ICT for growth and equality: renewing strategies for the information society

Summary

Third Ministerial Conference on the Information Society in Latin America and the Caribbean

Lima, 21–23 November, 2010

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I. STEPPING UP THE PACE IN THE INFORMATION SOCIETY AGE

A. After the crisis: a window of opportunity for growth with equality

In the countries of Latin America and the Caribbean, prospects for development increasingly depend on the ability to generate the knowledge and skills needed to drive economic and social innovation and to leverage them for economic growth, social inclusion and environmental sustainability. Added to this is a setting that calls for redefining the relationship between the market, the State and society that has existed for three decades and has been unable to respond to the challenges of development or to narrow productive and social gaps (ECLAC, 2010a).

In this new phase of post-financial-crisis economic recovery, the countries of the region are meeting considerable challenges and opportunities involving the information society, an economic and social system in which knowledge and information are vital sources of well-being and progress. It has been said that the countries of the region will be able to achieve greater and better growth only if they renew their strategies for development with equality and lay a sounder foundation for growth and greater social inclusion in a new technological era based on information and communications technology (ICT), whose transformational potential can be used to add value to economic activity, to public services and to social organization.

Recent experience in the more advanced countries shows that the development and intensive use of ICT have had significant effects on

the productivity of those economies, promoting enterprise innovation and making public services more efficient. It is well known that in the developed countries, incorporating ICT into production processes boosts productivity and innovation for both user and producer industries. In particular, they enable the development of a new generation of enterprises with new business models. In addition, ICT use in government and social sectors improves the quality and coverage of public services and thus leads to greater social inclusion.

ICT accelerate the transmission of new technologies to the economic and social structure as a whole, becoming the core of a broader system driven by innovation and giving rise to a new technological and economic paradigm. Once innovation is under way, the salient dimension of this paradigm is its dissemination and the creation of positive externalities in production and consumption that lead to technological spillovers and contribute to the well-being of the population (Cimoli, Hofman and Mulder, 2010; Peres and Hilbert, 2009). But these developments come with a challenge: the adjustment and systematic deployment of public policies supporting innovation and the dissemination of these new applications in a manner that is consistent with the appearance of new technologies so as to avoid falling farther behind in digital development and inclusion.

The performance of Latin America and the Caribbean to date is in marked contrast with that of more advanced countries. Over the past few years, the region as a whole has achieved convergence in mobile telephone use but not in broadband Internet access. Moreover, comparative studies consistently show that there is no significant narrowing of the gap with countries of the Organisation for Economic Co-operation and Development (OECD) as to the degree of readiness for the information society. In addition, the impact of ICT in the countries of the region has been modest in comparison with international best practices, and the rise in spending on ICT as a proportion of GDP has not been matched by increases in productivity even though a variety of programmes and strategies for the information society have been implemented since the late 1990s.

It is therefore time for a second generation of digital development and inclusion strategies based on greater coordination between institutions. This requires expanding the high-speed Internet infrastructure to make broadband available to all. Progress is also

needed in e-government, education based on the intensive use of digital technologies and networks and ICT-intensive innovation, especially the production of content and applications. This also involves stepping up the pace of ICT dissemination towards microenterprises and small and medium-sized enterprises (SMEs) to help make them more competitive and decrease technological heterogeneity.

This will not be easy. Governments need to deploy innovative public policies, and enterprises need to complete new business models to achieve mass access to and use of broadband. It is also essential to ensure that digital technologies and networks span the public sector and that this effort goes along with reforms that make the State more efficient and transparent. In education, ICT should be introduced along with reforms geared towards improving the teaching/learning process, especially for lower-income sectors. No less important is the need for productive development policies to pay particular attention to promoting the software, applications and content industries while deepening efforts to put ICT within the reach of small enterprises.

Despite these challenges, the viability of a second generation of information society strategies stems from a set of favourable circumstances that are opening a window of opportunity for the countries of the region to play a more active role in the information society this time around and thus catch up with the more advanced countries. These circumstances are:

(i) Exogenous technological factors: The new ICT convergence cycle in technology, services and production will enable enterprises and citizens to gain access to simpler, more secure and flexible services that cost less, are easily scalable and offer greater security and reliability.

(ii) User consumption and behaviour patterns: The increasingly mass consumption of digital products and services is transforming the region into an emerging market with rising spending on ICT and rapidly changing Internet use patterns.

(iii) Accumulated public policy experience: In addition to progress in infrastructure and access policies in the region, there are regional and international best practices based on strategies that have enabled a group of countries to make significant progress towards the information society.

(iv) Development of national and regional capacities: Unlike a decade ago, there is now a critical mass of ICT professionals and enterprises based in the region that have acquired the capacity to serve enterprises and governments and form a new component of an innovation system that goes beyond national borders and is becoming regional in scope.

If these factors are to spur growth and lessen productive heterogeneity and social inequality, wider-reaching public policies must be designed and implemented, with new, cross-cutting strategies that will help to create complementary assets to reduce the structural heterogeneity of the productive sector and, as will be seen below, to move forward with larger-scale integrated programmes that are consistent across institutions. Only in this way will it be possible to reach the critical mass threshold required to increase productivity, accelerate innovation and contribute to inclusive development.

B.   Preparing the region for the information society

Over the past decade, the region has lagged behind the developed countries in terms of readiness for the information society, although since the 1990s most of the countries have implemented digital policies and, subsequently, new and more comprehensive information society programmes.

