Chapter 12
A worldwide view

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The main goal of this chapter is to present a brief overview of the global situation of information and communication technologies (ICT) and to discuss the most significant trends. In this context it is important to understand that these technologies pursue two main goals: processing information (i.e. presenting it in various forms, storing it, searching for it, reproducing it, etc.) and transmitting information from one geographical point to another, from one person to another, to a group of people or to the whole community. So in a certain sense the development of ICTs reflects the development of human beings throughout history. In this chapter, however, only factual material concerning the short life of ICTs over the last few years will be presented.

The second half of this century has witnessed the global phenomenon of an information explosion. The development of different electronic technologies has made it possible for millions of people to have fast access to huge information resources stored in different places on the planet, to communicate with each other and to handle information presented in various forms (text, graphics, video, sound, etc.). These technologies offer brilliant prospects together with dramatic social challenges as seen in Chapter 1.

Yet for the great majority of people in the world, traditional information technologies (postal services, press, radio and television) are still playing and no doubt will continue to play in the near future a much more important role than the ICTs such as electronic mail, multimedia and global computer networks. There are two main reasons for this : on the one hand, the use of these ICTs requires certain investments (the purchase of a computer, for instance) that still are too high in relation to average incomes in poor countries and, on the other hand, the ICTs need an adequate communication infrastructure, including telephone lines in sufficient number and quality.

For this reason, in this chapter the focus is on the main contemporary information and communi-

cation technologies, both traditional and modern, in an effort to understand their development and accessibility in different regions, as well as their prospective development and the ways in which they influence each other.

The relations between the various technologies are complex. Postal services, for example, provide a channel for press distribution, in the same way that telecommunications channels provide an infrastructure for digital networks. Some technologies are more concerned with transporting information, while others are more concerned with its production. Radio and television simultaneously produce and convey information, and are therefore of a different nature. This complex set of relations is the basis for the structure of this chapter, which is divided into five sections: postal services, the press, telecommunications, digital networks and radio and television.

POSTAL SERVICES

Postal service as a technology for conveying written messages from one person to another is the most traditional communication technology among all those discussed in this chapter. The Persians were the first to establish a formal network to transmit messages across their empire, so the postal service is an ancient working technology. It also plays an important role in the life of contemporary society because it is not only a media for a person-to-person communication, but also a media for the distribution of printed materials (newspapers, journals, magazines, advertising material, etc.).

Clearly, the significance of postal service as a means of person-to-person communication is steadily declining, since contemporary technology offers much faster, more reliable and cheaper solutions. For example, it takes only a few hours, or even just minutes, to deliver an e-mail message over the ocean, and it costs a few cents. Sending the same message to the same address by postal service takes days and costs dollars. The mail function of the postal service will, nevertheless, continue to play an important role at least in the near future, even in highly industrialized societies, as it is the only communication technology which can ensure the delivery of originals documents (for example, legal matters). Of course, modern Internet technologies also offer some solutions in this area, such as the delivery by e-mail of digitally signed messages, but these solutions are yet to be legally recognized by the great majority of countries (see Chapter 11).

The second function of the postal service as a means to distribute newspapers and other printed material in a community will no doubt survive, despite the development of modern technologies. Even the most devoted Internet users can hardly imagine themselves at the breakfast table looking at a computer monitor, rather than a newspaper, for a news item.

One of the main indicators of the state of the postal services in a given region is the number of letter-post items posted per capita. The source of the following data, as well as the other numerical data in this section is the Universal Postal Union (UPU). Table 12.1 illustrates the rates of change in the number of letter-post items posted per capita by domestic and by international service dispatch per year. The table shows that the figures of letter-post items posted per capita has remained more or less stable during the last ten years, with the exception of Europe and Commonwealth of Independent States (CIS), but there is an obvious political explanation for this. The sharp reduction here (approximately five times!) is no doubt a result of the disintegration of the former Soviet Union, Yugoslavia and East European Communist Block (Warsaw Treaty Organization). The table also demonstrates that the exponential development of ICTs in industrialized countries has had practically no effect on the domestic postal service: the number of letter-post items posted per capita by the domestic services in industrialized countries has been growing steadily since 1985. However, the slight reduction in the number of international post items in indus-

Table 12.1 → Number of letter-post items posted per capita, 1985–1995

	Domestic service			International service dispatch		
Region\year	1985	1990	1995	1985	1990	1995
Industrialized countries	311	367	380	6.5	6.4	6.0
Developing countries:						
Africa	6	6	6	1.0	1.1	1.1
Latin America and Caribbean	12	12	16	1.2	1.1	1.1
Asia and Pacific	17	15	17	0.5	0.4	0.5
Arab countries	6	5	5	3.7	2.7	2.6
Europe and the CIS	148	152	31	1.6	1.8	1.6
World average	75	80	69	1.8	1.7	1.6

Source: UPU.

trialized countries could be a consequence of the development of Internet mailing and fax messaging.

Table 12.1 also indicates a sharp disproportion between industrialized and developing countries in the availability of postal services. This could be the result of a whole group of factors, one of which is the higher illiteracy rate in some developing countries.

The economic importance of the postal service should not be underestimated. As a public service, it has been considered for many years to be a state monopoly. However, the recent development of private delivery services has certainly created an entirely new situation, which puts strong pressure on traditional services.

