

# **COMMISSION OF THE EUROPEAN COMMUNITIES**

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**IMPACT programme (EC programme for the establishment of an information services market)**

**COMMUNICATION AND REPORT FROM THE COMMISSION  
TO THE COUNCIL, THE EUROPEAN PARLIAMENT  
AND TO THE ECONOMIC AND SOCIAL COMMITTEE**

**on the main events and developments which occurred in the electronic information  
services market in 1991/92**

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1. This Communication concerns the IMPACT Programme (EC plan of action for setting up an information services market) adopted by Council Decision 91/691/EEC of 12 December 1991.

2. In conformity with article 6 of Council Decision 91/691/EEC, a report has been prepared on the main events and developments which occurred in the electronic information services market in 1991/92 and is attached to this Communication. Three similar reports, covering the state of the market in the periods 1988-89, 1989-90 and 1990-91 have been forwarded to the European Parliament and to the Council as docs. SEC(90) 1788 final, dated 24 September 1990, SEC(92) 1536 final, dated 2 September 1992, and COM(93) 156 final, dated 19 April 1993.

3. This fourth report reviews the most important trends which became apparent over the period 1991/92, within the following sectors:

"classical" on-line ASCII database services,  
videotex services,  
publications on optical disk,  
fax-based and audiotex information services.

4. The following major findings are highlighted in the report, which to some extent confirm earlier findings:

- Europe is a major world force in world-wide on-line production and distribution: by end of 1991, 35% of all database producers and 30% of on-line service operators were based within the Community. However, the international marketplace for text and bibliographic on-line services is dominated by two US vendors.

- World-wide sales in 1991, generated by EC-based hosts and information providers amounted to a value of 3.3 BECU, an increase of 5.6% in absolute terms compared with 1990. The strongest growth came from off-line sales: magnetic and optical media (which doubled) and document delivery (which trebled). However, in relation to total income, these media types accounted for only 5.4% of the 1991 total industry value.

- The videotex market continues to be nationally based, mainly as a result of the lack of standardisation and compatibility between the various systems and language barriers. France remains the largest national market, with some 75 million connections per month (mid-1991), although the most intensive levels of professional demand are to be found in Italy and Germany.

- Although the number of installed CD-ROM drives in Europe has increased from 0.2 m. in 1991, to an estimated 0.6m. by end of 1992, the number of people actually able to use CD-ROM titles remains small. In the years to come multi-media information products and services will have a tremendous impact on most information technology sectors.

- Total world-wide turnover of audiotex services in 1991 is estimated at 2.8 BECU, and is projected to grow annually by between 25 and 30 per cent. Europe with a turnover of 765 MECU compares with USA 754 MECU, and Japan 989 MECU. The development of the European Audiotex market is presently restricted by technical, linguistic and legal barriers, as well as the fragmented nature of the industry.

- Telecommunications and software developments will have a significant impact on the future shape of the European Information services sector. Investment is therefore required in a high-speed trans-european telecommunications infrastructure to improve the competitive position in relation to US and Japanese competitors.

- European players have begun to respond to the need for higher levels of vertical integration in electronics, telecommunications and computing, as product technologies converge. This has resulted in the forging of strategic alliances both within the European marketplace, as well as overseas.

- Increasing globalisation of information markets means that there is a need for legal protection and regulation of the electronic services sector at the international level, which has been recognised by the Commission's publication in 1992 of two Draft Directives concerning copyright.

5. The main conclusions highlight the report's major theme of Europe's international competitiveness in electronic information services in relation to USA and Japan. In this respect:

- The significant gap between US and EC information service sector revenues (worth 8.2 and 3.3 BECU in 1991 respectively), shows signs of further widening. Future prospects for reducing this gap depend upon the quality and performance of the telecommunications infrastructure, e.g. the EC's Integrated Services Digital Network (ISDN) initiatives.

- Japan is not as yet a major player in electronic information services, but has a comparative strength in hardware and consumer electronics, which will allow it to compete in the new markets for interactive media. A key factor for its relative weak position stems from the failure of Japan to find markets outside of its domestic market, despite the fact that the supply of new database services being offered has increased significantly.

- Europe still has significant strengths in publishing and a rich legacy of recorded information. Success depends on the extent to which these assets can be exploited by European actors.

- The European firm is typically smaller and less vertically integrated and more nationally focused than its US counterpart, and will therefore in order to survive need to enter joint ventures and alliances, as well as take advantage of the opportunities presented by multi-media technologies.

- Demographic and social changes in Europe are likely to lead to an increase in demand for information communication technologies and services as a means of increasing productivity and rationalising costs.

- The further development of the European information market, will depend to a large extent upon the availability of advanced information engineering technologies, especially to increase the user-friendliness of the services. This will require significant levels of co-operation and co-ordination at the European level, because the investment and resources needed to develop generic solutions are probably beyond even the largest information industry players.

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## **INTRODUCTION**

When on 26 July 1988, the Council adopted a plan of action for setting up an information services market (the IMPACT programme), it asked the Commission to establish an Information Market Observatory (IMO) and to present an Annual Report on the most significant developments and trends in the European electronic information services market. This fourth Annual Report, based on data collected by the IMO during 1992, reviews the overall state of the European market for electronic information services and identifies the most important trends which became apparent during that year. As before, this Report reviews in more detail developments in four key segments of the European marketplace for professional electronic information services:

- "classical" online ASCII database services
- videotex services
- publications on optical disk (including interactive multimedia)
- audiotex and fax-based information services

As well as presenting detailed findings of work undertaken or commissioned by the Information Market Observatory, this Annual Report attempts to widen the usefulness of the work by stressing the competitive strengths and weaknesses of European information service providers, especially in relation to the USA and Japan.

## EXECUTIVE OVERVIEW

### *Information as a critical European resource*

1 January 1993, the inauguration of the Single European Market, is not a 'finishing line' but rather a 'signpost to the way ahead.' The success of the single market depends upon the complete removal of all barriers to trade; including barriers to flows of tradeable information. With much of the developed world in recession and Europe experiencing high levels of unemployment, all Member States are having to make concerted efforts to boost confidence and to promote economic recovery. One important factor in improving European competitiveness is by making better use of information as a factor of production. This requires that information resources be managed and deployed more efficiently and that the links between the creators of information products and the ultimate users are effective. Information and communications technologies (ICTs) have a crucial role to play here; by improving the competitiveness of European industry they may help to promote economic growth and employment.

### *The European information marketplace*

Europe is a major world force in worldwide online production and distribution: by the end of 1991, 35 per cent of all database producers and 30 per cent of online service operators were based within the Community. According to supply-side indicators for 1991 and 1990, there has been a striking increase in the numbers of Community databases (by 26.3%) and database producers (by 21.7%). Although these figures, which represent directory entries, need to be interpreted with caution, they nonetheless provide confirmation of trends noted in earlier IMO Annual Reports; these include the fact that the pattern of database distribution continues to be more highly concentrated in North America than in the Community (2.4 and 2.0 databases per host respectively).

The international marketplace for text and bibliographic online services is dominated by two US vendors: Mead Data Central (MDC) and Dialog. While EC-based vendors (OR Télématique, Questel, Européenne des Données, GBI and ESA/IRS) occupied five positions out of the top ten world rankings, none came within the range of either of the two US mega-host. This tends to support the view that the markets for EC vendors are predominantly national or regional, rather than worldwide.

In 1991, EC-based hosts and information providers generated worldwide sales to the value of 3,325 MECU, an increase of 5.6 per cent over 1990 in absolute terms. Sales of real-time services grew by 4.5 per cent, while online retrospective services increased by only 2.8 per cent. A much stronger pattern of growth was evident in offline sales, notably for magnetic and optical media (which doubled) and document delivery (which trebled); however revenues from offline sales are still small in relation to total income; the combined income from magnetic and optical media, plus document delivery was only 5.4 per cent of 1991 total industry value.

## *CD-ROM*

The number of people actually able to use CD-ROM titles remains small. Recent estimates suggest that the worldwide installed base of CD-ROM drives at the end of 1991 was around 2.25 million, with 1.44m in the USA, 0.62m in Asia, and 0.2m in Western Europe. High growth rates are predicted; by the end of 1992, the European installed CD-ROM base is likely to rise to around 600,000 with the largest single national marketplace being the UK (185,000 units). Other leading EC markets include Germany (125,000 units), Italy (85,000), France (50,000) and the Netherlands (25,000). Worldwide revenues for the commercial and in-house CD-ROM sectors have grown from 66.5 MECU (1987) to 3,200 MECU (1992). Global revenues from commercial titles and drives were said to amount to 2.2 BECU in 1992. The long-range impact of the CD-ROM on online markets is likely to be considerable, especially in the academic and library communities where CD-ROM pricing structures can be highly attractive.

## *Videotex services*

The videotex market continues to be predominantly nationally based. The largest market for videotex within the EC continues to be France, where Télétel attracts, on average, around 75 million connections per month (mid-1991 estimate). National videotex markets outside France are much smaller, but they are nonetheless used just as, if not more, intensively. In fact the most intensive levels of professional demand for videotex are to be found in Germany and in Italy. One reason for videotex services continuing to cater predominantly for national markets is the lack of standardisation and compatibility between the various systems. The European Commission has recently, through the introduction of the multilingual IMPACT videotex service, implemented sample pages in existing national systems in ten Member States, making the same information available in the native language of each country. This is designed partly to overcome the lack of common standards and also to increase awareness of the advantages of accessing electronic information resources.

## *Audiotex services*

Industry analysts predict that audiotex will play a fairly significant role in the delivery of professional and consumer information services in the future, especially for applications in finance, travel and transport, sports information, and tele-marketing. The UK, France and the Netherlands are the three largest audiotex markets within the Community, with estimated 1992 market values of 347 MECU, 279 MECU and 100 MECU respectively. Japan is the world's largest single audiotex market, with an estimated 1992 turnover of 989 MECU. The total worldwide turnover of audiotex services is estimated at 2.8 BECU (1992 estimate) and is projected to grow annually by between 25 and 30 per cent. Interactive audiotex services are likely to increase substantially in their importance. As with other electronic information services within the EC, audiotex market development is presently restricted by technical and legal barriers as well as the fragmented nature of the industry. Overcoming these barriers is a current area for discussion by the Commission of the EC.

## *Europe in the global marketplace*

The Asia-Pacific region is emerging as a major hub of the world's economy; regional cooperation has led to the assembly of a powerful network infrastructure (including the ASEAN optical fibre cable network). The region is relatively information-poor, however, and market opportunities for the supply of external information are likely to present themselves. Compared with Japan, the Community has a significant strategic advantage in terms of industry size, which is likely to grow in absolute if not relative terms over the next five years. A key factor explaining Japan's relative weakness in the electronic information sector lies in its continuing failure to find markets outside of Japan, despite the fact that the supply of new database services being offered has increased markedly. Foreign access to Japanese data is limited, despite high *potential* demand, by a number of factors: including lack of language skills, operational problems, uncertainty over copyright, and difficulties in setting up foreign sales and distribution networks.

## *Developments in telecommunications and software*

Telecommunications and software developments will have a very considerable bearing on the future shape of the European information services sector. Investment in high-speed transeuropean telecommunications infrastructure is needed to improve the competitive position of the European information industry in relation to its US and Japan competitors. The Commission's policies of liberalisation and harmonisation to create an internal market in telecommunications are important if service innovation is to flourish. In most of the EC Member States little progress has been made in the supply of high-speed lines. Tariffs for broadband leased lines vary considerably across the Community. On the positive side, however, competition has increased in terminal equipment markets and in those for value added and network services (one of the fastest growing markets for telecommunications-based services).

In June 1993, a Resolution was adopted by the EC Council of Telecommunications Ministers on the liberalisation of voice telephone services. This is to apply to all international (within and outside the Community) and national domestic services, but the action has been postponed until 1998. Furthermore, special arrangements and transitional periods will apply to the Community's peripheral regions and to those Member States with small and less developed networks. The speed at which liberalisation is to proceed is likely to remain a high priority issue throughout 1993. Much more emphasis is to be placed on the improvement of cross-border telecommunication networks which link national administrations. This should facilitate the processing and interchange of information between national administrations and Community institutions which is necessary for the functioning of the internal market and the implementation of common policies.

Future prospects for the information services industry depends also on progress in the EC's ISDN (Integrated Services Digital Network) infrastructure. While the take up of ISDN services has been slower than anticipated, it is currently available in most of the Member States; however its full benefits can only be realised with a fully-fledged, harmonised, European-wide network. To this end, an agreement has been drawn up between 26 of the EC's telecommunications' administrations (known as the 'Memorandum of Understanding on the Implementation of a European ISDN Service'). EURO-ISDN commits the signatories to provide at least a minimum set of pan-European services by the end of 1993.

### *Barriers to access to electronic information services*

Some of the most important barriers to increasing access to electronic information services are technical in nature. Many of the software and display interfaces, information retrieval languages and database structures are inappropriate to users' needs. Overcoming user access difficulties will depend to a large extent on the availability of advanced information engineering technologies. The development of generic applications often requires a multi-disciplinary approach, as well as large inputs of capital and RTD resources; since such resources are often beyond the capability of even the larger European players, the CEC intends to give the development of generic technologies a prominent place in the implementation of a Community fourth framework programme for research and technological development (1994-98).

Industry analysts are predicting that multimedia information products and services will have an enormous impact on all information technology sectors over the next few years. While the EC has undoubted strengths in publishing and in information content, it is comparatively weak in computing and consumer electronics, both of which are needed to develop interactive multimedia services and products. There has been considerable progress in developing multimedia products in Japan and the USA, but Europe is lagging behind. In the USA, most of the major software suppliers have developed multimedia applications.

Further progress in the field of information transfer standards and their adoption is vital if the Community is to establish a presence in world markets for interactive multimedia, where the need to integrate data from different sources in a hardware-independent environment will be a critical factor in competitive success. IMPACT, through its Open Information Interchange activity, is currently providing support for a range of strategic initiatives.

### *Changes in the marketplace and the impact on company structure*

Europe's electronic information services operate in a global market which is undergoing considerable structural change. Typically, the average European information services provider is smaller, less vertically integrated, and much more nationally orientated than its US counterpart. In general, European publishers and broadcasters are far behind their US counterparts in their interest and participation in multimedia. The strategic alliances that have recently been forged between the US film and music companies and major Japanese electronic companies and telecoms and software producers, for example Microsoft and AT&T, could exclude and damage the traditionally strong European publishing sector if it fails to enter the learning curve for multimedia and electronic publishing at an early enough stage.

European players have started to respond to the need for higher levels of vertical integration in electronics, telecommunications and computing, as product technologies converge. Increasingly, this has led to the restructuring of the information business and the forging of strategic alliances, including overseas ones, between manufacturers of consumer electronics and content services, such as print and film publishers. Recent examples of merger activity within the European marketplace include the acquisition of Data-Star by the US media conglomerate, Knight-Ridder, and the merger between Britain's Reed International and Holland's Elsevier publishing groups. The merger has

made Reed/Elsevier a colossus among quoted publishing and information companies, surpassed only by Time Warner and Dun & Bradstreet.

There is no doubting the need for cross-sectoral, cross-border alliances and more intensive R&D integration if Europe is to be able to develop new information-based products and services. Support will be required, however, in order to overcome the difficulties of a highly fragmented, multilingual market. The processes of convergence between production, packaging, distribution and facilitation add considerably to the already intense problems of mapping, defining and measuring the information industry. The rapid diffusion of ICTs will inevitably generate stresses and strains which may amplify existing problems such as skill shortages, divergences in technical standards, low levels of user awareness and legal and regulatory barriers. It is important for the IMO to continue to develop statistical tools and other ways of mapping and monitoring the EC information services sector in order to shed light on important policy issues.

### *New opportunities for traditional publishers*

Despite the barriers to entry, electronic publishing offers significant new market opportunities for traditional publishers. The EC print publishing sector was worth an estimated 75.5 BECU in 1991. This includes books, newspapers, consumer/general interest magazines and corporate publications. A review of the key European market segments for print publishing in 1992 showed that the corporate business market offers the largest potential for expansion since it is likely to need more information on markets in the context of European integration.

Although the business and professional markets appear to offer less risk (but ultimately a smaller demand base) than consumer markets, two other electronic media markets are likely to experience higher than average growth over the next ten years: travel/tourism and children's publishing. The travel and tourist industry is a key market given the vast amounts of information the industry generates. The potential for expansion in this area has been reflected in the Reed/Elsevier letter of intent to purchase the Official Airlines Guide, in addition to the ABC Airlines Guide it already owns. The benefits of children's publishing are equally clear; children are more easily attracted by computer-based interactive services (and far less critical of display quality) than adults. Secondly, the video games industry is expected to create a significant residential installed hardware base for compact disc drives.

### *Globalisation of information markets*

The increasing globalisation of information markets means that there is a need for legal protection and regulation of the electronic services sector at the international level. The concentration of publications in an ever smaller number of multinational conglomerates threatens to create a near monopoly on commercial information transfer. Commercial database distribution raises problems both of intellectual property and personal data; these have been the focus of the debate since GATT's TRIP (Trade Related Aspects of Intellectual Property) negotiations were launched.

The Commission recognises that a harmonious legal and regulatory environment for electronic information services is essential if Europe is to compete successfully in global markets. International efforts to harmonise technical standards are very important.

During 1992 the Commission published two Draft Directives concerning copyright; that on the Legal Protection of Databases relates more directly to electronic copyright. It was introduced by the Commission partly to overcome ambiguities in the existing legal framework, partly to address the potential for the widespread pirating of databases and to enable the EC information industry as a whole to challenge the US, where a coherent and consistent framework already exists.

This Report illustrates how the supply of electronic information products is shaped by the complex interplay of external forces. These include the legal and regulatory environment; technological advance and innovation; and investment in the telecommunications infrastructure. Supply-side factors alone, however, cannot create markets without the necessary demand. Industry analysts constantly try to predict future demand levels by taking account of economic, social and demographic trends. The spurt of merger and acquisition activity in the ICT sector in recent years is indicative of wide-reaching structural changes taking place both within the EC and in global markets.

### *The European information marketplace and demographic change*

The Community is currently undergoing some very complex demographic changes: the shift towards greater female participation in the workforce, the rise in migration from Central and Eastern Europe and the Mediterranean rim, the ageing populations of the northern and eastern Member States and the problems of national labour markets. These all present new challenges and new opportunities for the information services sector because they represent forces shaping future demand for those services.

EC and national government policy will need to address these challenges and continue to support industry, particularly the electronic information services industry. This support will include the need to respond to intellectual property issues; to continue to review and work towards the harmonisation of IT standards; to provide incentives for R&D investment; to protect individual privacy and to uphold anti-trust and other competition policy.

Within the CEC, the IMPACT programme aims to respond flexibly to the emerging needs of the changing market, and is working at a strategic level to ensure that the market for information services is nurtured and developed in the best interests of the entire Community, giving special attention to LFRs and small and medium-sized enterprises. The Information Market Observatory's role will prove to be increasingly important in evaluating the impact of EC policy instruments and their effect on both the demand and supply sides of the industry.



# 1 INFORMATION FOR EUROPEAN COMPETITIVENESS

## 1.1 Information: a critical European resource

From 1 January 1993, the single European market was complete in all essential respects (95 per cent of the programme outlined in the CEC's White Paper of 1985 had been adopted). The success of the single market depends upon the complete removal of all barriers to trade; including barriers to information flows. DG-XIII, through its IMPACT programme, tries to identify areas in which technical, legal, regulatory and other barriers are seen to impair the free flow of information and thus the effective operation of the market. In addition, the input received from the Information Market Observatory through analysis of the market from the user and supplier sides, has continued to play a useful role in identifying market trends. Using these and other inputs, the Commission is then able to formulate initiatives to overcome these barriers which take full account of the needs of the information industry.

With much of the developed world in recession and Europe experiencing high levels of unemployment, all Member States need to make concerted efforts to boost confidence and promote economic recovery. Information and communications technologies (ICTs) have a crucial role to play in this respect; by improving the competitiveness of European industry they can promote economic growth and employment. Managing information properly as a resource can improve a company's organisational efficiency; increase market awareness, and improve access to markets which can help firms to increase their market share. As firms in all sectors adjust to the pan-European market competition and regulation, the need for Community-wide information will increase, particularly in the area of marketing data, mailing lists, credit ratings and company information.

As the barriers to trade fall, and cross-border economic transactions increase, there will be a growing need for Europeans to communicate quickly and efficiently. While the role of information and communication technologies as a vital corporate asset is being increasingly recognised, many executives are still to be convinced of the benefits that can be derived - often because they are not fully aware of the range of information services which are available or of the means by which they can be delivered.

## 1.2 Current issues in information and European competitiveness

### 1.2.1 *European telecommunications infrastructure*

In terms of competitiveness, one of the most crucial factors in determining a company's pan-European success is the establishment of efficient distribution networks. These have to be supported by equivalent information flows and the necessary cross-border infrastructure. Historic parallels can be drawn between the Community's programme to liberalise and harmonise European telecommunications services and the nineteenth century development of railroads where a series of local or regional systems interfaced, evolving toward systems that crossed national frontiers. The CEC programme of regulatory change in the telecommunications services sector remains one of the most difficult outstanding challenges of the internal market.

In October 1992 the CEC published its *Review of the Situation in the Telecommunications Services Sector*. In examining the progress made in liberalisation and harmonisation, the

Commission found the main problem to be the high tariffs charged to telephone users for intra-Community services which are known to have a very negative effect on the use of electronic information. On the other hand, competition has increased in terminal equipment markets and in those for value added and network services. Goods and services have improved, innovation has increased and costs have fallen. There has been steady liberalisation and growth in communications and computer services, and in the provision of information services.

There is still little progress in most Member States in the supply of high-speed lines, which are essential for the connection of Local Area Networks, and for the creation of Community-wide networks for private corporations and closed user groups. Broadband leased lines commonly have tariffs which vary considerably between Member States, and there are still few high-speed leased lines.

In order that there may be further development in the liberalisation and harmonisation of telecommunications services, the Commission review set forward four options for progress:

- Option 1:* freezing the progress of liberalisation and maintaining the situation as it was at the end of 1992
- Option 2:* regulating extensively on tariffs and investments, in order to remove the surcharge on intra-Community tariffs
- Option 3:* liberalising all voice telephone services internationally (within and outside the Community) and also national domestic services
- Option 4:* opening up competition on voice telephone services between Member States

In its initial appraisal of the options available, the Commission favoured option 4 as an intermediate alternative, believing it would best maintain the balance between liberalisation and harmonisation. It also believed this option would provide the legal basis for the establishment of trans-European networks for telecommunications.