A comparison of developments in the region with those in the OECD countries for 2002-2008, using the ICT development index of the International Telecommunication Union (ITU), reveals clear trends in terms of gaps, convergences and lags (see figure 1).

(i) The ICT development index gap has narrowed slightly. This persistent asymmetry is related to each country's baseline and the design, scope, scale and budgets of national information society strategies. If the current trend continues, it will be 2014 before the region reaches the level of readiness that the OECD countries achieved in 2002.

(ii) The strategies applied in the region —focused mostly on supply policies, such as infrastructure and access programmes— have had only localized impacts. These programmes, known as first-generation strategies, have narrowed the gap in the infrastructure and access component in relation to the OECD countries. This is the only component showing significant convergence with the developed countries.

(iii) The greatest lag is in the ICT use sub-index, indicating that in addition to the progress made by some of the countries of the region a new generation of public policies is required in order to promote the use of advanced ICT applications in production, government and social services.

LATIN AMERICA AND THE CARIBBEAN: PROGRESS TOWARDS THE INFORMATION SOCIETY, SIMPLE AVERAGE BY REGION, COMPARED WITH THE COUNTRIES OF THE ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD)
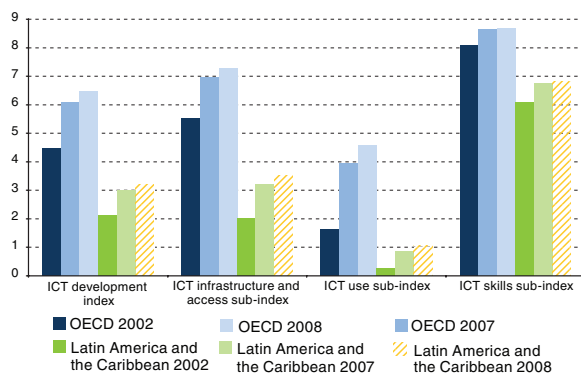
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of International Telecommunication Union (ITU), ICT Development Index (IDI).

A comparative analysis of the region's readiness for the information society shows that this variable mirrors the uneven distribution of per capita income. The Southern Cone and the Caribbean are among the developing subregions with the highest information society readiness indices, while Central America lags farther behind (see table 1).

International experience shows that, in recent decades and in various ways, public policies have led to significant progress in readiness for the information society in a number of countries (Dutta and others, 2010). Countries such as China, India, Romania and Viet Nam have advanced rapidly in the space of 10 years (measured by the Networked Readiness Index, or NRI).

In Latin America and the Caribbean, there is also a group of countries that are quite diverse in terms of per capita income, the size of their economies and their geographic location, and that have improved their e-readiness by implementing national strategies for the information

society. Notable among these are two groups of countries: Colombia, Costa Rica and Jamaica, which gained at least two deciles in the readiness index between 2001-2002 and 2009-2010; and Brazil and Chile, which are relatively better positioned and have advanced more slowly in recent years (ECLAC 2010b).

Table 1
GLOBAL READINESS FOR THE INFORMATION SOCIETY, BY REGION, COMPARED WITH THE LEADING REGION, 2009-2010
(Index: leading region=1)

Readiness index/Region	Digital technology access index (ICT Development Index, IDI)	World Bank ICT Index (WB-ICT)
OECD countries	1.00	1.00
Eastern Europe and Central Asia	0.64	0.68
Latin America and the Caribbean	0.51	0.58
Southern Cone	0.58	0.67
Caribbean	0.59	0.67
Andean Subregion	0.48	0.56
Central America	0.23	0.48
Asia and the Pacific and East Asia	0.62	0.64
Middle East and North Africa	0.55	0.63
South Asia	0.25	0.26
Sub-Saharan Africa	0.24	0.25

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of International Telecommunication Union (ITU), *Measuring the Information Society. The ICT Development Index, 2009 Edition*; World Bank, Information and communication Technology Index (WB ICT).

C. The convergence scenario in the information society

Since the 1960s, waves of technological progress in ICT industries, and therefore in industry standards, have succeeded each other every 15 years on average, evolving from a structure based on large mainframe computers to an Internet-based industry. The ICT industry is among the most dynamic internationally, doubling in size every 10 years. It has alternated between fast-growth cycles averaging about 6%-7% a year and short declines like the ones in 2001-2002 and 2009 that saw annual average drops of 5%.

Until recently, the development of new technological products was driven by hardware technologies associated with microelectronics. New products now depend on greater integration of hardware and software components, which are combined in multidimensional processes. Against a background of rapid technological integration, the development of ICT in the coming decade will be shaped by the trend towards convergence of technologies.

Snowballing convergence between information technology and media and telecommunications technology is reflected in a number of areas: communications networks (networks and services), hardware (mobile multimedia equipment), processing and applications services (cloud computing) and Web technologies (Web 2.0). These new technologies will lead to a new ICT cycle characterized by explosive development of wireless and mobile applications with falling costs and exponential growth in processing capacities thanks to cloud computing. They will spark new changes in user behaviour patterns through the new social networks associated with Web 2.0 (see table 2).

Table 2

PRINCIPAL TECHNOLOGICAL TRENDS ASSOCIATED WITH INFORMATION AND COMMUNICATIONS TECHNOLOGIES

Type of convergence	Technology	Impact on developing countries
In networks	Cable and mobile network technology for convergence of networks and services. Third- and fourth-generation (3G and 4G) wireless mobile technologies for fixed- and mobile-network convergence.	Greater service flexibility; lower prices; development of mobile Internet; new regulation for convergence; and migration of fixed-line subscribers to mobile platforms.
In hardware	3G and 4G mobile multimedia equipment.	Access to different services from a single device; multi-standard and multi-platform mobile terminals; changes in user habits through the use of smart phones.
In data processing and applications services	Cloud computing.	Change in ICT business model; access to new ICT services; lower cost of ICT services; lower cost of hardware; new local ICT enterprises; new investments in broadband and data centres.
In Web technology	Web 2.0.	Changes in consumer behaviour, Internet- and television-based consumption habits, social relationships and relationships with government services.