THE PRINTED PRESS

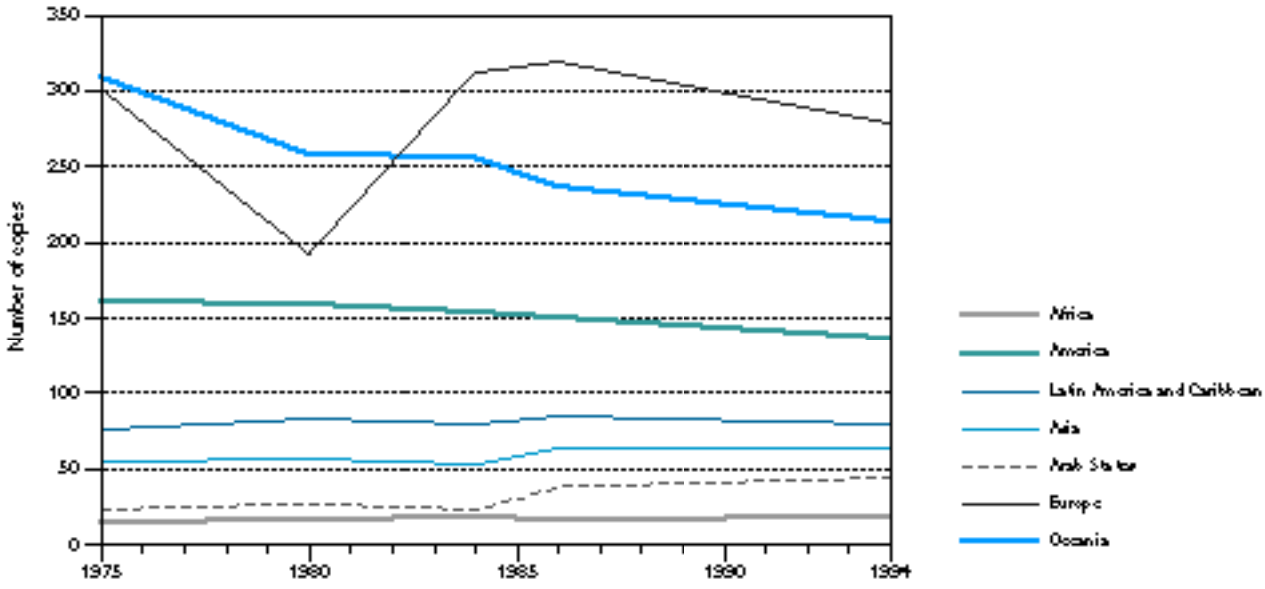
The printed press is quite another type of information technology. Whereas the postal service is primarily used for of person-to-person communication, the main goal of the press is to deliver information to a large group of people, such as the population of a town or country. Daily newspapers may be considered as a most significant part of the press, because they offer the latest information. The publishing of daily newspapers requires a highly-qualified staff of journalists and editors, as well as important infrastructures for the quick printing of a huge quantity of material, and fast and reliable delivery services.

For this reason, the number of titles of daily newspapers as well as figures for their total circulation are good indicators of the situation of the press in the various regions of the world. These data clearly reflect the situation of the press at large. Figure 12.1 shows circulation statistics for daily newspapers (i.e. the number of copies circulated per 1,000 inhabitants) by region from 1975 to 1994. It shows that from 1985 to 1994 the figures remained more or less stable, or decreased slightly.

Figure 12.2 shows changes in the number of titles of daily newspapers in different geographical regions from 1980 to 1996. The source for these data is the UNESCO Statistical Yearbook 1998, in which the corresponding figures for different countries are listed. Since much of the data is incomplete, they were extrapolated and then aggregated by regions by the author. The resulting figures are thus very approximate. Figure 12.2 shows that during the period considered, the main figures which reflect the development of the press remained more or less stable, with the exceptions of Asia and Europe.

The significant increase in circulation figures and in the number of publications from 1980 to 1990 in Asia is due mainly to India. According to the data from the UNESCO Statistical Yearbook 1998, the number of daily newspapers in India in 1990 exceeded the 1980 figure by more than two times the number of titles and one and a half times the number of copies: 3,037 against 1,173; and 22,969 against 14,531, respectively. The decrease in figures of total circulation

Figure 12.1 → Daily newspapers: circulation per 1,000 inhabitants, 1975–1994



Source: Unesco Statistical Office, 1998.

of daily newspapers in Europe between 1990 and 1994 (see Figure 12.1) could be explained by the dramatic political changes: the former Soviet Union and state support of the press disintegrated, and circulation rates decreased significantly because of the new economic situation in the CIS countries. For example, according to data from the UNESCO Statistical Yearbook 1998, in 1990 in the Russian Federation, 328 daily newspapers with a total circulation of approximately 105 million copies were published, as compared with 285 newspapers with a total circulation of approximately 16 million copies in 1996. A seven-fold decrease in circulation!

Figure 12.2 shows nevertheless that the number of publications (titles) of daily newspapers in Europe increased slowly between 1980 and 1996. As a result of political changes in Eastern Europe, the circulation of daily newspapers dropped but the variety available increased.

