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**ROAD MAPS TOWARDS AN INFORMATION SOCIETY IN  
LATIN AMERICA AND THE CARIBBEAN**

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## INTRODUCTION

The concept of an “information society” refers to a paradigm which is profoundly changing the world in which we live at the beginning of this new millennium. This transformation is being driven primarily by new ways of creating and disseminating information using digital technologies. Information flows, communications and coordination mechanisms are being digitized in many different sectors of society, and this process is gradually giving rise to new ways of organizing society and production. While this form of “digital conduct” is becoming an increasingly global phenomenon, it has its origins in what are, for the most part, mature industrial societies. Indeed, the adoption of this technology-based paradigm is strongly correlated with any given society’s degree of development. However, technology is not only the child of development (as it derives from the development process), but is also, to a large extent, its parent (since it is also a tool for development).

Viewed from the perspective of Latin America and the Caribbean, the question of how to employ this emerging paradigm to achieve broader development goals and to integrate the region more fully into the global information society is an issue of paramount importance on the development agenda. In order to tackle the challenging task of integrating the paradigm of the information society into the development agenda, ECLAC is seeking to address three key questions:

- (1) What kind of “information society” is desired?

Based on an analytical framework developed by ECLAC for the consideration of the many complex issues involved in the construction and operation of an information society, it is of vital importance to determine the purpose and aims of all lines of action oriented towards the transition to an information society. The first chapter of this study lays the groundwork for such an analysis.

- (2) What are the basic characteristics and regional particularities of the transition towards an information society in Latin America and the Caribbean?

In order to understand what current and future paths the region can choose to follow in making the transition to an information society, the second chapter reviews some of the specifically regional features of the current process.

- (3) What policies can support the transition towards an information society?

The third and final chapter proposes a positive agenda for Latin America and the Caribbean in the transition to an information society.

## Chapter 1

**DEFINITIONS AND GUIDING PRINCIPLES  
OF AN INFORMATION SOCIETY**

Technology-based paradigms, such as that of the information society, provide a multitude of means to a multitude of ends. In order to discuss those ends meaningfully and to set priorities on the policy agenda, a clear distinction must be drawn between the ends and means associated with this paradigm. The first step in doing so is to gain a better understanding of exactly what the paradigm of an “information society” entails (Hilbert and Katz, 2002; UN ICT Task Force, 2002; CV Mistica, 2002; WEF, 2002a; DOT Force, 2001; Digital Opportunity Initiative, 2001; SocInfo, 2000; between others).

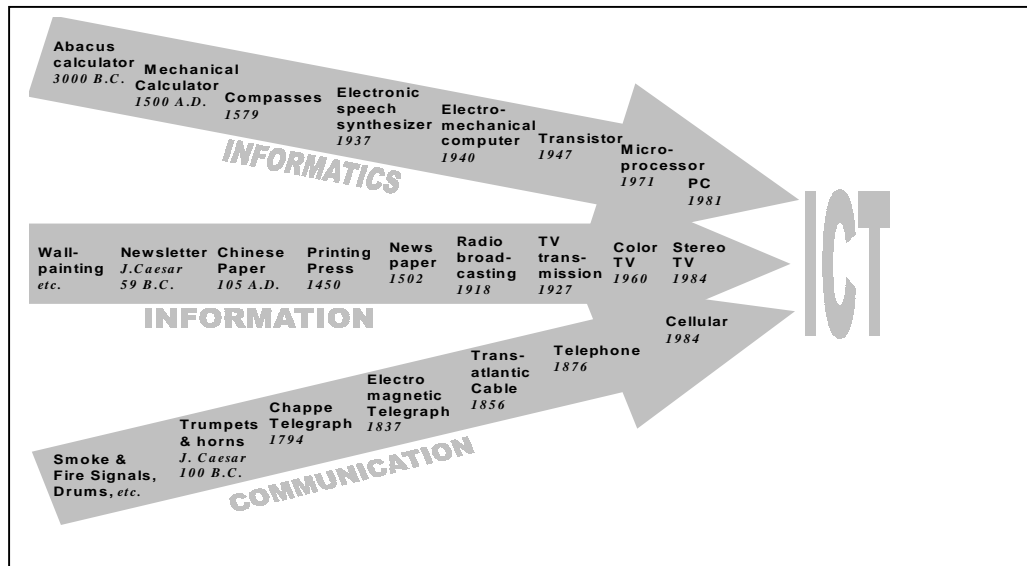
The concept of an “information society” is both very complex and at a very incipient stage in its development. Intellectual thought will need to reduce this complexity through a process of abstraction, whereby this paradigmatic “reality” is expressed in terms of specific entities and their relationships to each other. Clearly defined terms and schemata need to be established in order to discuss the concept of an “information society”, since such a model is essential in order to pursue specific development goals. The conceptual framework used by ECLAC is based on general characteristics of information and communications technologies (ICTs) and the resulting digitization process, which are at the core of the emerging paradigm.

All human behaviour is based on the exchange of information and communication. Communication can take place through many different channels. Voice, text, gestures, movements, expressions, affection and even non-attention transmit some kind of information. After all, for human beings, *it is impossible not to communicate* (Watzlawick, Beavin and Jackson, 1990). An ever-greater proportion of human communication can be and is being digitized. This process began a few decades ago and is accelerating as technological solutions evolve. These technological systems are commonly referred to as ICTs. The deployment of ICTs has a significant impact on how information and codified knowledge are processed and disseminated throughout the world.

ICTs are defined as technical systems that receive, manipulate and process information and facilitate communication between at least two parties. ICTs are therefore more than just informatics and computers, since they do not operate as isolated systems but are instead embedded into a network. They are also more than just broadcasting technologies, since ICT systems not only foster the dissemination of information, but also permit interactive communication. The current process of “ICT convergence” (namely, the merging of information-dissemination technologies, communication-enabling technologies and informatics solutions) is leading to the coalescence of three previously separate technology paths into one technological system, which is simplistically referred to as “ICT” (the “network of networks”) (see figure 1.1).

ICT deployment necessarily entails the process of digitization, through which information flows, communications and coordination mechanisms—whether relayed through text, sound, voice, image or other media—are codified into binary digits. Digital ICTs use a language of binary digits to receive and manipulate information and to communicate between one other. The “information society” is a direct result of this development in the field of information and communications.

Figure 1.1  
ICT CONVERGENCE



**Source:** Martin Hilbert, “Toward a theory on the information society”; “Infrastructure”; “Strategies”; “Telecommunications regulation: technical standards”; “Financing a universal Information Society for all”; “e-Business: digital economics”; “e-Media”, *Building an Information Society: A Perspective from Latin America and the Caribbean*, Libros de la CEPAL series, No. 72 (LC/G.2199-P), Martin Hilbert and Jorge Katz (eds.), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2002.

**Note:** The dates given in this figure, as well as the choice of inventions, may be subject to debate.

The first requirement for “digital conduct” is the physical infrastructure (the “Net”). The build-out of computer networks, digital TV, digital cellular phones, telephone lines, fibre-optic networks, wireless networks and all sorts of hardware, telecommunications and generic IP services belong to this layer. The second requirement is the generic service applications that make it technologically feasible to use this physical infrastructure to create value. The entire array of software, webhosting, browsers and multimedia applications, along with everything else that is based on “bits and bytes”, fall into this category. Since the “infrastructure layer” and the “generic services layer” lay the foundations for the process of digitization (SocInfo, 2000), they are referred to as “horizontal layers”.

In considering these horizontal layers, it is important to bear in mind that neither the mere production of technology (be it hardware or software) nor the sheer existence of technological infrastructure automatically leads to the creation of an information society. The industries that produce ICTs are clearly flourishing, but they are often only indirectly connected to the digitization process, and it is this process that is, in essence, the driving force which is moving information exchanges into the digital age.<sup>1</sup>

Based on the technological foundations provided by these two horizontal layers (infrastructure and generic services), the aim is to digitize information flows and communications in different sectors of society (such as business and commerce, health care, public administration, education, etc.). The various

<sup>1</sup> It is interesting to observe that countries which are important producers of ICTs, such as the Republic of Korea, lag far behind in e-commerce, whereas countries with virtually no domestic ICT production sector, such as Australia, are in the e-business vanguard (OECD, 2001).

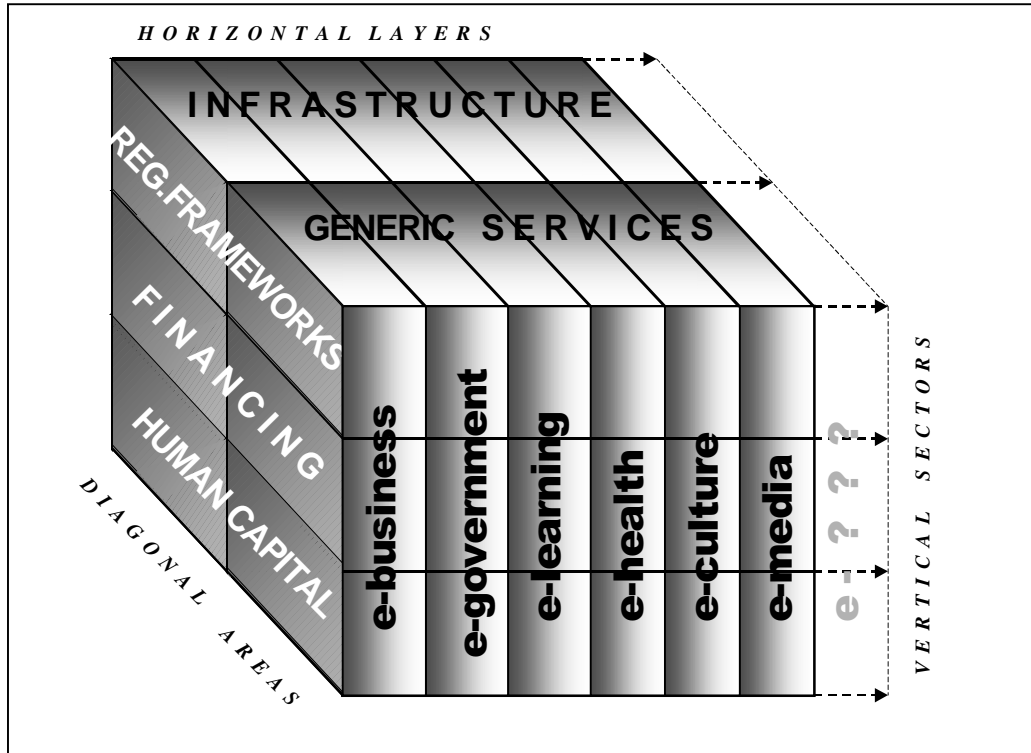
sectors of society in which the digitization process is taking place build up vertically from these horizontal foundations. As such, they are identified as the “vertical sectors” of an information society. It is the *application* of the technology that provides the *content* of an information society’s networks. The focus of these vertical sectors is on digital processes, whereas the horizontal layers’ focus is on digital outputs. The fact that information flows and communications move through electronic networks in a given sector is usually signified in the literature by adding an “e-” as a prefix. Many different “e-sectors” can be identified. The process of digitization is surely most advanced in the business and commercial sectors (e-business and e-commerce), but other sectors of society stand to gain a great deal from digitization as well (e.g., e-government, e-democracy, e-health, e-culture, e-learning, e-education, e-media, e-security, e-banking, etc.).

In addition to the different horizontal layers and vertical sectors, the digitization process must be supported by institutional developments in a number of interrelated fields, which might otherwise create bottlenecks in the digital organization of an information society. These cross-cutting, or diagonal, fields permeate various components of both horizontal layers and vertical sectors. Such cross-cutting areas include the establishment of regulatory frameworks that foster and provide scope for these new forms of behaviour, financing mechanisms that support the diffusion of these technologies and their implementation, and human capital that acts as the driving force behind the technology. Figure 1.2 provides a three-dimensional illustration of the different layers, sectors and areas of the information society.

This model can be used to identify interdependencies and causal relationships between the different actors and subjects involved. It also facilitates the identification of potential bottlenecks and supports the development of a comprehensive policy agenda to foster the transition to an information society. Such a policy agenda can be drawn up along the different lines marking the intersections of particular “layers”, “sectors” and “areas”. For example, a policy regarding the regulatory framework in the infrastructure layer (e.g., telecommunications regulation) can be focused on the diffusion of the relevant technology in municipalities (i.e., the intersection of regulatory frameworks with the infrastructure layer in the e-government sector). By the same token, the training of human capital (such as software engineers) in the generic services layer can be directed towards the introduction of software applications in small and medium-sized enterprises (i.e., the intersection of human capital with the generic services layer in the e-business sector). However, the different fields are also highly interdependent. Thus, for example, inadequate digital signature legislation (as an element of the regulatory framework) could act as a bottleneck that hinders the development of all of the different vertical e-sectors. Along the same lines, a downturn in foreign investment flows in the financing area may be slowing development in the infrastructure and generic services layers, which in turn hampers the development of e-sectors, and so forth.

The conceptual model provides for the fact that the transition to an information society has a generic impact in a wide range of areas. Since the characteristics and assets of every one of the horizontal, vertical and diagonal fields vary across regions and countries, there is no “one size fits all” path for the transition to an information society. The course to be followed in making that transition will depend on country- and region-specific features.

Figure 1.2  
**HORIZONTAL LAYERS, VERTICAL SECTORS AND DIAGONAL  
 AREAS OF THE INFORMATION SOCIETY**



**Source:** Martin Hilbert, “Toward a theory on the information society”; “Infrastructure”; “Strategies”; “Telecommunications regulation: technical standards”; “Financing a universal Information Society for all”; “e-Business: digital economics”; “e-Media”, *Building an Information Society: A Perspective from Latin America and the Caribbean*, Libros de la CEPAL series, No. 72 (LC/G.2199-P), Martin Hilbert and Jorge Katz (eds.), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2002.

The advent of ICTs and the subsequent digitization process in the different sectors of society is not an unmixed blessing. On the one hand, it has opened up many promising opportunities for developing countries. The fact that ICTs and digital practices have impacts that extend far beyond the economic sphere and can be employed in health, politics, public administration, education and advanced science, as well as in cultural, social and even religious activities, attests to the current technology-based paradigm’s development potential. On the other hand, a new form of exclusion —dubbed the “digital divide”— is taking shape. This “digital divide” has the potential to widen the gap between regions and countries (the international digital divide) and between groups of citizens within a society (the domestic digital divide). ECLAC has underscored the fact that the internal digital divide in Latin America and the Caribbean is more worrisome than the international one. While market-led mechanisms may ensure the advancement of that segment of the Latin American and Caribbean population which is integrated into the information society, the fact remains that part of the population could be left out of this process altogether, thereby creating a new form of exclusion within the region’s societies (Declaration of Florianopolis, 2000). The digital divide is a dividing line between sectors of the population that are already in a position to benefit from ICTs and those that are as yet unable to make use of this new technological system. In other words, it is a dividing line between people who already communicate information and coordinate actions through digital networks and people who have not yet reached this advanced stage of development. It is sometimes also described as the dividing line between the “information-rich” and “information-poor”

segments of society, with the “information-rich” sectors being the ones who are in a position to reap the social and economic benefits of having access to the global information infrastructure. Therefore, the digital divide should not be measured simply by connectivity to state-of-the-art communications technology but should rather be evaluated in terms of information-processing capacity and the ability to create mutually beneficial networks which can then help to improve living standards (CV Mistica, 2002).

The complexity of the transition to an information society underscores the need for public policy to help guide this process towards the desired outcome. The determination of exactly what that outcome should be is the result of a political decision-making process. The technology and its implementation are merely the tools to be used to reach that objective. ECLAC believes that the principal focus of the development of an information society should be the individual and the community. The priorities established in pursuing this goal will clearly influence the development agenda.

Economic development may be one of the guiding principles for the information society. On the one hand, the infrastructure and generic services layers are comprised of very dynamic, fast-growing industries. Some countries in the region (such as Costa Rica) have achieved impressive growth rates by engaging in production and export activities in these industries. Nonetheless, thus far, communications equipment, computers and office equipment manufacturing only make up around 1.5 % of the region’s GDP. Thus, the general focus in the region is not so much on the production of the technology, but rather on its effective use. A wide range of studies from North America, Europe and Japan all indicate that, via a combination of factors (such as reduced transaction costs, decreasing information asymmetries, access to new markets and supply chains, etc.), the digitization of information flows and communication mechanisms in the economy can have a strong positive impact on productivity (USDOC, 1998, 1999; OECD, 1999, *The Economist*, 2000). Since it is estimated that electronic transactions could make up to as much as 20% of the Latin American and Caribbean region’s GDP in the near future, the transition to a digital economy represents a real opportunity to raise productivity levels in the region and to foster dynamic competitive advantages.

In addition to the possible economic objectives, the new technologies can also be deployed in pursuit of social development goals. The digitization process can be used to raise educational standards and improve learning mechanisms and can serve as a tool for expanding such systems to benefit society as a whole. The transition to an information society can also be directed towards upgrading health care services and helping to reduce the incidence of preventable diseases and premature deaths. What is more, thanks to this process, humankind has never before had more effective tools at hand for enhancing the consumption of cultural goods and increasing “participation in the cultural life of a community, to enjoy the arts and to share in scientific advancement and its benefits” (article 27, UDHR)<sup>2</sup>.

What has been called the “digital opportunity” also furnishes tools for poverty alleviation, which can serve as another guiding principle. With the help of suitable content and inexpensive access to ICTs, basic needs can be met in a variety of fields. ICTs can, for example, provide access to basic health care information, be used to raise public awareness about diseases, facilitate general education, provide support for local farmers, and be used in establishing early warning systems and building up response capabilities for dealing with natural disasters such as floods, earthquakes and volcanic eruptions (Tampere Convention, 1998).

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<sup>2</sup> Universal Declaration of Human Rights, <http://www.un.org/Overview/rights>.

The effort to build an information society can also be guided by the objective of improving participation in the public sphere and in the political system. ICTs can be used to provide and allocate public goods more efficiently and to increase public-sector transparency. The digitization of information flows and communications paves the way for democratic participation, a closer alignment between legality and legitimacy in public affairs, and respect for the human rights of freedom of opinion and expression. What has come to be called “e-democracy” can show people the way to better and more responsible government and help them to become more responsible citizens.

The different principles that guide the creation of an information society have differing implications for public policy. In some cases they may even run counter to one another. Using the digitization process to celebrate linguistic and cultural diversity does not automatically lead to fuller integration into the global economy, for example. Using ICTs to promote economic growth does not necessarily strengthen democratic participation at the same time. The enjoyment of cultural goods, the arts and entertainment does not automatically improve the health of the members of society, and so on. A balanced approach needs to be adopted in order to ensure that the creation of an information society fulfils the principle of joint requirements. Thus, in order to integrate evolving information and communications technologies into the development agenda, the diverse opportunities offered by the new paradigm have to be assessed in the light of regional specificities and needs.

## **LATIN AMERICA AND THE CARIBBEAN IN TRANSITION TO AN INFORMATION SOCIETY**

### **A. THE GENERAL ECONOMIC CONTEXT**

The countries of the region that succeed in moving towards full membership in the global information society have very real, very promising opportunities available to them. Perhaps never before in their history have they had opportunities as tangible as those that are within their reach right now. Perhaps never before has a paradigm shift of these proportions opened up such an extensive range of opportunities, and perhaps never before has there been such an awareness of the fact that the countries can seize these opportunities to reap the benefits of this paradigm shift. It may also be the case, however, that perhaps never before in history has a window of opportunity been on the verge of closing so rapidly or has the risk of missing this opportunity entailed such enormous costs for future generations. In order for the Latin American and Caribbean countries to evaluate and utilize these opportunities properly, however, the general economic context in which they have arisen must be taken into account.

It should be pointed out that the ongoing debate in Latin America and the Caribbean regarding the transition to an information society and to the digital era is often based on “stylized facts” and theoretical constructs deriving from developed countries. There are various reasons to believe that such facts and constructs are ill-suited to an exploration of the region’s position in this process. Firstly, the industrialized economies’ macroeconomic fundamentals have been kept within a reasonable range of equilibrium, and economic growth has been modest but steady. This fact provides a basis for projecting the transition to the digital era along a given path, and the macroeconomic “backdrop” for that transition does not generate any major degree of uncertainty. Secondly, in developed countries the provision of public goods by the State and the existence of fairly mature regulatory systems and agencies creates an adequate institutional and market environment in which to examine the transition to the digital era.

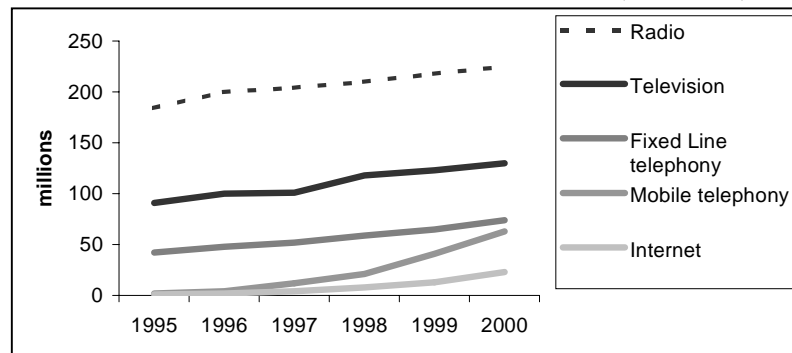
None of these conditions are present in the region. With very few exceptions, the countries of the region have not achieved satisfactory growth rates in the wake of the market liberalization and deregulation programmes that they carried out in the 1990s. What is more, many of their economies’ aggregate performances have deteriorated substantially in recent years. An even more disturbing development is that foreign direct investment (FDI) flows —the flows that have funded the construction, maintenance and expansion of the basic telecommunications infrastructure that serves as the foundation for much of the new digital era in the region— have been dwindling in the past few years. This has raised some doubts as to the future pace of the transition to the digital age. In addition to these factors, many of the countries’ economic fundamentals are far from being in equilibrium, and this generates uncertainty which dampens the “animal spirit” of the business community and slows the investment rate and the pace of technological modernization. Furthermore, given the “moving target” represented by the global technological frontier, very few countries —and, within them, very few sectors and firms— succeed in moving fast enough to even begin to catch up. Many others have simply fallen further behind that frontier (Katz, 2000). Local technological advancements do not appear to be a priority for national economic agents. As a result, the productivity gap separating the region from the developed world has not narrowed, and the structural heterogeneity of firms, regions and social groups has increased.

What is more, public goods are in short supply, and the regulatory systems and institutions responsible for designing a strategy and applying policies to promote the transition to the digital era are still fairly immature. Considering that, in addition to all this, the per capita income levels of the countries of the region are, on average, only one fourth as much as those of the developed countries (or even less), it is fairly obvious that these countries can hardly make the transition to the information society by following the path that has been plotted out for developed countries.