Source: Economic Commission for Latin America and the Caribbean (ECLAC).

As can be seen in table 2, convergence can be viewed from four complementary perspectives: telecommunications networks, hardware, ICT services and Web platforms:

(i)   Convergence in telecommunications networks has two dimensions: convergence in networks and services, and convergence of fixed and mobile networks. Convergence in networks and services gives consumers access to a variety of services on a single platform; mobile networks are following a similar path in that they can provide the full range of voice, data and audiovisual services.

(ii) Hardware convergence gives users access to a variety of services from a single device or terminal, even if they originate from different platforms. Given the speed of technological change in this area, it can be expected that, in the short to medium term, new-generation devices will have overlapping functions that will combine, if not all, at least several of the services formerly provided only by separate devices.

(iii) Another dimension of convergence in ICT services is cloud computing, an Internet-based technology whereby data storage and processing and applications reside on remote servers, offering users demand-based services. Cloud computing reflects the transformation of the ICT industry business model from the concept of ICT as a product to that of ICT as a service.

(iv) Web convergence, known as Web 2.0, has become a strategic tool for new applications in the economic and social spheres. Web 2.0 is the result of the combination of new Web technologies with new business models and trends in social behaviour. Web 2.0 is a phase of Web evolution and is more interactive and collaborative than its predecessor, emphasizing social interaction and collaborative work.

D. Closing gaps

Latin America and the Caribbean is regarded as an emerging region in terms of ICT access and use. In the 2000s, the countries of the region have steadily increased their share of the numbers of Internet users and applications and of the spending on incorporating these technologies. As of 2010, Latin America and the Caribbean accounted for 8% of the world's Internet users and 7.8% of the spending; these percentages are higher than the region's share of world GDP (ComScore, 2010 and Gartner, 2009). The region's degree of digital development is certainly substantially higher than it was 10 years ago.

Despite these advances, taking advantage of the potential of ICT applications depends on the ability to close the gap with the developed countries. The main gaps in the region include those relating to infrastructure, complementary assets and institutions.

As for infrastructure gaps, figure 2 shows that the region has begun to converge with high-income OECD countries in terms of fixed and mobile telephone penetration, although most mobile phones in the region are pay-as-you-go and are used mainly for voice and messaging services. In 2005, the gap in Internet users per 100 inhabitants began to gradually narrow. This is not the case with broadband access, however. The region is rapidly falling farther behind the high-income OECD countries in terms of mobile broadband access. So while the gap in telephone services has closed, a new gap (in broadband access) has opened. Low broadband penetration in the region is even more critical in the less developed countries, in lower-income households and in rural areas.

Figure 2
LATIN AMERICA AND THE CARIBBEAN: TRENDS IN DIGITAL DIVIDES COMPARED WITH THE COUNTRIES OF THE ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD)
(Percentages)
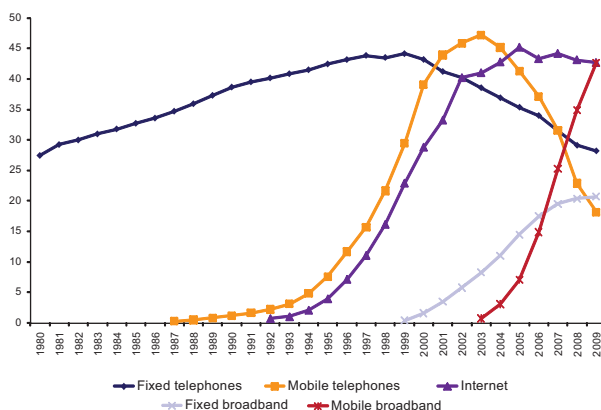
Source: Economic Commission for Latin America and the Caribbean (ECLAC).

Other dimensions of the broadband gap relate to deficiencies in quality of access, measured in terms of transmission capacity, long latency times and high costs. The fact that the significant increase in the numbers of broadband users and subscribers in the region has not

been accompanied by improved quality of access is cause for concern. In 2000-2007 the region's share of the worldwide number of Internet users and subscribers rose from 4.4% to 8.2%, but at the same time its share of total transmission capacity fell significantly, from 2.9% to 1.1%. This had a negative impact on opportunities to use the most advanced applications (López and Hilbert, 2010).

ICT use has had little effect on productivity in Latin America and the Caribbean because of gaps in access, poor broadband quality and problems relating to the shortage or lack of complementary ICT assets. While the region is among the world's most dynamic in terms of the increase in Internet users and ICT spending, this has not been reflected in improved productivity, giving rise to a phenomenon similar to what Solow (1987) called the "productivity paradox". The gap in complementary ICT assets relates to the undersupply of complementary goods and services in the areas of human resources, business management, research and development and public sector reform, all of which are essential to ensuring appropriate ownership of technological advances and creating a significant impact on productivity and social inclusion.

