The Information Society in Latin America and the Caribbean:

Development of Technology and Technologies for Development

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FOREWORD

In 1999, the Economic and Social Council of the United Nations decided that the high-level segment of its substantive session of 2000 would be devoted to the subject of "Development and international cooperation in the twenty-first century: the role of information technology in the context of a knowledge-based global economy". In response, the countries of Latin America and the Caribbean gathered at a conference convened by the Government of Brazil and ECLAC in July 2000 and adopted the Declaration of Florianópolis regarding the use of information and communications technologies (ICTs) for development. This declaration marked the beginning of an ongoing process which, as will be discussed here still, continues to pose a major challenge for the region. One of the objectives set forth in the Declaration reflected "the shared aspirations of the Latin American and Caribbean countries to become full-fledged members of the information society by the year 2005 on an efficient, effective and sustainable basis within the framework of the global knowledge-based economy". Now the time has come to determine how far the region has advanced towards that objective. During that initial stage, the region's leaders acknowledged the importance of adopting proactive public policies to promote its integration into the information society and to bridge the digital divide when they stated that "allowing the evolution of the information and knowledge-based society to be guided solely by market mechanisms entails the risk of a widening of the social gaps existing within our societies, the creation of new modes of exclusion, an increase in the negative aspects of globalization and a widening of the distances between developed and developing countries". Thus, in order to assess the region's achievements to date, it becomes necessary to look at what progress has been made since that political act of acknowledgement.

As part of the international process set in motion in two phases by the World Summit on the Information Society (Geneva in 2003 and Tunis in 2005),[1] the authorities of the Latin American and Caribbean countries have stepped up their efforts to shape a regional perspective regarding the development of information societies. At a number of meetings held between 2001 and 2003 by the Latin America and Caribbean Regional Network of the United Nations Information and Communication Technologies Task Force, emphasis was placed on the importance of collaboration among stakeholders in order to meet this challenge. The Agenda for Connectivity in the Americas and the Plan of Action of Quito of 2002 also have underscored the need to devise realistic action programmes and country strategies. By helping to identify the main aspects of the transition towards information societies in the region, the Bávaro Declaration of 2003 represented a major stride towards the establishment of core principles to guide Latin America and the Caribbean in making that transition. This last document has had significant repercussions; its approval led to the incorporation of the analysis of Internet governance and open-source software (issues that were to take on significant importance during that summit and subsequent events) into the World Summit process on an official basis for the very first time.

During the preparatory meetings for the second phase of the World Summit held in Quito in May 2005 and at the Regional Preparatory Ministerial Conference of Latin America and the Caribbean for the second phase of the World Summit on the Information Society (Rio de Janeiro, June 2005), years of dialogue regarding the relationships between ICTs, growth and equity culminated in the Plan of Action for the Information Society in Latin America and the Caribbean (known as eLAC 2007), which was issued in tandem with the Rio de Janeiro Commitment. The Plan of Action, which is the outcome of a gradual learning process, constitutes a milestone in the effort to address issues relating to the information society at the regional level. In view of the fact that the Latin American and Caribbean countries are

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[1]   The World Summit has issued the Geneva Declaration of Principles and Geneva Plan of Action, Tunis Commitment and Tunis Agenda for the Information Society (http://www.itu.int/wsis).

called upon to respond to the 167 goals for 2015 set forth by the World Summit, the basic purpose of eLAC 2007 was to pinpoint the most urgent objectives for the region in the short run; 30 goals and 70 specific measures were selected for implementation in 2005-2007 with a view to expediting the attainment of goals set at the international level by aligning them with local needs in the countries. The Plan acknowledges the dynamic nature of ICTs, the need for realism and the importance of moving steadily forward towards achievement of the Millennium Development Goals and the goals of the World Summit as these two processes advance towards convergence in 2015.

The incorporation of the Latin American and Caribbean region into the global information society in a way that will benefits its inhabitants is an ongoing challenge, as noted in the Declaration of Santo Domingo: Good Governance and Development in the Knowledge-Based Society, as approved at the thirty-sixth regular session of the General Assembly of the Organization of American States in June 2006. More recently, the Santiago Declaration, adopted at the seventeenth Ibero-American Summit of Heads of State and Government in November 2007, supports the Plan of Action for the Information Society in Latin America and the Caribbean (eLAC 2007) and advocates its extension to 2010 to serve as a framework for the achievement of goals relating to the creation of a people-centred, inclusive and development-oriented information society in line with the principles espoused by the World Summit on the Information Society. In addition, eLAC 2007 was acknowledged as the most important regional initiative in this field at the nineteenth Summit of Heads of State and Government of the Permanent Mechanism for Consultation and Policy Coordination (Rio Group), held in Guyana in March 2007.

Nearly eight years after the Declaration of Florianópolis was issued, five years after the Bávaro Declaration's adoption and shortly after the end of the period covered by the Plan of Action for the Information Society in Latin America and the Caribbean (eLAC 2007), ECLAC is taking advantage of the opportunity provided by the Second Ministerial Conference on the Information Society in Latin America and the Caribbean, to be held in El Salvador from 6 to 8 February 2008, to examine the progress made since those initial pronouncements. This document supplements and builds upon other studies published by the Commission since 2000.[2] In its most recent book on the subject (ECLAC, 2003), which was published when the countries of the region were preparing for the first phase of the World Summit on the Information Society, ECLAC raised the following questions as part of its exploration of the growing presence of ICT-related issues in policy discussions: What type of information society does the region want to build? What are the basic characteristics and specific features of the transition to an information society in Latin America and the Caribbean? What policy measures could be adopted to expedite that transition? These questions are still relevant today. Yet there is also another, even more fundamental, question to be asked: After nearly a decade of work in this connection, what positive outcomes can be observed in terms of the relationship between ICTs and development? Data have been compiled that can serve as a basis for an assessment of the extent to which the countries of the region have reached their objective of becoming full-fledged members of the information society. ECLAC has undertaken a large-scale effort to perform such an assessment and to examine the priorities, concerns and measures that are reflected in public policies aimed at that objective.

In recent years the countries of Latin America and the Caribbean have made enormous strides in terms of the use of ICTs on a mass scale in a broad range of areas of economic and social development. This includes the deployment of digital information infrastructure, modernization of the State, the digitization of economic processes as a means of boosting productivity, the upgrading of education and health care, natural disaster management and a host of other elements. ECLAC is of the opinion that the countries of Latin America and the Caribbean have achieved positive results in terms of the progress

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[2] See ECLAC (2000), ECLAC (2003) and ECLAC (2005).

made towards building information societies in the region in a relatively short time and have turned ICTs into a tangible solution for meeting the challenges posed by the development agenda. Technology continues to progress at an ever-faster pace, however, and new challenges are constantly being added to existing ones. The transition to information societies does not take place in a vacuum but rather within the structure of the region's societies. Accordingly, a number of these societies' structural problems, such as low per capita incomes and unequal income distribution, the weakness of their institutions and limited educational and skill levels, will need to be addressed.

In striving to make efficient use of ICTs to promote development, it is important to bear in mind that these technologies are a tool, not an end in themselves. The question therefore naturally arises as to whether ICTs should be the core element of a sectoral approach to the development of information societies or whether it should be the various aspects of development that occupy a central position within this technological revolution. The question as to the "development *of* ICTs" or "development *with* ICTs," which is a common thread running throughout this document, goes right to the heart of the debate about ICTs and development and about the complementarities necessarily involved in the simultaneity of these two processes.

INTRODUCTION

The capacity for capturing, transmitting, computing and storing information on a massive scale has become so widespread that it has brought about a far-reaching economic and social reorganization (Webster, 1995). This transformation affords opportunities to Latin American and Caribbean countries while challenging them to overcome lags with respect to the developed world. There are different ways of joining the information society and these depend on the starting conditions in each country, their technological, economic, social and cultural dynamic, and the strategic public-policy options that are chosen (ECLAC, 2003).

In the ECLAC tradition, this last element warrants special attention. Policy agendas arise from processes involving different social stakeholders often with conflicting objectives. The establishment of an agenda may be understood as a sequence of processes of recognition of problems and opportunities, preparation of proposals and occurrence of political events (Kingdon, 1995).

The first process involves choosing issues considered important for society. Citizens, civil society organizations and the communications media work to arouse interest in certain issues, and especially to raise awareness and foster thorough understanding. Second, preparation of proposals implies working out ways of dealing with the problem in question. If a proposal is to be maintained long enough to be given careful consideration, it must fulfil several criteria, including the political support or rejection it may receive, conformity with the dominant values and mood of the time, budgetary feasibility, and technical and institutional feasibility. The third phase is the dynamic of political events. While the search for solutions focuses on analysis and persuasion, the achievement of consensus in the political process is determined by negotiation, that is, by events that address the problem from the viewpoint of the alternatives identified.

The present document, an extract of a book soon to be published by ECLAC,[1] seeks to build awareness and find solutions. To this end, it includes information that provides insight into the development of the information society in the countries of Latin America and the Caribbean and seeks to support the formulation of public policies to facilitate it.

The theoretical concepts espoused in the document are based on two fundamental elements: the use of an evolutionary view of technical progress and development, which is closely linked to the concepts of national innovation systems and technical and economic paradigms, and the technological trajectories of the digital paradigm of information and communications technologies (ICTs), culminating in the process of convergence which characterizes them at the present time. The use of these concepts places emphasis on the historical environment that has led to the current situation and which determines to a significant extent the different possible paths, at the same time as it gives prominence to technological and economic analyses. The importance of incorporating the effects of the fast, or even accelerating, pace of technical change in the analysis and in policy design, with the uncertainty that such change implies, is another proposition.

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[1] The book to be published by ECLAC ("The Information Society in Latin America and the Caribbean: Development of Technology and Technologies for Development") consists of 13 chapters, which cover the issues referred to in this introduction, recommendations; chapter I is a summary of chapters II and XII of the book (see http://www.eclac.org/socinfo)

The main determinants of the dynamic of the national and international digital divides facing the countries of the region are income levels and the pattern of income distribution, and the level of formal education among the population. These variables, which are closely interrelated, must be analysed in order to present and examine the elements that characterize the dissemination of the digital paradigm and its impact on growth and productivity in the countries of Latin America and the Caribbean. These analyses give rise to a conclusion that is fundamental for public-policy formulation: the digital divide is a moving target. Given the rapidity of the alteration in the trajectories of the digital paradigm, the definition of the divide to be bridged is constantly changing: within a matter of years, it has moved from targets linked to narrowing the gap in telephone service to targets relating to Internet access and subsequently to targets for broad-band Internet access (with the definition of broad band being itself subject to constant revision). Thus, the divide changes from being a problem of expansion (access) to one of depth (quality of such access).

ICT impact on economic growth and productivity can be measured in different ways. The first quantifies growth by disaggregating the contributions of the factors of production: capital and labour. The second is evolutionist in nature and is based on the analysis of the impact of ICT on growth in labour productivity. Whichever method is adopted, all the elements considered convey the same message: the advance of the ICT paradigm has a positive impact on the economic dynamic of Latin America and the Caribbean and this could be further boosted by adopting a comprehensive set of complementary economic, social and institutional measures, such as technological development and innovation, changing sectoral productive structures in order to incorporate more knowledge into the production of goods and services and the strengthening of economic and social institutions. In other words, an effort must be made to generate these complementarities in order to take full advantage of the digital paradigm.

The changing technological, economic, social and institutional structures are generating technological variables and complementarities whose impact will be significant.

The heterogeneous patterns of production and economic development in the different countries in the region will determine whether those countries have a role in the fabrication of hardware — telecommunications, computer and consumer electronic equipment— the software industry and related services and the operation of telecommunications service providers or the development of information and communications technologies. Hardware production is concentrated almost exclusively in the largest countries, which have a large domestic market or are export platforms for the developed world. Conversely, the production of software and related services is slightly less concentrated; in fact, it constitutes an important component of exports, including in smaller countries, especially those where levels of education are higher than the regional average. On the other hand, while naturally, telecommunications operators are present in all countries, ownership and control of companies are highly concentrated in a virtual duopoly, which operates in many countries in the region.

An analysis of these three main sectors of production of ICT-related goods and services reveals that in each of them, the region performs different roles in the world economy. In terms of hardware production, it does not have a significant role, except in the case of Brazil, which produces equipment for the domestic market, and Mexico, which produces for export to North America, both with scant integration of local components. In the software industry, local firms have achieved a greater level of capacity development, although the main stakeholders are invariably major transnationals whose operations are geared to supplying the domestic market of each country. In contrast with the limited part played by regional firms in software and, especially, hardware production, the major telecommunications companies have operations that span the entire continent, if not the whole globe. Any deficiencies on their services, for example, from the point of view of cost or access, have less to do with any limitations on the

part of the companies than with the fragility or inefficiency of the regulatory frameworks within which they operate. Such services could be strengthened by increasing regulators' independence and institutional capacity, enabling them to adapt, as necessary, to the changes brought about by technological convergence and creating the conditions conducive to multiple objectives, such as fair resource allocation, expansion of networks and the incorporation of social objectives, for example, giving access to the marginal population or to poor or isolated areas. Lastly, the conclusions arrived at and the strategies adopted as a result of discussions on intellectual property rights, with special attention to open-code software issues and technological protection measures, will alter the cost conditions for users and businesses in the region.

Another area of interest concerns ICTs for development, in which the focus is on their increasing use in major application areas, such as education, public administration, business, health and disaster management. Progress varies considerably from one area to the other as well as from one country to another within the region. Thus, while significant progress has been recorded in e-government activities, such as tax collection, procurement or national security, the incorporation of the digital paradigm in health is still at an incipient stage, especially in crucial areas of interoperability and of interfaces with users of the system, which go well beyond the use of frontier technology equipment in more advanced welfare centres. In addition, countries display widely varying degrees of progress; while some are at the vanguard in e-government, even by global standards, others, in most cases the least developed ones, still experience problems in implementing efficient public procurement systems. Nevertheless, on the whole, disparities and lags in ICT access and use are less than those that may be observed in the productive sector.

The questions directly linked to public policies are studied in chapter II, which considers and assesses the impact of ICT policies applied both nationally and regionally in Latin America and the Caribbean. These considerations complement the appraisals of sectoral policies, placing them within the more general framework in which they operate, to the extent that such a framework exists.

