

**INTER-AMERICAN DEVELOPMENT BANK
SUSTAINABLE DEVELOPMENT DEPARTMENT
EDUCATION SCIENCE AND TECHNOLOGY SUB-DEPARTMENT
INFORMATION AND COMMUNICATION TECHNOLOGY FOR DEVELOPMENT DIVISION
(SDS/ICT)**

**“Building Opportunity for the Majority”
Washington, D.C., June 11-13, 2006**

“Connecting the Majority: Digital Dividends”

“Empowering the Majority through Information and Communication Technology”

I. INTRODUCTION¹

A. Information and Communication Technology and Digital Opportunities

- 1.1 The rapid advances and pervasive diffusion of information and communication technology (ICT), combined with the growth of the Internet and other global networks have led to deep transformations in economic, social and institutional structures. ICT applications affect the performance of businesses and the efficiency of markets, foster the empowerment of citizens and communities as well as their access to knowledge, and contribute to strengthening and redefining governance processes at all institutional levels.
- 1.2 Nevertheless, as all major and wide-ranging technological advances, the ICT revolution is at the same time creating enormous opportunities and posing daunting challenges. On one hand, it has the potential to increase productivity and wealth, generate new activities, products and services, and improve the well being of the population, notably in regard to education and health levels. On the other hand, the uneven distribution of such opportunities can lead to further alienation of marginalized communities and an exacerbation of existing socioeconomic inequalities. Thereby, a balanced access and effective use of ICT tools and networks in the new global economy, along with an integrated process of technological innovation are critical for reducing poverty, increasing social inclusion and improving living conditions for all.
- 1.3 Numerous studies have focused on the direct contribution of ICT to socioeconomic development and, while their findings and conclusions vary according to the context and application, there is an overall agreement that access to information can transform production processes, increase income potential, and improve the living conditions of the poor. ICT is an effective tool that, when supplemented by investments in connectivity and other factors such as innovation, education, health and infrastructure, increases competitiveness and contributes to economic growth, social development and poverty reduction
- 1.4 Indeed, ICT is changing the way people live and do business globally, and is creating new social and economic development opportunities for lower-income populations, by enlarging markets and facilitating greater access to information, public services and economic activity. Yet, these opportunities cannot be effectively and fully realized if left to market forces alone, and require the

¹ Mr. Allen Hammond of the World Resources Institute (WRI) and Mr. Pablo Bermúdez Mogni contributed with relevant information and material for the elaboration of the present document.

active participation of the public, private and civil society sectors under integrated efforts towards the development of an inclusive information society.

B. ICT and Social and Development

- 1.5 The “digital divide” (a phrase coined in the 1990s) described the perceived growing gap between those who have access to and the skills to use information and communication technologies and those who, for socioeconomic and/or geographical reasons, have limited or no access. In particular, it is used to raise the concern that the emergence of ICT could exacerbate existing inequalities in the access to information and that, thereby, certain groups could face additional disadvantages because of their geographic location, age, gender, culture, and social and economic status, among others. Moreover, the phrase reflects the prevalence of socioeconomic and structural inequalities at the regional, national and local levels, which are characterized by insufficient infrastructure, relatively high access costs, inappropriate or weak policy regimes, inefficiencies in the provision of telecommunication networks and services, lack of local content, and uneven ability to derive economic and social benefits from information-intensive activities.
- 1.6 The United Nations Millennium Declaration notes that efforts to make access available to all and harness the power of ICT can contribute toward the achievement of the Millennium Development Goals (MDGs) by 2015, thereby creating “digital opportunities” in development. Directly, by expanding the reach, scope and impact of social development programs, health services, and education and training programs, and providing opportunities for improving gender equality and citizen participation. Indirectly, by creating new economic opportunities and/or extending them to lift individuals, communities and nations out of poverty.

C. ICT Penetration in Latin America and the Caribbean

- 1.7 The countries of Latin American and the Caribbean have experienced a considerable progress in the penetration of ICT in recent years, exceeding that of other regions of the World. For example, the penetration of the Internet in the Region increased 272.8% between 2000 and 2005, while the penetration of personal computers and mobile lines increased by 65.3% and 171.5%, respectively between 2000 and 2004. As can be seen in Table I-1 such figures presented double digit annual compounded growth rates which highly exceeded those of the United States of America (USA), the European Union (EU) and of the members of the Organization for Economic Cooperation and Development (OECD).
- 1.8 In spite of such progress, the levels of ICT penetration in the Region along with the absorption capacity of the countries continue to fall short of those of industrialized nations. In 2005, only 15.2% of the population of LAC had access to the Internet compared to 68.7% in the USA, and over 50% in both, the EC and OECD. With respect to personal computers, only 8.1% of the population of LAC had some access to a home computer compared to 74.1% in the USA and 45.0% in OECD in 2004. Similar lags remain with respect to ownership of fixed and mobile phone lines between LAC and industrialized countries.

TABLE I-1: INFORMATION AND COMMUNICATION TECHNOLOGY PENETRATION 2000-2005
(numbers per 100 inhabitants)