Following extensive consultation with 130 companies, regulators, national governments and users; the Commission decided that option 4 would be superfluous. At a meeting of Telecommunications Ministers on 16 June 1993 a Resolution was passed to adopt option 3, but with implementation delayed until 1 January 1998. Special arrangements and transitional periods will apply to the peripheral regions and countries with small and less developed networks. The speed at which liberalisation will be introduced is likely to be a high priority issue throughout 1993.

The revised Review also placed more emphasis on the improvement of cross-border telecommunication networks linking national administrations. This is to enable national administrations and Community institutions and bodies to process and interchange the information necessary to the functioning of the internal market and the implementation of common policies. One of the major goals for the Community's telecommunications policy in the longer term to maintain the balance between liberalisation and harmonisation.

### ***1.2.2 Information, telecommunications and regional development***

Since the publication of its Green Paper on telecommunications in 1987, the Commission has adopted a range of practical proposals within a framework of two specific programmes, RACE and STAR. The purpose of the RACE programme, the main telecommunications R&D effort, is to develop the technologies necessary for setting up the broadband networks of the future. The STAR programme (Community programme for the development of certain less-favoured regions of the Community by improving access to advanced telecommunications services) was originally geared to specific regions in seven of the Member States, financed through the European Regional Development Fund (ERDF). The STAR programme hinged on two major lines of action:

- helping to set up infrastructure offering users advanced services
- supporting measures designed to stimulate demand and encourage the use of advanced services, in particular by SMEs

The services part of STAR ended in October 1991 but was extended in 1992 and 1993 under the Télématique programme, the aim of which was to develop telematic services in the less-favoured regions (objective 1) of the Community. It is planned to extend the infrastructure part of the STAR programme from 1993. STAR aims to boost regional development by encouraging:

- the introduction of advanced telecommunications services into small and medium-sized enterprises
- the introduction of data communications for users in the public sectors
- the improvement of access to data communications networks within the Community

### ***1.2.3 Technical barriers to information market development***

Some of the most important barriers to the access of information are technical ones; software and display interfaces, information retrieval languages and database structures, are all areas where current technologies are a very long way from offering user-friendly access to electronic information. This is not because current technologies are too complex, but rather that they are inappropriate to users' needs and so place a lower limit on the potential market.

Continuing technical innovation in the delivery of information has always been a strength of the electronic information services market. It has also been the source of much controversy and misunderstanding, especially in the context of market development. Many commentators have argued that the information services market has been shaped and influenced more by the availability of exciting new technologies than by user preferences. Such arguments are both oversimplistic and partly misleading: there are many factors which hamper access to information. For these reasons, continuing development and innovation in information delivery will depend on the availability of advanced information engineering technologies. This will require much co-operation and co-ordination, since

the investment and resources needed to develop generic solutions are beyond the capability even of the larger European information industry players.

The development of generic technologies will be given a prominent place in the implementation of a Community fourth Framework programme for research and technological development (1994-98). One of the core themes of the programme corresponds to priority technology activities, by addressing broad application, generic technologies, which are critical to the competitiveness of the European industrial system. The development of generic applications often requires a multidisciplinary approach, as well as large inputs of capital and RTD resources.

#### *1.2.4 Standards for information transfer*

As well as the need to develop better human-machine interfaces, a key element in improving access to the Community's rich information assets will also depend on the consistent application of information standards and norms. In September 1992 a report was presented by the Commission of the EC to the Council and the European Parliament, regarding standardisation in the field of information technology and telecommunications in the years 1990-91 (SEC(92) 1598 final). The period 1990-91 was marked by the:

- extension of the fields covered by standardisation
- development of 'tools' to speed up and improve the work
- practical application of the projects launched previously
- promotion of the standards by the Commission

In pursuit of the practical application of standards in the exchange of computerised information, Community projects in the 1991 programme, including IMPACT and the Libraries programme, supported the application and promotion of standards in the information sector. Under the IMPACT programme, the activity Open Information Interchange (OII) promotes the application of information encoding standards for electronic documents such as SGML (Standard Generalised Markup Language); MHEG (Multimedia/Hypermedia Expert Group); and ODA (Open Document Architecture) through workshops, publications and the stimulation of new applications. Standards for the interchange of geographic information are under development, supported through IMPACT strategic project activity. The standardisation process is to be followed up in the technical committee (TC-287) set up within the framework of the European Committee for Standardisation (CEN). Geographic information systems are of growing importance for a wide range of applications and it is an area in which the Less Favoured Regions have a strong interest and a role to play.

Public procurement initiatives such as EPHOS (European Procurement Handbook for Open Systems) are being extended to cover electronic document interchange. The Libraries programme is promoting the application of Open Systems Interchange (OSI) standards in libraries and is also aiding the introduction of Electronic Data Interchange (EDI) through its project support.

Further progress in the field of information transfer standards and their application is vital if companies are to establish a presence in world markets for interactive multimedia, where the need to integrate data from different sources in a hardware-independent environment will be a critical factor in competitive success.

### *1.2.5 Transitional regime for value added taxes*

Although new (transitional) rules for value added taxes in intra-Community trade apply, from 1 January 1993 until 1 January 1997, for the most part there has been no change in the VAT treatment of services, particularly for intangible services. Electronic information providers continue to face uncertainty, both because of delays in the adoption of a Directive on the approximation of VAT rates applied by Member States and because there is still no specific VAT classification for electronic services. At present a higher level of VAT is imposed on information products in electronic form than on paper-based products (i.e. books, newspapers and magazines). The definition of 'books' does not include electronic media, which means they are charged at the standard rate, which varies across Member States. While the Commission does not oppose non-inclusion, this does mean that print has an price advantage over parallel electronic versions.

The lack of clarification on VAT can be attributed to the rapid changes witnessed in the information market since the Single Market Paper of June 1985. Many of the users of information services within the EC are not registered for VAT. The new rules which applied from 1 January 1993 have added to the confusion, especially as cross-border suppliers are required to apply their local VAT rate to the goods shipped to non-registered clients, even when the recipient's country may have lower or even zero rating for those items. Such anomalies could lead to distortions in the market and/or act as a psychological barrier to trade. The Commission's mapping of industry and user activities helps identify the problem and the Legal Advisory Board can then act to bring all the relevant EC parties and market operators together.

## 2 THE BUSINESS ENVIRONMENT FOR ELECTRONIC PUBLISHING

### 2.1 Economics of electronic publishing

#### 2.1.1 Cost-benefits of electronic publishing

Any commercially-based decision regarding whether or not to enter electronic publishing has to take into account a complex cost-benefit analysis. Each product and application has to be considered separately. The combination and use options of media choices is likely to multiply over the next decade, such that publishing will become far more integrated: paper, optical memory, magnetic memory, online databases, etc. Thus the opportunity costs of *not* entering this market have also to be taken into account.

As Table 1 shows, the most attractive benefit of publishing print and electronic versions in parallel is the low spin-off costs of the electronic version (as a proportion of total costs). Print publishers can use the new media to improve internal efficiencies by adding more secondary media products and producing current products more economically for their present customers. Electronic publishing opportunities are not confined to traditional publishers but other content suppliers are also establishing themselves. Despite the lack of predictability over the development costs and market performance of electronic publishing technologies, European publishers have taken steps to incorporate this technology into their overall company strategy.

**Table 1**

Printed and spin-off electronic publications; comparative cost structure (as percentage of total costs).

	PRINTED EDITIONS (%)	SPIN-OFF ELECTRONIC EDITIONS (%)
Acquisition / storage	13	3
Data preparation / manipulation	36	-
Distribution	25	64
Sales	1	16
Other costs	25	17
<b>Total costs</b>	<b>100</b>	<b>100</b>

*Source: Consulting Trust GmbH, 1993.*

Many of the top EC-based publishers (see Table 2) have interests which extend outside of traditional publishing activities. The Bertelsmann Group, for example, have global interests which span records and musical publishing, printing and manufacturing, telemedia, information and audiovisual services.

**Table 2**  
**EC's top ranking publishing companies, by 1992 turnover.**

Rank- ing (a)	Company	Location of HQ	Sales (MECU)	Sales per employee (ECU)
89	Bertelsmann	Germany	7,042	156.1
151	Hachette	France	4,360	153.2
252	Reed International	UK	2,319	126.7
256	Pearson	UK	2,284	80.2
309	Axel Springer (b)	Germany	1,795	181.0
417	VNU	Netherlands	1,182	102.9
422	United Newspapers(b)	UK	1,160	96.5
450	Wolters Kluwer(b)	Netherlands	1,030	118.0
464	Elsevier(b)	Netherlands	982	134.1
469	Arnoldo Mondadori Editore	Italy	958	171.4
473	Groupe de la Cité	France	951	105.7
489	Daily Mail & General Trust (b)	UK	920	95.1

(a) Position in Europe's Top 500 companies, by 1992 turnover.

(b) Includes printing operation.

*Source: International Management, 1993.*

### 2.1.2 Traditional and alternative delivery media

There are three basic offline publishing media: paper, magnetic disc and optical disc. Traditional print products are progressively losing their guiding function in several areas and are no longer the exclusive attribute of intellectual activity. Of the alternative media available, those produced on optical storage media - magneto-optical re-writable disc storage and CD-ROM have the advantage of large capacity, robustness and relative cheapness. A recent study on opportunities in electronic publishing has found that for traditional publishers, offline publishing (CD-ROM, CD-I, memory cards, print-on demand etc.) is likely to be more attractive than online in the short to medium term. CD-ROM is currently the most used medium for offline information storage and has rapidly become a major area of activity within the publishing industry.

Considerable progress has also been made in developing alternatives, such as CD-ROM XA, CD-I, CDTV, and DVI, which facilitate the combination of text, images and sound (multimedia). There are many examples of multimedia products already among Japanese and North American companies. Besides the Grolier Encyclopedia on CDTV/PC/Macintosh, these include Compton's Multimedia Encyclopedia which combines text, sound and pictures, Computer Select - an on-going information dissemination/retrieval service, and Discis Talking Books - a range of multimedia electronic talking pictures books on CD-ROM aimed at young children. In contrast, there are few examples of European developed products, apart from Philips' CD-I (see Section 3.7.2), which was jointly developed with Sony.

A further delivery medium is the electronic book. Electronic books are a useful instructional resource. In 1992, the University of Teeside (UK) produced a prototype

publication called Screen Design for Computer-based Training (CBT), as part of a research programme looking at the use of telemedia learning for the support of flexible learning using CBT methods. In the library sector, electronic books could be used as a means of storing, sharing and communicating large volumes of multimedia information. Polymedia workstations (i.e. using a combination of several different media, such as CD-ROM and magnetic disc) could be used to provide access to such systems and the mechanisms which would enable users to use and interact with both paper-based and electronic publications. Using telecommunications links it will then be possible to link together such workstations so as to achieve the global and dynamic sharing of information.

### ***2.1.3 Multimedia issues from the industry's perspective***

European publishing companies (and broadcasters) are in general far behind their US counterparts in their interest and participation in multimedia. Within Europe, the most active broadcasting companies are those in the UK, with most commercial broadcasters having an active interest (many are involved with Philips' CD-I). The British Broadcasting Corporation (BBC) has a special interest through its spin-off company, the Multimedia Corporation. Within the publishing sector, the most active company is Hachette, France's largest publishing company and communications group. It recently purchased Grolier, one of the US publishers most active in the field of multimedia. According to *The Bookseller* (2.4.1993) total sales of Grolier's Encyclopedia are more than one million copies. On 31 December 1992, Hachette merged with the defence and transport group, Matra. Matra's interests include telecommunications and satellite manufacturing.

These companies remain exceptions in Europe and on the whole European players who do have strengths in broadcasting and publishing are hanging back on multimedia waiting to see what will happen, especially in establishing networks which tie together players from different sectors. Apart from Philips, European involvement in networks generally centres on the United States. A large share of the revenues of the top European information/publishing companies, including those of Bertelsmann, Hachette and Reed come from there.

In 1992, a distribution scheme which addresses the problems of retail distribution was launched by Sony Electronic Publishing; the 'Affiliated Label' CD-ROM programme. Under the programme, Sony Electronic Publishing manufactures, markets and distributes education and entertainment titles from many leading US publishers. They will also feedback sales and demographic data back to the publishers, thereby helping identify sales trends and new market opportunities.

All of the major suppliers of application software in the USA have concentrated increasingly on multimedia applications of their products. This area is considered as one of the most promising markets, such that some have themselves entered electronic publishing. The strong US film and video industry also has a comparative advantage in multimedia publishing as compared with European actors. Moreover, major Japanese electronics companies are acquiring major US-based film and music companies, which gives both the USA and Japan favourable global positions in competition.

In Japan, electronic publishing activities are already ahead of those in Europe by around six to twelve months. Japanese hardware companies introduce new devices on the Japanese market first in order to test the market. Partners from related industries work



together to develop technologies, standards, concepts or products in the pre-marketing phase, starting to compete only once products have been launched on the market. In this case competition is based not on the different technologies or standards, but on product features and customer benefits. This approach allows all participants to agree on compatible concepts at a very early stage and develop products and contents in parallel thereafter. In addition to this, Japanese companies benefit from a high level of vertical integration in electronics, telecommunications and computing.

The pattern in Europe is beginning to take on some of these characteristics as product technologies converge and key players recognise the need for cross-sectoral, cross-border alliances and more intensive R&D integration in order to develop new information-based products and services. Increasingly all players in publishing, electronics and networking, will have to recognise the fact that these technologies are rapidly converging, driving alliances and joint ventures to form the new information industry.

## **2.2 Barriers to electronic publishing**

For the foreseeable future electronic publishers will continue to face high marketing and distribution costs. In this respect, schemes such as Sony's will be invaluable in identifying target groups and the level of readily available reading equipment. More difficult to overcome, for traditional print publishers, is a general lack of awareness and appreciation of the new media. Many publishing houses, drawing on their experiences of the 1970s and 1980s, when many suffered losses in their attempts to produce new media, have expressed uncertainty about new technologies and have resisted further product innovation.

Publishers are also deterred by confusion and uncertainty over standards. There are several personal computer operating systems and numerous search languages and protocols. Different proprietary software applications requires the user to learn new procedures. Many publishers hold data in a format which would be difficult and costly to convert to another. Publishers are thus very much dependent on third parties, such as system integrators or developers, for electronic publishing skills.

The European market is highly fragmented and on the whole, has a low penetration rate of computers, reading devices, and terminals. The use of electronic information products varies significantly, from very well developed markets such the UK, France, and Italy to countries such as Portugal and Greece. Unlike the global market for real-time financial data services, patents, STM and newswire services, electronic publishing markets have so far been developed mostly within and for national markets; too often these are not large enough to offer the economies of scale and scope which are necessary to attract investment for product development.

The marketing problems of electronic publishing products are considerable, since the products are not directly accessible to users and require special reading devices with the appropriate search and retrieval software. Since it is not normally the content itself, but the enhanced access to it, that makes an electronic publishing product attractive, the only way to market the product is by encouraging the user to try it for her/himself, which in turn requires the appropriate distribution channels.

Multimedia products are likely to suffer the same problems as educational software has done in national markets; education and training, as discussed below, are key development

areas for multimedia products. However, despite the large potential take-up in these markets, it is extremely hard for producers to recoup development costs, given financial constraints affecting potential users in the education sector and the fragmentation of markets and the lack of worldwide standards.

Other barriers include language barriers; only English language electronic information services have a world market, although individual languages such as Spanish in South and Central America or French in the former colonies have international significance. Just as online services and information providers which do not operate in English are largely excluded, not only from the North American market, but also from much of the remaining markets, the same holds true for the European publishing market as a whole. The advantages to be gained by using English texts involves an even more costly and risky learning process for non-English publishers.

Pricing strategies are a key obstacle. It is very difficult to assess the true 'value' of an information product or service. The approach to pricing differs between traditional and non-traditional publishers. Electronic publishers will expect to make a profit on sales. Traditional publishers currently tend to consider these products as an incremental income source. The need to keep prices affordable will, in general, demand mass production of products and a reasonable degree of standardisation of reading device designs, disc media and disc loading processes. If either the cost or production speed requirements for competing with particular types of current print products cannot be met, then alternative significant advantages will be needed that will enable effective indirect competition with print.

Most print publishers own copyright in a single medium whereas other media producers often have comprehensive copyrights. This gives them a higher leverage in multimedia. Given that most global players in movie and music production are non-European, this leaves many European publishers exposed in trading rights. If they fail to establish multimedia cooperations and strategic alliances at an early enough stage, many publishers will be unable to exploit the potential electronic publishing markets, especially if they wait until the point when the operating costs of electronic alternatives fall below those of print. Journal publishers believe this transition will occur before the turn of the century, as paper and mail costs increase rapidly and exceed telecommunications and data storage and processing costs, (especially as Commission initiatives to further liberalise and harmonise telecommunications services are well advanced). The potential high cost of increasingly shorter print production runs is another factor which can have a significant bearing on the switch to electronic media.

### **2.3 New opportunities for traditional publishers**

Despite the barriers to entry outlined above, electronic publishing offers significant new market opportunities for traditional publishers. Table 3 reviews the key European market segments for print publishing in 1992 and assesses the potential for replacement by electronic publication by the year 2000.

According to Table 3, the corporate business market currently offers the largest potential for expansion, especially in travel and tourism; multimedia technology also has the potential to spawn large new markets in entertainment and education. Publishers should be able to exploit their already well-established market, which includes reference material.

Within the book market, the greatest potential for electronic products is likely to be in children's publishing. This is because children in general are greatly attracted by electronic media and this, taken together with the growth in the video games industry, is expected to lead to a significant, worldwide installation base of compact disc readers. This global hardware base, although presently tailored to the needs of interactive games, could be exploited by electronic publishers in cooperation with video games suppliers. Other important market segments include directories, reference material, legal, STM, education, hobbies and special interest.

**Table 3**

**Electronic publishing; market potential in key European traditional print publishing market segments, 1992 and 2000.**

*Traditional print publishing markets*

	1992 (MECU)	2000 (MECU)
Books	18,500	27,200
Magazines	22,000	32,500
Newspapers	25,000	37,000
Corporate	10,000	15,000
<b>Total</b>	<b>75,000</b>	<b>111,700</b>

*Electronic publishing markets in 2000*

	Potential for electronic publishing (percentage share)	Market forecast (MECU)
Books	8-18%	3,480
Magazines	5-15%	3,250
Newspapers	5-10%	2,775
Corporate	10-25%	2,625
<b>Total</b>		<b>12,130</b>

*Source: Consulting Trust GmbH, 1993.*

Progress has been made within the EC in establishing an infrastructure to overcome existing obstacles in telecommunications. Already in Europe, as in the United States, academic networks are increasing in both number and usage. Researchers recognise the benefits of using publicly financed data highways and information which was traditionally supplied by the printed journal and which is now increasingly being delivered through the network. Both electronic document delivery in image form and full text electronic journals, are likely to feature prominently on the networks in future. On the negative side, this could threaten the subscription base of traditional publishers with subscribers switching to electronic networked versions.

One of the RACE II programme activities (see section 1.2.2) includes the Telepublishing Project, which involves sixteen partners and is coordinated by Deutsche Telepost Consulting GmbH. One of the sub-projects of the programme which ran throughout 1992 was the Individualised Electronic Newspaper (IEN). Users receive individually composed newspapers based on a profile specified in advance. Another project, part of the Europublishing project, is the development of a multimedia dictionary of art using data supplied by UK publisher Macmillan. The project is designed to identify gaps between those in the academic world developing original technical work and publishers like Macmillan. It involves developing a "publication development environment" within which new and existing systems are integrated to provide a platform for demonstrating parallel publishing (publishing in both print and electronic form) and the development of innovative publishing products. The second project, DIDOS (Distributed Document Services), involves technical documentation and aims to create a "distributed service centre" to provide, via ISDN and broadband networks, authoring, editing, composition, printing and multimedia services to those producing technical documents. The overall aim is to make open access to advanced authoring, production and distribution methods available across Europe.

There exist many opportunities for new 'generic' applications which are relevant to electronic publishing. These include multimedia information handling, offered via high speed networks such as the US National Research and Education Network (NREN) and the UK Joint Academic Network (JANET), teleshopping, teleworking and multimedia conferencing. Teleworking provides the opportunity for workers to enjoy a more flexible working life and for employers it is accepted as having the potential to foster a higher level of productivity as employees are removed from the distractions of the office. These developments are not without concern, however, especially from the users' point of view. The concentration of publications in an ever smaller number of multinational conglomerates threatens to create a near monopoly on commercial information transfer. The notion of intellectual property becomes difficult when material is 'published' across networks.

#### **2.4 Cross-sector, cross-border alliances and Europe's electronic information services sector**

Europe's electronic information services operate in a global market which is undergoing considerable structural change. Typically, the average European information services provider is smaller, less vertically integrated, and much more nationally orientated than its US counterpart. Increasingly, small and medium sized information services companies are unable to survive unaided without entering into joint ventures and alliances, including overseas ones. This is becoming even more necessary as product technologies converge. In terms of cross-media ownership there is a high degree of interlock in the information business, including Europe, which spans both national and international markets. However, media firms themselves are nervous of competition coming from both software and hardware developers of multimedia products, who have the ability to capture control of the emerging multimedia market. Listed below are some examples of cross-border, cross-media merger activity.

#### **2.4.1 *Data-Star/Knight-Ridder***

The uncontested acquisition of Data-Star by Knight-Ridder, in March 1993, raised important issues for the future of Europe's emerging electronic information services sector. Data-Star, owned by Radio Suisse AG, was the leading European supplier of text and bibliographic information in electronic form. Knight-Ridder Inc. is the owner of DIALOG Information Services, which is one of the world's leading database hosts. Before the merger, DIALOG was Data-Star's main competitor in the European market, especially in the area of biomedicine and healthcare. Knight-Ridder has other substantial interests besides DIALOG, including newspaper publishing and popular television. The merger effectively gives Data-Star's main competitor enhanced access to European markets and distribution rights to a number of key European sources of business, biomedical and other scientific information. This, in turn, raises wider issues relating to industry concentration and cross-media ownership.

The EC has considerable over-capacity in the database distribution sector. The market is highly fragmented and there are no hosts in the text and bibliographic area to match either the market share or the pan-European marketing capability of Knight-Ridder following the acquisition of Data-Star. This will intensify competition in a market segment where host revenues are already being eroded by a trend for database producers to sell information direct (typically in the form of CD-ROM). These factors will make business conditions more difficult for EC-based hosts, and may possibly force some hosts to leave the market.