Lastly, ECLAC formulates and presents its recommendations. Beyond the specificities of each, these recommendations may be summed up in five messages which emerge from the advances and problems observed in the region: (i) develop the necessary complementarities in order to take advantage of the potential impact of ICTs on economic performance and social integration; (ii) improve coordination of the use of resources and the numerous initiatives present in the countries; (iii) take advantage of the progress achieved in the economies of the region in order to pursue, consolidate or implement new intraregional cooperation initiatives; (iv) allow those responsible for areas where ICTs are used to effectively take the lead in policy-making; and (v) strengthen instruments and institutions responsible for policy implementation.

Thus, throughout the document, there is recognition of the tension between the demands of what is, essentially, an exogenous —and accelerating— technological revolution and the productive and institutional structures of the countries of the region, in which failures caused by the course followed pose constraints in terms of the possible ways of responding to the pressures of the digital paradigm.

Chapter I

NATIONAL AND INTERNATIONAL DIVIDES AND POLICIES IN THE REGION[1]

A. THE PENETRATION OF THE DIGITAL PARADIGM: A MOVING TARGET

1. The international divide

Economic growth is increasingly led by rapid progress in science and technology, particularly the digital paradigm which dominates information and communications technologies (ICTs). This is why it is so important to analyse the penetration of these general-purpose technologies in Latin America and the Caribbean.

The penetration of ICTs in the region is slightly lower than the global average, except in the mobile telephony segment (see figure I.1): less than a decade on from its introduction, this technology is used by almost one in two of the region's inhabitants.

Figure I.1
**ACCESS TO INFORMATION AND COMMUNICATIONS TECHNOLOGIES IN LATIN AMERICA
AND WORLDWIDE**

Legend:
- Fixed lines in Latin America and the Caribbean
- Fixed lines in the world
- Mobile lines in Latin America and the Caribbean
- Mobile lines in the world
- Internet users in Latin America and the Caribbean
- Internet users in the world
- Broadband subscribers in Latin America and the Caribbean
- Broadband subscribers in the world
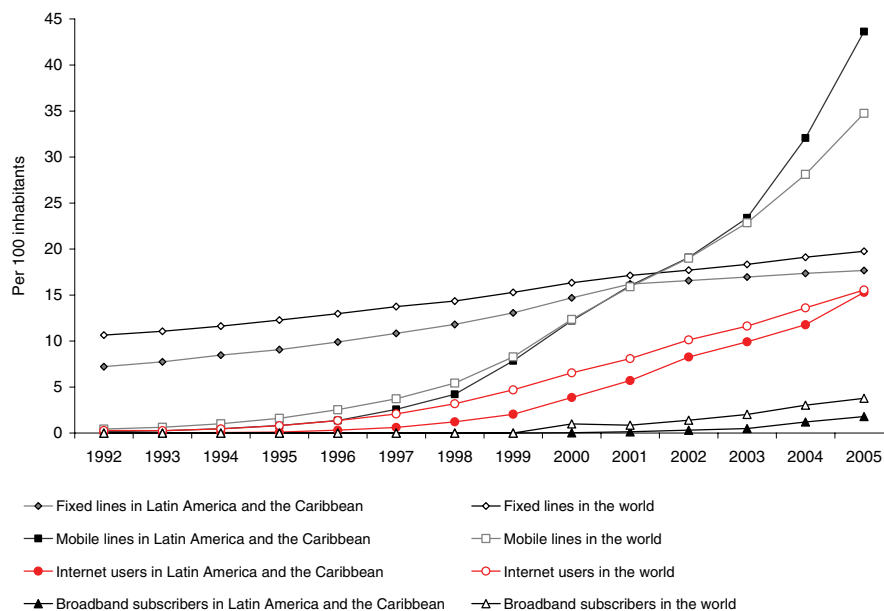
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of International Telecommunication Union, *World Telecommunications Database*, 2007.

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[1] Excerpt from chapters 2 "The penetration of the digital paradigm in the region" and 12 "National and regional strategies" of the ECLAC book (2008).

Many studies argue that the international digital divide is closing and that access levels in developing countries are catching up with unprecedented speed (ITU, 2006; UNCTAD, 2006; World Economic Forum/INSEAD, 2006; ITU/UNCTAD, 2007). In particular, it is claimed that the gap is narrowing as developed-country markets become saturated.

Without denying the positive effects of ICT access (access to mobile telephony, for example) on people's welfare, ECLAC holds a different position, arguing that the digital divide has more than one dimension; countries are separated not just by the amount of access, but by its quality too.[2] The digital divide that matters, therefore, is in the ability to work with information. This divide is apparently still widening, with no change in this tendency in prospect, and while there is a limit to how many computers a human being can own, it is not clear that there is any limit to the number of bits that can be worked with. If there were, this would be what determined the saturation level, not the number of computers.

To arrive at a more accurate measurement of the international divide in ICT penetration, the ability of people in Latin America and the Caribbean to carry out the four basic computing operations of capture, storage, transmission and processing is compared with the situation in the countries of the Organisation for Economic Co-operation and Development (OECD). This is followed by an analysis of the penetration profile of the digital paradigm in the region, with a particular focus on the characteristics of the divide within and between countries. The ability to communicate via fixed-line and mobile telephony networks, the Internet and radio is analysed, with different technology mixes and bandwidth capacities being considered in each situation (see figures I.2, I.3 and I.4).

Figure I.2
CAPACITY FOR COMMUNICATION VIA FIXED-LINE AND MOBILE TELEPHONY AND THE INTERNET
(Megabytes per second per capita)
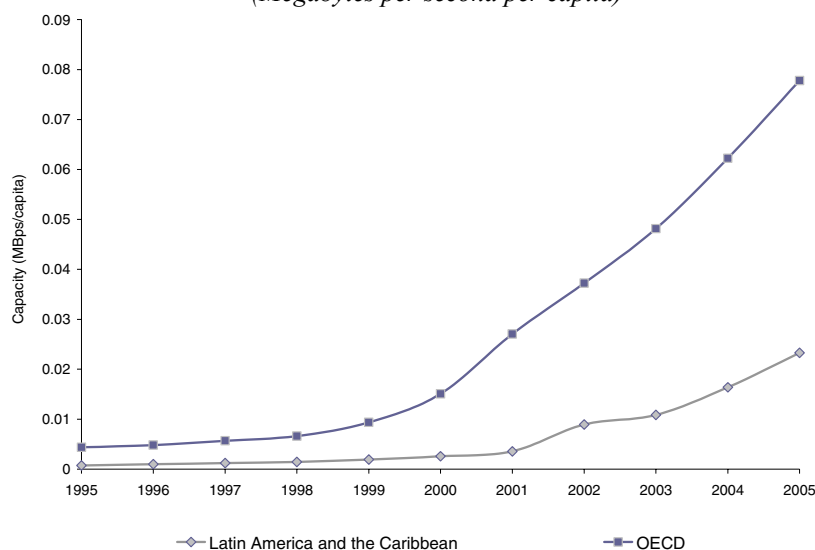
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of M. Hilbert, P. López and C. Vázquez, "ICT innovation avenues and the amount of digital information: deepening comprehension of the digital paradigm", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2007, unpublished.

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[2] Thus, while a 256 Kb connection is categorized as broadband in the region, in the developed countries this term is applied to connections of 1 Mb or over.

Figure I.3
COMMUNICATION CAPACITY, BY TECHNOLOGY
(Megabytes per second per capita)
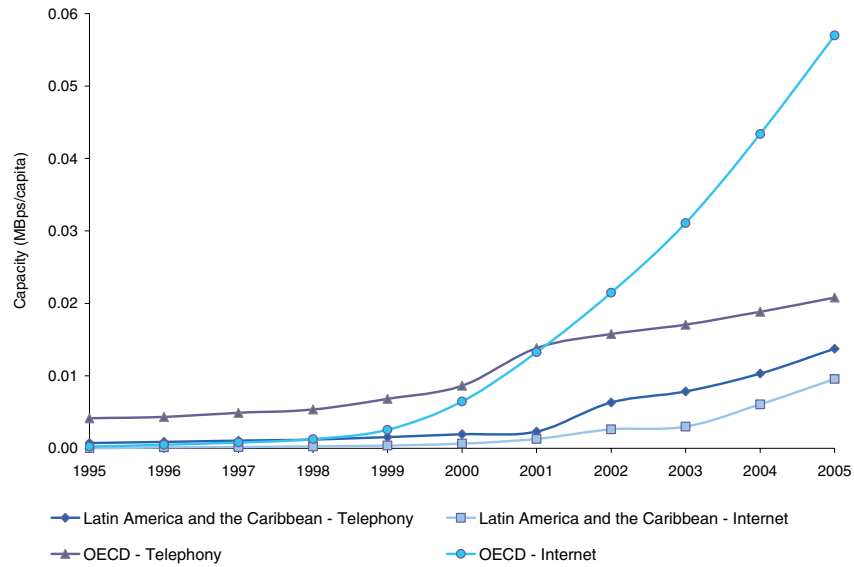
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of M. Hilbert, P. López and C. Vázquez, "ICT innovation avenues and the amount of digital information: deepening comprehension of the digital paradigm", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2007, unpublished.

Figure I.4
CAPACITY FOR INFORMATION BROADCASTING VIA TERRESTRIAL, SATELLITE AND CABLE RADIO AND TELEVISION
(Megabytes per second per capita)
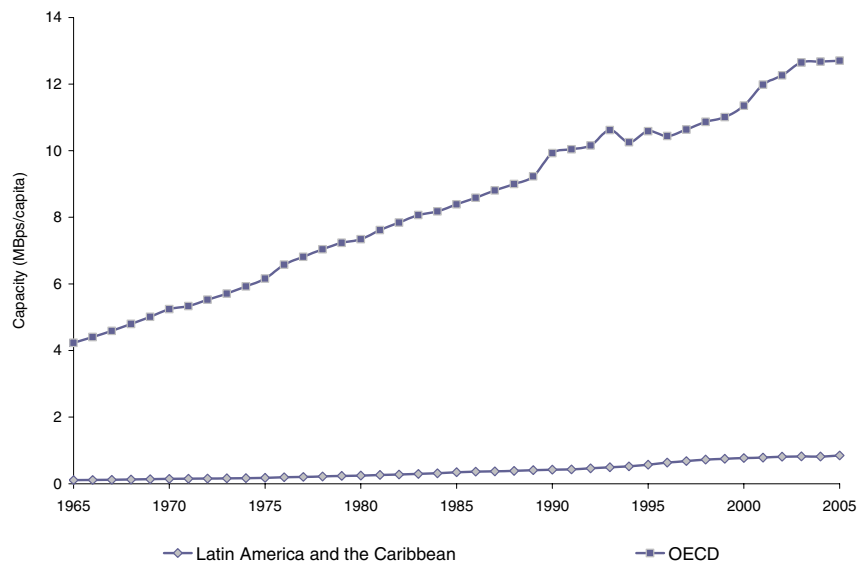
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of M. Hilbert, P. López and C. Vázquez, "ICT innovation avenues and the amount of digital information: deepening comprehension of the digital paradigm", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2007, unpublished.

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Even as the information storage capacity divide has persisted in relative terms and worsened in absolute terms (see figure I.5), the information processing capacity divide has been widening. Even if it is assumed that computers and mobile telephones in the two regions belong to the same generation and have the same computing capacity,[3] which would be optimistic where Latin America and the Caribbean are concerned, the inhabitants of the region are falling further behind the international frontier (see figure I.6).

Figure I.5
CAPACITY FOR INFORMATION STORAGE ON HARD AND FLOPPY DISKS, MEMORY CARDS AND OPTICAL DEVICES
(Megabytes per capita)
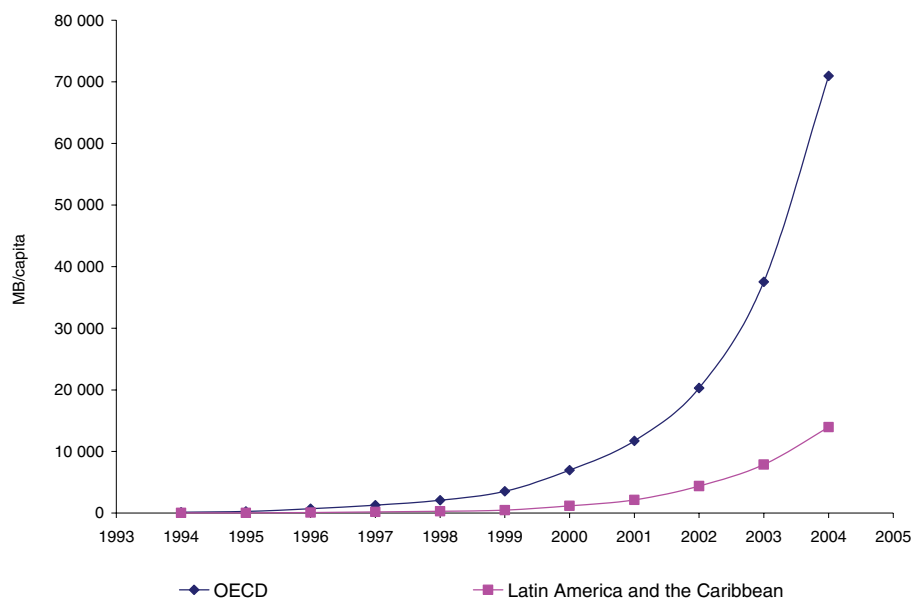
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of M. Hilbert, P. López and C. Vázquez, "ICT innovation avenues and the amount of digital information: deepening comprehension of the digital paradigm", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2007, unpublished.

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[3] The estimate is based on the number of computers and computing capacity in the year concerned, taking account of Nordhaus (2002).

