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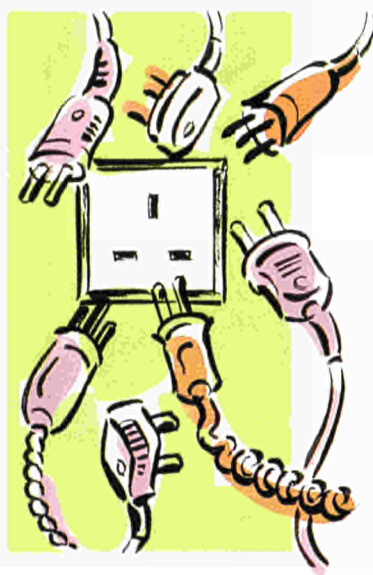
WINTER 1994-5

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The information society: the way ahead

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WINTER 1994-5 (No. 16)



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Editorial

THE EUROPEAN UNION launched the political debate on the liberalization of information infrastructures at the Joint Industry and Telecommunications Council held on 28 September 1994. The Council asked the European Commission to speed up the decision-making process and submit the first part of its Green Paper on the liberalization of infrastructures with all speed. The second part of the document, which is devoted to the means of implementing this liberalization process, was expected in early 1995. The objective was to enable the Council of Ministers to examine the dossier at the earliest opportunity and, if possible, take a decision on the principles governing this liberalization, as well as draw up a timetable for its implementation.

This first step was taken on 17 November, the day on which the Ministers for Telecommunications adopted a resolution providing for the liberalization of all telecommunications infrastructures as of 1 January 1998. Longer deadlines could be invoked by Portugal, Spain, Greece and Ireland (five years) and by Luxemburg (two years). At the same time the Council undertook to adopt a regulatory framework by then, defining a number of common principles, such as universal service, rules governing interconnection, the granting of licences, reciprocal arrangements with third countries and fair conditions of competition between the various networks.

This debate on the liberalization of infrastructures reflects the political will to establish a regulatory framework geared to the new technological and commercial realities of telecommunications. This is enabling economic participants to take the initiatives necessary for achieving the information society.

The process of liberalization does not apply solely to the Union. It is also unfolding in all technologically advanced countries, where it is based on a few simple principles, irrespective of the variety of regulatory mechanisms applying at the start.

Bearing in mind that current trends in the telecommunications sector mean a wide range of new technological innovations and economic operators will enter the market, there is good reason to make sure that the regulatory framework shifts towards greater competition, otherwise progress and the interests of users may be undermined.

Openness to competition is not increasing uniformly or at the same pace the whole world over. In places where the regulatory framework in application makes distinctions based on geographical criteria (eg the United States of America and Canada) long-distance communications were the first ones to be liberalized. Elsewhere, particularly in Europe, it was technological advances – initially in value-added services, followed more recently by the advent of mobile telephony – which led to the first major adaptations of this framework.

Today, technological development has allowed us to glimpse the potential for competitive relations to extend right up to the level of access to the subscriber, as illustrated by the discussions and first multimedia communications facilities offered by public or cable operators.

However, it is not possible to shift from a monopoly to free competition overnight. Indeed, the very fact that former monopoly operators occupy a dominant position at the outset of the liberalization process (especially since they control the network for accessing subscribers) and that only some services have been liberalized while others have not (creating a risk of crossed subsidies), shows there is a clear need for regulatory provisions allowing new competitors to enter the fray. These would create the conditions required for the durable existence of a truly competitive market. Extending this approach even further, it is easy to identify the regulatory steps to be taken. These include provisions to govern the procedures for awarding licences and determining their content; technical and commercial aspects of the system of interconnection; the provision and financing of universal service; comparable and effective access to the markets of third countries, and measures aimed at guaranteeing the development of undistorted competition between traditional and new operators.

However, a clear, fixed timetable must be drawn up, making it possible to free up financial resources and prepare commercially and technically for the considerable investments required to develop new infrastructures.

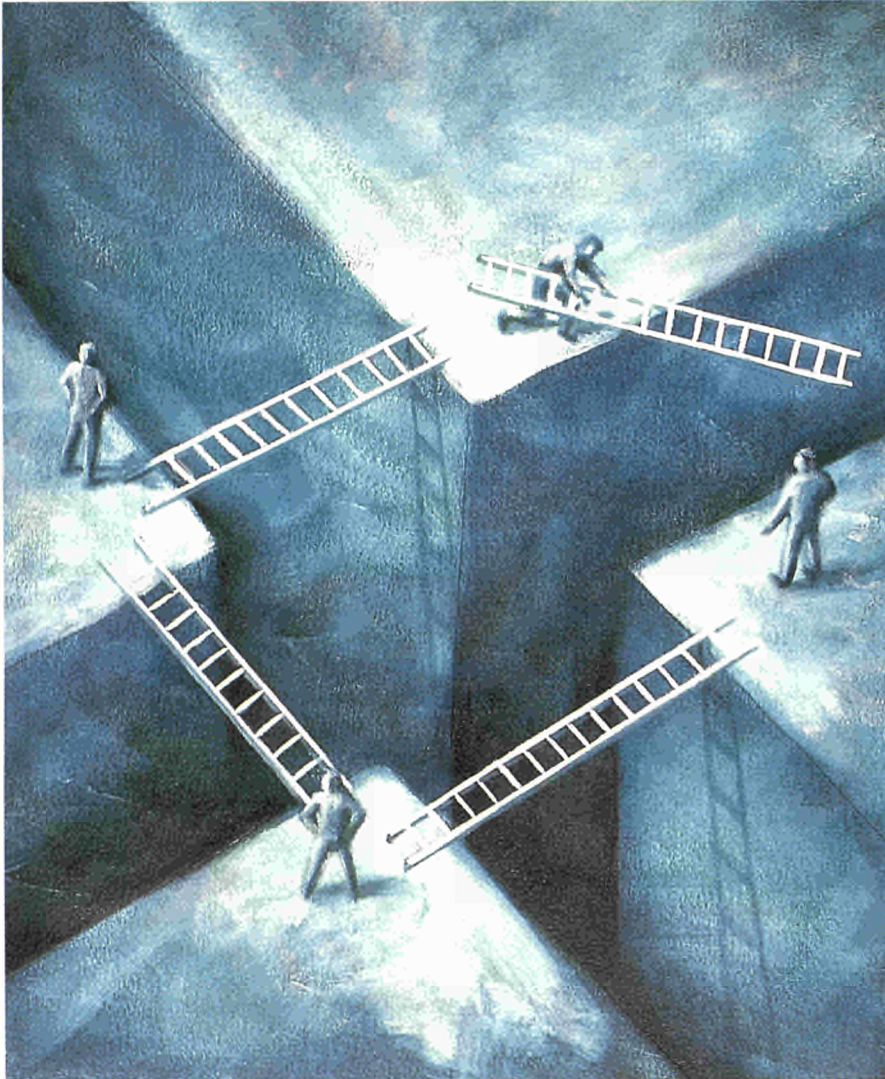
Only when these regulatory conditions are fulfilled will the liberalization of infrastructures lead to investments that are rational from the economic point of view. In fact, the new actors will only invest in competing infrastructures when they can appreciate the opportunities for interconnection to the existing infrastructure. Consequently, the regulatory provisions aim to create the best possible economic conditions for competitors to enter the market while at the same time avoiding both over- and under-investment.

These regulated competitive provisions also serve as key references for the traditional public operators, showing them that the *terminus ad quem* is a fully competitive market and that their economic survival will depend on their efficiency. Although the regulatory framework aims to enable the potential entry to the market of new competitors, it is equally indicative of the fact that the efficiency of any operator will limit the number of such entries. The regulatory provisions will also impose certain obligations on all the actors, whereas today they only weigh on public operators (universal service).

The adaptation by public operators (legal status, status of their staff, volume of employment) is a critical phase. Passing from a monopolistic to a competitive framework necessarily involves a transfer of wealth to the benefit of users (lower prices). Nonetheless, far from being saturated, the communications sector is expanding, and competition and lower prices will create the conditions required for the global development of services which are fundamental to the establishment of the information society. In this context the relative position of each key player will depend in the last analysis on his efficiency. ■

Michel Carpentier DG XIII

International relations and the information society



UTOPIAN VISIONS of better ways of living and working in the society of the future, through new, user-friendly and affordable information technology, are on the threshold of becoming reality, thanks to the rapid pace at which the information society is developing. However, without international regulation, standards and agreements to channel that development, Europe, America and South-East Asia will each go their separate ways and end up with incompatible regional-based information systems, and the vision will remain merely a dream.

International regulations to protect the user are also going to prove important if consumers are going to teleshop cross-border, or if firms are to sell patented goods by computer securely. Moreover, telecommunication and computer component manufacturers will need to have free and fair access to world markets to ensure healthy levels of competition and affordable prices for all users.

Getting international agreement

These are concerns which governments in the industrialised world recognise and are trying to respond to through international agreement. In February 1995 the Group of Seven (G7) of the world's most industrialised nations meets in Brussels to consider the information boom, while continuing negotiations under the General Agreement on Tariffs and Trade (GATT) are geared towards extending current international free trade rules to telecommunications. GATT negotiations are due to conclude in April 1996 and mainly focus on market access and national treatment.

The European Commission will use the G7 talks as an opportunity to press home the need to make information infrastructures as widely available and interoperable as possible, not just between different national systems but also between various types of communication modes – mobile and fixed, satellite and cable.

Commission officials will argue that a bigger network will be far more valuable as it allows more people worldwide to link up into a "network of networks." Globalization is essential to this aim and depends on the different systems being interconnected and open to the outside – so-called open network provision (ONP) or open access. Such interoperability hinges on common standards and international cooperation.

In July 1994 at the G7 summit in Naples, US President Clinton put forward a series of proposals for a Global Information Infrastructure (GII) which urged governments to promote competition. Clinton claimed this would accelerate investment in infrastructure and encourage development of common standards, which in turn would ensure the interoperability and interconnection essential if the GI is to be truly global. The proposals suggested that global applications could be developed through international cooperation in two specific areas, namely a global digital library (GLOBE), creating a worldwide student network, and telemedicine, which would link teaching hospitals worldwide.

The most concrete plan, which like the other proposals won European Commission support, was to establish a G7 Forum composed of the US, EU, Japan and Canada, and starting with a US-hosted conference for Ministers for Telecommunications and Information Technology which Clinton hoped could take place at the end of 1994, beginning of 1995. The Forum would extend current bilateral links and deal with issues of common interest related to GI in what Clinton claimed would be a more efficient and effective way. As mentioned above, this conference is now scheduled to take place in Brussels in February 1995.

The Bangemann Report

In June 1994, just before the G7 talks, European Industry Commissioner Martin Bangemann and colleagues from the High-Level Group on the Information Society presented EU Heads of State at the European Council in Corfu with a far-reaching report calling for Europe to back global networks and recommending ways of moving towards an international information society. The report, "Europe and the global information society,"

urged the EU "to put its faith in market mechanisms as the motive power to carry us into the Information Age."

It said this meant developing a common European regulatory approach to promote a "competitive, Europe-wide market for information services" and put forward a comprehensive action plan that would link the private and public sectors in concrete initiatives.

The report warned that "political attention is too intermittent" and that without urgent action from a private-public partnership, Europe will be left a user rather than a supplier of information services. It pointed out that competitors supplying networks and services are increasingly active in European markets and that if Europe arrives late, domestic suppliers "will lack the commercial muscle to win a share of the enormous global opportunities which lie ahead."

It also highlighted again and again the international nature of the information market. "Given the power and pervasiveness of the technology, this market is global," it said. The Group called for reciprocal access to Europe and other regions of the world and said "it is of paramount importance for Europe that adequate steps are taken to guarantee equal access."

It further recommended EU action to secure European and international regulations protecting intellectual property rights, privacy and security of information.