## B. HORIZONTAL LAYERS: ACCESS TO ICTs

The information society's horizontal layers are certainly its most visible and tangible component. Most of the research and initiatives being undertaken in connection with the emerging information society focus on this technological dimension. Thus far, there have been many different kinds of "information infrastructures" in Latin America and the Caribbean (see figure 2.1) but, driven by the process of ICT convergence, they are all merging into the "network of networks". The broadcasting technology networks with the highest penetration in the region are radio and television. TV penetration in South American homes stands at around 83% and in Central America it is about 77% (ITU, 2000). The infrastructure network with the highest degree of digitization is fixed-line telephony, and almost 100% of this network had already been digitized by 2001.<sup>3</sup> The fastest growing ICT network in Latin America is mobile telephony, with 92.5 million digital cellular phone subscribers in the region as of June 2002 (18.1%).<sup>4</sup> However, Internet and PC penetration in the region is relatively low. It is estimated that just 8% of the population had access to the Internet in 2002.<sup>5</sup> Broadband Internet connections (in the majority DSL) had a penetration of only 0.3%.<sup>6</sup>

Figure 2.1  
ICT INFRASTRUCTURE IN LATIN AMERICA (1995-2000)



**Source:** International Telecommunication Union (ITU), United Nations Educational, Scientific and Cultural Organization (UNESCO), Asociación Hispanoamericana de Centros de Investigación y Empresas de Telecomunicaciones (AHCJET), *Benchmarking 2001. Análisis comparativo del sector de las telecomunicaciones en Iberoamérica*, PriceWaterhouseCoopers, April 2002.

<sup>3</sup> Some countries have placed a remarkable degree of emphasis on the digitization of fixed-line telephony in recent years. Brazil for example had only 36% of its network digitized in 1994, but 93% of the network had been digitized by 2000 (AHCJET, 2002).

<sup>4</sup> The breakdown for 2G cellular systems is: GSM: 5.3 million; CDMA: 20.3 million; and TDMA: 54.6 million. In addition, there are 12.2 million analogue 1G users (3G Americas, 2002).

<sup>5</sup> Worldwide, around 9% of the population was using the Internet in 2002, but the G-7 countries accounted for 60% of that figure.

<sup>6</sup> Broadband penetration was 1.3% in Argentina, 0.7% in Brazil and 0.6% in Mexico (eMarketer, 2002).

## 1. The digital divide

When talking about the digital divide, a distinction has to be drawn between two different dimensions. The first is the *international* divide. The issues here are quite similar to those addressed in the classic discussion about the “relatively slow and irregular” spread of technical progress from the originating countries to the rest of the world (Prebisch, 1951), about catching up and about the importance of not falling too far behind. At present, OECD countries account for 79% of the world’s Internet users. The whole of Africa has less international bandwidth than São Paulo, Brazil. Latin America’s bandwidth, in turn, is roughly equal to that of Seoul, Republic of Korea, which is the worldwide leader in broadband Internet access (UNDP, 2001). The second (but surely no less important) dimension is the *domestic* divide. The discussion in this connection is about universal inclusion, about growing with equality and about averting the emergence of yet another form of exclusion. This second focus is of major importance in a region with such harsh social and economic inequalities as those found within Latin American and Caribbean societies.

The digital divide is essentially an outgrowth of pre-existing socio-economic divides. It can be assessed from many different standpoints. If Internet penetration is measured in relation to per capita income in a cross-section of countries, it becomes clear that the countries of Latin America and the Caribbean are situated in the bottom third on both scales. Income and Internet use are positively correlated, with countries that have lower income levels tending to have lower Internet penetration rates as well (see figure 2.2).

However, a more detailed analysis of the relationship between Internet connectivity and per capita income shows that most of the countries in the region are below the statistical norm (which is nothing more than an international “average”). Countries in Eastern Europe (such as Estonia, Slovenia or the Czech Republic) do not have much higher per capita incomes, but their connectivity rates are far higher. By the same token, many countries in Latin America and the Caribbean could be expected to have higher connectivity rates than they actually do, given their per capita income levels.

These figures indicate that access to ICT infrastructure is not exclusively determined by income. Other variables seem to account for the fact that some countries (such as Chile and Peru, which are above the international connectivity/income average) make fuller use of its economic potential than others.<sup>7</sup>

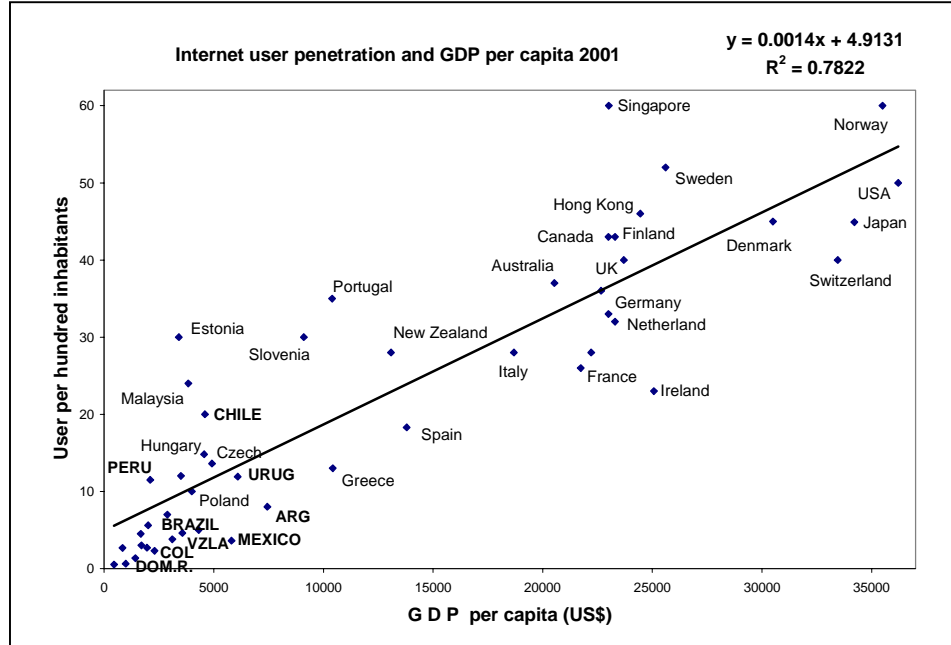
This situation may, to some extent, be a reflection of the particular price- and income- elasticity of ICT demand in each country. According to official figures, “ICT expenditure”<sup>8</sup> in the major Latin American and Caribbean economies amounts to between US\$ 190 and US\$ 370 per capita per year (in comparison to between US\$ 2,000 and US\$ 3000 in Europe and North America) (WITSA, 2002a). On the other hand, and relative to the differing per capita income levels of Latin American countries, it is notable that some countries (such as Chile, Colombia and Brazil) spend two or three times as much on ICTs as others (such as Venezuela and Mexico). In other words, while in some countries access to ICTs is already seen as an economic priority, in other countries such access is still less of a driving force for the transition (Hilbert, 2002).

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<sup>7</sup> Chile has a very competitive Internet market, with a variety of different access technologies. In Peru, the provision of access through “public booths” contributes to the high Internet use rate.

<sup>8</sup> “ICT expenditure” is defined as external ICT spending (the purchase of ICT products), domestic ICT spending (expenditure on domestically customized technology) and spending on telecommunications and other office equipment (WITSA, 2002a).

Figure 2.2  
**INTERNET USER PENETRATION COMPARED  
 WITH PER CAPITA INCOME**

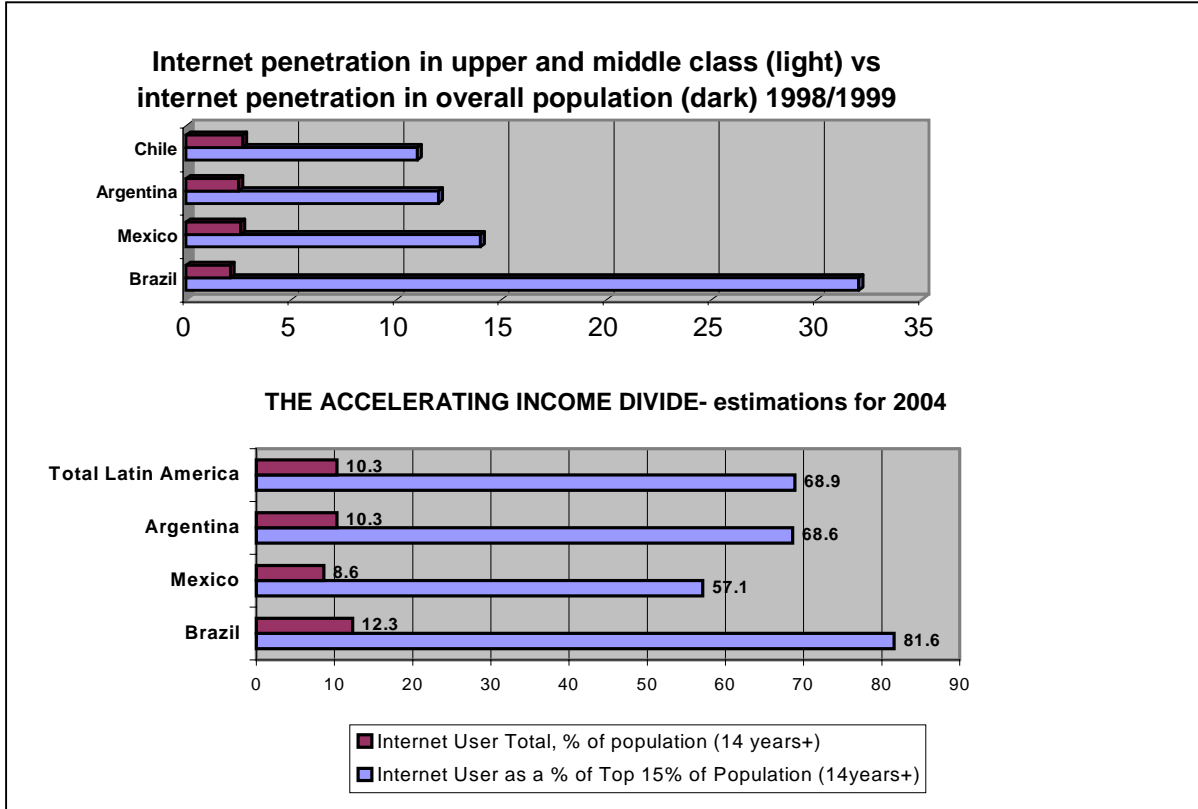


**Source:** Martin Hilbert, “Toward a theory on the information society”; “Infrastructure”; “Strategies”; “Telecommunications regulation: technical standards”; “Financing a universal Information Society for all”; “e-Business: digital economics”; “e-Media”, *Building an Information Society: A Perspective from Latin America and the Caribbean*, Libros de la CEPAL series, No. 72 (LC/G.2199-P), Martin Hilbert and Jorge Katz (eds.), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2002; based on International Telecommunication Union (ITU), “Information and Communication Indicators” (<http://www.itu.int/ITU-D/ict/index.html>), 2002.

**Note:** Sample of 48 countries in five continents.

Alongside this international dimension of the digital divide, a similar situation is found between different groups of citizens within a given society. The Latin American and Caribbean region has the most unequal income distribution in the world (ECLAC, 2002a). This inequality is reflected—and often replicated—in its inhabitants’ access to the “heart of the information society”. The available figures and estimates regarding the domestic divide give grounds for serious concern about the creation of another form of exclusion. According to various estimates, almost 20% of the richest 15% of the Latin American population already had Internet connections by 2000, compared to an overall connectivity rate of around 3% for that same year. Extrapolating these numbers into the future, this discrepancy can be expected to increase significantly. For example, the top income group in Brazil is expected to reach a connectivity rate of 82% by 2004, in comparison to an estimated overall connectivity rate of just 12% (see figure 2.3).

Figure 2.3  
**THE LATIN AMERICAN INCOME/CONNECTIVITY DIVIDE**



**Source:** Martin Hilbert, *Latin America on its Path into the Digital Age: Where Are We?*, Desarrollo productivo series, No. 104 (LC/L.1555-P), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), June 2001. United Nations publication, Sales No. E.01.II.G.100; based on International Telecommunication Union (ITU), Boston Consulting Group (BCG), eMarketer, “The eLatin America Report” (<http://www.emarketer.com>), 2001.

In addition to income, the digital divide is reflected in many other socioeconomic, demographic and geographic characteristics. One of the most evident correlations is between ICT use and educational level. While it is true that, especially in Latin America and the Caribbean, there is also a very high positive correlation between income and education (ECLAC, 2000a), the educational level has an independent effect on ICT use. Even within the same income group, ICT use is significantly higher among more highly educated people (U.S. Dept. of Commerce, 2001). In a recent study in Trinidad and Tobago, it was found that secondary school graduates make up more than 50% of the country’s ICT users (Sanatan, 2002).

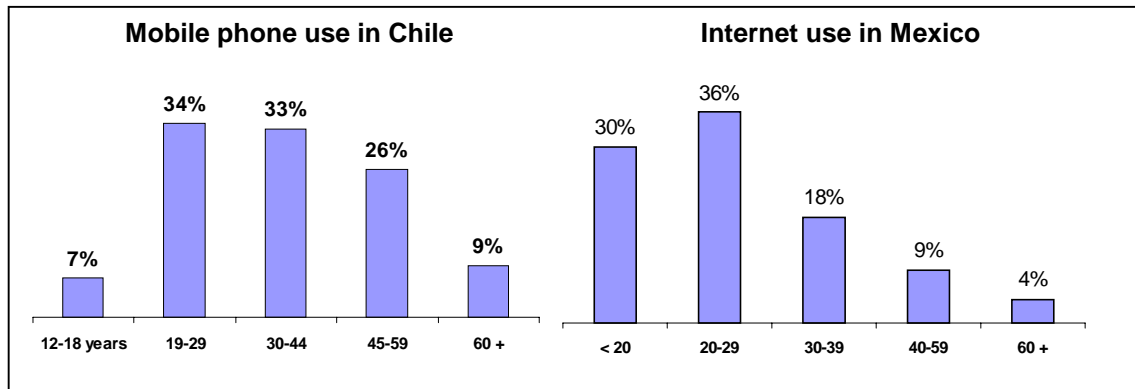
In this context, it is also noteworthy that illiteracy can be a major contributing factor to the digital divide. It is often overlooked in current discussions on the subject that illiteracy is one of the fundamental barriers to participation in the information society. Illiteracy rates in Latin America and the Caribbean vary widely (from as low as 2% to as much as 50% or more of the total national population). Especially among minority and marginalized groups (such as indigenous women), illiteracy rates are very high.<sup>9</sup> It

<sup>9</sup> In Guatemala, only 51% of the women aged 15 or over are literate, and only 14% of the female indigenous population is literate.

should also be pointed out, however, that ICTs offer a way of tackling long-standing problems such as illiteracy and, in fact, ICT-based literacy methods and projects are already being implemented in the region.<sup>10</sup> Advancements in text-to-voice and voice-to-text software may eventually provide a useful tool for mitigating this long-standing form of social and economic exclusion.

The differences that show up when the figures on the digital divide are broken down by age groups are encouraging ones for a region with such a young population as Latin America and the Caribbean. On average, more than half of the population is under 25 years of age (51.58% in 2000). As is widely recognized, young people adapt much more easily to modern ICTs than elderly people do (see figure 2.4), but have less purchasing power. Many analysts believe that the transition towards an information society in Latin America and the Caribbean will naturally accelerate once this young, Internet-savvy generation becomes the driving economic force in the region.

Figure 2.4  
**ICT PENETRATION BY AGE GROUP, 2002**  
*(As a percentage of each age group)*

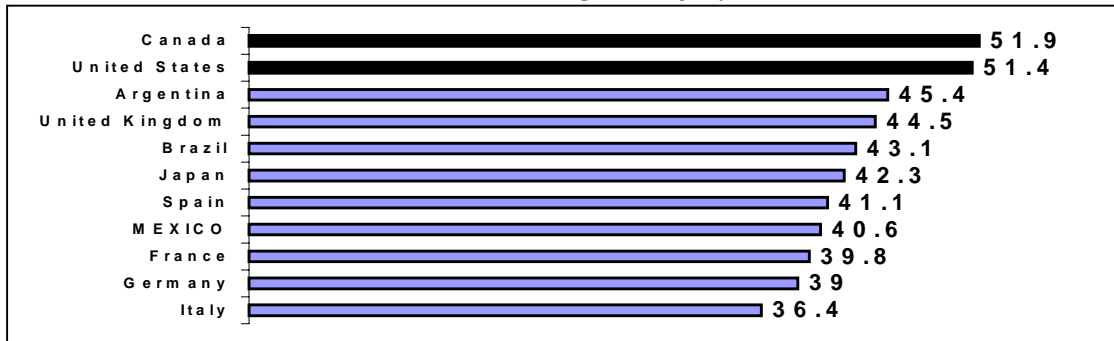


**Source:** Subsecretaría de Telecomunicaciones de Chile (Subtel), “Informe estadístico 4; caracterización socioeconómica de los servicios de telefonía y tecnologías de información y comunicación”, Santiago, Chile (<http://www.subtel.cl>), 2002; Taylor Nelson Sofres (TNS), eMarketer, “Latin America Online: Demographics, Usage & e-Commerce”, e-telligence for business (<http://www.emarketer.com>; [http://www.emarketer.com/products/report.php?latin\\_am](http://www.emarketer.com/products/report.php?latin_am)), October 2002.

Gender parity in the Internet-user population has so far been reached only by the United States and Canada. In Latin America, Argentina comes the closest to gender parity (see figure 2.5). However, the statistics show that, although in the past, Internet users were overwhelmingly male, female Internet users are catching up rapidly. In Argentina more than 71% of new Internet users were male in 1998, but in 2002, 45% of the new users have been female.

<sup>10</sup> The BI-ALFA Regional Project (CELADE/ECLAC: <http://www.eclac.cl/bialfa>) provides a model of thematic integration within an inter-agency framework. In seeking to counter the digital divide, this project combines two methodologies (computing technology literacy and basic bilingual literacy) based on instructional strategies that use computer-assisted teaching techniques to achieve the same objective as is pursued when teaching students to read and write on paper: the “internalization” of concepts relating to community organization, ethnic and cultural self-identification and family and self-health care from a gender equity perspective.

Figure 2.5  
**INTERNET USE BY GENDER, 2002**  
*(Female Internet users as a percentage of the total)*



**Source:** Nielson NetRatings, *Wall Street Journal*, eMarketer, “Latin America Online: Demographics, Usage & e-Commerce”, e-telligence for business (<http://www.emarketer.com>; [http://www.emarketer.com/products/report.php?latin\\_am](http://www.emarketer.com/products/report.php?latin_am)), October 2002.

As is to be expected, ICT use is geographically concentrated in the highly urbanized countries of Latin American and the Caribbean (see table 2.1). The continuing trend towards urbanization is reflected—and often greatly magnified—in the figures on the implementation and use of modern ICTs. One of the factors here is that economies of scale can naturally be better exploited in urban areas.<sup>12</sup>

Ethnic origin is another dimension of the digital divide in Latin America and the Caribbean. As figure 2.6 shows, the probability of having a computer in the household is five times higher for non-indigenous sectors of society than it is for indigenous groups. The probability of possessing a television is only twice as high.

One possible explanation for this is the generally low educational level and primarily rural location of the indigenous population,<sup>13</sup> and the right-hand graph bears this out. The figure also shows, however, that even within urbanized areas and with equal educational levels, indigenous groups are still more likely to be excluded from the information society. To some degree this may be due to the lack of adequate content in indigenous languages; this is a dimension of the digital divide which goes beyond “access to technology”.

<sup>12</sup> Following the same line of argument, it could be claimed that high urbanization favours the diffusion of ICTs. Those nations in which relatively larger proportions of the population live in rural regions—such as El Salvador (55% urbanized), Guatemala (39%), Paraguay (56%), Nicaragua (55%), Bolivia (64%), etc.— exhibit far less fixed-line and mobile penetration than the more highly urbanized countries.

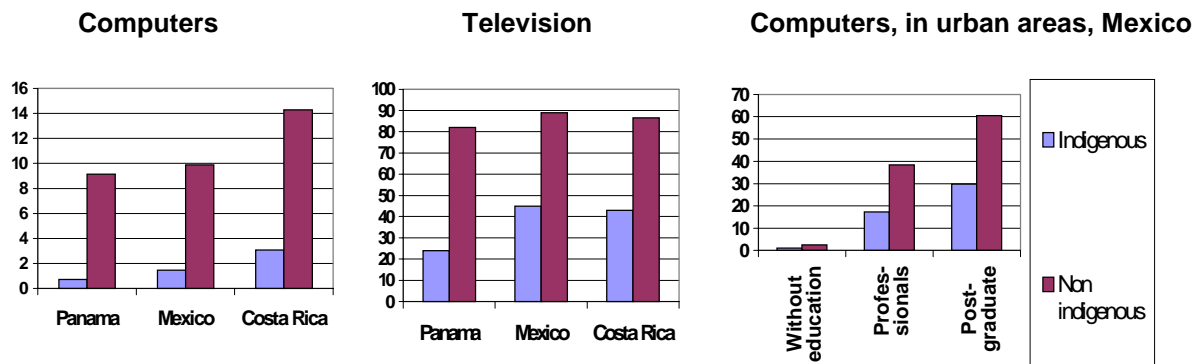
<sup>13</sup> An estimated 57% of the indigenous population of Panama, 63% of this population in Mexico and 79% of Costa Rica’s indigenous inhabitants reside in rural areas.

Table 2.1  
GEOGRAPHIC CONCENTRATION

Cell-phone penetration and degree of urbanization, 2001		
Country	Mobile penetration (%)	Urbanization (%)
Haiti	1.1	38.1
Nicaragua	3.0	55.3
Honduras	3.6	48.2
Ecuador	6.7	62.7
Costa Rica	7.6	50.4
Peru	5.9	72.3
Colombia	7.6	74.5
Bolivia	9.0	64.7
Guatemala	9.7	39.4
El Salvador	12.5	55.2
Dominican Republic	14.7	70.4
Uruguay	15.5	92.6
Brazil	16.7	79.9
Argentina	18.6	89.6
Paraguay	20.4	56.1
Panama	20.7	57.6
Mexico	21.7	75.4
Venezuela	26.4	87.4
Chile	34.0	85.7

**Source:** International Telecommunication Union (ITU), "Information and Communication Indicators" (<http://www.itu.int/ITU-D/ict/index.html>), 2002; ECLAC, *Foreign Investment in Latin America and the Caribbean* (LC/G.2125-P), Santiago, Chile, 2001. United Nations publication, Sales No. E.01.II.G.12.