Despite the potential opportunities of the single European market, few pan-European information services have been brought to the marketplace. The persistence of technical, linguistic, administrative and legal barriers continue to hamper the emergence of a truly common European market for information services and considerable effort and investment still has to be made if these barriers are to be overcome. A difficult question facing European actors in the information services sector is to what extent such investment can or should be European, given that overseas investment might provide the desired impetus to the development of a strong European industry.

The acquisition of Data-Star demonstrates the powerful trends operating within the electronic information services sector which favour both the rationalisation and consolidation of large 'supermarket'-type hosts operations. It is increasingly important for the Commission of the EC to respond to these trends by creating an appropriate framework in which the potential strengths of European electronic information services can be maintained and developed, without endangering the 'level playing field'.

#### **2.4.2 *Reed International/Elsevier***

Britain's Reed International and Holland's Elsevier publishing groups merged as from 1 January 1993. Both companies interests cover a range of businesses and both are major global players. Reed's businesses include business publishing, academic and school titles, information services, telepublishing, travel and regional newspapers. Elsevier is, among other things, the world's biggest publisher of scientific journals and also has its own electronic publishing division. Elsevier is hoping to exploit Reed's expertise in CD-ROM and other new publishing technologies.

Reed/Elsevier's combined sales of 3.2 BECU in 1992 (see Table 2) makes it a colossus among quoted publishing and information companies; the group should now have the necessary financial strength, technical expertise and access to global markets to enable it to enter into the development of electronic publishing and to make further strategic acquisitions.

As part of this strategy, Reed/Elsevier have reached an agreement to acquire at least a controlling interest in Editions Techniques, the largest general legal publisher in France. It has also signed a letter of intent to purchase Official Airlines Guide (OAG). Reed/Elsevier already owns ABC airlines guide and has argued that combining the two will allow the business to compete more effectively with the electronic systems now being operated by many airlines.

### **2.4.3 US West/Time-Warner**

US West, one of the seven US regional "Baby Bells" is to invest US\$ 2.5 billion in Time-Warner Entertainment, part of Time-Warner, the US media and entertainment conglomerate; US\$ 1 billion of equity is to be used for the five-year investment programme in Time Warner's planned fibre-optic 'full service' network, an interactive cable-based home entertainment and communications network. In return for this investment, Time-Warner hopes to benefit from US West's detailed knowledge of network switching which facilitates efficient tracking and billing of transactions. US West also has direct experience of working alongside a cable company, having linked up with Tele-Communications (TCI), the largest US cable television operator, to provide telephone and cable services in the UK. TCI is also Time-Warner's arch rival.

Once fully optical networks are in operation, the price of data transmission will fall dramatically. Profits will be made in the main from value added services such as high-speed computing, video telecommunications, information and entertainment. US West will be well placed to exploit this profit potential, as will TCI.

This merger illustrates US cable and telecommunications companies' willingness to collaborate in the building of America's 'information superhighways' rather than compete with each other as was initially expected. This reflects a growing realisation that data highways require technical expertise of telecommunications operators to build the necessary switched networks. Cable television companies lack the necessary capital to meet the required investment costs themselves; nor are they allowed to pass on those costs to their customers, since price rises are limited by the Federal Communications Commission (FCC). Likewise telecommunications operators recognise the value of links with cable companies who are ahead on certain technologies, such as digital compression. The impact that new technologies are having on the regulatory framework is also significant. Cellular networks for example, are in direct competition to the local-exchange monopolies.

## **2.5 Legal and regulatory issues**

The increasing globalisation of information markets means that there is a need for legal protection and regulation of the electronic information services sector at international level; national legal and regulatory frameworks are not adequate by themselves. Originators, as well as database service providers must be treated equally, irrespective of

the fact, whether a German service provider markets its products via a French host, or whether an English customer of a database service has access to an information pool in The Netherlands.

### ***2.5.1 Copyright and intellectual property***

Electronic publishers can refer to known and conventional legal structures for guidance on legal copyright issues. They must always ensure they have the appropriate rights of a publication that is to be published. However, ambiguities and uncertainties over copyright status have led to operators relying increasingly on contracts, rather than copyright law, to regulate their trading relationships. This can still lead to problems, especially where reference to editions in electronic form is omitted.

The threat of piracy is a serious concern to the publisher and content owner and many book publishers fear that if they put their books on to an optical disk, this will encourage copying and potential loss of revenue. Also, as transborder information flows increase, there has been some pressure on the Commission to take action to establish a legal framework for copyright which is coherent and consistent for both print and non-print material.

In the EC, copyright and related rights are considered to be intellectual property items. A framework of intellectual property rights already exists. The problem is how to make this framework work effectively. In so far as both copyright and related rights are concerned, the terms of protection differ considerably within individual Member States, despite global adherence to the Berne Convention. The Convention insists on a minimum protection period of 50 years, but allows for countries to extend this if they wish -Germany, France and Spain do so. The Berne Convention on copyright is based on the application of the principle of 'national treatment', which essentially states that a member country must accord the same protection to works by nationals of other member countries as it does to works of domestic origin.

During 1992 the Commission published two Draft Directives concerning copyright. The first, which proposed that copyright protection on literary works be extended from 50 to 70 years, was approved in June 1993; for electronic publishers the impact is likely to be small, although it could prove to be marginally negative in that it puts Community countries out of line with the USA.

The second, the draft Directive on the Legal Protection of Databases relates more directly to electronic copyright. It was introduced by the Commission partly to overcome the ambiguities outlined above, partly to address the potential for widespread pirating of databases and, finally, in order to enable the EC information industry as a whole to challenge the US, where a coherent and consistent framework already exists. The Draft Directive:

- clearly and unambiguously defines what constitutes a database
- confirms that databases are to be protected as Literary Works under copyright law
- gives a special protection against large scale piracy of certain types of database for a period of 10 years after the database has been created

○ defines the concept of Fair Dealing in relation to databases

○ provides for the compulsory licensing of certain databases

The Directive has provoked considerable contention concerning legal interpretation, the updating of databases, and the distinction between electronic and print publications.

The latter, perhaps of most concern to electronic publishers, relates to Article 9, which introduces a new *sui generis* protection for databases whose individual contents do not merit copyright protection. Article 9, which would apply to listings such as telephone directories and share price listings, could also potentially apply to other collections of data, such as electronic dictionaries or spell checkers, according to how the Courts come to interpret the clause. This may mean that certain compilations even though they had involved considerable effort and cost, would only be afforded the untested and unknown protection of 'unfair extraction', which lasts only ten years. The Commission chose to introduce this new right to avoid cases such as the recent US Supreme Court decision, *Feist Publications Inc. v Rural Telephone Service Company Inc.*, whereby reliance upon copyright law led to certain compilations (such as telephone directories) being afforded no protection at all.

The Draft Directive covers electronic, electromagnetic or electro-optical processes and extends the term 'database' beyond its conventional sense, to include collections of any type of material in the literary, artistic and musical fields, such as text, images and sound as well as numbers, data, facts and pieces of information. Nonetheless, the copyright implications of multimedia delivery are enormous. A multimedia publisher will have to negotiate rights to all the components in the product with the many rights owners. The issues to be addressed include: identifying the rights holder, defining the technologies to be covered, copyright rights of illustrators, moral rights, geographic distribution limitations, translation rights, duration of rights. Once it becomes a simple task to make copies of multimedia products, then piracy issues will also have to be addressed.

### ***2.5.2 Transborder data flows and trade-related issues***

As a consequence of the inauguration of the Single European Market there is likely to be a dramatic increase in level of transborder data flows (TBDF). TBDF is, however, subject to loss of security, which can include interruption, interception and modification of the data. The security and privacy of any data obtained through TBDF is an issue of paramount importance for the provider, the carrier, the receiver, the user and the subject. Clearly the legal approach adopted in one Member State will affect all the databases stored there.

When a transborder flow of information is necessary and the transmitting country requires an adequate level of protection by the recipient country and/or organisation, a contractual approach could be useful. The Council of Europe, in cooperation with the Commission of the EC and the International Chamber of Commerce, is currently developing a model contract designed to ensure appropriate data protection in the context of transborder data flows.

In October 1992, the CEC adopted and sent to the Council an Amended Proposal for a Council Directive on the protection of individuals with regard to the processing of



personal data and on the free movement of such data. The new text has been restructured to make it easier to read and understand and its scope extended. The rules are now more precise for cases where data are processed by computer and where they are contained in manual files. The previous distinction between public- and private-sector rules has been abandoned and individuals' rights have been strengthened. The criteria relating to the notifications of processing operations to the supervisory authorities have been refined and the provisions relating to the transfer of data to third countries have been clarified and amended. Another dimension in the modified version is attention to the principle of subsidiarity. A framework directive is proposed laying down the main guidelines for legislation, while Member States will have considerable discretion in implementing the common principles and in selecting the methods and procedures for ensuring that those principles are effectively applied.

Commercial database distribution raises problems both of intellectual property and personal data - these have been the focus of the debate since GATT's TRIP (Trade Related Aspects of Intellectual Property) negotiations were launched. Electronic information distribution creates new technical possibilities for breach of copyright. It is technically easy for users to appropriate information and integrate it into their own information handling, and it is very difficult to police this. Copyright issues are important since firms will tend to avoid countries where copyright protection to databases is not provided and/or guaranteed.

The draft GATT agreement on intellectual property rights contains a database specific provision which was not contested as of the end of July 1992. This states that 'Compilations of data or other material, whether in machine-readable form or other forms, which by reason of the selection or arrangement of their contents constitute intellectual creation shall be protected as such. Such protection which shall extend to the data or material itself shall be without prejudice to any copyright subsisting in the data or material itself.'

Legislation alone cannot solve the problems of copyright and intellectual property. There has to be some flexibility for innovative development to ensure that intellectual property can be used by the public. The ideal is to develop a system which can monitor use, rather than prevent it, so that who uses what and how can be limited where necessary. With an appropriate mechanism the owner can then be paid for the use to which the property is put. A consortium of electronic publishers, a computer manufacturer, a library, a barrister, security and software specialists and experts in databases and networking, from a good spread of EC countries, have, as part of the Commission's ESPRIT project, developed CITED (Copyright In TransmittEd Documents). One objective of CITED is to provide in a technical manner the protection of digital information by *technical* means in such a way as to make it possible to prevent reproduction.

### ***2.5.3 Public-private synergy in the information market***

In 1989, DG-XIII of the Commission of the European Communities published a set of Guidelines for improving the synergy between public and private sectors in the information market, following a lengthy process of consultation with both sides of the market. These Guidelines are intended to encourage governments and public sector bodies to make basic information and data available to entrepreneurs in the information industries for the creation of new and innovative value-added services.

In 1992, three years after their publication, the Commission sponsored a follow-up study (PUBLAW2) to assess the impact of the Guidelines. Isolating the specific influence of the Guidelines from external developments affecting the information market is difficult. The reaction to the Guidelines has, on the whole, been very positive on both sides of the market; in their current form they are felt to provide a useful framework for public-private synergy which is widely accepted, if not always applied, in all Member States.

Successful public-private sector synergy within the information market involves the resolution of complex legal, technical, tariffication and other issues. It is not sufficient to leave market forces alone to determine future directions for public-private synergy as many issues require policies and directives to guard against market distortion, legitimise practices and ensure equity and accessibility of information across the Community.

### 3 THE EUROPEAN INFORMATION MARKETPLACE

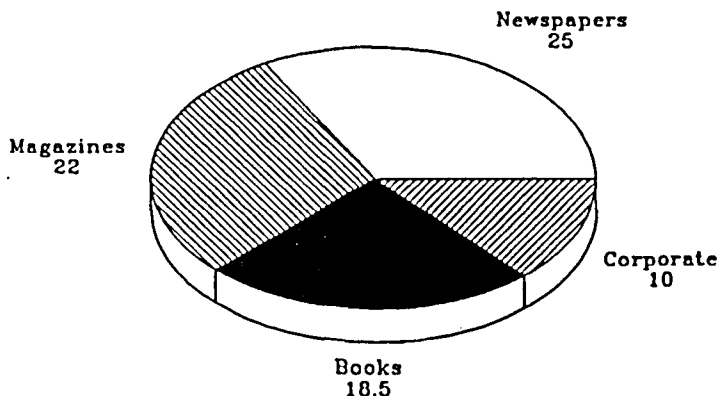
This section of the Report presents an overview of the European information marketplace, identifying trends and developments for both printed and electronic information media. It begins with the oldest delivery technology, print-on-paper, and then looks at the potential that this market represents for electronic publishers.

#### 3.1 Print publishing

The EC print publishing sector was worth an estimated 75.5 BECU in 1991, according to Consulting Trust GmbH.

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**Figure 1**  
Print publishing; EC industry value, 1991.



European industry value: 75.5 BECU.

Source: Consulting Trust GmbH, 1992.

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This sector includes books, newspapers, consumer/general interest magazines, and corporate publications (see Figure 1). It is not easy to distinguish between professional and consumer markets for print, since most published figures segment the market by format (books, newspapers) rather than by type of end-user. It is estimated, however, that professional print markets (primarily newsletters, trade press and textbooks) make up approximately one-third of the sector's total revenues, and so are probably worth around 25 BECU. This figure contrasts with the equivalent value of the European professional *electronic* information services sector, which was 3.3 BECU in 1991.

The European market for printed publications, as for many other durable goods, is relatively mature; annual growth in revenue is slow by electronic information industry sector standards. Consulting Trust GmbH estimates that the 'traditional' publishing industry has grown by an average of only 3.8 per cent each year since the mid-1980s, considerably less than the growth shown by electronic information services (typically, these were of the order of 15 to 20 per cent per year over the same period).

**Table 4**  
**World markets for books(a); 1990 estimates and forecast(b) for 1995.**

	1990 estimate (c) BECU	1995 forecast (d) BECU	Growth 1995/1990 (%)
European Community(e)	17.1	19.8	16
USA	16.5	18.0	10
Japan	4.6	4.9	6

- (a) Estimates include professional and consumer markets.
- (b) Constant 1990 prices, converted from US dollars (EUROSTAT).
- (c) 1990 figures for former West Germany only.
- (d) 1995 forecast for unified Germany.
- (e) No market estimates available for Greece or Luxembourg.

*Source: converted from Euromonitor estimates, 1992.*

Europe has long had a reputation for excellence in information content and publishing. It has a leading position in the world market for books, as Table 4 indicates. The professional market for books in Europe (Table 5) is dominated by reference and educational materials, which account for more than a quarter of total value across all book sales.

Language is an important factor which will continue to shape supply-side developments in the publishing industry, as much for electronic as traditional publishers. The opportunities for international language publishers are clearly greater than for publishers in other languages, however well developed their own domestic markets (international languages are those used widely outside their home countries). As a first language, many more people speak Mandarin Chinese than English, but as a second language, English is supreme. The marketing advantage which this presents to publishers in the UK, The Netherlands, and the USA is considerable. Spanish is the next most important international language, followed by French and German.

Print and electronic information media have co-existed for more than twenty years, and there are currently few signs of any reduction in demand for print. Indeed, the British Library has estimated that less than two per cent of all the information held in large corporations and public administrations is currently held in digital form. Print publications have inherent strengths (notably convenience, portability, familiarity) that will secure their primary role in the media mix for years to come.

**Table 5**  
**Book markets by subject category; EC, 1992.**

Subject category	Value (MECU)	Market share (%)	
		by value	by volume
<i>Professional markets</i>			
Education	2,200	12	11
Reference	2,600	14	10
STM	1,700	9	5
Legal	700	4	1
<i>Consumer markets</i>			
Fiction	4,000	22	32
Children	2,800	15	18
<i>Other markets</i>	4,500	24	23
<b>Total</b>	<b>18,500</b>	<b>100</b>	<b>100</b>

*Source: compiled by Consulting Trust GmbH, 1992.*

Conventional print-based media compete in a mature industry sector where the economics and risks are well understood. In contrast, players in the electronic information services sector are confronted with a developing market, with uncertainty, and with high fixed costs in building files. Yet, there is hardly an area of publishing where market opportunities and potential for new electronic media do not exist. The basic technologies for producing electronic publications are available and increasingly well understood. More crucial is the application of these existing technologies; to be successful, a publication in electronic form should offer features which go some way beyond what is possible with print-on-paper. Critical areas where electronic publishing is demonstrably superior to print-on-paper as an information delivery medium are when the information content is:

- time-sensitive (e.g. financial data and transactions)
- volume-sensitive (e.g. huge online databases operated by governments and multinational companies)
- intended to be re-processed or combined with other information (e.g. marketing data)

Publishers who plan to move into electronic media need to distinguish between two principal markets: professional (the main focus of this Report) and general interest consumer services. These two market segments show considerable differences in terms of their structure and dynamics, although considerable commercial synergy may exist for the publisher addressing both markets (professional markets, such as those for software or optical discs, often create and subsequently drive consumer demand). Business and professional markets appear to offer less risk (but ultimately a smaller demand base) than consumer markets. It is therefore likely that the highest short to medium-term growth

rates for electronic publishing will be in the professional area, notably in STM (science, technology, medicine) and in other corporate applications such as risk analysis and interactive training.

Two other electronic media markets are likely to experience higher than average growth over the next ten years: travel and childrens' publishing. The travel and tourism industry is one of the largest information providers and one where the benefits of electronic publishing are most evident. This market segment, one of the few where corporate and consumer needs are so closely identified, presents significant opportunities for growth. So, for differing reasons does childrens' publishing; children are more easily attracted by computer-based interactive services (and far less critical of display quality) than adults. Secondly, the video games industry is expected to create a significant residential installed hardware base for compact disc drives.

### 3.2 Retrospective online database services

Online professional information services fall into two broad categories: retrospective and real-time. Retrospective services are those where relatively time-insensitive information is stored indefinitely and later retrieved on demand; these services are used mainly for reference and analysis. In contrast, real-time services provide instant access to continuously updated information. Traditionally, the main applications for real-time services have been in the financial services community for monitoring changes in securities, foreign exchange rates and commodities. The distinction between 'retrospective' and 'real-time' is important from an industry perspective because it reflects different patterns of service delivery, not simply a difference in technology.

**Table 6**  
**Online ASCII database production / distribution; EC, end-1991.**

	Databases	Database producers	Hosts	Gateway services (a)
Belgium	68	33	6	-
Denmark	30	27	17	1
Germany	256	110	20	4
Spain	86	36	25	1
France	245	154	62	3
Greece	-	-	-	-
Ireland	3	2	2	-
Italy	134	39	21	2
Luxembourg	27	10	3	-
Netherlands	50	32	14	-
Portugal	9	8	9	1
UK	708	341	67	13
<b>Total</b>	<b>1,616</b>	<b>792</b>	<b>246</b>	<b>25</b>

(a) These figures relate to the number of online service *organisations* offering gateway facilities to third parties; the actual number of gateways is not indicated.

*Source: Directory of Online Databases, Cuadra/Gale, July 1992.*

Table 6 presents a series of supply-side indicators which offer some insight into patterns of online ASCII database production and distribution within the Community at one point in time (end-1991). Compared with data gathered in the same source (Cuadra/Gale) twelve months earlier, a striking increase in numbers of Community databases and database producers is apparent (increasing by 26.3 and 21.7 per cent respectively). These figures, which represent *directory entries*, should be interpreted cautiously, since they may reflect changes of editorial policy as much as shifts in the marketplace. However, the figures do provide some confirmation of trends noted in earlier IMO Annual Reports. These include the fact that the pattern of database distribution continues to be more highly concentrated in North America than in the Community (2.4 and 2.0 databases per host respectively).

The international marketplace for text and bibliographic online services is dominated by two US vendors: Mead Data Central (MDC) and Dialog (see Table 7). While EC-based vendors occupied five positions out of the top ten world rankings (based on 1990 turnover), none came within range of either of the two US mega-hosts.

**Table 7**  
**Leading international database vendors(a), ranked by 1990 turnover.**

Vendor	Turnover (b) MECU	Country of origin	Key markets
Mead Data Central	312.7	USA	USA/Europe/Japan
DIALOG	102.9	USA	World
OR Télématique	28.8	France	France
Radio Suisse(c)	26.4	Switzerland	Europe/USA
WEFA Group	24.8	USA	OECD
Questel	22.6	France	Europe
Data Resource Inc.	8.7	USA	USA/Europe
Européenne de Données	8.0	France	France
GBI	3.2	Germany	Germany
ESA/IRS	1.6	Italy	Europe

- (a) Retrospective text and bibliographic services only.
- (b) Converted from Italian lire using EUROSTAT 1991 average exchange rate.
- (c) Radio Suisse activities in the text and bibliographic online sector include Data-Star and TRADSTAT services.

*Original source: Il Sole 24 Ore New Media, 1991.*

As well as offering an indication of the relative sizes of the larger EC-based vendors in relation to their competitors, Table 7 tends to support the view that the markets for EC vendors are predominantly national or regional rather than worldwide.

In 1991, EC-based hosts and information providers generated worldwide sales to the value of 3,325 MECU (see Table 8), an increase of 5.6 per cent over 1990 in absolute terms. Sales of real-time services grew by 4.5 per cent, while online retrospective services increased by only 2.8 per cent. A much stronger pattern of growth was evident in offline sales, notably for magnetic and optical media (which doubled), and document delivery (which trebled). This is probably another indication of a tendency in the market for database producers to sell information goods and services direct. However, the revenues

from offline sales are still small in relation to total income; the combined income from magnetic and optical media, plus document delivery was only 5.4 per cent of 1991 total industry value.

**Table 8**

**Distribution of professional electronic information services; EC industry turnover by service or product type, 1989-1991.**

	1989 MECU	1990 MECU	1991(a) MECU
<b>Online services</b>			
Real-time	1,346	1,545	1,614
Retrospective	967	1,068	1,098
Other online	20	24	266
<b>Total online</b>	<b>2,333</b>	<b>2,638</b>	<b>2,978</b>
<b>Offline products and services</b>			
Magnetic media	31	35	65
Optical media	23	31	66
Document delivery	12	13	45
Consultancy	115	119	19
Other offline	117	119	79
<b>Total offline</b>	<b>466</b>	<b>491</b>	<b>274</b>
<b>EC INDUSTRY TURNOVER (TOTAL)</b>	<b>2,799</b>	<b>3,149</b>	<b>3,325</b>

(a) 1991 figures for Ireland unavailable.

*Source: CEC Information Market Observatory / European Information Industry Association, 1993.*

Recessionary pressures in the European economy provide one possible explanation for the low growth in industry turnover in 1991. However, figures released by the US Department of Commerce indicate that the value of the US electronic information services sector (including professional and consumer services) grew by 18.8 per cent in 1991, from 6.9 to 8.2 BECU. This is an alarming finding for the European information services sector, especially since the USA itself has not been immune from the effects of economic recession.

