

Table 5.14 Trade and FDI in research and development services

	Trade		FDI flows		FDI stocks[a]	
	Extra-EU	Intra-EU	Extra-EU	Intra-EU	Extra-EU	Intra-EU
Value 1998 (Euro bn.)						
Credits[b]	6.1	6.7	0.0	0.1	0.5	0.9
Debits[c]	4.3	7.8	0.4	0.2	1.1	0.3
Share of Total Services[d] 1996 –1998 (%)						
Credits	2.5	2.6	0.2	0.2	0.2	0.2
Debits	1.9	3.0	1.0	0.2	0.4	0.1
Growth rate 1996-1998 (%)[e]						
Credits	27.4	8.7	44.9	76.4	-	-
Debits	28.6	9.7	164.4	92.6	-	-

Notes: see notes in Table 5.10.
Source: NEI calculations, using NewCronos, EUROSTAT.

internationalised in terms of both foreign direct investment and intensity of trade. The use of FDI (and trade) is one reason why relatively small industrialised countries (e.g. Sweden, Switzerland, Finland and the Netherlands) are able to place themselves among the most R&D intensive countries in the world.

Both the importance of trade relative to the level of activity of the R&D services sector and overall levels of FDI in R&D are, however, difficult to evaluate on the basis of conventional trade and FDI statistics. Data inconsistencies may lead, on the one hand, to the importance of trade in R&D services relative to R&D effort to be overstated and, on the other hand, to the importance of FDI to be understated.[25]

What the data do indicate is that trade in R&D services is one of the fastest growing segments of overall EU trade in services, particularly for extra-EU transactions (see Table 5.14). This points to an increasingly outward geographical orientation for the sector. Even though, at around one-third of total imports of R&D services, the share of extra-EU imports is relatively low when compared to many other services sectors, this share has been increasing. At the same time, the share of extra-EU exports has reached nearly half of total EU exports of R&D services. Net extra-EU FDI flows and stocks are both negative, indicating that foreign non-EU companies are investing more in EU R&D services markets than EU companies are investing outside the EU. This points to the attractiveness to non-EU investors of the EU R&D services sector. This is supported by mergers and acquisition data that indicate a marked increase over recent years in the number of operations where EU companies have been the target for bids from companies from outside the EU, although the overall number of operations in this sector is relatively small.

25 Typically only firms and organisations whose primary activity is in R&D services are covered by enterprises data of economic indicators for the sector, thus significantly underestimating the overall value of R&D activities. By contrast, trade data on R&D services include trade between firms whose pricipal activity is not in R&D. Consequently, trade in R&D services appears to be very high when compared to the size of the R&D services sector. Conversely, data for FDI in R&D services only cover transactions where, according to its principal activity, the direct investment enterprise (i.e. the enterprise into which an investment is made) is classified within the R&D services sector.

7. Summary

This chapter provides a description of international transactions in market service sectors.

The theoretical discussion of the internationalisation of service activities stresses the importance of commercial presence as a means of undertaking international trade in services. Indeed data show that:

- Conventional trade is less important for services than for goods, while FDI is more important for services than for manufacturing.
- FDI in services is expanding more rapidly than conventional trade and both are increasing faster than GDP.
- Compared to conventional trade in goods and FDI in manufacturing, services are growing more quickly and, in particular, the share of services in total FDI flows and positions is increasing substantially.

These findings point to an increasing internationalisation of European services, with commercial presence becoming the preferred mode of international expansion.

Concerning the importance of European integration relative to the integration of Europe in world-wide service markets (intra-EU versus extra-EU), data on trade and FDI convey a mixed message:

- Data on conventional trade show that the share of services in total intra-EU trade has changed little during the 1990s, and the share of intra-EU trade in total services trade (both imports and exports) has been fairly stable.

Thus, although trade in services is growing, the Internal Market does not seem to have resulted in faster growth of services than goods or in higher service trade growth within the EU than with the rest of the world.

- By contrast, the share of services in total intra-EU FDI inflows has risen considerably, showing that commercial presence in services within the EU is expanding more rapidly than in other sectors.

This is an encouraging sign of service integration within Europe, since commercial presence is a potentially more important component of integration in services than in goods producing sectors.

- At the same time, data point to an increasingly outward orientation of European FDI, with the share of intra-EU outflows in total services outflows declining from three quarters to a half between 1992 and 1998 and the share of intra-EU inflows in total services inflows remaining fairly stable.

Thus, although integration of EU service markets through FDI is growing rapidly, there is an increasing emphasis on investment outside the EU by European investors.

Concerning the geographical composition of extra-EU transactions, the US is undoubtedly the most important partner in transactions in services (both inward and outward). On the basis of current trends, this situation looks set to continue in the future. Nonetheless, EU FDI outflows to regions other that the US and EFTA, a traditionally important partner, are the fastest growing regional component of total FDI outflows for services, pointing to an increasingly global dimension in the development of EU services providers.

Analysis of the relative importance of service trade for EU Member States indicates that smaller countries tend to trade more intensively and to have higher ratios of intra-EU trade to total trade.

