Chapter 18
Western Europe and North America

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Deregulation of the telecommunications sector, the emergence of global markets and the convergence of media and developments in telecommunications and information technology have forced countries all over the world to face up to new challenges. It will be less and less easy to separate telecommunications from networked computer-based communications (i.e. the Internet, electronic commerce, Internet-telephony, etc.) and electronic media and content (broadcasting, multimedia, on-line services). The convergence of electronic networks and services is a global phenomenon which transcends national boundaries and increases international competition.

Furthermore, unemployment and its harmful effects on society increase the pressure to seize the new economic opportunities offered by the emerging Information society. These developments represent a political challenge. Experts say that sustainable economic growth and prosperity can be supported by making more efficient use of telecommunications and information technology, by increasing productivity and the development of new products and services. The development potential of new services such as digital television and the Internet offer huge scope for services that are either completely new or designed to complement existing ones. However, the process of technical convergence brought about by digitization and the merging of previously distinct areas should not lead to the assumption that future developments will be dominated solely by technical issues.

Initially we are 'merely' talking in terms of technical potential. The extent to which this potential is realized and utilized in the countries of Western Europe and North America will depend primarily on infrastructural penetration, usage rates with corresponding added value in work and daily life, and last but not least on political initiatives for the emerging information society.

This chapter presents a comparative overview of the following topics:

→ ICT markets and multimedia in Western Europe and North America
→ Basic indicators of specific ICT and multimedia infrastructures
→ Initiatives in Western Europe and North America for the information society

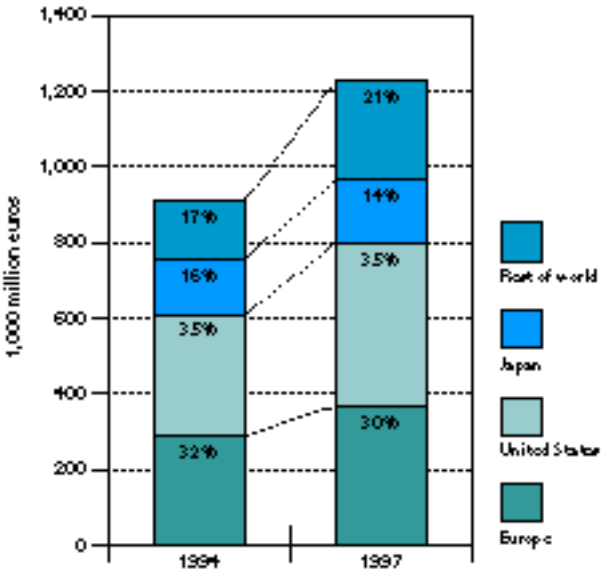
MARKETS FOR ICT AND MULTIMEDIA IN WESTERN EUROPE AND NORTH AMERICA

The worldwide ICT market grew from 910,000 million euros to 1,225,000 million euros between 1994 and 1997, an increase of around 35%. It is evident from Figure 18.1, showing regional market shares for 1997, that the United States occupies the dominant position in this market with a share of 424,000 million euros (approximately 35%). Europe takes second place with 371,000 million euros (30%), followed by Japan with 171,000 million euros (14%). The combined total for all other countries amounted to 259,000 million euros (21%), with growth rates in Asia and Latin America being mainly responsible for the disproportionate increase in this category (European Information Technology Observatory [EITO], 1998).

The increasing economic significance of information technology and telecommunications is also evident from the growing proportion of gross domestic product (GDP) that these markets represent. Table 18.1 and Figure 18.2, showing ICT expenditure as a percentage of gross domestic product since 1993, illustrate the overall increase in the contribution of this sector to the national economies of individual countries. These figures do not include ICT technology used in other products (Prognos AG, 1998).

A comparison of national ICT expenditure in 1997 shows that in the United States, it reached 7.0% of GDP and exceeded 6% in the United Kingdom, Sweden, Switzerland and Ireland. In Western Europe ICT technology averaged a direct proportion of 4.9%

Figure 18.1 → Worldwide ICT market by region, 1994-1997



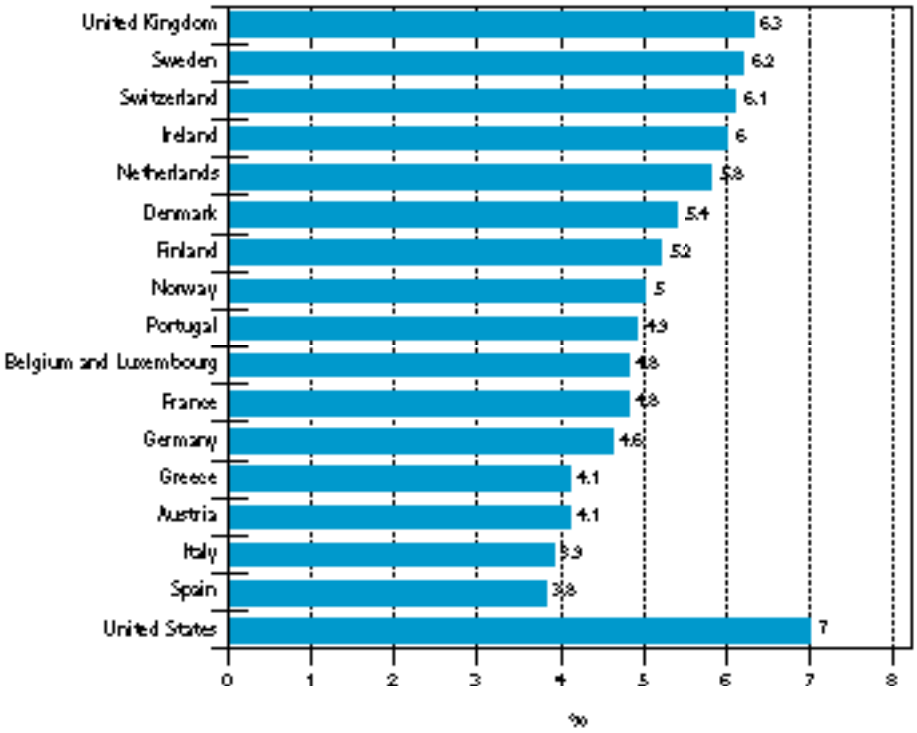
Source: European Information Technology Observatory, 1998.

Table 18.1 → ICT expenditure as a percentage of GDP, 1993–1997

	1993	1994	1995	1996	1997
Germany	4.05	4.14	4.30	4.23	4.33
France	3.91	4.25	4.37	4.53	4.75
United Kingdom	4.77	5.46	5.77	6.09	6.26
Italy	3.48	3.76	3.67	3.70	3.85
USA	6.02	6.13	6.47	6.81	7.02

Source: Prognos, 1998.