Lastly, in the area of ICT policies there are significant institutional gaps with the advanced countries, despite the broad set of initiatives deployed in the region. These, with varying scales and impacts, represent progress compared with the countries' starting points in the areas of infrastructure and Internet access, ICT access and use in enterprises, e-government services, ICT use in education and promotion of e-health in public health centres (ECLAC, 2010b). In this context, the institutional gaps are problems relating to weaknesses in policy design and in the institutional structure of the bodies responsible for agendas and programmes, lack of coordination between government bodies and the private sector, budgetary constraints, and low levels of leverage and support from key actors.

II. RENEWING STRATEGIES FOR THE INFORMATION SOCIETY

A. The challenge of productive convergence with equality

It has been noted that structural heterogeneity and the lack of complementary assets have limited the contribution of ICT to the achievement of full economic and social development in the region. The countries therefore need to recover their ability to fashion long-term development strategies in which the State resumes an active role, rebuilding capacities to address the challenges that the development model faces (ECLAC, 2010a). The institutional framework must thus be adapted to enable the State to promote general well-being and implement development strategies without being subordinated to the market.

International evidence shows that ICT are a strategic factor in economic and social development because of their systemic impacts. Where there are failures of coordination, it is important to have complementarities; the State must therefore intervene in the development of infrastructure and applications in order to achieve mass access and drive knowledge generation and learning (Cimoli, Dosi and Stiglitz, 2009). New strategies for the information society should thus encompass at least the following complementary public policy areas for developing ICT in countries of the region (see table 3):

(i) Systemic complementarities: As general-use technologies, ICT cut across markets and fields of activity, making complementarities essential for maximizing their contribution to economic and social

development. The State should therefore coordinate public policies on several fronts so that, together, they produce spillover effects and generate complementarities for the economy as a whole. Among such public policies are those geared towards building access infrastructure, training human resources, promoting research and development, transferring technology to microenterprises and SMEs, reforming the State and developing e-government.

(ii) Equity in access and use: The benefits of ICT stem from the positive production and consumption externalities associated with access and use. Because these externalities are not fully taken into consideration by economic agents during the decision-making process, the supply of services tends to be below socially efficient levels. Access to ICT should therefore be regarded as being in the public interest because it facilitates the provision of social services (health, education and public administration) and helps ensure access to global public assets, such as information that is freely available on the net.

(iii) Management of State resources: Some of the key resources for developing an ICT infrastructure and environment are owned by the State, which is therefore responsible for managing and allocating them as efficiently as possible. As an example, the radioelectric spectrum must be managed effectively in order to expand broadband because demand is growing —mainly for providing mobile and wireless services.

(iv) Standards and regulations: An appropriate framework of standards and regulations is one of the principal determinants for developing markets, attracting investments and adopting new technologies. Technology evolves so quickly that the State must constantly adapt this framework to accommodate technological developments without neglecting legal certainty or the vested rights of stakeholders.

(v) Dissemination of technological innovation: Among the key factors for growth is the ability to innovate and rapidly disseminate best international practices in technology within the production structure. Technological learning is closely linked to the production apparatus and the institutional framework of education, science and technology. The greater the weight of technology-intensive sectors in the production structure, the faster the learning process will be. The pace of innovation will be quicker, and domestic and international demand for goods produced in the country will expand.

(vi) Dynamic public policy focus: The need to refocus public policies as market conditions and the environment change is particularly critical in the telecommunications market. Advances in microelectronics, digitization and convergence have driven a sharp fall in the fixed costs of provision and made it possible to segregate infrastructure markets from the markets for each service, which has impacted market structure. Electronic communications services now resemble monopolistic competition markets in that many competing companies offer comparable services.

Table 3

THE ROLE OF THE STATE IN DEVELOPING INFORMATION AND COMMUNICATIONS TECHNOLOGIES
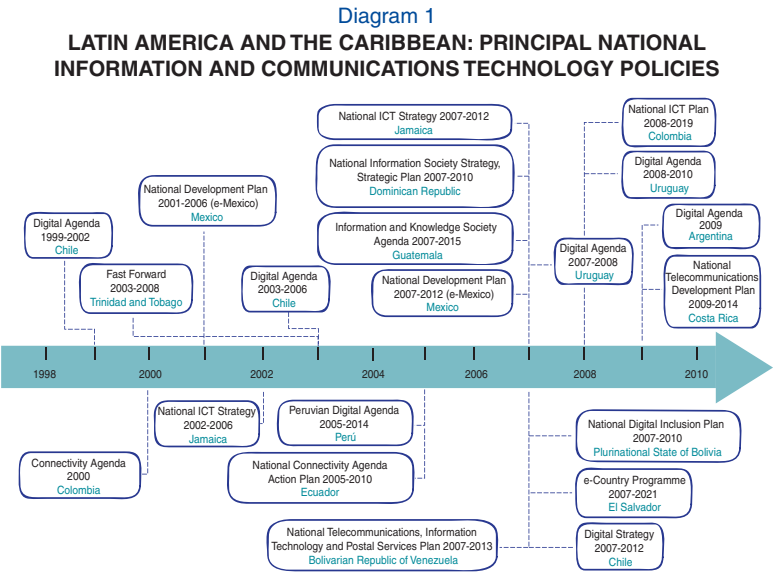
Spheres	Goals
Systemic complementarities	Correct failures of coordination in order to link with other sectors and develop synergies (nanotechnologies and biotechnologies).
Equity in access and use	Achieve mass access and use in order to promote equality and competitiveness.
Management of State resources	Efficiently allocate and manage resources such as the radioelectric spectrum, servitudes and domain names.
Standards and regulations	Modernize and adapt standards and regulations to accommodate technological convergence.
Dissemination of technological innovation	Accelerate the learning process, encourage innovation and disseminate best technological practices to enable leap-frogging.
Public policy	Refocus public policy to accommodate a fast-changing, evolutionary and innovative environment.