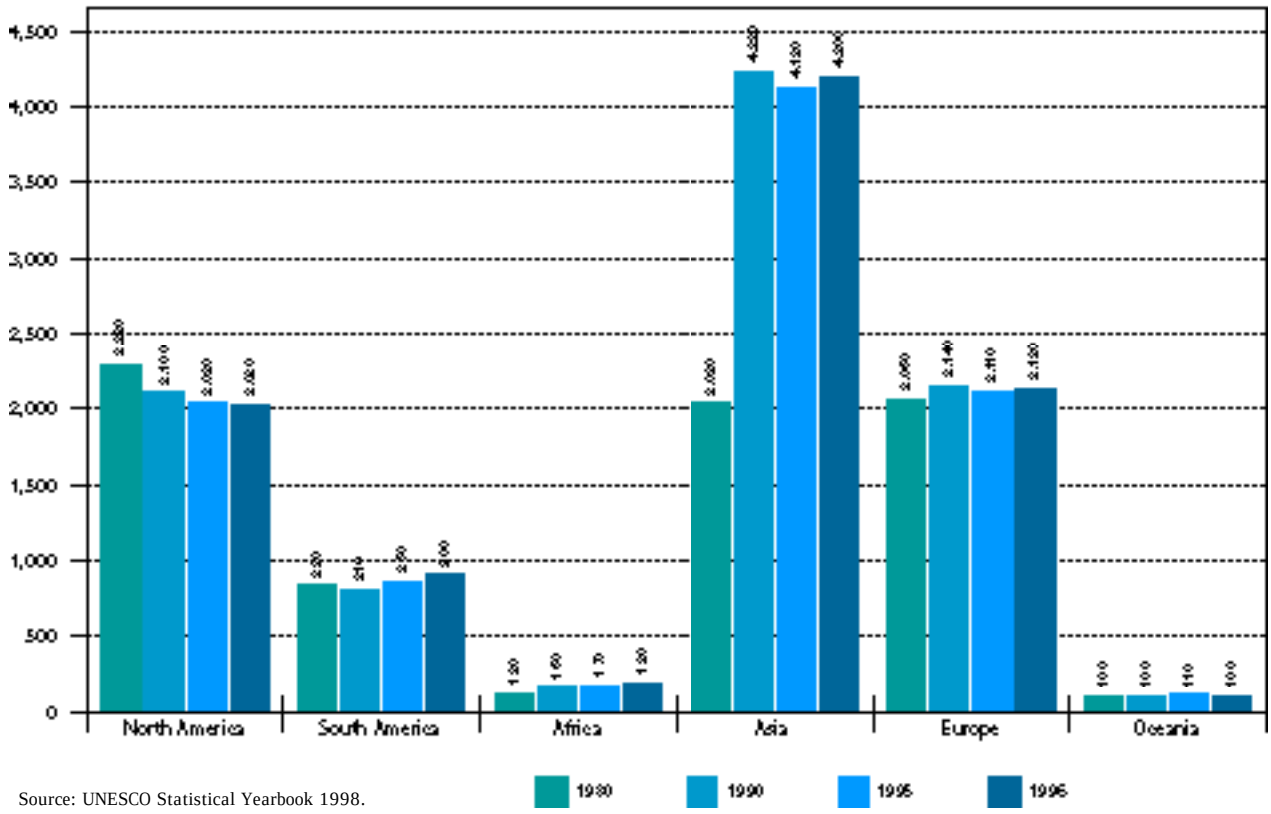
Comparing the data of Figure 12.1 with the annual rate of population growth in the world since 1985, leads to the conclusion that the number of copies of daily newspapers per capita has remained more or less constant in different regions and groups of countries, with the exception of Europe and the industrialized countries. In the latter the figures in question are decreasing slightly, which could be a possible impact of the ICTs (see Figure 12.3).

TELECOMMUNICATIONS

The term telecommunications was first used for wired telephony. Today, telecommunications are one of the most important of the contemporary ICTs. They include wired and wireless telephony; different mobile services, such as cellular telephones and paging; voice and data transmission; and Integrated Services Digital Networks (ISDN), which provide a very high quality of voice as well as high data communication rates. Existing telephone networks are now also used as a complement to computer networks, including the Internet and other wide area networks (WAN).

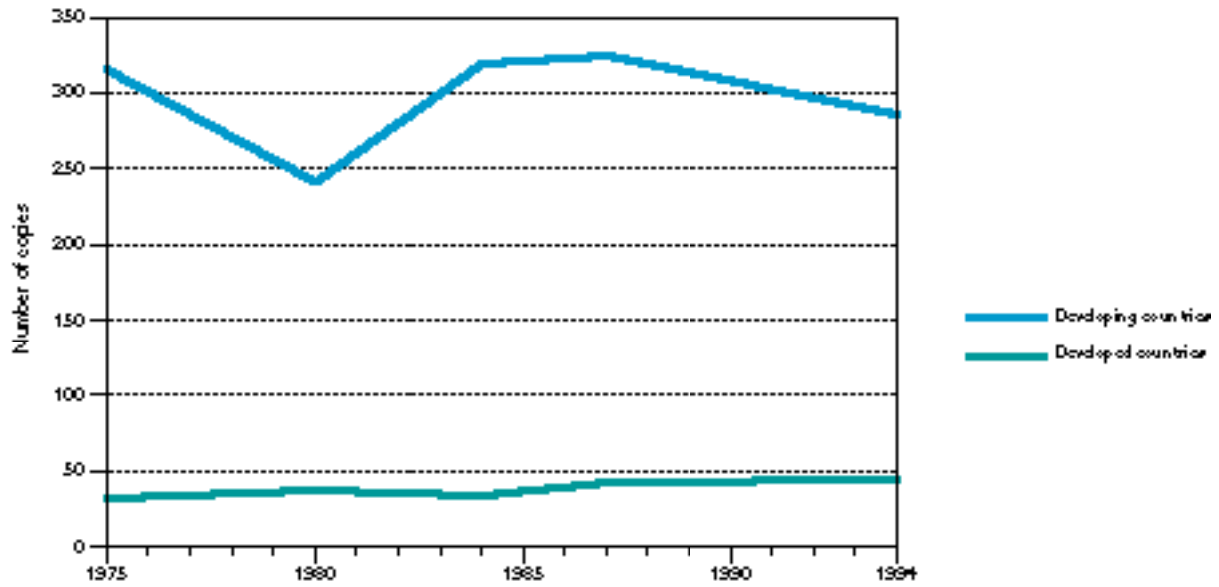
Yet since their very origins at the beginning of this century, the main goal of telecommunications has remained that of providing better, faster and more reliable person-to-person communication. This is why radio paging is usually considered to be a telecommunications service, in contrast to videotext for example, which is considered by many experts to be a television service. For a technical introduction to

Figure 12.2 → Daily newspapers: number of publications (titles)