Figure 2.6  
PERCENTAGE OF POPULATION WITH COMPUTER/TELEVISION  
BY ETHNIC ORIGIN, 2000



**Source:** Micro-databases for Panama, Mexico and Costa Rica, 2000 census round.

Within the region, one of the most commonly used policies for dealing with the digital divide is based on the shared-access model. This type of policy not only helps to overcome the “technology access” barrier, but also has positive effects in terms of training and user support. In the past, libraries and fixed-line telephony successfully pioneered this model for sharing access to information and communication in the region. Whereas in 1994 Latin America had fewer than 1.6 public telephones per 1,000 inhabitants, by 1999 this number had doubled to 3.2. In Chile for example, just one public telephone per 1,000 inhabitants provides basic telephony access to 21% of the population (based on a walking distance of four blocks) who, without such facilities, would have no access to telecommunications at all (Subtel, 2002). Along the same lines, it is notable that in 2002 only 14 million of the 33 million Internet users in Latin America had home access to the Internet (Nielson NetRatings, 2002). The rest hook up to the World Wide Web through terminals at their workplace, schools or public access points (see box 2.1). National telecommunications authorities normally use special funds to finance these public access points (access points for the Internet are also referred to as “info-centres”). The majority of these funds are maintained by contributions of a specific percentage of telecom operators’ proceeds (usually operators are required to contribute 1% of their gross income to the fund) or through other revenue sources available to the regulatory authority (e.g., licensing fees, etc.).<sup>14</sup>

Box 2.1  
**ACCESS, NOT OWNERSHIP**

In addition to public-sector initiatives, there are a variety of business models for reducing the digital divide. Peru for example, is considered to be the worldwide leader in providing public access to the Internet. Private-sector initiatives have played a major role in the creation of Internet booths. As a result, the number of Internet users per Internet host is up to 14 times higher in Peru than in other Latin American and Caribbean countries. Telecordia’s Netsizer (an Internet statistics company which measures the number of users and hosts by continuously taking random samples of IP addresses) reports that there were 2.6 users per Internet host in the United States in the first quarter of 2002, 5.7 in Central America and 11.9 in South America as a whole. In Peru, however, the company’s figure of 81.1 Internet users per Internet host clearly demonstrates the potential of the shared-access model.

The increasing number of people sharing an access account is indicative of trends found throughout the developing world. In Venezuela, for example, the number of Internet users more than doubled (from 0.5 million in 1999 to 1.3 million in 2001). At the same time, however, the number of Internet users per Internet access subscription in Venezuela rose from 2.51 users in 1999 to 4.93 users per host in 2001 (eMarketer, 2002).

Another line of action taken by initiatives focusing on the digital divide is the provision of suitable hardware. “Access cost” is a combination of telecommunications cost (a variable cost) and the fixed cost of ICT equipment. The cost of access equipment (such as a PC with an Internet browser, for example) is often prohibitively high. The Brazilian Government, for example, launched an initiative in 2000 whose aim is to develop a “computer for the people” (see box 2.2).

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<sup>14</sup> As of November 2001, for example, the Brazilian telecom authority collected more than US\$ 400 million for its telecommunications fund; the vast majority of these funds are used to subsidize Internet access and end-user equipment.

## Box 2.2

**PROVIDING COMPUTERS TO THE PEOPLE: THE IDEA OF A “VOLKS-COMPUTER”**

In late 2000, in response to concern about the possibility that the country's social and economic inequalities might deepen if the poor were “starved” of information technology, the Brazilian Government commissioned a team of scientists to design a low-budget computer. The project has been carried forward by a massive effort of coordination between government, the computer industry, and academia but, with funding of only US\$ 75,000, has not required any major technological innovations. The computer had to have a modem, a color monitor, speakers, a mouse and simple Internet-browsing software. It also had to be modular so users could later add a printer or disk drives. The final version of the so-called “Popular PC” costs around US\$ 300. It has a 500-megahertz processor, 64 megabytes of main memory and 16 MB more on a flash chip that substitutes for a hard drive. The device can be connected to the Internet using a 56 kbps modem. The software is Linux-based and therefore free. The PC will be primarily used in social programmes financed by the Government's universal telecommunications fund. The Government intends to buy the first shipment of PCs to provide easy access to the Internet for schools, libraries, clinics and community facilities. Private consumers will be able to purchase the computer by paying US\$ 15 monthly installments.

Another best practice relating to the development of a “Volks-computer” (following in the footsteps of the famous “Volks-wagen”) comes from India. The “Simputer” —short for “simple”, “inexpensive” and “multilingual”— is a somewhat bulky handheld device. It is a powered by three AAA batteries and the keyboard is substituted by an interface that comprises mainly icons and graphics on a touch screen. The Simputer uses Linux open-source software and is available for around US\$ 200. It can be connected to the Internet through any telephone booth. The device also supports text-to-speech capability and translates English-language Web sites into four different local Indian languages, reading the content aloud to illiterate users ([www.simputer.org](http://www.simputer.org)).

## 2. The implications of ICT convergence

In view of the above-mentioned statistics on technology infrastructure in Latin America and the Caribbean (such as the high penetration of televisions and cell-phones), the process of convergence is obviously opening up a great opportunity for the region. Advances in mobile telephony, VoIP (Voice over IP) and alternative innovations such as powerline (the use of the electricity grid to connect to the Internet)<sup>15</sup> provide ample scope for policy actions aimed at starting to bridge the notorious digital divide in ICT infrastructure.<sup>16</sup>

The introduction of digital television, for example, is one way to provide less expensive ICT hardware solutions. So-called “set-top boxes” are an inexpensive, efficient solution for upgrading analogue television sets. According to industry sources, such a converter could be manufactured at a cost of as little as US\$ 120, depending on the level of interactivity (EU, 2002). This would be less than one quarter of the average price of a conventional computer in the Latin American and Caribbean region in 2002. Digital TV also offers a chance to overcome the often lamented habitual and cultural barrier to the

<sup>15</sup> In December 2001 the Chilean Government announced the launch of a pilot project that is providing 50 clients in Santiago with **Power Line Communications** (PLC) services, and it is now evaluating the possibility of expanding the project. Brazil's largest energy concern also began testing broadband powerline technology in 40 homes in Belo Horizonte at the end of December 2001.

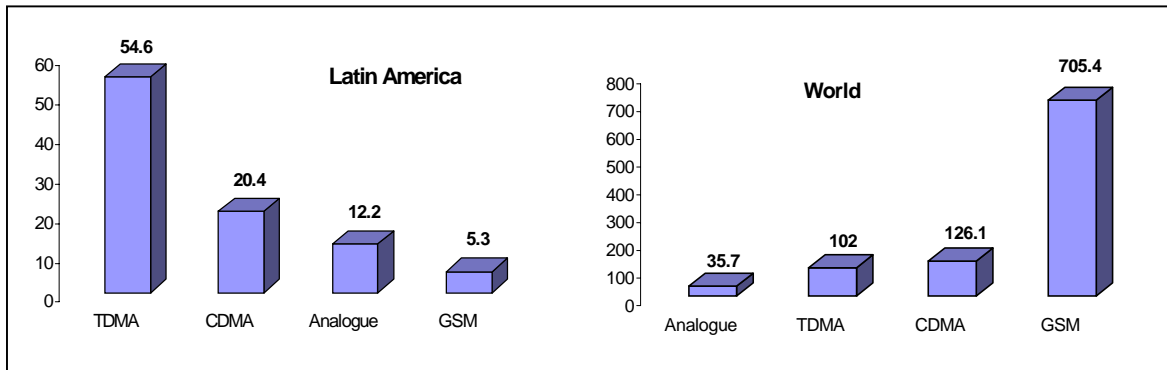
<sup>16</sup> For successful business models, the consideration of ICT convergence has become a necessity in Latin America, given the low rate of PC penetration. Research shows that while in North America only 26% of retail banks offer customers access to their accounts via multiple devices (PC, telephone, wireless devices, etc.), 43% of the Latin American retail banks are doing so (Speer&Associates, eMarketer, 2002).

adaptation of modern ICTs, since it can be used to give millions of families interactive access to the world’s global information infrastructure by building upon a highly familiar and widely used device.

Wireless solutions also provide a large variety of access alternatives. In mobile telephony, the gradual migration from 2G (second-generation) to 3G (third-generation) networks<sup>17</sup> is merging a highly popular communications technology into the ICT family. The current market situation may lead to a prolongation of the lead time for the implementation of such networks, and it may take some years until business models are able to deal with the “biggest gamble the telecommunications industry has ever taken on” (ITU, 2002b). However, inexpensive and less commercial wireless access technologies (such as the Simputer from India) could provide additional options for bridging the digital divide.

When considering the introduction of such new technological systems, standardization issues become important. The strategic importance of technical standards for development is often underestimated. A brief look at the situation in the mobile telephony industry provides some idea of the implications of technical standards policies. In mobile telephony technology, three evolutionary paths can be distinguished: one based on the European open standard (GSM), another on TDMA and a third one on the proprietary solution cdmaOne. As the following numbers show, the 2G mobile telephony standards deployed in Latin America run counter to the main-standard trend in the rest of the world. In Latin America, the most common standard is TDMA (60% of the Latin American mobile market). Worldwide, TDMA is a minority technology which accounts for only 10% of global cell-phones. The most widely used mobile technology in the world is GSM, which makes up 69% of the mobile market, but in Latin America only 6% of the market uses this technology (see figure 2.7).

Figure 2.7  
**2G MOBILE TELEPHONY STANDARD DILEMMA IN LATIN AMERICA**  
*(In millions, June 2002)*



**Source:** 3G Americas, “Global Comparisons Statistcs”, 3G Americas Unifying the Americas through Wireless Technology (<http://www.3gamericas.org>), June 2002.

Failure to engage in a serious debate on global technological developments may not only result in the loss of economies of scale in ICT equipment production (and therefore increasing prices), as well as to missed opportunities for ensuring interoperability and roaming capacity, but may also lead to a situation in which a minority technology’s evolutionary path runs into a “dead end”. In the case of mobile

<sup>17</sup> 2G (second generation) is a term which refers to mobile telecommunications (i.e., voice and data transmission through a mobile network). Data transmission is slow and generally between 9.6 Kbit/s and 14.4 Kbit/s. 2G networks are gradually evolving into 2.5G (GRPS, EDGE) networks and, from there, to 3G (UMTS, cdma200, etc.) systems which should provide data transmission speeds of between 400 and 2000 Kbit/s.

telephony for example, the TDMA evolutionary path is on the verge of coming to just such an end. After a decade of heavy investment in building out far-flung TDMA networks in Latin America, operators all over the region are now busy switching to the GSM or CDMA paths in order to acquire packet data transmission capabilities. Running into such a technological dead end can be very expensive, especially for operators in low-income economies.

Technical standards are an extremely important issue in relation to software applications, and the question of whether to use proprietary solutions or open standards is of particular significance. Today most computer systems use “proprietary” software, which simply means that the software’s source codes are the protected property of an individual company. This has triggered a debate about the dominance of certain computer operating systems (US vs. Microsoft, 2002), but the problems that will have to be addressed in the future are likely to be far more complex (APC, 2002). As ICT convergence proceeds (which means that more and more information and communications systems will be merging into the ICT family) and as the protocols and standards that permit the movement of information become proprietary (be it a word processor file or the encoding of video information prior to transmission), the fear is that control over the flow of information will be centralized in the corporations that own these standards. The discussion with regard to open or proprietary middleware for digital television, for example, revolves around this crucial issue (Hilbert, 2002). An alternative to proprietary software would be “open-source software”, with Linux being the most significant development within this model. However, while a radical switch to pure open-source software models is surely neither feasible nor a panacea,<sup>18</sup> the threat of being “locked-in” to proprietary software networks makes it advisable to undertake a thorough analysis to see how the model of open-source software can be used more effectively in developing countries.

### 3. Generic services

Apart from the question of access in quantitative terms, the digital divide is also reflected in the quality of ICT use. The major reasons for going online in Latin America and the Caribbean are to obtain general information services, entertainment, instant messaging or e-mailing. Online transactions are still very limited. Whereas in December 2001 almost 80% of Venezuelan Internet users employed the global information infrastructure to search for information and almost 70% of them sent e-mails, only 2.5% purchased and/or sold goods and services online (Data analysis, eMarketer, 2002). In general, it is estimated that fewer than 5% of Latin American Internet users buy a product or service online at least once a month. By comparison, an estimated 79% of Internet users in the United States are regular online shoppers (eMarketer, 2002).

In some countries, such as in Brazil and Chile, an increasing number of Internet users are going online to do research for either educational or work purposes. In Chile, the figures are 24% and 15%, respectively (CCS, 2002). One of the first solid online transaction applications has been e-banking. However this use is still far more limited than information services. The 600,000 e-banking users in Chile (4% of the population) completed one online banking transaction per every 6,222 visits to online banking websites between 2001 and 2002 (24 transactions per user) (SBIF, 2002). This reluctance to use the more sophisticated online applications is chiefly due to a lack of confidence and trust on the part of users (this issue will be discussed in greater depth in a later section), as well as to a lack of suitable application services.

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<sup>18</sup> Open software models have not yet, for example, demonstrated the capacity to create adequate maintenance, support and training industries. The reputation of an individual company and the guarantees that it provides for its proprietary solution are often the reason why consumers opt for proprietary software.

The introduction of administrative software systems poses a major challenge in Latin America and the Caribbean. The statistics point to a very low penetration rate for high-quality software systems, especially in the production system. For example, just 4% of Mexican firms have implemented some kind of Supply Chain Management (SCM) application (eMarketer, 2002). In Brazil, 11% of the companies have some kind of Customer Relationship Management (CRM) system in operation<sup>19</sup> (Elkin, 2002). In many developed countries, the process of digitization started as an in-house process and only later moved on to the interconnection of different actors. In Latin America and the Caribbean, on the other hand, many organizational units wrote their first e-mail before introducing their first electronic database. Statistics from Chile, for example, show that in 2002 only 28% of the country's PC-equipped small and medium-sized enterprises were using an administrative software application for their inter-firm processes, but 54% of them were using e-mail (Subsecretaría de Economía de Chile, 2002). This kind of pattern is seen not only in business firms but in schools, hospitals, clinics, ministries, municipalities and other organizations as well. The absence of in-house application systems is a major obstacle to the adoption of more advanced inter-organizational applications. The benefits to be derived from Internet marketplaces and online interactions will be limited so long as a paper-and-pen-based system continues to be used for the vast majority of such organizations' in-house procedures.

Owing to the lack of such in-house systems, the digitization process in Latin America and the Caribbean is diverging from the path being taken by that process in many developed countries. One of the obvious results is a difference in operational business models. In contrast to many North American B2B (business-to-business) marketplaces, which are mainly based on online catalogues, many successful business models in Latin America start from the buyers' side (e.g., Mercado Electrónico in Brazil and Senegocia in Chile, Argentina and Peru). Instead of a model in which suppliers provide expensive online catalogues, in Latin America and the Caribbean buyers are asking for products and services in the B2B marketplaces, are setting the sales and payment conditions, and are sending out their "requests for quotes" to selected potential suppliers. These kinds of differences in the digitization process need to be considered when searching for appropriate policies.

One of the major obstacles to the integration of sophisticated information and communications systems is their cost. With world-class Enterprise Resource Planning (ERP) software systems ranging from US\$ 100,000 to US\$ 2 million as of early 2002, small and medium-sized organizational units' chances of accessing such technological systems are extremely limited. Promoting competition in the software market would be one way of driving down prices. Until recently, transnational corporations controlled many of the Latin American and Caribbean markets (such as SAP, which holds more than 50% of some ERP systems markets) (Canessa, 2002). However, local firms are starting to enter the market and to expand their market shares in segments where smaller organizational units require cost-effective information systems (such as SMEs, municipalities, small clinics, etc). Competitive pressure of this sort lowers prices and generates suitable solutions for small agents.<sup>20</sup>

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<sup>19</sup> It is interesting to note that, unlike the situation in some developed countries, CRM is more widely accepted in Latin America than SCM. While companies see the financial benefits of increasing revenues by leveraging their existing client base through CRM, the problems with SCM in Latin America lie further down along the supply chain, where difficulties with transportation systems and inadequate automation are particularly important factors (eMarketer, 2002).

<sup>20</sup> IDC and eMarketer point out that some local companies did succeed in entering the ERP markets of Argentina, Brazil, Colombia and Venezuela in 2001.

Application Service Provider (ASP) models could represent another potential solution for the provision of quality software to small organizational units. The outsourcing of ICT services is still in its infancy, but is growing fast. The ASP model reduces the cost of acquiring and updating software applications by sharing infrastructure, service organization and maintenance costs. However, studies in the MERCOSUR area show that hardware and software prices make up only around 40% of the cost of installing ERP systems (Symnetics, 2000). The remainder is accounted for by the cost of training, consultations, in-house equipment and the overall adjustment of organizational functions. Integrating such systems into the organizational structure requires additional human and financial resources, as well as institutional flexibility and organizational innovation. By deploying preconfigured solutions and sharing training resources, implementation costs can also be reduced. Furthermore, service providers' liability and enforcement assurances guarantee the functionality of the system for the client and provide ongoing updates of applications in an industry where they become outdated very rapidly. The ASP can also provide assistance with software implementation (be it in a firm, municipality, hospital, educational centre, etc.) and oversee the maintenance of the system.

### **C. THE DIAGONAL AREAS: REMOVING OBSTACLES AND ACCELERATING THE TRANSITION**

It is important to underscore the fact that the information society does not exist within a vacuum, nor is the transition towards the “digital age” an automatic process. The information society depends heavily on the characteristics of the industrial society that it builds upon. It is often said that the information society is a subsequent evolutionary stage of the industrial society, and therefore a given society's adjustment to newly emerging requirements will depend on its particular features and on its type and degree of industrialization. It is not solely a question of having connectivity to the new technology.<sup>21</sup> The adoption and integration of the new technology into existing social and economic structures depends a number of other factors as well.

Among the factors that influence the transition are the existing regulatory frameworks and how successful they are in enabling and facilitating digital interactions for the benefit of society as a whole. Financing also needs to be available and financing mechanisms need to be adjusted in order to ensure the sustainability of the domestic information society in a globalized world economy. It is also clear that the quality and profile of the available human capital (as the driving force behind the technology) play a key role in an information society. Efforts in these three areas need to be concentrated on fostering the growth of the infrastructure and generic services layers, as well as on expediting the adoption of the new tools becoming available in the different “e-sectors” (e-business, e-government, e-health, etc).

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<sup>21</sup> This is also the central lesson to be learned from the discussion about the famous “productivity paradox” in the 1980s and the hyperbole about the “New Economy” at the end of the 1990s. The discussion about the so-called “productivity paradox” started with the observation that productivity mysteriously slowed down in the United States economy around 1973 —just about the time when computers arrived on the scene (Hilbert, 2001a). In 1987 Robert Solow started the discussion with his famous quip: “We can see the computer age everywhere except in the productivity statistics”. However, as was pointed out later on, it is not the number of computers that triggers higher productivity but overall changes in the way the economy works (David, 1990). The 2000 crash of the “New Economy” provided compelling evidence that it is not enough to set up a webpage and to open up Internet companies without having a solid business model. As a central lesson from these experiences, the focus on ICT-for-development is shifting away from simply connecting to the ICT infrastructure and towards incorporating digital practices into all the various forms of social and production organization as soon as possible.

## 1. Regulatory frameworks

The starting point for the task of creating a regulatory framework for the information society is respect for people's fundamental rights. The digital divide has implications that go far beyond economic and material considerations. It is a symbolic abyss in the distribution of information, citizen participation, political inclusion and representation, social services, security and prevention mechanisms, consumption of the arts and of cultural goods, and participation in the cultural life of a community at large (be this community local, national, regional or global). The right "to seek, receive and impart information and ideas through any media and regardless of frontiers" is a basic human right<sup>22</sup> which serves to reinforce all other human rights. The emerging information society should extend and strengthen this fundamental right (APC, 2002; CRIS, 2002; Bonilla, 2002). In this sense, ICTs (as an enabler of information and communication) are both a right and a commodity (a "merit good" to use the terminology of welfare economics). The global information infrastructure acts as an enabler for other economic, social and cultural rights and is one of the most tangible examples of a "global good" which provides the foundation for global citizenship (ECLAC, 2002a). The goal is to implement the right to information and communication through the global public good of "participation in ICTs".

Another challenge for the regulatory framework in an information society is the regulation of its technological layers (infrastructure and generic services). The approaches being taken to telecommunications regulation vary widely throughout Latin America and the Caribbean. While some countries are pursuing a very market-friendly strategy and are relying on private-sector leadership (such as the Dominican Republic and Chile), other countries have opted for a national public telecommunications company (such as in Uruguay and Costa Rica). Generally speaking, however, the vast majority of the telecommunications operators in the region are either fully or largely owned by private (often foreign) investors. In comparison with other regions, the Americas are the region with the most privatized telecommunications sector in the world (ITU, 2000). In many cases the liberalization of the telecommunications industry and the privatization process have followed separate paths in Latin America and the Caribbean (Ahciet, 2002). This is true particularly because the primary focus of the underlying privatization policies may in some cases not have been an increase in competition, but rather an increase in foreign investment (ECLAC, 2001). As a result, in many instances private monopolies have simply replaced State-owned monopolies. The opportunities for full competition and sharp price reductions are still limited in many countries in the region, especially where economies of scale and sunk costs create natural monopolies. In view of this evidence, steps need to be taken to promote energetic, fair and workable competition at the different levels of telecom services (e.g., suppliers of telecom and computing hardware, telecom carriers, telecom resellers and associated suppliers such as e-commerce service providers) and among the telecom services provided through all the various types of media (e.g., fixed-line, wireless, cable and satellite technologies). To fulfil this objective, an effective, fair and transparent oversight body is needed to make sure that anti-competitive conditions do not arise. In some cases, the existence of an anti-trust or competition watchdog, in addition to the telecom regulator, creates a positive dynamic between the regulatory agency for the telecom sector and the general commission set up to ensure competition (Hilbert and Petrazzini, 2001). Regulatory regimes should also permit a broad range of pricing strategies, including unmetered rates, for services used to access the Internet and should adopt cost-based approaches for interconnection pricing.

Regulatory issues relating to the infrastructure and generic services layers go beyond the scope of telecommunications per se. A solid growth strategy is also needed for the hardware and software markets.

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<sup>22</sup> Article 19, Universal Declaration of Human Rights.

In this respect, the extreme importance and potential strategic power of technical standards are often underestimated in technological development strategies in Latin America and the Caribbean. The neglect of this issue and the uncoordinated search for foreign investments have created a uniquely challenging standards scenario in the region which may pose a serious obstacle to smooth technological development in the future.

Before introducing a new technological system (such as 3G or digital TV), an institutionalized testing process should be pursued in order to identify the best solution for each particular situation. Such a mechanism needs to take the process of ICT convergence into consideration (which implies, for example the interdependency of 3G and digital TV systems, since they will eventually converge). Brazil's extensive testing of digital television standards during 2000 is a best practice in this respect. In fact, the largest and "most complete tests in the world" regarding digital television platforms have been carried out there (SET/ABERT, 2000). The results of these tests have attracted worldwide attention and are the leading point of reference for many countries around the globe that are currently in the process of reaching a decision about digital TV standards. Some Latin American countries have recognized Brazil's effort and are watching the process closely. Others have already said that they will follow the recommendations made on the basis of the Brazilian tests. One of the limiting factors of this process, however, is the high cost of such tests (SET/ABERT, 2000). Since many Latin American countries share common characteristics which are important considerations in selecting an adequate standard, an institutionalized and region-wide mechanism for standard testing could help to exploit synergies and ensure more coordination in Latin American standards policies on the basis of non-mandatory recommendations.

Another crucial question is the evaluation of the costs and benefits of proprietary standards versus open standards for the different technological solutions in the market. Ongoing, in-depth economic analyses are essential inputs for an informed decision regarding this vital issue. In principle, the preference should be for open standards, since they prevent "lock-in" effects, help hold down the level of royalty payments on intellectual property, foster integration and interoperability, and hence promote industrial participation, competition and economies of scale on a common platform.

