

Box 1.1 → UNESCO's mission and activities

UNESCO's constitution requires the Organization to facilitate universal access to information through international co-operation, 'for the purpose of advancing . . . the objectives of international peace and of the common welfare of mankind'. UNESCO pursues this mission by defending freedom of expression and its corollary freedom of the press, encouraging the development of pluralistic and independent media, promoting the free flow of information, ensuring that the new electronic media are of benefit to the greatest possible number of people and taking measures to avert the risks of uniformization and exclusion.

A new communication strategy

At the end of the cold war, the General Conference of UNESCO adopted a new communication strategy which, inter alia, solemnly reaffirmed the principle of the 'free flow of information' and reiterated that freedom of expression must be exercised 'without any obstacle'. With this return to constitutional basics, UNESCO regained its moral authority in this area. UNESCO is playing a leading role within the United Nations system for the defence and promotion of freedom of expression and its corollary, press freedom, which, in the words of the General Conference, is an 'essential component of any democratic society'. Together with the United Nations, UNESCO organized five regional seminars on the promotion of independent and pluralistic media. Their conclusions and

recommendations contained in the Declarations of Windhoek, Almaty, Santiago, Sana'a and Sofia were endorsed by the General Conference, as was the decision by the United Nations General Assembly taken at the initiative of UNESCO, to proclaim 3 May, the anniversary of the adoption of the Windhoek Declaration, 'World Press Freedom Day'. These activities and events have done much to promote freedom of expression worldwide. The launching in 1997 of the 'UNESCO-Guillermo Cano World Press Freedom Prize', the Director-General's systematic public condemnation of crimes committed against journalists (most of which go unpunished), and UNESCO's discreet diplomatic action on behalf of journalists and other intellectuals in prison or missing, are all examples of initiatives in keeping with this fundamental role of the Organization.

Action in conflict zones

In several conflict zones, UNESCO is playing a pioneering role by helping to promote a culture of peace with and by the media. For more than five years now, in the countries of former Yugoslavia, the Organization has been offering assistance to independent media in order to to preserve their freedom of expression. This action is essential if they are to provide the local population with non-partisan information and to counter the propaganda of violence and hatred disseminated by media under the direct or indirect control of

those who advocate force and confrontation. This type of action in former Yugoslavia, which has won UNESCO recognition within the United Nations system as the 'lead agency' for the provision of assistance to independent media in zones of conflict, has since been extended to other regions of the world. Moreover, the Organization has taken a number of initiatives to provide opportunities for exchange and co-operation among media professionals belonging to antagonistic national, ethnic or religious groups. This allows them to analyze together their attitudes towards each other and to create, through dialogue, a climate of mutual understanding to ease tension and foster reconciliation. The establishment of press houses in Rwanda and Burundi, open to both Tutsi and Hutu journalists, the setting up in Latin America of the REDIPAZ network and the launching in Jerusalem of the Israeli-Palestinian Media Forum, are examples of UNESCO's contribution to a culture of peace with and by the media.

Key issues in communication

UNESCO also makes a special effort to strengthen communication and information capacities in developing countries so that they can participate more actively in the communication process. This is done through the programmes and projects responding to the needs of these countries and of society in general.

There is no doubt about the growing impact of communication media in today's society, both the conventional media (press, radio and television) and the information technologies such as the Internet, and the rapidly developing digital media. In this context, UNESCO has become a principal world forum for the discussion on such issues as Public Service Broadcasting and Editorial Independence; strengthening democratic voices (Tampere, 1997); The Young and the Media – Tomorrow (Paris, 1997 and 1998); and Sexual Abuse of Children, Child Pornography and Paedophilia on the Internet (Paris 1999).

The Organization also issued a Global Study on Media Violence, based on a survey administered by leaders of the World Movement of Scout Organizations and computer-

analyzed by Utrecht University. The UNESCO International Clearing House on Children and Violence on the Screen, established in February 1997 at the University of Gothenburg, regularly issues information on this subject, and published a yearbook entitled Children and Media Violence in 1998 and 1999.

Women and the media have also figured prominently in UNESCO's programme. Thousands of women media practitioners, people's movements, news and features services and information resources on women's issues participate in the WOMMED world network. A practical handbook, Women on the Net, has been issued in English and French and under a special project, Women Speaking to Women, community radio stations are run by women in six countries in Africa and Asia.

UNESCO's regional and national training programmes are an important part of communication development, particularly for independent local newspapers and community media. This work is further reinforced through the Global Network of Journalism Training Centres and Institutes organized in 1997 and launched with support from the International Programme for the Development of Communication (IPDC) in 1999. This complements the work done in universities by the UNESCO Chairs in Communication, including the most recent one created for communication technology for women at the Sook Myung University, Seoul (Republic of Korea).

The International Programme for the Development of Communication

Freedom of expression is meaningful only when there is a wide range of media in existence, such as newspapers, radio stations and television channels. That is the basic philosophy on which the IPDC was founded. Established by a resolution of UNESCO's General Conference, it is a specialized programme focusing exclusively on building up the means of mass communication in developing countries.

Since its establishment in 1980, IPDC has mobilized some \$41 million in voluntary contributions for its special account and nearly \$45 million for projects financed under

funds-in-trust. Fellowships sponsored by individual countries have provided retraining for 1,500 communication professionals.

The projects carried out with IPDC funding cover a wide range of activities which seek to promote the concept of media pluralism and independence. They include the launching of community radio networks, newspapers for women and rural communities, the training of journalists for all types of media and the computerization of the editorial offices of news agencies, television channels, radio stations and newspapers. In addition, IPDC finances and supports the setting up of networks to denounce violations of press freedom.

Information and informatics

In the area of information and informatics, UNESCO is promoting international development of both 'content' and 'infrastructure':

UNESCO is fostering access to diversified content in cyberspace by promoting the concept of the electronic 'public domain', accessible on-line and off-line. The 'Publica' CD-ROM series of electronic documentary heritage, produced in co-operation with institutions in developing and developed countries and made available free of charge, covers, for example, electronic anthologies of development literature, free software and classical literature. The Memory of the World programme helps to inventory, preserve and disseminate the world's documentary heritage including manuscripts of unique cultural significance. UNESCO itself aims at providing a portal to the global 'cyber commons' of public domain information and applications through its own Web site, and regularly organizes activities to promote creativity and diversity on the Internet, such as through the annual UNESCO Web Prize awarded for outstanding achievements in creating Web sites in the areas of education, science, culture, and communication.

Another content-related focus concerns the use of electronic information to improve governance and facilitate democratization, which was the subject of a global UNESCO survey in 1998/99 to identify promising technologies, applications and approaches in this area of particular

national information and informatics policies through guidelines, workshops and technical assistance. Special consideration is given to 'info-ethical' questions, to achieving a balance between the common good and economic imperatives, and to facilitating the use of information and communication technologies for development purposes by the public sector and the civil society.

UNESCO's general orientations concerning the cyberspace are described in Box 8.2. Activities in the field of ICTs funded from extra-budgetary sources are described in the Statistical Annex (Section 4).

This review illustrates the wide range of UNESCO's actions in the fields of communication, information and

relevance for developing countries. Within its Infoyouth programme, UNESCO supports the establishment of Info-centres, info-skills and info-bulletins for young people.

In the 'infrastructure' area, UNESCO provides assistance in the establishment of regional computer communication networks for public service applications and for new approaches to virtual communities for learning, for scientific exchange and for cultural development. Examples are a pilot project for the use of the Internet in priority development sectors in the Eastern Caribbean, extending the European Union's Trans-European Tele-Education Network (TEN) to four East European countries, the HeritageNet project linking libraries, archives, museums, art galleries and universities in Central Asia, and, in Africa, 'Learning Networks' enabling teachers to use the Internet for the improvement of education and multi-purpose community telecentres in rural or disadvantaged locations.

Since its beginnings, UNESCO has been promoting library and archive development through the preparation of guidelines and methodologies, advisory services, training of specialists and technical support to selected institutions. More recently, over 300 libraries have been linked through the UNESCO Network of Associated Libraries (UNAL) which was launched in 1990, and within the MEDLIB project major libraries in the Mediterranean region are focusing together on improving the management of and access to electronic information.