Figure 18.2 → Information technology and telecommunications expenditure as a percentage of GDP, 1997

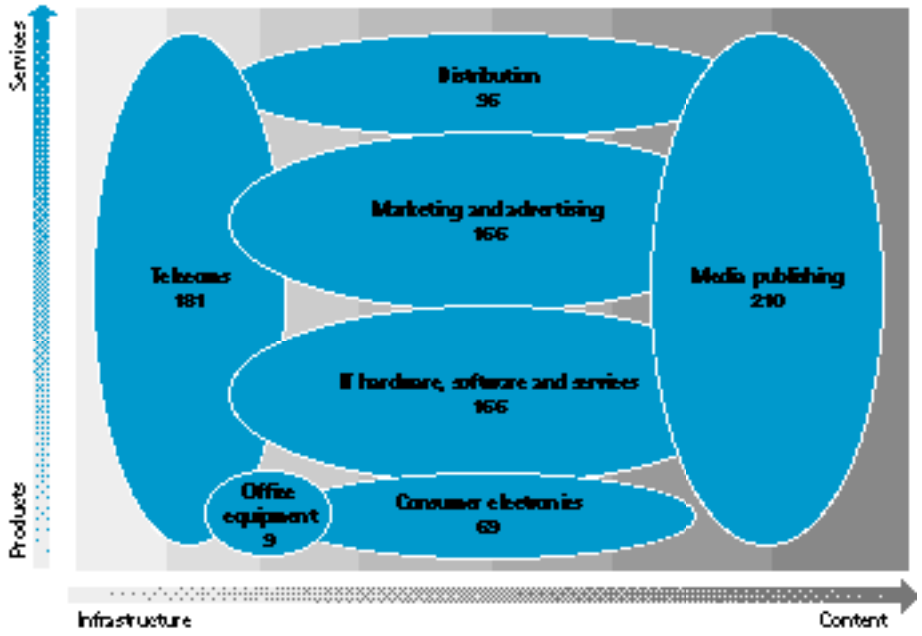


Source: FVVIT/FVK 1998.

of GDP in 1997 (FVIT/FVK, 1998). However, the extraordinary financial significance of information and communications technologies to competitiveness is not only illustrated by the increasing proportion of turnover that this sector represents. More important still is the fact that ICTs are an innovative inter-disciplinary technology for other products (e.g. in the fields of mechanical engineering, equipment manufacturing and automotive engineering) and services (e.g. electronic commerce) and represent a high proportion of the potential added value creation of these markets. At the same time, the extensive digitalization of content, services, networks and terminals is reinforcing the trend towards convergence in the fields of information technology, telecommunications and media (broadcasting, publishing etc.), leading to increased process and product innovation in the value-added chain of the developing multimedia markets.

The ongoing process of convergence in the information technology, telecommunications and media sectors serves to reinforce the increasing significance of multimedia-related markets for overall economic development. In Western Europe, the annual expenditure in these converging fields increased by around 21% between 1993 and 1996 from 743,000 million euros to 897,000 million euros. However, information and communication technologies continue to be the driving force for ongoing growth in the converging sectors. A study carried out by Booz, Allen and Hamilton (Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie, 1998) on multimedia-related ICT markets (content, networks, components and terminals) in the G7 countries reported a total expenditure of around $1,344,000 million for 1996. The growth rates in these markets have been approximately 10.4% each year since 1992, with the content sector (software, games, multimedia, TV/Pay-TV), which is to a large extent dependent on the software and ICT service market, showing the highest growth rate. A regional breakdown of the G7 market as a whole, reveals the dominance of the United States, with a market share of 48.7%, followed by Japan with 25.0%, and Germany with 8.4%. Of the

Figure 18.3 → Expenditure in the converging IT, telecoms and media sectors, in thousands of millions of euros, 1996



Source: European Information Technology Observatory, 1998.

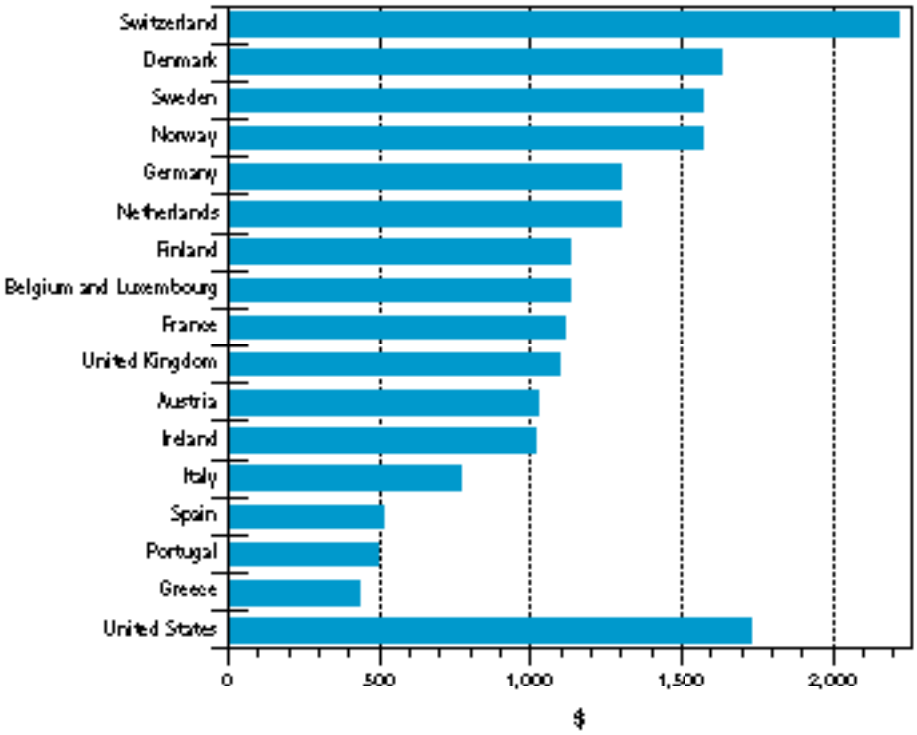
G7 countries, Canada, with just 3%, has the smallest share of the total multimedia-related ICT market.

BASIC INDICATORS OF SPECIFIC ICT AND MULTIMEDIA INFRASTRUCTURES

One of the main factors determining a country's competitiveness, its ability to develop innovative new services and content and provide equal access to the new multimedia-related markets for all, lies in the creation of an ICT infrastructure that allows these new services to be distributed among and used by large sections of the population. From a socio-political point of view, the problem of ensuring equal access to these markets calls for particular vigilance, because the new media, services and content on offer in an emerging information society represent much more than mere commercial products or sources of market information (see also Chapter 3 on this issue). The development of multimedia is in itself a significant cultural issue and serves to express cultural identity. Therefore the extension of technological infrastructures in ICTs and multimedia is one of the main pillars for developing economic and cultural prosperity. However, willingness to invest in information and communications technology – and the financial capacity to do so – varies greatly inside Europe and between Europe and North America.

Figure 18.4 gives a breakdown of per capita expenditure on information technology and telecommunications for individual countries and shows a clear North-South divide in Western Europe. Investment in ICT technology is particularly pronounced in countries that are economically prosperous and already possess a particularly good telecommunications infrastructure, thus serving to further widen the gap between

Figure 18.4 → Expenditure on ICT in $ per inhabitant, 1997



Source: FVIT/FVK 1998, compiled by the EIM.