Overall, the evidence from trade, FDI and M&A data suggests that economies of scale are important for services and, thus, services sectors in smaller countries with correspondingly small domestic markets are more "open" to internationalisation. At the same time, however, service sectors in the larger economies are more outwardly (i.e. extra-EU) orientated. Should the argument that larger economies are more outwardly oriented be true, it could be important for determining the long-term implications of the Internal Market. To the extent that European service markets become integrated and, hence, location within the EU becomes less important for defining a firm's "home" market, the ability of firms from smaller Member States to increase their geographical reach may be enhanced.

Across sectors, patterns of international transactions vary considerably both in terms of modes of supply and in terms of the importance of international activities relative to overall activity levels.

In communication services and computer and information services, conventional trade is growing extremely rapidly, both inside and outside the EU, with the share of intra-EU trade in total trade rising, thus hinting at greater integration of EU services in these sectors.

The wholesale trade sector as well as a number of "knowledge intensive" service sectors (such as computer and related activities, advertising and architectural, engineering and technical testing services) display a relatively large commercial presence of nonnational companies. Air transport and wholesale distribution are found to be sectors with both a high share of cross-border M&A operations and, within these, a high share of Community operations. This indicates that internationalisation is important for these sectors, and that restructuring is currently focussed on the integration of markets within the EU, rather than being more outwardly orientated.

Extra-EU international operations appear most important for advertising, sea transport and research and development. International M&A operations are also important for legal services and accounting and related services, although cross-border operations, overall, account for only a low proportion of total operations.

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Supplement
B2B e-commerce: recent market developments and future challenges

It is in the business to business domain (B2B) that the real e-commerce revolution is happening, in contrast with the business to consumer field (B2C), which may follow a more evolutionary path. B2B is the core of the "e-market", the most important in economic terms, with more than 80% of total e-commerce activities. It is the fastest growing and most rapidly evolving area of e-commerce.

Beyond its direct impact, B2B e-commerce has broad indirect effects that reach far beyond the total amount of trade. B2B impacts company and market structures. It affects the competitiveness of individual firms and of entire sectors of the economy. B2B is changing traditional patterns of economic behaviour and shaping a new business culture. Most importantly, B2B – combined with the Euro – represents a powerful catalyst for the Internal Market.

Therefore, for policy makers, B2B is clearly a strategic area and a clear understanding of B2B is crucial. New challenges are emerging as electronic markets develop. Competitive imbalances may appear between the "offline" and "online" environments, between new and established players. The main policy challenge is to manage the change towards the digital economy.

This supplement gives an account of the recent market developments and discusses the economic and organisational impacts of B2B e-commerce.

1. B2B: concepts and measures

Defining B2B

Multiple definitions of e-commerce exist, none of them fully satisfactory.[1] The same applies to B2B.

- A positive definition is difficult. B2B encompasses a complex and fast evolving set of activities carried out electronically inside companies and between companies. Certainly, B2B is not limited to "electronic transactions" or to "electronic trading" – it also concerns broader structural aspects, both between and within companies.
- A negative definition may be easier. B2B can be described as encompassing all e-commerce activities that do not address either a final individual consumer (B2C) or public authorities (B2G). This is not only a functional difference. It also entails a major difference in legal regime.

In general, legal and regulatory issues are simpler in B2B than in B2C, particularly for cross-border activities. Complex, often contradictory, regulations (e.g. privacy, consumer protection, jurisdiction, commercial communication, and consumption taxes) are hampering the development of global B2C.

In contrast, B2B builds largely on established laws and practices (e.g. private international law, freedom of contract, contractual choice of court, well established and effective arbitration procedures). In B2B, regulatory issues (e.g. electronic contracts) tend to be more straightforward – and less politically sensitive – than when final, individual consumers are involved.

However, borders between B2B and B2C are becoming blurred, as many companies engage

1 "... In a loose sense [e-commerce] means doing business over the Internet, selling goods and services which are delivered offline as well as products which can be "digitised" and delivered online, such as computer software", see OECD (2000b) p. 194.

Box 1 Blurring boundaries, examples

- B2C companies ("e-tailers" such as book distributors or e-supermarkets) almost always engage "upstream" in B2B as they source from other companies.
- Conversely, many manufacturers (e.g. car and pharmaceutical companies in the US) seek to use their e-commerce expertise "downstream" in retail activities to reach the final consumer (implementation of e-commerce, once started, rarely stops at the supply chain).
- Additionally, pivotal wholesaling activities are under pressure both from "above" and from "below". Powerful retailers move up the distribution chain into wholesaling, while manufacturers move down the chain into "new intermediary" or "market maker" position.

simultaneously in a number of different activities. The growing convergence into a continuum of related activities – where B2B merges with B2C into "e-business" – may challenge such differences in legal regimes in the future (see Box 1).

Measuring B2B

According to all estimates, B2B is already big – according to Goldman Sachs (2000) it reached 135.3 billion USD in 1999 and it is growing fast, expected to reach 1304 billion USD in 2002. However, gauging the true size of B2B is fraught with severe measurement problems (see Box 2).

B2B estimates

Even where surveys claim to measure the same indicators, discrepancies occur, ranging from 200% to 500%. However, most surveys agree that B2B will grow exponentially in the next years (see Figures 1 and 2). Some analysts believe that the so-called "e-hype" of excessively optimistic forecasts will soon give way to more realistic expectations based on actual experience in the market.