This point raises a number of issues regarding intellectual property rights. It is customary to argue that imperfect excludability and non-rivalry affect optimal market functioning in the field of technology, creating a wide gap between the social and public benefits of domestic technology generation and diffusion efforts. These features are ubiquitous in the field of ICTs, as is illustrated by the dispute surrounding the sharing of MP3 music files in the music industry, the registration of commercial trademarks and personal names in Domain Name Systems, software development and reverse engineering in the creation of new algorithms and computer programs, and so forth.<sup>23</sup> An intellectual property right system needs to be put in place in order to create the right kind of incentives for individuals and firms to advance in the production of new hardware and software, as well as in the development of digital content. However, intellectual property rights systems need to fulfil two additional requirements: they should grant differential treatment to intellectual property for goods having a high social and educational value (such as software for hospitals and clinics or for universities, etc.), and they should promote a technological development and learning process in developing countries while at the same time seeking to protect such

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<sup>23</sup> Some of the challenges of online enforcement and licensing are addressed in two treaties that were concluded at the World Intellectual Property Organization (WIPO) in 1996: the WIPO Copyright Treaty (WCT) and the WIPO Performances and Phonograms Treaty (WPPT), commonly known as the "Internet treaties". These treaties are not yet in force, but their ratification by developing countries will assist in the adaptation of intellectual property rights to the digital age (UNCTAD, 2001).

countries from becoming locked into a foreign technology (Abarza and Katz, 2002). Both policy directions are consistent with the use of open standards, which can be regarded as a kind of “public good”.

The digitization process in the different “e-sectors” also calls for an adjustment of the juridical framework. The creation of trust and confidence in the digital communications channel is a key element in this respect.<sup>24</sup> Policy actions in this area might include measures for ensuring the authenticity of electronic documents, the privacy and confidentiality of personal and corporate records, participation in the establishment of internationally acceptable rules, and the recognition of electronic documents, digital signatures and certification authorities, as well as restrictions on the exportation of technology, especially with respect to encryption standards, and legal recourse mechanisms for the settlement of disputes.

A secure payment infrastructure helps to create trust and confidence and encourages more sophisticated e-applications. Online payment systems are therefore essential. In this field it is necessary for the governments to cooperate with the private sector, including chambers of commerce, and especially banking and retail associations. Examples from Brazil and Chile demonstrate that the banking sector can play a central role in the development of online transactions. Innovative approaches in the development of alternative payment mechanisms are also needed to improve efficiency and lower costs while ensuring the security of payment systems.

Box 2.3

**OECD GUIDELINES FOR CONSUMER PROTECTION IN THE CONTEXT OF ELECTRONIC COMMERCE**

The OECD experience with building trust in an e-commerce environment points to several important policy areas. These include compliance with contractual terms regarding delivery and payment; clear information about an online business’s identity; honouring confidentiality of client information; consumer and business education; and protecting transactions from unauthorized “snooping” (including theft of sensitive financial information) by third parties. Though private-sector initiatives can contribute to building online trust, a strong government regulatory framework addressing consumer protection, privacy, security of transactions, cybercrime and other concerns can greatly reinforce those efforts (Bastos and O’connor, 2002). The countries of Latin America and the Caribbean should consider working with industry and consumer groups in regional and multilateral venues to address these e-commerce issues and to encourage the development of compatible legal and policy frameworks for consumer protection.

**Source:** Organization for Economic Co-operation and Development (OECD), “Guideline for Consumer Protection in the Context of Electronic Commerce” (<http://www.oecd.org>), 2000.

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<sup>24</sup> Issues of confidence and trust are relevant not only for end-consumers, but also for intra-organizational relations. With regard to B2B e-commerce, for example, proprietary information sent over networks, which may include trade secrets and company strategies, can be stolen. Thus, businesses that expand their internal networks to include linkages with other firms typically need to develop strong trust relationships (OECD, 1999). Initiatives in the areas of consumer protection, ethical advertising and contract enforcement measures could provide for the launch of programmes to educate consumers and businesses about the risks and benefits of conducting transactions online, to provide guidelines on consumer protection and to encourage the private sector to adopt self-regulatory measures such as codes of conduct and trustmark programmes.

An area that deserves special attention is the settlement of disputes arising in the context of digital interaction. Governments have many different options, including the use of the judicial apparatus of the State and the delegation of some or all of the State's dispute settlement powers to private self-regulating bodies. Procedures in this area might range from mediation to binding arbitration. These methods are often listed under the headings of alternative dispute resolution (ADR) or online dispute resolution (ODR). "Since ADR/ODR systems will continue to be developed independently of the court system, States should also consider investing more in modernizing their judicial system by training judges, increasing the number of judges, equipping their courts with up-to-date infrastructures and allowing them to proceed online if need be" (UNCTAD TD/COM/3./EM/15.2, p. 39).

Box 2.4

**ENABLING DIGITAL TRANSACTIONS ACROSS THE REGION**

Digital transactions are often cross-country transactions, and the heterogeneous nature of legislation in the region poses a severe obstacle for cross-border e-practices and hence for the full exploitation of digital opportunities. A cooperation programme should be established on a regional level in Latin America and the Caribbean to promote the convergence of regulatory frameworks. With regard to the limits of the Model Law on Electronic Data Interchange of UNCITRAL, a regional forum should be created to analyse and discuss issues such as non-discrimination between the recognition of electronic and handwritten documents; technological neutrality and harmonization of digital signature legislation; dispute settlement; and the institutionalization of a system of certification bodies that would establish similar requirements for electronic certification and ensure their mutual recognition.

Regarding subjects that require regional coordination but are not covered by the UNCITRAL model law (especially the trade of digital goods and services, taxation issues, consumer protection, cybercrime and fraud and data integrity) forums should be created within the framework of the existing integration processes (especially the Andean Community, MERCOSUR, CARICOM and the Central American Common Market). The directives and recommendations of the European Union could serve as a raw model for efforts at this level.

## 2. Financing

As ECLAC has pointed out in various studies, the Latin American and Caribbean region is very sensitive and vulnerable to worldwide economic trends. This pattern is linked to the perception that, with few exceptions, the developing countries are high-risk markets, subject to sharp financial cycles in which phases marked by a greater appetite for risk alternate with droughts triggered by a "flight to quality" assets. The recent worldwide economic downturn has been shown to have disastrous effects on regional ICT markets. After worldwide high-technology stock markets crashed in 2000, the flow of venture capital into Latin America and the Caribbean, which had reached extraordinarily high levels, came to an abrupt halt. FDI flows to the region have also dropped sharply in the early years of this decade. Latin America accounted for 4.5% of worldwide telecommunications expenditure in 2000 and witnessed the steepest reduction in global telecom carrier expenditures in the world between 2001 and 2002 (62%) (eMarketer, 2002). FDI and venture capital continue to play an essential role in financing the creation of an information society in the region, however. The "ICT (r)evolution" continues, driven by the forces of ICT convergence. The build out of wireless and mobile infrastructure (especially 3G) and the adaptation of digital television represent important opportunities for the integration of Latin America and the Caribbean into the global information society, but they will also require significant amounts of investment in the years to come. Since content and business models will surely be different for digital TV and 3G networks, the creation of suitable content will require flexible venture capital mechanisms. If the region does not

want to fall too far behind in these ongoing developments, adequate financing mechanisms and markets are indispensable.

Apart from the quantity of FDI, the quality of its allocation needs to become a key focus of financing policies. The region's uncoordinated search for FDI has left it with an extremely heterogeneous and often non-interoperable scenario of different technological standards. This situation stands in sharp contrast to the importance of formulating a regional strategy for promoting its technological development. This state of affairs has turned the region into a "battlefield of foreign interests" (ECLAC, 2001) which prevents the region from proceeding along a smooth technological development path. New policies should shift the focus away from attempts to maximize the quantity of FDI and towards efforts to improve its quality (ECLAC, 2002a).

In addition to the optimization of market mechanisms for financing the transition, the public sector must become proactively involved, together with the private sector, in financing or designing mechanisms for bridging the digital divide. Considering historical evidence from the TV and radio diffusion process<sup>25</sup> (Hilbert, 2002) and reviewing actual Internet growth patterns and market saturation rates worldwide (ITU, 2002a; eMarketer, 2002<sup>26</sup>), it can be roughly estimated that, if market mechanisms are relied upon, it will take until 2020 to reach an Internet penetration ratio in Latin America and the Caribbean similar to the ratio now seen in Sweden, Finland, the United States or Singapore. Bearing in mind Latin America's harsh socioeconomic inequalities, it is clear that, in the meantime, those relatively few who are already online will have the advantage of accessing the unlimited wealth of information available in cyberspace, which means that they will have greater access to educational materials, political information and public services, cultural assets, e-health services, etc. Worries about this resulting in increasing social inequality seem highly justified.

A basic characteristic of "public goods" is that they benefit not only the individual who consumes them, but also everybody else in the community. ICTs fit those requirements (CV Mistica, 2002).<sup>27</sup> Public Internet access points, demand subsidies, tax and tariff relief (such as in Ecuador),<sup>28</sup> cross-taxation mechanisms to ensure the inclusion of marginalized groups and areas, and the promotion of open standards (such as special telecommunications funds) can be regarded as steps towards the provision of "public ICT goods".

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<sup>25</sup> It took 70 years to bridge the worldwide radio divide (whereas [ $y$  = radio receivers] and [ $x$  = GNI per capita];  $y = 0.0237x + 341$  in the year 1997) and 40 years to bridge the international TV divide (whereas [ $y$  = TV receivers] and [ $x$  = GNI per capita];  $y = 0.019x + 223$  in the year 1997) (Hilbert, 2002).

<sup>26</sup> See also figures and estimates for Latin American Internet users and compound annual growth rates Internet users from IBOPE eRatings (August 2002); Nielsen/ NetRatings (August 2002); Yankee Group (June 2002); Computer Economics (June, 2002); Morgan Stanley (May 2002); Bank Technology News (March 2002); Probe Research (February 2002); Speer & Associates (December 2001); International Data Corporation IDC (September 2001); Computer Industry Almanac CIA (April 2001); Accenture (February 2001) (cited in eMarketer, 2002).

<sup>27</sup> ICTs actually fit the definition of what is called a "semi public-good" or "merit good" more closely. They are usually partially rivalrous (meaning that the benefit of one individual reduces the supply available to others) and partially excludable (the benefit can be limited to a selected group). Such public goods are often financed by the formation of "clubs", whose members consume the good while sharing the cost of access (Tiebout, 1956; Buchanan, 1965). The model has been successfully implemented through public libraries, museums and theatres and is the concept underlying current efforts to provide "public Internet access points".

<sup>28</sup> In an effort to provide "democratic access to the benefits of technology to all citizens", the Ecuadorian Government ratified Decree No. 2143-A in January 2002, which introduces "zero tariffs for the import of hardware and software" (Conatel, 2002). This cuts hardware and software costs by about 20%.

Policies on financing mechanisms need to take into consideration that the transition to the information society cannot be completed simply by laying the technological groundwork for the infrastructure and the generic services layers. Financing mechanisms have to be set up for the integration of the technology into existing socioeconomic structures in the different e-Sectors.

The introduction of digital information systems induces sweeping changes in the organization of society and production. The up-front costs of in-house software systems are very high, and their implementation requires a great deal of effort. Experience shows that the introduction of an ERP (Enterprise Resource Planning) software system in a small or medium-sized enterprise takes from 3 to 18 months (Arancibia, 2002). While the long-term productivity gains greatly exceed the required initial investment, the short-term financial and organizational demands (such as the formation of an implementation team) may be too high, especially for small agents. The company might not survive the productivity slowdown that occurs during the software implementation phase. Thus, short-term incentive mechanisms or loans need to be provided in order to enable and motivate small organizations to make the necessary investments and organizational adjustments.<sup>29</sup>

### 3. Human capital

The conventional challenges to be addressed in developing educational systems in Latin American and Caribbean countries include how to increase public education expenditure (with the general objective being to reach at least similar levels to those found in OECD countries, i.e., 5% of GDP), how to increase the average number of years and hours of schooling and how to better integrate marginalized groups, among others (ECLAC, 2002a). These long-deferred tasks take on even greater importance when considered in the new light which the information society sheds on human capital development.

In order to improve educational quality and to narrow existing gaps, the curriculum needs to be made more relevant—adapting educational content, practices and institutions to specific social, cultural, linguistic and geographic situations—and mass use needs to be made of ICT resources to enhance learning outcomes and socialize the basic tools of the information society. However, it is not enough to modernize educational tools by introducing and integrating ICTs into existing public educational systems. It is even more important, in conjunction with these new tools, to develop higher cognitive functions by orienting the learning process towards problem identification and problem-solving, an increased capacity for reflection, creativity, the ability to distinguish between what is relevant and what is not, and planning and research skills, since these functions are vital in an information-saturated world. Progress also has to be made in the design and use of portals and software applications (educational content) and in the training of educators (teachers, administrators and families).

The region is still far from reaching the level of skilled human resources necessary to respond to the needs arising from the emerging information society. Furthermore, the skills of those who have achieved a higher level of education often do not meet the labour market's requirements. This gives rise to a paradox in the Latin American and Caribbean labour market, where the number of skilled workers is insufficient and yet, at the same time, there is a considerable underutilization of skilled labour, as those who are skilled do not have the abilities demanded by that market (ECLAC, 2002b). It is no easy task to resolve this problem, because curricula and programmes of study become obsolete very fast in the

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<sup>29</sup> These incentives need to be designed on the basis of the full cost of the implementation of application systems (hardware, telecom, software, implementation services, training, reorganization, etc.).

information society, especially in the field of engineering (León, 2002). The development of professional profiles which fit the special requirements of the particular industries operating in Latin America and the Caribbean is a responsibility to be shared by educational institutions, the public sector and the relevant industry itself. The creation of a network of representatives of all the different stakeholders which can monitor and propose suitable professional profiles is essential in order to avoid this common problem of skill-mismatches and to reduce the risk of offering outdated curricula.

The new technology also creates a great deal of disruption in the lives of a large part of the workforce. Labour policies therefore need to be integrated into the information-society strategy. While it is too early to speculate about the employment effects of ICTs on Latin America and the Caribbean (ECLAC, 2002c), it is clear that, in this region as elsewhere, the use of these new labour-saving technologies will have a severe impact on the labour market. In large economies, such as the United States and United Kingdom, the disruption has favoured highly skilled workers (Brenashan and others, 1999), while the displaced workers have been absorbed by the growing economy. However, smaller economies with higher unemployment rates do not have the same ability to absorb displaced workers. Accordingly, there is a greater potential for social upheaval in the wake of ICT introduction in smaller and slowly growing economies. Middle-aged individuals (“too young to retire, too old to learn”) are most vulnerable (Sanatan, 2002). Many of these workers face the specter of shattered lives and an inability to ever return to the labour market. These disruptions carry a high cost for society, as these people are likely to suffer more physical and mental illnesses throughout the rest of their lives.

Partnerships with industry and private companies also become necessary to create “lifelong-learning” mechanisms, which entails the extension of national education systems to the existing workforce (WEF, 2002b, 2002c). The concept of lifelong learning is a key element here, since an information society competes through tacit knowledge. It would even justify a move by the public sector to re-budget its expenditures so that it can spend more on higher education as a means of allowing not only those between the ages of 18 and 25 to profit from it, but also those between the ages of 25 and 60. Involving the private sector in this effort could help to make subsidies and tax allowances available for individuals and firms that invest in skills development.

In many Latin American and Caribbean countries, special agencies exist which support the training of the national workforce. Over the decades these “national apprenticeship agencies” have become powerful and widely recognized organizations that manage a considerable annual budget. However, they are often ill-equipped to meet the demanding challenges of a workforce in the information society and many may need to be overhauled (Cardenas, 2001 quoted in Hilbert and Katz, 2002). These agencies would also be ideal points of origin for initiatives to form private-public partnerships and to identify appropriate professional profiles. Directing these agencies’ efforts towards the creation of a well-equipped workforce for the information society in Latin America and the Caribbean would be a powerful policy.

The discussion about human capital for the information society also involves the notorious “brain drain”. Although it is not a new phenomenon, the growing demand in the developed countries for foreign workers with specific skills means that the barriers impeding their mobility need to be reviewed (ECLAC, 2002a). Those with high qualifications are clearly in a better position in this regard. The developed countries naturally make deliberate efforts to attract scarce specialists—in some cases this forms part of their human resources policies—and these efforts are welcomed in many segments of migrants’ societies of origin. While all sorts of high-quality human capital is important in the information society, there has been a particularly striking increase in developed countries’ demand for immigrants with increasingly specialized skills in the field of ICT engineering, and they are therefore offering terms and conditions that

cannot be matched by the nations of Latin America and Caribbean. In the early 1990s, some 300,000 Latin American and Caribbean professionals and technicians —approximately 3% of the total number existing in the region— were living in countries other than those of their birth; over two-thirds of that total were concentrated in the United States (Villa and Martínez, 2000).

International regulations on trade in services contribute to this trend.<sup>30</sup> Even by the modest standards of liberalization, little has been achieved in terms of the temporary entry of natural persons within the framework of the General Agreement on Trade in Services (GATS) (known as “Mode Four”). Commitments are horizontal, mainly concern movements associated with the establishment of a commercial presence (known as “Mode Three” under GATS), and are confined to intra-corporate transferees of senior executives and highly skilled professionals and specialists. Furthermore, the procedural requirements for the granting of visas and work permits have not changed as the result of the Uruguay Round commitments and are still subject to considerable discretionary powers on the part of the issuing authorities, all of which results in a further erosion of access opportunities. Additionally, the commitments are subject to conditions and qualifications, such as various kinds of needs tests, wage-parity requirements, etc., which further reduce their effectiveness in providing genuine market access (Self and Zutshi, 2002).

On the other hand, the general flow of skilled labour to developed countries notwithstanding, anecdotal evidence indicates that a portion of the intraregional and extraregional flows of professionals consists of return migration, which then helps to build capacity in the home countries of the former emigrants (see box 2.5).

Box 2.5

**RETURN IMMIGRATION OF ICT PROFESSIONALS IN THE CARIBBEAN**

In the Caribbean, for example, some of the ICT specialists and professionals who studied abroad and who initially joined the labour force in their host countries have been returning to their home countries either to take up jobs with transnational corporations or to establish their own businesses. Returning migrants have also established consultancies, in some cases in partnership with residents, to cater to the growing needs of businesses and governments for high-value services. This is perhaps truer of the service-based economies, such as those in the OECS countries and the Bahamas, as well as Jamaica, where the services industry, especially telecommunications, has been growing significantly since the early 1990s. Other Caribbean nationals who have completed their working life abroad are also returning to set up businesses or retire in the region. Return migration is not peculiar to this phase of globalization. It was encouraged in the 1970s by the Governments of Jamaica and Guyana, which provided incentives to entice qualified nationals to return to their home countries to fill vacancies in the public sector. The difference now is that the market is providing the incentives, and the return migrants are pursuing job opportunities in the private sector. Be that as it may, governments are facilitating return migration, through legislation, as in Saint Kitts and Nevis, and through community projects, as in Jamaica.

**Source:** ECLAC, Globalization and development (LC/G.2157(SES.29/3)), Santiago, Chile, 2002.

<sup>30</sup> The Annex on Movement of Natural Persons Supplying Services Under the Agreement, dealing with negotiations on individuals’ rights to stay temporarily in a country for the purpose of providing a service, specifies that the Agreement does not apply to people seeking permanent employment or to conditions for obtaining citizenship, permanent residency or permanent employment.

## D. THE VERTICAL SECTORS: THE DIGITIZATION PROCESS

The digitization of information flows, communication processes and coordination mechanisms in different sectors of society ushers in an advanced form of organization. This constitutes an institutional reorganization process which shifts the functionality of the sector into the digital age. The fact that part of the information flows and communication processes are taking place through electronic networks in a given sector is usually signalled in the literature by adding an “e-” as a prefix. e-business and e-commerce (the digitization of business processes or commercial activities, respectively) may be the most common process of this sort, but they are not necessarily the most sophisticated examples. In Brazil and Chile, for example, the most popular online services are either online banking (e-banking) or online tax payment (e-government).<sup>31</sup> Some countries in the region (especially in the Caribbean) are making an intensive effort to exploit the “digital opportunity” and their access to the global information infrastructure in the tourism industry.<sup>32</sup>

Other sectors that hold out a great deal of potential for digital activity include the health sector (e-health) and the cultural media and entertainment industry (e-media). The digitization of learning processes in schools and other educational institutions is an area of increased digital activity in many countries of the region (e-learning), as is the use of ICTs for advanced academic and scientific R&D. Going back to the roots of the Internet, digital communications and coordination are an increasingly crucial part of military activity and warfare. The list of e-sectors goes on and on. While the scope of this paper does not permit an indepth analysis of all the specific sectors involved or of the various core regimes and their inter-functionality, the following sections are intended to provide a cross-sectoral overview of the digitization process in general and of a selection of specific e-sectors.

### 1. ICT for development

Two main lines of thought help to explain the impact of the ICT paradigm on development through the digitization of information flows and communication processes. The first argument is related to the knowledge transfers induced by the augmented information flow. The second argument is related to the internal development of an individual society thanks to a more valuable form of organization.

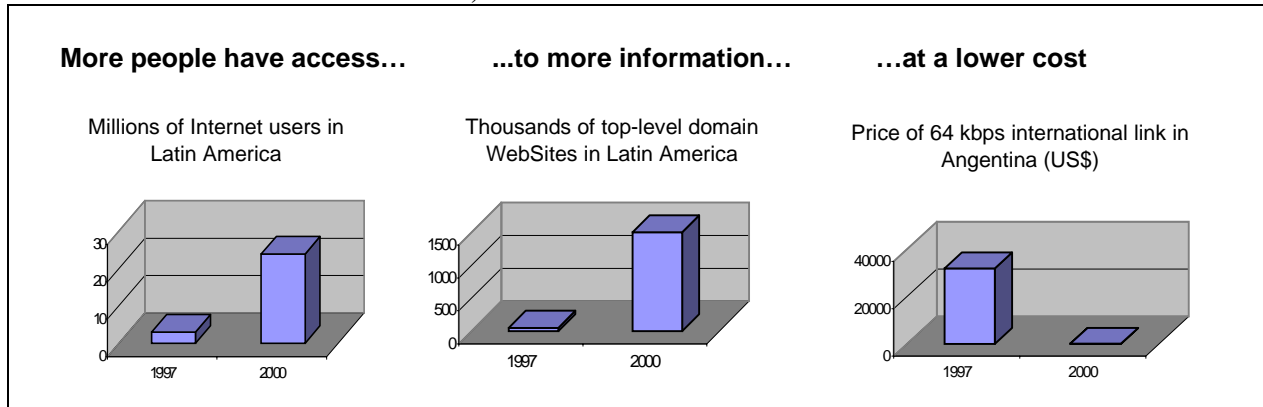
First of all, the augmented information flow holds out the hope of a decline in information asymmetries, which would pave the way for a history-making chance to integrate all societies by networking them in a global information society. More people than ever before in history have access to an ever-increasing amount of information at a constantly falling cost (UNDP, 2001) (see figure 2.8).

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<sup>31</sup> The Brazilian Government received more than 95% of all income tax statements in 2001 via the Internet. In Chile, 55% of income-tax payers used the electronic infrastructure in 2002.