Green Paper strategies for development

In April 1994 the Commission published a Green Paper on mobile and personal communications called "Towards the Personal Communications Environment" which suggested a strategy for the development of a Europe-wide communications system and market. It showed how with the pan-European digital mobile system GSM, the EU has established a world-leading technology in what it termed a "key area of the future global communications market" and said that the EU now must build on that success. Despite this, it said Europe has yet to find a suitable response to the US-dominated initiatives in satellite-based personal communications.

The Green Paper went on to say that access to third country markets, particularly the US and Japan, is difficult for European manufacturers and operators. While US manufacturers and operators are extremely active in Europe's mobile communications market, European operators are not able to access the US market in a comparable manner due to the US 20%

ownership restriction required under the US Communications Act. The Green Paper warned that the imbalance could undermine the economics of the European mobile communications sector.

It also argued that the EU must develop common positions on market access, vis-à-vis third countries, on issues that have a direct impact on trade and EU exports such as intellectual property rights, and in the various international fora which decide on global standards,



frequencies and numbering. Common rules under GATT (soon to be WTO) for trade in services and equipment with third countries and any EU agreements with individual nations need to be agreed, the Green Paper added.

Differences of opinion

Nevertheless, the road to global interoperability and fair trade is a rocky one, sometimes barred by the natural desire to help domestic industry and favour home-developed technologies. Certain provisions contained in a series of telecommunication reform bills which were set to pass US Congress before the end of 1994 have upset European governments and industry which see them as protectionist. Of particular concern is a 40% local content requirement for telecommunications systems. Europeans claim the provision goes against the international free trade policy of the US and its obligations as a GATT signatory. Indeed, it can be expected that the European Union along with European industry will lobby hard to have the provisions removed from new legislation likely to be proposed next year.

Europeans were also angry about the 20% restriction in the existing US Communications Act on foreign ownership of telecommunication and broadcasting operating companies. The Commission protested that this would

make the US market more restrictive than the EU one, which is already relatively open in fields like mobile and satellite communications.

The US has often complained about European public procurement rules and practices, claiming US companies have been denied full access to contracts in Europe. However, Europe has made considerable progress towards free and open public procurement in the utilities, through the so-called utilities directive, which is being or has been implemented in all Member States, while similar legislation on open telecommunications procurement does not exist in the United States.

European nations counter that their manufacturing companies face great difficulties in the US network equipment market because Regional Bell Operating Companies (RBOCs) have always bought from local suppliers and, more significantly, AT&T buys its network equipment almost exclusively from itself.

US firms and politicians, for their part, have often claimed that the liberalisation process in Europe and Japan is too slow-paced, especially compared with legislative developments in the US. However, the telecommunication reform bills in the US which aimed at lifting the remaining restrictions on competition between regional telephone and cable companies were withdrawn from Congress in September 1994 as a result of political haggling.

This setback in the US Administration's ambitious goal of building a National Information Infrastructure (N.I.I.) risks causing severe delays on that side of the Atlantic, whilst Europe presses ahead with its own legislative programme. A Commission directive, adopted on 13 October 1994, liberalised satellite communications, and already on July 19 1994, the European Commission issued a Communication in which it sets out an Action Plan called "Europe's Way to the Information Society."

As a first step in executing the Action Plan, on 25 October 1994 the Commission sent the first part of its Green Paper on the liberalisation of telecommunications

infrastructure and cable TV networks to the Council and Parliament. The Commission proposes a clear timetable for the introduction of competition in the provision of telecommunications infrastructures. As an immediate step, the Commission intends to enable operators of infrastructure authorised for specific purposes, such as cable TV or networks for own use only (e.g. electrical utilities, railways), to make their infrastructure available for the provision of telecommunication services which have already been liberalised.

The first part of the Commission's Green Paper was discussed at the Council of Ministers on 17 November '94. The Member States agreed on the principle that the liberalisation of all telecommunications infrastructures should be in line with that of voice telephony before 1 January, 1998. However, the Commission proposal for more rapid liberalisation of alternative networks (cable TV, leased lines, private networks) was rejected. The second part of the Green Paper was due to be issued by the end of 1994 and will define the regulatory framework as well as the safeguards for infrastructure liberalisation.

The Canadian authorities are also pressing ahead with regulatory reforms in the communications sector. On 16 September 1994, the Canadian Radio-Television and Telecommunications Commission (CRTC) published a report in which it agreed to allow cable TV operators and other newcomers to enter Canada's local telephone market in competition with existing provincial monopolies. The CRTC also cleared the way for the powerful telephone companies, led by Bell Canada, to enter other telecommunications markets, either as carriers or content providers.

In short, in the race to build information infrastructures, no-one can afford to be complacent. Indeed, whilst confronting challenges that are specific to their respective environments, all parties appear to be heading for the same goal: regulatory reform to open up telecommunication markets to competition which in turn will help generate revenues, bring down prices for users, and stimulate investment.

Another bone of contention between the US and Europe was over the Intellectual Property Rights regulations of the European Telecommunications Standards Institute (ETSI) which US firms contended would force them to relinquish exclusive rights to proprietary standards in Europe. The European

Commission argued that as an autonomous association, ETSI is free to lay down its own rules such as the IPR regulations, provided they respect EU anti-trust requirements as outlined in a 1992 Commission Communication on Standardization and IPR. The Commission also pointed out that ETSI rules do not force firms to give up IPRs, but simply to declare any intention of withholding their IPRs within a period of 180 days.

However, agreement on an interim policy was reached by ETSI members in late '94 and supported by their American counterparts.

Despite the differences, Europe, Japan, Canada and the US are all agreed that if the world is to move towards a seamless global information society everybody must respect the principles of interconnection, interoperability, IPR, privacy, security and universal service. Governments and international organisations throughout the globe uphold these very principles in their agendas for information infrastructure, although the means of achieving them remain the subject of debate.

These issues will figure high on the forthcoming G7 meeting's agenda. Indeed, a strong political will is detectable behind the idea that the fundamental principles, challenges and safeguards associated with the rapid development of a global information society should be addressed multilaterally in a range of international gatherings. ■

Sara Lewis, *journalist for DG XIII*

The information society

Comparisons in the trio of Europe, North America and Japan



THE DRIVING FORCE behind the information society is the desire of governments worldwide to improve the use of Information and Communication Technologies (ICT) products and to make the best possible use of the opportunities they create. This will lead to an increase in competitiveness, create new jobs and improve the overall quality of life for all citizens. Such benefits as improved health care, easier access to public services provided by local and national governments, new leisure and entertainment opportunities, teleworking, and home shopping are examples of applications which are already available as pilot systems in many countries.

This article compares the differences and similarities in the various approaches to implementing the information society

*The new programme
will lend its
support to training
for highly skilled
resource management
in an environment
of radical
technological change.*

taken by governments and industry in the trio of major economies comprised by the USA, Japan and Europe. Dramatic improvements to telecommunications infrastructures and regulatory issues are now a common thread in the proposals of all the countries involved.

These infrastructures will have to be interconnected and the basic services available on them must be interoperable. Consequently, a global policy is required which should be initiated in the G7 summit meeting hosted by the Commission on 25 and 26 February 1995. However, the methods adopted in arriving at global solutions need not be identical. In fact, regional policies will vary according to the differing social, cultural and linguistic conditions of the nations implementing them.

The National Information Infrastructure in America

The American administration recognized the importance of the information society in its Agenda for Action on the National Information Infrastructure (NII) published in September 1993. The initial approach in the USA focused attention on an electronic super-highways policy which would permit rapid improvements to be made to the communications infrastructure. The Clinton/Gore NII policy was supported from the very beginning by American companies.

At government level there was great emphasis on deregulatory issues regarding telecommunications, media ownership and distribution rules. From the earliest days, the US administration stressed that industry would have to pay for the information infrastructure and that government's role would be to help pave the way. High-level government support led to the formation of the Information Infrastructure Task Force (IITF) and the US Advisory Council on the National Information Infrastructure created by Executive Order in December 1993 to oversee recommendations relating to the US President's NII Initiative. Formal structures for co-ordinated dialogue between public authorities and the private sector are now in place.

At industry level, chief executive officers of major American computer companies had already formed the Computer Systems Policy Project (CSPP) in 1989 and were thus well positioned to provide immediate input to the government's plans. These leaders quickly recognised the unique nature of the tremendous business opportunity which the NII would create for them, not only nationally but globally. Certain potentially high-volume consumer applications, such as video-on-demand (500-channel TV networks), would provide a large market for services delivered over this new broadband infrastructure.

Supported by partial funding from the government's National Information Infrastructure Testbed (NIIT) initiative, various trials are testing the commercial implications of access to a widespread, high-speed information infrastructure.



Pilot applications exist in areas such as just-in-time manufacturing and delivery, electronic publishing, remote collaborative working and linking businesses together on a national (or global) basis.

Obstacles in the US path

Progress towards the information society has not been smooth in America. Some of the largest business alliances ever announced in the ICT industry, such as the US\$23 billion TCI/Bell Atlantic merger, were never completed. Others that were completed have yet to prove that they will be successful in financial terms. The stock value of partners in some alliances has had a disturbing tendency to drop in value following announcement of the mergers.

Most interactive video-on-demand trials have been delayed by as much as a year – with the result that much-needed marketing information will not be available until mid to late 1995. Of 28 interactive trials announced to begin in 1994 by 21 different operators or consortia in 30 US cities, fewer than 20% will actually start when planned.

Uncertainty for American companies concerning regulatory issues remains high. Conflicting signals regarding regulation have been received. Rulings from the Federal Communications Commission (FCC) on lowering cable TV charges had an adverse effect on more than one planned strategic alliance. Anti-competition rulings from the US judicial system and other federal watchdog bodies have also slowed the pace at which the larger companies will be able to participate fully in the Information Society outside their traditional areas of expertise. In fact, America remains a highly regulated environment in areas relating to ICT, contrary to popular opinion.

The recent administration-supported Hollings Telecommunications Reform bill would have permitted telephone and cable companies to enter each others' businesses and would have let regional phone companies provide long-distance services and manufacture telecom equipment. After passing the House of Representatives with certain modifications, the bill was then defeated in the US Senate in September 1994. A true consensus on the way forward has still to be achieved in the USA.

Japan watched the USA and EU

Progress was slower in Japan than in the US, and the impetus came from different sources, primarily MITI (Ministry of International Trade and Industry), MPT (Ministry of Posts and Telecommunications) and NTT (Nippon Telephone and Telegraph). Other players in the Japanese vision of the information society include the numerous cable TV (CATV) companies, now operating at a loss due to government restrictions on ownership and distribution, telecoms equipment suppliers (including those from the US and Europe), and media owners.

The Information Industry Subcommittee of the Industrial Structure Council of MITI published its report on improving social infrastructure for the information society in June 1993. Later that year, the giant NTT announced the grand plan to put optical fibre throughout the whole of Japan by 2015 – at a cost of approximately US\$ 400 billion. Also during this period, the Japanese government's MPT was developing its

new approach to policy on regulatory issues surrounding the information society.

Compared to Europe, Japan should in fact have been in the communications vanguard, having privatized NTT in 1985, only two years after the AT&T break-up in the USA. Markets were liberalised to allow more competition. But Japan lost ground compared to the American model, for example falling far behind in cable television by restricting cable businesses to narrow geographic areas, resulting in small operations that lose money. NTT was late in introducing new telephone and data services. Monopoly control of key markets by NTT and KDD increased the cost of everything from microwave transmission to database hook-ups.

In response to industry criticism, MPT proposed a policy focused on developing new services, restructuring the industry, and expanding the total market size. MPT feels this latter point is crucial to the carriers and their suppliers and offers opportunities for foreign players in the market place. They also drew up a plan to unite fragmented cable television operations into a nationwide network which could provide a full range of multimedia services, believed to be worth as much as \$783 billion by the year 2010. The proposed network would enable advanced services to be made available, including telephony, which would provide significant competition for NTT. Cable companies could sell more than 20% of their shares to foreign investors. Telecom companies could enter the CATV business.

Because of its size and near monopolistic position, NTT plays a more dominant role in the future of the information society in Japan than do national PTTs in most European countries or any single RBOC or international carrier in the USA. NTT's 12

research centres have an annual budget of \$3 billion to help them focus on the latest technology for the 21st century. NTT is also entering into more foreign collaborations than ever before.