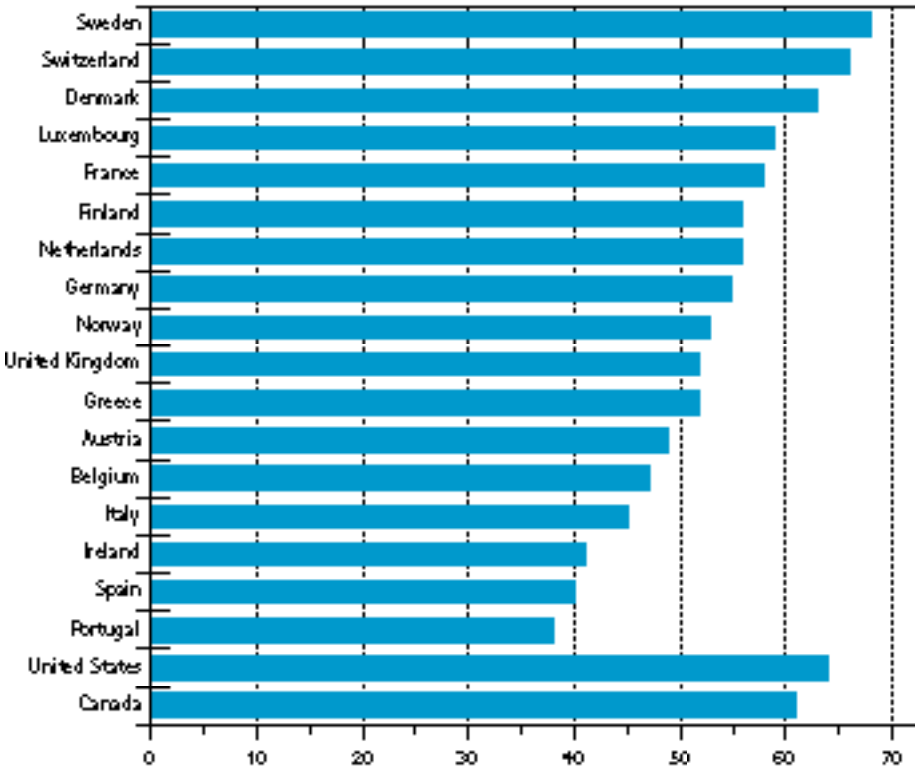
infrastructure levels of northern and southern Europe. Switzerland has by far the highest per capita ICT investment at $2,216, followed by the United States at $1,729 and the Nordic countries of Denmark, Sweden and Norway. The lowest per capita ICT investment is found in Greece, Italy, Portugal and Spain.

Access to electronic information and services can only be provided where the country in question possesses a network infrastructure that allows the user to connect to the various information and communicationsservicesatareasonableprice.Thisinfrastructure includes analogue and digital telephone lines, mobile telephone networks and cable and satellite Television connections.

Unlike in Africa, where there are only 2 main telephone lines for every 100 inhabitants on the average, the widespread availability of telephone lines is almost taken for granted in Western Europe and North America. In addition to individual telephony, a telephone line used in connection with the appropriate hardware provides extra functions and services (telephone answering, fax services), which are increasing in importance for both personal and business use. Furthermore, the combination of a telephone line, a personal computer (PC) and modem is currently the most important gateway to the Internet network, whichisexpandingveryrapidlyallovertheworld.The number of main telephone lines per 100 inhabitants inEuropevariesbetween40(Portugal) and 70 (Sweden). The United States and Canada are again among the leaders, with over 60 lines for every 100 inhabitants.

The push towards the digitization of telephony and the increasing numbers of main digital telephone lines, particularly in Europe, is paving the way for

Figure 18.5 → Main telephone lines per 100 inhabitants in Western Europe and North America, 1997



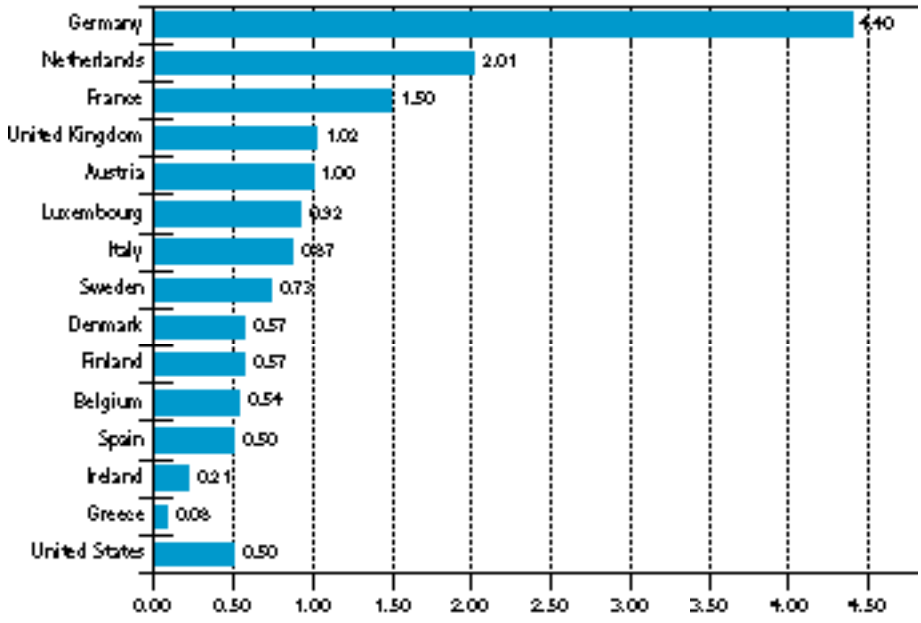
Source: ITU, 1998.

new services, extra functions and improved data transfer speeds (e.g. 2 × 64 kbits/s). Germany is the overall international leader in this field, with 4.4 integrated service digital network (ISDN) lines per 100 inhabitants in 1997. By comparison the United States is a long way behind, with around 0.5 ISDN lines per 100 inhabitants. However, ISDN will face increased competition from other digital transmission technologies in the future, such as Asymmetric Digital Subscriber Line (ADSL), which can multiply the transmission capacity of ISDN (e.g. 2–8 Mbits/s) using the digitized telephone network. The same applies for the multifunctional application of cable and satellite television, which is currently used almost exclusively for the reception of radio and television programmes, but which will also be used for new multimedia services in the near future.

Within Western Europe, cable and satellite penetration stands at almost 100% of television households, particularly in the Benelux countries. Following close behind with over 90% penetration are Denmark, Switzerland and, with a slightly lower penetration, Germany. However, terrestrial television is still of great importance in Europe and in individual countries such as France, Italy, Portugal, Spain and the United Kingdom.