<sup>32</sup> In contrast to the main industrialized countries (with the exception of France), more than half of total Latin American and Caribbean service exports in the year 2000 came under the heading of travel, which highlights the importance of the region as a tourist destination (ECLAC, 2002b). The percentage is particularly high in Mexico (60.5%) and the Caribbean countries (70.2%), especially Cuba and the Dominican Republic (87.1%). The travel industry has been the third-largest B2C segment in Latin America, making up for more than 10% of the region’s B2C e-commerce (eMarketer, 2002).

Figure 2.8  
**WIDESPREAD, INEXPENSIVE INFORMATION ACCESS**



**Source:** International Telecommunication Union (ITU), “The Americas Region: into the year 2000” (www.itu.int/telecom), 2000; Internet Software Consortium (ISC), 2001; *Empirica*, “Gesellschaft für Kommunikations- und Technologieforschung mbH” (http://www.empirica.com/iemp/index.html), 2000.

The information obtained via these channels can help to create knowledge relating to the different aspects of development. In the long run, this would mean that developing countries could move closer to the current “knowledge frontier” in educational standards, health standards, business models, public-sector administration and living standards in general. The augmented domestic and worldwide flow of information through digital networks offers developing countries the chance to integrate themselves more fully into the global exchange of ideas.

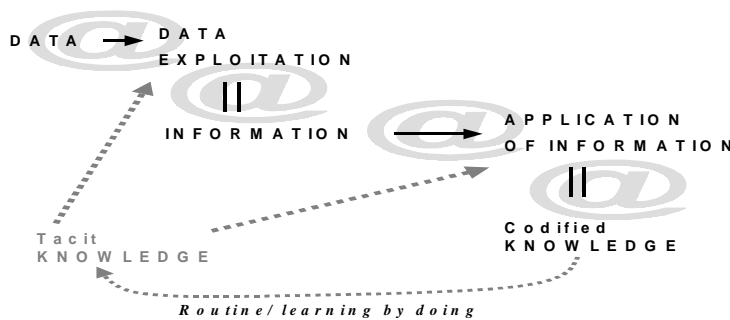
A second line of thought as to how ICTs can be used for development is based on advancements in the institutional structure for the organization of production and society. The digitization of information flows and communication processes brings a change in “*the way things are done*”. The reorganization that results from digital coordination is introducing a new institutional setting. Institutional settings determine the form and behaviour of organization, as well as the “rules of the game” (North, 1993). They reduce uncertainty in everyday life by forming patterns of interaction and shaping the way individuals view and understand communication mechanisms. Institutions enable effective interactivity. They are a combination of formal rules, informal norms of behaviour, conventions and codes of conduct, and their enforcement characteristics. Digital organization can help to create and manifest an advanced form of the institutional framework in a society.

The opportunity for lagging countries that arises in this connection is that, during paradigm shifts, they will have time for learning while everybody else is doing the same thing (Perez and Soete, 1988). The whole world is digitizing information and communication processes in different sectors of society, and the entire world will still have to learn how to handle this new forms of information processing and coordination (see box 2.6). In the meantime, developing countries can make extraordinary advances with regard to the existing institutional structure through digitization. Considerations about institutional changes through digitization can lead to strategies for “leapfrogging” along institutional and organizational learning curves (see box 2.7).

Box 2.6  
**THE INFORMATION OVERLOAD AND THE KNOWLEDGE PROCESS  
 IN THE INFORMATION SOCIETY**

Through digitization in the vertical sectors, people's perceptions about the processing of information and the creation of knowledge are changing. The use of ICTs is changing how the conversion of information into knowledge and the conversion of communication into coordination are perceived. Knowledge can be characterized as tacit (implicit) knowledge or as codified (explicit) knowledge (Polanyi, 1962). Tacit knowledge includes skills, habitual processes or customs; it is intangible and "carried inside" an individual or a community. When knowledge is codified it can be transmitted (codification through language, text, images, sounds, smells, etc). In its natural form, knowledge is tacit and internalized so it can be deployed. However, in order to transmit knowledge from one to the other, it needs to be codified, which means that it needs to be made tangible and static.

The codification of knowledge implies that knowledge is being transformed into information. It is a process of reduction and conversion, since it is aimed at expressing knowledge in a compact, standardized format. ICTs are clearly incapable of processing "tacit knowledge". ICTs are nothing more than a technological tool to support the transmission and processing of codified knowledge (information) and to support the interpretation of the information obtained. In order to fulfill this function, ICTs simply process data, whereas human beings can exploit those data (sometimes with the help of informatics applications) to obtain information. Through the creative interpretation of this information, knowledge can be obtained. By frequently consuming codified knowledge, a learning process facilitates the creation and use of tacit knowledge.



The paradigm shift that ICTs are bringing about in the way information is processed and knowledge is obtained requires a learning process on the part of the user (user groups). We are often confronted with the fact that we (as the users of this new paradigm) are still not able to handle this new "function/process" of information processing properly. The result is an information overload. Transaction costs are rising, instead of decreasing, transparency is turning into confusion, Spam e-mails are overflowing cyberspace and the focus of virtual communication is lost. Undoubtedly, once the stage of a true "information society" is reached, the processing of information will become a more important part of our lives. However, thus far, what is taking place is simply a mismatch between the "technologically possible" and the "humanly capable". Neither the supply side (the creator of digital content) nor the demand side (the consumer of digital content) has yet learned to handle digital information properly.

This often leads to a paradoxical situation in which the use of ICTs is increasing the cost and effort involved in processing information instead of decreasing it. In order to resolve this paradox, we will first have to learn how to handle these new forms of information processing. Evidence shows that young people are often faster in adapting to this new kind of "knowledge process". They grow up in a world where this new form of information processing and knowledge creation becomes natural. Only when we will have learned how to handle the "technologically possible", will we be able to implement the vision of the "information society".

**Source:** Martin Hilbert, *From Industrial Economics to Digital Economics: An Introduction to the Transition*, Desarrollo productivo series, No. 100 (LC/L.1497-P), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), February 2001. United Nations publication, Sales No. E.01.II.G.38; "Toward a theory on the information society"; "Infrastructure"; "Strategies"; "Telecommunications regulation: technical standards"; "Financing a universal Information Society for all"; "e-Business: digital economics"; "e-Media", *Building an Information Society: A Perspective from Latin America and the Caribbean*, Libros de la CEPAL series, No. 72 (LC/G.2199-P), Martin Hilbert and Jorge Katz (eds.), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2002.

## Box 2.7

**LEAPFROGGING INSTITUTIONAL DEVELOPMENT**

Institutions and organizational structures (formal rules, informal norms of behaviour, conventions and codes of conduct, common forms of interpretation and accepted mechanisms, etc.) are subject to a learning process. Immature institutions and inefficient organizations are a serious obstacle to development. The digitization process in the different e-sectors of an information society constitutes a form of institutional reorganization. Performance is improved and efficiency gained. The question that arises is whether sophisticated leapfrogging strategies might permit a country to engage in “institutional leapfrogging” through the process of digitization.

Undoubtedly, during this “time of great structural change” (U.S. White House, 1997), the entire world needs to reorganize its institutional structures in order to deal with the new forms of conduct that the information society paradigm deploys. It is claimed that the greater juridical, cultural and political flexibility existing in many developing countries is making it easier for them to adapt to the new paradigm than it is for traditional industrialized countries (such as in Europe or Japan) that have a strict and detailed regulatory framework and, comparatively speaking, deadlocked organizational structures. The existence of well functioning institutions (such as in developed countries) can in some cases even induce a reluctance to change. Given the extensive experience with older solutions, the new ideas do not initially seem to be an important improvement. When innovations occur, leaders may have no incentive to adopt the new mechanisms. An absence of solutions and the urgent need for their development, on the other hand, opens the door to change. When people have less experience with the old solution they will more readily accept a new technological solution that offers them an opportunity to, first of all, tackle the old problem (satisfy their needs) and, secondly, even to bypass the previous top performer once the new system is in place (Brezis, Krugman, Tsiddon, 1991).

For example, in a region where the traditional postal service is neither reliable nor dependable enough to meet basic needs, the potential for online practices is vast. By skipping over part of the evolutionary path that the postal service has gone through in developed countries, followers should be able to “leapfrog” certain stages in the postal service’s evolution. Since digital conduct offers an advanced form of postal communication, the digitization of the postal service sector in developing countries could narrow the performance divide between them and more advanced countries. Anecdotal evidence is available on this point. For example, in Brazil 90% of the tax statements have been received via the Internet, whereas this is a threshold that the United States—with a reliable traditional postal service and well-organized traditional tax payment mechanisms—is not expected to reach until 2007. Another example would be that, whereas the 2002 presidential elections in Brazil were held entirely through electronic voting machines, this is an area in which the United States is still facing formidable problems. In the areas of income tax payments and e-voting as well, Brazil—through strong public sector leadership—has “leapfrogged” certain developmental stages.

In times of normal, incremental technological change, increasing returns to scale tend to strengthen developed countries’ leadership positions. However, when a new innovation arises or major structural changes occur, a temporary window of opportunity opens up for less developed countries to catch up (Perez, 2001). Leapfrogging strategies should aim at passing on to an advanced stage of productive and social organization.

**Source:** Martin Hilbert, “Toward a theory on the information society”; “Infrastructure”; “Strategies”; “Telecommunications regulation: technical standards”; “Financing a universal Information Society for all”; “e-Business: digital economics”; “e-Media”, *Building an Information Society: A Perspective from Latin America and the Caribbean*, Libros de la CEPAL series, No. 72 (LC/G.2199-P), Martin Hilbert and Jorge Katz (eds.), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2002.

## 2. Cosmopolitanism and trans-localism

The logic of interactive networks diverges from the logic underlying the organization of communications within a territorially defined area or within the nation-State. This combination of horizontality in the communication and softening of geographical borders leads to trans-localism and cosmopolitanism: we flow towards the centre and/or we form horizontal links with many different points on the periphery (Castells, 1999). In other words, interactive electronic networks allow people to communicate with distant peers who share certain values or needs, while at the same time facilitating a direct link between the individual and major centres of information processing, knowledge production and political debate. This forges a real-time link between the local and global levels that allows them to skip over the national level in between them. In this sense, network technology paves the way for a form of “coordinated diversification” (Castells, 1999), in which it is possible to desegregate signals and expressions to a much greater degree while improving the coordination among them.

The two-way ICT information systems offer a chance to overcome the region’s subordinate position in the industrialized world. Cyberspace opens up an opportunity for integrating less privileged groups (CV Mistica, 2002). Anecdotal evidence from countries in the region shows how the “network of networks” is horizontally connecting diverse groups that have been subjected to sociocultural or gender segregation (Flinquelievich, 1999, 2002). On the worldwide level, the figures indicate that interactivity permits the “silent voices” to be heard. In 2001, native speakers of Spanish and Portuguese represented around 7% of the world’s 500 million Internet users. Spanish- and Portuguese-language content accounted for around 8.5% of Internet content in that same year (see table 2.2). The languages that are spoken in cyberspace grow in parallel to the number of users. The majority of users are still native English speakers, but this is changing as cyberspace become increasingly globalized.

Table 2.2  
**THE USE OF ROMANCE LANGUAGES IS GROWING RAPIDLY IN CYBERSPACE**

Language	Real world share in %	Internet users (2001) in %	Webpages (1998) in %	Webpages (2001) in %	Webpage growth (1998-2001) %
English	10.5	47.6	75.0	52.0	-30
Spanish	6.3	4.5	2.4	5.7	+242
French	2.2	3.7	2.8	4.6	+164
Italian	1.0	3.7	1.5	3.0	+204
Portuguese	3.2	2.5	0.8	2.8	+343

**Source:** Funredes (Networks-and-Development-Foundation) (<http://funredes.org/LC>), 2001.

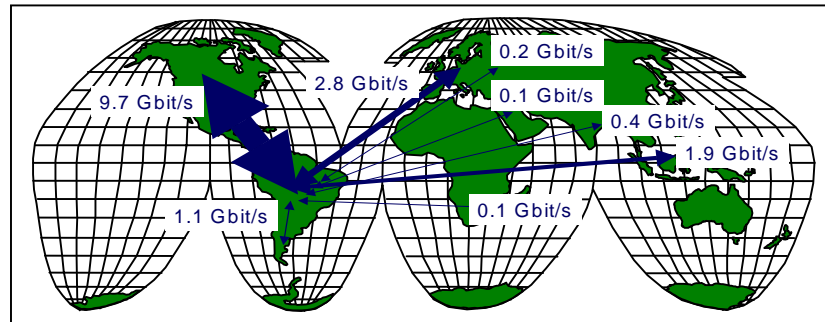
On the other hand, the existence of “network externalities”<sup>33</sup> and “lock-in effects” in digital networks (Shapiro and Varian, 1999), the non-rivalry of digits (Negroponte, 1995; Kelly, 1998) and the existence of economies of scale (Hilbert, 2001a) lead to a marked concentration in the hands of the leading actors in cyberspace. It may cost millions of dollars to create digital content or a digital product, but it may cost almost nothing to duplicate it. The “death of distance” for digital performance (Cairncross, 1997), which is breaking down any type of “industrial protection” in digital industries (such as content providers, software providers, entertainment and other digitizable services), opens up a worldwide competitive arena in cyberspace. The exploitation of economies of scope in information management (which becomes possible with the use of intelligent information systems that manage vast databases) and of economies of scale in digital production are more accessible to large-scale high-quality performers.

<sup>33</sup> The value of a network is increasing through the function  $(x^2-x)$ , with every additional  $x$  users connected.

The fact that high-quality digital goods and services offered by foreign providers can reach the doorsteps of individual final consumers around the world pose major challenges for developing economies and may result in capital flight, tax evasion, employment reduction, capture of the health market and “cultural colonization”. Scenarios in which a “new global division of labour” leads to the location of all of the more sophisticated service industries in the developed world, with the functions of such sectors taking place over digital networks, would be the ultimate stage in this process.<sup>34</sup>

The preliminary evidence shows that almost 60% of Internet traffic flows from Latin America and the Caribbean are directed to North America, while only 6.7% of Latin American Internet users are using Latin American content (see figure 2.9).

Figure 2.9  
INTERNATIONAL PEAK-HOUR INTERNET TRAFFIC FLOWS TO AND FROM  
LATIN AMERICA IN 2001  
(Gbit/s)



**Source:** Ovum Analyses, cited from Foro Latinoamericano de Entes Reguladores/Asociación Hispanoamericana de Centros de Investigación y Empresas de Telecomunicaciones (Regulatel/AHCIET), “Internet and Telecommunications Traffic Flows in Latin America and their Market Dynamics”, prepared by Ovum-CyberRegulation Consultants (<http://www.ahciet.net/pag.asp?pag=ovum.asp>), 2001.

On the other hand, the same channels could be used to transfer jobs to developing countries. Cases where developed countries outsource part of their service industries to developing countries are found in the software and service industries in India, for example (UNDP, 2001; ECLAC, 2002c).

Evidence from the e-commerce sectors demonstrates that Latin American e-consumers use the global information infrastructure to reach out to foreign economies (see table 2.3). Brazilian consumers are an exception in Latin America in this respect, since they shop predominantly on domestic sites.

<sup>34</sup> Such scenarios are already a reality in R&D activities (see Cimoli and Katz, 2002).

Table 2.3  
**SHARE OF CONSUMERS SHOPPING AT DOMESTIC AND FOREIGN WEBSITES  
 IN LATIN AMERICA, THE UNITED STATES AND EUROPE, 2000**

	Domestic	Foreign
Argentina	37	63
Brazil	61	39
Chile	25	75
Colombia	34	66
Mexico	40	60
Peru	20	80
Venezuela	23	77
Latin America (average)	41	59
United States	91	9
Europe (average)	41	59

**Source:** *InfoAmericas*, “Tendencias Latin America Market Report”, Market Intelligence and Strategic Consulting (<http://www.infoamericas.com/>), 2000.

However, there is evidence that since those data were collected (in 2000), a shift towards domestic online retailers has taken place in some countries. In Chile, for example, it is claimed that in 2001, 43% of consumer e-commerce spending went to national retailers. The rise in the number and variety of domestic online retailers as well as an increase in the products offered would presumably account for this shift.<sup>35</sup>

This dimension of the digital divide, which goes far beyond mere “access to computers” and focuses on who is really exploiting the “digital opportunity” and who is unable to do so, is raising crucial development issues. ECLAC believes that the use of ICTs opens up opportunities for developing countries, but that this is not an automatic process and that strong public policies are required to ensure successful integration into the global information society.

### 3. The digitization process

Passing from off-line organizational structures to online forms of coordination is an imperfect process, marked by a large degree of momentum, on the one hand, but by uncertainty and discontinuities, on the other. The following section focuses on some of the general phenomena which can be observed in this transition within Latin America and the Caribbean, as well as taking a closer look at some of the specific vertical sectors of an information society.

It is foreseeable that private and public organizations and actors will adapt to the new processes and models at different paces. In some cases, this may create tensions. Experience with the use of ICTs in schools, hospitals, government ministries and municipalities, for example, shows that in Latin America and the Caribbean it is often not the consumer of digital content (students, patients, citizens) who feels uncomfortable with them, but rather the provider (teacher, physician or public official) (Hilbert and Katz, 2002). The changes in the functionality of daily routines that are introduced by digitizing part of the performance of the sector are often profound. The investment required in order to learn how to deal with

<sup>35</sup> Changes in exchange rates and currency devaluations may have helped this process along.

the new technological solutions takes energy and involves financial sacrifices. The lack of incentives and of training opportunities for the “operator” of digital applications becomes a major obstacle. Civil servants, for example, are often not given any monetary recompense for learning how to use new e-government applications effectively (Orrego, 2001 quoted in Hilbert and Katz, 2002). Physicians prefer to use the Internet for private purposes and do not make sufficient effort to integrate the new mechanisms into medical care (Rodrigues, 2001 quoted in Hilbert and Katz, 2002). Teachers often regard visits to the computer labs in schools as an additional “enrichment” activity, instead of effectively integrating the new possibilities into the curriculum (Jara, 2001 quoted in Hilbert and Katz, 2002). There are very few systems of positive or negative incentive mechanisms to foster the integration of ICTs into the daily routine of teachers, physicians or civil servants, and the adoption of the tools that will make it possible to take advantage of these new opportunities is therefore advancing very slowly in such sectors.

Inter-organizational digitization is another generic issue that deserves special attention. The interconnection of organizations may be a less intriguing subject than anecdotal best practices in end-user performance (such as in tele-medicine, distance-education, online tax payments or the worldwide retailing of domestic products, etc.), but the main foundations for the digital economy and the information society are the digitization of back-office processes. Only a small part of digital organization becomes visible in the front-end user interface. The digitization and interconnection of information systems in and between hospitals and clinics, the different public-sector institutions of a municipality, research networks, and schools and universities present tremendous challenges, but also offer the greatest opportunities. Web pages are only the “tip of the iceberg”. In the tourism industry, for example, the real challenge does not lie in setting up travel portals, but rather in integrating the local industry into worldwide reservation systems, such as SABRE, System One or Galileo. Some operators have also created their proprietary systems. The integration of the various networks becomes the focus of e-tourism. In the digital economy, the much-touted B2C e-commerce (online retailing such as Amazon.com) represents only 1% of the transactions channeled through electronic networks. The rest takes place in the “back office” of Latin America’s production systems. The interconnection of medical databases might not be as “fancy” as the use of remotely controlled robotic devices to carry out long-distance surgeries, but it is surely a very effective (and complex) step towards e-health. In this respect, the important work being done by several academic research networks linking universities across Latin America and the Caribbean deserve special mention.<sup>36</sup>

Another formidable challenge for digital communications in a broad spectrum of e-sectors is the quality of publicly available information. The Internet has an unparalleled potential to provide all users—students, professionals, managers, salespersons, families, educators, nurses, physicians, researchers, regulators and policymakers—with data of unprecedented timeliness, accuracy, depth and diversity. Yet it is equally clear that the very qualities that make the Internet such a rich marketplace of ideas (its decentralized structure, its global reach, its leveling of access to the tools of publication, its immediacy of response and its ability to facilitate free-ranging interchange) also make the Web a channel for potential misinformation, concealed bias, covert self-dealing and evasion of legitimate regulation. This is not only hindering the development of digital interaction (because of mistrust between buyers and sellers, who only know each other virtually, or because of a lack of information as to the quality of educational or health content), but also relates to the need to control undesirable content, such as the illegal dissemination of child pornography or organized crime. Efficient mechanisms to confront these challenges do not yet exist.

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<sup>36</sup> Such as RETINA in Argentina, RNP in Brazil, REUNA in Chile, Red Pacificocyt in Colombia, Reduniv in Cuba, SVNet in El Salvador, Red Universitario Guatemalteca, Red PANNET in Panama, RCP in Peru, CUDI in Mexico, Seciu/Rau in Uruguay and the recent formation of CLARA (Cooperación LatinoAmericana de Redes Avanzadas).

*e-Business*

Since the natural incentive to change is greater in the e-business sector than in other e-sectors (such as e-health, e-government, or e-learning), the digitization process is more advanced in this area of the economy. The idea of using electronic networks to facilitate business processes has been around since the early days of “Internetting” in the 1970s. Nowadays, the concept of digitizing information flows, communication processes and coordination mechanisms in business activities is known as “e-business”. This term denotes all strategic and operational aspects of economic trade through electronic networks, including inter-firm processes such as human resources coordination, planning and control mechanisms, EDI systems<sup>37</sup> and other forms of electronic trade. The term “e-commerce” does not include the digitization of the production system, since it refers exclusively to operations between a provider and its client that are channeled through electronic networks (according to its accepted definition, these operations are, on the whole, limited to transactions channeled through the open Internet).

Numbers and figures about e-business and e-commerce volumes vary widely from one source to another (as do the definitions of the terms “e-commerce” and “e-business”). It is estimated that worldwide e-commerce transactions in 2002 (including Web-based B2C online retailing and B2B intra-industry trade) accounted for 3% of global GDP (with B2B representing 86% of the total). The United States accounts for the lion’s share of this, with 58% of global e-commerce. Estimates for e-commerce in developed countries show that Web-based online transactions in the United States, Japan and Europe represented around 7%-15% percent of their GDPs in 2002 (eMarketer, 2002).

In Latin America it is estimated that e-commerce transactions accounted for approximately 1% of GDP in 2002 (US\$ 20 billion out of US\$ 2 trillion) (eMarketer, 2002). However, with growth rates of between 80% and 90% per year, Latin American e-commerce is among the fastest-growing in the world (only Europe’s e-commerce is expected to grow more rapidly in the years to come). Although B2C e-commerce (“online retailing”) tends to garner more publicity than B2B transactions (“intra-industry trade”), the B2C segment actually represents a small and shrinking share of Latin America’s total e-commerce revenues (around 10% of total e-commerce). Most research firms believe that the B2B segment will continue to generate the great majority of e-commerce revenues in the region. Selling and buying directly to each other, businesses have been able to introduce certain rules of procedures and codes of digital conduct via electronic marketplaces very quickly.<sup>38</sup> Private consumers, on the other hand, are so far only conducting small transactions over the Internet.