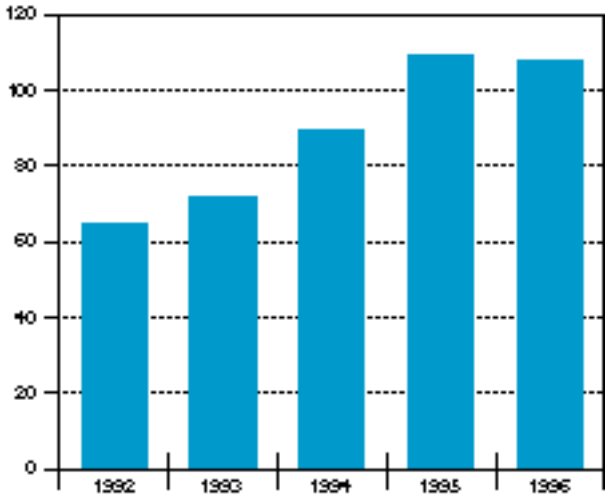
Source: UNESCO Statistical Yearbook 1998.

Figure 12.3 → Daily newspapers: circulation per 1,000 inhabitants, 1975–1994



Source: Unesco Statistical Office, 1998.

Figure 12.4 → Exports of telecommunication equipment worldwide in billions of $, 1992–1996

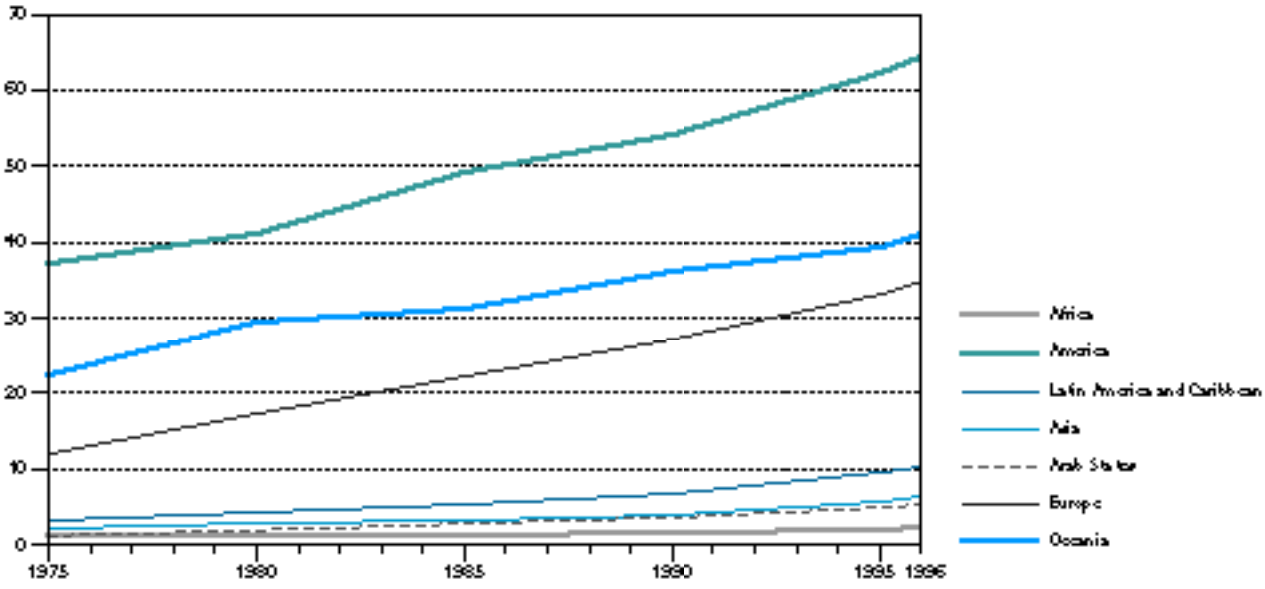


Source: International Trade Centre: www.intracen.org

telecommunication technologies the reader is referred to Chapter 17 of the World Information Report 1997 (UNESCO, 1997).

Telecommunications are a rapidly developing and highly profitable business (see Chapter 1). For instance, according to the available data from the International Telecommunication Union (ITU), in 1996 the world total telecommunication investment was about $109,670 million, whereas the world total telecommunication revenue was about $515,490 million (source: World Telecommunication Indicators, ITU, Geneva, 1998). Telecommunications revenues are generated mainly by two sources: equipment trading and communication charges. According to the International Trade Centre data (see Statistical Annex, Table A.6 and www.intracen.org), the top ten major world exporters (manufacturers) of telecommunications equipment are: the United States, Japan, Germany, the United Kingdom, Sweden, Singapore, France, China, the Republic of Korea and Canada. It may be noted that the list of the top ten major exporters and importers of telecommunications equipment is identical, except for Hong Kong, which replaces Sweden in the list of the top ten main importers. The world development of trade in telecommunication equipment from 1992 to 1996 is given