MPT acknowledges that the telecommunication network is one of the most important parts of the social and industrial infrastructure for Japan's future development. And the Electronic Industry Association of Japan (EIAJ) expects new business related to the information society to grow as large as that of the electronic appliance or automobile industries by the year 2000 – that is, as much as US\$ 527 billion.

A new vision for an advanced information society was created by Prime Minister Murayama's Advanced Information and Telecommunications Society Promotion Headquarters, scheduled for launch in September 1994. The objective of this new initiative is to prepare comprehensive measures for social awareness, deregulation, and better definition of the role of private/public sectors in the information society, including social impact. Senior members include Ministers from MPT and MITI, plus 18 other ministries responsible for areas in which applications will be developed, plus 12 members from the commercial and academic communities and numerous advisors from large businesses. The Japanese government fully recognizes the importance of co-operation on these issues and welcomes contacts such as those offered by the proposed EU-Japan "Information Policy Working Group" (IPWG) in the framework of the EU-Japan dialogue on industrial cooperation.

Europe moves towards the information society

In Europe, attention was focused on the importance of the information society by publication in December 1993 of the European Commission's White Paper called "Growth, Competitiveness, Employment – the Challenges and Ways Forward into the 21st Century." Key elements of this vision of the future for Europe included dramatic improvements in trans-European infrastructure networks, greater use of technology, especially information technology, and coordinated implementation of a European information society. From the very beginning, the various ways that electronic information will impact on the whole of society have been considered as key issues.

In February, 1994, as mandated by the European Summit of Brussels (December 1993), Commissioner Martin Bangemann of the European Commission formed a

special Task Force of high-level experts drawn from European industry, including both users of information and providers of products and services. Their task was to examine the issues facing Europe regarding implementation of a European Information Infrastructure to match that of the US. Their goal was to produce recommendations for a practical way forward, including specific application areas, to ensure Europe a rightful place in both the global information society and also the marketplace.

This group, known as the Bangemann Task Force, published their report "Europe and the Global Information Society – Recommendations to the European Council," in May 1994, for presentation to the Corfu summit meeting of late June 1994. The main conclusions were that "the EU should put its faith in market mechanisms...to carry us into the Information Age," by "fostering an entrepreneurial mentality" and "developing a common regulatory approach." Ten priority applications areas were identified for immediate action, ranging from teleworking and distance learning, to university research centre networks and telematic services for SMEs, road traffic management, air traffic control, health care networks, electronic tendering, public administration networks and city information highways.

The European Corfu Summit requested a plan to establish a clear framework for actions relating to the information society. This led to the communication called "Europe's way to the Information Society: An Action Plan," published in July 1994, covering four areas: the required regulatory and legal framework; networks, basic services, applications and content; social and cultural aspects; and promotion of the information society. At the same time, the Commission issued a Green Paper on audiovisual policy and proposed orientations to improve the European programme industry. Without it, the European information society will not emerge satisfactorily.



Information society differences between the USA, Japan and Europe

	<i>In the USA & Japan</i>	<i>In Europe</i>
Information content	<p>Content is national in character.</p> <p>Single-language market predominates in most mass communications arenas.</p> <p>Large, integrated media companies exist with huge investment power for new technologies.</p> <p>Content sellers are mostly selling to a large single market.</p>	<p>Multinational & multicultural in character.</p> <p>Multilingual market.</p> <p>Smaller national media producers can combine forces to approach the size and financial strength of single American media producers.</p> <p>Sales of information products are to national and European-wide markets.</p>
Network structures	<p>Manufacturers and users have access to basically a single set of standards, which have evolved in place over many years. Nevertheless there are inter-operability problems.</p> <p>Most technologies are "home-grown," and developed as a result of direct national R&D programmes.</p> <p>Wide distribution of basic infrastructure exists such as telephone, cable TV, inexpensive high-speed networks.</p> <p>This is less true in Japan.</p>	<p>Great success in mobile telephony (GSM). Multiple standards exist at many levels; many foreign suppliers and purchasers are more familiar with the US standards.</p> <p>Often competing technologies exist, developed as a result of national R&D initiatives; innovation is widespread.</p> <p>Distribution of basic services is complicated by national differences in both coverage and regulatory issues.</p> <p>Modern telephone basic infrastructures.</p>
Applications & software	<p>In the USA, a large, aggressive, software product industry rules in critical basic software areas.</p> <p>In Japan, the software product industry is weak.</p>	<p>Specialist developers; many excellent niche market applications, e.g. in areas such as virtual reality systems, compression technologies, etc.</p>
The "people" element	<p>Users, especially in business and industry, are technology-oriented and are reaching a level of technology maturity which increases their awareness of information use possibilities.</p> <p>Information producers, whether entertainment media, educational material, or simply personal communications, are familiar and at ease with the various technologies and applications.</p> <p>Awareness of information technology and of the information society is becoming much more widespread.</p>	<p>The historically lower level of penetration of ICT applications in business and industry, in the home and in secondary and advanced education, is now being rapidly remedied.</p> <p>Relatively late arrival of many information services to Europe means users and producers have not reached the level of their counterparts in the USA; yet Europe has some of the largest publishing groups in the world.</p> <p>Awareness activity is increasing considerably.</p>

Due to differing national policies, telecommunications deregulation was uneven throughout the European Union. Markets available to the companies making possible the information society are more diverse because of cultural and linguistic differences among the citizens of the Member States. Due to the geopolitical reality of the EU, the issues of standardisation, interoperability, cross-media ownership, intellectual property rights, privacy, protection of electronic media, legal protection and data security are more complex than in the single-government environments of the USA or Japan. If the information society policy is a strategic creation applicable to the whole Union, then the challenge will be overcome and European cultural richness will be a great asset.

The European approach to the information society places less stress on technology *per se*, and more on wise, innovative use of existing technology or near-future developments. Assumptions are made that broadband networks will be available, at affordable prices, when needed. Sufficient technology already exists to deliver the envisaged services. What is needed are extensions to infrastructure, such as higher cable penetration to homes and innovative means (such as Euro-ISDN and ATM broadband networks) to enable high-speed connections from the final telecom operator's node to the home or business. These enhancements will be funded by industry as consumer-oriented services begin to appear, offering potentially high profits.

In Europe, the diverse state of readiness for the information society at national level within the EU results in additional challenges which must be met by Member State governments. The European Commission has taken a proactive role by expressing a clear vision for the future of the information society.

What are the basic differences between the US, Japan and Europe?

The different environments which exist within the USA, Japan and Europe have many implications for the manner in which the information society will develop in these regions. As the table opposite illustrates, Japan is similar to the USA in offering vendors and developers a single national market, without the multicultural and multi-

lingual characteristics of Europe, and a partially deregulated telecommunications industry. Japan is similar to Europe in lagging behind the US in availability of inexpensive high-speed networks and cable TV penetration. In both Japan and America, telecom liberalization and trade issues can be effectively addressed through a single legislative framework within a single government.

Because of these many differences, we should not expect that the information society will develop in all three regions of the trio along identical paths. Emphasis, methodologies, goals and priorities will differ based on variations in political, cultural and business climates. There are, however, issues which face all nations equally. These include creating awareness of the possibilities offered by the information society, education at all levels of society on how to use information infrastructures and coordination of effort on global issues such as standardisation, IPR, privacy or competition rules.

What is needed – globally – today?

Similar trends are appearing in all three regions of the trio. Deregulation, especially in removing or reducing the power of monopolies, is now part of all regional plans, and faces some opposition, albeit from different sources, in all three regions. Key issues no longer relate simply to national telecoms infrastructures and access to international lines, but focus on more complex areas such as applications, social aspects, intellectual property rights, cross-ownership of media, privacy, censorship, security of electronic information, and universal access.

Many of these issues can only be resolved, for a globally interconnected society, by widely-adopted international agreements arising from cooperation and coordination on a global level.

Similar infrastructures to enable consultation on policy and implementation issues are needed in all three regions of the trio in order that:

- global cooperation can be facilitated, since discussions could then take place at the relevant level, with similarly empowered authorities, across the range of G7 countries, in a common framework;
- global (commercial and marketing) opportunities could be more readily addressed by all actors in the implementation of the information society, regardless of their geographical location (which would enhance trade opportunities).

The countries of the trio should rapidly ensure formal co-operation with all interested countries in the world.

This consultation infrastructure should exist at three levels:

Level 1 would consist of contacts in public authorities, i.e. the senior government officials in charge at ministerial or cabinet level of consultation on interoperability, telecom deregulation policy, monopoly control, social impacts, and other high-level issues.

Level 2 would more closely involve the companies through contact with practical work groups examining specific implementation issues and applications areas, for example the Bangemann Task Force in the EU, or the NII Advisory Council in America, or MITI's Information Infrastructure Sub-Committee.

Level 3 would constitute all implementation actors, e.g. the CommerceNet project teams or the digital library programme coordinators in the USA, electronic publishers or multimedia fora in Europe and commercial pilot project leaders in Japan.

Dialogue and exchange of information between actors of these three levels at the national and international level is a prerequisite for a successful emergence of a global information society.

Implementing this global consultation infrastructure will not be easy, but evidence of current lack of coordination deems it highly advisable – and very necessary. ■

Roger Longhorn DGIH



Global networks and interoperability

A priority in Europe's move to the information society

INTEROPERABILITY. Without it different pieces of Lego couldn't hook up, trains couldn't interconnect and phone calls from Belgium would stop at the borders, because there would be no mechanism for allowing national systems using different standards to communicate.

And without it, moving from today's largely analogue world of separate national voice and data communication systems to the digitalized information society – where video, high-speed data and voice travel worldwide down a single network connecting with other high-speed networks – will be impossible.

Interoperability permits telecom and IT systems and equipment from different manufacturers to communicate, leading to major advantages for users and the creation of a truly global market for manufacturers and service providers. As one consultant in the sector, Terry Lawrence, explained, the march towards interoperability "is currently the most important event" shaping the information technology and telecommunications sectors.

In recognition of its crucial importance to the construction of the global information society, interoperability is on the agenda for discussion by the Group of Seven, the leading industrialized countries including the European Union, the United States and Japan, when they meet to discuss the Global Information Infrastructure in Brussels on 25-26 February, 1995. All involved want to make sure that the information highways they are building will interlink across the planet.

Within the European Union interoperability is already identified as a "primary Union objective" in the report prepared by Industry and Information Technology Commissioner Martin Bangemann and senior executives from 19 information technology companies in 1994, called "Europe and the Global Information Society." The report describes interconnection of networks and interoperability of services and applications as "essential to the deployment of the information infrastructure."

It explains that not only is the information society emerging from different sources, but it is evolving into a web of networks, services, applications and equipment. "In an efficient and expanding information infrastructure, such components should work together." That is the role of interoperability.

Achieving interoperability, however, is not easy. Common standards are widely recognized as the best, cheapest and most efficient route, but drafting standards that permit systems and equipment to interwork not only with other existing terminals, networks and infrastructure but with future developments as well represents a technical and political challenge that European industry – with the help of the European institutions – must overcome.

The past

In the world of telecommunications, interoperability has always played a key role in ensuring ostensibly seamless communications for the user. In the past, however, when the national market largely satisfied both supply and demand, interoperability was important only at the border where specialised switching equipment transferred the limited number of international calls from one system to another.

In the information technology sector, each manufacturer used to rely on a different technology protected by intellectual property to prevent interchange of equipment, in this way hoping to

preserve his clients and markets with a view to recuperating the cost of product development. Every office worker has had his own nightmare experience trying to make equipment from different manufacturers communicate.

This situation started to change over the last decade, both as a result of the merging of the IT and telecommunications industry and of user demand for a world market in services and equipment. Lack of interoperability is now acknowledged as a competitive disadvantage by all manufacturers and governments. Unfortunately, in Europe the switch to interoperability and open systems has coincided and amplified the structural crisis that the entire information technology sector is experiencing. This has made it more difficult for companies to move rapidly into the interoperable world.