Figure I.6
INFORMATION PROCESSING CAPACITY OF COMPUTERS AND MOBILE TELEPHONES
(Millions of computations per second per capita)
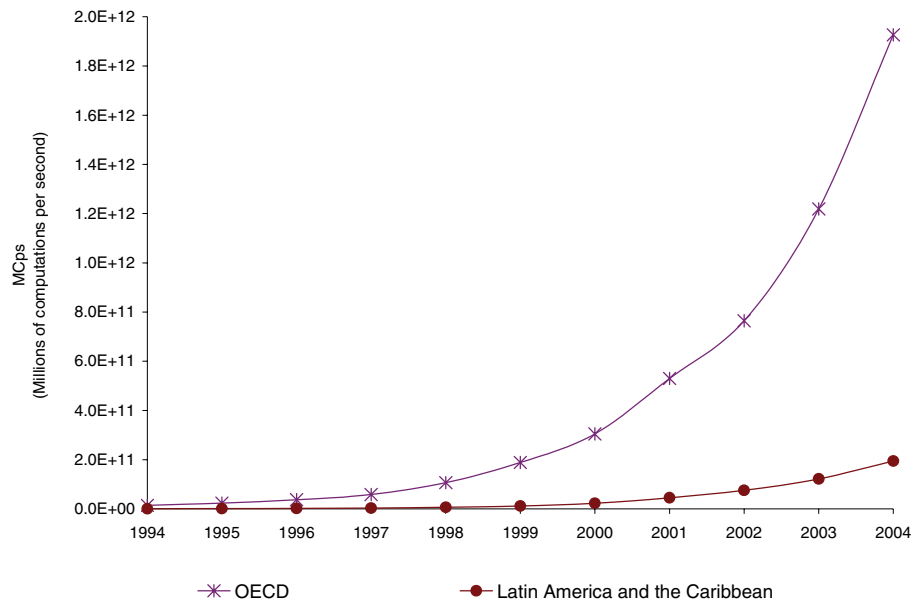
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of M. Hilbert, P. López and C. Vázquez, "ICT innovation avenues and the amount of digital information: deepening comprehension of the digital paradigm", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2007, unpublished.

If the information society is defined by information handling capacity and it is accepted that this definition depends on a rapidly expanding technology frontier, the above data show that, for the countries of Latin America and the Caribbean, the goal of becoming "full-fledged members of the information society […] on an efficient, effective and sustainable basis within the framework of the global knowledge-based economy" (Declaration of Florianopolis, 2000) is becoming increasingly remote. Although capacity differences may have diminished in relative terms, they are still growing in absolute terms. Compounding this, "the internal digital divide in Latin America and the Caribbean is more worrisome than the international one" (ECLAC, 2003).

2. The internal divide

The digital divide within a country stems from existing economic and social inequalities in areas such as income, education, gender, ethnic origin, geographical location.

The distribution of ICTs looks even more unequal when the newest technologies are considered, the exception being mobile telephony, which is more equally distributed than fixed-line telephony. This is so because it is cheaper to expand the mobile services network than the fixed-line network, allowing greater coverage and access. In addition, prepayment facilitates access for users, particularly the poorest, by reducing the number of prerequisites for obtaining a line, although it does not necessary mean a lower cost.

Mobile telephony is distributed fairly evenly between male- and female-headed households. The educational level of the household head does not seem to be a factor in mobile telephony use since, unlike other ICTs, it requires no special training. The availability of electric power determines access to most ICTs, reminding us once again that the components of a technological paradigm are mutually complementary.

Disaggregated data from household surveys can be used to conduct detailed analyses within or between countries and propose explanations for the relationship between income and education levels and ICT access. The socio-economic variable least indicative of inequality in ICT distribution is the age of the head of household; although young people adopt new technologies more quickly, this is offset by lower penetration in households with younger heads because of their lower incomes.

We shall now present the findings of an exercise to measure households' access to mobile telephony, computers and the Internet by the educational level of the household head and per capita household income in 2005 in two very different countries, Brazil and Paraguay.[4]

Figure I.7 shows that some characteristics are common to both countries. In both, for a given level of education, higher income entails more intensive ICT use, and the opposite relationship also holds. In a given income segment, people with more formal education show more interest in using these technologies. Income and education differences affect access to both computers and the Internet,[5] while mobile telephony is the most widely used medium of communication in all strata. Thus, the greater a technology's complexity and cost to the user, the wider the domestic divide.

Figure I.7
ACCESS TO INFORMATION AND COMMUNICATIONS TECHNOLOGIES, BRAZIL AND PARAGUAY, BY INCOME QUINTILE AND EDUCATION LEVEL, 2005
(*Percentages*)

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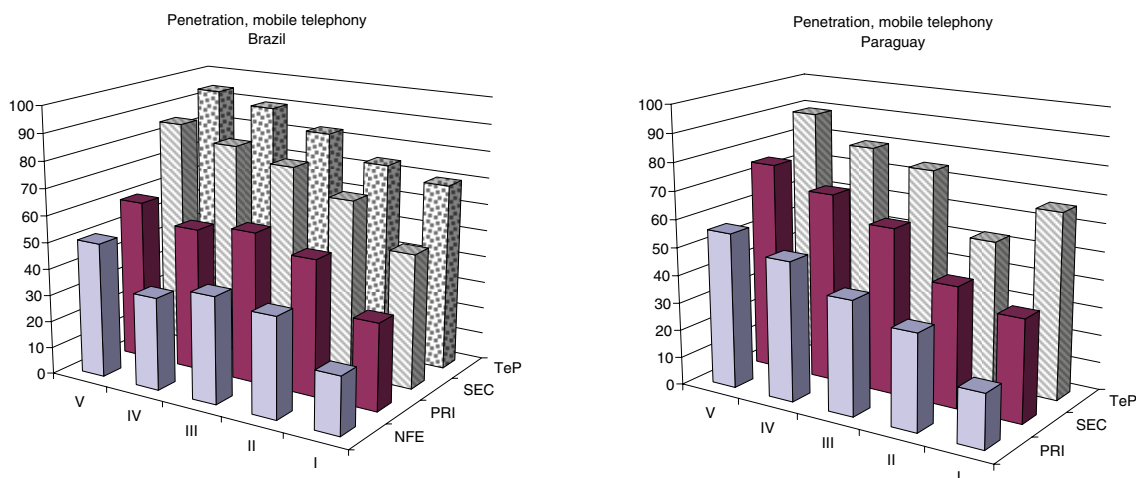
[4]   It is important to note that per capita income at constant market prices (2000 dollars) is almost three times as high in Brazil as in Paraguay: US$ 4,021 and US$ 1,396, respectively, according to ECLAC (2007).

[5]   The greater apparent importance of education over other variables when it comes to computer access in Brazil may be due to the fact that, being a more developed country than Paraguay, it has a proportionately larger sector of more educated people wishing or needing to use more advanced ICTs.

Figure I.7 (concluded)
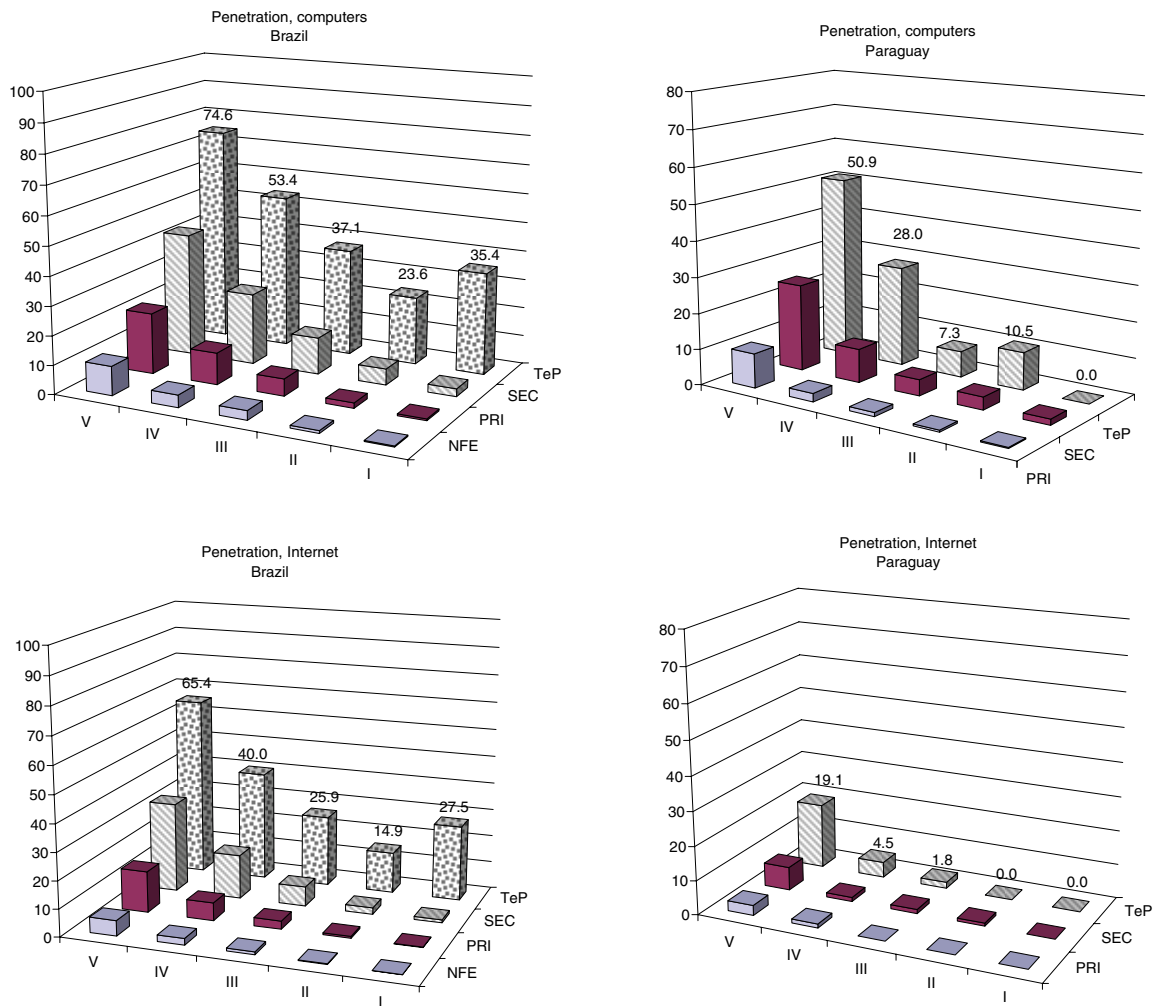
Source: Observatory for the Information Society in Latin America and the Caribbean (OSILAC), on the basis of household surveys in Brazil (2004) and Paraguay (2005).

Note: NFE: no formal education; PRI: incomplete or complete primary education; SEC: incomplete or complete secondary education; TeP: incomplete or complete tertiary or post-secondary education.

Comparison of the 2005 data with those for the previous year shows that the highest growth in mobile telephone and computer access was among the poorest people with the least formal education; the rate of growth in Internet access, conversely, varied considerably between the different levels. Thus, the technology that costs the least and is easiest to use would appear to have neared saturation point at the highest income levels, with the poorest quintiles gradually closing the gap, while income was still the main determinant of Internet access and education determined both Internet and computer access.

Again, assuming that Internet access spreads from the highest-income deciles downward and that the region's households spend 4% of their income on ICTs, it may be concluded that, with Internet penetration in the region of 15% in 2005, a typical user had US$ 231 a year available for connectivity.

This equates to US$ 4.5 a week for variable spending on mobile, fixed-line and Internet connectivity and for investment in the necessary access equipment. Against this background, extending Internet access to 50% of the population would mean connecting up income deciles with less than US$ 80 a year, or US$ 1.5 a week, available for ICT spending.

These figures reveal not only that attaining objectives like *One Laptop per Child* (MIT Media Lab, 2005) would require far cheaper solutions than computers costing US$ 100, but that the most viable solution would be some type of shared access model. Such models are widespread in the region and the most important places for Internet use are public facilities such as commercial cafés with Internet access, community centres in libraries and others types of organization (see figure I.8).

Figure I.8
PLACE OF INTERNET USE, 2005-2006
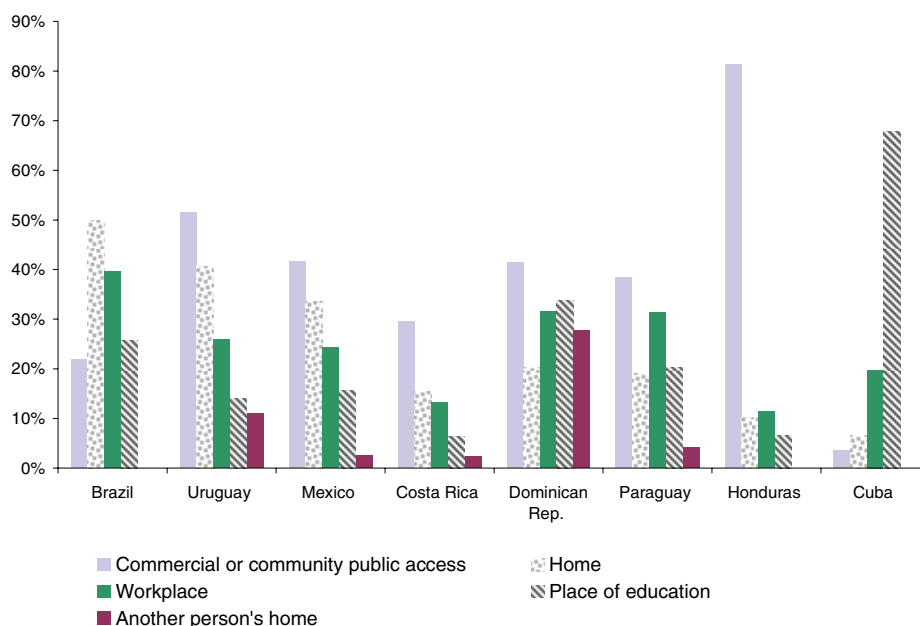
Source: Observatory for the Information Society in Latin America and the Caribbean (OSILAC), on the basis of household surveys.

Nonetheless, ICT access is only the first step towards participation in the information society, and the mere fact of its existence tells us little about the use made of the opportunities it creates and, therefore, about its repercussions. Unsurprisingly, the adoption and use of these technologies require a learning process which generally starts with simple activities before moving on to more sophisticated types of interaction. The learning curves involved are determined by personal or contextual factors such as skill levels and habits, the legal framework and the content available on networks (ECLAC, 2003).

Figure I.9 shows that, in the home, ICTs are employed mainly to communicate and obtain information and that they are not yet used on a large scale for online transactions. However, many people with access to the Internet use it to find information, and this involves interactions similar to those required for online education.

Interaction with the public authorities is important for speeding up this learning process. By making it compulsory for certain procedures to be carried out online, they can help to break the vicious circle of trepidation about using ICTs and ignorance of the benefits of doing so. Accordingly, some governments in the region have made it compulsory for tax payment or public procurement to be carried out over the Internet, and as a result, these are the first electronic transactions to be carried out by a large proportion of the population. The authorities and public servants themselves also learn about the requirements of computerized interaction by digitizing their own processes and operations.