Given the critical importance of skills for the development of an information society, UNESCO pays particular attention to the training of information professionals (librarians, archivists, documentalists, computer specialists), as well as of users at all levels. For example, a complete modular framework for training in informatics, covering undergraduate, and postgraduate and continuing education programmes, has been developed in collaboration with the International Federation for Information Processing (IFIP) to serve as a framework for development, testing and international exchange of training materials in these areas.

In another key interdisciplinary area, UNESCO is assisting Member States in the formulation of appropriate

informatics, and its contribution to the emerging information society at the political, intellectual and operational levels. Other agencies also make important contributions, but for reasons of space, it is not possible to review them here. Given the magnitude of the problems, it is clear that a strong commitment by the international community is necessary to ensure that commercial interest do not dominate the development of ICTs in the world, more particularly in developing countries. Governments, public and private institutions have to assume their responsibilities if the gap between information-rich and information-poor is not to continue to widen (for more information see www.unesco.org/webworld).

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Box 2.1 → The use of electronic media in open learning and distance education

This is a worldwide study based on data from 147 institutions involved in distance education.

39 countries are represented; 72% of the institutions are located in developed and 28% in developing countries.

Educational level of the programmes included Training levels	Programmes (%)
Pre-primary	2
Primary	6
Secondary	14
Tertiary	60
Vocational	26
Continuing education	46
Life enrichment, civic education, etc.	13

Use of learning materials	Programmes in:	
	Developed countries (%)	Developing countries (%)
Documents	99	100
Audio	67	86
Video	82	77
Computer assisted learning	50	43
Multimedia	30	7

Distance education is by no means a new phenomenon, but the means of distribution are changing and increasing rapidly with recent technological developments. The study provides some insight into the use of electronic media in terms of the types and means of interaction that takes place in the course of the educational programmes. The most noticeable result is that electronic media are used mainly to support traditional learning methods. Only a few cases could be identified where media were used to change the characteristics of learning to better serve the needs of the learners.

Use of communication tools	Programmes in:	
	Developed countries (%)	Developing countries (%)
Telephone/fax	84	84
Audio-conferences	34	27
Video-conferences	24	18
Computer conferences	28	5
E-mail	64	30
Database access	15	11

Some selected results concerning:

- types of learning materials
- types of communication tools
- types of communication channels

Audio-based materials have a significantly higher usage in developing countries than in developed countries. Production of audio materials is relatively inexpensive and requires less technical sophistication than other electronic learning materials. The requirements at the user-end are also lower than for other electronic learning materials.

Use of communication channels	Programmes in:	
	Developed countries (%)	Developing countries (%)
Mail/physical delivery	87	86
Public service telephone network	83	57
Radio	6	29
Direct Broadcast TV	9	16
Terrestr. Broadcast TV	13	11
Integrated Services Digital Network	20	7
Specialized links (unspecified)	17	2
Digital spec. links	11	5
Public data network	12	2
Cable	11	2

Concerning the tools used to facilitate the interaction during the learning process, all forms except the use of telephone/fax are more highly represented in the developed countries. Consequently the channel most used for communication (apart from mail) is the public service telephone network; radio is used on a larger scale in the developing countries than in the developed countries.

Compiled from *The Use of Electronic Media in Open and Distance Education*, prepared by My von Euler and David Berg, Paris, UNESCO, 1998.

Box 3.1 → Non-roman alphabets and the computer

In a period of rapid and accelerating developments in information and communication technologies, the letters and texts, the images and graphics that are the very *raison d'être* of these same technologies do not always receive sufficient attention.

This is a serious matter. The non-computerization of scripts which are not based on the Latin alphabet could lead to whole societies regressing to an almost pre-Gutenberg age, when only an élite of privileged scholars were commissioned to write, copy and read precious books, of which there was often only a unique original.

This problem is of great concern to over two hundred ethnic societies and language groups, mainly in Asia, but also to the autochthonous peoples of the circumpolar region and the indigenous peoples of Latin America. For a large number of languages, it is a matter of using graphic tools to represent the letters, words and phrases of these languages as symbols within computerized lines, in the same way that those who speak the languages would have written them. Because the computerized writing tool should follow as closely as possible the grammar and style of writing, it is not simply a question of correctly transposing one alphabet based on imitating sounds to another, also based on sound imitation.

In most cases, for example, the consonant is written first and the appropriate vowel becomes an accent or diacritic, near the consonant symbol. There could, however, be an essential difference if a vowel comes first or if it comes last as a stand-alone vowel, and the writing tool should be able to take this factor into account.

An entirely different writing tool needs to be developed in order to transpose ideo-based alphabets with characters that do not represent sounds, but rather objects or ideas, such as Chinese, Japanese and Korean. The challenge is even greater to develop writing tools for scripts based solely on ideogrammes, such as the Indian languages of North America or the Inuit scripts, which recount whole sagas and histories with what the uninitiated would call a scarcity of symbols.

Creating the appropriate fonts is only the first step. A computerized writing tool that enables the style of writing to be articulated and expressed has to be developed. In any given language, there are different ways of using bold characters, italics, underlining, and other typographical elements. There are different types of punctuation and different ways of separating words, sentences and paragraphs. In Thai, for

example, all words are run together. There are no commas to mark independent thoughts, no full stops to end a sentence and no indentations to show a paragraph. Most traditional scripts are written in upper case; lower case has no meaning. Moreover, the size of the symbol is very important and is usually determined by the traditional use to which the script will be put.

Beyond these considerations, and making good use of new information technology, it will then be necessary to consider the following: the creation of electronic dictionaries, electronic thesauri, electronic spellcheckers integrated into the writing software, multiscript writing environments, voice activation and translation and format standardization to allow electronic transmission and conversion. Even for Afralpha, the script system developed on Apple computers to integrate several dozen African languages into an extended roman alphabet, there is a need to advance further to the stage of dictionaries, thesauri and other such reference tools.

Finally, given the fairly large number of initiatives to develop computerized writing tools for non-roman scripts, it will eventually be necessary to codify scripts to ensure uniformity within the script language and compatibility with related scripts, as for example between Dzongkha, the language of Bhutan, and Tibetan, the origin of most of the religious writings used in Bhutan.

The importance of computerizing scripts as one integrated and holistic programme cannot be overestimated. Peoples and societies who are unable to write their own language script on computer for global transmission and exchange will also be unable to participate fully in the emerging information society or to benefit wholly from the opportunities offered by information and communication technologies. Another consequence may be that their creative spirit and their cultural identities could be adversely affected.

Reference

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Box 6.1 → Newspapers on line

There are many sites on the Internet that provide news. One type are the special Internet news sites, often provided by the Internet Service Providers (ISPs). Others are sites maintained by already-existing newspapers as a complement to the printed product. One can find daily newspapers and news-oriented periodicals from almost every country in the world, representing a mixture of national and regional/local press, as well as news targeting specific groups in terms of language and/or ethnic belonging. One significant result of this development is that, whereas the possibilities of access to traditionally disseminated press were limited, especially concerning regional and local press, news via the Internet means worldwide dissemination. Some examples of estimated number of newspapers and periodicals available by country of origin are given in Table 6.1.

Box 7.1 → The development of new information technologies for libraries

Computerization for libraries

Libraries were very quick to computerize their management systems. Since the invention of Machine-Readable Cataloguing (MARC) in the mid-1960s, many countries have adopted national versions of that format. Nearly all libraries in developed countries are now equipped with computerized management systems, particularly software for cataloguing and lending operations. Computerization is steadily eliminating card indexes in favour of Online Public Access Catalogues (OPAC). In the 1990s, with the development of the Internet and more recently of the Intranet, the distribution of catalogues on CD-ROM is tending to be replaced by direct access via those networks to constantly updated files.

Interconnection of catalogues

The adoption of sufficiently compatible cataloguing rules and formats makes it possible to interconnect catalogues via the Z39.50 (International Organization for Standardization, ISO 23950) common communication protocol. This protocol fixes a standard for communication between software programmes and controls dialogue between the requesting computer (client) and the answering computer (server). Such dialogue requires, among other things, the indexed fields to be defined in the same way in each system. When that is the case, a reader in any library may search catalogues functioning under that protocol anywhere in the world using the set-up and computer language with which he is fully familiar, those of his own institution.