Nevertheless, the picture is still rather incomplete and sometimes divergent (see Box 3). Opinions differ as to when and where B2B will become the norm. They also vary on who will drive e-commerce

Box 2 Official statistics vs. private sector estimates

There is a lack of official statistics. The US is the only country to have published official figures - and that only for very specific sectors (US Department of Commerce, 2000). In Europe, no official statistics are available yet at Community level.

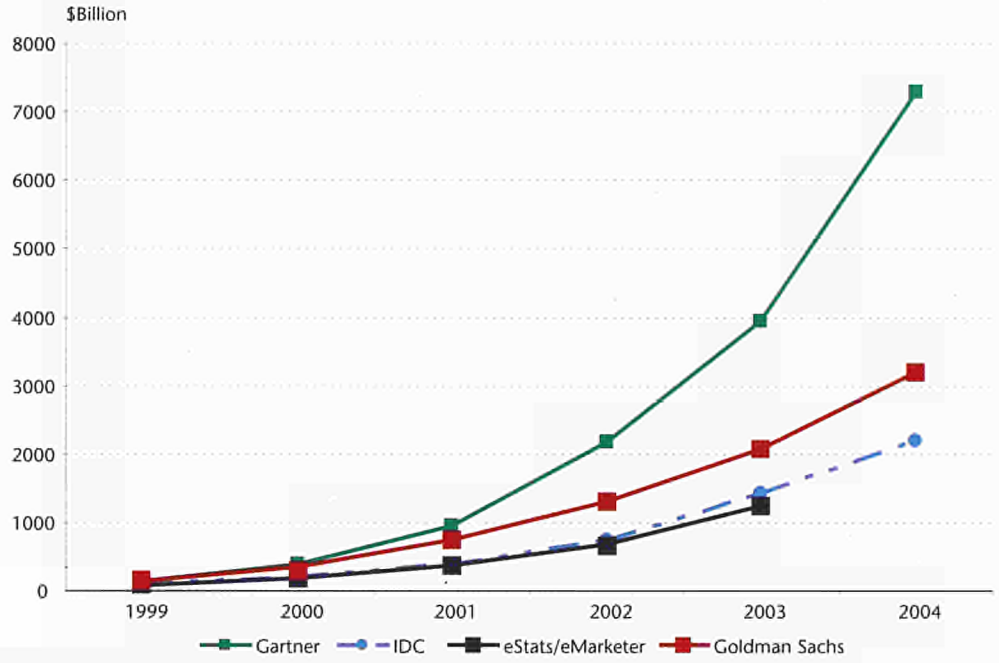
However, a number of OECD Member Countries (US, Canada, Australia, Denmark) are leading the way. These countries are addressing B2B measurement problems either through ad hoc surveys (e.g. Nordic Countries joint e-commerce survey), or by adding specific "new economy" indicators to existing surveys (e.g. small business census in Canada). A model survey, including a set of basic "new economy" indicators, is being developed (see OECD, 2000a). This includes e-readiness as well as e-intensity indicators. The last phase of the proposed OECD methodology concerns the measurement of "impact", which includes measures of the degree of business transformation. The aim of such a model survey, to be adopted by all OECD members, is to ensure international comparability, as well as to assess the specific added value of B2B. OECD-defined indicators are thus forming the basis of recent Eurostat proposals.

Additionally, Member States and the Commission services, in particular DG ENTR, have worked together to develop a normalised questionnaire that can support a harmonised survey of enterprises on e-commerce readiness and intensity at European level. The survey is planned to be carried out during the first quarter of 2001.

Private sector estimates offer a less uniform picture. Their purpose differs from official data collection - they aim at facilitating strategic decisions by companies, rather than assessing long-term trends in support of policy developments. Methodologies differ widely (sample surveys, proprietary modelling), as does the choice of indicators. For instance, Forrester Research measures "transactions in which the final order is placed on the Internet", IDC estimates "transactions initiated on the Internet", Goldman Sachs tracks "transactions which are both initiated and completed on the Internet". Some estimates include Electronic Data Interchange (EDI) thus drastically enlarging the B2B universe; others only measure Internet-only companies.