Total e-business trade (including closed EDI networks and other electronic trading systems) is estimated to have accounted for US\$ 189 billion in Latin America in 2002 (9.35% of GDP) (eMarketer, 2002). This makes it clear that the current focus of electronic business transactions in Latin America (as elsewhere in the world) does not lie in Web portals or other open Web-based front-end interfaces, since 90% of the e-activity is taking place through back-office transactions in the region’s production systems. Be this as it may, although the entire digital economy is expected to continue to grow rapidly, Web-based

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<sup>37</sup> EDI (electronic data interchange) systems are often proprietary networks and maintain their own internal systems based on a set of contractual agreements. They have been developed by large companies who adopted the technology early on and are capable of making the necessary economic investment and of proving its business applications. EDI networks are standardized, and the interconnection of these networks has extended the scope of EDI on a global scale. In comparison to Web-based transactions on the “open” Internet, “closed” EDI systems are considered to be more secure and less susceptible to fraud.

<sup>38</sup> Some of the most developed B2B marketplaces in Latin America serve the construction industry, manufacturing, textiles, the automotive industry, metals, mining and professional services (Elkin, 2001 quoted in Hilbert and Katz 2002).

e-commerce is expected to catch up in relative terms. It is not, however, expected that many of the large companies in the region that have considerable investments in EDI networks will discard them in favour of purely Internet-based systems any time soon. Open, inexpensive Internet exchanges are primarily an option for small and medium-sized organizational units, given their low cost.

Advanced e-business software systems are still very expensive, and while large enterprises in Latin America have already reached a penetration rate of 5%-11% for ERP (Enterprise Resource Planning) or CRM (Customer Relationship Management) systems, less than 1% of the region's SMEs operate with such sophisticated configurations (see box 2.8). In comparison to other developing regions of the world, Latin America is not too far behind in software implementation. It is estimated that 4% of South American and 3% of Central American companies had implemented some kind of e-procurement system (SCM) by 2001. While, in the United States, 40% of the companies have done so, in Europe only 10% of firms have participated in an e-procurement supply chain, and in Asia the figure is only 3% (eMarketer, 2002).

Box 2.8

**THE DIGITAL OPPORTUNITY FOR SMALL AND MEDIUM-SIZED ENTERPRISES (SMEs)**

While several studies indicate that large companies have significantly higher Internet access rates and more Webpages and administrative software systems than SMEs, in terms of online transactions SMEs do not lag behind at all. Private research firms estimate that around 62% of Latin American e-business revenues in 2001 were generated by SMEs (US\$ 5.97 billion out of US\$ 20.7 billion). In the United States, SME's share of total e-commerce amounts to only 38% (eMarketer, 2002).

In Chile, for example, currently 37% of small businesses, 84.9% of medium-sized enterprises and 92.6% of large firms are connected to the Internet (Subsecretaría de Economía de Chile, 2002). However, while large firms in Chile account for 80% of total nationwide sales, they generate only 53% of Chile's total e-commerce. In contrast, SMEs accounted for only 17% of "real world" sales but made up 46% of e-commerce revenues in 2001. Thus, in relative terms, SMEs in Chile have a market share in cyberspace that is more than 2.5 times greater than their share in "brick-and-mortar" economic activities in the country (CCS, 2001).

This evidence from the first stages of e-business in Latin America notwithstanding, it is expected that the large and powerful actors in the region (governments, financial institutions and manufacturers, raw-material producers, agribusiness, construction firms and telecom companies) will be the ones that deploy much of the more sophisticated e-business systems (Elkin, 2002). Advanced e-business software systems are still very expensive, and while large enterprises in the region already have a penetration ratio of 5%-11% for ERP (Enterprise Resource Planning) or CRM (Customer Relationship Management) systems, less than 1% of the region's SMEs operate with such software systems.

However, the predominance of SMEs and their structural importance in the Latin American and Caribbean economy (although their contribution in terms of employment opportunities is substantially greater than their actual contribution to GDP) point to an opportunity that is well worth exploring. The declaration recently issued by the CARICOM/CIS/UWI expert group has underscored the importance for Caribbean countries of considering SMEs in formulating their commercial policies on e-commerce.

*e-Government*

The Net provides a modern channel for a form of democratic action which is itself associated with the origins of modern thought; in so doing, it opens up the political arena and allows a wider range of actors to be heard and represented (see box 2.9). The information society decentralizes citizenship by introducing real-time interactive flows without borders and can thus permit an exponential increase in the

number of individuals taking part in a public dialogue. On the new global stage, having a voice and making it heard, regardless of distance, is not only a heightened form of expression but a true cultural and political victory for citizens everywhere. Being able to send out messages and proposals enables people to participate on an equal footing in an emblematic exchange and be a part of pressure groups and deliberations that can influence different social groups. Electronic communications networks are becoming potential public access routes for broad social sectors and cultural actors who have traditionally been deprived of a voice in any but the most limited of forums.

Box 2.9

**e-DEMOCRACY IN MEXICO: THE NATIONAL DEVELOPMENT PLAN EXPERIENCE**

A best practice in online citizen participation is exemplified by the Citizen's Consultation for the 2001-2006 National Development Plan in Mexico (PND). The 2001-2006 PND represents the Federation's main planning instrument and sets forth not only the government's principles but also its objectives and strategies. It is the central document for the entire federal public administration and is legally approved by Congress. In December 2000, at the beginning of the new presidential term, a planning system was organized to promote citizen participation through a nationwide programme whose purpose was to involve citizens in the drafting of the 2001-2006 PND. Public servants saw this process as providing an appropriate mechanism for taking note of citizen's opinions, proposals and expectations regarding a number of development issues at the federal, local, municipal, family and even individual levels.

Citizen participation was enabled via mailed surveys and the Internet. Additionally, government ministries organized citizens' meetings in which outstanding academics and opinion leaders participated. Proposals were collected on about 110 national issues, which were classified under the three most important government areas: Human and Social Development, Growth with Quality, and Law and Order. A total of 117,040 completed questionnaires were received via the Internet and mailed surveys, and 196,854 proposals were drawn from them. The Internet page built for the PND extended the possibilities of participation, expedited the recording of opinions, and permitted the participation of Mexicans living abroad, who submitted over 43,000 proposals. Suggestions were gathered and analysed, and many of them were incorporated into the Plan's objectives and strategies. All the proposals were sent to the different public agencies for their analysis and possible inclusion in the PND. Furthermore, all actions taken by society and government to implement the PND will provide important elements for use in institutional regional or local plans, thus furthering the goals of the PND.

**Source:** United Nations Educational, Scientific and Cultural Organization (UNESCO), "Country Profiles of e-Governance", Commonwealth Network of Information Technology for Development Foundation (COMNET-IT) ([http://www.comnet.mt/unesco/Country%20Profiles%20Project/joint\\_unesco\\_and\\_comnet.htm](http://www.comnet.mt/unesco/Country%20Profiles%20Project/joint_unesco_and_comnet.htm)), 2002.

At present the legislative, executive, and judicial powers of Latin America and the Caribbean have reached differing stages in the digitization process. Mainly as a consequence of technological, regulatory and habitual constraints, the judiciary has lagged behind in the effective incorporation of these new opportunities, while the legislative branch is taking its first towards what is referred to as "e-democracy". The concept of "e-administration" refers to the introduction of ICTs into the public administration of the executive branch. While the latter has been the major focus of e-government activities so far, the potential of e-democracy should not be underestimated.

In a recent e-government study of the 190 States Members of the United Nations (UNDPEPA-ASPA, 2002), the South American countries and Mexico have been ranked among the nations in the world that have a medium or high degree of e-government capacity. In this worldwide index, Brazil was ranked 18th, Mexico 22nd, Argentina 31st, Uruguay 34th and Chile 35th. The Central American and

Caribbean countries' current capacity for e-government is described as "minimal" (they are ranked between 47th and 112th). Some of the countries in the region are making steady progress. However, some governments continue to suffer from an absence of strategic vision, programme coordination and success in balancing real citizen-centric concerns with constituent needs. This study underlines the lack of coordination among ministries and agencies in Latin American e-government initiatives. Furthermore, because of an insufficient commitment to a citizen-centric approach, there is a tendency to build online services around the objectives of the service providers rather than around the needs of the citizens.

The strategic importance of the business sector as a source of government revenue, the likelihood that businesses will regularly use e-government services more than individual citizens and the fact that governments can publicly demonstrate a greater degree of success with the business community than with the delivery of individual citizen-centric social services have, at least up to this point, led to a concentration of e-government services around the needs of the business community in Latin America and the Caribbean.

The functionality of e-government can hardly be compared with that of the e-business sector. In the current discussion about moving "from e-business to e-government", "streamlining government" and "citizens-as-clients," this is unfortunately often forgotten. It is true that some of the "governmental mechanisms of the industrial age" (Tapscott, 1996) can be improved tremendously through the effective use of ICTs. However, thoughts about "banishing bureaucracy" and "transforming bureaucratic systems and organizations into entrepreneurial ones" (Osborne and Plastrik, 1997) may be leading from the "dot-com bubble" to a "dot-gov bubble" (Osorio, 2002) which confuses means with ends.

The main objective of many "State-modernization projects" and "administrative reforms" is to seek out ways of improving public services and rectifying the failures and disadvantages of bureaucracy, while continuing to enforce regulations and public laws. Unlike private enterprises, the nature of the public sector and its functionality do not permit the implementation of far-reaching organizational changes overnight. Such changes have to be made gradually and be combined with an improvement in the public sector's political image and reputation. In addition, care must be taken not to take the types of revolutionary steps that may trigger strong resistance. This goes for municipalities, as well as for national governments. The goal of digitization in local, regional or national governments should therefore not be to imitate private-sector business models and short-lived trends, but rather to gradually reinvent the public sector so that it can meet the public demands of the twenty-first century (Fountain, 2001).

### *e-Health*

The countries of Latin America and the Caribbean exhibit a wide range of differing situations in terms of the organization and performance of health care services. As a result, there is also a wide range of variation in how equitable access to those services is and in the microeconomic effectiveness and efficiency of their resource allocation. The public/private mix, both in the financing and delivery of these services, also differs a great deal across countries. There is, however, a general predominance of mixed models in which the State operates on the basis of group insurance and public clinics, while the middle- and upper-income strata of society tend to use individual insurance policies and private health care facilities.

The gradual incorporation of ICTs opens up a broad window of opportunity for increasing the microeconomic efficiency and effectiveness of the region's health care systems and making them more equitable. In terms of microeconomic management, ICTs make it possible to achieve economies of scale

and scope by making it feasible to organize real-time health care delivery in such a way as to reduce waiting times, provide individualized care, and optimizing and decentralizing the use of the physical infrastructure and human capital available to each society, regardless of whether the system's assets are publicly or privately owned.

ICTs also offer an opportunity to make the system more equitable by increasing the transparency of information flows and thus helping to combat the adverse selection and moral hazard problems that often undermine the spirit of public service which should guide the operation of health care systems.

Another consideration has to do with the trust and confidence that are of special importance in the health sector. There is growing concern about the protection of health records against intrusion, unauthorized use, data corruption, intentional or unintentional damage, theft and fraud. Given the sensitive nature of personal health information, and how heavily health-care professionals rely on trustworthy records, the issues of reliability (data residing in the electronic health record is accurate and remains accurate), security (owner and users of the electronic health record can control data transmission and storage) and privacy (subject of data can control its use and dissemination) are of particular significance and must be clearly and effectively addressed by health-care and related organizations and professionals (Rodrigues, 2002).

### *e-Learning*

There is no question about the urgent need to incorporate ICTs in education on a massive scale, since this is the swiftest, most economical and largest-scale method for narrowing the digital divide between and within countries. Bridging the digital divide is not simply a matter of connectivity; it also requires the development of the necessary skills so that the population can make use of this technological tool to further the political, social and economic development process (CV Mistica, 2002). As social inclusion comes to depend increasingly on knowledge, networking and the use of state-of-the-art ICTs, the formal education system will play an ever greater role in affording access to social participation, since it can make connectivity and the ability to use electronic networks available to the population at large. As these media are incorporated into the educational system and their implications and uses are analysed, the schools will be able to start blending the academic learning process with media use, thereby encouraging the students to consume cultural resources more selectively and thoughtfully. Primary school coverage in Latin America and the Caribbean is close to 100% and secondary school coverage is expanding rapidly. It is in the schools that children and young people are socialized and where they develop their ability to learn and interact with their peers on a daily basis. Socialization in relation to networks should be part of the socialization process in the schools.

There have been numerous national campaigns to equip public schools with interactive media. The track record of school informatics programmes in the countries of the region raise a number of issues and questions (Jara, 2002). First of all, it is important not to lose sight of the fact that the technologies used for various purposes in the schools are a means of enhancing the teaching process, not an end in and of themselves. Secondly, it is important to make teaching strategies more flexible in order to create an environment that is conducive to the diffusion of ICTs in the schools. Thirdly, teachers need to be trained to serve as a central agent of change and to prevent the formation of a division between the culture of teaching and learning, on the one hand, and virtual culture, on the other. Fourthly, steps should be taken to promote and forge links with organizations outside the school system with a view to obtaining private-sector contributions in the form of hardware, training and network content.

The introduction of ICTs in the school system is a slow process. The pace of this process is more closely associated with the long time horizons of cultural change than with government terms in office, which is why this should be a policy of State rather than the policy of a particular Administration. Innovation should be an incremental, empathetic process, and the diffusion of ICTs should therefore be articulated with teachers' pedagogical requirements and be oriented towards providing teachers with easy-to-understand, user-friendly instructional tools (hardware, software, manuals). Furthermore, the resources endowments and the skills to be imparted cannot be determined on a system-wide basis, but must instead be tailored to the differing needs of teachers and students in the particular schools, since the learning environment will vary substantially from one school to the next. Finally, this aspect of educational reform needs to be coordinated with other reforms in order to generate synergies between school computerization programmes and classroom library programmes, curricular changes, the development of interdisciplinary curricula, etc.

The implementation of informatics programmes in the educational system has drawn criticism with respect to the role and training of teachers. The general feeling is that the impact of ICTs will be a positive one only if teachers are capable of integrating them into their day-to-day activities (Hepp, 1998). Thus, their use of PCs is a function of their needs.<sup>39</sup>

It is said that ICTs make it easier for students to understand key concepts in the sciences, in language and in mathematics and to grasp the logic of these disciplines in ways that allow the students to assimilate them more thoroughly and, at the same time, more rapidly (interactivity, simulation, games, modelling, etc.). In this sense, training students to use ICTs is an end in itself, since these skills are a basic minimum requirement for participation in the workforce and in cultural affairs and since they facilitate more significant learning processes in all sorts of fields. Educating people to be members of the information and knowledge society involves much more than simply replacing books with screens or monitors. It entails combining the best of traditional critical thought and teaching experience with new technological options. And it also entails blending formal education with day-to-day distance communication techniques in a society where these practices are increasingly important, common and interrelated. This is a long road, and it must be travelled by planners, school administrators, faculty, students, students' families, software designers, communicators and cultural-industry strategists. Rote learning and the compartmentalization of knowledge will surely not survive, given the ease with which information can be codified and computer memories can be expanded and the speed at which heterogeneous data and disciplines can be blended using electronic networks. The process will inevitably involve a measure of creative destruction.

### *e-Culture*

The cultural changes brought about by the use of virtual media are far-reaching, and it is difficult to project their impact on our societies. The emergence of virtual cultures alters our perception of time and space (as we gain real-time access to distant signals), our sense of belongingness and solidarity (owing to the shift from face-to-face interaction to virtual contact), our ideas of nearness and permanence, and the proportions of written expression versus images and oral expression in cultural media, among

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<sup>39</sup> The Links Programme of the Chilean Ministry of Education, for example, combines the introduction of computer hardware with a two-year intensive training programme for a group of 20 teachers per school and ongoing basic technical assistance which is provided on demand to the schools. The first year of the training module is devoted to the basic use of hardware and software, while the second year is oriented towards the use of these resources for teaching purposes (Jara, 2002).

others (Castells, 1999). All these changes lead the individuals involved adjust their cognitive schemes, whether they are aware of it or not, to the modes of interaction available in a virtual world.

Because of the segmentation of access to networks in the region, however, we are faced with a situation in which one part of the population is experiencing these cultural changes at a very different pace than the rest. The problem of network access has been partially solved by the establishment of public access points or the provision of access in public schools. In both cases, the premise is that *the digital era is not defined so much by computer ownership as it is by access to the Net*. There are countries such as Peru, where Internet use is spreading through the use of computers in cybercafes and public Internet booths rather than in the home, and there are countries such as Chile, Mexico, Brazil and Costa Rica, where the increase in Internet users is made possible by the provision of network access in the schools.

Becoming a member of the virtual culture is not only a matter of having sporadic access to a computer terminal, however. It also require some familiarity with the language, form of communication and ways of navigating the Net. Providing access through public schools is unlikely, with some exceptions, to permit this frequency of use. Cybercafes and Internet booths charge by connection time, and the duration or frequency of use is therefore restricted; it is also uncertain what impact use of the Internet has when—as in Peru—there are an average of 81.1 users per Internet host. In Chile (which exemplifies a best practice in regard to the use of ICTs in the schools), there are still 50 students per PC,<sup>40</sup> and these computer labs are used only 28 hours per week in the primary schools and 40 hours per week in the secondary schools. It is not certain, therefore, whether the access afforded by these policies actually provides a means for bringing the general population into the virtual culture.

Numbers from private research firms corroborate the finding that Latin Americans' Internet use is sporadic and fairly non-intensive. Only 45% of Internet users in the region are residential or business subscribers who pay a monthly Internet access fee (Yankee Group, 2002). The rest enter the Internet “on-demand”, using pre-paid cards, public access or pay-per-minute telephone charges through a “free” ISP. The inconsistency and infrequency of use blur the significance of statistics in terms of “real access” to the Internet versus the “possibility of Internet use”. In Brazil, for example, it is estimated that only 53% of the Internet users in 2002 can be counted as being “active users” (meaning that they go online at least once per month) (IBOPE, eMarketer, 2002). The process of creating an “e-culture” is obviously very slow if almost half of the Internet users only go online less then once a month.

The combination of the digital divide, high television density, media convergence and frequent versus sporadic use of the Internet results in a segmented spectrum that ranges from “Internet citizens” to cyber-illiterates. Consequently, participation in the virtual culture—and in virtual cultures—replicates the same type of segmentation as is seen in education, the labour market and links to the world, with one sector being closely connected to the Internet and the world, another sector whose connection is intermittent and sporadic, and a third sector that has been left completely on the sidelines.

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<sup>40</sup> Chile was the only Latin American country that took part in the international SITES (Second Information Technology in Education Study) test, which was sponsored by the International Association for the Evaluation of Educational Achievement (IEA). The study's findings show that Chile is at an intermediate level in terms of the availability of computer hardware in relation to the 27 countries in the sample. The most advanced countries (such as Canada, Norway and Singapore) have ratios of between 6 and 15 students per computer.

*e-Media*

The “e-media” sector is closely linked to e-culture. In the literature, the media sector is often referred to as the “cultural industry”. The industry itself is very complex, and has emerged from a number of predecessor industries, including the IT industry, the film and video industry, the broadcasting industry, cable TV, the publishing industry, radio broadcasting and the software industry. It is one of the five biggest industries in the world economy and certainly the most powerful one. Given its enormous social and political importance, the multimedia industry cannot be meaningfully compared with other industries in quantitative terms.

The process of ICT convergence and the ongoing digitization of media content have led to the creation of large and powerful transnational corporations in the sector. Generally speaking, concentration of ownership occurs most frequently in industries that benefit from economies of scale and scope and where entry barriers are high. These characteristics are especially true of information and entertainment production and processing, and market concentration in the media is thus a long-standing phenomenon (Noam, 1999; Hilbert, 2002). The wave of de-concentration and the emergence of multiple Internet content providers during the second half of the 1990s appears to be reversing direction as the new technologies mature. Economies of scale take over and economies of scope help producers to exploit fixed costs. As a result, ownership tends to become concentrated once again. The total number of companies controlling 60% of United States Internet-user minutes online shrank from 110 to 14 between March 1999 and March 2001 (Jupiter Media Metrix, 2001). The number one company in the United States Internet market is the media giant AOL Time Warner, which accounted for 32% of online time. The myth that extreme market dominance is impossible on the Internet because the number of potential online channels is infinite appears to have been debunked by the power of economies of scale and scope, which have led to an undeniable trend towards online media consolidation.

As in the rest of the world, media concentration is an observable phenomenon in Latin America. Televisa, Mexico’s largest media group, runs 189 of the 200 most popular TV programmes in the country and boasts 76% of the national TV audience (Grupo Televisa, 2000). The Brazilian Rede Globo, with its 133 broadcasting and affiliate stations, reaches 74% of the Brazilian TV audience during prime time (Rede Globo, 2002). Grupo Abril, Brazil’s largest publisher, controls 233 magazines and sells 224 million copies yearly and publishes 7 out of the 10 most popular magazines in the country (Grupo Abril, 2002).<sup>41</sup> In the Internet market, the two largest Brazilian portals (UOL and BOL, both connected to Grupo Abril) account for 30% of the total page views of the 10 largest Brazilian Internet portals (Hilbert, 2001b).

Nevertheless, when the largest Latin American media companies are compared with their transnational counterparts, it becomes clear that the regional media groups are operating on a significantly smaller scale. Total revenues of the regionally powerful Grupo Televisa are equivalent to 8.6% of the total annual sales of Walt Disney (US\$ 2.15 billion vs. US\$ 24.88 billion in 2001) (Walt Disney, Grupo Televisa, 2001). Grupo Cisneros reported total revenues of US\$ 4 billion in 2001, while its North American partner AOL Time Warner took in US\$ 38 billion (Grupo Cisneros, 2002;<sup>42</sup> AOL-TW, 2002). Grupo Clarin had a turnover of US\$ 2.2 billion in 2001 (Grupo Clarin, 2002)<sup>43</sup>, whereas its German counterpart, Bertelsmann, posted more than 10 times as much (Bertelsmann, 2002). In fact, none of the world’s largest multimedia groups is Ibero-American. In terms of sales turnovers, the United States represents more than half of the global audiovisual market, and the European Union around one quarter,

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<sup>41</sup> Grupo Abril (2002); <http://www.abril.com.br>.

<sup>42</sup> Grupo Cisneros (2002), <http://www.cisneros.com/about/aboutUs.asp>.

<sup>43</sup> Grupo Clarin (2002); <http://www.grupoclarin.com.ar/>.

whereas Latin America and the Caribbean are well below 5%. If there is any correlation between these figures and the degree of symbolic influence that is exerted, then we may well wonder how audible and visible the Latin American and Caribbean region is in the world today (ECLAC, 2002a).

In order to capture the Latin American mass media market, powerful transnational corporations have already begun to enter the region. Sometimes they compete with domestic information and entertainment providers, and sometimes they line up with them. While the advancing globalization of the “cultural industries” is surely positive from an economic point of view for Latin America and the Caribbean (fresh foreign investment, know-how spillovers, etc.), it should be emphasized that special attention should always be devoted to the media industry because of its weight in the political affairs of a country and its influence on domestic culture and social life. The provision of digital content through ICTs is and will be increasingly important in promoting cultural and political visibility in the information society. A country’s cultural presence in the global dialogue, as well as its presence in the domestic and international political arena, is reflected through its presence in the audiovisual networks of the information society. Active participation in online content creation increases the opportunities for engaging in a culturally diverse dialogue with the rest of the world on an equal footing.