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | AG 1/ | ACG 2/ |
|--------------------------------------|------|------|------|------|------|------|--------|--------|
| A. Fixed Lines | | | | | | | | |
| - LAC 3/ | 14.6 | 15.7 | 15.9 | 16.1 | 17.3 | NA | 18.1% | 4.2% |
| - USA | 66.4 | 67.2 | 65.1 | 62.4 | 59.9 | NA | -9.8% | -2.6% |
| - EU | 53.7 | 49.8 | 48.9 | 48.0 | 46.5 | NA | -13.3% | -3.5% |
| - OECD | 59.4 | 52.7 | 52.1 | 51.4 | 49.5 | NA | -16.6% | -4.4% |
| B. Cellular Subscribers/Lines | | | | | | | | |
| - LAC 3/ | 12.1 | 14.7 | 20.0 | 24.6 | 32.9 | NA | 171.5% | 28.4% |
| - USA | 38.9 | 45.0 | 48.9 | 54.6 | 61.0 | NA | 56.7% | 11.9% |
| - EU | 61.2 | 65.0 | 73.9 | 82.2 | 91.2 | NA | 49.1% | 10.5% |
| - OECD | 52.2 | 62.0 | 67.9 | 74.0 | 81.0 | NA | 55.1% | 11.6% |
| C. Personal Computers | | | | | | | | |
| - LAC 3/ | 4.9 | 5.8 | 6.4 | 6.5 | 8.1 | NA | 65.3% | 13.4% |
| - USA | 57.2 | 62.4 | 66.0 | 66.0 | 74.1 | NA | 29.5% | 6.7% |
| - EU | 25.7 | 26.8 | 30.0 | 31.9 | 38.3 | NA | 49.4% | 10.6% |
| - OECD | 30.2 | 33.6 | 36.6 | 37.7 | 45.0 | NA | 49.0% | 10.5% |
| D. Internet Access | | | | | | | | |
| - LAC 3/ | 4.1 | 5.7 | 8.9 | 11.3 | 14.4 | 15.2 | 272.8% | 30.1% |
| - USA | 44.1 | 50.1 | 55.2 | 55.6 | 62.3 | 68.7 | 55.9% | 9.3% |
| - EU | 25.0 | 26.7 | 31.7 | 36.0 | 45.8 | 50.0 | 100.0% | 14.9% |
| - OECD | 32.3 | 31.7 | 36.2 | 39.2 | 48.3 | 50.9 | 57.6% | 9.5% |

1/ Accumulated Growth.

2/ Annual Compounded Growth.

3/ Includes only the Bank's borrowing member countries of the Latin American and Caribbean Region.

NA Not available.

Source: International Telecommunications Union (ITU); "Education, Science and Technology in Latin America and the Caribbean: A Statistical Compendium of Indicators" (IDB, 2006).

1.9 As can be seen in Table I-2, Internet penetration in LAC (15.2%) as of 2005 exceeded the overall figure for the Middle East (9.6%), Africa (2.5%) and Asia (9.9%). Nevertheless, such level is way below when compared to the High Performance Asian Economies (HPAE) including Hong Kong, Singapore, Taiwan and Korea whose levels of Internet use are near the 60%. Similar situation is perceived with respect to fixed and mobile telephony and personal computer ownership.

TABLE I-2: WORLD INTERNET PENETRATION 2005
(in millions of inhabitants and percentages)

| World Regions | Population % of World | Internet Users | Internet Penetration | % of World Users | AG 1/ 2000-2005 |
|-------------------|--------------------------|-------------------|-------------------------|---------------------|--------------------|
| Middle East | 2.9% | 18.2 | 9.6% | 1.8% | 454.2% |
| Africa | 14.1% | 22.7 | 2.5% | 2.2% | 403.7% |
| LAC 1/ | 8.5% | 79.0 | 15.2% | 7.8% | 272.8% |
| Asia | 56.4% | 364.3 | 9.9% | 35.7% | 218.7% |
| Europe | 12.4% | 290.1 | 35.9% | 28.5% | 176.1% |
| Oceania/Australia | 0.5% | 17.7 | 52.9% | 1.8% | 132.2% |
| North America | 5.1% | 225.8 | 68.1% | 22.2% | 108.9% |

1/ Accumulated Growth.

2/ Includes only the Bank's borrowing member countries of the Latin American and Caribbean Region.

Source: International Telecommunications Union (ITU); "Education, Science and Technology in Latin America and the Caribbean: A Statistical Compendium of Indicators" (IDB, 2006).

- 1.10 Such indicators reveal the need for concerted actions by various stakeholders and sectors of the Region to create the conditions that will allow for the diffusion of ICT, while promoting and ensuring the functioning of the market that alone cannot fully overcome the challenge in hand. Concerted actions should address a number of factors such as limitations in institutional capacity to coordinate and promote public policies for the dissemination of ICT, the limited coverage of connectivity and ICT access costs, and the need for widespread digital alphabetization.

II. CONNECTING THE MAJORITY: ENHANCING DEVELOPMENT OPPORTUNITIES FOR ALL THROUGH ICT

- 2.1 ICT solutions can facilitate the participation of lower income populations in the development process of the Region by directly tackling relevant aspects, which precisely hinder their integration to social and economic development. In particular: (a) limited knowledge and literacy which impairs access to skills and jobs (education); (b) poor health and sanitary conditions limiting employability and risk-taking attitudes (health); (c) active involvement in civic life and strengthening of democratic process; and (d) economic opportunities. In this respect, the evolution of modern ICT bring about concrete opportunities for enhanced provision of social services and poverty reduction through, among others, distance education and telemedicine solutions, connectivity, and strengthened and more transparent government operations (i.e. e-government). It also provides for the modernization and expansion of the micro-finance sector to effectively reach marginalized and less favored populations through effective technology-based solutions and innovative financial services and, thereby, creating economic opportunities at the local level.

A. Best Practices in ICT for Social Development and Poverty Reduction

- 2.2 Untapped opportunities exist to replicate, multiply and scale up successful pilot projects and approaches in the deployment of ICT as a means to reduce poverty and promote social development. Of particular interest are those opportunities that further the potential of ICT for sharing knowledge, generating synergies and economies of scale, and adapting to local conditions. Indeed, scaling up poverty reduction efforts through ICT requires extensive outreach and capabilities for deepening its impact.