Figure I.9
ACTIVITIES CONDUCTED OVER THE INTERNET, 2005-2006

Source: Observatory for the Information Society in Latin America and the Caribbean (OSILAC), on the basis of household surveys.

Note: The data are for 2006 in Mexico and Uruguay and 2005 in the other countries.

Analysing usage patterns in the light of users' social and demographic characteristics once again reveals the importance of income and education as determinants of the digital divide. Figure I.10 shows that only people with formal education use the most advanced ICTs, something that is particularly evident in the case of the Internet, whose users are people with secondary and post-secondary education.6 Again, people with post-secondary education, especially students, display high usage patterns irrespective of income, provided they do not belong to the poorest quintile.

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6 As indicated earlier, caution has to be exercised when comparing data between countries as different as Brazil and Paraguay.

Figure I.10
INTERNET USERS OVER 16 YEARS OF AGE IN BRAZIL AND PARAGUAY, STUDENTS AND NON-STUDENTS
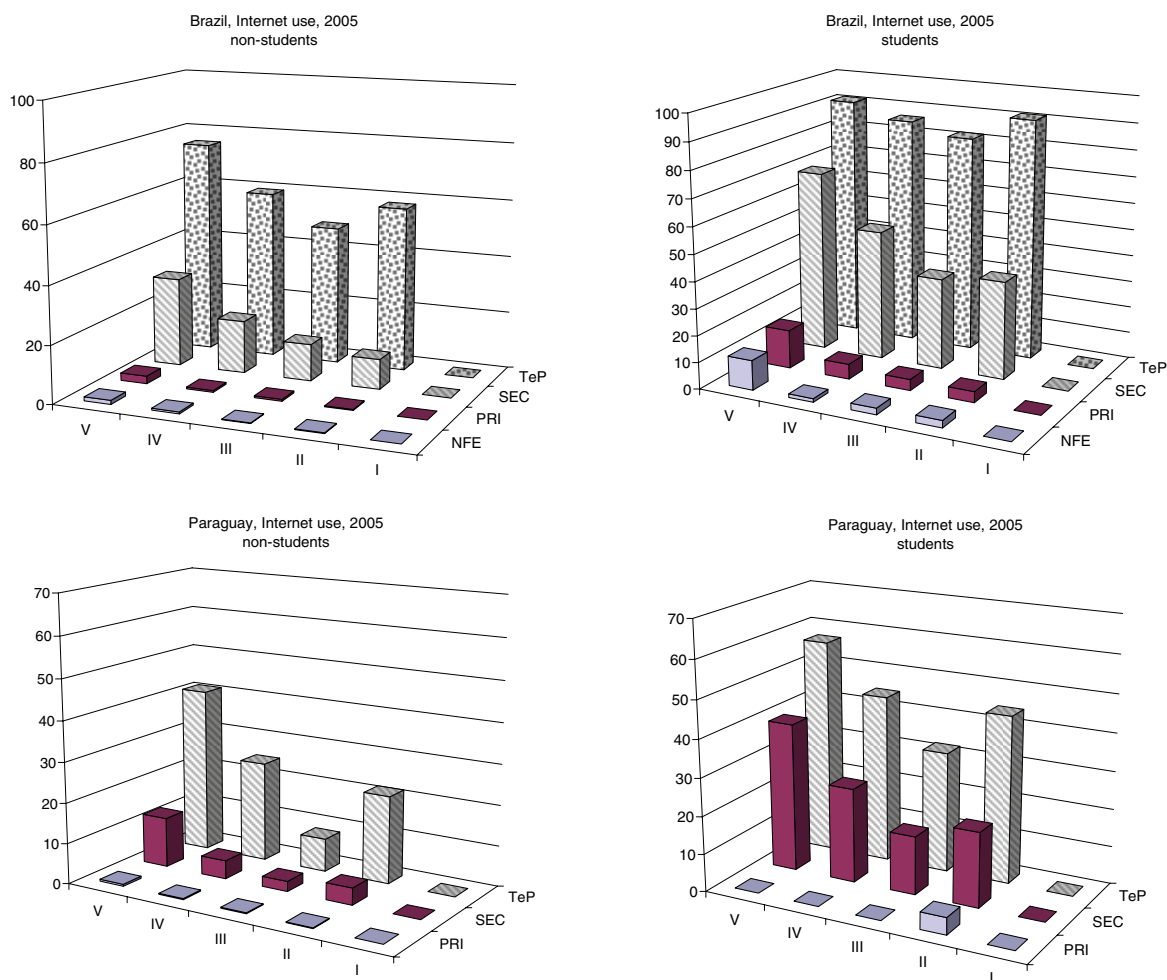
Brazil, Internet use, 2005
non-students

Brazil, Internet use, 2005
students

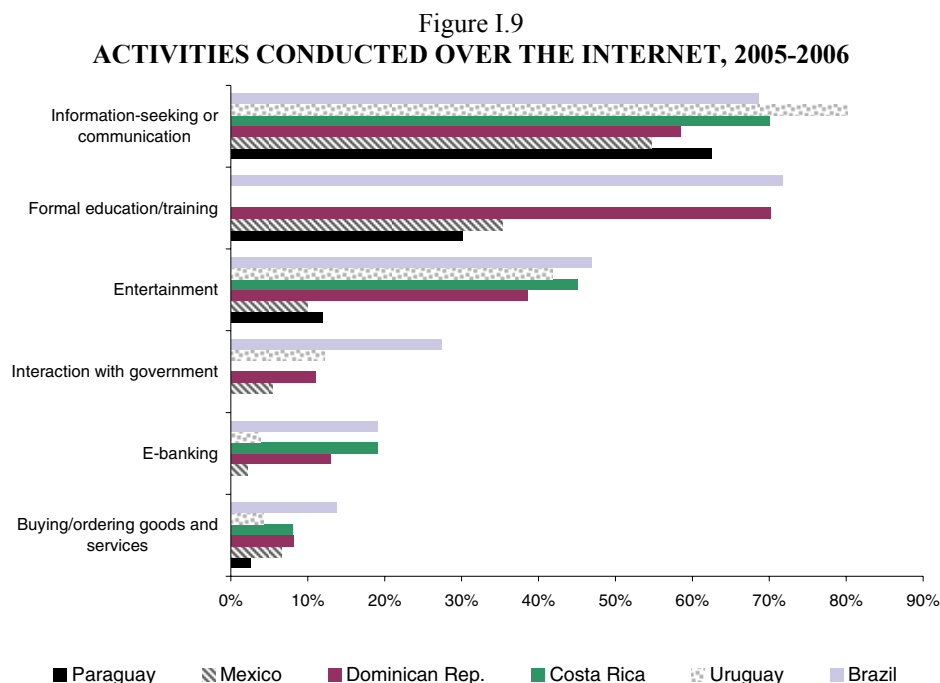Paraguay, Internet use, 2005
non-students

Paraguay, Internet use, 2005
students

Source: Observatory for the Information Society in Latin America and the Caribbean (OSILAC), on the basis of household surveys conducted in Brazil (2004) and Paraguay (2005).

Note: NFE: no formal education; PRI: Up to and including primary education; SEC: Up to and including secondary education; TeP: Up to and including tertiary or post-secondary education.

B. NATIONAL AND REGIONAL STRATEGIES

1. Justification and peculiarities of ICT policies

The digital revolution and the emergence of the information society have prompted governments of Latin American and Caribbean countries to undertake initiatives and design policy instruments in order to obtain the social and productive benefits associated with ICTs. The first such initiatives were seen in the 1980s and 1990s, when a number of countries sought to increase the impact of these technologies on economic and social development by introducing universal access programmes; introducing computers in

schools, eventually with Internet access; and setting policies for radio and television broadcasters and for the development of the software and, in some cases, the hardware industry, and for digitization of administrative, financial and accounting processes in the central public sector.

Increasingly aware of the cross-cutting nature of ICTs and of their complementarity in different spheres of the economy and society, and recognizing that they have become a prerequisite for participation in a globalized economy, governments have sought to design public policies for coordinating isolated ICT-related activities and initiatives undertaken by different stakeholders and agencies. In recent years, most countries have formulated plans, policies or agendas in an effort to develop public ICT programmes with a view to the construction of information societies. A large number of regional and global declarations culminated, at the regional level, a set of regional plans of action known as eLAC, a strategy for the information society in Latin America and the Caribbean.

Strategies for the information society are based on the need to complement and correct market development and to increase the efficiency of ICT-related activities among all agents and sectoral authorities. Lack of certain resources in the countries of the region and the high cost of the transition towards the information society make it imperative to combine efforts into national strategies.

ICTs and the information society represent a new public-policy issue, although precedents do exist in some areas (telecommunications and the media). Thus, there is no model as to how such policies should be designed and implemented. The guiding principle is continuous learning, in which an attempt is made to find the proper organizational approach, and this varies according to each country's objectives and requirements. ICT policies cannot, in the short term, be expected to achieve results similar to those that have had more time to mature; for example, the results cannot be as remarkable as in the case of the health or education sectors, which, moreover, have their own institutions whose existence is not questioned. Thus, the challenge is to give continuity to policies that do not produce immediate results and whose implementation is still the subject of debate and analysis.

The exponential growth of technological progress in this field in recent decades means that one of its dominant features is uncertainty. From the start, ICTs have followed a rapid growth path and there is no reason to suppose that this process will stop or slow down. Digital agendas must therefore be limited to relatively short-term perspectives, and action plans must not exceed five years; hence the need to monitor progress continuously in order to keep pace with requirements as they arise.

Given the specific features of Latin America and the Caribbean, the dynamic of technical progress is exogenous, since it is to a great extent beyond the sphere of influence of the region's public- and private-sector decision-makers. On the other hand, policy-makers do have control over options relating to the adoption of technological systems within the structure of society, since these are endogenous to the region.

Lastly, given that levels of economic and social development vary from one country to another and even within individual countries, any public-policy agenda must be tailored to the needs and capacities of each country in order to achieve the relevant policy objectives. The agenda for Latin America and the Caribbean must be more specific than the global agenda since it cannot replace regional and subregional agendas, much less national ones. The idea should be to have complementary agendas that operate at different levels of abstraction.

In short, decisions relating to the development of the information society in Latin America and the Caribbean depend not only on the region's characteristics, for example, its heterogeneity and the exogeneity of technological progress, but also on the characteristics of the digital revolution, such as the uncertainty arising from the pace of technological change, the cross-cutting nature of ICT applications and the fact that this is a new area.

2. National agendas and the current situation

The national strategy to be adopted will be determined by each country's level of development, and must be based not only on traditional socio-economic variables, such as per capita income and human development components, but also on the degree of preparedness and progress towards an information society.[7] The political class must recognize the importance of this issue not only when defining a strategy but throughout the process, since on this will depend the adoption of measures necessary for implementation of the decisions. Other factors, such as growth trends, the macroeconomic position and stability of the country in question and its general policy stance, will also have an impact on the continuity of the process; as will the hierarchical level and institutional status of the authority whose responsibility it is to lead, coordinate and execute the national strategy. The nature of the policy document will also be decisive, because if it is a legal instrument, it will have binding force. In the same way, the availability and management of resources earmarked for the national strategy, the working methods and the establishment of clear procedures for coordination of the participants' work have an impact on the different phases of the process.

Table I.1 presents the stage of the process for defining and implementing public policies for building information societies in 24 countries in the region to January 2008. It shows the progress, features of the current policy document, previous documents and the institutional framework set up for implementing the strategy established in each country.[8]

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[7] For example the World Summit on the Information Society 2003-2005 helped to raise awareness among Governments of the importance of the digital paradigm, by facilitating discussion at the phase of identification of the problem and by revealing the global consensus on ICTs as a public policy issue.

[8] The table may contain inaccuracies as it is based on an exhaustive attempt to collect secondary information.

Table I.1
LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): NATIONAL STRATEGIES FOR INFORMATION SOCIETIES, JANUARY 2008

Country	Characteristics of the current document			Background and status		Institutional framework of the current strategy		
	Name of the document	Period of validity	Type of document	Previous document and year of issue	Status of ICT policy	Main coordinator	Strategic management	Operational management
Argentina	No document			National programme for the information society, 2000	First-generation-formulation			
Bahamas	Policy Statement on Electronic Commerce and the Bahamian Digital Agenda	2003 - indefinite	Definitive	No previous document	First-generation-implementation	Ministry of Finance (e- Business Development Office)	Inter-agency committee	Ministry of Finance
Barbados	Barbados National ICT Strategic Plan		Initial draft	No previous document	First-generation-formulation	National Advisory Committee on ICT	Inter-agency committee	Ministry of Commerce, Consumer Affairs and Business Development
Bolivia	National Plan for Digital Inclusion 2007-2010	2007 - 2010	Continuity draft	Bolivian Strategy for Information and Communications Technologies (ETIC) 2005	First-generation-formulation	Agency for the Development of the Information Society in Bolivia (ADSIB) and Office of the Deputy Minister for Science and Technology in the Ministry of Development Planning	Inter-agency committee	Technical (inter-agency) committee
Brazil	No document			Green book on the information society 2001	First-generation-formulation			
Chile	Strategic Digital Development Plan 2007-2012	2007 - 2012	Continuity draft	Digital agenda 2004-2006	Second-generation-implementation	Ministerial Committee for Digital Development	Inter-agency committee	Office of the Executive Secretary in the Ministry of the Economy (inter-agency)