Digital collections

In the last few years, major libraries have begun building up digital collections, either for purposes of conservation or in order to facilitate access to documents that are rare or national treasures. This trend is so powerful that sites devoted to digital collections have been created on the Internet. Indeed, the movement has recently been further stimulated by the G7 programme Memoria Universalis, in which both UNESCO and the European Commission are involved as observer members. (<http://portico.bl.uk/gabriel/bibliotheca-universalis/digit.htm>)

Among the flagship programmes are:

- The INIST (Institute of Scientific and Technical Information), a French documentation centre that was

the first to scan 1,500 international scientific journals systematically in order to computerize the procedures used in document delivery. The programme began in 1990 and is still continuing, processing 1.5 million pages per year. (www.inist.fr)

- The National Library of France has launched a programme for the computer storage of 100,000 works of French literature (30 million pages, essentially in image mode) and 300,000 illustrations. Documents in the public domain are made available on the Internet. (www.bnf.fr)
- The National Digital Library Project piloted by the United States Library of Congress began in 1995 and is scheduled for completion in 2000. It is a co-operative project involving numerous large research libraries. The aim is to store in digital form one million heritage documents (texts, photographs, sound recordings and films) relating to the history of the United States of America. These documents are made available on the Internet. (<http://lcweb2.loc.gov/amhome.html>)
- Archivo general de Indias is a programme launched in partnership with IBM for the computerized storage of ten million documents from the Seville archives. (www.mcu.es/lab/archivos/AGI.html)
- The computerized storage policy of the German libraries: the Deutsche Forschungsgemeinschaft (DFG) has been subsidizing programmes since 1997 for the storage of the collections of German university libraries in digital form. This national project assigns responsibility for digitization, by chronological period and by theme, to the various libraries in exactly the same way as the Sonder Sammel Gebiete distributes acquisitions by research field among the university libraries. In 1997, two technical centres for digitization were set up, one in Munich and the other in Göttingen (www.gvb.de), which test the scanners, develop technical standards in the field of library science, study computerized document management systems and issue recommendations for German libraries.
- On behalf of UNESCO, the International Federation of Library Associations and Institutions (IFLA) is carrying out a major survey of digitization programmes in libraries and other cultural institutions. (www.ifla.org/VI/2/p1/miscel.htm).

Scientific electronic publishing

In parallel with commercial electronic publishing, which has been gradually introduced over the last five years by major international publishers (Elsevier, Springer, Academic Press, Kluwer, etc.), research communities and university libraries are developing electronic publishing facilities for their own scientific production (preprints, theses, symposia) and for distance learning technologies (courses, educational software). These productions are processed in more elaborate formats than the image mode that was preferred for the digitization of paper documents. The formats are of the Standard Generalized Mark-up Language (SGML) type, in particular Hypertext Markup Language (HTML) and Standard Markup Language (SML). The Description of Type of Document (DTD) of the Text Encoding Initiative (TEI) is the basis for all recent operations aimed at classifying academic documents in the social and human sciences in America and in Europe. The Z39.50 protocol has now been extended so that a Standard General Markup Language (SGML) type structure can be used directly to search within documents. (See also Box 7.2.)

Acquisition of published electronic documents

The supply of electronic documents is currently posing a great many problems for libraries. Certain publications appear only in that form, and it is clear that libraries need to acquire them or at least to have access to them. However, the regulations now being introduced regard the acquisition of electronic documents as equivalent to a licence to use the contents, and require a bilateral contract. The legal issues are at present the centre of international attention (see Chapter 8). In essence, libraries set access to documents via the publisher's server or a service provider which may be a subscription agency (Swets, Dawson, Blackwell's, etc.) or a cooperative network (OCLC, Pica, etc.). The delivery of electronic documents to the local site of a university or consortium of libraries is still at an experimental stage, but seems to be the most promising solution for making use of published scientific literature.

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Box 7.2 → Electronic publishing in science

Electronic journals create added value in publication that has great appeal to scientists and publishers, and the number of electronic journals in science, engineering and medicine – refereed and unrefereed – has increased dramatically in recent years. But electronic publishing, with its greater flexibility and variety of presentation, challenges conventional norms and practices. How will the existing culture and practices associated with publication in science be affected? What standards should apply in the electronic environment?

To explore these and related questions, an international workshop was organized from 12-14 October 1998, under the auspices of the American Association for the Advancement of Science (AAAS), the International Council for Science (ICSU), and the United Nations Educational, Scientific and Cultural Organization (UNESCO) to examine the application of electronic methods to the publication of scientific journals with a view to encouraging the development of internationally recognized practices and standards. The Workshop was intended to build on the work of the international conference of 'Experts on Electronic Publishing in Science' that was convened by ICSU Press and UNESCO in February 1996. A major recommendation emerging from that meeting urged the convening of a forum involving scientists and their organizations 'to formulate codes of ethics and of conduct for electronic publication which would spell out the reciprocal obligations of the scientist and the community on such matters as peer review, citation, integrity and authentication of material and archiving.'

Wide variations in the practices and traditions of scholarly publishing across disciplines suggests caution in attempting to construct generalizations intended to apply broadly. Nevertheless, the Workshop was able to identify a number of issues that merit attention by the scientific community at large. They are the following:

→ Defining a Publication. Digital processing facilitates the production and preservation of several public versions of a document or scientific paper, and the Workshop recommended that each publicly available version of a document carry a full specification of its status laid out

in a visible and readily understandable manner.

- Citation. Because of the possible existence of multiple versions of a document, the Workshop recommended that the scientific community become involved in the development of standardized citation practices that are friendly to science, include appropriate metadata, are capable of automatic assignment and are easy to use.
- Peer Review. The ease of publication in electronic media reinforces the case for adequate quality control in terms of both the scientific content and the presentation. Scientific societies and/or journals should therefore establish and distribute guidelines in order to maintain the quality and integrity of the review process.
- Scientific misconduct. Any reduction in the controls applicable to electronic publication increases the opportunities for scientific misconduct, such as the falsifying of results and plagiarism, although the technical features of electronic publication (such as the ease of automatic scanning and searching for similarities) raises the chance of detection. Research into the application of electronic methods for the detection of scientific misconduct should therefore be encouraged.
- Open Access. The Workshop considered the conflict between the needs of scientists for ready access to large databases and collections of scientific observations, and the requirements of the aggregators for commercial reward for their endeavours. The results of publicly funded research should be clearly recognized as a 'public good', and full and open access to the data collected was essential for scientific advancement. This does not necessarily mean 'free' access by research workers, since the part played by publishers, aggregators, librarians and other facilitators merits adequate recompense if they are to continue in their valuable roles (see also Chapter 8 on this issue). The Workshop recommended that the attention of the scientific community, funding agencies and legislators be drawn to the fact that the scientific enterprise is crucially

dependent upon the ability of research workers to make use of collections of facts and observations and that measures that limit access to such material are contrary to the public good. Legislators are urged to provide for a mechanism permitting 'fair use' of large databases in order to promote full and open access to critical data for scientific research and education with little adverse effect on the commercial interests of the owner.

- Privacy. It is now possible for journal editors and publishers to collect detailed information on the nature of the material accessed and the usage, and to compile author/user profiles. The kind of information being collected should be clearly stated by journal editors and/or publishers, as well as the use to which it is being put. Specific information relating to individuals should not be divulged to anyone without the permission of the subject.
- Archiving. A major factor restraining the adoption of electronic methods of publication was the lack of

archiving facilities, for there is currently little assurance for authors and publishers that, with the advancement of technology, material issued electronically will remain available and readable in the decades and centuries to come. The establishment of archives, for the long-term preservation of electronic publications, should be encouraged as fundamental to scientific and cultural development.

- Developing Countries. Electronic publishing represents a unique opportunity for developing countries to promote the advancement of their scientific communications. It has the potential for improving access to the world literature, for filling gaps in local collections and for improving the visibility of their own scientific contributions.

Source: AAAS/UNESCO/ICSU Workshop on Developing Practices and Standards for Electronic Publishing in Science, Final Report, www.aaas.org/spp/dspp/sfrrl/projects/epub/report.htm

Box 8.1 → Teledemocracy

Teledemocracy is the adaptation of Internet-based information tools by government, business, and civil society to create an advanced participatory form of democracy. In its purely theoretical form, teledemocracy is the use of the Internet to produce an informed and publicly active citizenship. But in its current form, teledemocracy is a misused and misconstrued term: while the prefix tele explicitly means 'distance' or 'way of', adding the conception of the Internet gives teledemocracy a more technical characteristic.