1. ICT in Human Capital Development

- 2.3 Inequalities in access to education--especially high-quality education that prepares young people for employment opportunities in an inclusive information society and to become active citizens in complex, market-driven, democratic societies--are a critical barrier to reducing poverty and increasing economic growth. Near-universal access to the Internet via low-cost networks enables teacher training, enhances student access to traditional teaching materials via Internet distribution, and allows the introduction and use of new and advanced multi-media resources and learning tools. The young generation takes readily to computers and such resources, and there is evidence that classroom access to ICT tools can improve learning and help motivate students to stay in school.
- 2.4 Outside the classroom, affordable and near-universal access to information--via government or commercial voice-driven systems and the Internet--enables life-long learning and encourages the habit of searching for information to support personal and family decision-making. For many adults, voice-driven information sources and services in local languages that are accessible via

telephones are important means for improving their access to information. At the same time, there is evidence that informal learning outside the classroom is strongly enhanced by affordable access to the Internet. This informal learning is driven, in part, by the growing availability of information on the Internet and the increasing organization of such information by search engines, but also by the growing use of interactive systems--from “chat” systems to e-mail and text-messaging to web logs and other interactive web-based systems--.

Box 1: National University Network in Chile

The Red Universitaria Nacional (REUNA) project in Chile uses point-to-point and point-to-multi-point wireless services to provide network access to 25 suburban and rural colleges from two urban universities. The system took advantage of existing fiber and cable backhaul infrastructure available in Valparaíso and Temuco, providing access to neighboring colleges using wireless technologies. Because distances between points varied, the network “topology” presented different features. Also, a local cloud of connectivity was provided using WiFi technologies. Through a community choice system, where students decided the order and content of class “programming,” students at the receiving colleges used videoconferencing to customize their curricula, choosing from among a large selection of classes. Additionally, project participants point to the spontaneous creation of self-managing communities and research networks as a result of the project. The resulting economies of scale and decline in the price of wireless components, allowed for a considerable reduction (40 percent) in equipment costs for access and remote points. <http://www.reuna.cl/>

- 2.5 Best practices for ICT-enhanced classroom education have been slow to emerge, in part because of the high cost of providing computers, appropriate curricula and adequate teacher training. Nevertheless, there are a number of concrete examples that show the effectiveness of widespread, small-scale experimentation and pilot projects which, coupled with careful evaluation, provide best practice ICT applications for formal and informal education.

Box 2: Committee to Democratize Information and Communication Technology in Brazil

The Comitê para Democratização da Informática (CDI), a nongovernmental, nonprofit organization fosters the social inclusion of less-privileged social groups through the use of ICT as a tool to encourage education and active citizenship. It works to create opportunities for young people to free themselves from poverty and social exclusion through the implementation of community Computer Science and Citizenship Schools (EICs). The CDI views computer literacy as a vehicle for creating employment opportunities and promoting civic participation, formal education, literacy, concern for the ecology, health, human rights, and nonviolence. The CDI also uses ICT to benefit low-income communities and institutions by assisting individuals with special needs (including the physically and mentally disabled, the visually impaired, homeless children, prisoners, and indigenous populations). CDI invests in the community’s capacity to organize its own educational programs. Since its inception in Rio de Janeiro in 1995, CDI has provided support to 130 communities in the establishment of autonomous and financially self-sustaining EICs. In order to promote digital inclusion, CDI enters into partnerships with national and international philanthropic organizations, companies, government agencies and individual donors. There are currently 965 EICs using the methodology and model developed by CDI. In a recent evaluation, carried out by an external consulting group, 86 percent of the students stated that CDI schools had a positive impact on their lives (such as going back to regular schools, making new friends and staying away from drugs). The experience has been replicated throughout the world and, today, CDIs operate in Argentina, Chile, Colombia, Guatemala, Honduras, Mexico and Uruguay as well as in Angola, Japan and South Africa. <http://www.cdi.org.br/>

2. ICT in Social Services

- 2.6 The improvement in the delivery of health care services in geographically remote and rural areas

is one of the most promising and clearly demonstrated applications of ICT in social development. Evidence suggests that improved health outcomes have been achieved through various applications of ICT solutions. In particular, ICT is being used in many developing countries and communities to facilitate: (a) remote consultation, diagnosis and treatment through the use of digital cameras to download images onto a computer and transfer them to doctors in nearby towns; (b) collaboration and information exchange among physicians; (c) ICT-based medical research through the use a network of satellites and ground stations to submit data for clinical trials; (d) medical training through ICT-enabled delivery mechanisms; and (e) access to centralized data repositories connected to ICT networks that enable remote healthcare professionals to keep abreast of medical knowledge.

- 2.7 Moreover, ICT provides considerable benefits and capabilities when applied to disease prevention and response efforts during epidemics. The Internet is an effective means to disseminate public health messages and disease prevention techniques in developing countries. It also enables better monitoring and response mechanisms. Also, ICT is helping improve the efficiency of public health systems and medical facilities by, for example, streamlining medical procurement or creating and managing patient records.

Box 3: Alerta DISAMAR: An Innovative Disease Surveillance System in Peru

Real-time reporting of disease outbreaks as well as ordering medicines and supplies via software such as the VOXIVA toolset pioneered in Peru (which is now used worldwide) has dramatically increased the efficiency of health services delivery. Such solutions combined with handheld devices assist frontline health workers in efficiently collecting and reporting patient data, and contain digital diagnostic and treatment guides for a wide variety of conditions. Alerta DISAMAR is a pilot disease surveillance program implemented in 2002 by the Peruvian Navy, which relies on novel technology from VOXIVA Inc. Alerta DISAMAR allows users to collect, store, disseminate and analyze data on diseases under surveillance, reported through any type of telephone or the Internet. Designated users receive automatic notification of selected reports via e-mail, voice mail, or SMS message. Health officials can communicate with remote health professionals using voice mail as if they were e-mails to individuals or to predetermined groups of users. The system sends timely automatic reports on the number of cases of eight of the most reported diseases compared to the previous three weeks and a monitoring of cases that do not have yet a final diagnosis. Alerta DISAMAR shows a sustained improvement in coverage, data quality, baseline incidence rates, and outbreak detection capability. Alerta is a flexible and stable program with minimal recurring costs. It is a prime example of sustainable technology transfer for improving public health in a country with limited resources. More than 18,042 health events have been reported so far using this program. In addition, 18 outbreaks have been detected that have led to recommendations for improving vector control and food procurement processes. <http://www.voxiva.net/news/121603.asp>