Country	Characteristics of the current document			Background and status		Institutional framework of the current strategy		
	Name of the document	Period of validity	Type of document	Previous document and year of issue	Status of ICT policy	Main coordinator	Strategic management	Operational management
Colombia	Connectivity agenda	2000 - indefinite	Definitive	No previous document	First-generation-implementation	Institution by the name of Agenda for Connectivity	Office of the President	Directory chaired by the Ministry of Communications
Costa Rica	No document			National Plan for Science and Technology 2002-2006	First-generation-origin			
Ecuador	National Connectivity Agenda 2002 (Plan of Action 2005-2010)	2005 - 2010	Definitive	No previous document	First-generation-formulation	National Committee on Connectivity	National Inter-Agency Committee on Connectivity	National Committee for Connectivity through Special Technical Committees
El Salvador	e-Country Programme	2007 - 2021	Definitive	No previous document	First-generation-implementation	National Committee for the Information Society	Office of the President of the Republic	Organization e-Country
Grenada	ICT Strategy and Action Plan 2006 - 2010	2006 - 2010	Definitive	ICT Strategy and Action Plan 2001 - 2005	Second-generation-implementation	Central Information Management Agency	Central Information Management Agency	Office of Prime Minister
Guatemala	National Agenda for the Information and Knowledge Society	2007-2015	Definitive	No previous document	First-generation-implementation			
Guyana	ICT4D Guyana, National Strategy, Final Draft.		Draft	National Development Strategy 2001 - 2010	First-generation-formulation	Office of the President	Inter-agency Committee	Office of the President
Honduras	No document				First-generation-origin			
Jamaica	E-Powering Jamaica 2007-2012	2007 - 2012	Definitive	NICT Strategy 2002 - 2006	Second-generation-implementation	Central Information Technology Office	Inter-ministerial (Strategy Steering Committee)	Independent, attached to the Ministry of Commerce, Science and Technology

Country	Characteristics of the current document			Background and status		Institutional framework of the current strategy		
	Name of the document	Period of validity	Type of document	Previous document and year of issue	Status of ICT policy	Main coordinator	Strategic management	Operational management
Mexico	National Development Plan 2007-2012, National e-Mexico System	2007 - 2012	Definitive	National Development Plan 2001-2006	Second-generation-implementation	National e-Mexico System	Communications and Transport Secretariat	Communications and Transport Secretariat
Nicaragua	No document			National ICT Development Strategy 2005	First-generation-origin			
Panama	No document			National Agenda for Innovation and Connectivity 2005	First-generation-origin			
Paraguay	No document			National Development Plan for the Information Society in Paraguay (2002-2005)	First-generation-origin			
Peru	Peruvian Digital Agenda	2005 - 2014	Definitive	No previous document	First-generation-implementation	Multisectoral inter-agency monitoring committee	Office of the Chair of the Council of Ministers	National Office for Electronic Government and Information Technology (ONGEI), Office of the Chair of the Council of Ministers
Dominican Republic	National Strategy for the Information Society Strategic Plan 2007-2010	2007 - 2010	Definitive	No previous document	First-generation implementation	National Committee for the Information and Knowledge Society	Office of the Technical Secretary, Office of the President	Technical Support Unit (UTEA), based at the Dominican Telecommunications Institute (INDOTEL)

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Country	Characteristics of the current document			Background and status		Institutional framework of the current strategy		
	Name of the document	Period of validity	Type of document	Previous document and year of issue	Status of ICT policy	Main coordinator	Strategic management	Operational management
Trinidad and Tobago	Fast Forward	2003 - 2008	Definitive	No previous document	First-generation-implementation	Executive Group on the National Information and Communication Technology Plan	Ministry of Public Administration and Information, in inter-ministerial coordination	Executive Group
Uruguay	Uruguay Digital Agenda 2007-2008 (ADU'0708)	2007 - 2008	Definitive	No previous document	First-generation-implementation	Agency for the Development of Electronic Governance and the Information and Knowledge Society (AGESIC)	Office of the President of the Republic	Agency for the Development of Electronic Governance and the Information and Knowledge Society (AGESIC)
Bolivarian Republic of Venezuela	National Plan for Telecommunications, Information Technologies and Postal Services 2007-2013	2007 - 2013	Continuity draft	National Information Technologies Plan 2001	First-generation-formulation	National Information Technologies Centre	Ministry of Science and Technology	Ministry of Science and Technology

The issues included on the agendas show that the countries of the region are more interested in ICTs as a means of achieving social integration and improving the quality of life of the population than as a driver for economic development. The recurrent themes in the 16 countries for which information was available and which have formulated ICT policies are the creation of access and infrastructure, e-government, followed by human capital formation and the generation of contents and applications. Issues relating to the production sector, such as e-business and the development of software and hardware industries, seem to arise less frequently (see figure I.11).

Figure I.11
ISSUES ON NATIONAL AGENDAS FOR THE INFORMATION SOCIETY, NOVEMBER 2007
(*n=national agendas of 16 countries*)[a]
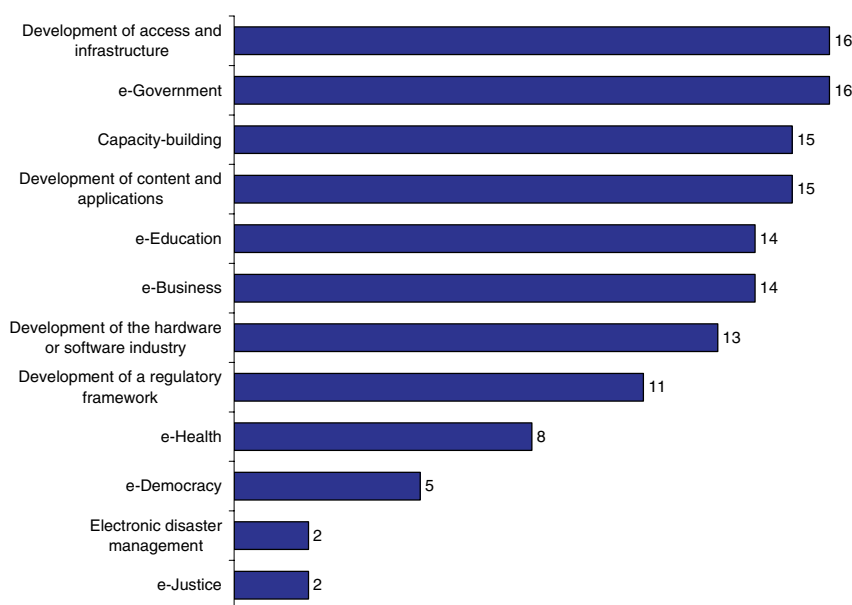
Source: Observatory for the Information Society in Latin America and the Caribbean (OSILAC),

[a]   Bahamas, Barbados, Bolivarian Republic of Venezuela, Bolivia, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Jamaica, Mexico, Peru, Trinidad and Tobago and Uruguay. No information was available for Grenada.

The specific objectives of the digital agendas are changing. Strategies have been geared to increasing access through the development of shared access centres (telecentres), in some cases along with computer-literacy programmes. Only in the second stage, when this objective has been achieved, are issues such as content and quality addressed, and the importance of the variety and quality of services considered, especially in terms of access to broadband connection.

Having assessed the state of digital policies, analysis will turn to the situation of the countries of the region in some of the critical areas of the information society in order to determine their degree of preparedness for confronting the challenges posed by this new form of economic and social organization. The areas that have been the focus of efforts and policy-making over the longest period of time, namely development of ICT and e-government infrastructure, will be reviewed.

Figure I.12 shows the level of access to ICT infrastructure and the state of development of digital policies in countries of the region, which are arranged according to different criteria. Countries are classified according to whether they are applying first- or second-generation ICT policies. In the case of countries at the stage of first-generation strategies, a further distinction is made based on the phase of the process of policy adoption and implementation (origin, formulation or implementation) and on the intensity of the ICT-related activities being conducted. The term "ICT-related activities" refers to the execution of programmes, projects or initiatives with a strong ICT component; such activities may or may not be part of sectoral digital policies. Countries are also classified on the basis of the maturity of such activities, that is, the time over which measures of this type have been implemented; to simplify the analysis, this classification includes two categories: measures with a maturity of more, or less, than five years.

Figure I.12
DEVELOPMENT OF INFRASTRUCTURE[a] IN 2006, STATUS OF DIGITAL POLICIES AND INTENSITY AND TIME OF MATURITY OF ICT-RELATED ACTIVITIES IN 2008
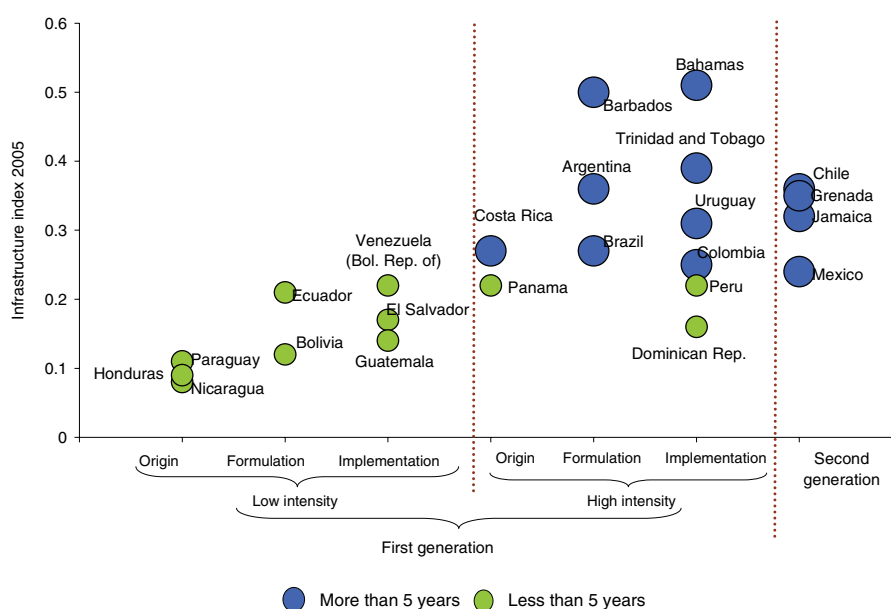
Source: Observatory for the Information Society in Latin America and the Caribbean (OSILAC), on the basis of the digital opportunity index of the International Telecommunications Union (ITU).

[a] The International Telecommunications Union digital opportunity index (DOI), used to measure the degree of infrastructure development, is a composite index comprising 11 indicators grouped in three categories: infrastructure, opportunity (which incorporates data on the cost of mobile telephone and Internet access in relation to national income) and utilization (which measures Internet use and broadband access). The infrastructure index consists of indicators of ICT penetration and is used to assess the degree of access by the population to fixed telephones, computers and Internet in the home, as well as the penetration, on a personal level, of mobile telephones and access to mobile Internet. The higher the index, the higher the development of ICT infrastructure and access.

Figure I.12 shows that the more ICT-related measures are adopted in a durable form, the better the country's situation is in terms of access and infrastructure. While such progress is contingent on the level of economic development, there are countries with similar per capita income levels, such as Chile and the Bolivarian Republic of Venezuela, or Colombia and El Salvador, which have different degrees of progress. The countries that have achieved greater progress are those that have adopted more intensive measures and whose digital policies have a higher level of maturity.

A country's online presence in the United Nations Online Network in Public Administration and Finance (UNPAN) is used as an indicator of its use of, or readiness for, e-government.[9] The e-readiness index lists government sites according to their degree of sophistication, from an emerging presence to a presence that is consolidated, interactive and transactional. In this case also, the higher the rate on the index, the greater the public administration's online presence.

Figure I.13 shows the state of development of e-government and the digital policies of the countries of the region. The criteria for classification follow the same logic as those of figure I.12 and similarly, the more intense the use of ICT-related measures over time, the greater the development of e-government.[10] The experiences of Chile, Mexico, Brazil and Argentina serve to illustrate this finding. In the last two cases, since the countries have not yet defined digital strategies or are in the process of defining one, the results relate to initiatives being executed. Chile and Mexico, on the other hand, are in the second phase of policy generation, which shows that better results are obtained when the country acts in accordance with coordinated consensus-based guidelines, such as digital policies or agendas.

Figure I.13
INDEX OF PRESENCE ON THE E-GOVERNMENT NETWORK, STATUS OF DIGITAL POLICY DEVELOPMENT, INTENSITY AND MATURITY OF ICT-RELATED ACTIVITIES IN 2008

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[9] The e-government preparedness index indicates the status of United Nations member countries in this area. It is a composite measure of countries' capacity and willingness to use ICT instruments in providing government services. It is based on indicators of countries' online presence, telecommunications infrastructure and human capital.

[10] The Caribbean countries show greater development in infrastructure than in e-government; indeed, no country in the subregion, apart from Jamaica (which is implementing a second-generation strategy), has an e-government index of over 0.5 (Miranda, 2007).

Hence the importance of conducting activities for moving forward in critical areas of digital development. Where countries are unable to define actual policies, they must seek to promote specific measures. However, those countries that have achieved more coordinated ICT measures on a continuous basis over time are better placed to construct an information society.

3. Lessons to be drawn from national experiences

Efforts to implement ICT policies have been affected by different factors, both inherent and exogenous to the process. Inherent factors include the institutional weaknesses of agencies, which, together with certain coordination failures, are an obstacle to success. The lack of funding for this area, or the fact that it has frequently been necessary to resort to each ministry's regular budget, has meant that funds are insufficient and fragmented, preventing planned activities from being undertaken. In some cases, lack of participation and commitment by significant actors has detracted from the legitimacy of the process, shifted its emphasis or caused serious deterioration, compounded by factors such as a change of government or of the competent authority. In the same way, some countries have embarked on policies promoted by ICT-related sectors without taking into account the fact that the initiative had not matured sufficiently to justify the establishment of a State policy.

Since this is a new area, policies have often resulted from individual leadership, which raises doubts as to their continuity even if they have the backing of the country's highest authorities.

In some countries, certain sectors see themselves as the exclusive owners of the issue and consider that the entry of new stakeholders and opinions into the debate only serves to complicate the process. This may lead to a situation where the telecommunications authority or the software industry, for example, may be allowed to determine the modernization strategy or the teaching methods and contents adopted for digital education in schools. The experience of ICT experts is decisive, but the same applies to the knowledge of persons working in sectors in which ICTs may have far-reaching repercussions. Moreover, ICTs themselves are an effective instrument for facilitating consensus-building, integration of all sectors and coordination of efforts.

The integration of relevant authorities into the digital agenda is crucial for its success. In order to achieve the commitment and cohesiveness needed for a particular objective, it is vital to raise awareness of the issue. Opinion-shapers, whether from civil society, the business sector, academia or public service, will have a role to play in explaining the importance of ICTs for economic and social development and in conveying the relevance of the issue in a clear, comprehensible and convincing manner to different political and social segments.