Clearly, the Latin American and Caribbean region does not possess the economic power to defend its own cultural industry against the large transnational media conglomerates. While the logical response is to call for protective legislation, the frontierless ICT-based global information infrastructure will eventually break down any attempt to protect a domestic industry by means of import-substituting legislation. This situation not only threatens the ideal of cultural diversity, since the control of symbolic exchanges affects identity-building and the formation of opinions and beliefs, but also widens the gap between the cultural norms most broadly disseminated through global channels and the cultural and artistic roots of countries and regions (ECLAC, 2002a). However, it should simply not be an option to give up the strategically important media industry just because of a lack of “competitive advantages”. It is therefore extremely important for the region to search for suitable ways of preserving its cultural industry.

## **A PUBLIC POLICY AGENDA IN LATIN AMERICA AND THE CARIBBEAN**

ICTs can be placed at the service of a large variety of development goals. They can be used to promote social development in such areas as health care and education, improve economic efficiency, increase cultural and political participation, assist in poverty reduction, promote equality and the better integration of marginalized groups, and support the creation of global partnerships. The first step towards setting an agenda for public policy is therefore to define a set of principles that should guide the transition towards an information society in Latin America and the Caribbean.

The second step consists of setting up a strategy for the information society. As the global information society approaches maturity, it has become quite clear that the question for developing countries is not “*whether to get connected*” or not, but rather “*when to get connected*” and “*how to get connected*”. A solid, broadly-based information-society strategy is vital in order for the Latin American and Caribbean countries to be able to integrate themselves into the global information society rapidly and in a way that works to their benefit. In order to be successful, such an initiative has to focus on national, as well as to international, aspects of the information society and needs to cover a broad spectrum of related topics. Several thematic working groups could be created within the conceptual framework that underlies the arguments presented in this paper. Such an initiative would need to involve the entire public and industrial sectors, academia and civil society. The following chapter points out some of the main priorities for such a public policy agenda.

### **A. NATIONAL INFORMATION-SOCIETY STRATEGIES**

Many countries around the world are pursuing special national strategies for integrating themselves into the global information society. Information-society development strategies may start off from a small-scale government initiative, but their ultimate aim should be to integrate the whole of the public sector, national, regional and international institutions, regulatory and technical authorities, academia, private-sector service providers and the high-technology industry, mediation institutions and civil society. A holistic approach, with an open dialogue being carried out within the entire society, as well as across countries, is an essential element in seizing the “digital opportunity”.

In order to reach this goal, one of the first steps that the public sector should take is to establish a national authority to act as a coordinating agency. Some Latin American and Caribbean countries have already launched national information society initiatives (see box 3.1), while others are still in the process of determining how best to approach such a programme. In those cases where initiatives are already in place, the countries have assigned this task either to the telecommunications authority (often a ministry) or to the Ministry of Science and Technology (such as the “Programa Sociedade da Informação” in Brazil) or the Ministry of Communications (as in the “e-Mexico” programme or the “Agenda de Conectividad” in Colombia). Other countries have created an inter-ministerial committee (such as Chile). Given the far-reaching impact and the generic nature of ICTs, an authority directly linked to the presidency (such as in Paraguay or Uruguay) seems to be a valid alternative. Another approach which has, for example, been taken in the Bahamas, links national measures relating to information society issues with the Finance Ministry in view of the cross-cutting nature of this important unit of government.

Box 3.1  
**INFORMATION-SOCIETY PROGRAMMES**

In the first quarter of 2002, UNCTAD surveyed 51 countries (37 developing countries and 14 developed countries) to find out more about their national information-society strategies (UNCTAD, 2002). Both developed and developing countries were found to prioritize “awareness-building, training and education” elements in their national strategies. Besides this common focus, developed countries put more emphasis on “legal and regulatory issues”, while developing countries prioritized “access and Infrastructure” issues in their strategic planning.

Most of the strategies in place in the Latin American and Caribbean region place special emphasis on bridging the domestic digital divide (Hilbert, 2002). Given the harsh socioeconomic differences existing in the region and its geographic concentration, the domestic digital divide within Latin American and Caribbean societies is one of the largest in the world. By drawing special attention to the regulation of telecommunications pricing in order to diminish regional differences or to the establishment of public access points (“Infocentres”), governments are working to narrow this gap. Some countries are also prioritizing the creation of appropriate human capital (as in Costa Rica), while in other countries the link between the national “capacity-building authority” and the national information-society authority is still very weak or does not exist at all. Special importance is also placed on “e-government”. Online tax paying and B2G (Business-to-Government) procurement practices lead the way in this segment. Also, “e-learning” (including ICT use in schools and Internet2) and the general use of ICTs in education is another pillar of most information-society strategies in the region. Given the structural importance of small and medium-sized enterprises (SMEs) in Latin American and Caribbean economies, projects that support the integration of ICTs in SMEs are often included in the national strategies as well. The Government of Jamaica is being even more proactive in this area, as it provides office facilities and infrastructure for ICT firms, loans from a venture capital fund for ICT projects and telecommunications infrastructure, together with other measures (ECLAC, 2002a). It can be seen as a positive development that an increasing emphasis on less traditional sectors (such as e-health) is leading to a broader concept of “ICT for development”.

Unfortunately, the recent volatility seen in the high-technology industry, in combination with the macroeconomic instability affecting the region, has taken some wind out of the sails of many information-society initiatives in countries across the region. In smaller nations, such as Barbados and Jamaica, some negative experiences with the ICT sector have shed a bad light on the entire array of government efforts (ECLAC, 2002a). However it is perceivable that, such setbacks notwithstanding, information-society and ICT issues are becoming a more natural part of the political discussion in the region. For example, all the presidential candidates in Brazil’s 2002 election promoted the information society as a key issue in their platforms.

It is of paramount importance to clearly define the role of this national information-society initiative in order to prevent overlapping responsibilities. The presence of harmonious cooperation, on the one hand, or power struggles, on the other, between the different authorities involved in the national information-society initiative can spell the difference between the success and failure of the programme.

Regardless of which public body is assigned responsibility for the national information-society initiative, close collaboration with a number of other public-sector agencies is critical. The national telecommunications regulator plays an important role in ensuring the build-out of the ICT infrastructure. This gives the telecom industry and its regulatory agency a major role in the creation of an information society. National apprenticeship agencies (which exist in many countries in the region) have a special role to play in training the workforce for the information society. Public health and educational authorities also need to be integrated into the public-sector programme.

The scope of the information society goes far beyond the public sector, however. A national initiative needs to incorporate many different actors from industry (e.g., high-technology and service providers, as well as the media), chambers of commerce, standardization agencies and Internet governance organizations (such as domain name registers), health-sector associations, academic networks and institutions, labour organizations and, of course, civil society groups, which have a key role to play in defining a common vision of the desired information society.

A central question to resolve is how to institutionalize the participation of the private sector and civil society in the national information-society programme. The complexity and pace of ICT development, on the one hand, and the profound implications of ICT implementation, on the other, require a close partnership between the private and public sectors and civil society right from the start. The public sector should try to integrate the private sector into its decision-making process in a non-discriminatory and neutral manner. Some practices in the region —such as the “Public-Private Internet Alliance” in Chile, which is based on the four pillars of “transparency, efficiency, technological neutrality and private leadership”— illustrate the benefits of such cooperative undertakings for general regulation or specific projects. Private-public partnerships and civil society participation should not be misinterpreted as a “division of labour” in which the private sector is expected to donate the necessary funding and the civil society organizations are supposed to provide the impression of “democratic” accountability, however. Such a functional division of labour is not sustainable in the long run. In order to arrive at the end of the long road leading to the information society, common visions about future development paths need to be found and jointly implemented. The concerns and interests of civil society need to be addressed at the highest policy-making level. The private sector's focus on profits (at least in the long term) must be respected and addressed, while the public sector needs to ensure the existence of competitive markets and the sustainability of the model (“workable competition”) and to see to it that no part of society is excluded from the benefits of progress.

One of the main goals of such a far-reaching and all-embracing initiative is to minimize the duplication of effort. In many cases, the introduction of ICTs into the organizational structures of different sectors (be it with regard to e-government, e-health, e-learning, etc.) is not an integrated part of ongoing modernization reforms. In Latin America and the Caribbean e-health initiatives often are often launched “on-top” of the established health-sector reform models (Rodrigues, 2002), just as e-government projects are implemented in parallel to State modernization reforms (Orrego, 2002). Computer labs in schools are not sufficiently integrated into national curricula and instead function as a voluntary activity situated alongside educational reforms (Jara, 2002; Bonilla, 2002). One of the most frequent reasons for this waste of resources is that the discussion turns into a debate about technology and computer sciences, rather than focusing on the issues of administrative efficiency, transparency, governance and teaching approaches.

Another factor which information-society initiatives need to take into consideration is the need to define precise goals and objectives, in cooperation with users, that are aligned with existing needs and priorities and that have set project-performance benchmarks. ICTs have the potential to cover a vast range of needs. Nonetheless, efforts have to be concentrated on a limited number of needs in order to prevent confusion and disorientation, which leads to decreasing motivation and fading political and financial support of such programmes.

National information-society initiatives should also focus on the identification and evaluation of market failures and of special measures for speeding the adoption of newly emerging mechanisms. While private-sector leadership is unquestioned in the process of building-out ICT environments, the public sector has to strive to complement its work. At present, market failures are often found in the provision of

applications. Market mechanisms alone are often not sufficient to create programmes and tools that can help lead the way to broader development goals. The market may produce video games and entertainment applications, but it is not necessarily producing suitable software programs for meeting local needs in the areas of health care or educational services. This is a classic example of the type of market failure that justifies government intervention. Apart from concerns about market failures, there is a long-standing line of public policy that is aimed at gently “nudging” consumers in the direction of desired consumption patterns. These kinds of policies discourage cigarette consumption (usually through taxes), for example, while promoting seat belt use. The same mechanisms can be fine-tuned to encourage ICT use. The goal should be to replace some of the existing inefficient methods of processing information. ICTs can replace obsolete channels of communication or incomplete coordination mechanisms and bring about desired increases in efficiency and democratic participation. The Brazilian Government has used these kinds of incentives to promote online income-tax payments. The Brazilian tax agency has complicated the process of filing tax returns on paper and has promoted mechanisms that allow faster processing of electronically submitted forms. As a result, it received more than 90% of the total number of tax statement via the Internet only four years after the implementation of online tax-payment systems.

## **B. INFRASTRUCTURE AND GENERIC SERVICES**

The most obvious thematic topics of information-society strategies focus on the build-out of the ICT infrastructure and generic ICT services. These kinds of policies are twofold. First of all, they need to be aimed at fostering universal access and use of the technology by providing a basic minimum of connectivity for the whole of society, with special emphasis on marginalized groups, such as rural inhabitants, ethnic minorities, women, the disabled and elderly people.

To strive for the provision of ICT access as a public good, initiatives and public projects are needed that will lower individual access costs through shared access models, financed by cross-taxation mechanisms (such as special telecommunication funds) or by special private-public sector partnerships.

A holistic approach to ICTs needs to provide for the effective integration of all the different access alternatives (computers, digital TV, mobile communications, fixed and wireless solutions, powerline, etc.). Different technological solutions for accessing ICT infrastructure should stay in healthy competition with one other. Steps also need to be taken to ensure that the introduction of 3G mobile telephony and digital television serves the interests of the entire society and does not create another form of technological exclusion. The institution of mobile/wireless and digital TV working groups within regional telecom forums (such as CITELE for the Americas, REGULATEL for Latin America and CTU for CARICOM) to seek ways in which these technologies can contribute to the connectivity agenda would help make sure that full advantage is taken of ICT convergence. Furthermore, the creation and provision of sufficiently—but not needlessly—sophisticated, inexpensive access equipment (hardware and software) needs to become an essential part of the digital divide agenda.

International cooperation can do a great deal to help create and maintain ICT infrastructure. Subregional projects<sup>44</sup> such as the Meso-American Information Highway of the Puebla-Panama Plan (see box 3.2) are especially important. Nonetheless, some of the challenges posed by the ICT infrastructure are best faced on a regional level. For many actors in Latin America and the Caribbean, for example, the

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<sup>44</sup> For example, in the Andean Community, MERCOSUR, CARICOM and the Central American Common Market.

current system of Internet traffic accounting is inequitable and unjust. Latin American operators pay for all (or at least the majority of) Internet traffic flows between Latin and North America, while users outside Latin America are able to access Latin American content without paying for the connectivity that allows them to do so (REGULATEL and AHCJET, 2001). International private-public sector forums on a regional (if not hemispheric) level need to discuss and find adequate solutions to deal with this pressing issue.

Box 3.2

**REGIONAL COOPERATION FOR ICT INFRASTRUCTURE: THE MESO-AMERICAN INFORMATION HIGHWAY OF THE PUEBLA-PANAMA PLAN**

This project seeks to develop a strong broadband telecommunications infrastructure to foster improvements in communications among the Central American countries, the southern and southeastern Mexican states and the rest of the world. In Central America, the project calls for the completion of the regional backbone. This will permit the broadband network to link more than 40 cities, including the capitals, main ports and airports, using high-capacity fibre-optic cables. This project is also designed to assist the region in the development of ICT policies and regulations, by strengthening regional institutions and cooperation among countries and promoting dialogue between the private and public sectors. Technical assistance will be required in the following areas: (i) strengthening of institutional procedures and structures for formulating ICT development policies; (ii) developing harmonized national and regional telecommunications regulations; and (iii) developing regulations in areas such as consumer protection, intellectual property rights and security.

**Source:** Based on IDB (Inter-American Development Bank), "Plan Puebla-Panamá" ([http://www.iadb.org/ppp/project/projectDetails.asp?project\\_id=78](http://www.iadb.org/ppp/project/projectDetails.asp?project_id=78)), 2002.

Secondly, the quality of access needs to be improved. The benefits of ICTs will remain limited and the international divide will only widen further if the countries of the region do not succeed in keeping pace with the technological frontier. With 65% of the businesses in Latin America connecting to the Internet through 56kbit dial-up (or slower) access terminals in 2002, the prospect of a real-time networked economy is still remote (Harte-Hanks, eMarketer, 2002). Trying to conduct an effective e-business through a narrow-band modem is clearly unlikely to permit significant productivity increases. In 2002 Latin America accounted for 5.8% of Internet users worldwide, but only 2.2% of the world's total broadband users (eMarketer, 2002).<sup>45</sup> Broadband penetration is not the exclusive preserve of highly developed countries, however, as the Republic of Korea and Taiwan Province of China are two of the four countries with the highest broadband penetration rates in the world (52% and 18%, respectively).<sup>46</sup> Experience shows that broadband introduction is by and large a question of policy directions and regulatory issues. Flat-rate tariffs and broadband policies are essential in order to open the way for the effective use of these opportunities.

Another important policy measure in raising the quality of digital interchange is to increase the diffusion of software systems among small and medium-sized organizational units. Evidence from the business sector shows that the introduction of in-house information systems (such as ERP, SCM, CRM, etc.) contributes decisively to overall efficiency increases. The lack of in-house application systems is a serious obstacle for the adaptation of inter-organizational online practices. Local software producers have displayed the capacity to fill market niches and to provide adequate and cost-effective solutions for small

<sup>45</sup> The specific figures are 33.1 million out of a worldwide total of 565.7 million Internet users and 1.17 million out of a total of 53.03 million Internet broadband users, respectively.

<sup>46</sup> By comparison, Japan has a broadband penetration rate of 5.8%, Germany has one of 5.4%, Finland 4.4%, Switzerland 3.3% and Australia 2% (eMarketer, 2002).

actors, such as SMEs, municipalities, small hospitals and clinics, schools, etc. Such software producers deserve special attention from policy-makers.

An alternative solution for facilitating the adoption of ICTs is to promote an Application Service Provider (ASP) industry. A well-functioning, strong ASP industry can play a crucial role in providing high-quality application services at a reasonable price to a large sector of organizations in Latin America and the Caribbean. The ASP model also often facilitates training and maintenance tasks through the provision of professional assistance.

## **C. THE DIAGONAL AREAS**

### **1. Regulatory frameworks**

The suggested policy for promoting the creation of appropriate regulatory frameworks for the information society has three major components:

First of all, ways have to be found to ensure that the emerging information society extends and strengthens fundamental human rights, such as the right to information, to communicate and to freedom of expression. In the last 15 years, significant constitutional changes in Trinidad and Tobago, Dominica, Jamaica and Grenada have defined the right to freedom of expression and speech as encompassing the right of access to the infrastructure (means) to exercise that freedom (Sanatan, 2002). Such basic rights should also include the morality and viability of human interaction in the information society. The importance of information in this emerging society and the new ways available to handle information through digital networks also call for special attention to be devoted to the question of how information should be owned and who should own it. Intellectual property rights are a pervasive feature of the information society and require detailed analysis in order to ensure that their deployment serves broader development goals.

Secondly, regulatory frameworks need to be established in order to ensure the extension and renovation of the information society's technological foundations. The regulation of the telecommunications industry and the strengthening of hardware and software markets are key policy areas. In this respect, the enormous significance and potential strategic power of technical standards are often underestimated in Latin American and Caribbean technological development strategies. The neglect of this issue and the uncoordinated search for foreign investments have created a uniquely challenging scenario in regard to technical standards in the region which may pose a serious obstacle to smooth technological development in the future, given the fast pace of ICT convergence and the importance of "lock-in" effects in digital networks. Before introducing a new technological system (such as 3G or digital TV), an institutionalized testing process should be used to identify the best solution for each particular situation. Such a mechanism needs to take the process of ICT convergence into consideration (which implies the interdependency, for example, of 3G and digital TV systems, since they will eventually converge). Countries could group together in order to share the high costs of such tests. A regional mechanism of this sort should also be used to evaluate the costs and benefits of using proprietary standards versus open standards for the different technological solutions in the market. Ongoing, indepth economic analyses are essential in order to resolve this crucial question. In principle, the preference should be for open standards, since they prevent "lock-in" effects, help hold down royalty payments for intellectual property, foster integration and interoperability, and therefore lead to industrial participation, competition and economies of scale on a common platform. In the medium term, it will also be important

for Latin American and Caribbean countries and companies to participate in global standards consortia. Open standards in mobile telephony (such as GSM) and digital television (such as DVB) have been created through such consortia over the past decade. Many of these consortia are open for participation. Participation in these consortia would help ensure that the special characteristics of the region are considered when a new standard is created. In addition, through close cooperation with countries and companies on the technological frontier, the Latin American and Caribbean region could position itself on a learning curve and, in time, change over from being a “standard taker” to being a “standard maker”.

A third policy area has to do with adjusting the legislative framework in order to enable and encourage digital communications and transactions. Security and reliability, electronic contracts and certification, e-payment systems and consumer protection have to be addressed in cross-border discussions in Latin America and the Caribbean. Internet legislation—and especially Internet trade legislation—is a policy area which might first be considered within the framework of subregional trading blocs, such as the Andean Community, MERCOSUR, CARICOM and the Central American Common Market, while, at the same time, supporting regional and global standards and trends (such as those being dealt with in WIPO, UNCITRAL, the Hague Conference on Private International Law, ISO and others). When internationally harmonized measures are either not possible or not necessary (or not even desirable), the negative trade effects of cross-country disparities may be reduced by recognizing the equivalence of trading parties’ regulatory measures or the results of conformity assessments performed in other countries.

## **2. Financing**

Raising the necessary resources to finance the establishment of an information society in Latin America and the Caribbean will require a joint effort on the part of the private and public sectors, as well as considerable national and international cooperation.

First, given the enormous importance of FDI flows to the region as a means of financing the build-out of ICT infrastructure, the abrupt turnaround in net flows in the past two years is clearly a cause of concern. Financing options will have to be sought that can be used to prevent the growth rate of physical infrastructure from slowing and to avoid the deterioration of infrastructure due to insufficient maintenance. In addition, proactive policies for attracting FDI may be very useful, but only if national objectives are defined on the basis of national priorities. Latin America is faced with the formidable task of devising “localized” policies to promote and channel FDI into priority sectors, activities or regions (Mortimore, Vergara and Katz, 2001). Thus, in future the idea should be to change over from an FDI policy of “more is better” to a targeted policy based on national objectives and priorities that cover various aspects of transnational corporations’ operations, such as human resources development, the reinforcement of supply chains and R&D.

In order for an FDI policy to be successful, national objectives—and, by extension, policy tools—should be complemented by transnational corporations’ strategies. This is the only way to set a virtuous circle into motion that will not only attract transnational corporations to the region but will also encourage the start-up of local activities having more technological content. In this respect the region has a great deal to learn from the experiences of countries such as Ireland and Singapore.

Selective FDI policies should be complemented with domestic financing mechanisms. For example, incentive mechanisms and loans for small enterprises are needed in order to enable them to undertake the expensive and time-consuming process of introducing information and communications

systems into their organizational structures. Incentive mechanisms need to consider the full cost of ICT implementation (hardware, telecoms, software, consultancy services, training, reorganization, etc.). Credits for this purpose could be allocated through efficient e-finance programmes. ICTs are making it possible to build up huge credit information databases and apply modern credit analysis and related credit appraisal, scoring and rating techniques to assess creditworthiness. As a result, it is becoming possible to develop improved systems for appraising credit risks and processing credit applications. These kinds of e-finance systems also encourage SMEs to acquire Internet-based technologies and skills so that they can use trade-related e-financing mechanisms and can lay the foundations for the development of a strategy for gaining online access to longer-term finance and investment resources.

The public sector has to seek out innovative ways to finance the extension of the “**public good ICT access**”. Global and local private-public partnerships are indispensable in ICT for development initiatives. The introduction of ICTs into schools had been a positive development in this field (Jara, 2002; WEF, 2002b, 2002c). Ways now need to be found to introduce these partnerships into other sectors (e.g., hospitals and clinics, small municipalities, community service centres, etc.).

Domestic R&D expenditure must be increased, and incentives should be created to encourage private spending along the same lines (ECLAC, 2000b). Priority must be given to exploring possibilities for using seed capital to encourage the creation of new technology-based companies, of which there are too few in the region, and the development of science- and technology-intensive activities which can contribute to the creation of local content for the Latin American and Caribbean information society. The State must play a stronger role in funding R&D and promoting greater interaction among the agents involved in innovation systems at the national level. The State could also operate through second-tier banks, with commercial banks continuing to be responsible for fund management and risk assessment. Commercial banks would then be expected to adopt new criteria for assessing the risks involved in innovation and to play a more dynamic role in financing innovative technology projects.

### 3. Human capital

The first step in building human capital for the information society is to raise “e-wareness” about the potentials of the new technology. This can be done through best-practice sharing, through campaigns that stimulate discussion and through public demonstrations that give stakeholders in the information society the opportunity to familiarize themselves with the available tools.

An increase in the higher cognitive functions that permit access and make it possible to handle the overflow of information in the information society should be at the core of human capital policies, however. This task can be divided into two main lines of action: the training of users (“e-literacy”), and the formation and maintenance of a workforce that can sustain the information society. National apprenticeship agencies play a crucial role in this area.