Figure 12.5 → Main telephone lines per 100 inhabitants, 1975–1996



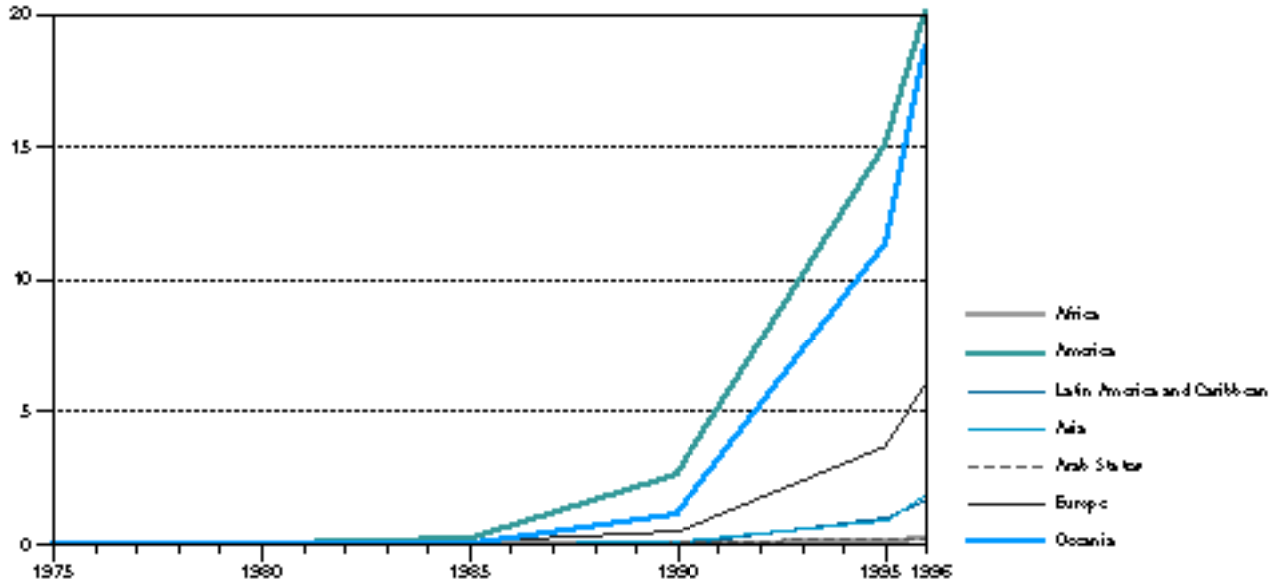
Source: International Tecommunication Indicators, ITU, Geneva, 1998.

in Figure 12.4, which indicates that exports nearly doubled during this period.

The development of the global situation concerning the availability of telecommunication services may be characterized by the growth in the number of telephone lines (both main and cellular) per capita in different geographical regions. Figure 12.5 shows smooth and almost linear growth in the number of main telephone lines per 100 inhabitants in different regions of the world during the last twenty years and Fig. 12.6 shows exponential growth of the number of cellular subscribers per 100 inhabitants over the last 10 years. The diagrams also demonstrate the sharp difference in the availability of telephone services (both wired and cellular) between developed and developing countries.

Cellular telephony is becoming more and more popular throughout the world, mostly in the developed countries. In 1997 according to data from Ericsson, one of the world's leading manufacturers of telecommunication equipment, the total number of cellular subscribers in the world increased from 70 million to 207 million. Among them more than 112 million are subscribers to digital cellular networks and about 95 million are subscribers to analog cellular networks. The highest number of cellular networks subscribers is in North America, with about 60 million, followed by Western Europe with 57 million, Asia and the Pacific (without Japan) with 40 million, Japan with 29 million and Latin America with 13 million. The rest of the world numbers 8 million subscribers. Ericsson forecasts there will be 830 million subscribers to cellular networks by 2003, and an average annual growth rate between 1998 and 2003 of 27%. Ericsson also forecasts that by the end of 2003 nearly 15% of the world's population will subscribe to cellular telephone networks. Among them will be almost 60% of the population of Japan, more than 50% of the population of North America and about 50% of the population of Western Europe. Today the highest rate

Figure 12.6 → Cellular mobile subscribers per 100 inhabitants, 1975–1996



Source: International Tecommunication Indicators, ITU, Geneva, 1998.

of cellular subscribers is in Finland, with about 50% of the population (source: Nokia Group).

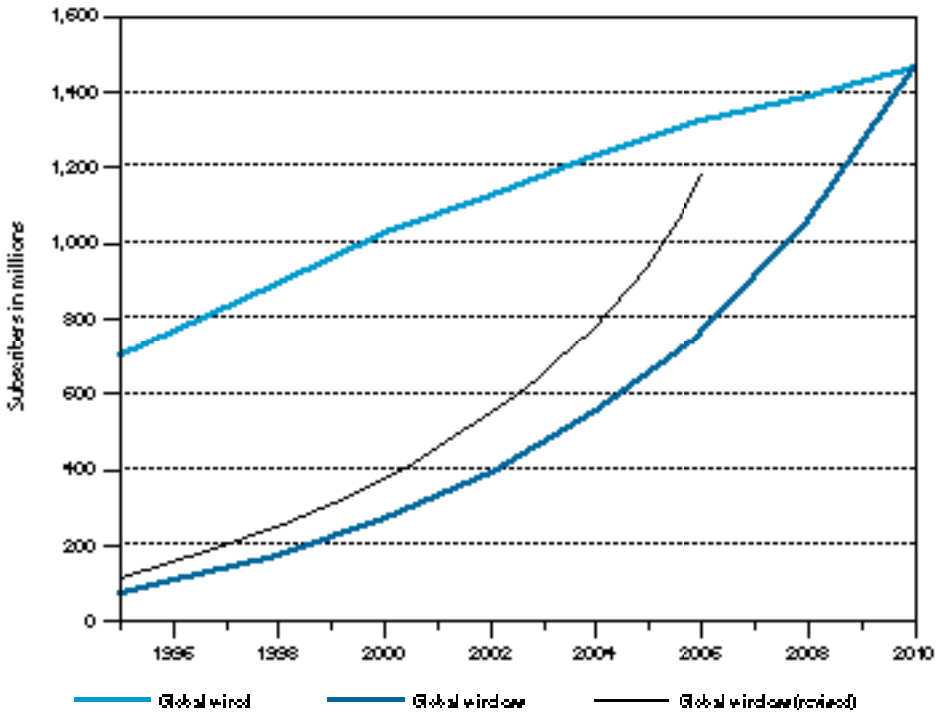
Another forecast for global wired/wireless market trends is given by Lucent Technologies/Bell Labs Innovations. They predict that by 2010 the number of subscribers to wireless telephony will exceed that of subscribers to wired telephony (see Figure 12.7).