National expenditure on ICTs may be viewed from two perspectives: spending on ICT projects in each country, and spending on ICT equipment and software by each public body. Lack of information on the amount of money actually spent on ICTs means that their relative weight in the budget is underestimated; whereas software or telecommunications companies know exactly what and how much is sold to public agencies, the public sector does not usually record this information. This often results in the use of incompatible standards which hamper interoperability between agencies; adjustments then have to be made later, which is wasteful of resources. Inefficiencies in resource management may also arise when contracting services or when equipment is purchased in a fragmentary way. Consequently, the entity responsible for coordinating and implementing the national agenda should have access to this information when making recommendations on investment in ICT projects.

In short, the success of a strategy for the information society will depend on the existing organizational structure and mechanisms for information and communication. Such a strategy has to establish and open up functional communication channels with all sectors and, at the same time, ensure that the voices of national promoters are heard. Information on the resources used is a prerequisite for coordination during the operational phase of the strategy.

4. The regional dimension

(a)   Origins and functioning of eLAC

The Plan of Action for the Information Society in Latin America and the Caribbean (eLAC 2007) is a regionally agreed policy agenda which takes into account the importance of ICTs for the economic and social development of the countries, and is designed to facilitate the adoption of these technologies through cooperation and the exchange of best practices in their evolution. The origins of this agenda may be traced back to the first phase of the World Summit on the Information Society (2003), at which 175 countries reached a political agreement and issued a Declaration setting forth 67 principles and a plan of action identifying 167 targets as global challenges to be achieved by 2015. Bearing in mind that many of these targets did not refer specifically to our region, it was imperative to formulate a regional plan of action that would reflect the needs and specific realities of the countries of Latin America and the Caribbean. eLAC is the fruit of a sustained, joint effort by the authorities of the countries and is the principal set of ICT policies in the region. At the same time, it is an operational instrument for achieving the targets of the World Summit on the Information Society, along with those of the Millennium Development Goals.

The central idea of eLAC was to identify the most urgent and important issues for the region, thus, the plan of action identifies 30 targets and 70 activities for the three-year period 2005-2007.

The plan is based on guidelines that seek to achieve three types of benefits that will provide relevant feedback:

- Strengthening regional projects. To this end, the regional specialized agencies have been approached on particular topics or, in the absence of such bodies, regional integration and cooperation agencies have been set up.

- Promoting strategies. Attempts have been made to promote initiatives and achievements in specific areas, establishing guidelines for action and defining indicators on the degree of progress made in building the information society.

- Deepening critical issues. The aim is to increase knowledge and understanding of critical areas in order to support the definition, design, implementation and evaluation of policies through studies conducted by working groups attached to major agencies in each area.

The functional structure of the plan of action includes: a regional monitoring mechanism comprising representatives of four countries (Brazil, Ecuador, El Salvador and Trinidad and Tobago); national focal points to coordinate the countries' participation at the various levels of the working structure of eLAC; and working groups made up of representatives of the countries and set up in accordance with the terms of some of the targets in the Plan of Action. The countries have requested ECLAC to serve as the technical secretariat, to coordinate work and facilitate sharing of information

among the various bodies. Although this structure has facilitated the organization of activities, there are a number of pending challenges such as ensuring that bodies and mechanisms are properly structured.

Given the exceptionally dynamic nature of ICTs, the Plan of Action focuses on short-term measures despite being based on a long-term vision (2015). In this way, the attainment of targets can be reviewed and goals can be reformulated as and when they are achieved and in accordance with new needs that may arise.

From April 2006 to September 2007, ECLAC conducted a Delphi Policy Priorities survey to assess the importance of the eLAC 2007 targets and define a new regional agenda for 2007-2010, known as eLAC 2010. The exercise received 1,454 individual inputs from the public, private and academic sectors and from civil society.[11] The document presenting the outcome of the exercise was submitted to the governments of the region for the negotiations leading up to the Second Ministerial Conference on the Information Society in Latin America and the Caribbean, to be held in San Salvador, El Salvador, from 6 to 8 February 2008.

If the results of the Delphi exercise are compared with the 70 targets of eLAC, it can be seen that 19% of them are similar to those targets, 60% are related to them, having been adjusted to changing contexts and to advances in the information society, and 21% reveal new challenges. The exercise suggests that three years is a reasonable deadline for reviewing the targets.

Most of the eLAC 2007 initiatives had already been in progress for years, with resources from both public and private sources. The Plan of Action united them and provided a frame of reference for public- and private-sector actions. Many of the eLAC 2007 activities have been managed by the private sector and civil society, with government cooperation. The Plan of Action improves the functioning of the existing multilateral system, introducing certain direct-democracy characteristics; this promises a new style for multilateral action, making room for civil-society actors and government representatives.

(b)   **Progress towards attaining the eLAC targets**

The Observatory for the Information Society in Latin America and the Caribbean (OSILAC) has produced an inventory of progress and the stage of development of information societies in the region, focusing on 27 of the 30 priority thematic areas as listed in eLAC 2007. Monitoring of the Plan of Action has shown that progress has been made in 15 of the 27 areas monitored (see table I.2), although it should be noted that each area comprises a number of activities and that progress is uneven from one country to another.

The targets relating to building of capacities and knowledge, access and digital inclusion have seen greater progress than those in the areas of public transparency and efficiency, the development of electronic applications and policy instruments. Five of the seven targets where no progress has been recorded relate to the second of those categories, while nine of the 15 targets where there has been good or outstanding progress come under the first category.

There have been notable advances in the area of connectivity, such as the opening of centres for public access to ICTs, connectivity in local government and municipalities, and the interconnection of research and education networks, mainly among the region's universities. In electronic applications, there

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[11] According to available information, this Delphi survey is the most extensive online interactive policymaking exercise in the history of intergovernmental processes in Latin America and the Caribbean.

has been little progress in the area of health and in the use of digital tools for natural disaster management. In the policy instruments category, there has been no movement in the areas of financing, universal-access policies, or implementation and functioning of the legislative framework. The dilemma of universal-access funds[12] shows that in the area of ICT policy, the challenge lies not in creating legislation and regulatory frameworks but in ensuring their effective implementation.

Table I.2
PROGRESS IN THE eLAC 2007 THEMATIC AREAS

Area	Target	Degree of progress
A. Digital access and inclusion	1 Regional infrastructure	Some progress
	2 Community centres	Strong progress
	3 Online schools and libraries	Some progress
	4 Online health centres	No progress
	5 Employment	Moderate progress
	6 Local government	Strong progress
	7 Alternative technologies	Moderate progress
B. Building of capacities and knowledge	8 Software	Moderate progress
	9 Training	Some progress
	10 Research and education networks	Strong progress
	11 Science and technology	No progress
	12 Firms	Some progress
	13 Creative and content industries	Some progress
	14 Internet governance	Some progress
C. Public transparency and efficiency	15 Electronic government	Some progress
	16 Electronic education	Strong progress
	17 Electronic health	No progress
	18 Disasters	No progress
	19 Electronic justice	Moderate progress
	20 Environmental protection	Moderate progress
	21 Public information and cultural heritage	Some progress
D. Policy instruments	22 National strategies	Some progress
	23 Financing	No progress
	24 Universal-access policies	No progress
	25 Legislative framework	No progress
	26 Indicators and measurement	Strong progress
E. Enabling environment	27 Follow-up to the World Summit and implementation of eLAC 2007	Strong progress

Source: Observatory for the Information Society in Latin America and the Caribbean (OSILAC).

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[12]   This subject will be discussed in chapter VI of the book to be published by ECLAC in the near future.

Chapter II

RECOMMENDATIONS BY ECLAC

The new technological paradigm underlying the information society depends on the existence of huge capacities to capture, transmit, store and process data, and entails profound economic and social reorganization. This long wave of technological change opens up new potential for economic growth and social integration; it both offers opportunities and involves risks, particularly for the developing countries. In this context, the international community has held world summits during which strategic elements were defined for progress towards information societies. The most significant effort in that respect was the World Summit on the Information Society, held in Geneva in 2003 and Tunis in 2005.

The economic, social and cultural conditions prevailing in Latin America and the Caribbean have had a marked impact on the extent to which the region can benefit from the information society and on ways of becoming part of it. Those conditions necessarily influence the strategic choices available to the countries of the region in terms of increasing the development and production of information and communications technologies (ICTs) in some of the countries, and expanding access, use and ownership of a wide range of applications in all of them. Efforts to reach the goals defined by the international community in accordance with the realities of the region have been marked by a number of events, including the Bávaro Declaration of 2003 and the Regional Preparatory Ministerial Conference of Latin America and the Caribbean for the second phase of the World Summit on the Information Society, held in Rio de Janeiro in June 2005, at which the Plan of Action for the Information Society in Latin America and the Caribbean (eLAC 2007) was adopted. The Plan of Action, which had an initial duration of three years (2005-2007) but was aimed towards a longer-term framework (2005-2015), was the object of a Delphi exercise in 2007 in order to confirm or reassess the priorities set out in the Plan. The next step is to submit it for consideration by the countries of the region at the second Regional Ministerial Conference on the Information Society, to be held in San Salvador, El Salvador, in February 2008, when a decision will be made concerning the extension of the Plan for a further three years, to 2010.

The present document contributes to the analysis of policy options by providing information in order to expand knowledge and understanding of current events in two areas: the development of the production of ICT-related goods and services ("development of ICTs") and the use and ownership of ICTs to promote development ("ICTs for development"). The proposals focus particularly on public policy issues, which are particularly important because of the characteristics of ICTs, the type of infrastructure needed and the business and market organization they require.

A. ICTs AND THEIR IMPACTS

The cross-cutting nature of ICTs and the fact that they are general-use and general-purpose technology underlie many of the conclusions of this document. ICTs have contributed to economic growth, the modernization of the State and the achievement of equity. Their cross-cutting characteristics have enabled them to serve as a tool to promote development in various areas of economic and social activity.

Experience has shown that digitization of information and communication flows has a positive impact on production processes and, consequently, on economic growth. From the social inclusion viewpoint, mobile telephones have experienced the fastest and most massive expansion of any technology in the history of Latin America and the Caribbean, and have improved the quality of life of the poorest segments of the population. At the same time, a large proportion of the population now has access to Web-based services thanks to the numerous Internet centres in the region. As for State modernization, in only a few years, the costs of public services have fallen steeply and the transparency of public administration has improved.

Both the magnitude of the economic impact of ICTs and the effects of their various applications depend on capacities, efficiency and effectiveness in their use and the supply of complementary goods and services. The economic impact of ICTs has differed widely among countries, even those which have access to the same technology. A necessary condition for increasing that impact is the development of initiatives to complement ICTs in areas such as education, research and development, the legal system and the productive base. In sum, investing in ICTs may produce no significant results in terms of productivity unless there is a minimal level of complementarity to make possible their effective use.

In other words, technology has a much greater impact if it is considered as an integral part of social and productive organization, rather than merely an additional sector. The conceptual distinctions which have been made between access, capacities, applications and digital content have been useful in the area of research and analysis of information societies and have facilitated understanding of the phenomenon, its growth and the relationships between the various components of that growth. Nonetheless, the indiscriminate application of that conceptual framework to policies designed to incorporate ICTs into various economic and social sectors can result in uneven digital development. The concentration of efforts in one area such as access (public centres) or applications (e-government) is likely to hold back progress in others. Consequently, rather than relying on a technology-based conceptual differentiation, it would be better to focus on the end user and the sector in which the digitization is taking place (such as education, health or government) and, from that perspective, to identify what is needed in order to achieve positive results.

Focusing on the end user requires that policy formulation and implementation is not the sole responsibility of the technology experts and telecommunications and data-processing institutions, but that those involved in those tasks should include specialists from each area of application, such as businesses, public administration, health, education, national security and disaster management. They are the ones who need to consider how the technologies can modernize and optimize their work, and how to include positive effects such as efficiency, speed, transparency and the benefits of economies of scale and network externalities. This document will suggest that policies in the region should evolve from a "development of ICTs" approach to an "ICTs for development" approach.

B. ICT DEVELOPMENT: HARDWARE

The countries of Latin America and the Caribbean are only marginally involved in the production of the goods upon which the digital paradigm is based, despite the fact that a number of governments have implemented policies to support and accelerate development. Some countries have achieved good results in attracting foreign direct investment, increasing exports, job creation and even research and development, but the sector has not shown the same dynamism in the region as it has in many Asian

countries which benefited from the growth of ICT industries in the 1980s and 1990s and which became producers of ICT-related goods for the world market.

Only a few of the countries of the region, such as Brazil and Mexico, have been able to enter certain segments of the world market for hardware, and they have done so from differing starting points. Mexico is a major exporter of assembled products to the North American market; Brazil is more oriented towards its own domestic market, although its exports are growing. Hardware production activities in other countries are only minor and are based almost entirely on assembly of imported parts and components. Developing activities with higher value added and technology use, such as semiconductor production, calls for export competitiveness which is often supported by long-term sectoral policies which are essential when a new technological paradigm is born.

One of the sectoral policy issues is how to support local production of components without harming the competitiveness of the end-product producing sector. There is also the question of whether it is feasible to attract and support electronic components producers by means of sectoral public policies, in such a way that the benefits exceed the costs (the latter include a considerable investment of public funds, entailing an opportunity cost). If there is no improvement in the structural factors obstructing the growth of the sector, the most likely outcome will be specialization in niche applications or in the design of products, not components; this would not mean, however, that the sector would reach a scale enabling it to change substantially the nature of the hardware industry in the region.

While hardware development, design and production creates highly skilled jobs and makes it possible to accumulate experience in order to be involved in subsequent stages of ICT development and application, the lack of productive capacity does not prevent the digitization of economic and social structures, since the necessary equipment is a tradable good on the world market.

C. ICT DEVELOPMENT: SOFTWARE AND RELATED SERVICES

Although most of the countries of the region have experienced no problems with a model based on the import of ICT equipment, the situation is different in the software and related services industry. Software facilitates and shapes flows of information and communications among organizations of all kinds, including businesses, hospitals, schools and municipalities. Software, particularly that designed for specific businesses or sectors, is therefore an essential tool for increasing productivity and for exploiting the potential of information societies, because its architecture determines actors' new organizational and institutional structures. Since those information and communication management processes determine organizational systems and coordination mechanisms between internal and external networks, particular attention must be given to local priorities and cultures.

Since transferring and adopting software systems means transferring and applying processes and types of organization, some doubts arise as to the effectiveness of indiscriminately adopting tools intended for actors who live and work in different realities. It is unclear whether computing tools which are suitable for the realities of developed countries can take account of all the particularities and priorities of Latin America and the Caribbean, where agents operate according to differing processes, cultures and habits.