Empowerment is the foundation of teledemocracy. In order to fulfill the ultimate goal of empowering citizens, two measures must be put in place:

- All citizens must have access to information tools. This highlights the importance of universal access to knowledge and participation in the Information Society.
- Government, business, and civil society must have a strong and committed Web presence. Teledemocracy cannot advance properly without the necessary balance between these three groups.

How does teledemocracy work? In existing democracies, the process starts locally with a virtual administrative body which consists of Web sites sponsored by local governments to facilitate exchange between elected officials and local citizens. Experiments of this kind are being carried out all over the United States, in parts of Europe, and other democratic countries. The Web sites are a dedicated forum for public policy debate, government outreach program, and in some cases, replace conventional mail with e-mail. Teledemocracy is further promoted through cyber-neighbourhoods, which are connected communities with access for each individual family, and cyberparties, which are representative groups that encourage on-line public participation. Both serve the function of increasing citizen partnership, through direct, active lobbying by citizens. On-line lobbying is no longer restricted to

government and business; informed and empowered individuals may take an active role in voicing their opinions.

In non-democratic countries and governments in transition, teledemocracy is practiced differently: through teledemocratization, which is the use of Internet-based information tools to promote knowledge-sharing among citizens and to organize citizen opposition groups. In turn, it may be used to circumvent oppressive regulatory efforts and facilitate discussion among civil societies, government and business. The effect of teledemocratization cannot be underestimated: the technical aspects of the network allow for technical solutions to offset government propaganda, censorship, and other repressive measures. Such is the case with Radio B92 in Belgrade. When shut down for its anti-government broadcasts, the station moved onto the Internet, and was rebroadcast into Yugoslavia by Radio Free Europe and Voice of America. It has become the sole source of independent reporting in Yugoslavia and a rallying point for democratic opposition.

Teledemocracy is only beginning to gain recognition for what it is: a valuable tool to produce an empowered and active society. While the theoretical evolution is still in its infancy, functional teledemocracy is already spreading to many parts of the world. Virtual local administrations are being envisaged and constructed, citizens are becoming more active in communities through cyber-neighbourhoods, and government regulations are circumvented by the technical solutions offered by the Internet. In step with the advancement of information and communication technologies, teledemocracy may well be a fast-developing, governing characteristic of the Information Society.

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Box 8.2 → UNESCO and cyberspace

The emergence of an information society, with new systems and modes of expression, representation and action, is a major challenge for UNESCO and its Member States. As part of its response to this phenomenon, the Organization is striving to 'help its Member States frame integrated policies and strategies, taking account of the convergence of telecommunications, information technology and the electronic media, which will enable them to adapt themselves to this new technological environment and take advantage of the opportunities it offers' (Medium-Term Strategy 1996–2001).

The most striking aspect of this new environment is cyberspace, which is also known as 'information highways'. This new electronic space, open to all forms of expression, information exchange and transactions, is becoming progressively accessible to an increasing number of people, whatever their age, geocultural origins or occupation. The ICTs which form the infrastructure of cyberspace, more particularly the Internet, are used for many different purposes, for the best and the worst. This new environment transcends state borders and largely escapes national jurisdictions.

UNESCO's governing bodies, the General conference and the Executive board, have urged the Organization to take a leading role to ensure that education, science and culture are given adequate intellectual space on the information highways. UNESCO's strategy is being developed around two complementary main lines of action. The first is to encourage international interdisciplinary reflection on the ethical, cultural, legal and social issues which characterize the emerging information society and, second, to promote the use of information technologies for the development of education, science, culture and communication.

In collaboration with producers and users of the ICTs and providers of cyberspace information and services, the Organization promotes the ethical values and legal principles essential for a democratic and participatory information society. In particular, UNESCO's efforts are directed towards promoting universal access to information and creating the conditions under which the information society can guarantee respect for privacy and personal data, enrich all lives, include the excluded and disadvantaged, ensure cultural pluralism and be free from violence, pornography, paedophilia, racism,

alienating ideologies and criminality. These are the objectives of the Project on ethical and sociocultural challenges of the new information society.

The Organization is also working to ensure that ICTs are used more effectively to foster freedom of expression, the free flow of information, access to knowledge for all throughout life, scientific research, artistic creativity, the protection and enhancement of the heritage and the common good. The programmes being implemented contribute to these ends in different ways and include: the diversification of educational services, especially through distance education; the establishment of networks and discussion forums on the Internet for educational, scientific and cultural communities; the digitization and on-line presentation of the cultural heritage, the organization of virtual curricula, libraries and laboratories; 'on-line governance'; the provision of computer hardware and software and means of access to networks; and the training of electronic network managers and trainers in informatics, telematics and multimedia.

Together with its international, regional and national partners, UNESCO has taken several initiatives in organizing a series of conferences and expert meetings worldwide. These include the African Regional Symposium on Telematics for Development (Addis Ababa, 1995), the Conference on Electronic Publishing in Science, organized with the International Council for Science (Paris, February 1996, see Box 7.2), the International UNESCO Symposium on Copyright and Communication in the Information Society (Madrid, March 1996), the second International Congress on Education and Informatics (Moscow, July 1996), the regional symposium on The Arab World and the Information Society (Tunis, May 1997), the Asia-Pacific regional meeting of experts on A Legal Framework for Cyberspace (Seoul, September 1998), the Expert Meeting on Cyberspace Law (Monaco, September 1998) and the two infoethics congresses held in Monaco in 1997 and 1998.

To fulfil its role as a platform for international debate, UNESCO has initiated an Observatory on the Information Society on the World Wide Web with a focus on ethical, legal, social and cultural aspects. For UNESCO's mission in general, see Box 1.1.

Box 8.3 → Paedophilia on the Internet

Violence and pornography have invaded the Internet. Photos and videos of children and young teenagers engaged in sexual acts and various forms of paedophilia are readily available. Reports of children being kidnapped, beaten, raped and murdered abound.

The information and communication technologies have not only changed the rules of the game, they have also moved the playing field. Save our Children, a California based child protection organization, has identified over 8,000 Internet sites dealing with paedophilia. A Japanese wire service reported 500,000 pornographic sites, based in Japan, of which a considerable percentage contain paedophilic images. The danger is not that children will accidentally happen on to these sites. Most of the blatantly illegal sites are well hidden to escape detection by the police. The real danger is that other public sites continue to increase in number and to perpetuate paedophilia and the production of pornography all over the world. One such site addressed to 'boy lovers' has links to over 800 other sites – all of them with 'legally acceptable' images of children.

The Internet has in many cases replaced the media of such paedophilic magazines, films and videos. It is a practical, cheap, convenient and untraceable means for conducting business as well as for trafficking in paedophilia and child pornography. The Internet has also become the principal medium for dialogue about paedophilia and its perpetuation.

Fully aware of the need to safeguard freedom of expression, UNESCO nonetheless seeks to make the Internet a safe place for children. It is in this context that the Director-General of UNESCO convened a meeting of experts at UNESCO Headquarters on 18–19 January 1999. More than 400 specialists and institutions, from over 40 countries

attended. The participants adopted a Declaration and a Plan of action. UNESCO, as the UN agency with a primary role of catalyzer, was asked to take the lead in 'breaking the silence'.

In accordance with its mandate, UNESCO proposed to use its educational, cultural, social and communication expertise to contribute to providing safety nets for children online. This means:

- setting up an electronic clearing house for NGOs, researchers, media, judiciary services and other actors to inform and be informed, to seek advice and resources in total transparency. As there are already several networks in operation, this should be rather an electronic interactive index of child care organizations and networks.
- the creation of two electronic watchtowers. One will act as an on-line helpline for young children to obtain advice and help. The other is for reporting illegal contents or sites, and will enable quick links to appropriate police forces regardless of the country where the sites are hosted, or the country reporting the crime.
- a polyglot glossary of terms covering all the themes of this meeting.
- generating funds and using this first circle of donor partners from the private sector to create what the Director General has referred to as a strategic group of personalities and leading citizens to lend resonance to the work, to marshal resources, and to state the case of children to the world.
- promoting and supporting the design of handbooks and safety brochures for children, teachers and parents.