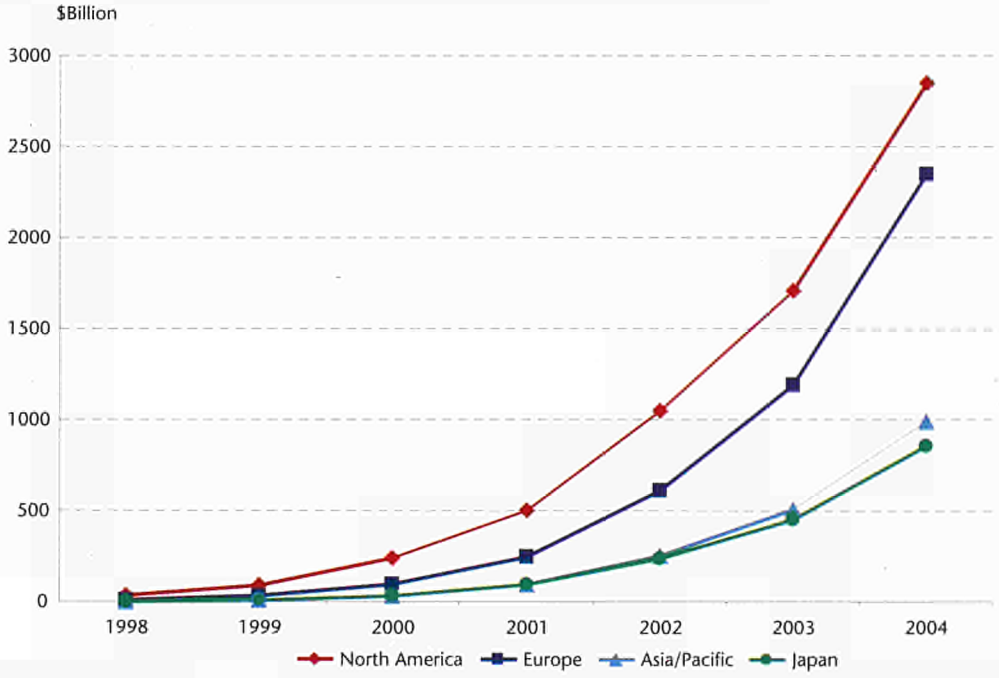
– the dot.com businesses or the "net-enabled" incumbents. In Europe, "old-economy" companies seem to play a much stronger role in this transformation process than in the US.

Figure 1 Business to business e-commerce world revenues



Source: Gartner Group (2000), OECD (2000b) for IDC estimates, eMarketer (2000), Goldman Sachs (2000).

Figure 2 Regional business to business electronic commerce forecast



Source: Gartner Group (2000).

Box 3 B2B, some key trends

- B2B will grow at a compound rate of 92% a year over the period 2000-2003 (OECD,2000b).
- B2B will reach $ 7,000 billion world-wide in 2003 in the US (Forrester, 1999, Gartner, 2000).
- B2B will represent more than 7% of total world GDP in 2003 (OECD, 2000b).
- The relative share of B2B vs. B2C will continue to increase - from 80% in 2000 to 90% in 2003 (IDC, 2000).
- The ratio of B2B to traditional transactions is growing rapidly. However B2B e-commerce will remain a fraction of all business transactions - 19% in the US by 2003, 11% in Japan (OECD, 2000).
- The share of US B2B in world-wide B2B is expected to decline rapidly – from 80% in 2000 to 50% in 2003 (OECD, 2000).
- E-exchanges and e-marketplaces are exploding from 1000 in 2000 to 3000 by 2003 (Gartner); e-market places revenues will grow from 7.5% of world-wide B2B revenues in 2000 to 55% in 2004 (IDC, 2000).
- SMEs still tend to concentrate primarily on B2C. In the US, a large proportion of SMEs (44%) are focusing primarily on the B2C market. Only 24% focus primarily on B2B. The same seems to apply in the European Union.

2. B2B, a contrasted picture: sectoral, geographical and company size

Across countries

The take-up of B2B varies considerably from country to country. In this respect, the sectoral composition of the economy in various Member States may explain the very different dynamics of development of B2B (see Box 4).

2 See US Department of Commerce (2000).

Across sectors

B2B take-up varies also considerably across sectors. In general, take-up is faster in sectors with a strong Electronic Data Interchange (EDI)[2] tradition – e.g. motor vehicles, European retail. It is also increasing faster in industries, which are traditionally information dependent – e.g. ICT and logistics.

Other factors include the presence of a diffuse supply chain (e.g. fishery industries, chemicals), and/or strong technology innovators (e.g. ICT). B2B take-up is also strong in industries where processes represent more than 20% of total costs (e.g. transport), where products exhibit complex configurations (e.g. aerospace), and where expense pressure is intense (e.g. consumer electronics) (see Table 1).

Box 4 B2B take-up, a contrasted geography

- Business use of the Internet reaches very high rates in "leading countries" (Finland, Denmark and the Netherlands) where Internet connectivity reaches "saturation point" (89% and 95% of businesses connected). However, whatever the degree of development, there is a contrast between "Internet connectivity" and the ability to engage in full, end-to-end, e-commerce.
- Other Member States are far less advanced (Italy, Spain, Greece, Portugal). Starting from low use, countries show however important growth differentials.
- There seems to be a direct relation between local access costs and use of Internet (OECD, 2000b).

Table 1 B2B take-up, the leading sectors (% of B2B sales in 2003)

Aerospace	35%
ICT	25%
Chemicals	20%
Automobile vehicles and parts	18%
Medical equipment	17%
Transport	17%

Source: Gartner Group,2000.

Across company size

In B2B, size seems to matter. B2B is taking off faster in large companies than in SMEs – reflecting the fact that larger companies are well placed to exploit economies of scale in logistics, administrative costs, stock management, and marketing. Recent EU-wide polls (see MORI, 2000) indicate that only 66% of SMEs have Internet access as opposed to 76% of large companies. Far fewer SMEs are actually using the Net at this stage to generate sales in one way or another (30% in retailing, 17% in manufacturing). Figures are still smaller for fully-fledged e-commerce – only 6% can carry end-to-end transactions. Figures for the US indicate that 31% of SMEs use the Internet to "source" electronically, and 11% to sell.[3] In general, however, it can be argued that SMEs are likely to experience higher growth than large companies. This, of course, should be qualified by the fact that SMEs are starting from a lower level, and that the whole market is growing very rapidly.