But they are all moving in this direction, recognising that interoperability will grow in importance with the explosion in services, networks and equipment expected as Europe and the world move into the information and multimedia age. Not only will phones have to communicate with other phones and computers to computers, but every telephone, computer and television set will be part of a global system in which each will have to interconnect with the others. And each will offer a variety of services.

"The future is not a single national voice network with limited connection to the outside world. It will be a mass of interconnecting networks, under many different ownerships, of different



Europe has identified the building block for the development of a multimedia network: ISDN

geographical spreads, offering voice, image, text and data services from which the customer can choose quickly and easily," explains Tom McKinlay of Directorate-General XIII at the European Commission.

The trick is to make sure this new world is interoperable from the time the various components hit the market.

The European Union's contribution

Thanks to over a decade of efforts to build pan-European systems and equipment, Europe is making a valuable contribution to ensuring global interoperability. In this the role of the European Commission lies in promoting research into the best technologies, in encouraging the drafting of common standards and in creating the appropriate regulatory environment in which market forces determine the winners.

Over the last ten years the European Union's research efforts have helped develop common technologies for future generations of equipment, systems and infrastructure, paving the way for interoperability. The EU's research efforts are coordinated under multi-annual framework programmes. The current

Fourth Framework Programme will provide 12.3 billion ecu in funding over the next five years. Its specific programmes include ACTS (Advanced Communication Technologies and Services) which replaces RACE (Research into Advanced Communications for Europe) as the EU's centrepiece for telecommunications research. A special 843 million ecu telematics programme will fund research into the technologies needed by public administrations and researchers to communicate with each other. In October 1994 the Council of Ministers approved 1.9 billion ecu in spending for the IT sector.

The ACTS programme will focus on six technology areas which are all playing vital roles in the construction of the information age: interactive digital multimedia systems, photonic technologies, high-speed networking, mobility and personal communications networks, intelligence in networks and service engineering, and quality and safety of communication services and systems.

To consolidate this move toward common technologies, the Union is promoting the development of common standards to guarantee interoperability in the market place. The Bangemann Group pointed to the successful example of the GSM standard for mobile phones which in the two years since its introduction has won over two million users and called on operators, public procurement suppliers and investors to step up their cooperation and establish unified standards. The independent European Telecommunications Standards Institute (ETSI) has already started work on a major multimedia standardisation project to ensure that when the new products, services and networks emerge they will all interconnect.

Meanwhile, new information systems, such as those linking customs administrations through the Systeme d'Information Douanière (SID), and those planned both for public administrations in Interchange of Data between Administrations (IDA) and for the custom and police administrations through the Schengen Information System (SIS), represent the first stage in the development of further networks. These will interconnect with others, ultimately linking not only administrations but companies, manufacturing

plants, banks, customers and households with the information highway.

In the United States, Internet, the global communications network of networks, is providing the starting point for its efforts to develop the information society. Internet already links up to two million terminals and an estimated 20 million users in 140 countries, but the network currently transmits only data, while the information society will require a multimedia internet over which image and voice can travel as well.

Europe has identified the building block for the development of a multimedia network: ISDN (Integrated Services Digital Network.) Current narrowband ISDN networks, however, cannot carry the amount of digitalized data per second required to transmit multimedia services covering high-quality moving images, data and voice over the same network.

But broadband ISDN can. So the EU in its RACE and ACTS programmes is working vigorously to establish the technology necessary for integrated broadband communications (IBC). Title XII of the Maastricht Treaty on European Union identifies this area of advanced communications as one of its crucial Trans-European Networks, and underlines the need to favour interoperability of the national networks and the access to these networks. In December 1993 the Commission awarded 14 contracts for IBC trials, and a Europe-wide trial started up during the second half of 1994.

Part of the challenge is to ensure that Europe moves to the same broadband standard from the start, to avoid the delays experienced in introducing pan-European ISDN services. This came about because each member state "adopted its own flavour" until the Commission proposed and the Council of Ministers approved a European ISDN standard.

At the same time that Europe is preparing the new networks for the future, companies are experimenting with technologies designed to upgrade and make better use of existing networks. At a Commission-sponsored conference on information technologies organized by the Club de Bruxelles, Horst Nasko,

Vice-Chairman of Siemens-Nixdorf, said that there "is room for a major improvement" in the use of existing networks.

However, it is clear that the fully developed information society will require fibre optic networks to carry broadband ISDN, and as a result by the year 2000 Europe is going to have to dig up its roads and lay the new networks for broadband – internationally compatible, internationally interoperable networks. At that time the big question will concern how to finance these new investments. Ultimately, of course, the customer will pay, and the secret will lie in identifying and providing the new services that he will want, at a price he can afford.

The deregulation dimension

The completion of the deregulation of Europe's telecom market also plays a pivotal role in the interoperability debate. Not only will open competition for the supply of all services including voice communications and network infrastructure accelerate the move to interoperability, but at the same time the requirement of interoperability will act as an enforcer of the deregulation objectives, since it provides a guarantee that new competitors will actually be able to connect with the former monopoly networks.

Industry's recommendations

As was recognised in the Bangemann report, today the European information society is emerging from many different angles and the European infrastructure is rapidly evolving into an ever tighter web of networks, generic services, applications and equipment. The development, distribution and maintenance of these occupy a multitude of resources worldwide.

The industry leaders consulted in the preparation of the report recommended action to support interconnection and interoperability at three different levels:

At the level of operators, public procurement and investors:

Following the successful example of GSM digital mobile telephony, market players could establish Memoranda of Understanding to set the specifications requirements for specific application objectives. These requirements would then provide input to the competent standardisation body.

At the level of the European standards bodies:

These should be encouraged to establish priorities based on market requirements. They could also identify publicly available specifications, originated by the market, which are suitable for rapid trans-

formation into standards through fast track procedures.

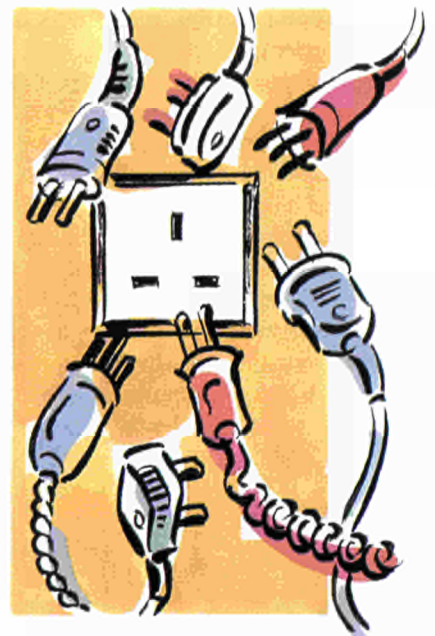
At the level of the Union:

Where the market is not providing acceptable technical solutions to achieve one of the European Union's objectives, a mechanism should be sought to select or generate suitable technologies.

The latter is an important role of Commission research programmes such as RACE and ACTS, which bring market players together into consortia to carry out basic research and trials, thus helping to generate the industry consensus on equipment or service specification which eventually becomes an official standard, the foundation of internationally interoperable networks.

Through its research programmes and also through its regulatory actions the European Commission has sought to promote interconnection and interoperability of both current and future telecommunications networks throughout the territory of the Union. Now, in the forthcoming Global Information Infrastructure discussions, it is to be hoped that the goal of interoperability will be promoted and secured on a world-wide scale. ■

Elizabeth De Bony journalist for DG XIII



Electronic commerce

business tool or catalyst for change?



ELECTRONIC COMMERCE (EC – also known as electronic trading) is an important aspect of the information society, and one with significant implications for the European Union. The growth of pan-European electronic trading is a manifestation of the Single Market, while conversely the existence of exclusive localised communities represents a tangible barrier to it.

The past ten years have seen a steady increase in the use of electronic commerce. This is a broad term used to encompass a number of different mechanisms that bring together communications and information technology, including for example E-mail and EDI (Electronic Data Interchange). Today over 30,000 organisations in Europe use standardised electronic messages transmitted over telecommunications networks to replace conventional paper-

based trading. The figure is expected to reach around 90,000 users by 1995, and by the year 2000 it is estimated that there will be some 300,000 users of electronic trading across Europe. However, up until now the pattern of this growth has been uneven. Disparities are noticeable not only across different sectors, with automotive, transport and electronics industries taking the lead, but also geographically, with certain countries and even regions moving forward rapidly. Taking a wider perspective, there is also evidence that the level of EC activity is higher in the USA than in Europe.

Who benefits?

One of the key objectives of the European Commission's TEDIS programme (Trade Electronic Data Interchange Systems) has been to examine the social and economic impact of EC. In other words, what are the economic benefits of trading electronically, who exactly benefits, and what are the wider social effects? A recently completed study by a consortium led by the University of

Edinburgh looked at these questions. The following is a résumé of its findings.

As is inevitable in any discussion concerning the interface between business practice and technology, attitudes of respondents differ widely. The researchers comment: 'As with any emerging technology, there are evangelists who view EC as a force for radical change in industry and public administration, and sceptics who view it as simply a means of enabling the same organisations to do the same things, only slightly quicker.' Their report concludes that the reality lies somewhere between these extremes.

It is important to bear in mind that EC is not a technology in itself; there has been no single technical breakthrough that has made EC possible. Rather it is a consolidation of diverse resources: telecommunications networks,

computer software, harmonisation of business practices, standardisation of business data, which put together make electronic commerce possible.

EC isn't simply a new process either, but rather a new way of organising private and public sector enterprises. For EC to be viable, organisations must agree on the form taken by electronic messages and commit themselves to invest in the technical and structural adjustments needed to implement it. The logic is inescapable, the researchers suggest – electronic trading cannot exist in a vacuum. It therefore follows that a degree of cooperation is needed from organisations having little previous history of cooperation, and which may even be direct competitors. This is where the EDIFACT standard (EDI for Administration, Commerce and Transport) plays an important role in establishing a common framework for such cooperation, and the TEDIS programme has been instrumental in promoting the use of EDIFACT and supporting migration from proprietary – and mutually incompatible – EDI standards.

Such cooperation was not always the case, comment the researchers. They point to case studies carried out for the TEDIS programme which demonstrated that many early users of EC saw its potential as a strategic information technology, and used it as a means of gaining competitive advantage. The benefits of such 'strategic investment' in EC accrued mainly to first-users and were inevitably short-lived, being eroded as competitors caught up.

Case studies have also shown that the main perceived benefit of EC is cost savings through the reduction of clerical processing, and through its use as an element in wider business process streamlining, for example in 'Quick Response' or 'Just-in-Time' supply chains. These benefits can only be fully realised when the volume of transactions exceeds a certain critical level. Studies have indicated that the benefits of EC in such cases have been unequally distributed, skewed towards large organisations and away from small companies – many of whom, indeed, adopt EC under pressure from large trading partners.

Assisting and encouraging SMEs (small and medium-sized enterprises) to adopt EC in a standardised – and ultimately more beneficial – manner has been a key objective of the TEDIS

programme. To counterbalance the disproportionate influence of large organisations, the researchers have focused attention on mediators.

These are bodies that they believe can play a coordinating role in an EC community, negotiating the form that EC will take in the community. ODETTE (Organization for Data Exchange via Tele Transmission in Europe) in the automotive sector, and EDIFICE (Electronic Data Interchange Forum for companies with Interest in Computing and Electronics) in the electronics industry are two of the most widely known. Mediators are instrumental in negotiating the scope of the trading network, addressing such issues as the transactions to be included, the data to be exchanged and the geographical boundaries of the community. They also liaise with other mediators and national and international agencies, including EDIFACT message development groups. Many of the most successful mediators have evolved as offshoots from industry associations, deriving their legitimacy from the organisations which support them.

Cohesion and convergence: regional effects

The researchers identify a number of potential consequences that would follow if existing patterns of EC adoption continue. On the one hand, there is the development of 'industrial districts,' – localised networks of small firms engaged in intense intertrading and information networking. On the other hand there are localised supplier agglomerations based on the 'Just-in-Time' model and situated around major assembly plants. These two models seem to have become more popular among researchers and have displaced the internationalisation model in which large organisations set up branch plants

depending on international sourcing strategies with few local suppliers – the so-called 'cathedrals in the desert' effect. The question remains, comment the team, as to whether EC will reinforce or weaken these models.