With around 66 million cable television connections in the United States (67.2% of television households) and 8 million connections in Canada (73.2% of television households), North America has

Figure 18.6 → Integrated Service Digital Network (ISDN) lines per 100 inhabitants in Western Europe and the United States, 1997



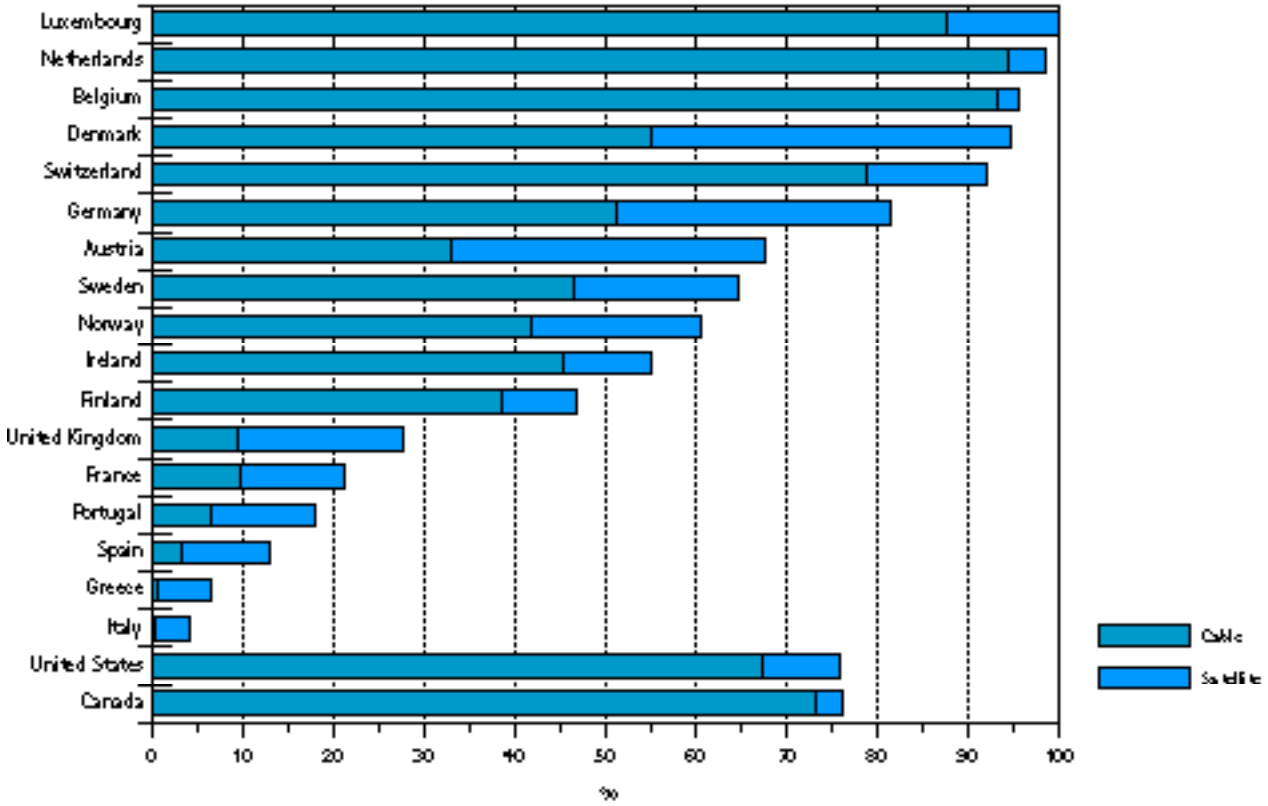
Source: ESIS-IPSO; BA&H; VDMA:ZVEI; data for Finland, Denmark, Belgium, Luxembourg 1996.

a very high level of cable penetration. Its lead in relation to the total figure for Western Europe of 42.5 million cable television households (28.8% of television households) is considerable, despite the fact that individual countries in Europe had a higher cable penetration in 1997 than Canada and the United States. In Western Europe 24.5 million television households received their television and radio programmes via satellite at the end of 1997, representing 16.6% of all television households. Europe is therefore a long way ahead of North America in terms of satellite penetration.

The commercial significance of digital television using broadband transmission via cable and satellite will increase in the future. The interlinking of new television services (Pay-television, Video on Demand, Pay-per-View, thematic channels) with new interactive services (Internet access, Online shopping, e-mail by television, electronic commerce, etc.) is particularly important in opening up new economic opportunities for the multimedia-related ICT industry and the media sector. The decisive advantage of digital transmission systems is that, by using compression techniques, the data quantities to be transmitted can be greatly increased, and the frequencies released in the process can be used for new multimedia services.

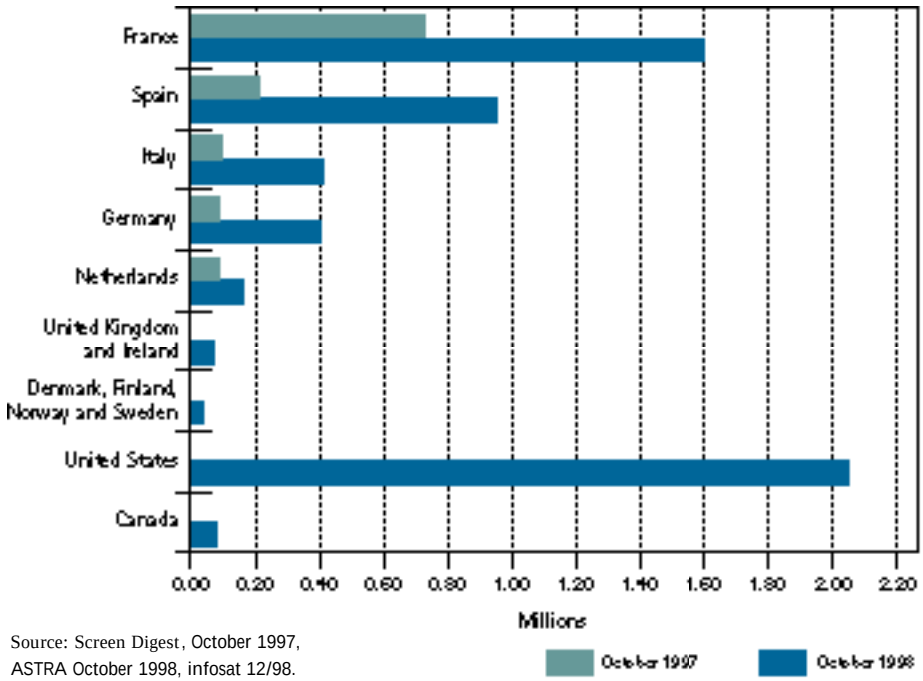
The current trend within the digital market in European countries shows that the countries that have traditionally been pay-television countries, such as France and Spain, have the highest digital television penetration. France, with the digital television providers Canal+ and the Télévision par Satellite consortium, and Spain with the providers Canal Satellite Digital and ViaDigital, are currently the only digital television markets in Europe in which there is any noteworthy level of competition. The most successful

Figure 18.7 → Percentage of cable and satellite penetration in TV households in Western Europe and North America



Source: TV Europe 1998, Screen Digest, May 1998; TBI Yearbook 99.