The distribution of financial and business information services represents by far the largest source of revenue for EC-based suppliers. As Table 9 indicates, these two segments accounted for 91.3 per cent of all EC online and offline revenues in 1991.



**Table 9****Distribution of professional electronic information services; EC industry turnover by subject interest(a,b), 1990-1991(c).**

	1990 Turnover (MECU)	Share (%)	1991 Turnover (MECU)	Share (%)
Financial	1,929	70.7	1,979	63.9
Commercial	689	25.2	849	27.4
STM	52	1.9	100	3.3
Government	43	1.6	104	3.4
Other	17	0.6	64	2.1

(a) Turnover from online and offline goods and services.

(b) These figures relate only to those survey respondents who were able to provide a breakdown of turnover by subject.

(c) 1991 figures for Ireland unavailable.

*Source: CEC Information Market Observatory / European Information Industry Association, 1993.*

The online industry is still largely technology-driven, although suppliers are paying more attention to the needs and preferences of users as they attempt to consolidate market share in difficult and highly competitive trading conditions. A notable recent trend in the supply of electronic information has been an increase in the

number and variety of alternative paths to database offerings (notably through parallel publication on CD-ROM and by offering the same database through multiple suppliers). Service enhancements continue to play a key role in maintaining the interest and commitment of users; in the past year there has been much activity by hosts in developing menu interfaces and repackaging and relaunching existing databases. For their part, producers have been busy enhancing database coverage and content in response to consumer demand, especially in the light of the completion of the Single Market. Another response to the challenge posed by 1992 has been an increasing level of collaboration between partners in different EC Member States. For example, a new European credit information service, Eurogate, was set up in November 1992 by a consortium of information providers in Germany, France, The Netherlands, and the UK in order to offer an alternative to existing Dun & Bradstreet services.

Online services have their historical roots in mainframe computing and a highly centralised type of architecture. However, there is a powerful trend among IT users and suppliers in favour of distributed rather than centralised processing. This can be seen in the popularity of local and wide area networks (LANs and WANs) and, more recently, in the interest being shown in client/server architectures. Network publishing is emerging as a threat to the conventional model of online database distribution from a central host and a potential opportunity for information providers. The rise of electronic document delivery through networks, of customised publishing, and recently of electronic journals is also likely to have an impact on the market for conventional print-on-paper publishing.

The US-based Internet, launched in 1988, has quickly become the world's largest computer network with more than 1.3 million connected computers and a user base probably numbering eight million (end-1992). The Internet provides high-speed, long-distance interconnection between external networks to form an almost completely decentralised network architecture. The Internet is, in fact, a 'virtual' network consisting of mainframe computers, campus local area networks, or individual PCs. Initially developed as a service to the academic and research community in the USA, most of the Internet is now privately owned and consists of LANs inside companies. In fact, commercial applications are growing faster than educational ones, although some parts of the system (including the fastest parts) are reserved for the academic community. After the USA, the countries with the largest number of Internet hosts are Australia, Canada, and Germany.

Network developments like the Internet are of significance to the 'traditional' electronic information supply community for two reasons. First, because they demonstrate a high degree of consumer acceptance, particularly in academic and professional circles, that simply did not exist before. The services are particularly attractive to end-users because the charges are fixed and levied at institutional level; they are effectively free at the point of use.

Secondly, they signal an important shift towards author control; a number of electronic journals are emerging on the Internet where the initiative has come from the academic community itself, not from commercial publishers. A counter argument to the rise of network publishing is that confusion is easily created in an environment which lacks effective co-ordination and basic tools such as service directories. These factors, together with the difficulty of maintaining copyright control in a network environment erode the traditional links between information supplier and customer and threaten the economic base on which publishers depend. There is also a question mark over the extent to which peer review can be maintained in electronically created journals.

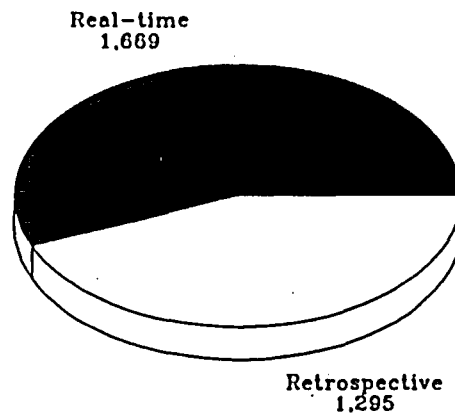
Online ASCII database services form a fundamental part of professional information provision in Europe, but how quickly the current user base, which concentrates too heavily in two or three EC Member States can be expanded is uncertain. Satellite technology could offer an opportunity here, since it has previously been under-exploited for online delivery. If this overcomes some of the terrestrial network and distance problems mentioned earlier in this Report then, in tandem with telecoms liberalisation measures, it could go a long way to offering Europe a much more effective online infrastructure.

### 3.3 Real-time financial data services

The EC professional electronic information services industry is dominated in revenue terms and economic importance by the real-time sector. This accounted for 1,669 MECU in 1991 (or 56 percent of total revenues from online information delivery, as is illustrated by Figure 2). The financial services sector is by far the largest segment of the real-time market. The UK occupies a leading position in this sector because of the location of Europe's most important stock exchange in London and the extensive information flows that this generates. The UK also happens to be the European base for both Reuters and Telerate, the biggest players in a highly oligopolistic market across the Community.

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**Figure 2**  
**Real-time and retrospective service revenues(a); EC, 1991.**



(a) BECU, excluding offline services.

*Source: CEC Information Market Observatory / European Information Industry Association, 1993.*

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**Figure 3**  
**Real-time financial data services and retrospective online database services compared.**

	<b>REAL-TIME SERVICES</b>	<b>RETROSPECTIVE ONLINE SERVICES</b>
<i>Frequency of updating:</i>	instantaneous	periodic
<i>Basic application:</i>	monitoring change	information retrieval
<i>Information delivery mode:</i>	simple data feeds	interactive query
<i>Information format:</i>	typically page-based	character by character
<i>Information content:</i>	limited and highly structured	flexible text-based
<i>Presentation technology:</i>	highly customised	generic
<i>Network access:</i>	proprietary networks	public/private data networks
<i>Transactional capability:</i>	highly developed	limited
<i>Market characteristics:</i>	easily identifiable vertical markets	highly dispersed user base

*Source: Policy Studies Institute, 1993.*

In reality, the 'market' for real-time financial services is a hybrid one, with customers being typically offered a mix of current data, historic text information (such as stockbrokers' reports), and transactional capability. Even the term 'real-time' itself requires further qualification and differentiation from a closely related family of 'time-lapse' services. In real-time services, information is relayed instantaneously (or near-instantaneously); whereas in time-lapse services, information is relayed after a limited time embargo, typically of 15, 30, or 60 minutes. Naturally, real-time delivery attracts a greater cost premium than time-lapse services, but nonetheless these find a market niche in the middle or back office financial services community.

Real-time services are mostly offered by companies which operate their own private value added networks. This offers benefits both to the service operator and the customer. The consumer can use the network not only to receive information, but to act on it as well,

using the network's transactional capabilities in a 'seamless' service. From the supplier's perspective there are two advantages: higher levels of return on investment and the opportunity to limit competition by firmly locking end-users into a particular system.

The gradual switch to full electronic trading seen through products like Reuters Dealing and the Stock Exchange Automated Quotations (SEAO) services, is part of a trend where more and more sophisticated transactional facilities are being added to the basic information feeds. This evolution finds a parallel in the important involvement that financial information providers such as Reuters, Dow Jones, and Telerate, have in the continuing globalisation of financial markets. Indeed, the extensive transactional capabilities of many real-time services virtually makes them markets in their own right.

The differences between real-time and retrospective services are more profound than the classical time-dependent definitions suggest. Figure 3 summarises some of the key differences between the two types of service. These differences underline their origins in very distinct marketplaces. In many ways, real-time products are actually very basic, and while the delivery and presentation technology may be advanced, offering a high degree of user-friendliness, the actual information content and formats are far more limited. It could even be argued that real-time services are not really a part of the database industry at all, and that they represent highly sophisticated current awareness tools. To a much greater extent than is the case with retrospective services, the relative ease with which any vendor can obtain data has changed the market into a commodity market where competition is on price rather than on value added to the information. Competition in real-time financial services markets depends far more on innovations in software and hardware as suppliers try to add value to the product through new technology and tailoring. This raises some highly controversial issues about the ownership of data and the extent to which reformatting constitutes a value-added service.

However, the relative success of real-time services vis-à-vis retrospective services ultimately has much more to do with their end market than with any technical or functional differences. The predictable, limited, and easily defined information needs of the financial services community has no parallel in the world of retrospective information services.

### 3.4 Videotex services

It is often argued that consumer acceptance of videotex services in Europe (and the USA) failed to meet early and overambitious projections. Even in France, with nearly 90 per cent of the Community's subscriber base, the commercial viability of videotex is in doubt, although Télétel reported its first operational profit in 1989. Many European countries have continued to pursue videotex in the face of consumer disinterest, and new and re-launched services continue to appear on both sides of the Atlantic.

In Europe, the market for videotex services has evolved along two very distinct technological paths: *broadcast* and *interactive*. The first of these, broadcast videotex, or teletext, makes use of the spare capacity available alongside broadcast television signals. Equipped with a suitable decoder, pages of teletext information can be displayed on a TV set. Broadcast videotex is non-interactive and so does not support any transactional functions. In contrast, interactive videotex connects directly with the public switched telephone network and is fully interactive. The main professional applications for interactive videotex in Europe to date have been in the following sectors:

- the travel industry
- financial services (e.g. latest stock prices)
- commercial organisations (e.g. banks and insurance companies)
- consumer information

This section will deal mainly with the market for professional services, which now dominates European videotex applications. Further information on home user markets and developments is presented later in this Report (in section 3.8.1).

Videotex was initially oriented towards households and designed to offer simplified access to information and other services such as electronic mail, teleshopping, home banking and travel reservation. In many countries, user-friendly professional applications followed, based on the early experience gained in the residential market. This assumption is increasingly being called into question as the videotex market matures and there are signs of a renewed attack on the professional marketplace. In fact, demand for business and professional applications has picked up over the past two or three years. Throughout Europe most network suppliers are experiencing an increase in demand for videotex services from business users following the integration of telex and electronic mail facilities as pioneered by Télétel in France. As a consequence, network suppliers are concentrating on supplying information and transactional services to the business community.

In recent years there has been a shift towards premium rate services (PRS) as a way of encouraging higher volumes of videotex traffic. These PRS services are characterised by two features: the sharing of revenue between information provider and network operator, and a simple accounting and billing mechanism based entirely on connect time. Premium rate services were available in all Community countries, with the exception of Greece, by the end of 1992. A further technological stimulus to business demand is likely to come with the introduction of ISDN, which will reduce response times and increase transactional capability.

The data presented in Table 10 further illustrates the sheer size of the French market for videotex services. On average, Télétel attracts around 75 million connections per month (mid-1991 estimate), a huge volume by comparison with any other country in the Community.

**Table 10****Public videotex services(a); monthly number of connections and average connect time per terminal; selected EC Member States, mid-1991.**

	Number of connections (thousands)	Connect time per terminal (minutes)
Belgium	195	169
Denmark	55	54
Germany	6,248	455
Spain	750	30
France	75,000	100
Italy	1,150	285
Netherlands	453	24
Portugal	23	137

(a) Includes professional and consumer videotex services.

*Sources: Various, cited in Relaunching videotex (eds Bouwman and Christoffersen), Kluwer, 1992.*

Perhaps the most interesting indicators in Table 10, however, are those which estimate the average monthly connect time *per terminal*. While national videotex markets outside France are much smaller, this should not be taken to mean that they are used any less intensively. In fact, the most intensive levels of demand for videotex are to be found in Germany (455 minutes) and in Italy (285 minutes). In both cases, these levels of usage are significantly higher than those encountered in France (100 minutes).

There is a widely-held view that, to date, videotex services have catered predominantly for national markets.

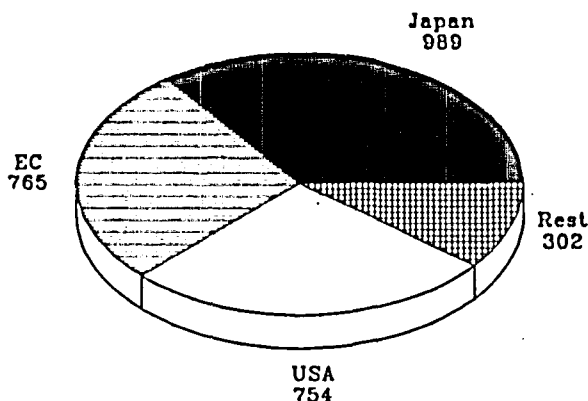
This situation has arisen from a lack of standardisation and compatibility between the various systems. The European Commission has recently, through the introduction of the multilingual IMPACT videotex service, implemented sample pages in existing national systems in ten Member States, making the same information available in the native language of each country. This has been done partly to highlight the difficulties in overcoming the lack of common standards, but also to intensify the awareness of the advantages of accessing the information resources available based on activities throughout the European Community. In addition, it is now possible to access ECHO databases and services from three national videotex systems (Belgium, Germany and France).

### 3.5 Audiotex services

The term audiotex has been used in a variety of ways to describe a range of automated voice, transactional, and fax-based services which may be obtained through dialling a special exchange number using a telephone handset. Audiotex services range from simple, passive recorded information to voice interaction with online database services (definitions vary widely, however, and caution is needed in the interpretation of market estimates, which may include voice messaging and chatline services). Experimental services in areas such as personal health care or financial services already indicate a very strong take-up,

especially because of their ease of use and the widespread availability of the telephone. Interactive audiotex services are therefore likely to become very important. Figure 4 compares the EC audiotex market with Japan and the USA.

**Figure 4**  
**World market for audiotex services, 1992.**



Total 1992 world market: 2,810 MECU.

Source: Triton Telecom, 1992.

1992 was an important year for audiotex Premium Rate Services (PRS) within the Community; three large markets opened: Germany (with a trial in Rhineland-Westphalia and the opening of eight more regions at the end of 1992); Italy (a trial in the Milano area); and Spain with full operation. Portugal and Denmark completed their first full year of operation. The Community marketplace for audiotex PRS now constitutes a value added market of considerable size, as Table 11 shows. The Information Market Observatory estimates that the Community marketplace will reach 2 BECU by 1995.

Currently, audiotex revenues are generated exclusively on a national basis and mainly from consumer-oriented services. Substantial differences exist between Member States' PRS systems in terms of tariffs, numbering, technology and service restrictions, while EC-wide accessibility is not provided.



**Table 11**  
**Audiotex PRS(a); market size estimates, EC Member States, end-1992.**

Member State	Service operator	Service starting date	Market estimate (MECU)
Belgium	RTT	1990	11
Denmark	Telecom Denmark	1991	25
Germany	Deutsche Bundespost Telekom	1991(b)	12
France	France Télécom	1986	279
Ireland	Telecom Eireann	1988	6
Netherlands	PTT Telecom	1986	100
Portugal	TLP and CTT	1992	2
Spain	Telefónica de Espana	1992	54
UK	British Telecom	1986	
	Mercury	1989	
	Vodata	1987	347(c)
<b>Total Community marketplace</b>			<b>836</b>

(a) Mainly premium rate services offering professional, business and consumer applications.

(b) Pilot project.

(c) Value for total UK marketplace.

*Source: CEC Information Market Observatory, 1992.*

According to industry estimates by VSB and Triton Telecom, the total worldwide turnover of audiotex services in 1992 was around 2.8 BECU.

Their estimates for the value of the European market (765 MECU) place it somewhere between Japan (989 MECU) and the USA (754 MECU).

The UK, France, and the Netherlands are the three largest audiotex PRS markets within the Community. Japan is the world's largest single audiotex market, with an estimated 1992 turnover of 989 MECU.

Industry analysts predict that audiotex will play a fairly significant role in the delivery of professional and consumer information services in the future, especially for applications in finance, travel and transport, sports information, and tele-marketing. An important development relating to audiotex which will help further stimulate growth is its linking to another widespread but simple technology, the fax machine. The convergence of audiotex services with fax ('audiofax') makes possible the delivery of much more detailed and voluminous information (including graphics). There is already a large installed base of telephone and fax equipment in place in Western Europe, offering immediately available facilities for implementing a full range of audiotex services. It has been forecast (by CIT Research) that the European audiotex market (excluding chatlines and 'rose' adult entertainment services) could be as high as 1,200 MECU by 1993 and that the market shows potential for very high continuing rates of growth.

In such a new and innovative medium as audiotex there remain, however, a number of factors which may restrict the progress of European market development, notably technical and legal barriers and the fragmented nature of the industry. At present there are no official technical standards for audiotex. The only standard required for simple audiotex services attached to the public telephone network is compliance with NET (Normes Européennes de Télécommunications) standards. More advanced services will require dedicated standards, which are currently under discussion.

Developing an optimal legal and regulatory environment within which audiotex services can flourish is a high priority of the European Commission's Legal Advisory Board (LAB). In most countries, audiotex services are provided on public networks as premium rate services. To prevent abuses in the audiotex market, specific bodies have been set up in two Member States: the Independent Committee for the Supervision of Standards of Telephone Information Services (ICSTIS) in the UK and the Commission de la Télématique in France. However, as far as content is concerned, the industry is largely self-regulating. Through the auspices of the LAB, a draft code of practice for pan-European premium rate services has been developed by the European Information Industry Association's audiotex working party. The issue of caller identification and personal privacy is one area where the Commission has made specific legislative proposals.

### 3.6 Fax-based information services

Fax machines have only become an integral part of office life in the past five years, although the technology itself is much older. Fax offers many advantages in terms of simplicity of use, relatively fast transmission speeds, and the fact that international communication is possible, independently of time zones. Fax has a significant advantage over electronic mail, a competing technology, in that it is possible to transmit graphics. Fax machines are now relatively inexpensive and it is estimated that around 26 million fax machines were in use around the world at the end of 1992. Increasingly, fax machines are to be found in the home for private and semi-professional use.

There is considerable synergy between fax and interactive information services such as audiotex. Many fax-based information services involve the user calling a telephone number, then selecting from a voice- or dial tone-activated menu to choose information which may then be delivered in image form from a fax server. This procedure combines interactive database interrogation with fax output. Fax-based publishing is a highly volatile market segment and one which, currently, is barely quantifiable (it was probably worth not more than 100 MECU worldwide in 1992). However, the low entry costs are encouraging suppliers to experiment with a very wide range of applications and test the potential of this emerging market.

As with audiotex and videotex, however, the development of fax-based information services depends on the interest and willingness of PTOs and value added network operators to encourage and support these services. Pricing mechanisms are an important factor, especially for automated services. Here, further progress is needed to develop variable tariffs and a pan-European premium rate charging mechanism. Variable tariffs are necessary to enable information providers to decide their own charges for their services (rather than being confined to the fixed charge per minute rates set by telecoms operators). This would, in turn, make automated fax response services a much more viable

commercial option. However, such changes are unlikely to take place before the mid-1990s at the earliest.

### **3.7 Optical information media**

Since its introduction in the mid-1980s, compact disc technology has met with considerable success as an information carrier finding a broad range of commercial and in-house applications. The emergence of the optical disc as a significant medium for distributing text and, increasingly, graphical information, has been driven by a number of powerful external factors, including the:

- popular acceptance of CD Audio in mass consumer markets
- proliferation and standardisation of PCs in business life
- need for non-paper alternatives for distributing bulk data

As an information publishing medium, optical discs are likely to continue to draw strength from the emergence of new applications (especially in multimedia publishing) and because of their appeal as a low cost medium for distributing information in bulk. The basic costs of producing optical publications are derived from three elements: the costs of disc production; retrieval software; and data. There is considerable downward pressure on the first two of these elements, the result of worldwide overcapacity in CD pressing facilities, and increasingly fierce competition among retrieval software suppliers. At the same time, CD-ROM disc drives are becoming increasingly affordable. In short, the costing and technological aspects of compact disc are ceasing to be a significant factor in the development of the medium and the costs of the information and how products are marketed are beginning to predominate.

**Table 12**  
**Commercial CD-ROM and multimedia CD; EC Member States, indicators**  
**of industry structure(a), end-1991.**

	Number	of	functional	activities(b)	Total firms
	1	2	3	4	
Belgium	23	5	1	2	31
Denmark	12	5	-	-	17
Germany	52	40	16	1	109
Spain	22	5	4	2	33
France	61	44	19	3	127
Greece	4	2	1	-	7
Ireland	2	2	1	1	6
Italy	52	21	9	3	85
Luxembourg	3	-	1	-	4
Netherlands	47	36	11	2	96
Portugal	7	-	-	-	7
UK	123	62	22	4	211
EC	408	222	85	18	733
Percentage of all firms	55.7	30.3	11.6	2.4	100.0

(a) Unlike other published analyses derived from this source, the figures presented in this Table *exclude* organisations which are solely involved in the supply and distribution of hardware (CD-ROM drives etc.).

(b) The four functional activities considered here are: information provider; publisher; distributor (of information goods and services); and system integrator/consultancy.

*Original source: The CD-ROM Directory 1992 (TFPL Publishing).*

Table 13

Commercial CD-ROM and multimedia CD; EC industry structure(a) compared with EFTA, the USA and Japan, end-1991.

	Number 1	of 2	functional 3	activities(b) 4	Total firms
<b>Number of firms</b>					
EC	408	222	85	18	733
EFTA	57	30	9	1	97
USA	321	185	84	17	607
Japan	62	18	5	2	87
<b>Percentage of firms in region</b>					
EC	55.7	30.3	11.6	2.4	100.0
EFTA	58.8	30.9	9.3	1.0	100.0
USA	52.9	30.5	13.8	2.8	100.0
Japan	71.3	20.7	5.7	2.3	100.0

- (a) Unlike other published analyses deriving from this source, the figures presented in this Table *exclude* organisations which are solely involved in the supply and distribution of hardware (CD-ROM drives etc.).
- (b) The four functional activities considered here are: information provider; publisher; distributor (of information goods and services); and system integrator/consultancy.

*Original source: The CD-ROM Directory 1992 (TFPL Publishing).*

Tables 12 and 13 present a series of supply-side indicators based on an analysis of entries in The CD-ROM Directory 1992 (TFPL Publishing). Unlike other published figures derived from this source, the data presented here excludes hardware distributors and focuses on organisations with a direct commercial interest in information content: either as information providers; publishers; distributors; or system developers and integrators. By indicating the number of organisations involved in one or more of these functional activities, Table 13 provides an insight into the structure of the supply-side and the degree of vertical integration.