3. ICT in Financial Services

- 2.8 ICT tools that can drive down transactions costs for financial services such as microfinance and a widening range of banking, insurance, and other services for low-income groups, particularly as their delivery expands beyond nonprofit groups and becomes more widespread. For example, the expanded use of ICT and the Internet can reduce the transaction costs of remittances in a way that brings higher social benefits for all parties involved in these transactions. Under the Bank's leadership, the Region has been a leader in both these areas, with many innovative financial companies serving low-income communities and providing the lowest-cost remittance services in the world. Nonetheless, there is still much to do. Transaction systems adapted to serve low-income communities via text messaging over mobile phones have been successful in Asia and Africa, and may prove useful in Latin America and the Caribbean as well. ICT technology offers several approaches to expanding access to electronic transactions and banking services via remote

transaction devices for microfinance that work over mobile phone networks; smart cards that can store account balances, transaction histories, and positive IDs such as a fingerprints. The next generation of mobile phones may be capable of conducting transactions automatically via very short-range radio, potentially turning phones into electronic wallets.

Box 4: PRODEM FFP's Multilingual Smart ATMs for Microfinance in Bolivia

Bolivian PRODEM Private Financial Fund (PRODEM FFP) offers low-income communities and micro, small and medium enterprises a wide range of savings, credit and money transfer services. Its 65-branch network is the largest in the country and spans both urban and rural areas. To expand its market, improve its services in even the most remote areas and help overcome barriers such as illiteracy, the company has developed and deployed a new technology-based solution that employs smart cards, digital fingerprint recognition technology, and Smart ATMs as well as stand-alone, voice-driven Smart ATMs in local languages with color-coded touch screens <http://www.digitaldividend.org/case/case.htm>

- 2.9 Among the potential benefits of expanding ICT-based financial services and electronic commerce to low-income communities are: market access, economic value added, improved household security, the ability to grow microenterprises, reduced vulnerability to theft, and greater participation in the formal economy.

4. Wireless Technologies and Community-Based Communications Services

- 2.10 Largely for reasons of cost, most rural communities and many low-income urban communities lack effective and affordable local phone systems. These communities usually rely on a few pay phones or shared mobile phones (which are used sparingly) and most calls are made to numbers outside the community. Yet historically, where affordable local phone systems exist, typically 60 percent of all phone traffic is within the community. Thereby, a low-cost local phone system can make universal access a reality in many communities of Latin America and the Caribbean.
- 2.11 The technological potential to do so has now emerged, via local Wireless Fidelity Networks (WiFi) and Voice-Over-Internet (VOIP) telephony using peer-to-peer systems. For example, technologies such as Skype are having a global impact on long distance calling. In addition to making a wide range of voice-driven e-government and commercial services accessible and affordable, low-cost wireless networks, VOIP and high-capacity broadband networks, enable access to a great variety of Internet services and information via a computer or other converged device.

Box 5: Communications and Social Services in the Amazon

The Amazon Association, a Brazilian NGO, and the Solar Electric Light Fund, a nonprofit organization based in Washington, D.C., teamed up to provide basic services and economic opportunities to the Caboclo Indians by means of broadband wireless Internet. Many members of this indigenous community lack basic health care, education and economic opportunities. In the absence of phones, electricity or Internet infrastructure, solar panels are being used to power a permanent satellite uplink to a local telecenter, which was built in four days and is expected to be self-sustainable in four years. In addition, it is expected that connectivity will be extended to other communities along the Jauaperí River in a cost effective manner by using WiFi technologies and sharing costs. According to the Wireless Internet Institute, "communicating on a regular basis with the outside world has provided a tremendous psychological lift to the community." The Amazon Association is able to stay in contact with community members through the use of e-mail, report on problems at the reserve, participate in decision-making, and request supplies and medicines. Wireless technologies are an important means for outreach, empowering a community and promoting civic involvement. The project has become a source of income for local craftswomen, who can now sell their wares through the Amazon Association. http://www.self.org/Brazil_Press_Release.asp

- 2.12 One of the benefits of voice-driven or voice-accessible services--especially if also made available in indigenous languages--is overcoming literacy and computer skill barriers. Other benefits also include ending rural isolation, enhanced family solidarity, increased access to information and services, improved ability to find employment and, at a community level, higher economic capacity and productivity and wider citizen participation in democratic processes. The experience shows that this can be achieved with affordable computers and Internet access, especially if these services are delivered through local entrepreneurs or community access facilities (such as telecenters) that can assist in computer and Internet usage.
- 2.13 Nevertheless, only a few countries in Latin America and the Caribbean have made VOIP legal or removed restrictions to its use. Likewise, few countries have made frequencies available for unrestricted WiFi use, permitted open competition for telecom and Internet services, or allowed community-based systems exemption from legal/natural monopolies. Beyond regulatory restrictions, the business environment in many countries still poses barriers to entrepreneurs and the creation of small businesses. There have been few pilot projects that promote best practices with rapidly emerging ICT technologies such as those cited. As a result, the Region still lags behind many Asian, and even some African countries in realizing the potential development benefits from widespread ICT access and emerging wireless and no conventional communication technologies.