3 See Goldman Sachs (1999).
4 See Goldman Sachs (1999).

3. Assessing the B2B revolution

Though quantitative measurements remain imprecise, qualitative assessments of the B2B revolution are more reliable. The shift in investor interest from B2C to B2B, as well as the growth of new marketplaces, has prompted further analysis both by private consultants and academic institutions. Taken together with earlier assessments of supply chain management and "extended enterprise" phenomena, these studies reveal complex and accelerating structural changes in companies and marketplaces (see Box 5).

From cutting costs to shaping marketplaces

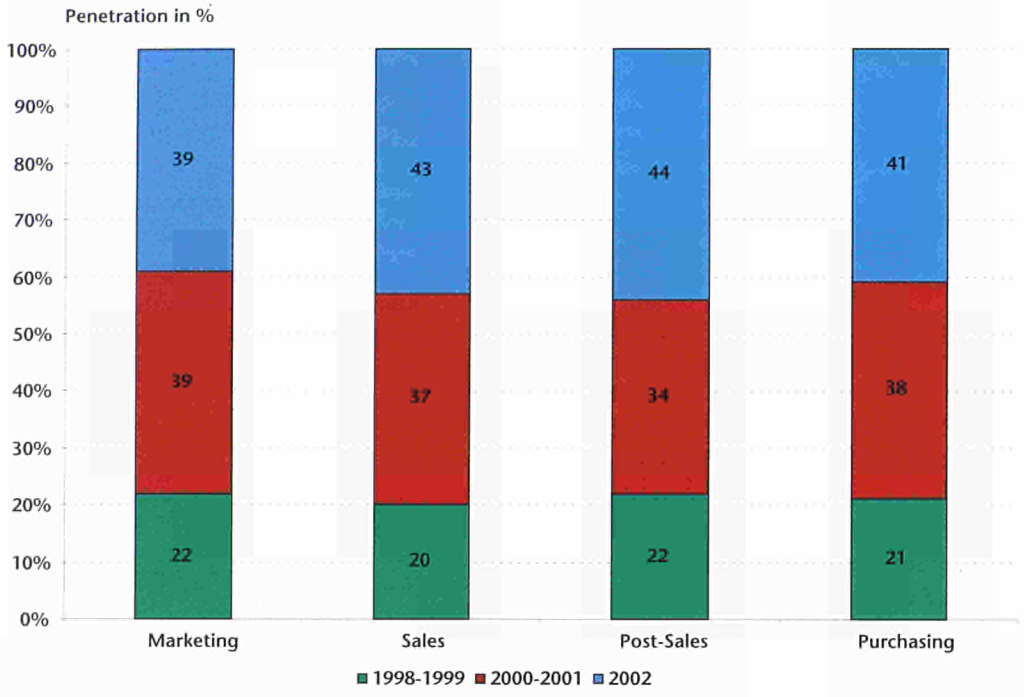
Cutting costs has been a powerful initial driver of B2B. Cost savings represent up to 40% on purchasing and procurement (e.g. 29%-39% in electronic components, 22% in machining/metals).[4] This has a measurable impact on individual companies, and on the economy as a whole. However, the macroeconomic impact of such cost reductions still needs further analysis. These may either result in higher profits or in lower prices – thus channelling growth through different mechanisms and with a different sectoral impact.

The real e-commerce revolution goes beyond cost savings. B2B not only reduces the time it takes to get a product to market; it also speeds up processes, improves quality and ensures better service. In this highly competitive environment, usually characterised by increased price transparency, better execution is often more important in ensuring success

Box 5 B2B revolution, from streamlining the supply chain to building "value constellations"

- From the "first generation" e-commerce model based on "ERP" ("enterprise resource planning"), dominant in the 1980s and early 90s, which is an approach centred on the individual company and concentrating on the internal use of IT to improve productivity and cut costs, B2B evolved to
- The "extended enterprise" model, which is still the rule in many industries. This is a more open but still limited vision of e-commerce where large companies trade with a limited number of known smaller firms (the so-called "hub and spoke" or "one to many" structure of EDI "clubs"). This approach mainly focuses on streamlining the supply chain.
- The "collaborative commerce" model is now emerging in a number of industries. This model is characterised by more fluid and complex relationships, conducted on open global electronic market. It involves potentially large numbers of known and unknown partners. It also entails much more complex processes of information exchange and value creation between partners (e.g. "specificator software" for collaborative design between manufacturer and client). Such multidimensional ("many to many") relationships between suppliers, customers and intermediaries are often described as "value constellations".

Figure 3 When will e-commerce become the norm?



Sources: EITO Report (1999), IDC (2000).

than the advantage of being the first to market a product. The edge goes to firms who are better able to "execute", in particular through more efficient integration of internal ("back end") processes and external ("front end") activities.

From closed to open markets, from linear to multidimensional relationships

The Internet – a "network of networks" based on open, interoperable protocols – represents a fundamental shift from closed, proprietary networks using proprietary protocols (as in EDI) to open global networks. From being a mere conduit, the network is becoming the market.