Another popular mobile telecommunication service is radio paging. It is cheaper than mobile telephones, which usually include a radio paging mode. Radio paging is most popular in Asian countries. In 1996, according to the ITU data (World Telecommunication Indicators, ITU, Geneva, 1998) in 1996 Singapore and the Republic of Korea had the highest number of radio paging subscribers per 100 inhabitants – 35 and 28 respectively. In comparison, for Hungary which has the highest number in Europe, the figure was 17. It is interesting to note that the ITU data show that normally in those countries where figures of cellular subscribers per 100 inhabitants are high, the corresponding figures for radio paging subscribers are relatively small, and vice versa. The situation in the European countries confirms this observation.

Cellular telephones and other mobile services are now a top advantage of telecommunication technology. Integrated services digital networks (ISDN) are another leader. As with cellular telephones, the use of ISDN in a given region reflects the state of development of the most contemporary telecommunications technologies.

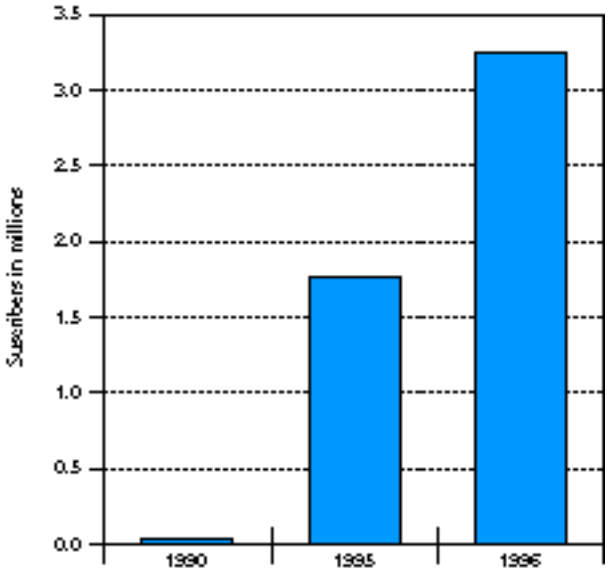
In 1996, according to the ITU data (World Telecommunication Indicators, ITU, Geneva, 1998), there were more than 12 million ISDN channels in the

Figure 12.7 → Wired/wireless trends, in millions of subscribers



Source: Lucent Technologies/Bell Labs Innovations.

Figure 12.8 → Number of European ISDN subscribers (millions), 1990–1996



Source: ITU, World Telecommunication Indicators, 1998.

world and about 4 million ISDN subscribers. About 75% of all ISDN subscribers are in Europe. There are 22% are in the United States and 3% in the rest of the world. The world leader in the number of ISDN channels and subscribers, in 1996, was Germany, with 5,150,000 channels and 1,945,000 subscribers. The rate of growth of ISDN subscribers in Europe from 1990 to 1996 is illustrated in Figure 12.8.

It may be concluded that telecommunication services, especially modern ones, are now growing exponentially, but only in the industrialized countries. There is very slight development in the rest of the world, and a sharp disproportion between industrialized and developing countries in the availability of telecommunication services, even such traditional ones as wired telephony. However, the example of China shows that some developing countries have great potential in manufacturing telecommunication equipment, and are thus capable of improving the availability of telecommunication services.

The development of telecommunication services in a given region has a vital impact on the development of the Internet for which they provide the necessary infrastructure, as they do for other wide area networks (WANs).

THE INTERNET AND OTHER WIDE AREA NETWORKS

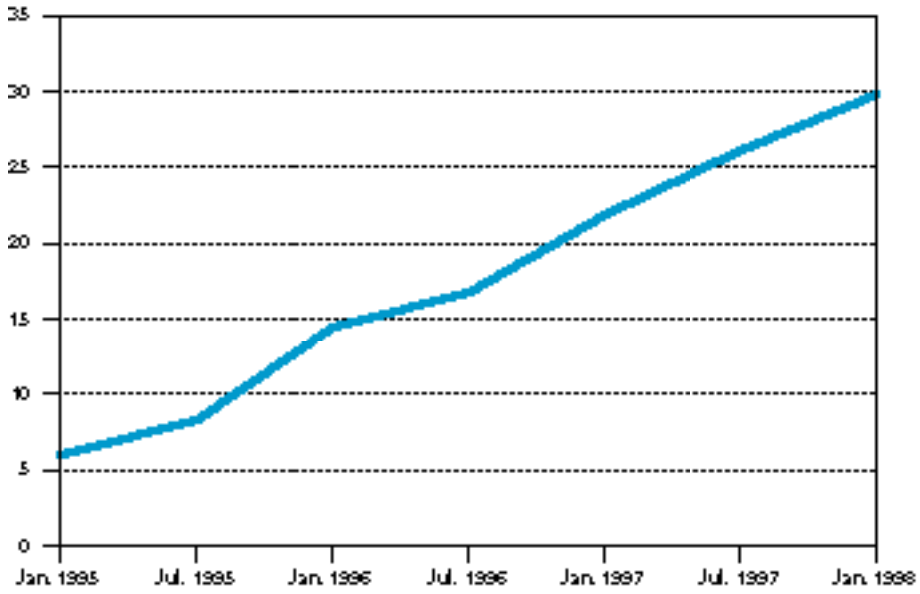
It makes sense from a technological point of view to treat digital networks separately from the other telecommunication systems available. Digital networks include the Internet, intranets and WANs and share several features including the large amount of data transmitted, the high speed of transmission and the use of digital technologies and data transmission protocols. While these features make digital networks different from the other telecommunication networks, they are not isolated from them. For instance, the 'last mile' by which a user reaches the Internet is often the common telephone wire. Furthermore, it is convenient to distinguish the Internet, which is based on the TCP/IP protocol, from other WANs, which are most often based on other protocols such as X.25 or the asynchronous transmission protocol (ATM). There are also gateways among the networks.