A number of conclusions can be drawn from Tables 12 and 13:

- the UK, Germany, and France dominate Community supply
- there are more firms with an active interest in information content and optical publishing in the EC, than in the USA or Japan (733, 607, and 87 respectively)
- while there is little difference between the EC and the USA industry structures, Japanese supply is less vertically integrated, suggesting a higher degree of specialisation

Further conclusions can be drawn from Tables 14 and 15 which focus on title production and numbers of publishers/information providers worldwide:

- the optical publishing industry is almost totally concentrated within the countries of the OECD
- title production in Western Europe has grown by around 100 per cent per annum over the past four years
- while the EC and the USA are comparable in terms of numbers of publishers (353 and 360 respectively), there is a very significant difference in the number of titles published in Western Europe and the Americas (689 and 1,361)

**Table 14**  
**CD-ROM and multimedia CD; worldwide commercial title production(a,b) by region, end-1988 to end-1991.**

	1988	1989	1990	1991
Western Europe	89	237	487	698
The Americas	284	510	952	1,361
Asia	6	37	64	147
Australasia	12	31	51	59
Africa	-	2	4	4
Middle East	-	-	-	2
<b>Total</b>	<b>391</b>	<b>817</b>	<b>1,558</b>	<b>2,271</b>

(a) Information publishing only; in-house archival applications excluded.

(b) Including titles with more than one publisher.

*Source: CD-ROM Facts and Figures 1992 (TFPL Publishing).*

**Table 15**  
**Commercial CD-ROM and multimedia CD; publishers and information providers by world region, end-1991.**

	Number of publishers	Share of world total (%)	Number of information providers	Share of world total (%)
EC	353	40.9	267	39.1
USA	360	41.6	298	43.8
Japan	46	5.3	26	3.8
Rest of world	105	12.2	91	13.3
<b>Total</b>	<b>864</b>	<b>100.0</b>	<b>682</b>	<b>100.0</b>

*Original source: The CD-ROM Directory 1992 (TFPL Publishing).*

### 3.7.1 CD-ROM

Much excitement has been aroused in recent years by the arrival of CD-ROM in the marketplace. For the time being, however, the number of people actually able to use CD-ROM titles is relatively small, certainly in comparison with other forms of information delivery such as print or online database services. Recent estimates by InfoTech suggest that the worldwide installed base of CD-ROM drives stood at around 2.25 millions, with 1.44m in the USA, 0.62m in Asia, and 0.2m in Western Europe at the end of 1991. InfoTech's figures suggest high rates of growth; by the end of 1992, the European installed CD-ROM base was projected to around 600,000 with the largest single national marketplace being the UK (185,000 units). Other leading EC markets included Germany (125,000 units), Italy (85,000), France (50,000) and The Netherlands (25,000).

Worldwide revenues for the commercial and in-house sectors together have grown from 66.5 MECU in 1987 to 3.3 BECU in 1992, according to InfoTech. In 1992, the world CD-based media market for commercial applications reached over 3,000 titles; 2.7 million installed drives; and title and drive revenues of 2.2 BECU.

The long-range impact of the CD-ROM on online markets is likely to be considerable, especially in the academic and library communities where CD-ROM pricing structures can be highly attractive. This may be true for high volume and time-independent information products such as bibliographies and abstracts journals, where CD-ROM is likely to gain market share at the expense of online delivery. It is far less true, however, for high value, low volume services such as the full texts of market research reports or detailed company records. Here CD-ROM becomes a far less attractive option because of the great difficulty of setting a price which does not erode existing print-on-paper and online markets.

CD-ROM networks are increasingly being introduced to combat the problem of single-user access to information on disc and licences are available for customers wishing to mount CD-ROM titles on local area networks (LANs). Sharing CD-ROM services has very obvious benefits: economy; time-saving; and dissemination of electronic information to a much wider community than that represented by the professional information specialist. Industry analysts predict that LAN usage is growing rapidly and it is likely that a major factor driving the optical sector will be a marked increase in networked CD-ROM servers within larger organisations.

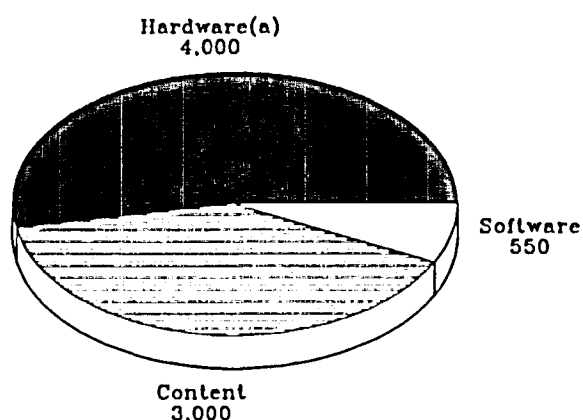
Initially, CD-ROM was seen as an excellent distribution medium but hardly a development which, in its own right, signalled a publishing revolution. Many of the currently available titles are still little more than enhanced versions of the equivalent online or printed product. For a real revolution to take place, optical publications products need to be designed, compiled and created from the beginning with the advantages (and disadvantages) of the medium in mind.

### 3.7.2 Interactive multimedia

Interactive multimedia (IMM) products offer the possibility of combining text, sound, and still and moving images in digitised form to present information in new and potentially stimulating ways. The enormous storage capacity of optical discs, amplified by advances in compression performance, makes the technology an ideal carrier for multimedia products.

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**Figure 5**  
**Worldwide multimedia revenues, 1991.**



(a) Includes peripherals.

Worldwide market size: 7,550 MECU.

Source: Information Workstation Group, 1992.

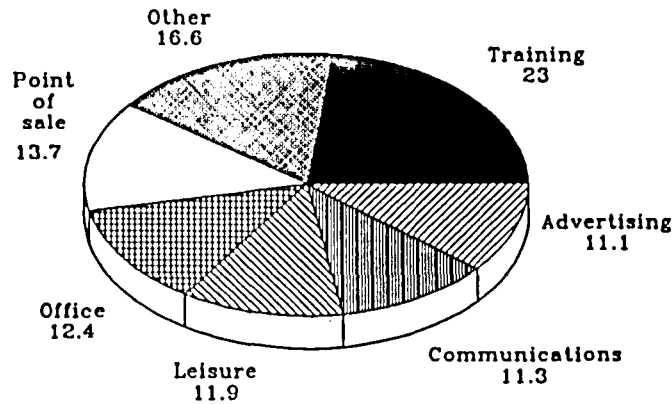
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A number of different format and delivery platforms have been used for multimedia applications, including: videodisc; CD-ROM; CD-ROM/XA; and CDTV (Commodore Dynamic Total Vision). A new optical disc format developed jointly by Philips and Sony, compact disc interactive (CD-I), had its European launch in the latter part of 1992 and is expected to be a significant stimulus to demand for IMM products and services. Around 100,000 CD-I players had been sold worldwide by the end of 1992.



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**Figure 6**  
**Multimedia applications in Western Europe;**  
**percentage market shares(a), 1996 forecast.**



Total market value: 2.4 BECU.

(a) Includes hardware, software and information content.

*Source: Frost & Sullivan Market Intelligence, 1992.*

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CD-I goes far beyond existing CD-ROM and CD-ROM/XA formats by providing a standardised environment for multimedia applications. Aimed at the home market, CD-I's fully interactive software allows viewers to use their TV screens with the aid of a special CD player incorporating a microprocessor and control device. Market estimates for IMM products and services typically include a mix of elements which include specialised hardware (including disc drives); software; and information content. Figure 5 shows the relative contribution of these three elements to an estimated worldwide IMM marketplace worth 7.5 BECU (1991). The relatively high value of the hardware component (4 BECU) demonstrates why IMM markets are potentially of such interest to firms active in consumer electronics.

Figure 6 is a prediction of relative Western European market share for different IMM applications by the year 1996. This analysis was carried out by Frost & Sullivan Market Intelligence and includes consumer and professional applications. The pie chart suggest that training is likely to be the largest single application area by some margin.

It should be noted that the data presented in Figures 5 and 6 include in-house multimedia applications together with multimedia publishing. Interest in interactive multimedia in the publishing world is a relatively new development. The market can be segmented into two main areas: business and consumer, of which the latter is currently the larger, judging from the number of worldwide titles available. There are links between the two in so far as developers (such as the UK-based Multimedia Corporation, an associated company of the British Broadcasting Corporation) are producing business titles in order to generate revenues while waiting for the consumer market to take off. The consumer market is both an educational and entertainment market. Many companies involved in this sector see

multimedia as a natural progression from their current publishing activities. These companies are trying to diversify their product range while remaining in the publishing market.

It is likely that a wide range of new interactive multimedia services will be brought to the marketplace in the near future. However, consumer acceptance and market development will depend on a number of factors: such as the cost of software and hardware; standards; and the extent to which suppliers are able to identify and develop applications which match real user needs. The market will need to be large enough to justify the investment required: in the necessary (broadband) infrastructure for distributed applications; and for the applications developer.

At this early stage in the development of the market, it is almost impossible to assess the impact of these factors. The market is therefore characterised by a very high degree of uncertainty. While European telecommunications operators are technically in a position to accept the challenge, the same is less true for Europe's computing, software, and content industries. There is a danger that European operators will distribute multimedia applications developed by US and Japanese companies on US equipment and with US software.

The copyright issue is a major problem which could hinder the growth of the consumer market in particular. It has become clear that developers of interactive multimedia products often have difficulties in establishing what copyright exists and who holds the rights to what may be a complex mix of music, text, film, ideas, and images. Some companies have found that the costs of dealing with these multiple copyright agencies, and the per-disc royalties for photographs, music and text may price a title out of the market. For this reason, the EC's Legal Advisory Board is undertaking further analysis aimed at increasing the transparency of existing licensing structures in (and beyond) Europe. The issue of copyright is also important because it is a significant factor in determining industry structure and patterns of ownership; publishing companies have an immediate advantage in the multimedia marketplace, since they own the rights to their own publications. However, the mix of expertise necessary to succeed in multimedia markets is encouraging the convergence of companies from very different backgrounds. Information technology companies, like Microsoft and Sony for example, are attempting to solve the copyright problem by buying into publishing houses, record companies and film studios.

### **3.8 Electronic information services in the home**

The three leading media for delivering interactive services into the home are videotex; teletext; and cable TV networks. Of these, videotex is by far the most important in European terms; from the early days, videotex was regarded as *the* consumer-oriented technology of the coming information society. Only in France, however, were initial forecasts met to any extent.

#### **3.8.1 General interest consumer videotex services**

Table 16 is a re-analysis by the IMO of indicators of videotex use provided by the Conférence Européenne des Postes et Télécommunications (CEPT). These figures suggest that there was a total domestic videotex user population of a little more than 2.9 million across the Community at the end of 1991. If, for the sake of comparison, we

assume that there is one terminal installed per household, it is possible to calculate a household adoption rate (the final column of Table 16). This shows that, on average, videotex services were available in 24.2 households per thousand across the Community in 1991. The distorting effect of the Minitel is illustrated by the fact that, in France, the figure was more than 128 households per thousand.

The failure of residential videotex services outside France is striking and says much about the problems of creating demand for electronic information. Videotex can be thought of as a highly interlocked innovation. This means that at least three sets of fairly specific conditions need to be satisfied to create a successful videotex market: there must be an appropriate technical infrastructure; close co-operation between information and service providers; and finally user demand has to be created by attractive services.

**Table 16**  
**Consumer videotex: household adoption rates; EC Member States, mid-1991.**

	Total number of users (a)	Number of domestic consumers	Number of households (millions)	Household adoption rate (b) (per 1000)
Belgium	7,700	565	3.6	0.2
Denmark	6,000	1,260	2.2	0.6
Germany(c)	260,000	104,000	27.6	3.8
Spain	150,000	60,000	11.9	5.0
France	5,256,300	2,628,150	20.5	128.2
Greece(d)	1,000	-	3.2	-
Ireland(d)	3,000	-	1.1	-
Italy	145,000	72,500	18.6	3.9
Luxembourg (d)	1,000	-	0.1	-
Netherlands	100,000	25,000	6.1	4.1
Portugal	3,500	1,750	3.5	0.5
UK	100,000	20,000	22.0	0.9
<b>EC</b>	<b>6,033,500</b>	<b>2,913,225</b>	<b>120.4</b>	<b>24.2</b>

(a) All users, including professional and business users.

(b) Number of households with access to consumer videotex services per thousand households (assuming only one user per household).

(c) Figures refer to Germany before unification.

(d) Non-professional use of videotex services in Greece, Ireland and Luxembourg is insignificant.

*Sources: Various, including CEC Information Market Observatory, 1992; and data cited in Relaunching videotex (eds Bouwman and Christoffersen), Kluwer, 1992.*

It is important to bear in mind that the introduction of videotex in many European countries came at a time when electronic publishing was in its infancy. Users, both professional and non-professional, had little if any experience in computers, information retrieval or data communications. In this new and untested market, suppliers were not

able to develop services which matched consumer needs for information which were and probably remain little understood.

**Table 17**  
**Consumer videotex; major services, system operators and subscriber base, USA, 1991(a).**

Service name	System operator	Number of users
CompuServe	CompuServe	760,000
Prodigy	Prodigy Services Co.	550,000
GEInie	GE Information Services Co.	252,000
PC Magnet	Ziff Communications Co.	120,000
CUC Online	CUC INternational	81,000
Delphi	General Videotex Corp.	80,000
PC-Link	Quantum Computer Services (Tandy)	60,000
QuantumLink	Quantum Computer Services Commodore	60,000
America Online	Quantum Computer Services	54,000
<b>Total</b>		<b>2,017,000</b>

(a) Estimates, 1 March 1991.

*Source: Arlen Communications, 1991.*

The development of home videotex in the United States both parallels and diverges from the situation in Europe. On the one hand, early and ambitious targets for consumer acceptance have failed to be met. Yet, while many European suppliers have persisted with videotex in the face of a considerable degree of consumer disinterest, new US videotex ventures continue to appear despite some spectacular commercial failures in the 1980s.

One factor which differentiates the USA from the European Community is the sheer size of the online services marketplace. Electronic information services in the American home still play a very small role in the online services market. Simba Information has estimated that residential services contributed only 2.7 per cent of total revenues in the US market in 1990. However, because the US online market is so large, the residential component is still quite significant relative to European standards. This is reflected in Table 17 which shows that the top nine US consumer videotex services commanded a subscriber base of just over 2.0 millions in 1991. Excluding other services, for which user figures are not available, this represents a US consumer videotex penetration rate of 21.6 per thousand households. This compares with penetration rates for the European Community of 24.2 (1991) and for Japan of only 3.0 (1992).

### *3.8.2 Prospects for consumer market development*

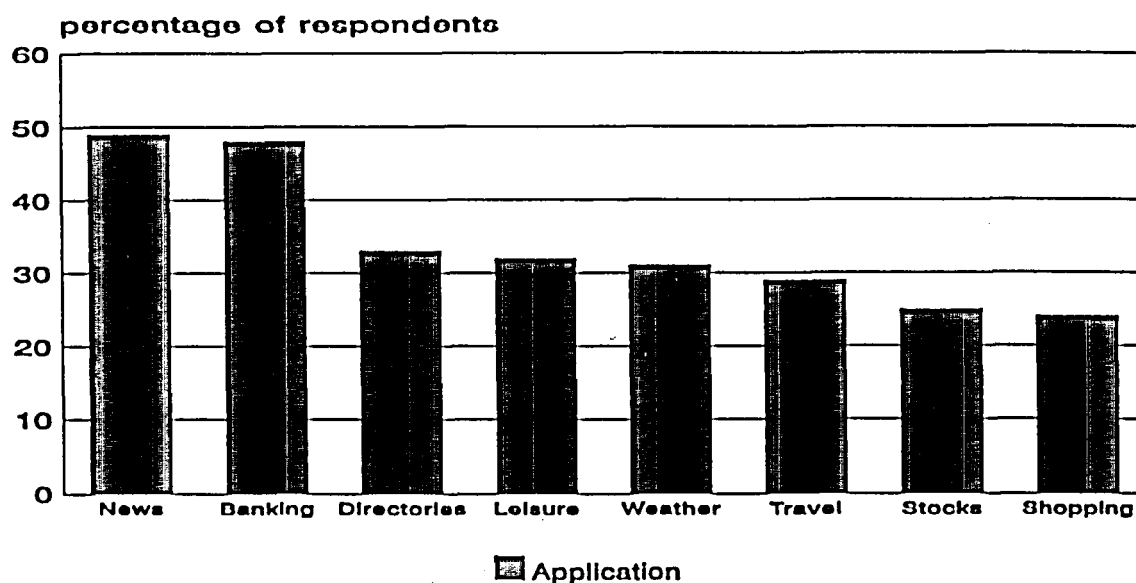
It is difficult to predict with any certainty that the late 1990s will witness the emergence of a significant market for electronic information products and services in the home, especially since the relationship between technological and social innovation is highly complex. However, it is possible to reflect on a number of recent trends and developments which may at least facilitate growth in residential markets.

The first is a social development; a trend towards more flexible patterns of working among white collar workers who are increasingly working from ('telecommuting') or at home ('outworking'). The years of high revenue growth in PC markets are over and suppliers are looking for new markets to exploit. At the same time, telecoms and cellular network operators are looking at ways to increase their revenues. There is considerable potential consumer demand waiting to be satisfied as more and more residential users would be more than happy to imitate the present business usage patterns and become equipped with fax machines, mobile and data communications. High telecommunications tariffs remain a significant obstacle to consumer acceptance of electronic information services, although they are falling slowly in real terms. Storage and hardware costs, however, are falling very rapidly. The relative costs of data communications and local storage will determine the differential adoption of online and offline solutions, especially in the domestic environment.

Technology push has always been a driving force in information market development. Interactive multimedia products, most obviously CD-I, may play a vital role in opening up the residential market, especially as this technology is backed by two of the leading names in consumer electronics: Philips and Sony. Publishing multimedia titles for consumer markets offers enormous scope for growth in both the traditional publishing and software industries (by the start of 1992 there were two and a half thousand published CD-ROM titles, of which around 15 per cent targeted the general interest and consumer markets). Two consumer products were launched in 1992 which are likely to stimulate interest in electronic information applications in the home. These are the market entry of games machines (such as those produced for SEGA) which incorporate CD-ROM drives for loading software, and the electronic book, introduced by Sony.

Finally, there is the question of what sort of services will find a place in the home of the future. Figure 7, based on research conducted by LINK Resources on a representative sample of European consumers, provides some clues. One conclusion which can easily be drawn from the data in Figure 7 is that residential information needs seem to focus around two key requirements. Firstly, access to quickly changing information such as news, stock prices and the weather. Secondly a desire for transactional capability to support applications like home banking, travel reservation and teleshopping.

**Figure 7**  
Western European consumers(a); interest in residential electronic information services, 1992.



(a) Base: existing residential users of electronic information.

*Source: LINK Resources European Consumers Survey, 1992.*

### 3.9 The widening European marketplace: EFTA countries

This section provides a brief overview of key market developments in the seven countries which comprise the European Free Trade Association (EFTA): Austria, Finland, Iceland, Liechtenstein, Norway, Sweden and Switzerland. On 2 May 1992, an agreement was signed between the EFTA states and the European Community to create an European Economic Area (EEA); a development which promises to establish an enormously powerful trading bloc (which in 1989 would have accounted for 45 per cent of total world trade). In the light of the subsequent "no-vote" in Switzerland's national referendum in December 1992, an amending protocol to the EEA agreement was due for signature in early 1993, with the ratification process to follow that.

The new European Economic Area agreement will remove most of the remaining non-tariff barriers to EC-EFTA trade and will extend the four freedoms to the area and greatly enhance market access (it is predicted that the Gross Domestic Product of EFTA will rise by five per cent as a result). The Edinburgh Council agreed that accession negotiations for full EC membership by Austria, Finland and Sweden were expected to begin early in 1993, with negotiations with Norway starting soon afterwards. All four are expected to join the Community by the middle of the decade.

With the possible exceptions of Finland and Sweden, very little data is currently available with which to describe the development of electronic information markets at national level, and there is practically no published analysis of the situation at the EFTA level. For these

reasons it is not possible to make direct quantitative comparisons between individual EFTA information markets.

The four Nordic members of EFTA exhibit considerable differences in terms of market sophistication and development. While there are some differences in language and tradition which differentiate the Nordic countries, these factors are balanced by a considerable degree of co-operation at the professional level. Finland has an advanced and competitive telecommunications structure and the Finnish public have demonstrated a readiness to experiment with new and a wider range of services; Sweden too has an advanced electronic information structure.

In contrast to the Nordic countries, Austria, Liechtenstein and Switzerland already share particularly close cultural, linguistic and technical infrastructure links with existing members of the Community, most notably Germany. These factors mean that it is difficult to consider information market developments in these EFTA countries in isolation. The Austrian telecommunications network is highly advanced, although there is much work to be done in liberalising telecommunication services.

The EFTA countries by no means represent a coherent whole. EFTA is characterised by different languages, cultures and traditions. However, one structural feature is common to all members of EFTA: their relatively small populations, averaging only six million (excluding Liechtenstein). This has an important implication for supply-side developments in the information market since there are few opportunities for economies of scale within domestic EFTA markets. In particular, this means that the production of information goods and services with a strong local orientation is difficult to establish on a viable commercial basis. The absence of scale economies limits profitability and makes local information hard to obtain in electronic form unless it is provided by the public sector (as is widely the case in Finland).

However, despite these factors, some EFTA suppliers still manage a strong presence in Western European markets for electronic services in relation to distribution activities. Three EFTA suppliers appeared within the twelve largest Western European database distributors (by value) in 1990, according to research conducted by CIT Research: the Swiss real-time financial services supplier Telekurs (ranked third); the Swiss host service Radio Suisse (ranked fourth); and the Swedish host and gateway builder DAFA Data (ranked eleventh). Their combined revenues represented 137 MECU or almost six per cent of the total estimated Western European marketplace in 1990. The success of these services demonstrates the fact that smaller countries can compete successfully in international online markets if the inherent value of their services is sufficiently high.

## 4 THE INTERNATIONAL INFORMATION MARKETPLACE

### 4.1 The information marketplace

Every business, whether large or small, in services or in manufacturing, needs to plan its strategy for the transition from doing business in an industrial economy to doing business in an information economy. The structural changes that have been taking place in Europe have major implications which affect every business firm and organisation: the composition of the workforce, productivity, competitive pressures, and philosophies of business management are all changing. In the past, productivity improvement focused on labour, capital and technology. Today, one of the key factors in maintaining competitive edge is to work more information-intensively, not simply harder. This requires that information resources should be managed much more effectively.