Source: Valeria Jordán, Wilson Peres and Fernando Rojas, "Banda ancha: una urgencia para América Latina y el Caribe", V European Union - Latin American and Caribbean Ministerial Forum on the Information Society (LC/R.2158), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), March 2010.

B.   Status of digital policies in the region

As diagram 1 shows, the digital agendas of the countries of Latin America and the Caribbean have a track record of little more than a decade although their beginnings date back to telecommunications and hardware and software industry development policies, to plans for computerizing public administration and to the first ventures into using ICT in education. In the late 1990s, several countries of the region embarked on initial attempts to

design comprehensive public policies for ICT incorporating the idea of an "information society", because this approach afforded a much farther-reaching view than did the notion of "computerization". These efforts later drew momentum from the two phases of the World Summit on the Information Society (WSIS) in 2003 and 2005, respectively, and from the inclusion of ICT in the United Nations Millennium Development Goals, incorporating the vision laid out at the summits.

Diagram 1
LATIN AMERICA AND THE CARIBBEAN: PRINCIPAL NATIONAL INFORMATION AND COMMUNICATIONS TECHNOLOGY POLICIES

Source: Economic Commission for Latin America and the Caribbean (ECLAC).

Against this backdrop, two plans of action for the information society in Latin America and the Caribbean (eLAC 2005-2007 and eLAC 2008-2010) were set in motion as technical/policy mechanisms for developing ICT at the regional level. Both plans of action, or regional digital agendas, were agreed upon among the governments of the region.[1] They sought to stimulate the adoption of these technologies by means of cooperation and the exchange of best practices regionwide. Both digital agendas were in line with long-term international goals defined by the World Summit on the Information Society and the Millennium Development Goals.

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[1]   See [online] http://www.cepal.org/SocInfo/eLAC.

The countries of the region are nearing completion of a proposal for a new Plan of Action for the Information Society in Latin America and the Caribbean (eLAC 2015), based on a broad public consultation on policy priorities and a monitoring report on progress made in 2010. It is hoped that this third plan will be approved at the third Ministerial Conference on the Information Society in Latin America and the Caribbean.

What was the main impact of the eLAC regional digital agendas? Beyond specific compliance with the agreed goals, what eLAC did was to spark the development of public policies in ICT in almost all of the countries of the region. Futhermore, as the first guidelines for a comprehensive ICT policy were being developed, the cross-cutting nature of this issue gradually became clear, as did the crucial role that the public sector could play as a major user and producer of information and services.

In this context and in view of the region's high levels of poverty and unequal income distribution, public ICT policies initially focused on social inclusion (unlike the European approach, which made it a priority to use these technologies in production and business and sought from the outset to promote innovation and competitiveness).

Public ICT policy at the country level depends on the quality of the strategies, the degree of political consensus and the ability to coordinate institutions. Several countries of the region have incomplete ICT policies, which undercuts their effectiveness and impact. Most have national ICT plans or agendas, but not all have managed to implement sector-based programmes while others have sectoral programmes but no national strategy and no overall coordination.

Evidence shows that the variables determining the most successful outcomes in the region include the level of political consensus on digital strategies, the degree of institutional consolidation and leadership in promoting these strategies. The hierarchical status and institutional development of the entity conducting, coordinating or executing the national strategy are also key factors that determine policy outcomes.

In this connection, the availability and management of resources for implementing the national strategy, work methods and clear procedures for coordinating the principal institutional actors also affect each stage of digital strategy implementation.

At present, the main policy objective is to deploy infrastructure in order to narrow the access gap and improve access quality. For this reason, initiatives for fostering more widespread, better use through training, promoting content production, developing an enabling environment and deploying ICT in heretofore minimally computerized sectors such as small enterprises, rural schools and health are still incipient. And most agendas do not sufficiently stress the need to coordinate the dissemination of ICT use with promotion of the local software, applications and digital services industry.

Both the degree of commitment to and the sustainability of such policies hinge on the institutional structure and government hierarchy of the entity responsible for them —the stronger the institutional structure the better the hierarchical position of the implementing authority and its ability to act as an interlocutor between institutions. Experience in the region shows that digital agendas take different institutional approaches and that only in a few countries are the entities responsible for these agendas high in the government hierarchy and able to cross-coordinate within the State. In most cases, the agendas are in the hands of institutions with little political influence or ability to coordinate between ministries.

A key shortcoming of this institutional structure is poor coordination between digital policy actors. On the one hand are the national entities or others responsible for coordinating digital strategies; on the other are the sectoral entities or ministries that should be involved in implementing specific initiatives within their spheres of action. Hence the need for public policy institutions capable of resolving the coordination issues that prevent digital policies from being as cross-cutting and complementary as they should be.

Although there are more resources for the public procurement of ICT goods and services, estimating the cost of and budgeting for the implementation of the measures on the agenda and securing sources of funding are functions that are very weak or virtually non-existent in the countries of the region. Added to this are problems in coordinating resources, which usually depend on the tight budgets of the relevant authorities. There is also a lack of evaluation and monitoring procedures for measuring the impacts and effectiveness of ICT policies.

C. New strategies for the information society

On balance, the greatest impediment to maximizing the impact of the region's information society initiatives based on international best practices is the failure to appropriately take into account, during policy design, the cross-cutting, complementary and internationally integrated nature of ICT.