For instance, a subscriber to America On Line (AOL), which is a private commercial WAN, can access the Internet, and conversely Internet users can, under certain conditions, access various other WANs. Private WANs based on TCP/IP protocol are called intranets and can also be linked to the Internet and other WANs. The above distinctions, which are important from a technological point of view, may or may not be apparent at the service level.

When data from different sources are analysed, it is sometimes difficult to ascertain whether a given source refers to all public and private networks, including intranets and the Internet. Possible errors are not, however, of concern here, since the principal aim in this chapter is to provide a global overview of the use and availability of ICTs in the world and the figures of network computers adequately reflect the situation.

The major indicator of development of the Internet is the number of hosts providing users with access. Figure 12.9 shows the annual rate of growth

Figure 12.9 → Estimated number of hosts (millions), 1995–1998



Source: Network Wizards, www.nw.com

of the total number of Internet hosts in the world. Table 12.2 shows the annual rate of growth of Internet hosts in different geographical regions from 1995 to 1996. It should be noted that Figure 12.9 seems to demonstrate a linear growth in the number of hosts in recent years in contrast with the exponential one of earlier years (cf. Figure 1 in Chapter 18 of World Information Report 1997). The number of hosts per country varies widely: from several hundred thousand in highly industrialized countries (or even millions in the United States), to very small numbers in developing countries.

In an international market forecast published in 1997 (see the Statistical Annex, Table A.8), the International Data Corporation estimated that the total compound annual growth rate of the purchase of products and services related to the use of Internet between 1996 and 2000 would be 49.5%. Other sources give different estimates for the Internet turnover in 1996: the total varies from $9,000 million to $10,000 million, including from $500 million to $530 million for retail trade, about $600 million for business-to-business trade, $200 million for information and the same figure for financial services. A forecast for the year 2000 suggests that the total turnover will be between $190,000 and $200,000 million; $7,000 million for the retail trade; $66,000 million for business-to-business trade; $37,000 million for information; and $23,000 million for financial services. Some IBM top managers propose similar estimates.

The main indicators of the Internet and other WAN development appear to demonstrate extremely high annual growth rates, but the divergence between industrialized countries and the rest of the world still remains significant. According to various sources, the Internet is little by little becoming less exclusive. Nevertheless, leaving aside political issues connected

Table 12.2 → Estimated number of Internet hosts, by region, 1995–1996

	1995	1996
Sub-Saharan Africa	51,588	104,158
Asia	743,947	1,585,295
Arab States	2,759	9,119
North America	6,428,458	10,717,487
Latin America	565,390	164,362
Europe	2,177,637	3,521,825
Oceania	363,290	599,744

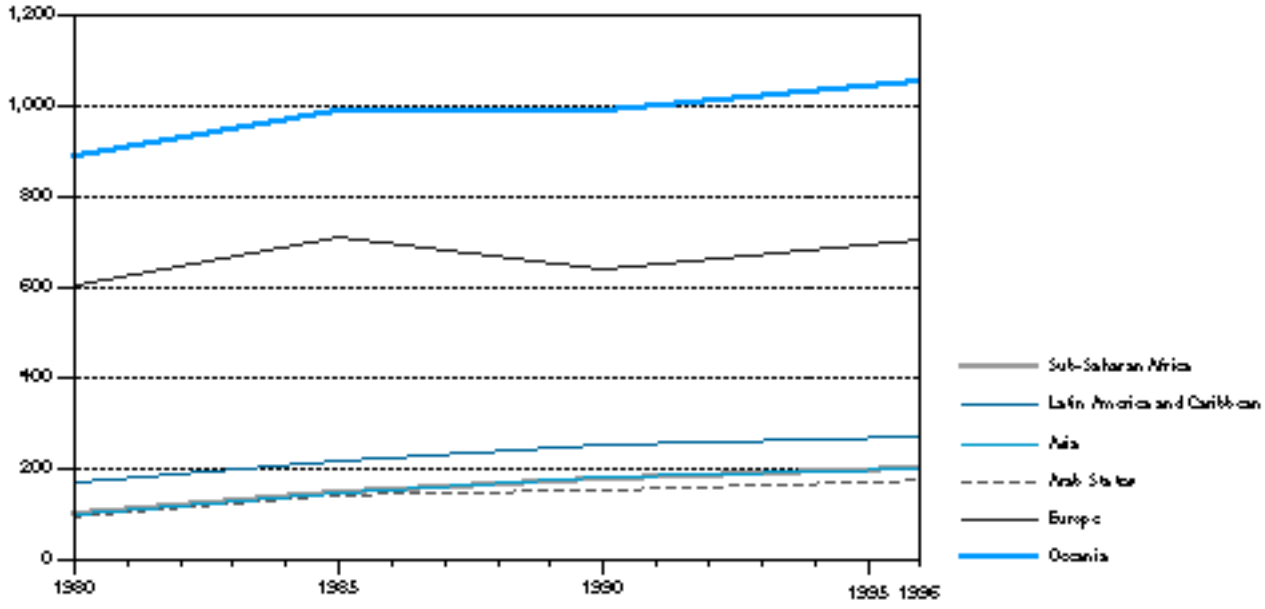
with the free circulation of information 'across borders', the successful development of the Internet in a given region still depends on the adequate development of telecommunications infrastructures and sufficient per capita income. More data on the Internet can be found in Section 3 of the Statistical Annex.