Figure 18.8 → Digital TV subscribers in Western Europe and North America, in millions, 1997–1998

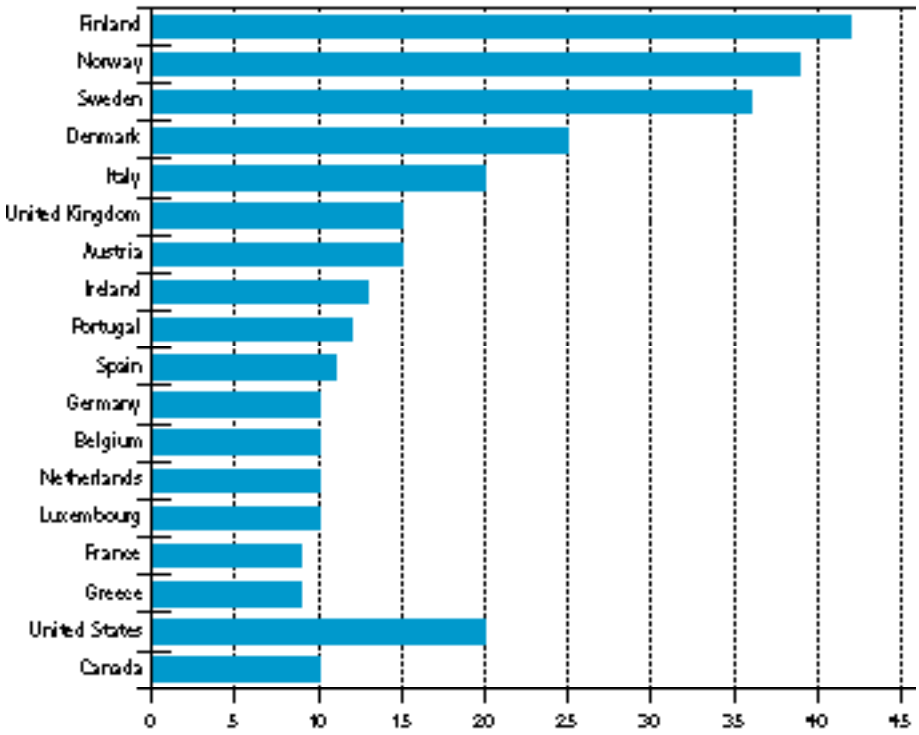


Source: Screen Digest, October 1997, ASTRA October 1998, infosat 12/98.

digital satellite system in the United States is Direct Television with 3.8 million subscribers (Infosat 12/98). Digital television is to be launched over the American cable networks this year after a long experimental phase, with the largest cable network operators such as TCI, Time Warner and Comcast having already ordered several million Set Top Boxes for digital reception. The software company Microsoft has also prepared itself for this development, investing around $1,000 million in the cable network operator Comcast in 1997. This involvement should speed up the development of data and video services available via the Comcast cable network and promote the merging of PCs and televisions , as will the take-over of Web-TV, a company involved in the provision of Internet services and Internet navigation systems via the television set (Konert, 1998). In the Canadian market, two digital satellite systems have been available since the end of 1997, Expressvu, which has 30,000 customers, and Star Choice, with 50,000 subscribers.

The digital mobile telephone sector is one of the few other areas of the telecommunication sector apart from ISDN development in which Western Europe holds an edge over North America in terms of its position in the world market. This applies both to the production of hardware (e.g. Nokia, Siemens, Ericsson), the development of Global System for Mobile Communications standards (GSM) and in terms of the usage figures for mobile telephone subscribers. The Nordic states of Finland, Norway, Sweden and Denmark in particular surged ahead of North America in the number of lines.

Figure 18.9 → Mobile telephone lines per 100 inhabitants in Western Europe and North America, 1997



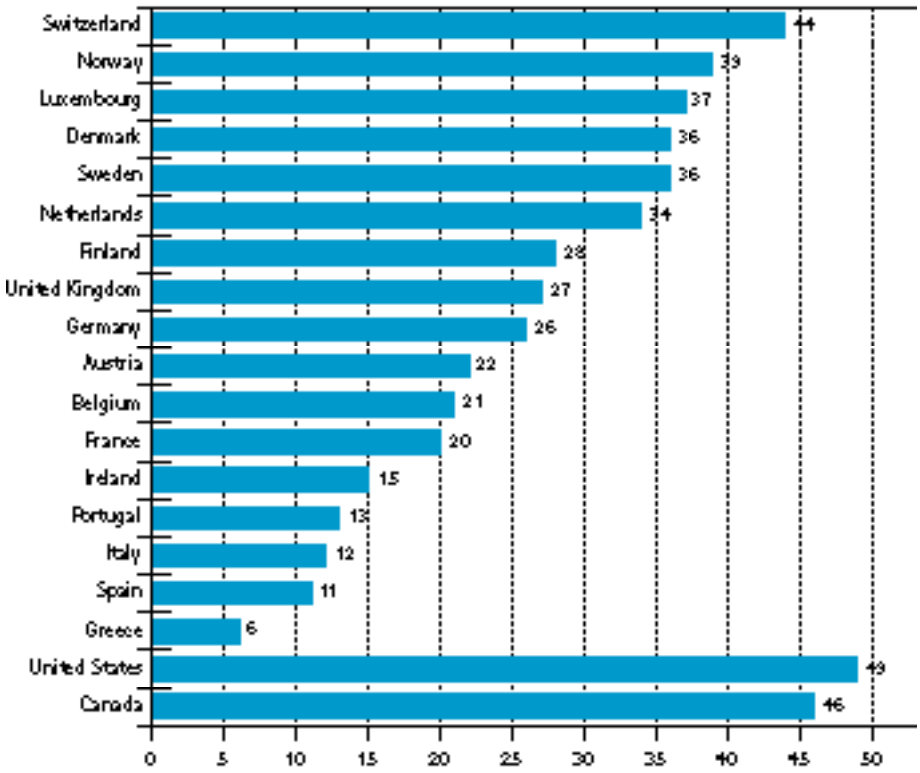
Sources: ESIS-ISPO; Ericsson 1/98; FVIT 1998; data for Denmark, Luxembourg, Canada 1996.

Table 18.2 → Mobile telephone subscribers per 100 inhabitants, 1993–1997

	1993	1994	1995	1996	1997
Germany	2.2	3.1	4.6	6.7	10.6
France	1.0	1.5	2.2	4.2	9.9
Great Britain	3.9	6.7	9.8	12.1	15.1
Italy	2.1	3.9	6.7	11.2	20.4
USA	6.2	9.3	12.8	16.6	20.7

Source: Prognos, 1998.

Figure 18.10 → PCs per 100 inhabitants in Western Europe and North America, 1997



Sources: ESIS-ISPO, EITO, BA&H, Statistics Canada; VDMA:ZVEI; data for Ireland, Portugal, Luxembourg 1996.