Website: www.unesco.org/child_screen/conf_index.html

Box 10.1 → Young people, new media

Research teams from twelve countries, co-ordinated by the Media Research Group at the London School of Economics under the direction of Dr Sonia Livingstone, have recently conducted extensive research on children's personal ownership and use of old and new media. Approximately 15,000 children and young people have been surveyed in Belgium (Flanders), Denmark, Finland, France, Germany, Israel, Italy, the Netherlands, Spain, Sweden, Switzerland and the United Kingdom. The comparative research was conducted by most countries on 4 age groups (6-7, 9-10, 12-13 and 15-16) making it inappropriate to quote a single figure for all children. The case of 12-13 year-olds is taken here as paradigmatic of that for the other three age groups.

Findings show that, although television in the home is more or less ubiquitous, the numbers of young people having their own set differs greatly between countries (see

Table 10.7). In Denmark and the United Kingdom, children and young people are more likely to have a television set in their own room than in other European countries and they also tend to spend more time watching television on the average (see Table 10.8). In the United Kingdom in particular there is a 'screen entertainment' culture with children and young people being more likely to own their own equipment.

The number of homes with up-to-date computers varies from almost two thirds in Belgium and Denmark to just over one quarter in the United Kingdom. Personal ownership by young people of such computers is comparatively rare. Despite its lead in the distribution of entertainment-oriented screen technologies, the United Kingdom, together with France, lags furthest behind as regards both home provision and personal ownership of up-to-date PCs by children. Internet access in the home is the most common in Belgium, where half of all

Table 10.7 → Access to television, TV-linked games machines, books, PCs with CD-ROM and Internet by children aged 12-13

	Television		Games machine		Books		PC with CD-ROM		Internet link	
	% in home	% in own room	% in home	% in own room	% in home	% in own room	% in home	% in own room	% in home	% in own room
Belgium	97	30	69	22	99	89	63	12	49	4
Denmark	98	72	38	24	96	83	61	19	27	5
Finland	95	42	47	22	93	88	54	18	31	8
France	98	30	65	35	98	94	31	8	12	4
Germany	100	48	39	24	95	88	44	18	10	1
Israel	94	44	42	21	90	74	57	32	34	18
Italy	95	52	53	34	90	74	37	23	11	5
Netherlands	100	39	58	23	100	96	47	3	15	0
Spain	96	37	62	42	96	89	41	13	11	4
Sweden	94	51	69	41	93	89	52	16	33	8
Switzerland	92	15	45	18	95	88	48	11	18	2
United Kingdom	99	69	64	42	84	64	28	6	8	1

Table 10.8 → Mean average number of minutes spent per day on television, games machines, books, PC and Internet by children aged 12-13

	Television		Games machine (at home)		Books (not for school)		PC (not for games)		Internet	
	Users	All	Users	All	Users	All	Users	All	Users	All
Belgium	105	100	19	10	23	20	23	13	5	1
Denmark	158	156	49	25	21	17	24	18	15	10
Finland	156	156	22	15	42	37	16	15	7	6
France	N/A	91	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18
Germany	105	103	N/A	N/A	23	20	20	10	5	1
Israel	129	124	40	N/A	39	28	48	28	30	23
Italy	N/A	N/A	38	30	N/A	N/A	44	23	11	4
Netherlands	134	122	13	8	25	23	18	14	4	1
Spain	134	134	34	19	N/A	N/A	30	17	9	4
Sweden	141	138	26	16	21	18	32	26	19	15
Switzerland	92	90	56	32	35	33	19	12	10	3
United Kingdom	164	164	32	21	32	17	26	10	11	3

homes have it, followed by the Scandinavian countries and Israel where around a third have access. Once again the United Kingdom and France lag behind, as do Germany, Italy and Spain.

There is some evidence of a trade-off between watching television and reading books in leisure time (see Table 10.9). Swiss children spend the least amount of time watching television and read more. The reverse also holds true: the least amount of time is spent reading in the United Kingdom and Denmark, where children spend larger amounts of time watching television. However, other factors are clearly influential: young people in Finland manage to spend time both with television and books, while Swedish children, who spend only average amounts of time with television, spend comparatively little time reading. Interestingly, provision of books both in the home and in the child's bedroom is lowest in

the United Kingdom, where there are more homes with television sets than a shelf of books, and as many children own their own TV sets as books (see Table 10.7). Israeli children are particularly likely to own a multi-media PC and thus, unsurprisingly, spend considerably more time on serious PC use than any other group of young people with the exception of those in Sweden, where around half have access to a family PC with CD-ROM, and in Italy, where personal ownership by children is also high. Time spent on the Internet is also highest in Israel.

For more information, consult:
www.psych.lse.ac.uk/young_people ; Special Issue of the European Journal of Communication, Vol. 13, No. 4, December 1998.

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Box 13.1 → Mauritius

The Mauritian government has a strong commitment to increase the use of ICTs and has made a number of efforts in addressing the regulatory and legal framework for ICTs. Several bills have already been drafted, and with the passing of the Copyright Bill at the National Assembly in July 1997, the legal challenges posed by the use of ICTs will be reduced significantly.

The National Computer Board (NCB) was established by government in late 1996 as a para-statal institution whose aim is to assist in the diffusion of ICTs in the various socio-economic sectors of the country. One of the NCB's major areas of activity is the use of the Internet in government, as well as the more general issues of privacy, security and intellectual property. The NCB has established an extensive web site which acts as the home site for information on other government ministries (ncb.intnet.mu).

NCB is the programme manager for the National IT Strategy Plan (NITSP) which is currently under active development as part of the Mauritian government's strategic objectives to move the country toward an information-age economy.

Hon. Sarat Lallah, appointed Minister of the newly created Ministry of Telecommunications and Information Technology (MITI) in July 1997 (<http://ncb.intnet.mu/mtit.htm> and it@intnet.mu), declared: 'Government is determined to ensure the widest participation in the formulation of any policy bearing in mind the nation's interest and the will to push Mauritius forward as an info-communications hub in the region'. <http://ncb.intnet.mu/mtit/whitepap.htm>

Two flagship practical projects proposed in January 1998 are a Government Information Infrastructure (GII), and a Population Database & National Identity Card. The first initiative will improve the communication capability of the government and improve awareness among the civil service in the use of ICTs. The GII will provide the electronic mail and publishing facilities for the Government to create a responsive and 'paperless' environment. It will also aim to provide information and services to the public round-the-clock via the Internet. Over time, the GII is also expected to evolve into an electronic backbone and infrastructure to meet the future public sector connectivity needs.

The purpose of the second project is to create a central repository of data on the citizens of Mauritius. It was felt by the task team that without this foundation, it would be extremely difficult to identify an individual, and offer and co-ordinate services across the board. The Identity Card will be

upgradable to become more secure and useful in a wider range of applications, facilitating transactions and movements of people. As this project will affect the majority of the population, it was felt that it offers the best means to alter the public's perception about ICTs.

The Information Technology (Miscellaneous Provisions) Bill and Copyright Act promulgated by MITI were passed in 1997 to modify existing legislation to take into account ICTs, such as the use of electronic documents in court (<http://ncb.intnet.mu/mtit/itbill.htm> and <http://ncb.intnet.mu/ncb/copyrite.htm>).

The telecommunications sector is regulated by the Mauritius Telecommunications Authority (MTA) and will be advised by a newly-created Telecommunications Advisory Council (TAC).

The Public Telecommunication Operator (PTO), Mauritel/MTS, is currently a monopoly but is engaged in a slow process of liberalization and tariff rebalancing which is expected to be completed by the end of 2004 when the entire sector will be opened up for competition as outlined in the recently published Telecommunications White Paper. Congruent with the NITSP, the more interesting policy objectives of the white paper are:

- A revised legislative mandate so that Mauritius can fulfil its commitments under the WTO Agreement on telecommunications.
- Access to an affordable universal service for the whole community (in Mauritius, Rodrigues and the Outer Islands) with
- The creation of an environment conducive for Mauritius to become the information, financial and services hub in the region.

Mauritius has a far better telecommunications infrastructure than most other countries in Africa. As part of its national strategy to become the 'Singapore of Africa', it has made telecommunications and data services a high national priority for some time now, and this is reflected in the availability of ISDN services in some areas, relatively short waiting times for the installation of new telephone lines (especially for businesses) and a rapidly emerging range of data communications services such as Internet, X.25 and EDI. Three SDH fibre optic rings have been built in Mauritius to improve the local telecom infrastructure and to provide a high-bandwidth connection to the main ground station in Port Louis. Mauritius will be connected by fibre optic cable to the global backbone in 1999 when South Africa's Far-East (SAFE) project links Cape Town to Kuala Lumpur and Singapore via submarine cable.