Box 6: Vodacom's Community Cell Phones in South Africa

Vodacom Community Services started operating under a 1994 government mandate to provide telecommunications services in disadvantaged communities in South Africa. Vodacom developed an innovative way to meet this mandate, via entrepreneur-owned and operated phone shops. These have provided affordable communication services to millions of South Africans, and empowered thousands of previously disadvantaged individuals with income-generating opportunities and lasting business skills. The Community Services program now provides over 23,000 cellular lines at over 4,400 locations throughout South Africa. By investing so extensively in disadvantaged communities, Vodacom is also investing in its own future by creating a distribution channel for its services, in addition to a well-recognized brand name. Though full returns will materialize in the future, the company is confident that its investments will pay off directly through increased sales and indirectly through a stronger, better-connected South African economy. <http://www.digitaldividend.org/case/case.htm>

5. Helping the Poor Profitably: A Case for Access to ICT and Wireless Solutions

- 2.14 The example in Box 6 illustrates what Professor C. K. Prahalad of the Michigan Business School poses in his book *The Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits*, which highlights the collective purchasing power potential of the world's 4 to 5 billion poorest people. He urges efforts to promote an enabling business climate that goes beyond the promotion of social corporate responsibility as means to foster local well-being, while generating a strong revenue and profit potential base in the long term. Moreover, a recent study by the London Business School found that, in a typical developing country, an increase of ten mobile phones per 100 people boosts GDP growth by 0.6 percentage points. The study concludes that wireless solutions are concrete examples of "technologies that help people help themselves."
- 2.15 It becomes clear that the poor can benefit from the effective deployment of ICT and the development of the new economy when such interventions match the local conditions and meet the following four requirements. First, promote a multi-stakeholder partnership framework

delineating the effective participation of the public sector and civil society, while creating the incentives for socially responsible private investment. Second, strengthen the provision of ICT-based public social services and promote social inclusion, while maintaining the role of the private sector as the main source of innovation. Third, stimulate macroeconomic growth by facilitating access to knowledge and information through increased connectivity and appropriate ICT solutions for marginalized and lower-income populations, thereby tapping a strong market potential. And fourth, design and adopt long-term ICT investment frameworks in human development (i.e. education, health and environment), along with the design and implementation of cost-effective technologies aimed at increasing the market access, efficiency and competitiveness of the poor (connectivity, knowledge centers, etc.).

- 2.16 By removing barriers to the entry of new and lower-cost technologies (such as fixed wireless) and of new communication and ICT-based services (such as Voice-Over-Internet phone service), and ensuring open competition, it will be possible to increase entrepreneurial activity and expand private sector investment. Nevertheless, the direct involvement of the public sector continues to be fundamental in sharing and expanding service into remote areas and to serve as a catalyst for the effective delivery of social services. This also reduces risk for private enterprises and helps comply with commitments to serve certain regions, communities and marginalized or disadvantaged groups, while also allowing market forces to trigger actions and operate effectively.

B. Deployment of Best Practices: A Five-Year Forward-Looking Scenario for Bank-Led Support to the Region

- 2.17 The present section describes a number of forward-looking scenarios consistent with the MDGs adopted by the countries of the Region, and towards which, the Bank should support a combination of adequate government and market driven policies, a multi-stakeholder approach delineating the active role of the private and public sector and civil society, and an overall institutional climate that promotes and facilitates technological innovation and investments in ICT infrastructure, applications and local content, among others. Specifically, through the deployment of ICT towards the attainment of an inclusive economic growth process for all, in addition to meeting social development and poverty reduction objectives, as expressed in the United Nations Millennium Declaration adopted by the countries of the Region.
- 2.18 Education. First and, of outmost importance, the attainment of near universal access to the Internet for every school, catalyzed by efforts to extend wireless networks to low-income urban neighborhoods and even remote rural locations, and with the concrete effort to encourage extensive teacher training in computer-based instruction, and to support new curricula development. Second, the expansion of locally developed curricula and content through the riding of the “search engine” revolution to access free knowledge resources on the Internet, new software tools to enable trusted networks of approved educational resources, interactive discussions in a participatory learning environment, and new multimedia courseware resources that effectively engage student interest. Third, the efficient access to inexpensive technologies generated from pilot initiatives in every borrowing member country, making new knowledge resources affordable to schools including less-expensive computers and other hardware, software and multi-media knowledge and multi-media learning tools. Overall, attaining higher equipment per child ratios, even though the goal of a computer for every child will still be far from being met.
- 2.19 Fourth, the proliferation of ICT innovations outside the school with a marked impact on education. These include, among others, the deployment of very low-cost solar-powered energy

(e.g. Light Emitting Diodes-LED), making possible for low-income families to benefit from extending the hours of reading, studying and use of ICT resources. This, as a complement to the design and deployment of cost effective ICT solutions including VSAT communications and WiFi and WiMax wireless networks at the school level. Fifth, an environment conducive to private-sector investments and innovative financing schemes, in addition to public-private partnerships in education.