In short, the evolution is from "basic" e-commerce – with its focus on reducing costs, on control of the supply chain and on trading tangibles – to "full" e-commerce – centred on maximising value, on creative and on proactive strategies and on adding value through service and relationships.

The B2B landscape is rapidly evolving. Very few companies or sectors remain unaffected by the Internet and by new ways of doing business electronically. Very few, however, are Internet-specific companies. Most companies are hybrids – sharing characteristics of both the offline and the online environment.

In fact, the move from "first generation" e-commerce tools and strategies to new forms of "collaborative" B2B can be a challenge for user industries. For example, the integration of business software applications already in use with new e-commerce tools is often a major problem, as is the migration from EDI to Internet systems. The interoperability of technologies and business processes is not always ensured. This evolution is also a challenge for vendors, as "classic" providers of business software and "enterprise solutions" are challenged by new players offering integrated "collaborative commerce" products.

Hybridisation takes other forms too. Traditional "bricks and mortar" companies are aggressively expanding (directly or through new subsidiaries) into e-business. Conversely, "pure" Internet companies are seeking to "materialise" their activities (through the acquisition of warehouses and by setting up high-street stores).

The emergence of B2B will certainly not result in the total disappearance of "traditional" commerce. However, it is clear that B2B may rapidly become the norm for European businesses. This does not mean that all sales of all companies will be done over the Net but it does imply that various Internet tools and processes will rapidly, and irrevocably, find

Box 6 E-exchanges, a heterogeneous environment

- some e-exchanges are traditional exchanges of goods or services moving online (e.g. London Tea Market, Dutch Flower exchange);
- some are new exchanges launched by a number of different players (vendors, user industries, trade associations, public bodies);
- some are "vertical" exchanges, filling the needs of specific sectors (e.g. plastics, chemicals, gold and even wine). In many areas, accelerated diversification into highly specialised markets is taking place (e.g. individual markets for specific chemicals);
- some are "horizontal" platforms set up by vendors to service many different; some are enterprise specific;
- some are neutral platforms among equals; some are set up by dominant industry players;
- some are open; some are closed (by invitation only).

their way into business processes, and will be used by a majority of companies.

"Most businesses believe that e-commerce will become the norm for each of the sales, post-sales, purchasing and marketing functions within three years, i.e. before the end of 2001" (Figure 3).[5]

For many companies, however, this race to embrace e-commerce may lead to failure. Not only is it likely that a number of "dot.com" businesses will fail, but traditional companies will also have to prove that their e-business projects can be successfully delivered.

Impact on inter-enterprise relations: outsourcing and "intangible" assets

B2B not only affects the internal organisation of companies; it has a strong impact on inter-enterprise relations – e.g. subcontracting, supply chain management, procurement, product developments, marketing and distribution.

B2B is accelerating the move to outsourcing, paving the way to innovative, dynamic and flexible forms of inter-enterprise relations. This is reinforced by the emergence of increasingly complex, intangible products (software, services, etc.). In many cases, a company's main asset resides in the value added capability derived from knowledge, services offered and intellectual property rather than machinery and physical inventory. In many sectors (logistics, ICT, services), this shift from tangible to intangible products is driving an evolution from linear, vertical supply chains – organised in a traditional, hierarchical manner – to new networks of interdependent, flexible, competence-based companies. In short, a company's competitiveness depends as much on its own organisation as on the efficiency of its network of customers, suppliers, partners and intermediaries.

Impact on market structures: electronic exchanges

A specific aspect of such new relationships is the fast-growing phenomenon of electronic marketplaces (e-exchanges). Over the past year, more than 1000 such electronic marketplaces were launched and this number is expected to triple until 2003.[6] Exchanges are a highly specific activity, a subset of overall B2B. For many companies, taking part in an exchange is only one of a number of possible, broader e-business strategies (one of the existing channels for sourcing). E-marketplaces establish communities of buyers and sellers, as well as mechanisms that allow business to participate cost-effectively in national and global markets.

E-exchanges: the "small business' ticket to e-commerce"?

For some analysts, electronic marketplaces are the "small business' ticket to B2B e-commerce".[7] According to Goldman Sachs[8], SMEs will be the main drivers of B2B (from 17% of global Internet commerce in 1997 to 30% in 2003). In many areas, SMEs are already key users of such marketplaces. This contrasts sharply with former views that SMEs risk being "trapped" in such networks run by large

5 "Becoming the norm" is defined as follows: "When 50% of organisations in a particular country or industry sector have adopted a new practice and/or new technology, a critical mass can be said to exist for that practice/technology, compelling further adoption by other organisations if they are to remain competitive" (EITO,1999).
6 See Gartner (2000).
7 See IDC (2000).
8 See Goldman Sachs (1999).

companies. Today, the main concern of SMEs is to become an integral part of emerging electronic marketplaces and to avoid being locked out.

Electronic marketplaces take many different forms, with different drivers and different rules (see Box 6). Large players and vendors play a key role. However, there are several common issues that need to be addressed so that SMEs can truly participate in B2B. These include *inter alia*, the establishment of a common system to automate and consolidate the verification process, the provision of efficient and cost-effective conflict resolution and of automated credit management services.