Almost all commentators on the information economy have emphasised the key role of information and communication technologies (ICTs) in the transition to a post-industrial society. ICTs are growing faster than any other industrial sector and already contribute around five per cent of world Gross Domestic Product (and eight per cent of GDP in the case of the industrialised nations).

In a mere twenty years or so, the major industrialised nations have witnessed the birth of an important new economic sector: the information industry. Predictably, definitions of the term 'information industry' vary. The information industry is clearly part of the services sector of the economy, but because of the pervasive nature of information activities, it is often difficult to gain a clear perspective on the information business. While some services, such as transport, education and public utilities are relatively tangible and discrete, information activities are evident in all economic sectors. This makes it difficult both to define the information services sector and to measure the contribution of an efficient information supply infrastructure to the wider economy.

#### 4.1.1 *Defining the information services sector*

The information industry, viewed from the broadest perspective, includes elements from four principal sectors of activity:

- *hardware manufacturing* (the microprocessor, computer and peripherals industry)
- *software* (packaged and customised software)
- *services delivery* (telecommunications utilities, network services and the broadcast media)
- *content services* (publishing, database production, films, books and records)

These sectors are closely linked and increasingly inter-dependent. Indeed, it is at the points where these four sectors meet or converge that the information industry might be said to be located. Figure 8 is a map of the information business, defined very broadly. It is an example of a functional rather than a sectoral approach to describing the information industry.



Four different kinds of functions are invoked when information goods and services are brought to the marketplace. Information has first to be created through intellectual effort and captured as databases, maps, manuscripts or other recorded forms. In the next quadrant of the information business cycle, information is packaged and marketed (published) for a specific user community. In this part of the cycle, relatively little intellectual value is added and commercial considerations come to the fore.

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**Figure 8**  
**Map of the information business.**

***Q1. PRODUCTION***

*Databases*  
*Press agencies*  
*Universities*  
*Authors, journalists*  
*Film studios*  
*Composers*  
*TV studios*

***Q2. PACKAGING***

*Host services*  
*Newspapers*  
*Academic publishing*  
*Print publishing*  
*Film publishing*  
*Music publishing*  
*TV stations*

***Q3. DISTRIBUTION***

*Telecommunications*  
*Postal services*  
*Libraries*  
*Broadcast transmission operators*  
*Retail bookshops*

***Q4. FACILITATION***

*Computer services*  
*Software services*  
*Value added data and network services*  
*Computer maintenance*

*Source: adopted from Understanding information: business, technology and geography (ed. Robins), Belhaven Press, 1992.*

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None of these activities could take place without supporting

infrastructure, so two other types of activity are necessary to bridge the gap between the creator of an information product and its ultimate user: distribution and facilitation. These activities include the provision of telecommunications, hardware and software production, libraries and postal services. All these are essential if efficient flows of information are to be maintained.

Although the business interests and activities of the major players in the four quadrants of Figure 8 are still largely discrete, the boundaries are blurring and converging. Many database creators (Quadrant 1 in Figure 8), for example, are packaging information themselves and publishing CD-ROM products (Quadrant 2). Providers of basic telecommunications services (Quadrant 3) are offering Value Added Data and Network Services (VADS and VANS), creating an environment where new forms of information services are possible (Quadrant 4). Manufacturers of consumer electronics (Quadrant 4) are forging strategic alliances with content services such as print and film publishers (Quadrant 2), positioning themselves to exploit the multimedia markets of the future.

These processes of convergence add considerably to the already intense problems of mapping, defining and measuring the information industry. It is important, however, to continue to develop statistical tools and other ways of monitoring the EC information services sector in order to shed light on important policy issues. The rapid diffusion of ICTs will inevitably generate stresses and strains which may amplify existing problems such as skill shortages, divergences in technical standards, low levels of user awareness, and legal and regulatory barriers.

The concept of an information services sector emerged in the 1970s with the advent of computerised databases and the growth of online distribution. Traditional sources of information: television, radio, books, and journals still play an important role, but electronic information sources have begun to form an important part of daily information supply - especially in business and professional life. Computers are now used at all levels in companies and organisations, predominantly for *internal* information storage and processing. For progress and success in many fields, the acquisition of publicly available *external* information is also vital. Access to growing mountains of information by traditional means is time-consuming and often limited in scope, despite the implementation of the most efficient documentation and filing systems. It is here that access to external electronic information services can be exploited for competitive advantage.

EUROSTAT has recently defined the information services sector as encompassing telecommunications, software and computing services, together with electronic information services (online and offline). The current NACE classification schedule does not easily lend itself to this definition and a forthcoming revision will provide specific classes for telecommunications (code 64.20) and for database activities (code 72.40). Using EUROSTAT's definition, the European Community's information services sector revenues totalled 135 BECU in 1991. Telecommunications services make up the bulk of this sector (80 BECU), followed by software and computing services (55 BECU). Electronic information services (online and offline) are included within the software and computing services segment, to which they made a contribution of around 5.5 per cent (3.1 BECU) in 1991.

Software has become a fundamental part of the cost and competitiveness of other subsectors such as telecommunications. It is therefore a major source of competitive advantage within the information services sector. Innovation, or lack of it, in software development will therefore become an increasingly important factor in the Community's ability to compete successfully with the USA and Japan.

The supply and consumption of electronic information services takes place in a wide range of competitive environments, from the national monopolies controlling many basic telecommunications services to the largely deregulated computing services market. Together with software, developments in the Community's telecommunications sector will have a very considerable bearing on the future shape of the European information services sector.

#### *4.1.2 Telecommunications infrastructure*

The European Commission predicts that information technology and related industries will account for around ten per cent of world economic activity by the millenium, displacing

the automobile industry as the key determinant of the developed world's economic prosperity. By the year 2000, the telecommunications services sector alone is set to account for around six per cent of Community Gross Domestic Product. As well as making a direct contribution to the economy, ICTs will play an increasingly important 'enabling' role in other industry sectors: it is projected that two out of three Europeans will use ICT products and services at their workplace by the year 2000.

Value Added Services (VAS) represent a very important submarket for telecommunications-based services and one which, from a strategic point of view, offers considerable opportunities for growth and innovation in the information services sector. The market for VAS consists of three generic service types:

- *network management and support services* (Managed Network Services, facilities management and network support services)
- *communications and transactional services* (electronic mail, fax store and forward, Electronic Data Interchange, voice messaging and videoconferencing)
- *electronic information services* (online databases, audiotex, videotex and data broadcasting)

Value Added Services also represent a strategic entry point into Europe for foreign companies, since most national PTOs are prevented, by strict regulation, from providing advanced (as opposed to basic) telecommunications services. With further discussions on telecoms deregulation taking place in Europe and with the development of more sophisticated VAS platforms, the current situation is highly volatile.

The European Commission argues that further liberalisation of Community telecoms market is likely to double its rate of growth and increase the overall size of the market by a factor of four by the year 2000, with obvious implications for the information services sector. But despite several years of market reforms, most EC basic voice telephony services are still under the control of national monopolies. The Community lags behind many other countries in terms of progress towards privatisation and liberalisation in this sector. However, the European Commission has made substantial progress in preparing the European telecommunications sector for the challenges of the single market, beginning with the 1987 Green Paper. On 5 June 1992, EC telecommunications ministers adopted a Directive on the application of Open Network Provision principles to leased lines (leased lines allow organisations to establish cost-effective permanent links between their offices in different cities and countries). In the new environment resulting from Community action to open up the telecommunications services market, it is likely that leased lines will also be used by private companies for selling a variety of value added services such as electronic messaging, access to online databases, public and corporate videotex services, videoconferencing, and videotelephony. Market acceptance of these services will greatly depend on the pan-European availability of leased lines, with harmonised technical standards and tariff structures (still regarded as too expensive by many users).

Future prospects for the information services industry also hinge on progress in one other critical area of telecommunications infrastructure: Integrated Services Digital Network (ISDN). ISDN is an end-to-end digital network which is seen as the successor to the

public switched telephone networks; providing the advanced technological base needed to support a wide range of advanced information and other services.

The Commission's interest in promoting ISDN has been fuelled by the recognition of the strategic importance of strong, harmonised telecommunications to the successful achievement of a Community-wide market for goods and services. While the take-up of ISDN services has been slower than anticipated, ISDN is currently available in most of the Member States. However, the full benefits of ISDN can only be exploited on the basis of a fully fledged European-wide and harmonised offering. So, following a suggestion from the European Commission, a 'Memorandum of Understanding on the Implementation of a European ISDN Service' (EURO-ISDN) has been drawn up between 26 European telecommunications administrations. This agreement commits the signatories to provide at least a minimum set of pan-European ISDN services by December 1993.

While the increasing availability of ISDN within the Community represents a major step forward for information suppliers, the implementation of EURO-ISDN is, by itself, not the whole answer. ISDN development and implementation is fragmentary over much of the industry's 'global' marketplace (actually centred on Western Europe, North America and Japan) which means that investment in new applications has an element of risk, at least until all the major market segments can receive the service. In North America, ISDN developments tend to be strongly user-driven, as exemplified by an apparent preference for high speed semi-private networks. In Europe, ISDN developments have tended, until recently, to be supplier-driven, a feature which is reflected in national differences in the speed and style of implementation. However, Germany, France and the UK have now adopted the European Telecommunications Standards Institute (ETSI) 300/075 Eurofile transfer standard for ISDN, which makes it possible to use the service for transnational digital communications; it is expected that all European countries will have this standard in place by 1995. However, what is really needed is a 'killer application' for ISDN services which will generate interest in ISDN in the same way that the Group 3 standard kick-started the fax market.

The rate of technical progress in communications technology is so fast that basic ISDN (64 kilobits per second) already appears to be a somewhat dated solution in some respects. One limitation of basic ISDN is that it is simply not fast enough to support all components of online interactive multimedia applications which industry analysts argue will be the driving force in electronic information delivery in coming years. However, further breakthroughs in data compression techniques may offer a positive trade-off against basic ISDN's inherent bandwidth limitations.

Since the online industry is currently in a period of some uncertainty, the impact of Community programmes such as those in support of high performance computing and networking should have a considerable impact on the opportunities and future development of the information services sector. Recognising the need for a Community-wide network infrastructure for the public sector, the European Commission first suggested work towards a vast administrative system, the European Nervous System (ENS) in 1989. The ENS idea appears in the Treaty of European Union (Article 129b) as part of a commitment to develop trans-European networks in transport, telecommunications, and energy infrastructure. According to the agreement, their purpose is 'promoting the interconnection and inter-operability of national networks in the

framework of an open and competitive market as well as access to such markets'. The implementation of a high speed telecommunications infrastructure would certainly improve the competitive position of the European information industry in relation to the USA and Japan.

## 4.2 Europe's competitive position in world markets

As the countries of the world continue to forge closer and more intense economic and social relationships, so there is increasing cross-border potential for tradeable information flows and telecommunications services. The 1990s will be a critical decade for European business as firms come to grips with the challenge of the Single Market and tougher competition from outside the Community. Electronic information services have a key role to play in helping firms to develop faster reactions, to become more flexible in their commercial relations, and to meet stricter production, stock management and delivery targets.

While globalisation may serve to bring national markets closer in some respects, significant differences and imbalances remain. The most obvious differences within the Community relate to the linguistic, cultural and regulatory fragmentation which hampers information market development. In general terms, however, electronic information service providers in the USA and Japan face many of the same problems (and opportunities) as their European counterparts; for electronic publishers, the underlying technologies and market needs are broadly similar, yet the size and shape of the electronic information service sectors in the EC, the USA and Japan differ widely.

**Table 18**

**The information industries: USA and Japan compared with the EC (ratios).**

	EC	USA	Japan
Population (1991)	1	0.7	0.4
GDP (1991)	1	0.9	0.5
R&D spent on IT (1989)	1	3.1	1.5
Software and computing services (1991)	1	1.5	0.4
Electronic information services (1991)	1	2.2	0.4

*Source: compiled by CEC Information Market Observatory, 1993.*

A series of key indicators for the EC, the USA, and Japan is presented in Table 18 for comparative purposes. This Table reveals that the USA has a considerable lead over the Community in terms of overall spending on R&D activities, and the size of its software, computing, and electronic information services sectors. While the size of the Japanese software and electronic information services sectors is smaller than those of the Community in absolute terms, the gap is actually much narrower if expressed as a proportion of total GDP.

### 4.2.1 Electronic information services

Table 19 offers a perspective on Europe's competitive situation in the form of a series of end-1991 supply-side indicators for publicly-available online ASCII database services. The Table shows that the Community remains a major world force in worldwide online

production and distribution; 35 per cent of all database producers and 30 per cent of online service operators are based within the EC. Compared with similar figures from 1990, the Community appears to have increased its world share of online databases (and database producers) by almost five percentage points. At the same time, the number of EC-based host services has fallen very slightly, further evidence of a previously observed trend towards concentration on the distribution side of the industry.

**Table 19**  
**Online ASCII database production / distribution; end-1991.**

	Databases	Database producers	Hosts	Gateway services (a)
<i>Numbers</i>				
European Community	1,616	792	246	25
North America	3,057	1,269	451	43
Rest of the world	637	182	121	25
<b>Total</b>	<b>5,310</b>	<b>2,243</b>	<b>818</b>	<b>93</b>
EC share of world suppliers (per cent)	30.4	35.3	30.1	26.9

(a) These figures relate to the number of online service *organisations* offering gateway facilities to third parties; the actual number of gateways is not indicated.

*Source: Directory of Online Databases, Cuadra/Gale, July 1992.*

It is evident from the data presented in Table 19 that the supply-side infrastructure in North America is practically twice the size of that in the Community. There is no single reason why the European electronic information services sector should lag behind the USA; in reality, the reasons vary from sector to sector. In the critical area of company information and credit ratings, for instance, at least four factors are important:

- European users continue to emphasise national (rather than EC-wide) data sources
- European companies typically devote fewer resources than US firms to researching their competitors
- Printed sources of company information, such as directories, remain a deeply established and preferred information channel for many European executives
- Company laws in the USA force the disclosure of much more detailed company information to the Securities and Exchange Commission (SEC) than is the case in any EC Member State

**Table 20**  
**Online ASCII online databases; geographic distribution of EC industry turnover(a,b), 1990-1991(c).**

	1990 turnover (MECU)	Share of total (%)	1991 turnover (MECU)	Share of total (%)
National	524	25.9	657	25.8
Intra-EC	777	38.3	1,040	40.8
<b>Turnover EC</b>	<b>1,301</b>	<b>64.2</b>	<b>1,697</b>	<b>66.6</b>
North America	294	14.5	331	13.0
Rest of World	432	21.3	518	20.4
<b>Turnover Export</b>	<b>726</b>	<b>35.8</b>	<b>849</b>	<b>33.4</b>
<b>Sub-total (b)</b>	<b>2,027</b>	<b>100.0</b>	<b>2,546</b>	<b>100.0</b>
Representing of total industry value	64.4%		76.6%	
	3,149 MECU		3,325 MECU	

- (a) Online delivery only, offline products/services excluded.  
 (b) These figures relate only to those survey respondents who were able to provide a breakdown of turnover by geographic area.  
 (c) 1991 figures for Ireland unavailable.

*Source: CEC Information Market Observatory / European Information Industry Association, 1993.*

Table 20 underlines the growing importance of trade in electronic information between EC Member States, a trend identified in the previous Annual Report of the IMO. Trade between Community partners grew from 777 MECU to 1,040 MECU between 1990 and 1991, to represent 40.8 per cent of all distribution revenues flowing to EC-based suppliers.

#### **4.2.2 Multimedia industries**

Many industry analysts are predicting that multimedia computing will have an enormous effect on the whole IT sector, and will provide a focus for the networking and computer industries into the next decade. Multimedia technologies make it possible to deliver information in the form of any combination of text, speech, music and still or moving images, and to do so interactively. Currently, optical disc is the favoured carrier for multimedia information, simply because the existing telecoms infrastructure lacks the bandwidth to deliver online interactive multimedia services effectively. If the analysts are right about the potential impact of multimedia, then the availability of broadband communications will become an essential component of Europe's ability to compete with Japan and the USA.

**Table 21**  
**Multimedia industries; strengths(a) and weaknesses by region, 1992.**

	Europe	USA	Japan
Computing	□	■	□
Consumer electronics	■	□	■
Telecommunications	■	■	■
TV, film, music	■	■	□
Publishing, information	■	■	?
Image companies	■	■	■
Services	■	■	?

(a) Regions are rated according to their *strength in multimedia-related aspects* of their information industry base.

*Source: DG-XIII Inter-Service Group of Analysis of Industrial and Technological Strategies, Brussels, 1992.*

Table 21 offers an assessment of the strengths and weaknesses of the EC, USA and Japan (the 'Triad') in terms of the elements needed to develop successful interactive multimedia (IMM) applications. The Table was compiled by members of DG-XIII's Inter-Service Group of Analysis of Industrial and Technological Strategies; it contains subjective ratings (on a scale 1-5) which represent the consensus view of the Group as to the *relative* strengths of each Triad member. While the Community has undoubted strengths in information content, it is comparatively very weak in two key areas which are needed to release the full potential of interactive multimedia products and services: computing and consumer electronics.

As was seen earlier, Europe retains a very powerful position in the world in relation to the supply of traditional printed publications. However, the challenge for publishers in the 1990s is that an increasing separation between electronic and printed products is becoming evident, as suppliers outside the traditional world of publishing enter the information market. In the risk averse, under-capitalised world of traditional publishing, the most usual entry route into the electronic information marketplace has been to offer machine-readable by-products from printed publications to a third party distributor: a host or CD-ROM integrator, for re-sale. Electronic publishing has too often been seen as a source of marginal revenue, supplementing (but not threatening) established print sales. This approach shows limited vision; it fails to address the fact that, as an information medium, electronic media offer a far wider range of development possibilities than ink-on-paper. This is perhaps most evident in an increasing convergence between electronic information and telecommunications in the form of Value Added Data and Network Services (VANS/VADS). The blurring of network and database products may create new opportunities for electronic information, but it also puts considerable technical and service pressure on those suppliers who have their origins in the conventional publishing area. For



these reasons, the issues of telecommunications infrastructure and policy will play a more central role in shaping electronic information services than before.

### **4.3 Developments in the USA**

#### **4.3.1 *Market size and trends***

The size of the US electronic information services sector grew by more than 17 per cent from 8.2 to 9.6 BECU between 1991 and 1992 according to estimates prepared by the US International Trade Administration (ITA). Table 22 shows how revenues from the distribution of US electronic information services has almost doubled since 1988. As presented, the figures also suggest that the gap between the USA and the EC widened substantially between 1988 and 1991. However, in the light of recent supply-side survey findings by the IMO (which revealed growth of 5.6 only per cent in the value of the EC distribution sector between 1990 and 1991) and generally downcast reports in the trade press, the US ITA figures seem rather optimistic.

Unlike the EC figures presented in Table 22, the US industry size estimates include general interest consumer services. Currently, this market is relatively small in the USA: it was estimated to account for less than three per cent of total revenues in 1991. Sales of financial, credit, marketing, STM, and legal information to businesses and professionals account for by far the largest segment of the US market. However, the US residential consumer market is large by European standards, with more than three million subscribers to online services, notably videotex and specially packaged online database services such as the 'After Dark' service from BRS, a leading US host. This service is essentially a marketing package which allows residential customers to access selected BRS database services outside of peak hours at a special rate. The general interest residential market is beginning to show signs of growth and is being targeted aggressively by a number of other US companies.

Table 22

Electronic information services; USA(a,b) and EC, industry turnover and forecasts, 1988-1993 (in BECU).

	1988	1989	1990	1991	1992	1993
USA	5.0	6.0	6.9	8.2	9.6	11.2
EC(c)	2.5	2.8	3.1	3.3	n/a	n/a
USA as a percentage of total CE	200	214	223	248	..	..

- (a) Including professional and consumer markets (US Standard Industrial Classification code: USSIC 7375).  
 (b) Converted from US dollars (EUROSTAT conversion rates).  
 (c) Professional information services only.

*Sources: US International Trade Administration (ITA) in US Industrial Outlook 1993, US Department of Commerce; and CEC Information Market Observatory / European Information Market Observatory, 1990-1993.*

One recent development which may help to expand US information services trade is the recently initialled North American Free Trade Agreement (NAFTA), which will increase market access to Canada and Mexico for a range of goods and services. The US information industry has always had a positive balance of payments, and this trend is expected to continue, at least in terms of absolute increases in the amount of the surplus. Finding new customers in foreign markets will become more important, however, if the US is to maintain its global leadership in this sector. Currently, the most important export markets for US-based suppliers are in the European Community and in Japan. These export markets were estimated (by the ITA) to be 3.1 BECU and 0.5 BECU respectively in 1992, and they contributed 38 per cent of total revenues flowing to US suppliers. Many US-based companies active in the VANS/VADS sectors have reported that their most rapid business growth over the past two years has been outside North America.

Assuming that the US economy and those of its major trading partners continue to expand, the US Department of Commerce predicts that total industry value will increase by more than 16 per cent in 1993. Much of this growth is expected to come from increased sales in three market segments: new foreign customers; US small businesses; and US non-professional consumers. Revenues from established customers are likely to show only modest expansion. Sales of information services through the media of CD-ROM and audiotex are likely to exhibit rates of growth well above the 16 per cent average.

Two recent developments are likely to have long-range implications for the US marketplace for electronic information. A July 1991 ruling by US District Court Judge Harold Greene in the District of Columbia Circuit allowed the seven regional Bell operating companies (RBOCs) to provide information services. During 1992, the RBOCs or 'Baby Bell' companies embarked on a number of new ventures, mainly in partnership with information services providers. This, however, was against a legal and regulatory background of some uncertainty. A Bill that would impose severe rules for the

participation of the RBOCs in the information market was introduced before Congress in 1992. Those in favour of the Bill argue that it is needed to prevent the RBOCs from competing unfairly against other service providers. The Bill's opponents, however, fear that it will impede market development, especially for users based at home or in small and medium enterprises (SMEs).

Another interesting development in the USA has been a recent sharp decline in the use of premium rate '900' and '800' information services. The fraudulent and misleading practices of a number of '900' service providers have damaged consumer confidence and caused the Federal Communications Commission (FCC) and Congress to implement new regulations and guidelines for operators of audiotex services. The industry has also responded by issuing its own voluntary code of practice and is trying to find ways of reducing the fraudulent uses of '900' services which have given audiotex a poor customer image in the USA.