Box 13.2 → Ghana

A draft national communications policy has been developed by the Ghanaian National Information and Communications Committee (GNICC), which comprises representatives from the academic, research, government and private sectors and is co-ordinated by the University of Ghana, Legon, Balme Library (www.ug.edu.gh).

The Library was chosen in part for its long standing experience with e-mail access and CD-ROM use, the latter which has in part been assisted by the sub-Saharan African Program of the American Association for the Advancement of Science (AAAS) (www.ug.edu.gh).

Support for the GNICC has been widespread, including from government, with participation from the ministries of environment, science and technology, education, information, transport and communication. The Ghana Government has indicated its support for promoting access to ICTs in all segments of society, particularly in the educational system. The Minister of Finance in his 1997 budget statement made the following declaration: 'In view of the positive effects of the application of information technology on development, Government will ensure that key institutions of state machinery are linked to the Internet. All the science resource centres will be connected to the network as and when they are commissioned. The program to link the Universities together and to the Internet will also be pursued.'

UNESCO has since agreed to fund the \$250,000 project, with the primary local partners being the Ministry of Environment, Science and Technology and the Ministry of Transport and Communication. One of the initial goals will be the establishment of the Ghana Academic and Research Network (GARNET).

The government has requested the Bank for Institutional Development Fund to implement a network to connect the Office of the President, Parliament, the Ministry of Information and some other key ministries.

The technical sub-committee of the GNCIC has been charged with designing the specifications of a national networking backbone. Within the context of the GNICC/GARNET project it was originally envisaged that the University of Ghana would form the hub for GARNET's Internet links to the other Universities and research centres. The university is installing a fibre optic campus network with support from

the Danish International Development Agency (DANIDA). It is located about 12 km from the centre of Accra, using a wireless link to the local Internet hub operated by NCS. With the emergence of NCS's national Internet backbone with POPs in three cities, along with its active support for academic networking, and furthermore Gilat's interest, a joint private/public sector networking project may emerge.

The Ministry of Transport and Communications (MOTC) established the Accelerated Development Programme (ADP) for telecommunications in 1995 to address the stagnant growth in the sector. The ADP is a reform program involving the establishment of a centralized regulatory body, the National Communications Authority (NCA), as the agency responsible for regulation of the telecommunications sector (www.communication.gov.gh).

At the same time Ghana Telecom (GT) was separated as a commercial entity from the Ministry of Posts and Telecommunications, with a 30% stake sold to a Malaysian consortium for \$38 million and the availability of a second national operator's license was announced. The license was subsequently awarded to a consortium proposing a \$10 million investment headed by the Ghana National Petroleum Corporation (GNPC), with the African Communications Group and Western Wireless (Cambridge, Mass, US). GNPC is working with the Israeli company Gilat to deploy a VSAT-based telephone network around the country. Both GT and GNPC have 20-year exclusivity licenses (www.gnpc.com.gh and gnpc@ncs.com.gh).

The MOTC plans to divest a further 21% of Ghana Telecom. It also hopes to exploit Ghana's strategic location at the centre of the ECOWAS region and intends to position the country as a hub for trade and commerce-driven telecommunications services.

Currently, Ghana's telephone network still reflects a poor state of development, but it is undergoing a process of rapid modernization. Many of the exchanges in Accra are now digitized, providing advanced services such as password, abbreviated dialing, call transfer, three-way conference, wake-up and call waiting. Motorola was awarded a contract in 1996 to expand GT's wireless local loop system to 13,000 subscribers.

Box 15.1 → India

India has been the largest democracy in the world since its independence in 1947. Today it is a country undergoing a massive transition with far-reaching consequences not only for its more than 900 million citizens, but for the entire globe. After a delay of nearly three years, and mired in litigation and controversy for over a year, the long-awaited ISP Policy has been announced and the process of issuing licenses has begun with gusto.

On 22 November 1998, Prime Minister Atal Bihari Vajpayee inaugurated SatyamOnline, the first private-sector Internet access service in Hyderabad, and at the same time the first phase of the Hi-Tec City project near Hyderabad. The highlight of the ISP policy is that licences will be issued for 15 years and there will be no licence fee or any limit on the number of licences awarded.

The railways, state electricity boards and the National Power Grid Corporation are all allowed to provide Internet backbone services. ISPs can set up their own international gateways but require a security clearance from an inter-ministerial committee. The norms for security clearance have not yet been worked out. Foreign equity of up to 49% in an ISP is permitted. Several large Indian industrial groups such as the Ambanis, Hinduja Mittals, Modis, Nandas, and Rais are reportedly undertaking ISP feasibility studies. India currently has an installed base of only 2 million PCs and less than 500,000 Internet users. The demand for PCs and Internet connections is expected to increase significantly due to the new services being launched.

While Internet is not new in the country thanks to the efforts of the Education Research Network (ERNET) and UNDP, it has been limited to those associated with educational institutes or R&D organizations. Previously, access was highly controlled and restricted, which limited its reach. In August 1995, Videsh Sanchar Nigam Limited (VSNL), a public-sector undertaking and the international telecom carrier, launched the first public Internet service in six major cities, which has today expanded to 42 cities and is expected to reach 70 cities by year-end. There is also a move to enable routing of calls at local-call rates from any of the 800 cities that have STD/ISD (long-distance calling) capability. Instead of setting up a local point of presence (POPs) in all cities, calls to the number

17222 will be directed to the closest Internet POP at no additional charge.

In the first year, 50,000 customers went online on VSNL's Gateway Internet Access Service (GIAS) and today the number exceeds 150,000. New Delhi and Mumbai (Bombay) constitute half the customers. The target is to reach one million users by the year 2000, but that seems unlikely even with the entry of private ISPs. One of the major factors limiting the expansion of Internet in the country is poor infrastructure, with problems such as the non-availability of telephone lines and an overloading of telephone circuits that were designed for voice communication. To partially overcome this problem, VSNL has installed routers at various telephone exchanges and linked them on dedicated 2Mbps circuits, thus bypassing the congestion. In the last five years the Department of Telecommunications (DoT) has successfully undertaken a mammoth job of converting telephone exchanges to digital/electronic exchanges and shifting to an optical fibre backbone. This has resulted in very good quality and stable connections, and a huge number of new phone connections. However, many more connections will be needed as India has achieved a teledensity of only 1%.

One of the greatest challenges India now faces is to improve penetration and broaden the access base. If the target of one million Internet subscribers is to be achieved, the entire infrastructure, especially data communication and telecommunications, will need to be overhauled. Another challenge in the short term will be a lack of expertise and talented workforce to handle ISP operations. A sizeable number of people are attracted to the field by world-wide growth figures and are thus jumping onto the ISP bandwagon, but they are often unfamiliar with the dynamics of the business.

India's software business, which relies heavily on computer networks for international operations, is reportedly poised to attain revenues of \$6,000 million by the turn of the century. Exports would account for about \$4,000 million of the total. Improved availability of the Internet will have a very positive impact on the software industry.

SUCHIT NANDA

(excerpted from The Pan Asia Networking Yearbook, 1998)

Box 15.2 → Pacific Islands

The Pacific Islands offer a complete contrast to the vast majority of Asian countries. Despite high levels of aid, the Pacific Islands region has experienced low growth and economic stagnation. This problem is attributed to high population growth, rural-urban migration, the restricted economic conditions of atoll life combined with the need to import a large number of goods and, finally, to high vulnerability to natural and economic disasters. Government is the major customer, employer and supplier of services in the islands, maintaining in many cases a monopoly. Given the unique geographical dispersion of these countries, Information and Communication Technologies, particularly telecommunications, offer a real opportunity to diminish the adverse effects of isolation. The physical infrastructure for

telecommunications seems well established. Three satellites can be accessed from every country (PeaceSat, Intelsat 174 and Intelsat 180), while other systems, such as telex and data transmission, cover only some of them. With the exception of emerging arrangements in mobile markets, telecommunications services are provided under state monopoly. But operations seem often to be inefficient. Coverage is poor in remote areas and consumer dissatisfaction is high. Teledensities (telephone lines per 100 inhabitants) are relatively low, with large differences between urban and rural areas. For instance, the figures for rural and urban teledensities are 0.09% and 7% in Tonga, while they are 18% and 27% in the Cook Islands. Fax, paging, cellular and Internet services have been introduced in the major urban centres.