B2B: "net bubble" or "creative destruction"?

It is generally recognised that a number of e-exchanges are doomed to fail. On the one hand, it is clear that in a number of areas, future growth expectations have been too high, leading to the recent correction. On the other, we may be witnessing a process of creative destruction that always occur in dynamic industries.

As in the retail "dot.com" environment, causes for failure include the inability to aggregate a critical mass of users – there may be just too many exchange places for the market to support. Another factor is the lack of a sustainable business model – a variety of revenue models (advertising, subscriptions, transaction fees) are being tested with more or less success. Moreover, the vast majority of these exchanges are centred on classical, "linear" buy/sell/auction models. There are currently only a few examples of advanced collaborative commerce marketplaces.

Therefore, it is likely that the "net bubble" will burst not only in the B2C area, but also in the field of B2B. There will be winners and losers. For vendors, such as B2B software providers, early winners may keep their advantage, while others may disappear. For user industries, and in particular for "traditional" companies, failures may also occur. This is not because the migration to e-business is "wrong" (as many established companies still believe), but because specific business models, strategies and methods of implementing e-business will have failed.

Despite such failures, it is clear that e-business will increase substantially. The question is not if, but when, it will become the norm. The main challenge for enterprise policy is thus to manage the change.

4. Enterprise policy issues

The development of B2B has crucial implications for the EU's enterprise policy. It has a direct impact on a number of key areas, such as competitiveness issues, SME policies and standardisation. The EU's policy has traditionally focused on removing inhibitors and barriers in order to foster a market-driven process. This has been done, primarily, by guaranteeing undistorted competition, preventing anti-competitive market developments, and ensuring the right conditions for entrepreneurship to develop. Consensus building (e.g. through standardisation, or through the promotion of self-regulation and co-regulation) has also played a key role.

In this perspective, a number of new questions and challenges may arise. These concern the impact of B2B on productivity, prices and growth; the means ensuring a broad participation of SMEs in B2B; the role of standardisation in shaping open electronic marketplaces; the development of better synergies between SME policies, research, innovation and standardisation to promote the take-up of B2B and finally how to encourage traditional sectors to embrace fully the new opportunities.

Macroeconomic estimates: an uncertain picture

This is a crucial area for policy makers. Goldman Sachs estimates that cost savings in B2B alone will bring a sustained extra economic growth of 0.25% per annum over the next ten years. If this were true, B2B would have a major impact on growth – a fact that should not be politically ignored. Similarly, the impact of the B2B revolution on job creation and employment is of prime political concern. In short, increases in the use of B2B are likely to provide an additional impetus to economic progress, and may unleash some of the network or scale effects that, so far, have been very difficult to detect in the data.

So far, the analysis is mainly based on the assumption that B2B will lower prices and costs which will stimulate demand, both directly (through price elasticity of demand) and indirectly (through wealth effects). This is the proposed explanation for the combination of full employment, low inflation and rapid growth experienced in the United States[9] as well as in some European countries.

9 See US Department of Commerce (2000).

If this analysis is correct, B2B may, however, induce changes in many areas, such as productivity, investments and savings. The fundamental economic laws of the "new economy" may not differ from those of the industrial age. But the dynamics might change, and the short-term effects might differ from the long-term perspectives.

Thus the challenge is to reliably assess and fully validate the macroeconomic effect of B2B, i.e. its full impact on productivity, growth, job creation, and inflation. Transmission mechanisms are still far from being fully understood. Past difficulties in assessing a narrower phenomenon – the impact of ICT on productivity – foretell future difficulties in assessing far more complex e-business processes. In addition, B2B is still at an early stage so that the macroeconomic impact is difficult to measure.

In the absence of statistical evidence concerning the impact of B2B commerce on growth there is real political interest in benchmarking national policies aimed at stimulating e-business. Although these lack methodological consistency, they seem to be interesting for the assessment of macroeconomic parameters. Further analysis is necessary to explore the validity of these indicators, which in going beyond the traditional ones show a country's readiness for structural change.

SME policy issues

• *B2B: global opportunities, global challenges*

For SMEs, e-commerce represents unprecedented opportunities. With the "death of distance" and the lowering of barriers to entry in global markets, e-commerce allows SMEs to "punch beyond their weight" and, in many cases, successfully take on much larger companies. SMEs are therefore ideally placed, in theory at least, to benefit from the e-commerce revolution, not only in terms of cost savings and improved processes, but also in terms of expanding opportunities.

However, obstacles are well documented: high telecommunication costs, limited bandwidth availability, skill gaps and training challenges, difficult access to finance, administrative obstacles to the creation of companies, legal and regulatory complexities of cross-border trade, lack of recognised brands, need to ensure transaction security, etc. Additionally, in many areas (for example distribution), distance still counts. Proximity is an asset, and SMEs remain crucially dependent on the efficiency of logistics.

The key challenge is to ensure that SMEs fully grasp the opportunities not only of e-commerce in general, but specifically of B2B. At this time, for a number of reasons, B2C seems to be a key preoccupation for the majority of SMEs, both in the US and in Europe. The challenge is to ensure that SMEs become key players in the "main league" of e-commerce – B2B. This is where the money is, and where legal and regulatory hurdles are less daunting, but where fierce commercial competition from global players is at its most intense.