Of course it must be realised that EC strategies are not implemented in a vacuum, and in most cases EC implementation is a means to an end rather than an end in itself. For example, according to the researchers, a number of new automotive plants in the UK and Italy utilise EC to integrate local suppliers into a 'Just-in-Time' system with delivery times measured in minutes rather than days. The benefits are also being felt by more distant suppliers through the development of EC-based logistics systems using consolidated deliveries, several times daily.

The overall effect of EC is nevertheless one of concentration. The researchers comment: 'Though EDI itself does not have a particular spatial bias, it is likely to reinforce the advantages of core regions without countervailing support for the disadvantaged areas.' This tends to underline the need for the extension of trans-European communications and transport infrastructure to disadvantaged areas, as recommended in the White Paper 'Growth, Competitiveness and Employment.'

The research team believe that these findings apply equally to public procurement. As Less Favoured Regions (LFRs) are required both to liberalise their purchasing strategies and introduce EC, then according to the team, LFR firms will be at a further disadvantage unless some support is forthcoming to encourage them to adopt EC. This issue of EC between the private and public sectors has been a consistent element in discussions on the future role of the Commission in promoting EC post-TEDIS. This would require cooperation



and coordination with IDA (Interchange of Data between Administrations), the new Community initiative on telematic services between administrations.

Employment impact

The direct employment impacts of EC are difficult to quantify, as most evidence is so far anecdotal, drawn from case-studies of EC implementations. On an empirical basis, however, it appears that EC only has an effect on employment levels once a certain threshold level of activity is exceeded. Currently estimated at around 10,000 EC messages per month, this level could progressively get lower as more sophisticated integration of EC with internal systems becomes possible.

The researchers expect that there will be some displacement of routine clerical labour, though in the initial stages of EC adoption, when electronic and paper-based systems operate in parallel, labour savings will be small. Once the threshold level of activity is exceeded, the evidence indicates that the displacement tends to result in internal restructuring, yielding improved efficiency and labour productivity in purchase and order administration. The researchers estimate that the extent of actual job savings will probably be small compared to other types of automation, and will probably be unequally distributed between trading partners,

with intense users seeing the greatest change and less frequent users (particularly small firms) seeing limited job savings.

More significant, according to the report, will be the indirect employment impacts. These are expected to take a number of different forms. Most obvious are those resulting from industrial restructuring caused by the combination of EC with other initiatives in supply chain management. The researchers believe that these changes will further tend to consolidate industrial structure. They also indicate that the changes will tend to occur at the expense of companies that do not use EC, and will have a disproportionate impact on SMEs and LFRs.

A further – possibly long-term – effect identified in the report will be felt by intermediaries such as brokers. The creation of a wider ‘electronic marketplace’ would tend to enable buyers and sellers to make direct contact, thus eliminating the ‘middle man.’ According to the researchers, this effect has already been seen in the EASIGO electronic market for surplus oil field equipment, where the role of the broker, who previously bought surplus equipment and used his knowledge of the market to re-sell it, has been largely superseded.

Training issues

Given the already high penetration of information technology in industry and commerce, the team believes that the incremental training implications related to EC – on a technical level at least – are quite modest. However, the shift of responsibilities within an organisation that EC can engender may have implications for business skill training. For example, the report quotes a TEDIS case study involving the Italian pasta manufacturer Barilla. When the company introduced EC for relations with distributors, it was found that the role of their buyers changed radically: from everyday dealings with Barilla to quality monitoring and negotiation of terms.

A learning curve

The results of the Edinburgh University research have been taken as a starting point for further investigation under the TEDIS programme. The current research consortium is examining the possible effects on employment in greater detail in order to suggest alternative develop-

ment scenarios. However, if at the present time we have a degree of understanding of the repercussions of EC on a social and economic level for industry, we know very little about the upheavals it will cause in the public sector. It is in this direction that we must concentrate in the future.

Ultimately, the implementation of electronic commerce is neither purely a technological question nor a competition issue. As the researchers emphasise: ‘Organisations will not introduce EDI because it is intellectually stimulating or simply because it is feasible; they will implement it because it fits in with their policy objectives, allowing them to become more competitive or efficient.’ ■

Alasdair Crewe *DGIII*

The TEDIS Programme

The TEDIS (Trade Electronic Data Interchange Systems) Programme was established in 1988 with the aim of promoting the use of EDI in Europe. The programme activities are divided into the work areas of standardization, telecommunications, awareness and legal and security issues.

The second phase of the TEDIS programme, established in 1991, has three main objectives:

- the integration of EDI implementations and activity across different sectors
- the examination of the economic and social repercussions of EDI
- the promotion of EDI among potential users, particularly small and medium-sized enterprises (SMEs).

Standards for the information society: greater role, greater issues



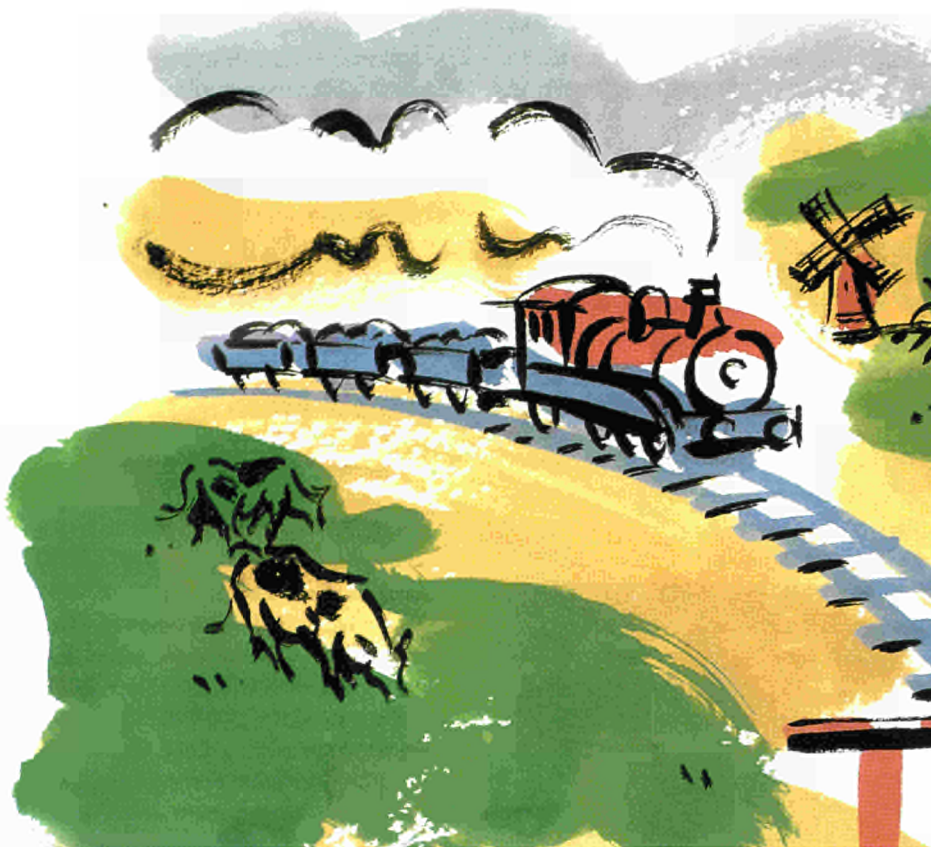
The need for standards

Creating a true Information Society with benefits for the whole world requires the establishment of a Global Information Infrastructure (GII). This will have to be pieced together from a huge variety of different components: communications sub-networks, information services, sector-specific applications and end-user information equipment. The development, distribution and maintenance of all these components is dispersed among many thousands of suppliers across the world.

In a truly integrated and interoperable information infrastructure all the components should work together: users should be able to access whatever service, information or individual they need easily, quickly and transparently, just as they do with the telephone system. Conversely, information and services should be made accessible through the infrastructure to anyone who wishes it, regardless of the equipment used, the physical networks which will transport the information and the location and format of the data.

Assembling the various pieces of the puzzle to meet the challenge of interoperability will be impossible without clear conventions to define the interfaces and the behaviour of all the components, from the communications sub-networks to the user devices. These conventions need to be technically accurate, to be agreed by all parties involved in their use, and to be publicly available. They must also be stable, well-maintained and free from control by any individual party. In fact, they must be "open" – in the true sense of the word. Furthermore, given that exchange of information takes place all over the world, the conventions must not be restricted to a regional level but should be, as far as possible, world-wide.

Achieving this level of interoperability requires a rigorous approach to technical specifications for the GII's



*A coherent approach
to standardization
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infrastructure*

critical interfaces. International standards for Open Systems offer the best approach. They cover all links in the chain, including communications technologies and generic information services as well as specific sectors and equipment. Most importantly, being based on stable reference models, they are able to grow to accommodate further needs. Nevertheless, a careful balance should be kept between consistency, to permit interoperability of emerging and existing products, and the degree of freedom required for innovation.

The gap between standardization and the market

Promotion of Open Systems standards has been at the heart of the European Union's IT standardization policy since it was established in 1986.⁽¹⁾

After almost ten years, the concept of Open Systems has finally 'taken off'. Its popularity constitutes a remarkable success for standardization policy, although openness is not necessarily achieved through official standards. Indeed, though the Open Systems Interconnection (OSI) concepts of interoperability and portability have become a must for customers and vendors, products based on official standards have been few and far between. On the contrary, they have often been displaced by so-called *de facto* standards, through the success in the marketplace of

products based on either public or private specifications. Such specifications often duplicate or compete with each other, leading to the development of islands of non-communicability and disparate technology – resulting in confusion for users and the risk that people will stop investing and stop buying.

Demand for products that conform to standards has not yet proved sufficient to push manufacturers into a genuine commitment to standardization. While everyone agrees on the advantages of official standards over private or public specifications, nobody is willing to wait for the promised fully standardized solutions. There are four major problem areas:

- The capacity of the existing standardization system to keep pace with technological evolution, delivering the required specifications on time and with the appropriate level of detail.
- The possibility of implementing such specifications with sufficient discipline to prevent divergence and ensure interoperability.
- The availability of products that conform to standards.
- The difficulties faced by purchasers (public or private) when they wish to refer to standards for buying and building interoperable systems.

These difficulties are especially evident in networking, where large groups are using different protocol suites to meet their open systems requirements. The Internet Protocol Suite (IPS) specifications are playing an increasing role; however, they have been unable to displace OSI standards as they address different needs. The IPS solutions are simple, cost-effective, and widely available. OSI solutions offer greater richness and flexibility, and find supporters among those communities whose needs are not satisfied by IPS. Indeed, for those communities OSI represents the only possible non-proprietary solution. The resulting lack of interoperability may be partially overcome by mutually compatible gateways, although these will inevitably increase costs and complexity, and often result in a more restricted service.

The OSI-IPS duality is only one example of how difficult situations can become when the relationship between

standardization and the market is ambiguous or poorly understood. Competing standards are difficult for users, costly for manufacturers, confusing for managers, and detrimental to the construction of the world-wide interoperable information infrastructure. The IPS-OSI case is a critical test for the global infrastructure; if the most developed regions are unable to agree with one another on how to set up unified, basic services (starting with e-mail) they will not be credible when talking of more ambitious projects for the global information society.

An open workshop in November

Major changes have occurred in the technological domain, and standardization should be adapted to keep pace with them. The European Union's standardization policy has stood for almost ten years. In the meantime, many fundamental changes have occurred, making a review more urgent than ever.

The promise of a global information society creates new opportunities and new challenges for standardization policy. The Commission opened the debate on the different aspects of standardization policy with its workshop entitled 'How to choose the right ICT standardization policy,' held in Brussels in November 1994. The conclusions arising from this workshop may form the basis of a communication on re-orientation of ICT standardization policy and will be examined in further detail in a future issue.