Box 15.3 → China

China, officially the People's Republic of China, is the world's third largest country by area and the largest by population. Covering a total area of 9,596,960 square kilometres, China encompasses a diversity of landscapes extending from the Tibetan Plateau at the southwest extremity to the deserts in the Mongolian borderland of north central China and to the sub-tropical fertile plains of the Canton Delta to the south.

By the end of 1997, China had a population of 1,236.26 million (excluding the Hong Kong Special Administrative Region and Macau), comprising 56 ethnic groups. China's population density (126 people per square kilometre according to a 1995 sample survey) is relatively high. Distribution, however, is uneven: the coastal areas in the east are densely populated, with more than 400 people per square kilometre, while the plateau areas in the west are sparsely populated, with fewer than 10 people per square kilometre.

Telecommunication is one of the fastest growing industries in China. In 1997, aggregate postal and telecommunications volume totalled 177,900 million yuan, a 33.3% increase over 1995. Telephone lines have been increasing at an annual rate of 41.5% per year for the past seven years. Domestic and international telecommunication services are increasingly available for private use. By the end of 1997, the number of telephone lines had expanded to 120 million, with 9.55 telephones per hundred persons. The domestic system serves principal cities, industrial centres, most townships and is fast reaching villages. By 1997, 55.6% of China's villages were connected to the public telephone system. All cities above the county level in China now have programme-controlled telephones, and China ranks second in the world in the scale of its telephone network. By 1997, 14 inter-provincial fibre-optic trunk lines had been installed, while mobile communication networks and international services have been expanding rapidly.

The Chinese government encourages the development of Chinese software and formatted fonts facilitate the use of Chinese characters for digital communication. It is estimated that Internet users in China will exceed 2 million by the end of 1998 and reach 5 million in the year 2000. Yet considering China's population of 1.2 billion, the percentage of people accessing the Internet is and will be very small. For the whole nation to become 'wired', the geographic, professional, gender and economic obstacles to accessing the Internet would need to be addressed.

In China, major metropolitan cities and economically more advanced regions tend to have the best network facilities

and therefore it is not surprising that most Internet users are based in Beijing, Shanghai and Guangzhou. Beijing also has the most ISPs. Ordinary people are still not very aware of the Internet, and current users are mostly in computer-related professions or have higher education qualifications. The average user is young – 80% are between 21 and 35 – and 88% of Internet users in China are male.

Placing great emphasis on the strategic importance of information/communication technologies to the modernization of China's economy, the Chinese government has made it a priority to build the national information infrastructure (NII), especially national economic computer network projects in the country's Ninth Five-Year Construction Plan (1996–2000). The government supports the expansion of Internet into China, though it maintains close control over content. While foreign ownership of any Chinese telecommunications and information infrastructure is strictly prohibited, the government actively seeks foreign investments to fund the rapid development of China's information infrastructure. The four major Internet backbone networks are all government sponsored and must use China Telecom links to connect to Internet sites in other countries. All ISPs must register with the police.

On 1 February 1996, the State Council issued Decree No.195, 'The Temporary Provisions of Internet Administration of the Computer Information Communication network of the P.R.China'. This mandated that the four established Internet networks – ChinaNet, CHINAGBN, CERnet and CASnet – should be separately administered by the Ministry of Posts and Telecommunications, the Ministry of Electronics Industry, the State Committee of Education, and the Science Institute of China.

In June 1998, the government restructured its information and telecommunications authorities. The Ministry of Information Industry (MII) was established by merging the Ministry of Electronic Industry and the Ministry of Post and Telecommunications. The new ministry is responsible for invigorating the manufacture of information products, telecommunications and software; formulating sectoral programmes, policies and legal codes; mapping out an overall plan for telecommunications trunk networks (including local and long-distance telecommunications networks), broadcast and television networks (including radio and cable television networks), and special-use telecommunications networks for military and other departments.

LI ZHANG

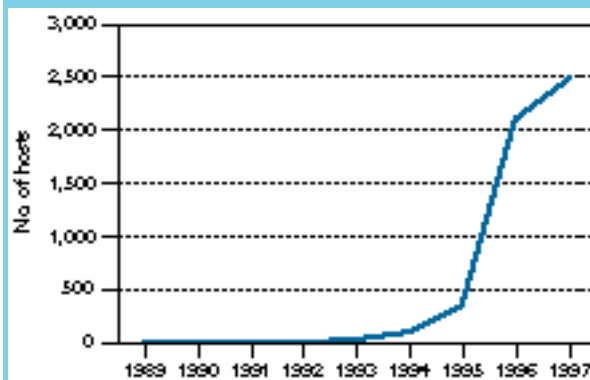
(excerpted from The Pan Asia Networking Yearbook, 1998)

Box 17.1 → The RedHUCyT Project and the telecommunications situation in Central America (excluding Costa Rica)

The Costa Rican National Research Network (CRNet), supported by the RedHUCyT, is the mainstay of the trunk network which will link up the networks of the Central America region. The first connection was made in November 1996: Costa Rica and Nicaragua were interconnected directly by digital link. Since then, the other countries have also been interconnected. RedHUCyT is supporting the process and providing technical consultancy services to El Salvador, Honduras, Nicaragua and Panama. In March 1997, an agreement was signed with the University of Costa Rica to provide technical assistance to other countries in Central America and the Caribbean.

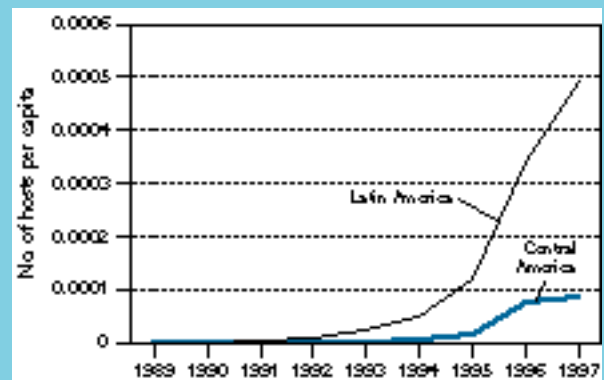
With the process of creating a trunk network thus under way, Internet use has gained momentum, and this has been reflected in the substantial rise in the number of hosts since 1996. Even so, the number of hosts per capita has remained very far below the regional average, and is falling farther behind all the time. Cellular telephony has always been below the regional average, and is likewise dropping ever farther behind. As regards the number of personal computers (PCs) per capita, the gap with the region is very large indeed, although there could be some uncertainty about this as our source does not have data for certain Central American countries.

Internet



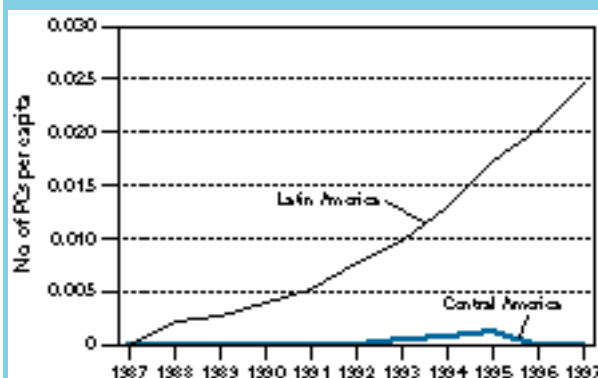
Source: World Telecommunication Indicators, ITU, 1998.

Internet



Source: World Telecommunication Indicators, ITU, 1998.

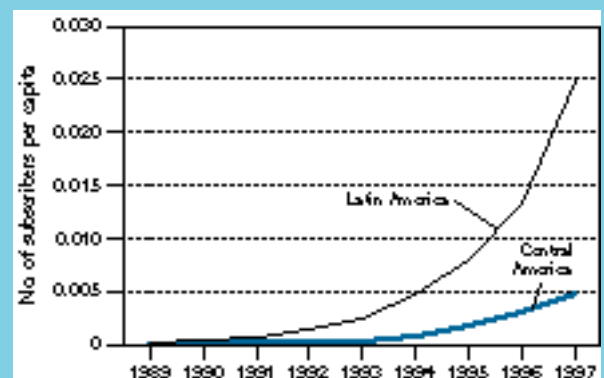
Personal computers



Source: World Telecommunication Indicators, ITU, 1998.