The software and related services industry in the region has developed in an essentially spontaneous manner, since it is only in recent years that public policies to promote the sector have been put in place. The evolution of software sales as a proportion of GDP has been relatively stable in the region in recent years,

while businesses in the sector have gradually increased their exports, mostly to other countries within the region. Nonetheless, the production of software for export does not contribute directly to the digitization of processes in businesses, hospitals, municipalities and other public and private entities; as a result, it does not necessarily help to create the information society in the country concerned.

The relative size of the software industry depends not only on the level of economic development and the labour supply in each country, but also on the evolution and quality of domestic demand, on the pattern of industrial specialization, and even on fluency in English, the language which is generally used in software.

On the basis of the new opportunities for decentralizing software production, the sector's main transnational companies are multiplying their operating centres in order to reduce costs and find skilled human resources outside their countries of origin. That is why some of the countries in the region are poles of production for the world market and attract labour-intensive activities.

The major challenge of digitizing productive and social organization in the countries of the region involves a huge task for some 340,000 professionals who work in the software and related services sector in Latin America and the Caribbean, in order to progress with computerization, adaptation and innovation needed by the users. Furthermore, the spread of ICTs has boosted demand for skilled professionals, who are essential for progress towards the creation of information societies in the region, not only in the software industry, but also in user businesses. The development of regional production networks in the sector may be the right tool for ensuring that many countries form a critical mass so that good results can be achieved.

In order for the sector to move forward, related educational programmes must be linked with national strategies for the development of ICTs. Although secondary-school educational levels need to be improved in disciplines such as mathematics, data processing and English, policies for tertiary education and the development of technical and scientific infrastructure probably have greater potential for developing the software industry in the medium and long term. This will involve high-level human resources training, investment in research activities and promotion of international cooperation. This is a vital task because, unlike hardware production, the application and adoption of software systems and ensuring that they continue to produce good results involve knowledge of local processes. A true information society cannot exist without a critical mass of local actors representing this key industry.

D. ICT DEVELOPMENT: TELECOMMUNICATIONS OPERATORS AND REGULATION

In the developed countries, data transmission and Internet access services are the engine of growth in telecommunications services. The picture is similar in the developing countries, but with marked emphasis on mobile telephones. Fixed-line telephone services, on the other hand, have seen a significant drop in the growth of their customer numbers and, therefore, of their income. The convergence of mobile and fixed-line telephony and the replacement of the latter by the former have led telecommunications operators to explore synergies between the two segments. There are now many combined offers of multiple packages which are breaking down the traditional frontiers between the segments of the industry. Consumers are generally paying less for more, enjoying improved services and benefiting from the dismantling of barriers between markets, which enables them to choose among services offered by a greater number of providers.

These trends show that the generation of value lies in the provision of connection infrastructure and in the content transmitted over the networks. The increase of traffic caused by the spread of broadband connections is one of the principal growth areas for operators and represents one of their main challenges in the region, in view of the levels of coverage, which remain very low in most of the countries, particularly for the low-income population and those living outside major cities. Initially, operators had no incentive to offer access via Internet protocol (IP) technology, since this would increase the risk of replacement of switched telephone services by Voice over Internet Protocol (VoIP); nonetheless, faced with falling income from traditional communication systems, they were obliged to invest in modernizing networks and incorporating broadband Internet access technology.

Rising demand for traffic resulting from the new technological options will force operators to move forward towards Next Generation Networking (NGN) using fibre-optic cables; much remains to be done in this regard, particularly concerning connection to the major international trunk networks.

Faced with these changes, survival may be possible for businesses which have taken advantage of the synergies and struck a balance between voice, data and video services. Creating and reinforcing this modern infrastructure requires a new investment cycle, with the resulting financing needs.

The region is headed towards convergence, and operators are abandoning the segmentation of the late 1990s in order to create greater integration between various areas of activity. Duopolies have come into being in the great majority of the Latin American countries, involving two actors, Telmex-América Móvil and Telefónica, which owe some of their success to the implementation of business strategies to broaden the market penetration of the services required by governments. Strong market concentration has meant a major role for the authorities responsible for regulation and for protecting competition, while the reduction and removal of technological barriers are forcing regulators to take a new look at how to regulate specific services markets which are increasingly multifaceted, convergent and interfacing. In a situation where technological and market forces entail the efficient functioning of a limited number of operators, the main public-policy actions are focused on regulation and protecting competition.

In a number of the countries of the region, legislation remains weak in terms of regulating ICT-related matters, and institutions are weaker still in its implementation. The speed of technological change, reflected in barriers to market entry by new actors, creates complex problems for legislators and regulators when they need to anticipate, or at least keep up with, requirements in the area of regulation. As mentioned above, technological convergence blurs the boundaries of businesses' fields of competition and their traditional areas of operation. This is a development that is hard for regulators to deal with although, given the limited progress of markets with converging solutions in the region, it is unlikely that discussions will be centred on network characteristics as they are in the developed countries. The focus of attention is currently on regulatory changes to make possible multiple-package options. Regulatory bodies in some countries are assessing the characteristics of new networks and the design of rules which will have a decisive impact on the deployment of advanced technology.

Such regulatory changes are more difficult because many of the region's regulatory bodies, being still very young, have yet to consolidate their positions or build well-defined operational agendas. Such authorities tend to find themselves having to regulate according to each sector's efficiency and, at the same time, having to take into account issues such as equity and the need for universal access to services. The two goals can be contradictory, at least in the short term, which is why such authorities may not have the analytical tools necessary to clearly define their actions. This may make their functions unworkable for lack of clarity concerning the priorities for their actions. This leads to consideration of possible institutional separation between the authorities seeking to create conditions of market efficiency and those which focus

on social objectives and equity in services. There is considerable complementarity between the two tasks, but separating them would contribute to the consolidation and transparency of regulatory decisions.

The functions of the region's regulators must therefore be strengthened in three vital areas so that they can perform efficiently: their independence must be assured, their responsibilities must be clearly defined in respect of the efficiency of the sector and equity in service provision, and their technical capacities must be improved. This is indispensable in order to enable them to overcome problems relating to convergence, such as duplication of regulations applicable to a given sector, from ex ante changes in a regulation to measures to protect competition ex post, and multiple economic and social objectives which may be imposed on them and which may often be contradictory or hard to reconcile.

E. THE INTELLECTUAL PROPERTY DEBATE

The countries of the region are undertaking the construction of new frameworks to balance the possibility of ownership of the benefits of innovation and universal access. This is reflected in three types of actions: first, the design of legislation on intellectual property rights which, while fulfilling commitments entered into under international agreements, will provide every possible flexibility to facilitate the dissemination of knowledge and information at reasonable prices; second, the elaboration of public policies and complementary legislation in the areas of innovation, education, competition and consumer rights, while including considerations of intellectual property in sectoral policies; and third, the establishment of legal frameworks and institutions to facilitate the expression of the interests both of owners and of consumers or users of goods protected by those rights.

Since increased protection of intellectual property rights will not provide all the necessary incentives for investment in new knowledge, which will always generate externalities, policies must be designed and broadened to increase national efforts in favour of research and development, technology transfer towards small and medium-sized enterprises, the training of highly skilled professionals and the development of quality learning systems. In particular, the countries must continue to consider and encourage, especially through public-sector demand, the use of open-code software. Thus, the set of issues relating to intellectual property should transcend the related laws and institutions and should also include institutions and policies in the areas of education, protection of competition and innovation.

F. ICT DEVELOPMENT: EDUCATION

Members of the public and private sectors, academia and civil society taking part in the policy priority Delphi survey for the Plan of Action for the Information Society in Latin America and the Caribbean, eLAC 2007, (almost 1,500 contributions were received) identified education as the most urgent priority to be addressed in this area. This was the consensus that emerged in almost all countries of the region, within the community interested in ICTs for development, irrespective of the gender, level of education or professional affiliation of the experts in question.

Training in ICT skills is increasingly important in the information society, but many people lack the basic training necessary to use these technologies. Most countries in the region incorporate in their ICT education policies strategies that seek to promote their use by teachers and students alike. ICTs are being incorporated in schools in order to provide students with the skills necessary to perform in the

information society. Nevertheless, many schools still do not have computers on site, much less Internet access. The divide between public and private is significant with the advantage accruing to the latter. Since students in private schools usually come from better-off households, and have a computer and Internet access at home, those in public schools are at a double disadvantage (both at home and at school). To date, public policies have not been successful in providing equal opportunities in terms of access and basic ICT skills. Because of these setbacks, whereas ICT policies in the developed countries, place emphasis on increasing students' digital skills and on improving teaching and learning, the focus in the developing countries continues to be on closing the gap in access and basic use. In other words, just as was done initially in the case of education, the main thrust now is to expand access.

In addition to expanding ICT coverage and quality in schools, training strategies must be intensified and deepened so that teachers can acquire the skills and abilities they need in order to use these technologies in their professional practice. Steps must also be taken to promote the design and implement applications of these technologies in teaching through integral models for ICT use. The demand for new skills and abilities, such as building knowledge, the capacity for change and innovation, and life-long learning, requires the design and implementation of a new school curriculum.

ICTs can enhance teaching by changing the way in which students learn and teachers impart knowledge by promoting student-based teaching practices with active commitment and constant interactivity and dialogue. To be effective, training in ICTs must be part of a coherent teaching strategy that is sustained over time and in which practices at the establishment and classroom level are consistent with national teaching strategies. In many countries of the region, however, classroom teaching methods are defined without considering the possibilities of digital technology. Since, paradoxically, there are no clear estimates of how much a student's performance will benefit from ICTs, steps must be taken to move forward in this field and to develop and apply indicators, not only of the introduction and use of these technologies, but also of their impact.

In terms of content, countries seek solutions for providing software and applications that keep abreast of technological advances and reflect their educational needs. An important initiative in this regard is the Latin American Network of Education Portals (RELPE), which circulates free of charge the content developed by national portals, taking advantage of the low cost of reproduction and dissemination of digital content.

Education is a clear example of the need for sectoral specialists, in this case, educators, to harness ICTs in order to improve content, teaching and the effectiveness of the material provided. While all the countries in the region have committed themselves in the Geneva Plan of Action (2003) to "to adapt all primary and secondary school curricula to meet the challenges of the Information Society, taking into account national circumstances" by the year 2015, the development of ICT and education often seem to be following parallel, non-convergent paths. The onus is on the education sector itself to make ICTs an integral part of a coherent education reform that seeks not only to optimize ICT-based teaching methods, but also to train future generations in the use of these technologies.

G. ICT DEVELOPMENT: ELECTRONIC GOVERNMENT

The success of e-government depends on the interoperability of networks. It is relatively simple and inexpensive to design and present straightforward information web pages (*front office*) compared with the complexity of integrating multiple digital systems that provide content (*back office*). Without interoperability between the different State-owned information systems, it is not possible to set up single Web pages where all State procedures can be performed online. The direct beneficiaries of this interoperability are citizens and enterprises, not to mention the public entities themselves, which no longer have to search or provide the same information over and over again. In addition, interoperability promotes transparency by enabling tighter controls over potential frauds. Thus, conditions for information exchange between public administration entities must be improved, to avoid the development of "information islands" which take into account only their own particular needs, leading to inefficient and poorly coordinated management of information and seriously hampering interaction between them. All of this calls for strengthening of governance in terms of e-government, that is the norms and institutions necessary for achieving information exchange agreements, homogeneous practices and standards accepted by the different public entities.

Several countries of Latin America and the Caribbean have made significant progress in ensuring the interoperability of their e-government solutions. The benefits of digitization and interoperability are also provided in relationships between the countries of the region. Thus, the MERCOSUR, Central American and Andean Community countries have adopted initiatives that seek to develop interoperable applications, for example, in terms of harmonization of customs systems.

ICTs are a resource that must be used for the development of coordinated mechanisms for information exchange and the integration of processes between countries, which will help to reduce the barriers that have prevented them from pursuing common objectives owing to the high costs involved. In this context, the interoperability of e-government systems must be seen as a tool in integration processes with respect to policies and norms in fields such as international trade, telecommunications infrastructure, regulation, migration, social security, health, education, technological innovation, the environment and macroeconomic cooperation. To this end, activities have been defined and programmed to ensure that within a certain time limit an efficient environment and interoperability platform can be set up at the regional level, with legal security in a climate of convergence of norms and disciplines and with advances in infrastructure and connectivity. The White Book of e-Government Interoperability in Latin America and the Caribbean, prepared by the authorities of the countries of the region in cooperation with ECLAC, the Organization of American States (OAS) and the Inter-American Development Bank (IDB), is a major step in this direction. The coming years will be decisive for the implementation of these concepts and rules.

In conjunction with these advances, the interoperability of information systems at the national level or between countries requires clear policies that guarantee citizens' privacy. Otherwise, people might be discouraged from interacting electronically with public entities for fear that the data might be handled irresponsibly or be subject to fraud. Therefore, efforts in interoperability must be put forward in tandem with rules for data protection.

H. DEVELOPMENT WITH ICTs: ELECTRONIC BUSINESS

In terms of companies' transition towards e-business, the results of the policy priority Delphi survey undertaken in the framework of eLAC 2007 indicate that there are no major problems for access by companies to ICTs, at least not for those operating in the formal sector, which require training of entrepreneurs and workers to adapt business to the digital era.

Businesses in the region have to face simultaneously the digitization of their inter- and intra-company processes, whereas in the developed countries, most in-house processes were digitized when the Internet facilitated business interconnectivity. In order for companies in the region to take full advantage of the potential of electronic business, they must make progress in moving their internal management into the digital age, and software producers must therefore provide appropriate solutions at affordable prices. Digitization of processes, reorganization of management and the provision of relevant human resource training calls for time and resources. In the case of small and medium-sized enterprises, financing systems are needed to cope with this transition.

Businesses in the region must not only incorporate technological change, importing solutions and business practices from more advanced economies, but must also be capable of acting in the new context with tools that match their reality. Hence the need for a critical mass of technical staff capable of modernizing local processes. The challenge for companies in the region is to incorporate the competitive potential of e-business fully into their production processes.