RADIO AND TELEVISION

Both radio and television produce and distribute information via their own channels. In both, although ICT production is technically separated from distribution, the two processes do coexist in these media. It may be that the educational levels of radio and television audiences are lower in comparison with those of newspaper readers or Internet users: a subscriber to a newspaper cannot be illiterate, in contrast to a radio listener or television viewer. It is also true that listening to the radio or watching television is less costly than subscribing to a newspaper or using the Internet. Radio, for which it is sufficient to make a fairly small investment only once, is the cheapest. Finally, poor communities need not invest in their own radio or television industry since they may listen to radio or watch television programmes produced by other countries. All these considerations explain the fact that radio and television are the most available and widespread ICTs in the world, both in developing and developed countries with radio in first place. This is apparent in Figures 12.10 and 12.11, which are worth comparing with the data from the printed press section.

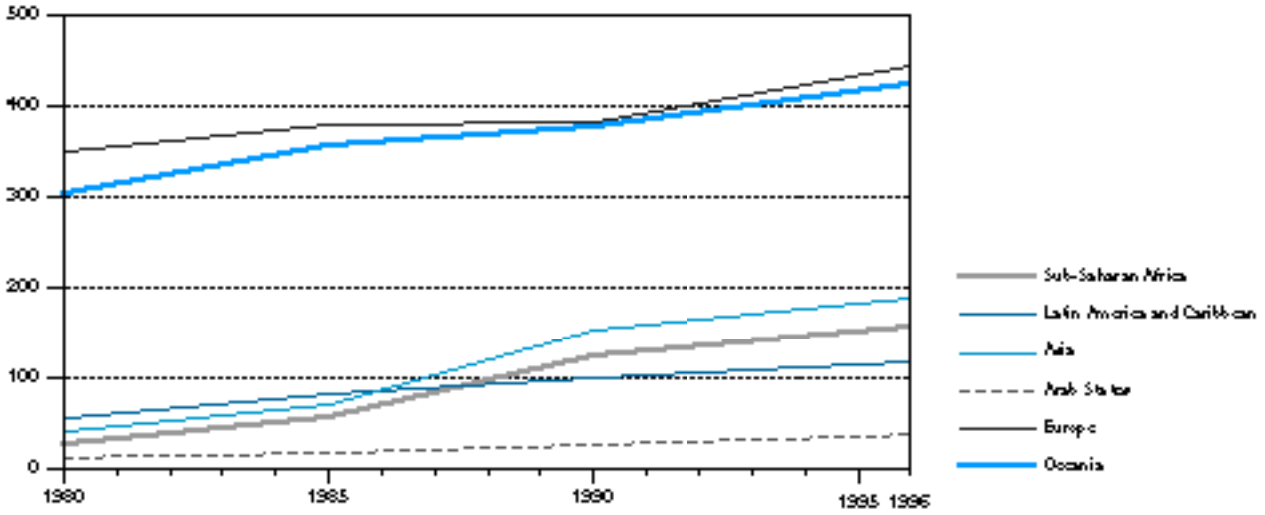
The difference between the developed and developing countries in the availability of radio is not so sharp as in the case of printed press. Moreover, the share of developing countries in the list of the top ten world manufacturers of television receivers and radio receivers is quite large. The top ten television exporters are Mexico, the Republic of Korea, Malaysia, Japan, the United Kingdom, Singapore, Thailand,

Figure 12.10 → Number of radio receivers per 1,000 inhabitants, 1980–1996



Source: UNESCO Statistical Office, 1998.

Figure 12.11 → Number of television receivers per 1,000 inhabitants, 1980–1996



Source: UNESCO Statistical Office, 1998.

France, Germany and Spain; the top ten radio receiver exporters are Malaysia, China, Singapore, Japan, Mexico, the United States, the Netherlands, Portugal, Germany, Belgium-Luxembourg (see Statistical Annex, Tables A.3 and A.2).

According to BIPE Conseil data, in the European Union Countries, television and other home appliances such as VCRs and camcorders still represent about 58% of expenditures on hardware equipment for home use, whereas expenditure on special hardware for multimedia is only 1%. This implies that multimedia per se is of very little interest for the population of this region and is more commonly used with computer equipment. Since multimedia is basically a form of representing information, this situation is not surprising. In addition, expenditures on personal computers for use in the home are only slightly less than expenditures on television sets (38% and 40% respectively in EU countries). This seems to indicate that the home software industry and home use of the Internet have a bright future in industrialized countries (see also Chapter 10 on these issues).

Radio and television are clearly the most available ICTs in the world, and their development still has good prospects in both industrialized and developing countries.

ICTs IN THE WORLD

In this chapter the availability and use of both traditional (postal services and press) and modern ICTs (radio, television, telecommunications and digital networks) have been considered in different regions of the world and groups of countries. Radio and television are both channels providing information and producing technologies. The data analysed here leads to the following conclusions:

→ In recent years, the consumption of the traditional ICTs per capita has remained more or less stable or only slightly changing in different regions of the world as well as in groups of countries, with the exception of Asia and Eastern Europe. As for Eastern Europe (including the CIS), the significant reduction is a result of dramatic political changes there, whereas the

growth of press consumption in Asia is due mainly to India.

- → There is a high rate of growth of indicators which characterize development, use and availability of modern ICTs in industrialized countries.
- → There is a sharp difference between industrialized countries and the rest of the world in use and availability of the most modern ICTs, such as ISDN networks including the Internet, as well as in the development of these ICTs.
- → The development of channels providing technologies in a country or region is a necessary condition for a successful development of information-producing technologies (the present situation may change in future with the further development of projects like Iridium, which will probably offer cheap and easy-to-access channels through a system of satellites).
- → The most available and the most widely-used ICT in the world is radio, followed by television. One of the reasons for this is the low demand in terms of literacy made on the audience, relatively cheap hardware and the availability of existing broadcasting channels.

It is difficult to escape from the conclusion that if the present trends continue, the gap between information-rich and the information-poor will continue to widen.

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