In the field of user training, special attention needs to be given to marginalized groups. The training of leaders from indigenous groups is a very important component of this effort, since it can help to ensure the inclusion of these segments of the population, together with their cultures and languages, in the region’s information society.

Incentive regimes need to be provided for key ICT users (teachers, public officials, physicians, nurses, etc.) in order to integrate ICT use into these actors’ daily practices. A failure to appreciate the potential possibilities, fear of the unknown and the high level of personal effort required to readjust

conventional professional approaches pose obstacles that may require mechanisms for persuading professionals to reshape their habits. Awareness-raising, information and best-practice sharing; political, material and intangible incentives; and even norms and certain obligations to speed up the incorporation of ICTs all become necessary.

In order to increase the competitiveness of their economies, one of the biggest challenges that governments confront is to transform the quality of education (Sanatan, 2002). Closer links have to be forged between the educational system, the world of communications and the occupational sphere if countries in Latin America and the Caribbean are to be successful in developing internationally competitive human resources. Furthermore, the education of the future cannot be imparted through a routine, hierarchical structure. Autonomy, administrative responsibility, experimentation and close ties to the community are needed. While decentralization is to be fostered, steps must be taken to ward off the risk of heightened inequalities, which could lead to a growing differentiation between minorities who are trained to manage the future and majorities who are linked with the past or excluded from the dynamic progress of modernity altogether. Thus, in conjunction with decentralization, emphasis should be placed on the importance of integration, social compensation for the underprivileged and policies aimed at checking the segmentary tendencies of the market and the educational system.

Given the speed at which ICTs are being developed, it would also be wise to leave a significant part of the educational effort to that industry. This means that incentives have to be provided to encourage the industry to invest in skills. The training of the workforce requires special attention at the time of ICT introduction and makes up a major part of ICT projects. In financial terms, 26% of total expenditure on ICT projects in Latin America goes into staff training. After investments in hardware (49% of the total), this is the largest funding item for ICT implementation (by comparison, only 13% is spent on software) (eMarketer, 2002).

Another key area which holds out potential for regional cooperation is the search for suitable professional profiles. Demands and curricula are changing very quickly, and constant analysis is needed in order to minimize the all-too-common skill-mismatches. Such an “observatory” could function on a supranational scale in order to make use of synergies in the Latin American and Caribbean region.

Furthermore, within the context of the international mobility of the skilled workforce, the opportunity provided by the ongoing WTO services negotiations must be exploited to promote the liberalization of the temporary movement of natural persons under GATS to the mutual benefit of developed and developing countries. This discourse has to start with a better understanding and appreciation of the GATS mode-4 provisions on such movements, on the one hand, and the demystification of immigration laws and regulations relating to temporary movements, on the other.

#### **D. THE “e-SECTORS”**

The creation of high-quality local content is vital: (a) to ensure the provision of adequate solutions for domestic needs; (b) to permit the use of the technology to create local capacity; and (c) to make the voice of the region heard in the global information society. The creation of local content is not only a crucial element in achieving the social integration of the entire society, but also as a catalyst for the inclusion of economic and political actors. UNCTAD (2000) has found, for example, that those countries and regions where efforts have been made to facilitate the use of languages other than English have been more successful in awakening local SMEs’ interest in e-commerce.

Since connectivity is much higher among organizations than it is among individual users, the focus in the e-sectors should be on intra- and inter-organizational back-office processes so long as the vast majority of the population is still not connected. The networking of databases in hospitals, clinics and health ministries; the creation and extension of university networks; the formation of trustworthy B2B marketplaces; the exchange of content between schools all over the region; and the networking of different public-sector authorities are all essential steps towards the information society and will facilitate the provision of adequate services in front-end users once the general population is connected.

### *e-Business*

An important area of government action is the empowerment of local SMEs through their integration into the digital economy. ICT and e-commerce policies need to be integrated into the SME policy agenda. Latin America and the Caribbean have made significant progress in designing policies to promote the development of this structurally important sector of the economy. However, the very limited financial and human resources that have been allocated for these policies are clearly insufficient (Peres and Stumpo, 2002). Resources need to be mobilized and financial mechanisms need to be established to ensure that SMEs can take part in the creation of a digital economy.

The effective use of ICTs also contributes to the expansion of trade by setting up much more efficient trade management procedures. Such “trade efficiency” measures require national actions covering a broad array of instruments, ranging from trade facilitation, customs automation, transport optimization (e.g., through computer-based cargo tracking systems), to insurance and banking (including export financing and credit insurance). International trade and transport developments will be strongly influenced by the development of ICTs and, in particular, Internet or web-based applications. With the rapid progress being made in such technology, many countries can now make significant improvements in their infrastructure for managing cross-border trade transactions.

The banking sector is another key actor in ensuring the expansion of e-business. Online banking is one of the typical beginner’s applications. Secure e-banking transactions can demonstrate the effectiveness of the new tools and create trust and confidence. The development and spread of trustworthy payment systems is then another step that can be taken to encourage more sophisticated online applications in other e-sectors. Direct and indirect support, incentive mechanisms and even provisions requiring the banking sector to invest in or develop secure transaction systems could prove very beneficial in furthering the progress of overall online activity.

### *e-Government*

A balanced e-government approach needs to combine electronic information-based services for citizens (e-administration) with the reinforcement of participatory elements (e-democracy) from the very start of the endeavour. With regard to e-administration, the goal should be to create a citizen-centric user interface (a “one-stop shop”), which entails the integration and networking of all the different public-sector authorities. With regard to e-democracy, a first step is to increase the transparency of government administration and of political decision-making as a guiding principle for e-government activities.

E-government projects need to become a central part of State-modernization reforms and need to include all levels of government, from the municipality to the presidency. The introduction of

e-government must be an incremental, steady process, as the nature of the public sector does not allow sweeping organizational changes to be made overnight.

E-government can also act as an effective catalyst in prompting companies and individuals to go online. Online tax-paying is the first online transaction for many citizens, while many companies decide to go online in an effort to secure “a piece of the pie” in public e-procurement spending. Such applications can help to overcome initial fears and doubts about online transactions and to lower the entry barriers to e-activities for user segments that are traditionally slower to adopt new technologies. Peru, for example, focuses its portal for public procurement on the promotion of the SME sector and has achieved considerable success in diffusing new forms of electronic interaction among the country’s SMEs.<sup>47</sup>

### *e-Health*

The effective and massive use of ICTs to improve performance in the health sector is still at a very incipient stage in Latin America and the Caribbean. The concept of e-health has to go far beyond telemedicine and distance consultation. It needs to be made an integral part of the health-sector reforms now under way in the region rather than being treated as an isolated endeavour. The health-care sector in Latin America and the Caribbean is largely a decentralized industry populated by diverse organizations with overlapping responsibilities and often conflicting goals, resources and incentives. Given this situation, close coordination and cooperation among the different actors is essential in order to help create synergies and economies of scale in the development of e-health applications and in the exchange of experiences and know-how.

Cooperative partnerships between the health sector and high-technology industry are indispensable. Outsourcing networks will need to become a more common feature in the health-care sector in order to keep up with the rapid advances taking place in ICTs. Efforts should also be made to integrate and deploy existing ICT infrastructure and alternative technologies for e-health services (such as smart-cards for medical records, ATM technologies, computer labs in schools and info-centres, wireless and mobile communications, etc). Shared-access models located in public areas (e.g., pharmacies) hold out great potential, since in many cases the most significant benefits lie in having temporary access to technology-mediated improved health services rather than in the continuous ownership of sophisticated technology.

Consumer protection is a key issue in the e-health sector, and special legislation is required to ensure the protection of personal health information. The European and North American experience demonstrate that regulatory powers can play a significant role in coaching the health-care industry on compliance with a variety of e-health guidelines related to data standardization, quality assurance, security and privacy (Rodrigues, 2002). As in other e-sectors, incentive-based regulation is the most cost-effective policy tool to achieve the rapid and smooth digitization of the sector.

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<sup>47</sup> PROMPYME (Commission for the Promotion of Small and Micro-Enterprise), Ministry of Labour and Social Promotion of Peru: [http://www.prompyme.gob.pe/compras\\_estatales](http://www.prompyme.gob.pe/compras_estatales).

*e-Learning*

Digitization in the education sector has to be seen as an evolution of existing institutions. Schools and their goals, authorities, hierarchy and power regimes, incentive mechanisms, culture and learning traditions make up part of this evolution. In order to prevent confusion, disorientation and frustration, e-learning programmes need to define precise goals. E-learning is a “next-generation issue” that is linked to cultural change. Therefore, in order to safeguard the stability and continuity of the effort, e-learning programmes should be institutionalized as long-term projects of the State, rather than of a particular governmental Administration. The development and use of quality indicators to measure progress and innovation are very efficient tools for this purpose, since advances in e-learning cannot be measured through “returns on investment”.

Quantitative and qualitative shortfalls in educational software pose a major obstacle. Regional cooperation can support the exchange of such applications. The main focus of e-learning projects, however, has to be teachers and educators. Comprehensive, well-institutionalized human resources development networks should be established among ministries, private ICT companies and especially universities and other institutions of higher learning which can sustain an extensive core group of “teacher-instructors” as the central axis of an ongoing innovation process.

In addition to such training institutions, incentive regimes need to be provided to encourage teachers to integrate ICTs into their daily teaching activities. Often, teachers receive no recompense for the time-consuming process of educating themselves about ICTs. An insufficient understanding of the potential opportunities, fear of the unknown and the magnitude of the personal effort involved in readjusting established teaching approaches (which also entails the loss of the teacher’s knowledge monopoly, since the teaching process would then be shared with interactive ICT applications) give little incentive for teachers to overhaul their lesson plans by digitizing part of the curriculum.

It is also essential to institutionalize the exploitation of the worldwide flow of information in order to integrate Latin America and the Caribbean more fully into the global “exchange of ideas” which takes place in digital networks. A wealth of updated information that can be used to enrich classes and curricula is available in cyberspace. However, the millions of Webpages around the globe represent an information overflow that overwhelms teachers and students alike. A virtual structure of easily identifiable and appropriate quality content from all over the world (consisting of specialized search engines, etc.) would be of great importance.

In order to digitize learning and academic activities, the network capabilities for the regional research community will have to be expanded. As pointed out by ECLAC in various recent studies, the reinforcement of national innovation systems and R&D activities has become one of the main objectives of systematic competitiveness policies (ECLAC, 2002a; Cimoli and Katz, 2002; ECLAC 1996). ICTs and the establishment of digital research networks can facilitate R&D activities without necessarily increasing existing budgets. Participation in Internet2 and the creation and maintenance of inter-university networks (examples include several national networks,<sup>48</sup> the Caribbean University CUNeT network and the recent formation of CLARA (Latin American Cooperation through Advanced Networks)) are best practices in this respect. Given the large number of science and technology networks existing in the region, it is

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<sup>48</sup> RETINA in Argentina, RNP in Brazil, REUNA in Chile, Red Pacificocyt in Colombia, Reduniv in Cuba, SVNet in El Salvador, Red Universitario Guatemalteca, Red PANNET in Panama, RCP in Peru, CUDI in Mexico, Seciu/Rau in Uruguay.

recommended that an institution be formed to act as a resource facility for such networks (Caribbean Council for Science and Technology/ ECLAC, 1999).

### *e-Culture*

The digital divide has implications that go far beyond economic and material characteristics. It is a symbolic abyss in the distribution of information, citizen participation, political inclusion and representation, social services, security and prevention mechanisms, consumption of the arts and of cultural goods, and participation in the cultural life of a community at large (be this community local, national, regional or global). The basic right to information and communication should lead to the creation of local content and citizen participation. To make the creation of an e-culture possible, special social and educational measures will be needed to overcome the technological limitations associated with shared-access models, overcrowded computer labs in schools, and the no more than sporadic access available to many users. Projects on the community level need to stimulate discussions about new forms of cultural, social and political participation and to raise awareness about the profound transformation of the society that is occurring.

As always in times of great structural change, civil society organizations are in extraordinary demand, and they require special attention and substantial support in Latin America and the Caribbean. ICTs and digital conduct are of enormous importance for civil society, not only because of their usefulness as cost-effective, powerful coordination and organizational tools, but also because of the role they can play in helping to develop and promote social policies and open up the debate about citizens' rights to communicate and to participate. Neither access to ICTs, nor interactive software tools automatically ensure participation. Human capacity and a modicum of acclimation to the virtual environment are required and need to be fostered through a "bottom-up" approach.

### *e-Media*

Latin American and Caribbean policy-makers have to be aware of the significance and potential power of the media industry in an information society. Media and entertainment companies are the driving force in content creation. Their economic, social, cultural and political weight in the information society is incalculable.

Alternatives and strategies have to be developed for creating an internationally competitive information and entertainment industry, while at the same time strengthening the local cultural industry.

Here the key question to consider is not so much whether or not local content providers will continue to provide local content, but rather whether or not they will be able to stay financially independent. In the long run, the particular relationship between financial control and control over content has to be considered as well. One alternative solution could be to analyse the possibility of granting special authorizations for projects aimed at building syndicates and alliances in the regional media market. Joining forces and creating scale through alignment and the formation of conglomerates in the domestic media market is one approach that could be promoted for export purposes. This line of action could also enable local firms to gain sufficient economies of scale to enter into stable strategic alliances with their powerful transnational counterparts while still preserving their own domestic cultural industry.

## E. INTERNATIONAL INFORMATION-SOCIETY STRATEGIES

Many information-society strategies require an international focus. The transnational character of the Internet makes it impossible to keep policies within the bounds of national borders. Policies of this sort may be subregional, regional or global in scope. On an international level, the item “information-society development strategies” (sometimes also called “e-strategies”) have become a central part of the development agenda (DOT Force, 2001; UN ICT Task Force, 2002; eEurope, 2002; among others).

International cooperation can be beneficial in any of the above-mentioned spheres. In some areas, international cooperation is necessary to prevent bottlenecks; in others it can be extremely valuable in speeding up the pace of the transition for all participants. Regional cooperation should be channelled through existing institutions and mechanisms, but there also needs to be a recognition of the fact that new tasks lie ahead and that the various national information-society authorities should coordinate their activities on a regional scale.

One of the areas in which international cooperation is particularly important is in the creation of international legislative standards to facilitate online activities. Various international organizations are actively working on this issue. For example, the International Standards Organization (ISO) coordinates its work with the International Electrotechnical Commission (IEC) through a Joint Technical Committee (JTCl) on Information Technology. This joint undertaking includes the development of criteria for mutual acceptance of certification authorities, trusted third parties, electronic signatures and cryptography. For example, in addition to dealing with many other important issues, the recent report “Towards draft guidelines for electronic commerce in the Caribbean” of the CARICOM Single Market and Economy (CSME) calls for the establishment of a regional certification authority. Treaty-based organizations such as ITU are actively working on the development of standards and telecommunication networks-related issues. Regional bodies such as the Inter-American Telecommunications Commission (CITEL) are working on an Inter-American Mutual Recognition Agreement for the Conformity Assessment of Telecommunications Equipment (FTAA, 2000). Latin American and Caribbean countries should continue to participate actively in these international and regional forums devoted to the definition of rules and technical standards for the Internet. Such participation does, however, require a degree of familiarity with the issues and the technology that is lacking in many countries of the region. Cooperation among countries and the pooling of their technical resources can help overcome this handicap.

It is also important for Latin American and Caribbean countries to defend their interests and to play an active role in future WTO negotiations on e-commerce treatment (see box 3.3).

Another specific area in which regional cooperation would be beneficial is the creation of a regional information-society observatory. The lack of “information” about the development of the “information society” in Latin America and the Caribbean presents a major obstacle itself. The dynamics which exist both within and between the different areas and actors involved create a swiftly changing, complex scenario which requires constant evaluation in order to ensure that Latin America and the Caribbean will find and hold to its own particular path in making its transition to the information society.<sup>49</sup> Such an observatory could also serve as a tool for the follow-up of the goals to be set in 2003 and 2005 by the World Summit on the Information Society process.<sup>50</sup>

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<sup>49</sup> ECLAC/CELADE have taken a major step towards creating a regional observatory in the field of socio-demographic data. The REDATAM (Retrieval of Data for Small Areas by Microcomputer) software permits easy and rapid processing of user-specified areas within large census databases. This makes data available to local

## Box 3.3

**MULTILATERAL POLICY AND PROGRAMME DEVELOPMENT**

The November 2001 decision by WTO Trade Ministers to launch a comprehensive trade round adds greater urgency to the negotiations on services, which have been under way since 2000. The Doha Declaration launching the trade round calls for countries to convey “requests” to trading partners in the services sectors by 30 June 2002 with offers to be made by March 2003. The current schedule calls for the negotiations to be concluded by 1 January 2005. ICT industries must work with their governments to determine how to negotiate trade commitments affecting these critical sectors over the next few months. This collaborative effort should establish the ICT industry’s goals for the Doha negotiations and the negotiating methodology best suited to achieve those goals.

The Uruguay Round negotiations generated valuable commitments to provide market access and national treatment for computer and information services, value-added network services and basic telecommunications services, as well as additional commitments to foster fair competition for basic telecommunications.<sup>a/</sup> The countries in the region should continue working together to negotiate on computer and information services, value-added network services, basic telecommunications services and other ICT service sectors. A successful outcome of the Doha negotiations can be expected once a critical mass of countries reaches a consensus on ICT negotiating methodologies and trade commitments (WITSA 2002b).

Some of the main e-commerce issues being dealt with in WTO are: (i) whether some “digital” products should be classified as a good or as a service;<sup>b/</sup> (ii) the question of whether a service is supplied and consumed within or outside the territory of the consumer is a critical factor in classifying an e-commerce service transaction in GATS; (iii) whether customs duties should be levied on e-commerce or not; (iv) the types of telecom services involved in e-commerce; (v) the issue of domestic regulation of e-commerce under international trade agreements; and (vi) intellectual property issues posed by e-commerce.

The issue of natural monopolies or oligopolies in telecommunications is addressed directly by multilateral disciplines (article VIII on monopolies). However, the relevant GATS provision is limited in scope; during the negotiations on basic telecommunications that followed the Uruguay Round, WTO members drafted a Reference Paper on Regulatory Principles focusing on the supply of basic networks and services. This paper and the competition policy principles it sets forth were developed to ensure that monopolistic suppliers would not undermine market-access commitments made by new entrants.<sup>c/</sup> WTO members have seen a need for pro-competitive regulation on key matters such as network interconnection, number portability and other issues that might block competition from new entrants in otherwise open services markets. Signatories of the Reference Paper are required to guarantee non-discriminatory interconnection, to establish an independent regulator and transparent rules for the use of the broadcast spectrum and to refrain from such anti-competitive practices as cross-subsidization. International negotiations will have a strong impact on competition in e-commerce-related areas. The scope of the Reference Paper is limited to basic telecommunications, and since e-commerce, Internet access services for example, are deemed to be basic and are therefore subject to the principles set out in the Reference Paper.

Multilateral actions are likely to be needed for the implementation of other common beneficial trade policies for cross-border e-commerce transactions within the WTO. Relevant WTO working bodies, in cooperation with private-sector experts, should address the question of classification. It is important to make sure that existing WTO obligations, rules, disciplines and commitments—including the GATS, GATT and TRIPS agreements—are technology-neutral (WITSA, 2001). In addition, no “commercial presence” requirements for supplying services on the Internet should be introduced without justification. This is particularly important for SMEs because they can provide cross-border services and access to global markets without the costs associated with establishing a commercial presence in each country’s market.

- a/ Within WTO, telecommunications is covered by the Basic Telecommunications Agreement, though rapid changes in communications technologies are beginning to blur the lines between so-called facilities-based and value-added services (for details on the classification of basic and value-added telecommunications services, see WTO [www.wto.org/english/tratop\\_e/serv\\_e/telecom\\_e/telecom\\_coverage\\_e.htm](http://www.wto.org/english/tratop_e/serv_e/telecom_e/telecom_coverage_e.htm)).
- b/ The issue here is whether the online delivery of information content, such as software, music and books, should be classified as “trade in goods” or “trade in services”. This dual possibility for certain products raises a question as to the appropriate trade policy classification of “digitized” products. The answer to this question has important implications for trade policy because goods and services are subject to different sets of multilateral trade disciplines.
- c/ In all, 60 of the 69 members that made specific market-access and national-treatment commitments under the agreement signed on to the Reference Paper. The Latin American and Caribbean countries that are signatories to the Paper include: Antigua and Barbados, Argentina, Belize, Bolivia, Brazil, Chile, Columbia, Ecuador, El Salvador, Grenada, Guatemala, Jamaica, Mexico, Trinidad and Tobago, and Venezuela.

authorities as well. CELADE also provides training courses to support the efficient use of the available data (<http://www.eclac.cl/redatam/default.asp>).

<sup>50</sup> ECLAC/CELADE is in the process of creating a regional observatory to monitor indicators for the follow-up to international conferences in Latin America and the Caribbean. Its purpose will be to track the advances and setbacks of efforts to achieve the goals defined by various summits and conferences. The inclusion of indicators relevant to the information society would be a useful tool for policy evaluation.

A further area for regional cooperation is in enhancing the region's negotiating power. It is crucial for the region to create scale in demand in order for its voice to be heard by large transnational corporations. With more than half a billion inhabitants and a GDP of US\$ 2 trillion, Latin America and the Caribbean represent an attractive market for ICTs and ICT service providers. The lack of coordination between the markets in the region, however, makes it easy for transnational conglomerates to engage in price discrimination and to exploit market segments to the fullest. Grouping together to leverage the region's negotiating and purchasing power would enable it to address problem areas in which bottlenecks are interfering with a rapid and universal integration of ICTs in the region. The above-mentioned inequitable and unjust accounting system for Internet traffic flows and the required negotiations with North American Tier 1 operators<sup>51</sup> are examples of areas in which urgent steps should be taken. Another field in which bulk negotiations with large transnational corporations is required is software licensing. Discount rates for software programs and "social licenses" can then serve poor communities, public facilities and microenterprises. Negotiations with transnationals in the computer industry concerning the production of special hardware (or hardware parts which can then be assembled domestically) could help to provide ICT equipment that meets minimum requirements of sophistication and price, since the currently available end-user equipment is often unaffordable or provides unnecessary functions. The profit margin for transnational corporations in providing simple, inexpensive equipment might not be as large as it is for sophisticated high-quality products, but low-priced and just sufficiently sophisticated access equipment is essential to provide basic access to the ICT infrastructure for all socio-economic strata in Latin America and the Caribbean. Especially with respect to the introduction of 3G mobile telephony and digital television, such negotiations become a crucial part of the digital-divide policy agenda. Public/private sector networks (such as the United Nations ICT Task Force, with its regional network, LacNet)<sup>52</sup> can provide an appropriate means of tackling such delicate yet pressing issues.

In order for Latin American and Caribbean countries to influence the creation of the global information society in ways that will work to their benefit, they must make their voices heard on a global level. Regional cooperation is essential, and the formulation of a common vision and vigorous advocacy of that vision in global forums such as the World Summit on the Information Society 2003-2005 are key elements in order for the region to move in this direction.

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<sup>51</sup> A Tier 1 Internet Service Provider is a backbone operator; this term refers specifically to the very largest ISP backbone providers.

<sup>52</sup> United Nations ICT Task Force, Latin American and Caribbean Regional Network: <http://lacnet.unicttaskforce.org/es>.

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