Chapter 38
An Innovation-Based and Sustainable Knowledge Society: The Triple Helix Approach

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ABSTRACT

Innovation is a key source of new products, benefit and fresh growth in revenues. In developed economies, the private sector is the engine of innovation and growth, accounting for between half and two-thirds of total spending on research and development in some countries. On the other hand, increasing access to technology will be a critical driver of economic growth in emerging economies, but it will require private sector leaders and the public sector to work together to make their respective programs more impactful. At the same time, the rapid advances and pervasive diffusion of information and communication technology (ICT), combined with the growth of the Internet 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. INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

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 and its transformation into knowledge can augment 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.

ICT solutions can facilitate the participation of lower income populations in the development process by directly tackling relevant aspects, which precisely hinder their integration into social and economic

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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 brings 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.

Inequalities in access to education--especially high-quality education that prepares young people for employment opportunities in an inclusive knowledge 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. 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--.

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. 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. Moreover, 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.

ICT tools 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. Moreover, 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