I. DEVELOPMENT WITH ICTs: HEALTH AND DISASTER MANAGEMENT

Information and communication processes are fundamental in the health sector, where a great number of potential ICT applications exist. Notwithstanding this potential and the fact that work in this sector is considered to be a priority in development agendas, health services in Latin America and the Caribbean have not yet entered the digital age. The technological capital in public hospitals and health centres is still limited, digitization of processes is fragmentary and weak, and content is scant. There are no coherent programmes or policies to make good these deficiencies.

Bringing countries up to date technologically in an area that is so critical for human development is a matter of urgency and must not be delayed; lessons may be drawn from the experiences of other sectors, such as education, which has created regional portals. Many countries in the region face similar problems in health and the creation of content exchange networks could provide positive results.

Various projects in the region have shown the benefits of telemedicine and in absentia care, especially for inhabitants of remote areas where there are few health professionals and specialists and where diagnostic equipment is unreliable or non-existent. Health entities must also digitize their in-house processes. However, lack of appropriate software and of interoperable systems is an obstacle to digitization of these processes. The introduction of large databases and complex resource provision and management processes poses a significant challenge. If there are no common standards for creating interoperable systems from the outset, it is difficult to introduce them later.

Privacy protection, an essential element in the interoperability of the health sector, is one area in which the region has made little progress. Its development requires the conjunction of specialist

knowledge in legislation, digital development and health; this calls for a level of interdisciplinary dialogue that is difficult to achieve because of the different codes used by each profession. Once again, a careful analysis of the experiences of other regions should prove useful.

A similar recommendation may be applied to natural disaster mitigation and management where, despite advances in development and institutional coordination, there is still room for deepening ICT knowledge and use, in particular in strengthening regional cooperation throughout the management cycle, including mitigation, preparation, response and recovery.

J. POLICIES FOR DEVELOPMENT WITH ICT

Facing up to the challenges of ICT policies calls for a broad vision of the technologies, complemented by other aspects of development. Given the cross-cutting nature of ICTs, the degree of success of a policy for the information society depends on the capacity to establish and operate coordination and communication channels with all sectors of the economy and society. Specific knowledge required to digitize education, business, health and government processes does not allow for policy centralization. ICTs, by their very nature, create opportunities for common learning, economies of scale and interdependencies, which may be used to coordinate decentralized activities through a coherent strategy or agenda. Latin American and Caribbean countries have moved forward at different rates in defining and implementing policies for building information societies. While many of them started this process in the first few years of the current decade, only in recent years have these policies taken shape, except in four countries which are already in the phase of second-generation digital strategies. Endogenous and exogenous factors conspire to hinder the dynamic for change, generating delays and hitches.

The endogenous factors include the institutional weakness of the agencies and the failure to allocate a specific budget for the purpose; as a result, ICT policies depend largely on ministerial budgets, which are not usually tailored to such activities. In some cases, the fact that key actors failed to participate or commit themselves detracted from the legitimacy of the process, causing hitches that were compounded by exogenous factors such as changes of government and turnover of those responsible for implementing such policies. In other cases, lack of digital maturity among the political class hampered the implementation of initiatives put forward by ICT-related sectors.

Following attempts over a number of years, however, national strategies are being consolidated in the countries of the region with a greater degree of ICT maturity. In this new phase, digital strategies have been part of countries' national development plans and thus are higher on the list of political priorities. The issues receiving the most attention continue to be increasing access and e-government, as well as capacity generation. In the smaller economies such as those of the Caribbean, major strides have been made in increasing access, but growth in the development of e-government remains sluggish, while in the larger countries (Argentina, Brazil, Colombia and Mexico), the opposite can be observed.

Notwithstanding the progress achieved, Latin America and the Caribbean still falls far short of implementing coherent, effective and operational national strategies, and one of the fundamental goals is to ensure mechanisms for building legitimate, lasting institutions that can withstand changes of government. The major advance in the region has been the integration and significant participation of different public stakeholders in the formulation of national strategies. Since this issue is a new one, however, efforts to implement policies of this kind still depend to a great extent on individual leadership and this means that the continuity of the process is at risk.

Indications are that the existence of in important number of initiatives boosts development in certain areas; moreover, better and faster results will be achievable if such actions are coordinated using a comprehensive strategy. In other words, progress in this area will depend on whether there are many or few initiatives, but continuous coordination of such initiatives will generate synergies.

ECLAC recommends defining and implementing such strategies to facilitate the coordination of resources for more efficient allocation and to take advantage of collective knowledge emerging from the participation of stakeholders from different sectors. Hence the need for opinion-shapers who stress the importance of ICTs for economic and social development and identify public resources allocated to ICTs in each department; this remains to be done in almost all countries of the region. Information on who spends what on ICTs in the public sector is vital for generating savings, coordination and synergy.

In terms of policies at the regional level, the Regional Plan of Action, eLAC, has been a tool for matching the urgent needs of the countries of Latin America and the Caribbean with the global Millennium Development Goals adopted for the year 2015 and the commitments adopted at the World Summit on the Information Society. eLAC is noted for two innovative features: it is a short-term plan based on a long-term vision, and it brings together all the important stakeholders in order to build information societies, irrespective of their nature, which constitutes a "metaplatform" for the coordination of public-private initiatives. The Plan of Action, although based on a long term vision (to 2015), provides for short-term actions (2005-2007, 2008-2010), and this opens up the possibility of periodically reviewing fulfilment of its targets and reformulating goals as they are implemented and in accordance with the needs emerging from the ICT dynamic, itself. Moreover, in view of the similarity of aspects of digital development in the public sector and the private sphere and the interrelationships that this implies, a spirit of cooperation is vital. This approach will multiply the positive effects, including in areas of exclusive public domain; thus, the public and private sectors must work in close cooperation and eLAC must consider among its objectives and activities the performance of all actors, thereby facilitating their identification and interrelationship.

As a political and regional process, eLAC has received broad support and recognition from the Governments of the countries of the region, which have been promoting phase two with a target period of 2010. The challenge is to keep this process alive, since the true magnitude of its impacts can only be measured in the long term.

K. CONCLUSION

The digital divide is a moving target which is changing faster and faster; experience suggests that technical change and the impact of ICTs in the coming years will be greater and vaster than the advances observed in the past decades. This acceleration of technological progress makes it necessary to develop appropriate institutional frameworks to confront this challenge consistently and systematically, since isolated, short-term initiatives cannot suffice.

ECLAC maintains that the digital divide has two dimensions: expansion (access) and depth (quality of access). Even when the whole population has access to digital networks, some will undoubtedly have access to an ever wider broadband and will be able to use advanced multimedia services, while others will be limited to voice communications. In this context, two challenges emerge: efficiency, to ensure the quality of services at the lowest possible price, and equity, to ensure an appropriate dissemination process. In terms of efficiency, in the case of mobile telephones, the technology

that has enjoyed the most rapid and greatest expansion in the region, appropriate regulatory frameworks have had to be set up to facilitate this expansion. In terms of equity, while funds have been available in various countries to finance the expansion of basic connection infrastructure, additional measures are still needed to ensure that businesses and individuals can first have minimal use and later full use of the potential of ICTs. In this respect, subsidies must be granted to compensate, at least partially, for income inequalities between individuals and geographical areas and to carry out an in-depth analysis of the amount of such subsidies, their management and whether the best option is direct subsidies or cross-subsidies. Each option has its advantages and costs in terms of economic efficiency and effectiveness of the policy involved. Moreover, in terms of feasibility, these options are not the same: convergence of technologies in a climate of free competition means that telecommunications operators' income per user is falling and this will limit the amount of cross-subsidies that can be granted.

Public access to digital information optimizes the use of scarce resources at the same time as it provides solutions for sharing the cost of on-going modernization of technology. A great deal of ground still remains to be covered in terms of advancing from the plethora of separate initiatives existing in the region for public access to digital information to a State policy with a stable institutional framework. Furthermore, as in any complex social system, solutions to problems such as rapid obsolescence of equipment and training of users are neither simple nor intuitive.

Given the cross-cutting character of ICTs, management of ICT support policies requires the involvement not only of senior government officials but also of computer and telecommunications specialists and professionals in application areas, including entrepreneurs, educators, doctors and health-sector staff and public administration staff. Furthermore, it is essential to draw on collective intelligence. Given the speed of technological change occurring essentially outside the region, authorities are faced with an extraordinarily high level of uncertainty in their decision-making. ICTs themselves, which provide mechanisms for virtual collaboration and consultation, have proved to be a tool for involving the different social sectors in an effective and efficient manner.

In conclusion, ECLAC reiterates that the countries of Latin America and the Caribbean must increase their efforts to reduce the digital divide in terms of access and quality of access and must step up the use of ICTs in order to continue their advance towards the construction of information societies. First, complementarities must be developed in order to realize the potential impact that ICTs can have on economic performance and social integration. Second, coordination of resources and initiatives underway in countries must be achieved or strengthened, as the case may be, in order to achieve synergy and thus avoid duplications, time lags and even incompatibility of goals. Third, new initiatives for intra-regional cooperation based on the different degrees of ICT advance in the countries of the region must be pursued, consolidated or implemented. Fourth, ICT decision-makers must be motivated to gradually take the lead in adopting policies in this respect. Lastly, a positive approach would consist in focusing attention on strengthening instruments and building institutions for implementing regional initiatives and national and sectoral ICT policies.

Bibliography

Digital Review of Latin America and the Caribbean (2008), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC)/United Nations Development Programme (UNDP)/International Development Research Centre (IDRC)/ Regional Dialogue on the Information Society (DIRSI), unpublished.

ECLAC (Economic Commission for Latin America and the Caribbean) (2008), "The Information Society in Latin America and the Caribbean: Development of Technology and Technologies for Development", unpublished.

_____ (2007), *Satistical Yearbook of Latin America and the Caribbean, 2006* (LC/G.2332-P/B), Santiago, Chile, March. United Nations publication, Sales No.E/S.07.II.G.1.

_____ (2005), "Políticas públicas para el desarrollo de sociedades de información en América Latina y el Caribe" (LC/W.19), Santiago, Chile [online] http://www.eclac.org/publicaciones/xml/5/21575/ Politicas%20Publicas.esp.pdf.

_____ (2003), *Road Maps towards an Information Society in Latin America and the Caribbean*, Libros de la CEPAL, No. 72 (LC/G.2195/Rev.1-P/I), Santiago, Chile, July. United Nations publication, Sales No. E.03.II.G.09.

_____ (2000), "América Latina y el Caribe en la transición hacia una sociedad del conocimiento: una agenda de políticas públicas", *Financiamiento del desarrollo series*, No. 96 (LC/L.1382), Santiago, Chile. United Nations publication, Sales No. S.00.II.G.55.

Hilbert, M., P. López and C. Vázquez (2007), "ICT innovation avenues and the amount of digital information: deepening comprehension of the digital paradigm", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), unpublished.

Hilbert, Martin and Osvaldo Cairó (2007), "Quo vadis, information and communication technology: technological trajectories, state of the art and perspectives of the digital systems", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), unpublished.

ITU (International Telecommunication Union) (2006), *World Telecommunication/ICT Development Report 2006: Measuring ICT for Social and Economic Development* [online] http://www.itu.int/ITU-D/ict/publications/wtdr_06/index.html.

ITU/UNCTAD (International Telecommunication Union//United Nations Conference on Trade and Development) (2007), *World Information Society Report 2007: Beyond WSIS* [online] http://www.itu.int/osg/spu/publications/worldinformationsociety/2007/report.html.

Kingdon, J. W. (1995), *Agendas, Alternatives, and Public Policies*, New York, HarperCollins.

Miranda, Carlos (2007), "Information society and public ICT policies in the Caribbean: a review of advances and challenges, policy instruments and country experiences", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), unpublished.

Nordhaus, W. D. (2002), *The Progress of Computing*, Yale University [online] http://nordhaus.econ.yale.edu/prog_030402_all.pdf.

UNCTAD (United Nations Conference on Trade and Development) (2006), *Information Economy Report 2006: The Development Perspective* (UNCTAD/SDTE/ECB/2006/1), Geneva.

Webster, Frank (1995), *Theories of the Information Society*, New York, Routledge.

World Economic Forum/INSEAD (2006), *The Global Information Technology Report 2005-2006, Leveraging ICT for Development*, Soumitra Dutta , Augusto Lopez-Claros and Irene Mia (eds.), Palgrave Macmillan.

Official websites

- Argentina: Programa Nacional para la Sociedad de la Información [online] www.psi.gov.ar.

- Bahamas: Policy Statement on Electronic Commerce and the Bahamian Digital Agenda [online] www.bahamas.gov.bs/finance.

- Barbados: Barbados National ICT Strategic Plan (anteproyecto) [online] www.commerce.gov.bb;

- Bolivarian Republic of Venezuela: Plan Nacional de Tecnologías de Información [online] http://www.plantic.gob.ve.

- Bolivia: ETIC [online] www.etic.bo, y Agencia de la Sociedad de la Información (ADSIB) [online] www.adsib.gov.bo.

- Brazil, Libro Verde de la Sociedad de la Información [online] http://diamante.socinfo.org.br;

- Chile: Agenda Digital [online] www.agendadigital.cl.

- Colombia, Agenda de Conectividad [online] www.agenda.gov.co.

- Dominican Republic: Estrategia Nacional para la Sociedad de la Información [online] www.edominicana.gov.do.

- Ecuador: Estrategia Nacional para la Sociedad de la Información [online] www.conatel.gov.ec.

- El Salvador: Programa e-País [online] www.epais.gob.sv.

- Grenada: ICT Strategy and Action Plan 2006 – 2010 [online] http://www.unpan.org/tasf/ICTStrategy-Grenada.PDF.

- Guatemala: Guatemala SI [online] http://www.guatesi.org.gt/.

  Guyana: ICT4D Guyana, National Strategy (anteproyecto) [online] www.ict4d.gov.gy.

- Jamaica, Five-Year Strategic Information Technology Plan [online] www.cito.gov.jm.

- Mexico: Programa Sectorial de Comunicaciones y Transporte 2001 -2006. Cap. 7: Sistema Nacional E-Mexico [online] www.e-mexico.gob.mx.

- Panama: Agenda Nacional para la Innovación y la Conectividad [online] www.innovacion.gob.pa.

- Peru: Agenda Digital [online] www.codesi.gob.pe.

- Trinidad and Tobago: Fast Forward [online] www.fastforward.tt.

- Uruguay: Agenda Digital Uruguay [online] www.agesic.gub.uy.