The Commission is open to new ideas being debated, formulating its policies in accordance with the opinions and interests of the parties involved. However, some points of view have already been contributed by the competent services within the Commission. These enable us to identify a series of critical issues:

A matter of terminology

The Commission favours the adoption of a consistent world-wide terminology. Its view is that the term *Standards* should only be used in the context of models developed by recognized standardization organizations, such as ISO and IEC on the international level, and CEN, CENELEC, and ETSI on the European level. Standards are drawn up on the basis of defined rules, and are subject to an open comment and voting process. The term *Specifications*, with further qualifiers, should be used to describe documents that have been arrived at through different procedures. In particular a *Publicly Available Specification* is a document that might form the basis for a formal Standard.

The standardization organization must evolve to survive

The Commission is responsible for the definition of standardization policy for the European Union but it cannot – and has no desire to – impose solutions to all the standardization problems posed by the information society. The Commission can be more than simply a policy maker: it can influence and support the evolution of the system in its multiple roles of user, regulator, arbiter, sponsor and facilitator. However, the initiative nevertheless remains the responsibility of other key figures. The recommendations of the Bangemann Group Report, 'Europe and the Global Information Society', clearly illustrates the distinction between these different roles. The standardization organizations, in particular, need to improve their planning and their development mechanisms to meet the requirements of the information society: if they do not evolve, they will find themselves being increasingly ignored by market forces.

A policy based on standards

The European Union favours the application of international and European standards. Preference should be given to such standards where they provide efficient solutions to technical problems. However, in the context of the Information Infrastructure, delivering timely and accurate standards constitutes a major challenge. Making Publicly Available

Specifications (PAS) established by industry, professional organizations or consortia into standards (e.g. by use of 'fast track procedures') may speed up the process and should be encouraged, so long as the following are also ensured:

- The consensus behind the PAS is convincing enough to stand the test of a public enquiry;
- clear provisions on Intellectual Property Rights (IPRs) are included;
- a sufficiently broad commitment is made by the various players to ensure that the standards can be properly maintained.

Conflicting standards risk creating islands of incompatibility, and should be discouraged. Where this situation cannot be avoided, there should be an obligation to ensure an acceptable level of interoperability. This is the case in the IPS and OSI protocol suites, for which co-existence and convergence are the key-words.

Conformance and interoperability testing

Conformance testing is a prerequisite for rigorous implementation and unambiguous interpretation of standard specifications. It provides a guarantee of operability and ensures technical integrity. Once standards-based products are more readily available, the importance of conformance testing will be better recognised, and the consequence should be a more appropriate organiza-



The Commission can be more than simply a policy-maker: it can influence and support the evolution of the system in its multiple role of user, regulator, arbiter, sponsor and facilitator.

tion of conformance services, which currently resemble a solution waiting for a problem.

The specifications for the testing process need to be reviewed and revised in the market-place and the services adapted to fit them. For example, testing services could be integrated into manufacturers' product development processes, or even designed so as to be used in customers' premises.

The work involved in producing and maintaining test suites and the related test technologies should be shared at an international level. Investment will be needed in automated tools to reduce the need for human intervention in the design and execution of tests. Commission support for conformance testing in the European Union has been re-focused on the funding of generic automated tools.

While conformance testing is a well-defined discipline, interoperability is not, and there is an urgent need for a global, unified approach that provides a balance between rigorous methodology and pragmatism.

Maintaining the international dimension

The developed countries have recently begun to align their standardization policies, setting an example that developing countries could follow profitably. The OSI model, and the consequent development of related protocols, provided the catalyst. Today, however, this state of affairs is being challenged as never before by the speed of technological development, and countries are re-thinking their standardization policies. It is vital at this delicate juncture not to jeopardize the existing consensus. We need both to maintain coherent policies and strive towards a common vision. A more comprehensive and flexible reference model will help to promote and secure world-wide interoperability and avoid economic fragmentation. The promise of a global information infrastructure provides an opportunity to reinforce alliances around a common vision and should not be missed.

The importance of coherence

A coherent approach to standardization is essential if we are to assemble the variety of elements required for a Global Information Infrastructure. Despite its remarkable achievements, the standardization process as it stands is unable to match either the pace of technology, or of market growth. It therefore needs to evolve towards a more efficient and

market-oriented methodology. The European Commission is willing to support and facilitate the evolution of the standardization process and the associated issues of testing, procurement and R&D. However, responsibility for the transformation of the process itself remains with the standardization organizations, in cooperation with industry.

Finally, the importance of maintaining the existing world-wide alignment of standardization policies should be restated and further implemented by the industrialized regions, wherever possible through a common approach and common actions. ■

Paola Bucciarelli DGIII

(1) Council Decision 87/95/EEC of 22 December 1986 on Standardization in the field of Information Technology and Telecommunications.

The digital world and intellectual property

Opportunities and challenges – a social issue

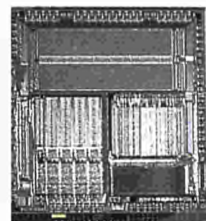
INFORMATION TECHNOLOGY is driving us toward a digital world. Digital information will cover all kinds of activities: music, literature, cinema, television, art & culture, software, photography, archives of all kinds, industrial design, etc. and generate new avenues of creativity.

This brings important challenges for society to cope with. Among these the problem of the protection of intellectual property is fast becoming a crucial issue that needs to be tackled as soon as possible within the next few years, especially as it is critical to the success of the new opportunities generated by digital technologies.

The European Commission considers that resolving this problem is a priority area of work within the 1994-1998 programme of R&D in Information Technologies.

"We do need to think about intellectual property in a new way. We need to think differently about how we define these properties, how we value them and how we protect and exploit them."⁽¹⁾

The widespread availability of digital information, whether delivered through any particular medium or simply "out of the ether" through airwaves or cable, brings with it an increasing demand for copying and reusing information. However, protection should not aim to restrict access to the information but rather to open it up by defining simple, easy-to-use controls which, moreover, will generate new business opportu-



nities in the exploitation of copyrights. Potential solutions to this problem are multi-faceted; they will emerge from an appropriate mix of legal, technical and political responses.

Legal – The application field of existing copyright laws and regulations urgently needs to be extended in order to cope with the digital information environment and harmonise the various European legal contexts related to intellectual property. Specific issues such as privacy of data, moral rights, integrity of information conveyed, responsibility for false or misleading information, how to deal with "compilation" works, etc. have still to be covered. Legal aspects may also lead to the stipulation that any copying, taping, recording and playing device must include a mechanism that will prevent unauthorised use of the information. The scope for action is broad and complex.

Technical – Encouraged by the potential economic importance of the new multimedia applications, technical solutions are beginning to emerge which aim to protect the rights attached to digital information transmitted over any kind of distribution networks, on or off-line. Further work is being planned to develop and implement appropriate "Electronic Authors' Rights Management Systems" (EARMS) for various application fields. Such systems are planned to include automatic licencing systems as well as the means to identify protected information and their usage rights & conditions.



Electronic means for payment of usage rights (including copyright) will also be addressed. New standards will have to be established to support these developments: data format to identify copyright material with standardised usage conditions, definition of standardised fees structure related to standardised usage acts, specification of "black boxes" preventing unauthorised use, etc. Almost everything is still to be done, let alone agreed.

Political – The new possibilities offered by the wide and easy distribution of digital information will affect the way society is currently organised. Political, economic as well as ethical choices will have to be made. Easy production of the information, widespread means of distribution and free access to the information will generate new economic activities, while others will disappear or will need thorough reorganisation and restructuring. New retail channels, still to be invented, will progressively supersede traditional ones. The transition period will bring a transfer of power and will generate

conflicts of interest, for example between authors, publishers and users that will have to be arbitrated to ensure a smooth move toward a new society where freedom could be reinforced. The "digital world" opens up a lot of opportunities but also poses serious threats that must be addressed at a political level.

These three aspects of the same problem – legal, technical and political – must be addressed in parallel.

A vision of the future

What kind of developments are we going to undertake? This very much depends on a vision of how the digital world will operate. Let us try to imagine how the present trends could affect the information society in the maybe not so distant future.

"Homes and offices are now connected at minimal cost to thousands of powerful and easy-to-use digital services. The precursor of them all was the French Minitel at the end of the twentieth century. These services cover about all kinds of human activities ranging from working at home – independently or for a company – to the distribution of music, movies, custom-made news or cooking recipes directly displayed in the kitchen."

The quantity and the richness of the resources made available to almost everybody has given rise to new sources of revenue rewarding the creative intellectual production of all individuals. For example, an attractive or interesting photograph (digital of course) can be loaded from your home in specialised databases served by information agencies. Having specified from your terminal the owner of the information

as well as the fees attached to future use of your creation, you will be automatically paid should anyone finds your creation useful for his personal or professional use. The information will be automatically deleted from the data base or returned to you if after a certain period of time it has not been accessed by potential users. Indeed, a new profession has been created just for tracking information potentially interesting for certain organisations, for example, news agencies.

On the other hand, you can pay for any information or services you use with a personalised "smart" copyright/payment card. This card is used as an electronic debit card for general purpose payments but also has particular features specific to certain applications. For copyright operations, payments are made instantly on-line when you are connected to a server. For off-line operations, payments are debited from a prepaid amount loaded in your card and the information to whom the payment has to be relayed – (copyright owners and service providers) – is transmitted each time you re-load your card to renew the prepaid amount stored in it or whenever you make an on-line transaction.

One of the most popular services is to get well-known paintings of famous artists displayed on large extra-flat LCD screens, with colourimetric correction features, hung on your walls; usage fees could be for just one evening or for a whole year, and the image disappears automatically at the end of the rental period.

Of course all existing recording equipment or devices are compulsorily equipped with a standardised protection mechanism preventing unauthorised use of the information and allowing payment of the fees for using the information. For example, you can record a digital movie from the TV and look at it once but you will have to pay to see it again; further recordings are also subject to fees. As everybody has to pay for using information they do not own themselves, the fees are very low, but nevertheless this has generated far more business than any other service.

All these services are controlled through very efficient and secure "Electronic Authors' Rights Management Systems" first conceived in the late 1990s, including interconnected "Licencing Systems" as well as well-designed features protecting the privacy of all individuals.

Each time you access a piece of information, specifically adapted rules apply. These rules have been produced mainly through negotiations between interested parties: creators, services providers and user associations. Particular groups of people, such as disabled people, students and teachers pay reduced or no fees for certain uses of information. Such rules are continuously evolving to follow the market demand as well as the social requirement.

The copyright laws have been adapted and harmonised throughout the world, thus giving rise to interconnected and highly competitive international information services. The business generated by this usage of Intellectual Property Rights has obliged the political world to include it as one of the main discussion topics in the GATT negotiations."

A possible approach

The above vision illustrates why the digital world needs developments in Intellectual Property Rights (IPR). Where do we stand today? IPR is generally held to be merely a legal problem, while legal experts consider that the transition from analogue to digital information requires an adaptation of existing laws to this new environment, rather than a wholesale rethinking of copyright laws.⁽²⁾ Developing and implementing integrated technical solutions to the problem of both protection and also exploitation of copyright is the main challenge for today, if we want to take full advantage of the emerging multimedia technologies.

CITED⁽³⁾ (Copyright in Transmitted Electronic Documents), an ESPRIT project, has paved the way towards an harmonised technical environment. This developed a generic model that could be applied to any possible application, be it on line, such as remote access to databases or off-line, such as CD distribution. This model is publicly available and it is proposed to make it a general reference model for all applications dealing with



copyright protection. This would give rise to the development of potentially compatible systems able to be interconnected when necessary.

Turning the potential benefit of the emerging multimedia applications into job creation mainly depends on the existence of an appropriate infrastructure, including an effective protection of Intellectual Property. Such protection must be supported by a new legal environment and new technical standards, both needing agreement at an international level.

The realisation of such an infrastructure could be initiated with the following action lines:

- Investment in the development of large content databases, including mechanisms for IPR protection.
- Investment in the development of distribution networks including "Electronic Copyright Management Systems" and "Automatic Licencing Systems."
- Evaluation of the economic and social impact of various scenarios, including that of pirating information in a loosely protected environment.
- Agreement of basic rules and standards at international level.