The cross-cutting nature of ICT means that such technologies can simultaneously contribute to economic growth, modernization of the State and the achievement of equity, as well as create platforms for efficient participation in the global economy. The policy agendas of the information society programmes implemented in countries of the region stress ICT applications more as a means for social integration and improving the standard of living than as contributors to economic development. Indeed, production sector issues such as e-business and the development of hardware, software, and ICT service and content industries, are frequently absent from policy agendas.

The complementary nature of ICT means that the magnitude of their impact depends on capacity, efficient and effective use, and the supply of complementary goods and services. Investments in ICT can yield substantial outcomes only if there is a threshold of complementarities at the institutional level (education, research and development, legal framework and local production base) and among economic agents, who should make organizational changes to effectively adopt technological advances.

International integration refers to the need for national information society strategies to mesh international technological change with the local transfer and localization of new technologies. For a region like Latin America and the Caribbean, the technical progress associated with ICT is exogenous and highly uncertain while technology adoption is endogenous and usually takes place in a context of severe constraints on human, technological and financial resources. That is why information society strategies require flexible policies that are highly integrated with international networks of innovation and, at the same time, are part of government policy agendas to mobilize the resources needed to transfer and adapt critical technology platforms.

All of these factors also necessitate adaptive public policies that address the successive waves of innovation that are transforming ICT and harness their economic and social potential. Public policies thus face a moving target, and the institutions involved in designing and implementing public policy must anticipate new technological trends and develop new policy models. The new generation of public policies must address the following challenges:

(i) In telecommunications, to shift from a policy focused on promoting telephone services to one centred on promoting fixed and mobile broadband.

(ii) In production development, to integrate policies through e-government, training, funding and technical assistance policies so that microenterprises and SMEs not only have access to ICT but quickly move to advanced uses, especially in the fields of management and e-commerce.

(iii) In technological innovation, to adapt instruments for promoting management, training, quality certification, public bidding and development finance to develop a new generation of nationally- and regionally-based ICT enterprises.

(iv) In e-government, to move from computerization focused on major public services operating in a compartmentalized fashion to an approach that favours interoperability between public services based on common standards and the digitization of municipalities, schools and health centres.

(v) In education, to advance towards the mainstreaming of ICT in education, which involves thorough teacher training. In health, to transition from computerization concentrated in specific areas to networked digitization developing high-impact initiatives such as electronic medical records, telemedicine and other applications geared towards access to health care by the poorest sectors of society.

The proposed ICT policy model takes a systemic approach to these technologies, taking into account their cross-cutting, complementary nature and international integration, grounded in an evolutionary view of patterns of technological change and their relationship to economic growth and social inclusion.

III. WHAT KIND OF DEVELOPMENT IN THE INFORMATION SOCIETY?

The design and large-scale implementation of a second generation of strategies for the information society in the region should take into account the challenges posed by the new set of conditions described earlier.

In view of the nature and content of these proposals, work must continue on a policy framework and institutional architecture for the information society that address the issues faced by policymakers. Based on the proposed model, the following should be considered:

(i) The cross-cutting nature of policies: Because strategies for the information society are cross-cutting, special institutional mechanisms are needed to align their strategic components with technological innovation, modernization of the public sector and education and health reforms. This requires a creative approach to the inertias of fragmented policies and public institutions in the region and the creation of inter-agency coordination mechanisms to generate synergies by setting goals that engage political authorities, the business community and citizens. These initiatives, which should have appropriate budget resources, may be based on public-private partnerships.

(ii) The complementary nature of policies: Information society strategy goals are associated with and conditioned by the performance of institutional systems (technological innovation and public administration) and the behaviour of many social and economic actors. There is thus a need for flagship information society programmes geared to reach a threshold of complementarities

that will ensure significant economic and social impacts. Some examples of such programmes are the expansion of broadband in an environment of regulatory convergence, advanced ICT use by enterprises in a context of innovation, and interoperability between public institutions, as part of an overall move to reform de public sector and ensure teacher training in advanced ICT use in the context of education reform.

(iii) International integration: One information society objective is convergence with more developed countries. The goals listed above thus become moving targets that shift along with the pace of technological change and innovation in a small group of leading countries. Supply-side policies for the ICT industry are therefore needed in order for some countries in the region to be able to develop an internationalized ICT industry that can access and participate in international production and innovation circuits.

The countries of Latin America and the Caribbean thus share a set of challenges that new strategies for the information society must address. Public policies for digital development and inclusion should encompass at least the following complementary strategic components as a benchmark for crafting national strategies:

(i) Broadband development for growth and equality.

(ii) ICT incorporation and development to boost productivity and innovation.

(iii) Improved public services as a result of e-government and ICT use for education and health.

A. Broadband development for growth and equality

As the new infrastructure for the information society, broadband makes it possible to fully integrate the production sector in the global economy and bring citizens the benefits of social progress. Enterprises, consumers and citizens seeking access to the new generation of knowledge society services (based on voice, data, video and Web applications) need high-speed connections. Among the applications with the greatest economic and social impact are process improvement systems, e-commerce, supply chains, telework and innovation networks

in the production sector, as well as e-government, e-learning and telemedicine applications in the social sphere.

Achieving universal broadband access is just as important for development with equality as power grids, roads and transportation were for industrial development in the twentieth century. It is an indispensable service that opens up opportunities for economic progress and greater equality and participation. For this reason, broadband Internet access should be regarded as a right for the citizens of Latin America and the Caribbean.