• *Global competition – the ultimate test for entrepreneurship*

At stake is the competitiveness of SMEs. In the B2B environment, only the most competitive companies will succeed. Easier access to global markets is counterbalanced by easier access to home markets by global competitors. Professionalism, quality of management, excellence of products, strength of brands, reliability of supply are the *condicio sine qua non* of success and of survival. What applies in the global markets will also apply at local/national level, where many SMEs will concentrate their activities.

• *"Awareness" and "best practice": reassessing the role of public policy*

In this highly competitive environment, the challenge is no longer to promote "awareness". Most EU entrepreneurs already know about e-commerce and about B2B. Industry itself (vendors, trade associations, consultants) has done its job. The challenge is to see SMEs move beyond the learning phase and put their new found awareness of e-commerce into practice. This is a task in which the industry has a crucial role to play. Generic public campaigns, particularly at EU level, are in general no longer justified. However, targeted public-private initiatives (such as the Syntens initiative in the Netherlands, or the Go Digital initiative under the e-Europe umbrella) may have a role to play. Additionally, while generic awareness campaigns may not be useful, there is a need for targeted regional support, especially in the less favoured regions. Promoting the information society, through packages of specific measures, is one of the priorities of the new programming period of Structural Funds.

- *Building entrepreneurship*

For policy makers, the real challenge is about entrepreneurship. It is to arm and to "steel" European SMEs to help them face the test of global competition. For many companies, taking part in global electronic exchanges is a competitive shock and a true test of entrepreneurship. Policy makers cannot absorb the shock for companies, but can play a catalytic role to help them do the job in a competitive environment.

5. Market access and openness

Competition issues

The development of electronic marketplaces raises important issues for competition policy. Such e-marketplaces, in their different forms, provide SMEs with new and crucial gateways to "go digital" and to access global markets. They create virtual communities of buyers and sellers, potentially on a much broader scale, and with lower access thresholds, than "brick and mortar" equivalents. However, there is also a risk that the development of such marketplaces may lead to competition problems. One is the emergence of new cartels. Illegal coordination between competitors could be facilitated in electronic marketplaces, as information sharing is difficult to detect and as some markets allow competitors to bundle sales on purchase volumes.

Another potential competition policy issue involves the design of an electronic market. The ownership of B2B electronic marketplaces and the rules governing them can raise competition problems, in particular where an online marketplace is controlled by a number of market participants. These owner-participants could then use the rules to exclude certain participants from the most efficient marketplace, thus putting them at a competitive disadvantage. Other risks may include the possibility of monopolising an industry's marketplace. As the value of many marketplaces increases with the number of users, the first successful market may obtain a head-start that makes it difficult for rival marketplaces to develop as competitors.

Competition laws show continued relevance in the fast changing world of B2B. Such laws were enacted to give businesses a level playing field and in particular to ensure buyers' trust in the market's pricing practices. The principles of competition policy (e.g. the methodology to define the relevant market) remain as valid for electronic marketplaces as for their "brick and mortar" equivalents. Also, the competition concerns do not change fundamentally. For example, EU competition law makes it illegal for companies to fix prices, including "rig" bidding, or to agree to divide the market. The task of competition authorities is to determine how those general principles should be applied to the new fact patterns that emerge.

Shaping marketplaces: a challenge for enterprise policy

In the B2B area, standardisation is a key issue. Combined with the Euro, B2B is potentially a powerful driver towards the realisation of the Internal Market. Standardisation is needed to deliver the full potential of B2B. This implies ensuring interoperability, and facilitating the creation of trust and confidence in secure e-commerce solutions.

The issue is not only new deliverables (e.g. workshop agreements, instead of formal standards), but also working methods. Standardisation organisations should evolve from their current role as technical experts to become service providers for consensus building.

Additionally, the use of open access to e-business frameworks by SMEs should be a key factor to encourage new job creation and therefore to meet the Lisbon employment rate targets. Standardisation organisations could play an important role in this, e.g. through quality standards for new Internet services.

Openness: the role of Research and Technology Development

There is currently a large number of Research and Technology development (RTD) projects in the area of B2B. Clustering is frequently used to maximise the impact of such projects. The links between RTD projects and standardisation should be improved with a view to better exploiting the results and bring them into the open environment. Similarly, there is a crucial role for innovation policy to be integrated with both RTD and standardisation.

RTD projects should result in wide dissemination into the public domain. Dissemination of results is a contractual obligation. Indeed, many RTD projects have contributed to standardisation in a number of areas (such as XML, agent technologies, negotiation

protocols). In parallel, participants in RTD projects should be encouraged to become involved in open standardisation *fora*. The selective approach of many RTD projects in the field of B2B platforms can only be justified if they ultimately contribute to openness and fair market access. In general, the objective must be to create a level playing field, not to promote proprietary solutions.

Additionally, European participation in key de facto standardisation initiatives should be concretely encouraged. Many of these initiatives – such as W3C, IETF, Open Group, OMG – have a direct, concrete impact on the market. To ensure the active, strategic participation of European companies and institutions in such *fora* should be an important focus of standardisation policy

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