Potential standardisation needs

As far as the protection of intellectual property for distributing digital information is concerned, the main objective for future technical standards would be to establish an international harmonised environment. This would encourage creative authors and entrepreneurs to have the confidence both to conceive and invest in new economic activities. Such standards would need to be agreed and supported at an international level.

Potential standardisation areas can be identified as follows:

- The establishment of a generic harmonised model, applicable to all possible distribution means for digital information, on & off-line, for example CITED (see above).
- The definition of appropriate data formats to identify copyright material with corresponding usage conditions.
- The definition of appropriate fees structures relating to corresponding usage.
- The definition and standardisation of specific "black boxes," such as chips, to be embedded in hardware devices, to:
 - identify protected information,
 - prevent unauthorised use,
 - allow clearing of copyright fees.
- Standardisation of possible specific means of payment, such as smart cards, for clearance of fees for information usage, including copyright.

All these tasks are included in the multimedia part of the Specific Programme on Information Technologies, for which a call for proposals was launched in December '94.

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(1) David Baron, Director of Digital World, USA, paper to WIPO (World Intellectual Property Organisation) symposium, April 1993.

(2) See Conference Proceedings of the WIPO Worldwide Symposium on the Impact of Digital Technology on Copyright and Neighbouring Rights, 31 March - 2 April 1993, Harvard Law School, Cambridge, Massachusetts, USA

(3) ESPRIT Project 5469 CITED. Final report available at \$25 incl. p+p from G. Cornish or S. Keates, British Library, Boston Spa, Weatherby, West Yorks, LS 23 7BQ, U.K.

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Telework in Europe: has it lived up to expectations?

Penetration, potential and practice

TELEWORK has long been an attractive concept, which has inspired numerous estimates of its likely spread and penetration over the past few decades. In the 1970s some authors had high expectations when they believed that "all Americans could be homeworkers by 1990" (AT&T, cited in Huws 1984).⁽¹⁾ A decade later, others stated that "by the year 2000 approximately 40% of the employees in the US will be teleworkers" (Institute for the Future, cited in Müllner 1985).⁽²⁾

Other estimates are that in many developed countries 10-15% of the workforce will be teleworking to some degree by the end of the century.

These examples show that the closer to the present the estimates were, the less optimistic they turned out to be, as authors realised that the spread of telework was going to be more evolutionary than revolutionary.

The situation is similarly confusing when it comes to estimating the penetration of telework in different countries round the world. When looking only at the most recent estimates, there appears to be a wide range in the actual number of teleworkers. This is partly due to differences in definitions of telework used by various authors and their differing methods for carrying out the estimations.

It was against this background that **empirica GmbH** decided to generate a representative empirical basis study providing reliable figures on the penetration of telework, and enabling its likely future development to be estimated accurately. To achieve this, **empirica** carried out representative surveys of



decision-makers and employees in organisations and the general population in the four largest EC Member States in 1985 (Germany, the UK, France, Italy) (Huws/ Korte/Robinson 1990), and again in 1994, this time adding Spain to the list. The 1994 survey was carried out as part of the TELDET project (Telework Developments and Trends, Project T1016 of the Telework Stimulations Activities of DGXIII-B). Partners led by **empirica** in Bonn were IDATE (France), The Work Centre (Ireland), INMARK (Spain), and INNOVA (Italy).

Telework penetration

According to the results of the surveys in 1994 the penetration of telework in European organisations is around 5%, and the actual number of teleworkers in the five largest EC countries approximately 1.1 million. Extrapolating this figure to the whole of the EU gives a total of 1.25 million teleworkers.

The UK and France are the countries with the highest telework penetration in organisations, with around 7% of the organisations practicing telework. Factors which are likely to have contributed to this situation are their particular cultures and mentalities, ie a much higher openness to technological developments than in other countries

(cf. the success of Minitel in France and the high level of PC usage in the UK), the widespread popularity of self-employment (especially in the UK) and an advanced awareness of the options telework offers. This latter has obviously also been stimulated to some extent by public awareness initiatives (eg DATAR in France, Robinson/Kordey 1994).⁽³⁾

Current telework practice in Europe

Telework is being practiced throughout the economy. The banking and insurance sector was the first to use it to a considerable extent. This may be due to their employees' very high familiarity with IT&T and the often highly decentralised organisation of such companies, where branch offices and mobile sales forces working from home are already connected to headquarters by telecommunications. In addition, large corporations appear to be the first to make use of teleworking. Telework practice is highest in organisations with more than 1,000 (in some countries up to 500) employees, where it reaches figures significantly above the average.

Urban areas are already telework growth centres and are likely to remain so. The situation is unlikely to alter unless specific initiatives to encourage change are undertaken.

In terms of absolute figures of teleworkers the UK tops the figures with 560,000, followed by France with around 215,000 teleworkers. Italy with 97,000, Spain with 102,000, and Germany with 149,000 are at a relatively early stage of telework diffusion.

Telework potential

The potential of telework is estimated by determining the opinions and attitudes towards telework of decision-makers and the population, and the organisational changes which it entails. These are used as indicators which can help to measure supply and demand in telework.

Awareness and information sources

In order for people who may be affected by telework to be able to assess it, they first of all need to know something about it. The more familiar people are with telework, the more qualified, differentiated and reliable their statements and expressions of interest (or otherwise) are likely to be.

Self-reported knowledge among the population about telework varies significantly across the countries. It ranges from a low of 23% in Spain to over 50% in France and the UK, and other populations having medium levels of knowledge: 37% in Germany, and 35% in Italy. These figures are surprisingly high, and probably represent the extent to which the media cover telework.

Newspapers and magazines are the primary media from which information about telework has been obtained, followed by TV and radio. The exception

here is France, where TV and radio rank top, with 42% of the respondents having got their information via these media. In the UK, press and TV/radio achieve similar ratings with both around 27%.

The gap between interest and practice

There is an enormous potential for telework uptake, judging by the interest and willingness to practice telework shown by decision-makers in organisations and the population at large. Depending on the country, between a third and half of the workforce in the European countries investigated would be willing to telework. Interest is quite evenly spread across Europe, ranging from 55% in Spain, down to 41% in Germany.

When comparing the results from the surveys in 1994 to **empirica** surveys in 1985, it becomes apparent that interest in telework among the workforce has risen dramatically between 1985 and 1994, and in European countries by a factor of three to four. The rise was not that significant in the UK, where interest in telework was already at a high level in 1985. It is now at a comparable level in the other European countries (Huws/Korte/Robinson 1990).⁽⁵⁾

However, there is a striking difference between the interest expressed by the general population, and the current practice of telework in organisations. The countries with the least use of telework, ie Italy (2.2%) and Spain (3.6%) also show the highest interest in it amongst the general population (45.4% and 54.6% respectively).

The telework demand figures (interest and willingness of organisations to practice telework) are at comparable levels, ie more than a third of decision-makers in Europe are interested in

telework. Nevertheless, in both cases, ie both the potential supply of teleworkers as well as the demand from organisations for teleworking, a large gap still exists between current telework practice and its potential in terms of interest.

Obstacles to introducing telework

Managers in organisations are well aware of the fact that not all tasks lend themselves to teleworking. Opinions differed considerably about what is possible and what not. Besides the task's suitability for teleworking, which either acts as a constraint or a facilitator to telework introduction, we inquired directly into the obstacles to teleworking as seen by decision-makers.

The categories of obstacles ranged from insufficient knowledge, expense, productivity and work quality, the difficulties of managing and supervising telework, communication problems, questions of health and safety, to inertia, employee resistance, and union resistance.

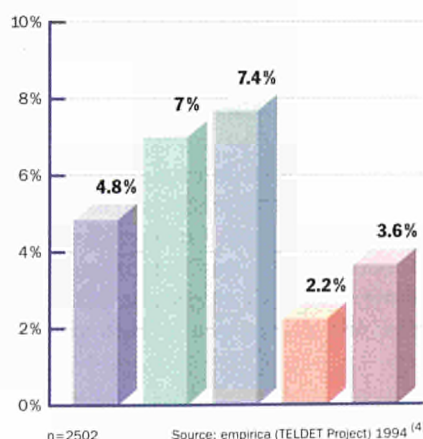
The most prominent obstacle cited was insufficient knowledge among managers of how to plan and organise telework. Further major constraints are the difficulties of managing and supervising, and the problems expected in organising communication with teleworkers. The expense of computing equipment and telecommunications services ranks fourth on the list of factors constraining telework uptake.

What the future holds

The figures from the **empirica** surveys carried out as part of the TELDET project indicate that around 1.1 million individuals are already teleworkers in Europe. 5% of European organisations already practice one form or another of

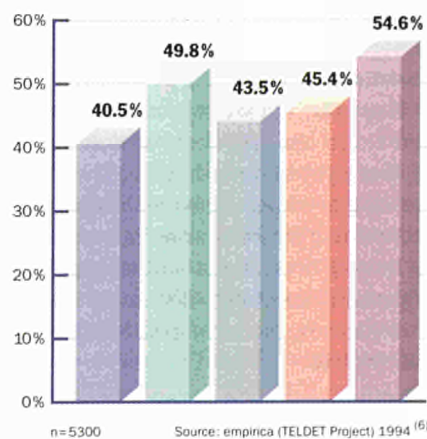
Telework practice in organisations

Decision Maker Survey (DMS) in Europe 1994



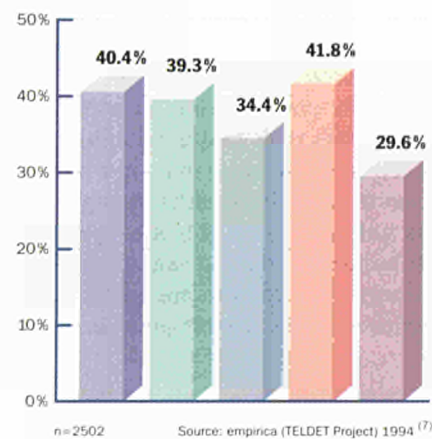
General interest in telework

General Population Survey (GPS) in Europe 1994



Interest in telework among organisations

Decision Maker Survey (DMS) in Europe 1994



Key

Germany

France

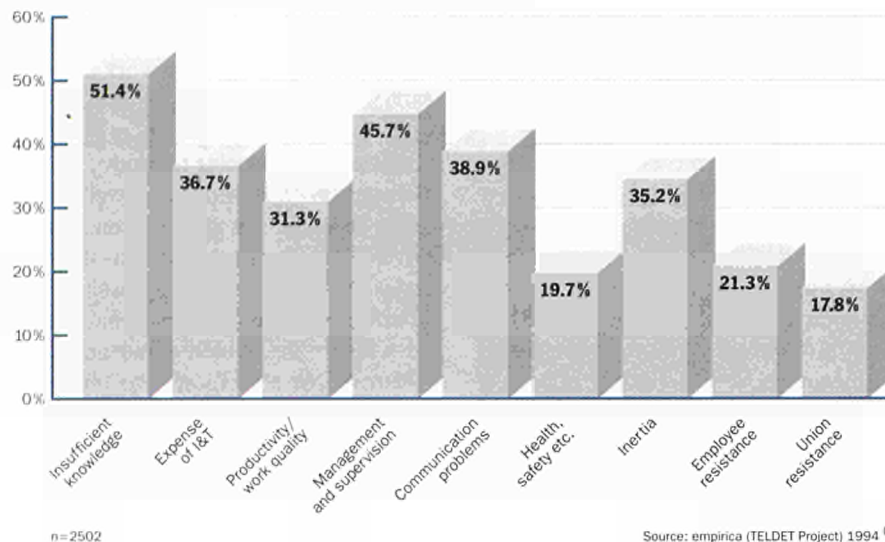
UK

Italy

Spain

Obstacles to the introduction of telework

Decision Maker Survey in Europe 1994



this new form of work organisation. However, telework practice has still not nearly reached its potential, and there is a likelihood for significant increased telework uptake in the near future. It appears that only a certain percentage of the European organisations and employees interested in telework seem to be good candidates for teleworking in the immediate future, because inevitably for one reason or another not all who have said they would be interested in telework will actually become teleworkers.