Growth rates in the mobile telephone sector from 1993 to 1997 are impressive. The boom is particularly pronounced in those countries that had previously occupied a mid-range position, with the number of subscribers increasing between five- and tenfold in the last four years. Increasing competition, the integration of tariffs with the fixed network and new services will lead to an increase in the number of mobile telephone subscribers. In addition, new digital network developments in the mobile telephone sector such as Universal Mobile Telecommunications Systems (UMTS), which have transmission capacities far in advance of those that can be achieved using ISDN, will promote further growth.

The North-South divide in ICT investment discussed at the beginning of this chapter is highlighted by a comparison of PC equipment in different countries at the end of 1997. Switzerland leads Europe

Table 18.3 → PCs per 100 inhabitants, 1993–1997

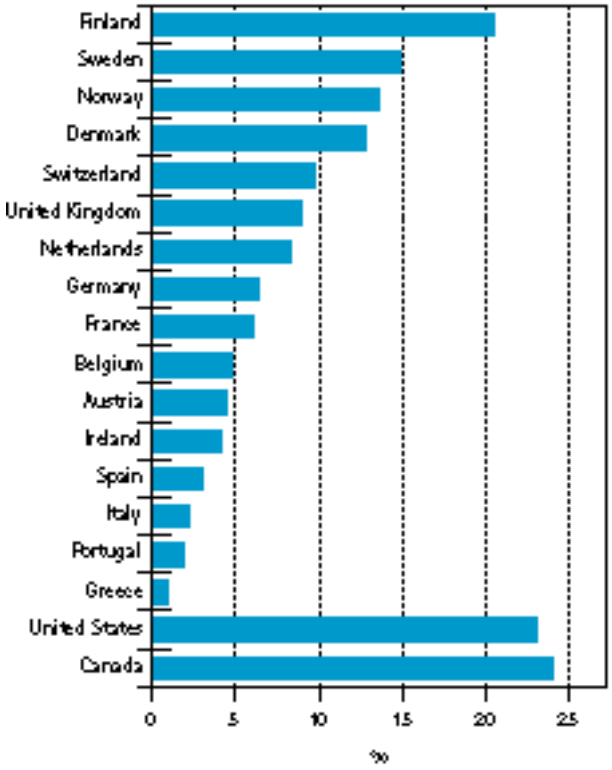
	1993	1994	1995	1996	1997
Germany	13	14	17	24	26
France	10	12	13	18	20
Great Britain	13	15	19	25	27
Italy	6	7	8	10	12
USA	27	30	33	48	49

Source: Prognos, 1998.

with 44 PCs per 100 inhabitants and the Nordic states are also amongst the highest in Europe with more than 35 PCs per 100 inhabitants. In the Southern countries of Europe, on the other hand, only one in ten inhabitants possesses a PC. Penetration is most advanced in North America (United States and Canada), where almost one out of two inhabitants possesses a PC. However, Table 18.3 also highlights the fact that the number of PCs installed in Great Britain, Germany and France – countries where PC ownership is close to the European average – has doubled within just four years. This increasing rate of growth also applies for Italy, although in this country there was a lower initial level of PC ownership. Furthermore, it is evident that a disproportionate level of growth took place in the PC sector from 1994 to 1996 in particular, and lower growth rates (although starting from a higher level) were experienced in 1997.

At the heart of the multimedia-related ICT revolution is the Internet, the most dynamic market of the future from a financial point of view (electronic commerce, Internet telephony, Internet broadcasting, on-line shopping, etc.). According to figures from the Fachverband Informationstechnik (FVIT), around 89 million people used the Internet or online services on a regular basis in 1997 (FVIT/FVK, 1998; see also the Statistical Annex, Section 3). It is extremely difficult to measure the number of Internet users directly, because individual accounts are sometimes used by several people, and figures from Internet Service Providers (ISP) and on-line services cannot be verified with any certainty. For this reason, the data in Figure 18.11 from the Nua Internet Survey for the period between late 1997 and early 1998 should be regarded as approximative. The figure clearly high-

Figure 18.11 → Internet users as percentage of total population, in Western Europe and North America, 1997

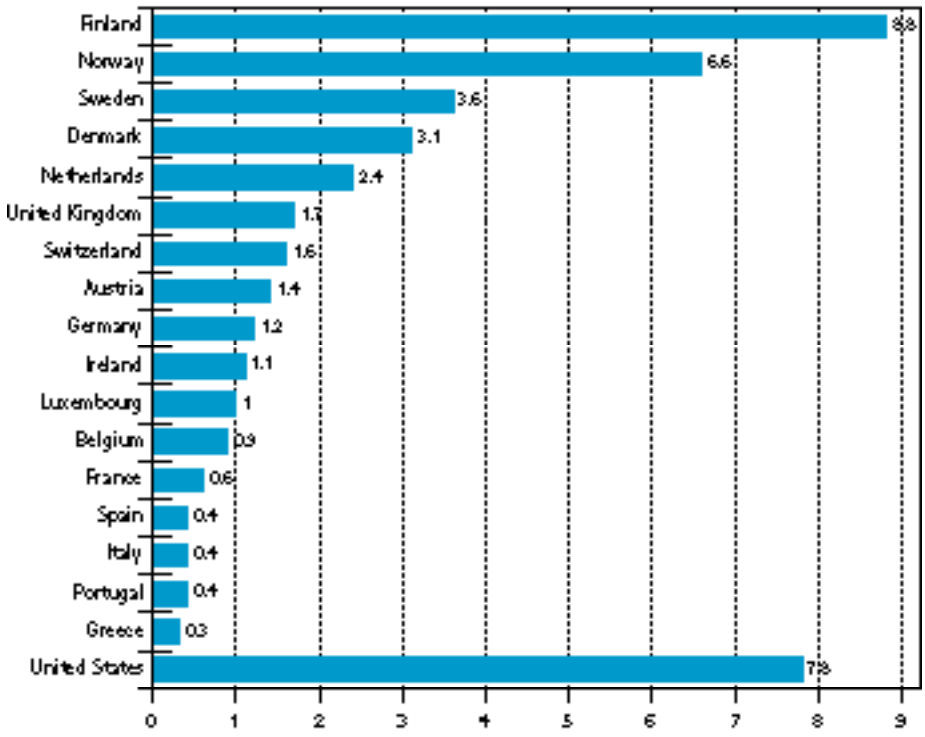


Source: NUA Internet Survey, Statistics Canada (with estimations 1997/1998).

lights the leading role played by North America in the spread of the Internet. In both Canada and the United States almost one in four inhabitants was using the Internet at the beginning of 1998. Within Western Europe a very mixed picture emerged with large variations. In the Nordic countries of Europe (Finland 20.4%, Sweden 14.8%, Norway 13.3%, Denmark 12.8%), Internet use is very advanced, but in the Southern countries (Spain, Italy, Portugal, Greece) at the beginning of the year only around 3% of the population had access to the Internet.