- 2.20 Health. First, an overall improvement in the distribution of healthcare services attained through the support extension of wireless connections to hospitals, clinics, pharmacies, and even front-line health workers, through expanding mobile networks and newer broadband wireless networks and solutions. Second, the attainment of real-time monitoring of diseases, rapid response to disasters and health emergencies, more extensive support for front-line health workers, and timely restocking of medicines. Third, the overall improvement in the operational efficiency of the health care system including that of national health networks--public and private clinics and hospitals and new franchised clinics and pharmacies--. Fourth, the expansion of telemedicine efforts through both, remote screening and diagnosis, and live consultations with national or international experts on particular cases and, thereby, improvement in the standard of care in many smaller towns and remote villages. Fifth, the implementation of inexpensive digital distribution networks for public health information, including easily-updated video and audio segments on inexpensive devices in every clinic and in many schools and communities centers. Sixth, the expansion of training of health workers at all levels through on-line courses and testing.
- 2.21 A second wave of improvements should arise as a result of the increasing sophistication of mobile phone and other “smart” mobile/wireless devices and techniques, and their use by doctors, nurses and other health workers. The combined result of these smart mobile devices and supporting databases should include: (a) improved patient management and records while maintaining confidentiality; (b) simplified administration and billing, resulting in considerable cost savings²; (c) improved emergency treatment of patients; and (d) increased efficiency for medical personnel, and enhanced capacity for frontline health workers, even when dealing with non-routine problems. Such changes should lead to improved health care at all levels, and mount to a revolution in the access to and quality of care provided the majority of Latin Americans, especially low-income populations. Improved health should in turn contribute to eliminating one of the causes of persistent poverty.
- 2.22 Financial Services and Remittances. The economies of the Latin American and Caribbean Region will continue to evolve from cash to cashless transactions, with cost reductions and enhanced accessibility to wireless/mobile technologies precisely driving such change, in addition to the incorporation of lessons learned from earlier mobile financial services. Such revolution will be undoubtedly driven by the private sector, but multi-stakeholder efforts will catalyze the early adoption of Region-wide standards and the modernization of financial regulations to facilitate such transformation, as well as encouraging extension of wireless networks to rural areas.
- 2.23 While higher income segments of the Region will increasingly benefit from mobile electronic transactions, instant banking, and cashless commerce, among others, for the majority, the impact will be even more profound and include benefits as: (a) extension of modern financial services including credit to lower-income segments of the population; (b) cheaper and faster means of

² Moving to fully electronic records and billing via mobile devices represents an opportunity for the LAC Region to leapfrog ahead on a problem that confronts every healthcare system.

transferring remittances from abroad, resulting in an accelerated modernization and capitalization of the micro-credit financial system, and the resulting mobilization of credit resources and modern financial services; (c) greater personal and transactional safety; (d) ease in transactions, record keeping and information management, allowing low-income individuals holding informal occupations to qualify for credit-worthiness and proven purchasing power; and (e) reduction of fixed costs of small financial transactions through the deployment of ICT-based electronic platforms.

- 2.24 Ultimately, automation and the respective reduction of transaction costs, the emergence of more affordable financial services, and expansion of both credit and pre-paid commercial transactions, will lead to the inclusion of most of the population of the Region to the formal financial system and, thereby, increasing equality of access to services. Microfinance should consolidate as a fully commercial activity, providing services traditionally concentrated in larger financial entities. Such transformation should also result in a reduced informality and increased efficiency of local economies, thereby stimulating investment and accelerating growth. Finally, the adoption of electronic systems and transparent record keeping mechanisms by small and medium enterprises (SMEs) should facilitate access to credit and mobilization of venture capital to such previously neglected sector, and allow them to further their potential as growth engines for local and national economies.
- 2.25 Complementary ICT-Based Government Services. Undoubtedly, public sector-supported extension of wireless connections to schools, healthcare facilities, and local government offices, especially in rural or underserved areas, should continue to provide the infrastructure foundation for electronic government (e-government) services. Indeed, the real transformation should continue to occur as governments in the Region increasingly reshape their administrative processes and public services for the Internet era, in addition to increasing the transparency and efficiency of the local and national administrations, and expanding the reach and impact of social services for all--especially in underserved rural and marginal areas--.
- 2.26 ICT solutions will extensively enhance the efficiency and modernization of traditional government-lead actions including, among others, identification services, land titling and registration, agricultural extension, and disaster reporting and relief management. This will be made possible through low cost solutions and the proliferation of electronic payment systems. Moreover, widespread connectivity, in addition to low cost software and efficient e-government networks should provide for an increased citizen participation in both, policy design and reform, and electoral processes. Finally, government actions should increasingly set the stage for private sector innovation, investment and ICT-based interventions in both, traditional and non-traditional areas and, thereby, allowing the private sector to share an active role in social development and poverty reduction in the Region.

III. EMPOWERING THE MAJORITY THROUGH ICT: AN ACTION ORIENTED AGENDA OF THE BANK IN THE LATIN AMERICAN AND CARIBBEAN REGION

A. Dissemination of ICT for Development

- 3.1 Contributing to development through ICT requires an environment that facilitates its dissemination and use in various institutional, business and social settings and, in particular, the promotion and creation of the necessary conditions to facilitate investment in technological infrastructure and connectivity, promote competition, facilitate access, foster digital education and training, promote the development of local content, and delineate the participation of various

stakeholders.

- 3.2 In particular and, as expressed above, an effective environment conducive to the promotion and use of ICT requires a number of concrete actions under a multi-sector approach. First, the creation or strengthening of the institutional capacity with the participation of the public, private and civil society sectors, in order to promote and foster the dissemination and use of ICT through programs and initiatives that build a participatory information and knowledge society. Second, raising awareness and creating the conditions for the design and implementation of pilot initiatives and the replication of best practices in priority areas including ICT for social development and poverty reduction, ICT for governance, and ICT for economic growth, among others. Third, undertaking the actions necessary to promote a digital inclusion for all.
- 3.3 Fourth, creating the organizational conditions for the identification of concrete and comprehensive national ICT investment plans which effectively delineate the participation of the various sectors and stakeholders. Fifth, implementing and/or strengthening national and regional regulatory frameworks to, among others, promote competition and loosen restrictions on the telecommunications market, allow for the expansion of media convergence, and promote and facilitate research and technological innovation. Such measures should also facilitate the extension of broadband connectivity services, bring rates into line with purchasing power, while placing priority on semi-urban, rural, and remote areas. They should also provide citizens and firms with access to ICT through initiatives that combine training, connectivity and infrastructure at affordable prices.