Under simple assumptions about the distribution of those interested in telework across the employment spectrum, we can calculate that 19% of the workforce is both interested in telework and employed by an organisation which is itself willing to implement telework. When in addition to mutual interest, the task at hand is suited to telework, we arrive at a more reliable estimate of telework potential.

On the premise that nowadays information-based occupations can all be carried out by telework of one form or another, and drawing on work in the

1980s showing that information-related occupations at that stage already made up 40% of the employment total, we arrive at an overall telework potential of just under 5% of the workforce. This amounts to over 10 million people in the European Union.

This potential is not static, for we have seen that interest in telework by individuals and managers has been rising strongly. Also the proportion of the workforce in occupations lending themselves to telework is likely to rise rather than fall, so that even without concerted action to encourage the spread of telework, the potential can be expected to increase. In our view, realising this potential will depend on dissemination of information on how to set up and manage telework across a wide spectrum of occupations – and in an economic and socially responsible way. Since the current liberalisation of telecommunications will reduce costs, this will encourage a positive assessment of telework by employers.

The aim of the European Commission is for 2% of white collar workers to be teleworkers by 1996 and for there to be 10 million teleworking jobs by the year 2000. Given the results of the above surveys, the EC figures seem to be both realistic and achievable.

However, the surveys also revealed that there are still some obstacles to telework yet to be overcome. The most pressing need is to provide information and training for European organisations on how to bring about and manage the organisational change necessary if they are to become more competitive through telework. ■

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(3) S. Robinson, N. Kordey: 'Teleworking: Internationale Trends. Telekom-Anwender Kongress '94: Corporate Networks und neue Techniken. Nationaler und internationaler Wettbewerb und Anwender.' Bonn 1994

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(5) Huws, Korte, Robinson: 'Telework – Towards the Elusive Office.' John Wiley & Sons, Chichester 1990

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(7) *ibid.*

(8) *ibid.*

Werner B. Korte, Norbert Kordey,
Simon Robinson *empirica GmbH*



Job creation in the information society

BY ALL ACCOUNTS building the information society holds the key to ensuring the long-term competitiveness of European services and industry, the prime motor for job creation whatever the sector. We are at the beginning of a new information infrastructure in society and industry. Easy access to usable electronic information for any citizen or business, at any time, in any place will be provided by the technologies and services which it brings together: information processing, storage, retrieval, transmission and the information content itself. This is the basis of the information society.

Information creation, access and use are set to play a central role in the efforts of the European Union (EU) to create employment. They offer enormous potential not only in the near term for the creation of new jobs in the infor-

mation and telecommunications sectors, but also in the long term as new services and applications spring from the advanced communications infrastructure, ranging from distance learning and telemedicine to teleshopping and video-on-demand, but above all, global seamless communications.

By focusing on such high value-added services, the European information infrastructure can provide the tools that will permit Europe to compete successfully on the world market and maintain high standards of living. The return to a strong economy and fuller employment, not just in the information technology sector but in all industries, will be strongly influenced by the speed and success with which the new information infrastructure can be set up and the structural adjustment of industry completed.

Moreover, as the EU moves to take advantage of the global information infrastructure in order to achieve the greatest possible job creation impact, the new technologies and services will

thoroughly transform the labour market, on the same scale as the industrial revolution transformed the agriculture-based societies of the 18th century.

With the unemployment rate averaging 10.5% across the Union, the role of the public authorities, notably the European Commission, lies in ensuring that the Union makes full use of the job-creating opportunities of the information society while at the same time easing the transition from today's labour market requirements to tomorrow's.

The information society is already transforming and sometimes displacing jobs, changing and upgrading skills required in other posts, while providing new opportunities for distance training techniques and life-long learning and training. It has already permitted the decentralisation of corporate organisations, allowing firms to displace certain

activities from a central office to regional locations in generally low-cost and often high-unemployment areas – and this trend will grow. If used correctly, the European information infrastructure dovetails with the EU's regional policy objectives. In addition it will help it in its efforts to reduce environmental pollution – particularly in congested urban centres – which in turn will contribute to improving the health, wellbeing and quality of life of its citizens.

Preparing the way

To investigate fully how the information society will affect the labour market, and with a view to preparing labour for the changes, the Commission has launched a series of studies and projects. A few of these are given below.

Building on the past achievements of ESPRIT, the new IT programme of the Directorate-General for Industry (DGIII) now focuses on the development of the information infrastructure and an emphasis on access and usability, with the aim of contributing to the healthy growth of the information infrastructure, improving the competitiveness of all Europe's industry and helping enhance people's quality of life.

One of its projects is QUALIT, which is exploring the impact of IT on the quality of working life. For years it has been recognised that the introduction of information technologies can provoke serious problems if employees resist change because of a lack of good technical and psychological preparation. The QUALIT project is bringing together psychologists, sociologists, employees, employers and technicians to develop appropriate tools and methods for avoiding such problems.

CAP Gemini, the project leader, is analysing the repercussions on a company's workforce following the introduction of a new information management system. At the Fiat company the effects of introducing information technology in a state-of-the-art and a traditional factory are being

compared. With the close cooperation of Denmark's General Workers Union (SiD), it is developing software and guidelines to help managers make the best possible use of information technologies, including introducing appropriate training for employees. SiD is testing these and providing feedback to enable fine-tuning of the results.

As an accompanying measure within the EU's programme in advanced communications, Telework 94 provides a framework for an entire series of projects set up to explore the possibilities in this field. AD-EMPLOY is one of them. It will assess the overall employment trends in Europe related to the use of advanced communications with a view to helping the Community use the technologies to stimulate new job creation.

Directorate-General XIII (Telecommunications, Information Market and Exploitation of Research) is also preparing a project in collaboration with the Commission's Social Affairs Directorate (DG V) which will measure the social cost of information technologies in terms of net job creation in the telecom transfer sector or elsewhere.

The information gathered in these projects will help public authorities assess and understand better the impact of information technology on employment, and in consequence formulate policies to make the transition easier.

Jobs and the new services

The job market is only now recovering from the first stage of the information society where the major impact on job numbers was at best neutral, if not negative. The information technology/telecom sector took the brunt of this initial impact and carried out widespread restructuring in response to rising global competition, new technologies and a period of recession. In other industrial sectors the new technologies initially focused largely on production techniques, which resulted in job losses but improved competitiveness: the introduction of robotics has decreased employment in the factory while word processing technologies have reduced demand for secretarial staff.

At the same time and for all industrial and service sectors the new technologies have upgraded the required qualifications of the staff that remained. Secretarial staff are being reoriented towards office management; factory workers are now controlling production through information technology.

Now that production and the service industries seem to have adapted to this initial stage, they are on the verge of using the new technologies and infrastructure to offer a range of new services that will transform and create jobs.

The market for teleservices already represents ECU 14 billion in turnover and is forecast to grow by 10 to 15% per year through 2005, according to France's Ministry of the Interior and Land Use. The services offered respond to a variety of user demands.

The expected popularity of telemedicine reflects growing client demand for a return to individualised treatment. This arises in part from changing lifestyles, in part from the deterioration of traditional services, but also from demographic changes, especially the ageing of Europe's population.

Distance learning is also experiencing new popularity as the demand for re-training and continuing education rises. The anticipated boom in teleshopping and home-based services reflect the serious time constraints of today's families, with both partners working and often only a day a week for hectic expeditions through crowded stores. Although this new trend may not directly increase jobs in the financial services sector, it should ensure the long-term viability of the banks by requiring that they respond to the changing needs and demands of their customers.

Telework

Commission President Jacques Delors' 1993 "White Paper on Growth, Competitiveness and Employment" (which provides a strategy for getting the European economy back on its feet) identifies telework as one of the eight strategic developments that the EU should encourage to help stimulate job creation. The paper estimates that in order to meet potential demand, investments in telework will have to reach 3 billion ECU over the period 1994 to 1999, out of the total 67 billion ECU required for the construction of trans-European telecommunications networks in general.

Telework represents an invaluable tool for employers seeking to reduce overheads, increase productivity and improve their competitiveness. It also provides employees with greater flexibility in working hours and geographic location. In many cases the services provide assistance in specific areas such as accounting or secretarial functions, which a client requires only on an irregular basis and for which he

therefore cannot justify employing full-time staff to carry out the tasks on his premises.

In Scotland, for example, BT, Grampian Enterprise and Strathspey Enterprise have supported the creation of a telecentre in Aberdeen to carry out administrative tasks for the textile and agricultural industries in the region. The centre has created 200 jobs. Over the last ten years France's Minitel has led to the creation of 23,000 videotext services and 15,000 new jobs solely in the new field of electronic services production.

The potential for telework is greatest in business sectors involving high levels of information interchange such as financial services, insurance claims processing, commercial sales support and publishing. A teleworker can, however, carry out a variety of tasks common to all business sectors including secretarial functions, administration, accounting and record-keeping.

Experience has already shown that companies and teleworkers themselves prefer the creation of decentralised "telecentres" rather than working from their home. Not only are telecentres less expensive than setting up networks of individual computers in homes and more easily supervised, but the workers often object to the almost total isolation of "home-work." In the UK the Telecottage Association regroups some 130 centres.

Currently, 10 million people in the EU or roughly 6% of the working population could be classified in one way or another as teleworkers or distance workers, and this figure will grow rapidly through the 1990s to 7.5% if the EU succeeds in promoting the implementation of such networks.

The audio-visual sector already employs 900,000 people in the European Union and with the introduction of multimedia services this figure could more than double by the year 2000. Pilot projects on the introduction of video-on-demand are already underway in the UK and Belgium, but new multimedia services will also include electronic access to libraries, art galleries and museums.



Shaping the business environment

Reaping these benefits, however, requires the development of a high-speed infrastructure with open access for all. The development of a single market for telecoms equipment and services by way of deregulation is the only means to achieving this goal.

But deregulation is not sufficient. To facilitate the move to these new types of employment, the public authorities may also have to adapt labour and social security laws in collaboration with social partners to prevent discrimination against the teleworker as regards salary levels, seniority and social protection. As David O' Sullivan, a member of the cabinet of Pádraig Flynn, Commissioner for Employment and Social Affairs, explained recently, "We need a new set of rules relating to social security, tax and employment law to take into consideration the new (working) environment."

Another priority area for action concerns small and medium-sized enterprises (SMEs). The public authorities must help SMEs to adapt to the information age. In recognition of the dominant role that SMEs play in the EU's economy – 93% of all companies in the EU employ 9 workers or less – an expert group organised by Internal Market Commissioner Raniero Vanni d'Archirafi recommended in 1994 that the EU should, among other steps, facilitate SMEs' access to capital markets.

This recommendation becomes all the more urgent in the information society where, due to their greater flexibility, SMEs have the capacity not only to incorporate the new technologies more rapidly but also to offer new services sooner than larger corporations – provided they have access to capital to finance the necessary investments. For

example a Danish company specialising in the production of chemical and pharmaceutical products increased staff by 25% over five years while modernising its data processing with the introduction of ISDN.

1996 Year of Lifelong Learning

The information society will also pose a challenge to Europe's education and vocational training systems which the public authorities will have to face. In exchange for the flexibility offered by the information society in terms of "work where you want to when you want to" workers must accept that their job descriptions will constantly evolve and their skills be continually updated. Perhaps for this reason the Commission has proposed naming 1996 as the "Year of Lifelong Learning."

The role of public authorities is to ensure that Europe can take full advantage of the opportunities presented by the information society, by removing obstacles to investment and by helping citizens adapt to the information age. The information society is inevitable and in a global economy no country or company can afford to ignore it. If they do, they risk slow growth, a lack of competitiveness and further job losses.

As the Bangemann Report on "Europe and the Global Information Society" warned: "The first countries to enter the information society will reap the greatest rewards... Countries which temporise or favour half-hearted solutions, could in less than a decade face disastrous declines in investment and a squeeze on jobs."

The message is clear. ■

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