#### ***4.3.2 High-speed network infrastructure***

A number of important new information policy developments are taking place in the USA with the arrival of the new Clinton-Gore administration. The recent US National Competitiveness Act, for instance, contains the text of Al Gore's proposals to establish an 'information superhighway' infrastructure based around the High Performance Computing and Communications (HPCC) initiative, launched in 1992. This represents a major enhancement of the competitive position of the USA in the provision and use of information services and is indicative of renewed interest in information policy as a major factor in strengthening the competitive position of US industry as a whole. The HPCC initiative is the result of several years of efforts by government, industry and academia to develop a new research agenda to expand US computing and networking technology. There are four inter-related strands to the HPCC, each comprising a major programme initiative:

- High-Performance Computing Systems (HPCS)
- Advanced Software Technology and Algorithms (ASTA)
- National Research and Education Network (NREN)
- Basic Resources and Human Resources (BRHR)

The creation of the NREN 'information superhighway' is designed to transmit data at high speed and thus allow researchers, business executives, academics and students around the USA to communicate with one another and access a broad range of research tools and information services. This is strongly re-enforced by the Electronic Libraries Act (1993) which places a duty on public administrations to offer public access to the data they collect. It is very likely that both public and private sector online database services will be positively affected by these important infra-structure developments.

#### 4.4 Developments in Japan and the Pacific Rim

This section reviews information market developments in Japan and the Pacific Rim countries and draws some preliminary conclusions about the European Community's relative strengths and weaknesses.

##### 4.4.1 Japan: market size and trends

The Japanese database industry emerged in the mid-1970s as part of the country's larger mission to develop Japan's capabilities in targeted industrial sectors. The government agency responsible for the early development of Japan's information policy is the Ministry of International Trade & Industry (MITI). MITI still plays an active role in the database sector's development, both directly and through the activities and support of the Database Promotion Center (DPC).

Since 1973, Japan's MITI has conducted an annual Survey of Selected Service Industries which covers industry size estimates for the Japanese professional electronic information services sector, including offline goods and services. Viewing Japanese industry size in five-year increments, database sales totalled 14.4 billion Yen in 1975, 44.1 billion in 1980, 100.8 billion in 1985, and 188.6 billion in 1990.

Table 23 compares electronic information services sector revenues for Japan and the EC over the period 1988-1990 and shows that the Community has a significant advantage over Japan in terms of industry size. This strategic advantage is one which is likely to grow in absolute, if not in relative terms, over the next five years.

**Table 23**  
**Electronic information services; Japan and the EC, industry turnover(a), 1988-1991 (in MECU).**

	1988	1989	1990	1991
Japan	699	1,037	1,241	n/a
EC (b)	2,492	2,799	3,149	3,325
Japan as a percentage of total EC	28.0	37.0	39.4	..

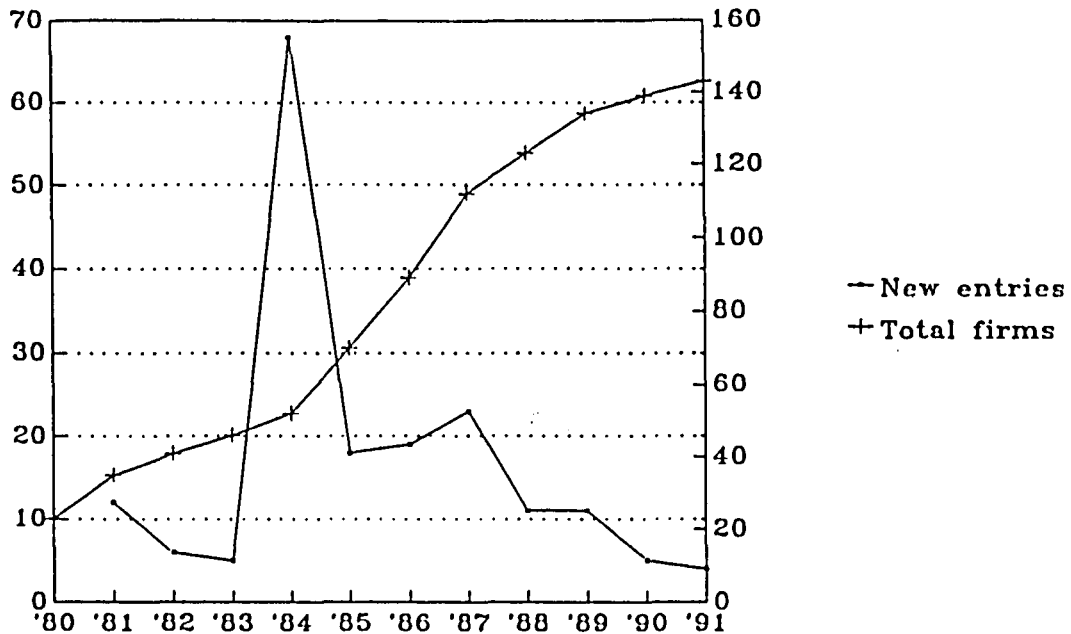
(a) Includes online and offline information products and services.

(b) Electronic information distribution only; excludes turnover attributable to 'pure' information providers.

*Sources: MITI, 1991; and CEC Information Market Observatory / European Information Industry Association, 1990-1993.*

The Database Promotion Centre has predicted, on the basis of a collaborative 1991 survey with the European Information Industry Association, that annual growth in the database services market for Japanese and European companies over the period 1991-1996 will be of the order of 15.6 and 15.9 per cent respectively.

**Figure 9**  
**New firms entering the Japanese database sector, 1980-1991.**

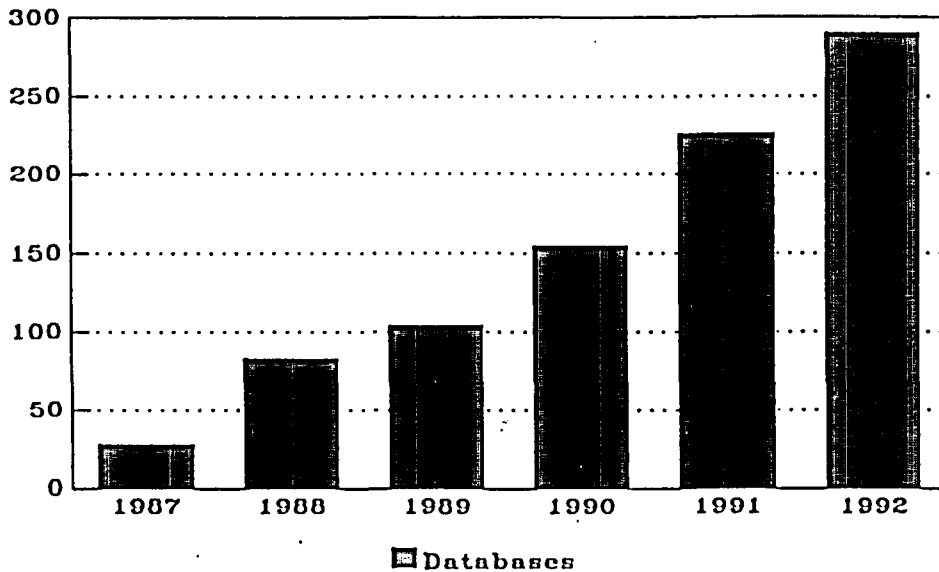


*Source: Database Promotion Center, 1992.*

Against the recorded growth of only 5.6 per cent in the value of EC-based database distribution between 1990 and 1991, however, these projections appear to be highly optimistic. The Database Promotion Center conducts an annual supply-side survey of the Japanese electronic information services sector which includes information providers, host services, gateway operators and information brokers. Figure 9, taken from the results of the 1991 survey, shows how the rate of new entrants into the database industry has recently declined. One key factor which partly explains the weakness of Japan's electronic information services sector relates to a continuing failure to find markets outside of Japan; despite the fact that the number of database services being offered to overseas customers has steadily increased (see Figure 10).

**Figure 10**

**Number of Japan-based online database services accessible outside Japan, 1992.**



*Source: Japan Database Industry Association (DINA), 1992.*

In a 1992 survey of players in the Japanese electronic information sector, the Japan Database Industry Association (DINA) identified some of the key issues facing Japanese suppliers who wish to break into the international marketplace (these are not necessarily presented in order of priority):

- the difficulty, for Japanese suppliers, in defining overseas information demands and estimating market size or potential
- gaining access to Japanese language databases requires (scarce) language skills and access to specialised terminal equipment, such as Kanji keyboards
- unacceptably high translation costs
- operational problems relating to the fact that servicing the main international markets, in Europe and the US, would require 24-hour user and technical support
- uncertainties relating to copyright protection for databases in Japan
- the difficulty of setting up sales and distribution networks

Despite these problems, there is clearly much *potential* demand for Japanese data, even if that demand is not currently being expressed. While the supply of information from and about Japan remains so immature, there is clearly a significant opportunity for EC-based suppliers.

The Asia-Pacific region has no equivalent of the Federal Communications Commission (FCC) or the European Commission, so regulations and standards in the

telecommunications services sector vary widely. Japan dwarfs the region's other information services markets, but with over 1,000 VAS suppliers, the Japanese market is so competitive that only a handful of players are making a profit. The activities of the Japanese Database Promotion Centre (DPC) are designed to support and further stimulate information market activity. This support takes the form of financial assistance for investment in database construction; contributions towards the costs of research and development; awareness programmes; and market studies and surveys.

#### *4.4.2 Longer-range developments in the Pacific Rim*

The 1980s witnessed a period of phenomenal growth period in the Asia-Pacific region, which has emerged as a major hub of the global economy; the region currently generates nearly half the world's total Gross National Product (GNP) and accounts for more than one third of world trade. The evolving Pacific Rim economy is one in which economic and social relationships are intensifying rapidly. This means greater flows of capital, technology, goods, services and people between the west and east coasts of the Asia-Pacific region. These flows increase the demand for information and communication services between competitors, customers, suppliers and business partners. For all these reasons, the Asia-Pacific region has the potential to become a significant and attractive market for EC electronic information goods and services.

As the trend of economic globalisation grows, telecommunications becomes a vital factor in creating competitive advantage; and there is a considerable degree of regional co-operation in this sector. With the ASEAN optical fibre cable network (AOFCN) nearing completion, a powerful high speed network infrastructure is being assembled in South East Asia. On a less visible but no less important scale, a proliferation of international and regional information networks between ASEAN countries and the rest of the world is evident. One such example is ASEANET, an electronic trade information system which has been set up to provide business information services by linking Chambers of Commerce and industry across the region.

Despite these advances, South East Asia is still very much a part of the developing world; 70 per cent of the population live in rural areas and the penetration of basic telephone services is very limited across large areas of the region (see Table 24).

**Table 24****Basic demographic, economic and telecommunications infrastructure indicators; Japan and ASEAN countries, 1991.**

	Population (milioni)	GNP per capita (US \$)	Line units per 100 population
Japan	124.2	23,570	55.0
<b>ASEAN countries</b>			
Brunei	0.2	17,000	16.0
Indonesia	184.3	520	0.5
Malaysia	18.0	2,305	4.0
Philippines	6.9	727	1.5
Singapore	2.7	12,718	4.3
Thailand	56.2	1,418	1.9

*Source: Far Eastern Economic Review, 1992.*

There is little doubt that as Asia becomes increasingly sophisticated, its horizons will expand faster than its existing business connections, and that firms in the region will come to rely much more heavily on external sources of information than before. This tendency, coupled with the current lack of indigenous services suggests that there may be considerable opportunities in the future for European suppliers to sell electronic information services into the region.



## 5 THE EVOLVING EUROPEAN MARKETPLACE

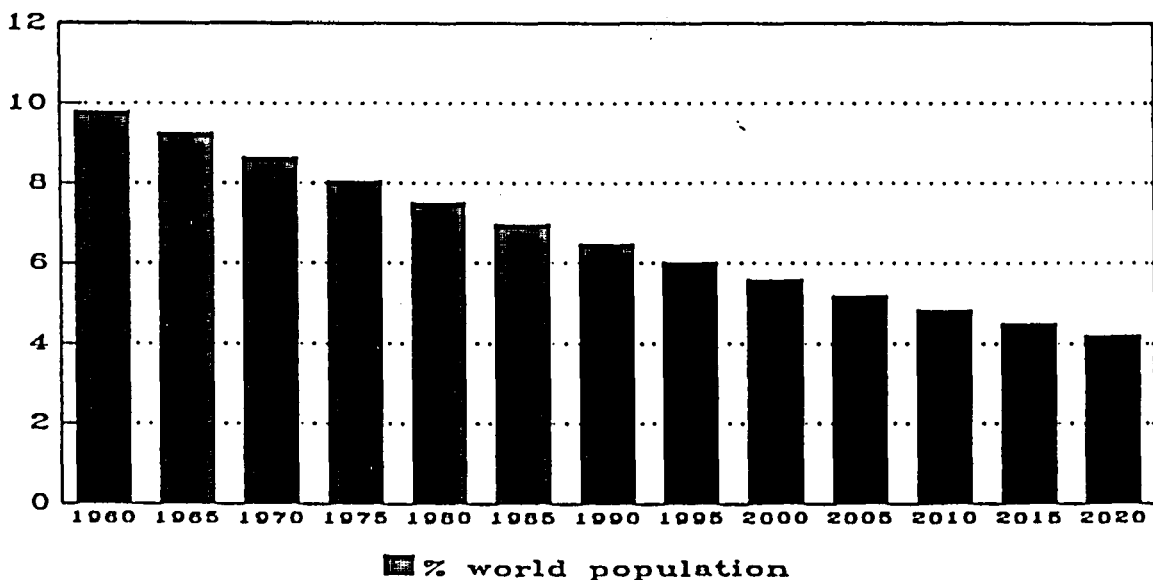
The supply of electronic information products and services is shaped by the complex interplay of many external forces. These include the legal and regulatory environment; technological advance and innovation; and investment in the telecommunications infrastructure. Without demand, however, there can be no marketplace for electronic information. Industry analysts constantly try to predict future demand levels by taking account of economic, social and demographic trends. The spurt of merger and acquisition activity in the ICT sector in recent years is indicative of wide-reaching structural changes taking place both within the EC and in global markets. This section attempts to isolate some of the key macro trends in the Community's social, demographic and industrial make-up which are likely to affect future demand for electronic information services.

### 5.1 Demographic and social change

#### 5.1.1 EC population trends

According to the most recent figures available from EUROSTAT (1 January 1991), the population of the twelve Member States of the European Community is 345 million, or around 6.5 per cent of the world's total population. This proportion has fallen from 9.8 per cent of world population in 1960, as Figure 11 illustrates, due to the slower rate of demographic change in the EC compared with the rest of the world.

Figure 11  
EC population as a percentage of world population, 1960-2020.

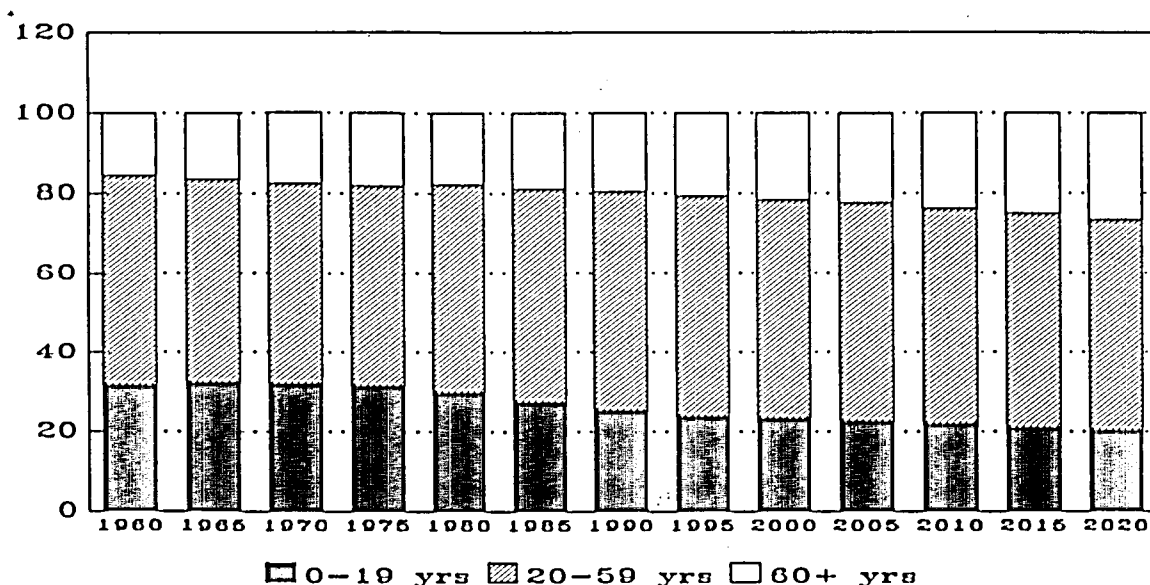


Source: EUROSTAT, 1992.

The most significant demographic factor affecting future markets for goods and services is the ageing population. As in all industrialised nations, there has been a sharp drop in the EC fertility rate since the 1960s, and this has led to a marked reduction in the numbers in

the lower age brackets of the population. Combined with the impact of advances in medical knowledge and healthcare, the net result is an ageing Community population (see Figure 12). Policy makers throughout the Community have recognised this trend and have already begun to incorporate its implications into current policies; by making changes in the provision of health care and retirement pensions, for example. Future demands on scarce economic resources are likely to be met increasingly through the increased application of ICTs. Health care provision is already a high IT growth sector, reflecting increased use both in primary health care (for example, monitoring equipment) and in the administration of an increasingly complex system.

**Figure 12**  
EC population by age group (%), 1960-2020.



*Source: EUROSTAT, 1992.*

Another factor in the Community's changing demographic profile is population shift as a result of migration and immigration. The migratory balance has over the period been positive; in 1989 there were more than eight million foreigners from non-Community countries living in the Member States. This figure has increased substantially following the end of the Cold War and the rising influx of immigrants and asylum seekers from central and eastern Europe, and also from the Maghreb countries and the Middle East. Nonetheless recent studies on migration have expressed doubt that immigration levels will be sufficiently high to replenish the labour force.

### **5.1.2 Labour force participation**

The activity rate of the population of working age has remained more or less constant in the Community for the past 25 years at around 65 per cent. This figure masks a fundamental change in the labour force, however; a decline in the male activity rate and an increase in the female rate. The female activity rate is still well below that of the USA, Japan, and Central and Eastern Europe. Despite improvements in education and training,

women still remain an under-utilised resource in the Community workforce. Almost three in every ten jobs held by women are part-time, and women account for fewer than 40 per cent of the total employed. Female under-representation in the labour market is less obvious, however, in the services sector where women account for nearly 45 per cent of the workforce.

The activity rate of employment varies considerably across the Community's regions. It is below 60 per cent in Italy's Mezzogiorno and in most regions of Spain, Greece, Ireland, Belgium and Luxembourg. In most other regions it lies between 60 per cent and 70 per cent; but in Denmark, most regions of the United Kingdom, and in Bavaria it is particularly high (above 70 per cent). The disparities between different regions of the Community and the less advanced state of development in the less favoured regions are given consideration within the IMPACT programme and provision is made for their participation in relevant activities.

The net effect of the demographic changes as outlined will be a decline in the numbers of young workers entering the labour force, particularly in the core regions of the Community where declining birth rates are more pronounced. These regions also have relatively higher wage rates, reflecting skill shortages which are likely to increase in professional occupations. One likely consequence of this trend is the relocation of firms from the core to the peripheral regions, supported by the increased use of ICTs. There is also likely to be an increase in the female participation rate, with the adoption of more flexible working patterns.

### *5.1.3 Industrial structure*

Changes to the European economic structure have seen a general shift from a predominantly manufacturing base to a service-based economy. In 1990, the value-added of services represented 61 per cent of total value added in the EC. The service sector employed 73.6 million people, around 61 per cent of total employment in the Community. Associated with the growing share of employment in the services sector has been the emergence of changing working patterns. The rise in the female participation rate is accounted for by the overall growth in part-time work, with a parallel growth in unemployment, particularly among the young and unskilled male workers.

The formal completion of the Single Market on 1 January 1993 has forced firms to rationalise their production and carry out all operations on a larger scale than previously; rationalisation can be expected to continue across the Community. It may be expected that the net impact on employment will be positive, but there will be a contraction in those sectors employing low-skilled workers and an expansion in sectors which demand management and administrative skills, and for engineers, designers and technicians. When combined with the free mobility of labour, this is likely to induce skill shortages in certain sectors which should increase the demand for ICTs.

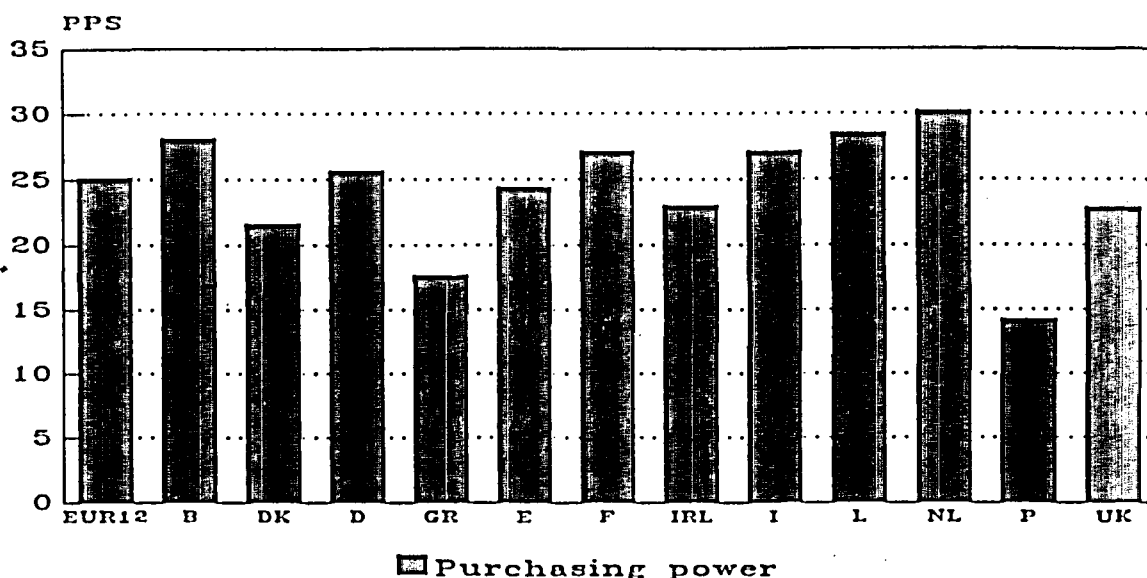
### *5.1.4 Levels of income*

Employment earnings do not necessarily reflect GDP and national income levels, although there has been a tendency towards convergence (with the exceptions of Luxembourg, Italy and Greece). The average remuneration of the average Community employee has been rising regularly and without interruption since 1970 and has not even fallen during

economic crises. Taken overall, the average increase of 2.2 per cent from 1970 to 1988 is identical to the increase for per capita GDP.