B. A Multi-Sector Stakeholder Approach: Towards Digital Inclusion for All

- 3.4 ICT for development requires not only a concrete delineation of the responsibilities that the public sector, private sector and civil society should assume, but also the promotion and establishment of partnerships based on their mandates, responsibilities, purpose and competitive advantages. Indeed, the consolidation of an information society leading to the effective deployment of ICT requires an action-oriented multi-stakeholder approach. Experience shows that these partnerships allow for addressing multiple issues that cannot be resolved without the concerted efforts of diverse constituents, while also allowing for synergies, coordination and sharing of priority investments, and ultimately leading to a more efficient and sustainable process of economic and social development and poverty reduction through the deployment of appropriate and innovative technologies.
- 3.5 First, with respect to the public sector, experience shows that ICT-based programs aimed at enhancing the reach and impact of social development and poverty reduction programs not only strengthen the capacity of the public administration--at the national and local levels--to deliver public services, but also contribute to building public trust while enhancing citizen participation. Also, taking into consideration the evidence derived from lessons learned and best practices, and based on the social development needs and opportunities in Latin America and the Caribbean, ICT is a proven instrument that, when effectively deployed, facilitates the provision of access to formal and informal education, the delivery of health services, the creation of new financial services and, overall, the implementation of targeted poverty reduction programs in priority remote and marginalized areas.
- 3.6 Second, adequate organizational arrangements must be in place to facilitate the participation of civil society organizations in the promotion and implementation of community-based development programs and, thereby, complement public sector investments in connectivity, ICT solutions in health care facilities, schools, and neighborhoods, the development of local content

and, overall, the delivery of social and poverty-targeted actions at the local level

- 3.7 Third, the active participation of the technology-based private sector in the development of the Region represents a pivotal source of innovation for promoting social development, and creating local jobs, income opportunities and wealth. This can be achieved through the effective implementation of market, regulatory and institutional conditions to create the incentives necessary to balance social responsibility with profit motives. Also, by promoting the participation of the private sector through ICT and connectivity investments and technical assistance in priority social sectors while, at the same time, creating value-added opportunities and the expansion of ICT-based social and financial services to underserved communities; and tapping the profit potential that can be realized from efforts aimed at improving the social and economic conditions of the poor (i.e. under a “blended strategy”).³

C. Digital Inclusion: A Public-Private Partnership in ICT for Development

- 3.8 The Bank is aware that it must continuously update its financial and technical assistance instruments to effectively adapt to the demand of its borrowing member countries of the Region, and support activities to provide and facilitate access to efficient ICT tools for the exchange of information, ideas and knowledge, and the deployment of ICT to promote a more inclusive socioeconomic development that extends benefits to the poor. One concrete action is the establishment of Bank-led public-private partnerships in ICT for development with various sectors and stakeholders which will allow to capitalizing from concrete experiences, lessons learned, best practices and, overall, innovation.
- 3.9 In particular, the Bank is at present establishing collaboration agreements with the technology-based private sector by taking into consideration: (a) the extensive need for new and modern technologies in pilot and demonstrative projects, and whose results and applications can be replicated in operations of a wider scale; (b) the goal to make the private sector from both, donor and borrowing member countries of the Bank, an active stakeholder in the development process of the Region through ICT; (c) the aim to provide opportunities for the private sector to participate in the efforts of the countries towards social development and poverty reduction, while creating value added opportunities and the expansion of ICT-based services; and (d) the goal of the IDB to effectively respond to its mandate and responsibilities as the leading regional development organization, by contributing to the attainment of the MDGs by the countries of the Region and, specifically, through the value added ICT solutions (paragraph 3.7).⁴

³ Promoting social corporate responsibility under a “blended strategy” framework, is based on the principle that the enhancement of the productive and economic capacity of the poor (under a long-term profit motive) through the provision and deployment of adequate technologies, has a direct impact on their access to information and sources of financing, their ability to enter formal labor markets, their purchasing power and, thereby, the economic growth of the Region.

⁴ SDS/ICT is currently leading a Bank working group for the design and implementation of a “Facility in Information and Communication Technology for Development”, which will set the institutional, financial and legal means for the IDB to effectively partner with leading private sector firms and civil society institutions from the member countries of the Bank to leverage the available non-reimbursable cash and in-kind resources for the design and implementation of state-of-the-art technologies as part of the development technical cooperation projects in the Region. The initiative will effectively contribute to instrumenting the Bank’s institutional, private sector development and ICT for development strategies. This in addition to contributing to the organizational and institutional realignment objectives of the new administration, and the corresponding increased emphasis on private sector-led innovation and development in the Region.

- 3.10 Finally, the Bank will strengthen its support to the countries of the Region in a number of technology-driven areas, within the framework of the new “Information and Communication Technology for Development Strategy”, and with the aim of enhancing the reach and impact of Bank led interventions in traditional development sectors in the Region., while tapping on the socioeconomic growth potential of the Region’s lower income and less favored populations. A number of concrete support actions are presented below.
- 3.11 In education, the Bank will support and facilitate the extension of broadband connectivity to all schools, especially in rural areas, in addition to promoting curriculum development and extensive teacher training to make effective use of expanding on-line knowledge resources. As a condition sine-qua-non, this also requires the implementation of extensive computer literacy programs, including the support to pilot projects demonstrating the use of hardware, software and other ICT applications, devices and technology options for educational use. The Bank will strengthen its support to the establishment of telecenters as access points for enabled connectivity, while also support policy reforms enabling school-based community “hotspot” networks, and support pilot undertakings to demonstrate their utility in facilitating local economic and social development.
- 3.12 In health, the Bank will support network extension to connect healthcare facilities and mobile access for all health workers, support software development and applications to enable real-time reporting, and extending telemedicine networks to rural and geographically marginal locations. This in addition to contributing to the modernization of the sector through pilot projects for the deployment of electronic billing models, emergency system use of mobile personal health records and other technologies, and dissemination of public health information via electronic platforms widely utilized in access points including community centers and clinics.
- 3.13 In financial services, the Bank will continue to consolidate its support to the modernization of the financial sector in the Region, in addition to allocating the efforts necessary to extend the reach of financial services to rural and marginal areas through the deployment of various connectivity and wireless network solutions, and allowing to capitalize on the potential of ICT as enabler of local economic development and growth. Concrete models of smart ATMs, electronic transactions and Internet-based applications adapted to local conditions will be tested and implemented as overall part of technical assistance actions, and in direct collaboration with telecom carriers, bank regulatory agencies, private sector, and other. Moreover, the Bank will continue assisting the countries of the Region in allowing ICT to enable lower transactions costs of electronic remittances, and the effective mobilization of such financial resources to the micro credit sector and, ultimately, to local entrepreneurs, microenterprises and individuals.
- 3.14 All the above actions must be necessarily accompanied by concrete Bank support to the process of modernization of the state where ICT plays a fundamental role in the re-engineering and integration of government processes to enable efficient and modern customer-oriented e-government services. Moreover, the Bank will continue to support policy design and reform to guarantee the full deployment of ICT in the public administration and addressing emerging issues such as media convergence, in addition to enhancing the role of the state in support of the implementation of electronic payment and clearing systems (public and private), and the creation of the normative framework for e-commerce, e-government and connectivity development, among others.
- 3.15 In research infrastructure development the Bank should continue strengthening its efforts to the establishment of public private partnerships in technology and advanced research for development. One concrete case is the support to the Latin American Cooperation for Advanced