The analysis given in Figure 18.12 of the number of Internet hosts provides an even more meaningful picture of the importance and intensity of Internet use in individual countries. Internet hosts are computers that are permanently connected to the Internet via a fixed Internet Protocol (IP) number and through which access can be gained to the Internet at any time using the IP. Computers that have access to the Internet only at certain times (e.g. using telephones with alternating IP numbers) are not considered here. The percentage distribution of Internet hosts illustrates even more clearly the large lead that the Scandinavian countries have gained over other European countries, with Finland having overtaken even the United States. The great variations within Europe have very different causes. On the one hand, due to their economic weakness, the ability and willingness of Southern European countries to invest is much lower than that of countries with stronger economies and higher incomes. On the other hand, country-specific differences are also in evidence. For example, in France the

Figure 18.12 → Internet hosts per 100 inhabitants in Western Europe and the United States, January 1998



Source: FVIT 1998.

on-line Minitel system, established very early on, has delayed development of the Internet. Cost structures for Internet access (service provider costs and telecommunications costs) are also very varied within Europe and disproportionately high in comparison with North America. The liberalization of the European telecommunications market has been an important factor in causing telecommunications costs to fall within Europe, thus reducing the costs of Internet access. This indicates that the growth rate for Internet use will increase more rapidly in countries where Internet use has previously been at a lower level than in those countries that already have relatively high Internet penetration (Squire, Sanders and Dempsey, 1998).

INITIATIVES OF WESTERN EUROPE AND NORTH AMERICA FOR THE INFORMATION SOCIETY

For most governments, the availability of infrastructures for electronically transferring and accessing information is perceived as essential for the realization of the economic, social and cultural benefits and competitive advantages for the economy. They are therefore willing to support and shape the development of an information infrastructure as was seen in the UNESCO World Information Report 1997, Chapter 21. This section outlines the main policies and initiatives concerned with the development of an information society in Europe and North America.

The concept of a National Information Infrastructure (NII): the United States and the Information Highway

The 1993 NII Agenda for Action emphasized the government-private sector partnership and the leading role of the private sector in the development of the National Information Infrastructure. As stated therein: 'Nonetheless, while the private sector role in NII development will predominate, the government has an essential role to play. In particular, carefully crafted government action can complement and enhance the benefits of these private sector initiatives.' Nine principles and goals have been identified to guide government action:

- → promote private sector investment;
- → extend the 'universal service' concept to ensure that information resources are available to all at affordable prices;
- → act as a catalyst to promote technological innovation and new applications;
- → promote seamless, interactive, user-driven operation of NII;
- → ensure information security and network reliability;
- → improve management of the radio frequency spectrum;
- → protect intellectual property rights;
- → co-ordinate with other levels of government and with other nations;
- → provide access to government information.

The well known metaphor 'Information Superhighway' is very attractive to the American public. From the beginning, the NII initiative emphasized benefits for all Americans and stressed a broad concept of universal service and public access. The administration therefore received strong support from public-interest groups. Furthermore the Information Infrastructure Task Force (IITF), set up to co-ordinate the United States Federal Government's activities, developed at an early stage a specific programme aimed at promoting non-commercial applications for the public and non-profit sectors, called the Telecommunications and Information Infrastructure Assistance Programme (TIIAP), which serves the public interest. In contrast the TELEMATIC application programme in Europe is not limited to the non-profit sector but also supports commercial projects to promote the competitiveness of the European Union (d'Udekem-Gevers, and Lobet-Maris, 1997, p. 199).

The reform of the United States telecommunications law dating back to 1934 took place, when President Clinton signed the Telecommuications Act in February 1996 (technologylaw.com/techlaw/act_index.html). This act primarily preempts state laws that prohibit entry into local telephone services; establishes the conditions for competition for local telephone services; eliminates restrictions that prevent cable and telephone companies from entering each others' business; gives the Federal Communications Commission (FCC) broad authority; requires the FCC to continue to update the definition of universal service, and to provide discounted service to schools and libraries; and makes the transmission of obscene or indecent communications to minors illegal (OECD, 1997, p. 213).

As far as online communication is concerned, legal provisions of the 1996 Telecommunications Act outlaw the transmission of indecent or patently offensive material to minors over PC networks. But the Supreme Court ruled that this Commmunication Decency Act would be unconstitutional as it breaches freedom of speech protected under the First Amendment of the United States Constitution.

In a speech at the International Telecommunications Union (ITU) in 1994, Vice President Gore argued for world wide co-operation to extend the project of the NII to a Global Information Infrastructure (GII) (www.iitf.nist.gov/documents/speeches/032194_gore_giispeech.html). This proposal was later endorsed at a 1995 meeting of ministers from the G7 group of leading industrialized countries. This G7 ministerial conference in Brussels was the first large international conference devoted to the information society, and bringing together political leaders on that subject (Club de Bruxelles, 1997, p. 76). The G7 conference outlined common principles for the world-wide information society and common guidelines for co-operation. The principles outlined were to promote dynamic competition; encourage private investment; define a regulatory framework that can change with the times; ensure open access to networks; guarantee universal supply of and access to services; promote equal opportunity for all citizens; promote diversity of content, including cultural and linguistic diversity; and recognize the need for global co-operation by paying particular attention to the least-developed countries.

This agreement was important as a means of facilitating multinational efforts to co-ordinate the work of global bodies like the World Trade Organisation (WTO), the World Intellectual Property Organization (WIPO) and the International Telecommunication Union (ITU). The GII is regarded as a key element of economic development and industrial policy in many developed countries as it creates opportunities for reaching international markets.

The United States Administration's major programme for supporting research and development related to the NII is the $1,100 million High-Performance Computing and Communications (HPCC) initiative. Since 1993 the scope of the programme has been expanded to include support for the NII applications and technologies. In October 1996, President Clinton announced the Next Generation Internet (NGI) initiative (www.ccic.gov/ngi/) that will support universities and national laboratories with networks that are much faster than today's Internet.

The Canadian Information Highway

In April 1994, Industry Canada's discussion paper The Canadian Information Highway proposed three main objectives for Canadian strategies, which were to create jobs through innovation and investment, reinforce Canadian sovereignty and cultural identity, and ensure universal access at reasonable cost.

To reach these goals and to provide advice and recommendations to the Minister of Industry the Information Highway Advisory Council (IHAC), with representatives from industry, education, research, labour, consumer and public interest groups, was established at the beginning of 1994. In September

1995, the Advisory Council released its final report Connection, Community, Content: The Challenge of the Information Highway, which contains some 300 recommendations for government action. In May 1996, the Government of Canada unveiled its plan for building the Information Highway in a report, which underlined four strategic thrusts with the following policies and initiatives (Minister of Supply and Services Canada, 1996) :

- → building Canada's Information Highway by creating a competitive, consumer-driven policy and regulatory environment that is in accord with the Canadian public interest and that is conducive to innovation and investment by Canadian industry in new services on the Information Highway.
- → growing Canadian content on the Information Highway, thereby strengthening the ongoing national cultural dialogue and creating economic growth and jobs.
- → realizing the economic and social benefits for all Canadians of the Information Highway and allowing them to participate fully in the emerging information society.
- → getting government right by ensuring better services and more affordable, accessible and responsive government and making government a model user and a catalyst for Information Highway development across Canada.