**Figure 13**

**Average income(a) from paid employment per employee; EC Member States, 1988.**



- (a) Expressed in Purchasing Power Standards (PPS). The amounts are obtained by using the exchange rate which is the purchasing power parity. This is compiled using the prices of a selection of comparable products and thus takes account of the real purchasing power of a currency.

*Source: EUROSTAT, 1992.*

This reflects a growing tendency to polarisation in terms of household income throughout the EC, firstly between the employed and unemployed, and secondly between single and dual-income households.

### *5.1.5 Flexible working patterns and teleworking*

A recent study carried out in the Netherlands looked at the feasibility of telework and possible strategies for increasing its use. One of the study's findings was that teleworking was mainly an option for medium-or higher qualified professions. Dual-income households have by far the largest discretionary disposable income and significantly, it is among such households that the largest growth in home-working has occurred. In these households there is likely to be sufficient disposable income to support computer systems and software for networking; and among professional groups there is likely to be significant scope for occasional home-working using computer links from home to the office.

Predominantly female, lower skilled teleworkers, in contrast, are likely to be employed on min-max contracts (data entry) which are highly dependent upon fluctuations in demand. It seems that where companies use teleworking it is part of an overall package of flexible

working practices, which includes a decentralised network organisation, such as UK Rank Xerox and France's IBM. In so far as employees are concerned, professional teleworkers, as described above, enjoy more autonomy and flexibility in their work whereas the min-max workers face increasing uncertainty in the labour market. In some of Europe's more competitive industries, such as printing, teleworking, where used, is a means of cutting down on labour costs. This polarisation of the workforce is expected to continue as the need for maximum workforce flexibility and minimum wage costs per unit of output increases.

The low diffusion of teleworking beyond a small group of professionals reflects the generally small installed base of telecoms-integrated computer systems in the mass home and recreational markets. So far, the potential for teleworking has been barely exploited by individuals and organisations, and the lack of a massive installed base of computers and of data communications links in households has prevented rapid development of a mass market. The driving forces behind a more dynamic growth in telecommuting will be diverse, and will include such factors as declining quality of life in city centres, increasing difficulties in commuting by car and rail in Member States, and innovation in the consumer electronics sector leading to wider diffusion and lower prices for devices integrating computing and telecommunications functions.

The Netherlands study also concluded that the extended use of teleworking to the lower skilled would depend on actual employment levels, changes in the occupational structure and the development of more sophisticated technologies, such as networks for computer-aided design and manufacturing (CAD/CAM).

Once this market has been strengthened and extended, the potential for increasing employment through home-working could be substantial. However, any increase in teleworking needs to be regulated and monitored to ensure social cohesion within the Community.

## **5.2 Economic and industrial change**

While hardware producers are expected to reduce their employment levels throughout the 1990s because of the growing competition in computer markets and the falling real price of computer power, software producers are expected to increase their employment levels. This is partly related to the rising diffusion of information and communication technologies throughout the Community and partly because of the growth in externalisation of functions previously performed in-house. Small- and medium-sized enterprises (SMEs) will need special support if they are to compete within the single market. They will need to improve their financial, management and technological resources if they are to compete with larger firms.

The growing tendency towards industrial concentration will hit the disadvantaged regions and smaller members of the Community and thus the continued and specialised support of EC structural funds will be necessary. To date, the main users of ICTs tend to be large firms or firms in Northern Member States. These inherent size and regional disparities can result in an uneven distribution of competitive advantage throughout the Community. This means that non-users of ICTs tend to be the main victims of job displacement since they lose their competitive advantage. Again, SMEs are vulnerable in this respect.

Many of the companies in the IT industry have begun to change the structure of their organisations to enable them to offer services which provide solutions to specific business problems. This has increased the number of networks of workers who communicate either electronically, or in specially created project schemes. Computer networks have the potential to improve efficiency in the handling of information and data in production and distribution, for savings associated with stock reductions and better scheduling, for more intensive inputs of technical and market knowledge into design processes, and for more flexible and quality-orientated production. Electronic information networks have been developed by application of technology, rather than as a result of basic research. Such a dimension offers a rapid feedback and response to product and/or service improvements, which in turn is very likely to encourage further innovation and R&D.

If such a potential is recognised and developed, this offers the opportunity to greatly enhance the performance of advanced economies. In the main, such improvements should prove to be beneficial although some additional volatility and instability might result, due to the increased speed of the information flows and the associated shortening of reaction times; but, in general, new growth prospects should be achieved through the closer integration of design, production and distribution, and of suppliers and users.

Furthermore, computer networks may become a major new infrastructure for a wide range of economic activities. Such networks are liable to be a core feature of economic life, with firms of all types needing to pay more attention to cultivating their external linkages. This may require large investments in new infrastructure and training of human resources. It could mean that the increasing 'professionalisation' of jobs accompanying the usage of networked IT systems may put new strains on the labour market and that the larger users might be able to exploit these opportunities to a much greater extent than smaller firms.

### **5.3 Implications of demographic and social change for the information services market**

The implications of complex demographic changes for the electronic services market are difficult to predict with certainty: the mapping and monitoring of the market by the IMO has a useful role to play in identifying likely trends. The shift towards greater female participation in the workforce, the rise in migration from eastern Europe and the Mediterranean rim, the ageing of the northern and eastern Member States, and the problems of national labour markets all imply new challenges for information, education, and training of end users of electronic systems. Nonetheless, there is likely to be an increased demand for ICTs in response to these changes.

EC and national government policy will need to address the issues outlined above and continue to support industry, particularly the electronic information services industry. This support will include the need:

- to respond to new intellectual property issues
- to continue to review and work towards the harmonisation of IT standards
- to provide incentives for R&D investment
- to protect individual privacy

**○ to uphold anti-trust and other competition policy**

Within the CEC, the IMPACT programme aims to respond flexibly to the emerging needs of the changing market, and is working at a strategic level to ensure that the market for information services is nurtured and developed in the best interests of the entire Community, giving special attention to LFRs and small and medium-sized enterprises. The Information Market Observatory's role will prove to be increasingly important in evaluating the impact of EC policy instruments and their effect on both the demand and supply sides of the industry.

## 6 CONCLUSIONS

A major theme of this 1992 Annual Report is Europe's international competitiveness in electronic information, especially in relation to the USA and Japan. There is a sizeable revenue gap between the US and EC information services sectors (worth respectively 8.2 and 3.3 BECU in 1991) which shows signs of further widening. Currently, Japan is not a major player in the global marketplace for electronic information, but the Community's ability to compete in new markets for interactive multimedia may be hindered as a result of its relative weakness in hardware, consumer electronics, and software. On the other hand, Europe has considerable assets: a strong publishing tradition and a rich legacy of recorded information. Europe's success in the electronic information services marketplace will depend on the extent to which these assets can be exploited by European actors.

The conditions which are necessary to support a strong and competitive information services sector are complex: the marketplace for electronic information lies at the point where the media, computing and telecommunications industries converge. A vital competitive factor, therefore, for the information services sector is the quality and performance of the telecommunications infrastructure. This is an area where the European Commission has been very active; in June 1992, the EC adopted a Directive on the application of Open Network Provision (ONP) principles to leased lines, a move which should help to promote the availability of pan-European leased line services.

Future prospects for the information services sector also hinge on progress in one other critical area of the telecommunications infrastructure: Integrated Services Digital Network (ISDN). ISDN is seen as the successor to the public switched telephone networks; providing the advanced technological base needed to support advanced information services. The Commission's interest in ISDN has been fuelled by its recognition of the strategic importance of strong, harmonised telecommunications to the successful achievement of a Community-wide market for goods and services. However, the full benefits of ISDN can only be exploited on the basis of a fully-fledged European-wide and harmonised offering. Following a suggestion from the Commission of the EC, a memorandum of understanding has been drawn up between 26 European telecommunications administrations, committing the signatories to provide a minimum set of pan-European ISDN services (EURO-ISDN) by December 1993.

The importance of the telecommunications infrastructure as a pre-condition for industrial success is strongly underlined by recent public policy developments in the United States. The US National Competitiveness Act contains the text of Al Gore's proposals to establish an 'information superhighway' infrastructure based around the High Performance Computing and Communications (HPCC) initiative which was launched in 1992. This represents a major boost to the competitive position of the USA in the provision and use of electronic information services and is indicative of the new Clinton-Gore administration's keen interest in information policy as a major factor in strengthening the competitive position of US industry as a whole.

Infrastructure developments are important, but they are not the only forces shaping the information services sector. Europe's electronic information businesses operate in a global market which is going through a period of considerable structural change. Typically, the average European firm is smaller, less vertically integrated, and more nationally-orientated than its competitor in the USA. Increasingly, small and medium sized companies are



unable to survive unaided without entering into joint ventures and alliances, sometimes with firms outside the EC. Much of this activity crosses traditional sector and media lines, especially as firms position themselves to take advantage of the opportunities presented by multimedia technologies. A good example of this tendency is the strategic alliance between the 'Baby Bell' company US West and Time Warner to invest in interactive information services for the home to be delivered through cable TV networks. The trend towards further concentration of ownership in the information publishing sector continues; its most notable recent manifestations in Europe being the acquisition of Data-Star by the US media conglomerate, Knight Ridder, and the much-publicised merger of two European giants: Reed International and Elsevier. The full implications of this process of massification have yet to be seen, especially in terms of consumer choice.

The supply-side strategies of information service firms must take full account of the changing European marketplace. Demographic and social changes, especially the ageing nature of the Community's population and the shortfall of young people entering the labour market, are likely to increase demand for ICTs and information services as a means of enhancing productivity and rationalising costs. A key issue for the information publishing sector as a whole is the extent to which a market can be developed for information services in the home. There are a number of encouraging signs for publishers in this area: a trend towards more flexible patterns of working, such as teleworking; the increasing availability of cable TV and personal computers in many homes; and the market entry of games machines (notably SEGA) which incorporate CD-ROM drives. Electronic information services will only find a place in the home environment if appropriate services are available and if acceptable pricing mechanisms are found. Above all, imagination in the packaging and marketing of consumer services will be critical. At the same time, it must be recognised that there are many technical barriers to the wide acceptance of electronic information services. Current technologies are not necessarily too complex; too often they are simply inappropriate to users' needs and information search behaviour. These comments are particularly true in relation to software and display interfaces, information retrieval languages and database structures: areas where current technologies are still a very long way from offering user-friendly access to electronic information. For these reasons, further information market development will depend to an extent upon the availability of advanced information engineering technologies. It will also depend upon new and innovative developments in information retrieval; advanced database structures and design; and the wider adoption of integrated electronic publishing. This will require much co-operation and co-ordination at European level, since the investment and resources needed to develop generic solutions are probably beyond the capability of even the larger information industry players. The development of generic technologies should receive a prominent place in the implementation of a Community Fourth Framework programme (1994-98).

## ANNEX A

### ELECTRONIC INFORMATION IN THE WINE INDUSTRY

In 1992 the IMO commissioned a pilot study comparing the use of electronic information in the wine sector in a favoured region (Bordeaux, France) and a less favoured region (Dao, Portugal) of the Community. The study aimed to identify gaps in the provision of electronic information services for a specific industrial sector and to explore how and to what extent electronic information can help improve competitiveness. The research identified differences in the levels of provision of information, education and training, and database supply, according to region, size of firm, degree of integration, nature of product, and different industry and institutional structures. It also highlighted the importance of personal contacts in disseminating information within a complex set of sectoral interrelationships. The study illustrated how competitiveness can be enhanced by:

- access to information on technological developments
- effective sectoral information flows, particularly in relation to the following issues:
  - trends in consumer preferences and price sensitivity
  - depletion data on actual sales of particular products
  - developments in distribution networks
  - activity by competitors
- use of electronic information services for rapid access to up-to-date information on specific topics

The project was able to identify reasons for non-use in the wine sector not only in relatively 'information poor' Portugal, but also in France, where there is widespread and ready access to electronic information services via Minitel. These reasons for non-use included the:

- limited nature of external information needs
- perceived lack of services matching specific company needs
- lack of knowledge of available specialist services
- high degree of secrecy in the wine industry
- satisfactory provision of information needs in print form
- comparative cost factors and problems of user-friendliness

The study established that overall the obstacles were 'perceived' rather than 'actual', and identified a high level of indirect use via intermediaries (such as Chambers of Commerce). The project made a number of policy recommendations regarding EC support for the

electronic information services sector. Ways in which public policy initiatives might help to improve competitiveness include the:

- development of an pan-European database specific to the wine industry to avoid cross-border duplication
- creation of a directory of databases at EC level to make general economic databases more widely accessible
- promotion of education and training and the establishment of advisory services, targeted particularly at SMEs
- promotion of audiotex services and the wider use of fax services, building on existing industry information channels and installed base of IT
- promotion of information concerning the potential competitive advantages to be gained by wider use of electronic information
- establishment of an appropriate legal framework necessary to support the provision of electronic information services
- continued development of the infrastructure needed to support wider provision of electronic information services throughout the Community, especially in advanced telecommunications

This pilot study identified the steps needed to overcome *perceived* barriers to use of electronic information services and thus to encourage their wider use. The IMPACT 2 programme is specifically designed to undertake such a role. Having identified specific barriers in a specific industry, measures can be taken to provide training, to ensure services are as user-friendly as possible and to ensure that firms are aware of all the potential benefits. Here, both the CEC and the electronic information sector have a role to play.

## **ANNEX B**

### **DEFINITION OF TERMS**

#### **AUDIOTEX:**

Audiotex is the term for telephone-based voice information services with applications both in consumer (home user) and business markets. Audiotex services are automated and are directly accessible by means of a suitable (Dual Tone Multi-Frequency or DTMF) telephone handset.

#### **BROADCAST SERVICES:**

Services where no interactivity is possible on the part of the customer in selecting what is sent by the service provider.

#### **DATABASE PRODUCER:**

An organisation which holds the intellectual property rights relating to the content of electronic information products and services and which licences host services or distributors to use that content which those hosts/distributors make available in electronically usable form. Usually the database producers perform the editorial tasks of collection and organisation of the information contained in electronic information services.

#### **DISTRIBUTOR:**

An organisation which performs a function similar in nature to that of a host service, but in relation to unitised electronic information products (such as magnetic tapes or disks, or CD-ROMS) rather than information services delivered via telecommunications.

#### **DOCUMENT DELIVERY:**

Primary documents ordered as a direct result of using electronic information services.

#### **GATEWAY SERVICE:**

A gateway operator provides specialised telecommunications links to online information services provided by third parties. 'Pure' gateway services are not hosts in their own right.

#### **HOST SERVICE:**

An organisation which offers its customers direct access to computer-held information via a telecommunications link. This definition includes services delivered in videotex mode.

#### **INFORMATION SERVICES INDUSTRIES:**

The term 'information services industries' embraces a range of commercial and non-commercial activities relating to the creation; publication; and distribution of information goods and services. In the context of this Report, the term carries a rather more precise meaning, relating solely to a subset of those industries which delivers information services to professional (i.e. non-consumer) markets on a commercial basis across a range of information media, from print-on-paper to optical disk.

#### **MAGNETIC MEDIA:**

Tapes and disks of various sizes and formats (including diskettes for personal computers) which use magnetic storage technology.

**ONLINE ASCII DATABASES:**

The term 'online' is deemed to cover all interactive information services delivered by hosts (directly or through gateways) via telecommunications links. Services delivered character by character, rather than page by page or screen-full by screen-full, are distinguished by reference to the internationally recognised ASCII convention for character coding.

**OPTICAL MEDIA:**

Various types of disk which use optical storage technology, the most common format being CD-ROM.

**REAL-TIME INFORMATION SERVICES:**

Online services which are updated immediately as new data becomes available.

**RETROSPECTIVE DATABASE SERVICES:**

Online services which are not updated in real time.

**TRANSACTION SERVICES:**

Services where the principal objective is a transaction rather than the delivery of information, such as EDI services.

**VIDEOTEKX:**

Online services delivered page by page or screen-full by screen-full, rather than character by character.

## ANNEX C

### ACRONYMS AND ABBREVIATIONS

AOFCN	ASEAN Optical Fibre Cable Network
ASCII	American Standard Code for Information Interchange
ASEAN	Association of South East Asian Nations
ASTA	Advanced Software Technology and Algorithms (USA)
AT&T	American Telephone & Telegraph
BBC	British Broadcasting Corporation
BLAISE	British Library Automated Information Service
BRHR	Basic Resources and Human Resources (USA)
BT	British Telecom
Btx	Bildschirmtext
CAS	Chemical Abstracts Service
CBT	Computer-based training
CCITT	Comité Consultatif International Télégraphique et Téléphonique
CD	Compact disk
CD-I	Compact Disk - Interactive
CD-ROM	Compact Disk - Read Only Memory
CD-ROM/XA	Compact Disk - Read Only Memory/eXtended Architecture
CDTV	Commodore Dynamic Total Vision
CEC	Commission of the European Communities
CEN	Comité Européenne des Normes
CEPT	Conférence Européenne des Postes et Télécommunications
CIT	Communications & Information Technology Research
CITED	Copyright In TransmittEd Documents
CMEA	Council for Mutual Economic Assistance
DIDOS	DIstributed DOcument Services
DINA	Database Industry Association (Japan)
DG-XIII	CEC Directorate-General for Information Technologies and Industries, and Telecommunications
DG-XVI	CEC Directorate-General for Regional Development
DPC	Database Promotion Centre (Japan)
DTMF	Dual Tone Multi-Frequency
DVI	Digital Video Interactive
EC	European Community
ECU	European Currency Unit
ECHO	European Commission Host Organisation
EDI	Electronic Data Interchange
EEA	European Economic Area
EFTA	European Free Trade Association
EIIA	European Information Industry Association
EIS	Electronic information services
ENS	European Nervous System

<b>EPHOS</b>	European Procurement Handbook for Open Systems
<b>ERDF</b>	European Regional Development Fund
<b>ESA/IRS</b>	European Space Agency / Information Retrieval Service
<b>ETSI</b>	European Telecommunications Standards Institute
<b>EUROLUG</b>	EUROpean OnLine User Group
<b>Eusidic</b>	European Association of Information Services
<b>FCC</b>	Federal Communications Commission (USA)
<b>GATT</b>	General Agreement on Tariffs and Trade
<b>GDP</b>	Gross Domestic Product
<b>GIS</b>	Geographical Information Systems
<b>GNP</b>	Gross National Product
<b>GUI</b>	Graphical User Interface
<b>HPCC</b>	High Performance Computing and Communications (USA)
<b>HPCS</b>	High Performance Computing Systems (USA)
<b>IBC</b>	Integrated Broadband Communications
<b>IDC</b>	International Data Corporation
<b>IEN</b>	Individualised Electronic Newspaper
<b>IBM</b>	International Business Machines
<b>ICSTIS</b>	Independent Committee for the Supervision of Standards of Telephone Information Services (UK)
<b>ICT</b>	Information and communication technologies
<b>IIA</b>	Information Industry Association (USA)
<b>IMM</b>	Interactive multimedia
<b>IMO</b>	Information Market Observatory
<b>IMPACT</b>	Information Market Policy ACTions
<b>INSPEC</b>	INformation Services for the Physics and Engineering Communities
<b>ISDN</b>	Integrated Services Digital Network
<b>ISO</b>	International Standards Organisation
<b>IT</b>	Information technology
<b>ITA</b>	International Trade Administration (USA)
<b>JANET</b>	Joint Academic NETwork (UK)
<b>JAPIO</b>	JAPAN Patent Information Office
<b>JICST</b>	Japan Information Centre for Science and Technology
<b>JPEG</b>	Joint Photographic Expert Group (ISO)
<b>LAB</b>	Legal Advisory Board
<b>LAN</b>	Local Area Network
<b>LFR</b>	Less Favoured Regions
<b>MDC</b>	Mead Data Central
<b>MHEG</b>	Multimedia/Hypermedia Expert Group
<b>MITI</b>	Ministry of International Trade and Industry (Japan)
<b>MPEG</b>	Motion Picture Expert Group (ISO)

NACE	Nomenclature des Activités Economiques
NAFTA	North American Free Trade Agreement
NET	Normes Européennes de Télécommunications
NREN	National Research and Education Network (USA)
NSF	National Science Foundation (USA)
OAG	Official Airlines Guide
ODA	Office Document Architecture
OECD	Organisation for Economic Co-operation and Development
OII	Open Information Interchange
ONP	Open Network Provision
OSI	Open Systems Interchange
PC	Personal Computer
PRS	Premium Rate Services
PSTN	Public Switched Telephone Network
PTO	Public Telephone Operators
RACE	Research & development in Advanced Communications in Europe
RBOC	Regional Bell Operating Company
RTD	Research and technological development
SDI	Selective Dissemination of Information
SEAO	Stock Exchange Automated Quotations
SEM	Single European Market
SGML	Standard Generalised Markup Language
SME	Small and Medium Enterprises
STAR	Special Telecommunications Action for Regional development
STM	Science, Technology and Medicine
TBDF	Trans-Border Data Flows
TRIP	Trade-Related aspects of Intellectual Property (GATT)
VADS	Value Added Data Services
VANS	Value Added Network Services
VAT	Value Added Tax
WAN	Wide Area Network
WORM	Write Once Read Many (optical disk standard)



## ANNEX D

### LIST OF PUBLICATIONS

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## ANNEX E

## THE COMMUNITY'S INSTALLED HARDWARE BASE, 1991-1992

	Population	Telephone lines	Lines/ 100 pop.	DTMF sets	Fax machines	Videotex terminals
Source:	Eurostat	Telcos	Telcos	Various	Various	Quadrature
Year:	1991	1992	1992	1922	1992	1992
Units:	000s	000s	integer	000s	000s	000s
Belgium	9,948	4,260	43	2,343	250	11
Denmark	5,146	2,900	56	2,755	80	6
France	56,640	30,100	53	18,662	550	6,263
Germany	79,753	33,000	41	3,300	600	310
Greece	10,269	3,900	38	390	40	1
Ireland	3,523	1,100	31	660	50	4
Italy	56,411	26,000	46	2,600	500	175
Luxembourg	385	293	76	226	29	2
Netherlands	15,060	7,495	50	2,998	280	175
Portugal	10,580	2,700	26	270	25	5
Spain	39,020	13,700	35	5,480	320	300
UK	57,560	30,000	52	9,900	700	67
EC	344,295	155,448	45	49,584	3,424	7,319