Networks (CLARA)–Caribbean, with non-reimbursable financing from the Regional Public Goods (RPG/OC) facility. In direct partnership with the European Commission--through its Latin America Connected to Europe (ALICE) project--, along with private sector support from Microsoft Corporation, the partners will directly contribute to, among others, institutional strengthening of CLARA and the National Research and Education Networks (NREN), the development of high-speed networks for academic institutions, and stimulating academic and industrial use of technical and financial resources.

- 3.16 In all cases, pilot and demonstrative undertakings should contribute to setting the stage for Bank loan and technical cooperation operations of a wider scale, and as part of the overall modernization and reform of the education, health and financial sectors, among others. Moreover, such ICT-based interventions in priority sectors are fully consistent and can contribute to instrumenting Bank's new financing framework.
- 3.17 To conclude, the Bank remains committed to continue supporting its borrowing member countries in the implementation of actions plans to provide access to ICT infrastructure and solutions and services with a high social impact. To this end, the Bank will help in delineating the road for investments by a socially responsible private sector, while modernizing and strengthening the capacity of local and national public administrations to use and allocate their financial and technical resources in an effective and efficient manner.

For further details please contact:

Danilo Piaggese,
Chief, Information and Communication Technology for Development Division (SDS/ICT)
Education, Science and Technology Sub-Department
Sustainable Development Department
Inter-American Development Bank
danilop@iadb.org; +1 202 623 2128

ANNEX
BEST PRACTICES IN INFORMATION AND COMMUNICATION TECHNOLOGY FOR DEVELOPMENT

A. ICT in Education and Connectivity

1. Technology Infrastructure for Emerging Regions (TIER)
<http://tier.cs.berkeley.edu/description.html>
2. Simputer
<http://www.simputer.org/>
3. Jhai PC and Communication System
http://www.jhai.org/jhai_remoteIT.htm
4. AMD Personal Internet Communicator
<http://www.amdboard.com/pic.html>
5. Multimedia Projector for Enhanced Education and Training
<http://www.designthatmatters.org/k2/docs/Design%20Challenge%20Summary%20-%20Multimedia%20Projector.pdf>
6. Low Cost-Lamps Brighten the Future of Rural India
<http://www.nextbillion.net/newsroom/2006/01/03/low-cost-lamps-brighten-the-future-of-rural-india>
7. Dominican Republic WiFi
http://www.dot-com-alliance.org/POWERING_ICT/pub/Dominican_Republic_-_WiFi.htm
8. WiFi in Macedonia
http://news.bbc.co.uk/2/hi/programmes/click_online/4427960.stm
9. Digital Gangetic Plains - Low Cost Networking for India

B. ICT in Health and Connectivity

1. Partners in Telemedicine – Connecting Health Care Providers and Patients
<http://telemedicine.partners.org/telemedicine/>

2. “In the Very Near Future” - Near Field Communication
http://www.economist.com/science/tq/displayStory.cfm?story_id=5244081&tranMode=none
3. Smart Communications – Providing Telecommunications Services to Low-Income Markets in the Philippines
http://www.nextbillion.net/files/Smart_0.pdf
4. Ca:sh
<http://www.dimagi.com/case-studies-cash.php>

C. ICT in Financial Services and Remittances

1. “In the Very Near Future” - Near Field Communication
http://www.economist.com/science/tq/displayStory.cfm?story_id=5244081&tranMode=none
2. Smart Communications – Providing Telecommunications Services to Low-Income Markets in the Philippines
http://www.nextbillion.net/files/Smart_0.pdf
3. WIZZIT – Bringing Cellphone Banking to the Unbanked
<http://www.nextbillion.net/activitycapsule/wizzit>
4. C-Sam Inc.
<http://www.nextbillion.net/activitycapsule/1125>
5. G-Cash: Remittances Find a New Vehicle in Mobile Phones
<http://www.nextbillion.net/remittances-mobile-globe-cash>
6. Porta Credit: Banco Solidario’s Mobile Microcredit in Ecuador
<http://www.nextbillion.net/activitycapsule/1229>

D. ICT in Governance

1. Bhoomi – Computerization of Land Records
<http://www.bhoomi.kar.nic.in/>

2. E-Government Overview and Lessons

http://www.digitaldividend.org/pubs/pubs_06_overview_egovernment.htm

<http://www1.worldbank.org/prem/PREMNotes/premnote91.pdf>

3. E-Government Toolkit for Developing Countries

<http://portal.unesco.org/ci/en/ev.php->

URL_ID=19432&URL_DO=DO_TOPIC&URL_SECTION=201.html