The government also expressed the intention – where market forces fail – to ensure affordable access to essential Information Highway services for all Canadians, regardless of their income or geographic location.

In September, 1997, the IHAC published its second final report of its mandate to encourage continuing action with regard to these commitments (The Information Highway Advisory Council, 1997). The IHAC concentrated on two tasks, namely advancing the public policy agenda by advising the government on outstanding issues and concerns related to the Information Highway, and reporting on Canada's progress in the transition to an information society and a knowledge-based economy. The IHAC emphasized that technology-neutrality must be the central principle of policy and regulation for the Information Highway, so that no obstacles remain to using the best technology for a given application or purpose. Access for all Canadians and Canadian quality content are seen as most important imperatives to ensure Canada's future as a knowledge society.

The government instructed the Canadian Radio-Television and Telecommunication Commission (CRTC) early in 1995 to conduct public hearings on regulatory changes required as a result of the convergence of broadcasting and telecommunications (Raboy, 1996, p. 51). In 1997 the CRTC adopted measures to fully liberalize Canada's telecommunication market by January 1998 and to encourage convergence between telecommunication and broadcasting. New telecommunication entrants were allowed to offer local services in 1998. As regards convergence, cable television operators were immediately allowedtooffer local telecommunication services, while telecommunication companies were entitled to apply for broadcasting licenses to enter the market in 1998. These decisions reflected the policy objectives included in the 1993 Telecommunications Act and the 1991 Broadcasting Act and, last but not least, the priority that the Canadian government has placed on the development of a competitive communications environment. The CRTC is an independent federal agency and is responsible for the supervision and regulation of telecommunications and broadcasting in Canada. The Telecommunication Act gives the CRTC a broad range of powers, including the regulation of telecommunication rates and conditions of service, approval of interconnection agreements, and quality of service standards (Industry Canada, 1997, p. 60).

In Canada, a wide range of social and cultural approaches built upon the Canadian tradition of a mixed public/private system (e.g. broadcasting) to the

NII have emerged during recent years. In order to develop the new information infrastructure, public policy promotes a new hybrid model of communication, which combines the social and cultural objectives of both broadcasting and telecommunications, and provides new regulatory mechanisms (IHAC, 1997).

The European Union's Information Society policy

Since the early 1990s the European Union has recognized the need to act quickly to develop an Information Society in Europe. The pace of globalization is picking up and Europeans fear that they will lose ground to the United States, Japan and the new emerging industrial nations in the Far East and South-East Asia. An analysis of the policies of the European Community reveals a gradual shift taking place in strategy (The European Institute for the Media, 1998, p. 45-51).

In the 1980s, the emphasis was on promoting information technology. Due to its multifunctionality and cross-sector significance, information technology was designated a 'key technology' and computer manufacturing was elevated to a 'key industry sector'. The key role given to information technology was illustrated in particular by the efforts made by the EU to set up the European Strategic Programme for Research and Development in Information Technology (ESPRIT) in 1984 and the increases in budget allocation for this area in subsequent Framework Programmes.

This period was followed by measures aimed at improving the communications infrastructure and accompanied by the deregulation of the telecommunications sector. By creating a comprehensive telecommunications infrastructure the idea was to offer, by simple, cost-effective means, opportunities to companies, authorities and citizens to share multimedia information (in the form of data, text, voice, still and moving images) to a high technical standard and with no constraints of distance. The creation of a European telecommunications infrastructure featuring narrow- and broad-band networks began with the Research and Development in Advanced Communications Technologies (RACE) and continued with its successor, the Advanced Communications Technologies and Services (ACTS). Within the framework of European policy on promoting the information society, increased assistance was given in the early 1990s towards establishing a trans-European network. To help accelerate and finance this expansion of the technical infrastructure, the European community has adopted deregulation and liberalization of the telecommunications sector (network, services, interfaces) as a key pillar of policy with some basic rules: an important precondition in this process is the need to safeguard a universal service and maintain interconnection and interoperability in a manner which ensures open and fair competition. The liberalization of the European telecommunications market was largely completed at the beginning of 1998.

The next step was to place greater emphasis on business matters relating to new services and content in the information society (information as a commodity and factor of production markets). This issue came to the fore, mainly because of the increasing convergence between telecommunications, computing and broadcasting/media sectors. These considerations led among other things to the setting up of the Telematics research programme. The programme placed greater emphasis on demonstration projects (i.e. in the area of transport, education, health and administration) that reflected market needs and provided assistance for products and multimedia applications likely to prove successful in the marketplace. In this context the problems facing small and medium-sized enterprises (SMEs) were given greater attention within the European assistance programmes. The 'information economy' was seen as the key area which will determine future growth and prosperity. The White Paper Growth, Competitiveness

and Employment emphasized a more specific focus on information infrastructures to enhance competitiveness and create jobs (European Commission, 1993). In December 1993, the European Council entrusted a high-level group, later known as the Bangemann group, with drafting a report. The report by the Bangemann group underscored that the private sector should be given a leading role in developing the European Information Society.

In July 1994, the European Commission published a communication entitled Europe's Way to the Information Society: An Action Plan that underlined issues such as the legal and regulatory setting as well as services, applications, content and social and cultural aspects (European Commission, 1994). Since the mid-1990s, new approaches in European information policy, particularly in the area of education and training, pointed to the need to consider the social repercussions of the information society. This change in approach grew from the realization that the upheavals taking place in society and business needed to be underpinned by a social framework. It was also understood that if such a social dimension were to be overlooked, growing problems of acceptance could jeopardize further progress. The High Level Group of Experts on Social and Societal Aspects of the Information Society, set up in April 1995, and the Information Society Forum (ISF) in July 1995 focused more attention on the social aspects of the information society (further information about ISF and HLEG and their publications can be found at the Information Society Project Office at www.ispo.cec.be). However, it can be seen that from the beginning the United States gave more prominence than Europe did to the notion of supporting the non-profit-sector and of improving the ways in which democracy functions and achieving higher levels of political codetermination with the help of online technology. If the notion of 'people first' (European Commission, 1996: COM (96) 389 and European Commission 1997, COM (97) 397) is to receive the widespread support of European citizens, it is absolutely essential that European citizens be involved in the democratic process of achieving equal access and economic and social cohesion in the development of the European information society.

One of the main problems with the European approach of concentrating on individual aspects of the information society one after the other is an inability to anticipate well in advance the cross-sectoral repercussions of the various actions for society, business, law and technology, along with accompanying structural changes. Only with the Green Paper on convergence of December 1997 has the European Commission launched a public discussion regarding a more comprehensive regulatory approach in the field of telecommunications, media and information technology (European Commission, 1997: COM (97) 623).

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