Harnessing the potential of the advanced and new-generation applications (e-commerce, e-government, e-health, e-learning and the like) has thus far been limited by the transmission capacity of access networks. The true economic and social potential of such tools as remote real-time diagnosis, interactive and multimedia computer programmes for teaching and smart management of energy and transportation resources can only be realized with high connection speeds. Broadband strategies must therefore seek to achieve a set of strategic objectives:

(i) Levels of coverage that are near those in middle-income OECD countries, targeting lower-income households, schools and small enterprises.

(ii) Broadband services whose quality is comparable to international standards in terms of speed and latency.

(iii) Broadband services at regionally competitive prices that are compatible with average household incomes in the region.

(iv) A threshold of applications and content for national and regional use that are relevant to the needs of the sectors lagging farthest behind in broadband use.

Moving towards these strategic objectives requires action on four fronts:

(i) Regulation: Adapt standards and regulations to accommodate technological convergence, including, among other factors, the development of open networks, efficient management of resources such as the radioelectric spectrum and the principle of net neutrality.

(ii) Infrastructure: Take direct government action for infrastructure development through coordination, subsidization or direct

investment in expanding broadband infrastructure, especially for public education and health systems, the lower-income population, rural areas and small cities.

(iii) Dissemination and use: Implement programmes for developing applications and content for small enterprises, schools and lower-income households; promote e-commerce and other enterprise management support tools; improve and increase government content and services; develop advanced telework, education and health applications; and encourage investments in data centre and content warehousing infrastructure.

(iv) Promotion of ICT research and development: Create technology partnerships and consortia in areas of technological convergence, such as mobile broadband, cloud computing and Web 2.0.

B. Incorporation and development of information and communications technologies for productivity and innovation

Among the factors behind productivity gains in developed economies are the advanced use of ICT tools and ICT industry development. These have changed how global production, business models, work systems and consumption patterns are organized in most industries. How developed a country's ICT infrastructure is affects the cost of and access to connectivity tools. The presence (or lack) of a sector producing ICT solutions affects the availability of applications and services tailored to the needs of local enterprises and institutions.

Productivity rises in the presence of a local ICT industry and complementary factors that allow the efficient use of ICT tools (OECD, 2010a). Countries that have become more competitive have developed an ICT production industry (mainly hardware and software), which is a source of economic growth and innovation. The region has an ICT industry (principally for software and, to a lesser extent, hardware) that has so far centred on applications for vertical industries (finance, government, manufacturing, telecommunications and retail) and large corporate clients.

The production units of enterprises in the region must use ICT tools if they are to become more productive. However, implementing such technologies does not in and of itself ensure productivity gains.

Other complementary factors must be in place in the national system for innovation and business organization models, these are even more critical for smaller, conservatively managed enterprises.

Use of ICT by business is one of the areas in which the region lags farthest behind more developed regions, even those countries in the region with more widespread adoption of ICT. Despite substantial progress in access to computers and the Internet for small enterprises, there is still a significant lag in ICT tool use compared with larger enterprises. Optimum use of ICT is possible only with profound changes in internal enterprise processes and relations with clients, suppliers and partners. The costs of implementing and learning ICT can be high because information technology tools are not widely used and fewer human and financial resources are available.

Policy strategy for promoting the incorporation of ICT in enterprise operations and business models rests on two pillars:

(i) Public policies to create a favourable environment for achieving mass use of ICT among enterprises, especially: broadband strategies to cut access costs, and e-government strategies to increase online transactions and open the government procurement system to small enterprises, provide facilities and security for e-billing and e-commerce and promote standards and quality certification.

(ii) Policies geared towards increasing enterprises' capacity for more advanced ICT uses: among the most significant initiatives are those that seek to promote operational management tools such as customer relationship management (CRM), enterprise resource planning (ERP) and e-billing systems, as well as advanced e-commerce applications such as business-to-business (B2B), business-to-consumer (B2C) and Web 2.0 platform applications. Training of professionals, technical assistance and credit support for changing business models are also necessary.

The policy strategy for developing an ICT industry is twofold:

(i) Strengthen the local ICT industry, principally the software and audiovisual industries: technological convergence brings the possibility of new waves of innovation based on digital technologies and applications, especially for national technology enterprises. Public policy should seek at least two complementary objectives.

It should encourage modernization processes that are national in scope and ICT-intensive. Some examples are digitizing transactions, customs services, public procurement, traceability systems, payments by mobile phone and services based on open statistics, in order to open market space for national ICT enterprises to capitalize on their potential for innovation. In addition, development policies should be geared to prepare, support and co-finance technological innovation projects in the area of ICT for national enterprises, drawing on technology funds and subsidies for human capital training.

(ii) Strengthen the export software industry: several countries of Latin America and the Caribbean are in a position to develop exports with greater value added. This would raise the region's profile in the international ICT market on a par with other successful regions such as Eastern Europe. From a national and regional public policy viewpoint, the short- and medium-term goal should be to resolve the main competitiveness gaps associated with the ICT industry, especially in the areas of human resource capacity, enterprise operational excellence, technology transfer, and the promotion of cluster initiatives.

C. E-government and information and communications technologies in education and health for social inclusion

In addition to the economic benefits that come with productivity and innovation, ICT can add value to the process of modernizing the public sector and hence improve how government delivers services to citizens. The agenda for integrating ICT into public administration should be based on a comprehensive approach, taking into consideration that the priority areas concern central and local government services, education and health. In the early 1990s, most countries in Latin America began to implement, albeit with different focuses, programmes for developing e-government, incorporating ICT into education and promoting public e-health policy.