This indicator has not been fully reported for the Central American countries.

Cellular telephony



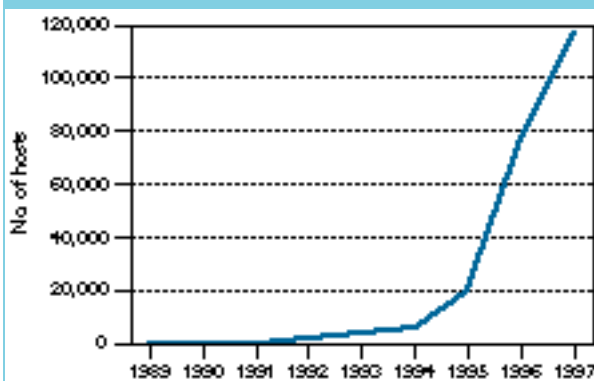
Source: World Telecommunication Indicators, ITU, 1998.

Box 17.2 → The RedHUCyT Project and the telecommunications situation in Brazil

Major contacts and arrangements are currently being made to connect the Universidad Estadual Minas Gerais and other institutions to the Internet with the support of the RedHUCyT project. This network was one of the joint sponsors and organizers of the First Network Forum in Latin America, together with the National Research Council/National Research Network (CNPq/RNP).

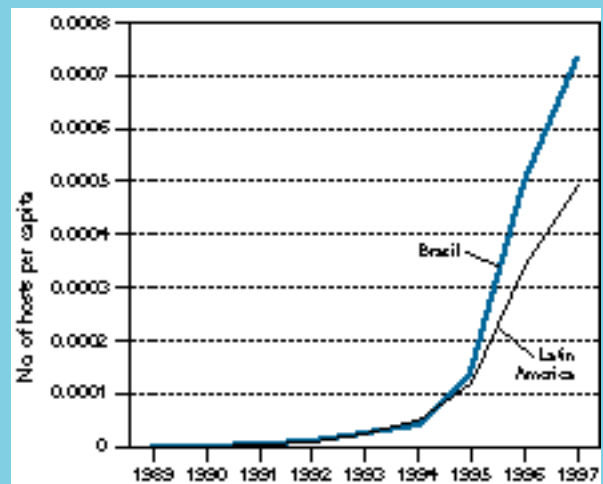
Brazil was formerly below the Latin American region average for personal computers and cellular telephony, but since 1995 it has been slightly above this average, as can be seen from the charts.

Internet



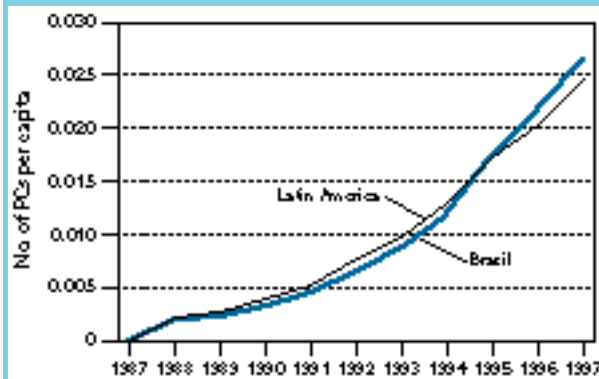
Source: World Telecommunication Indicators, ITU, 1998.

Internet



Source: World Telecommunication Indicators, ITU, 1998.

Personal computers



Source: World Telecommunication Indicators, ITU, 1998.

Cellular telephony



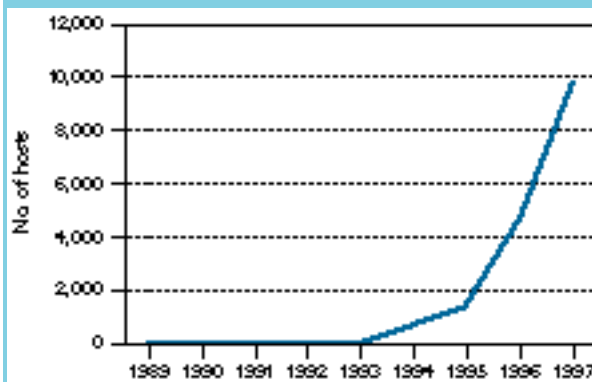
Source: World Telecommunication Indicators, ITU, 1998.

Box 17.3 → The RedHUCyT Project and the telecommunications situation in the Caribbean countries

In 1991, the Caribbean University Network (CUNet) was set up with the support of Puerto Rico, and this has facilitated Internet access for a number of institutions in the Caribbean. Most of the Caribbean countries now have access to the Internet. Connections to the outside are made through telephone companies. RedHUCyT has also helped arrange two important subregional seminars and financed a number of consultancy operations. In a second phase, the OAS is providing significant funding for the purchase of communications equipment, technical assistance and training, to help enable a greater number of academic, scientific and governmental institutions to connect to the Internet.

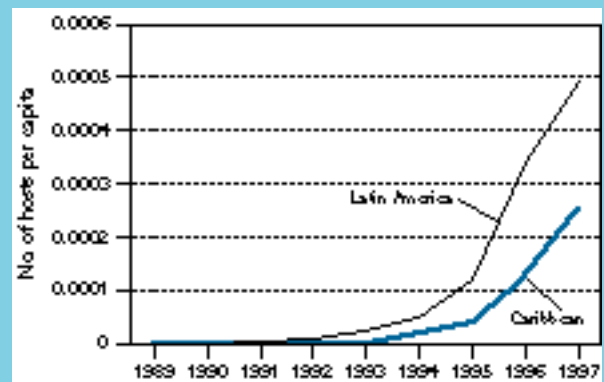
From the charts it can be seen that, where the Internet is concerned, the Caribbean countries have a growth rate similar to that of Latin America and the Caribbean region as a whole, albeit below the average for the region. In cellular telephony they were slightly above this average until 1996. The apparent decline since then is not a real one, as several Caribbean countries have not reported data. In personal computing, the Caribbean is well below the region; in fact, together with Central America, it has the lowest values for this indicator. A number of Caribbean countries did not provide data in 1996 or 1997, which accounts for the irregular pattern of those years.

Internet



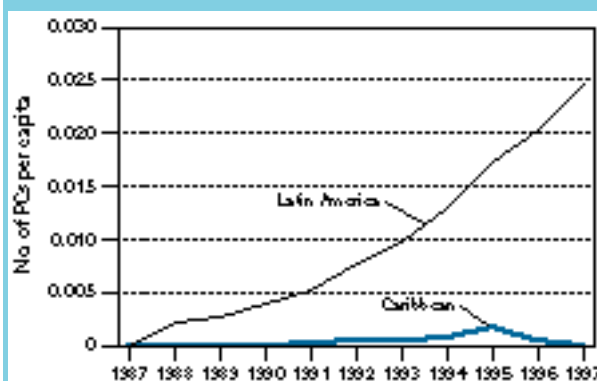
Source: World Telecommunication Indicators, ITU, 1998.

Internet



Source: World Telecommunication Indicators, ITU, 1998.

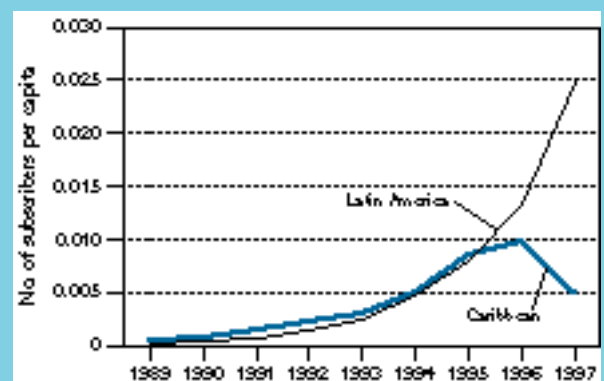
Personal computers



Source: World Telecommunication Indicators, ITU, 1998.

This indicator has not been fully reported for the Caribbean countries.

Cellular telephony



Source: World Telecommunication Indicators, ITU, 1998.

In 1997, this indicator was reported by only some Caribbean countries, whence the apparent decline.