1. E-government challenges

The region is already on the way to developing e-government. This has made it possible to combine initiatives for transforming the public sector in the countries of the region with the goal of making public administration more efficient and effective, achieving more equitable

access to public services and improving State transparency. On balance, there have been examples of progress and good practices in the region, although with marked differences between countries.

ICT use in various areas of government has yielded efficiency gains. Noteworthy initiatives include online services, public procurement, tax administration and electronic payments. An assessment of the region's progress in the sphere of e-government shows that there have been successes but that service provision, access and use still pose significant challenges. Among them are the need for more:

(i) Information and administrative transactions available online.
(ii) Interoperability among public services in order to correct the principal inefficiencies in and obstacles to the provision of services to citizens.
(iii) Broadband Internet access in municipalities.
(iv) Complementarity between greater ICT use and improvements in public administration.

In order to address these challenges, progress must be made on the following initiatives:

(i) Continue to promote the training of officials and end users on tools for accessing local government services.
(ii) Increase the amount of information online and the number of interactive applications for citizens and enterprises with Web 2.0 tools through public procurement and government portals.
(iii) Promote the widespread availability of electronic administrative transactions designed for fixed terminals and portable devices connected through mobile broadband.
(iv) Ensure that all municipalities have a broadband connection and provide community content.
(v) Encourage public administration coordination and interoperability based on open standards.

2. Information and communications technology dilemmas in education

Information society strategies have identified the integration of ICT into education as a priority because these technologies help improve the quality of education and contribute to more efficient education systems and to equity. There have thus been many initiatives in a range of areas of educational activity, such as using ICT in teaching and learning, improving school

connectivity, making more computers available to students, developing teacher training programmes and creating and maintaining education portals.

Although their great potential is clear, the evidence on the impact of integrating ICT into education remains inconclusive. It has been said that the productivity paradox is most apparent in the education sector. Evaluating the impact of ICT on education is a challenge not only for the countries of the region, but at the international level as well. Educational processes have changed little despite the introduction of ICT, so technology is being used alongside older pedagogical processes. The relevant question, therefore, is not whether ICT have improved the quality and efficiency of education, but how new ICT-based teaching methods can improve education performance compared with traditional methods (OECD, 2010b).

Since ICT are tools that can be used for a variety of purposes, including improving education, their use must be consistent with the level of development of the educational system in areas such as teaching methods, pedagogical practices, curricula, knowledge management, availability of resources and management models. The contributions of ICT can be divided into three areas: development of technology infrastructure and applications, management of educational establishments and support for innovation in pedagogical methodologies. Policies should therefore aim to support educational reform in these three main areas:

(i)   Infrastructure and applications: Achieve universal broadband access for educational establishments and the availability of computers and other digital media in order to make advanced educational applications viable, continue strengthening education portal networks on Web 2.0 platforms, provide more multimedia content and complement basic training for teachers to prepare them for using new applications.

(ii) Management of establishments: Disseminate tools for the strategic management of human and operational resources in educational establishments and administrative support systems. Provide the heads of such establishments with management training.

(iii) New pedagogical methodologies: Ensure advanced training for teachers, digitization of content, interactive applications and methodologies for integrating ICT effectively into the teaching and learning process.

3. The incipient development of e-health

ICT in e-health is a developing field in the region, while in more advanced countries highly sophisticated applications are in widespread use and the move is towards universal coverage. Faced with the need to provide better health services for the most vulnerable sectors, ICT constitute a tool that can help improve coverage and quality and optimize hospital management processes.

Only a few countries in the region have drawn up e-health policies. There has been limited experience with telemedicine. The development of electronic medical records is just beginning, there are few high-speed digital networks in hospitals (which are also hampered by poor connectivity) and human resources training and national health portals are inadequate.

Because health system digital technologies and networks are not well developed, change should be gradual and keep pace with national health sector reforms so as to address issues relating to infrastructure, adoption of standards, integration of ICT into management and implementation of e-health projects in public hospitals. In particular, it is necessary to:

(i)   Draw up e-health strategies that are consistent with health system reforms in order to improve the coverage and quality of care, especially for the most vulnerable sectors.

(ii)   Ensure that hospitals and public health centres have broadband Internet connections, promoting interoperability with a view to improving the integrated management of public health.

(iii) Guarantee error-free patient identification while also ensuring the protection of personal information.

(iv)   Foster dialogue and cooperation to lay the technical and legal groundwork for telemedicine and electronic medical records, in line with international best practices and personal data protection principles.

(v)   Develop regional interoperability for epidemiological cooperation, strengthening the use of ICT to improve health system coordination in border areas.

D. Closing remarks

The agenda for development with equality in the region should rethink the role of public policies and of the State and, in particular, address the policy shortfall in the areas of the promotion of development, economic regulation, well-being entitlements and the provision of public goods, within the context of current structural trends that are shaping a new technological cycle.

The region's strategies for the information society are in need of updating. International experience and lessons learned have made for a better understanding of the relationship between development dynamics and the technological innovation associated with ICT, particularly with regard to key factors that link the adaptation of new technologies to transformation in the economic and social spheres and in public administration.

The dissemination of ICT could thus fulfil expectations and prove to be a strategic factor in economic and social development. To create complementarities where at present there is little coordination, public policy action must be taken through public sector reform that creates the conditions for mass access, for the promotion of knowledge-generation and learning and for progressing towards inclusive development.

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