TELECOMMUNICATIONS SERVICES IN THE KNOWLEDGE ECONOMY

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Abstract:
Telecommunications services are the most important components in the new information society. Information and Communication Technologies (ICTs) represent a major challenge in terms of productivity, growth and jobs. The EU and its Member States must quickly adopt rapidly-developing ICT in order to bridge the e-skills gap and be in a position to create a real knowledge-based economy. Opening the telecommunications market to competition had the effect of a catalyst in a sector formerly reserved oligopolies. To complement these developments, the European decision-making authorities have adopted legislation to synchronize with technological and market requirements.

Key words: *knowledge economy, telecommunications, Communication Technologies*

JEL classification: O_1, O_3, L_{96}

1. Introduction

Information and communication technologies (ICT) are no longer a luxury for developing countries and they are already creating new ways of communicating, doing business, and delivering services. Through extending access and use of ICTs, the World Bank aims to stimulate sustainable economic growth, improve service delivery, and promote good governance and social accountability.

Technological progress is a considerable driving force behind economic growth. ICT infrastructure in particular has attracted much investment, and generated significant fiscal revenues and employment opportunities in developing countries. The number of mobile phone subscriptions in developing countries has increased from 200 million in 2000 to 3.7 billion in 2010, and the number of Internet users has grown more than tenfold.

With Internet penetration at a turning point including in the least connected region, Africa, and with 70 percent of the population in developing countries having access to fixed or mobile telephone services, ICT networks now constitute a far-reaching service delivery and citizen participation platform. ICTs can be used as a vehicle to increase accountability, and can transform and extend the reach of service delivery to the underserved in an innovative, fast, and cost-efficient manner.

Key remaining challenges and opportunities for developing countries include:

- ✓ improving affordability in order to reach the one-third of the population of the poorest countries who currently live beyond the ICT networks;
- ✓ widening access to more advanced ICT services such as broadband for high-speed internet;
- ✓ leveraging the new ICT infrastructure to improve the delivery of services and to build on it as a source of economic growth;

- ✓ developing and aligning people skills relevant to the Information Technology-enabled Services (ITeS) industries and knowledge economy.

A number of terms in current use emphasize related but different aspects of the emerging global economic order. The Information Society intends to be the most encompassing in that an economy is a subset of a society. The Information Age is someway limiting, in that it refers to a 30-year period between the widespread use of computers and the knowledge economy, rather than an emerging economic order. The knowledge era is about the nature of the content, not the socioeconomic processes by which it will be traded. The computer revolution, and knowledge revolution refer to specific revolutionary transitions, rather than the end state towards which we are evolving. The Information Revolution relates with the well known terms agricultural revolution and industrial revolution.

The information economy and the knowledge economy emphasize the content or intellectual property that is being traded through an information market or knowledge market.

Electronic commerce and electronic business emphasize the nature of transactions and running a business, respectively, using the Internet and World-Wide Web.

The digital economy focuses on trading bits in cyberspace rather than atoms in physical space. The network economy stresses that businesses will work collectively in webs or as part of business ecosystems rather than as stand-alone units. Social networking refers to the process of collaboration on massive, global scales. The internet economy focuses on the nature of markets that are enabled by the Internet. Knowledge services and knowledge value put content into an economic context. Knowledge services integrates Knowledge management, within a Knowledge organization, that trades in a Knowledge market. In order for individuals to receive more knowledge, surveillance is used. This relates to the use of Drones as a tool in order to gather knowledge on other individuals.

Although seemingly synonymous, each term conveys more than nuances or slightly different views of the same thing. Each term represents one attribute of the likely nature of economic activity in the emerging post-industrial society. Alternatively, the new economic order will incorporate all of the above plus other attributes that have not yet fully emerged.

One of the central paradoxes of the information society is that it makes information easily reproducible, leading to a variety of freedom/control problems relating to intellectual property. Essentially, business and capital, whose place becomes that of producing and selling information and knowledge, seems to require control over this new resource so that it can effectively be managed and sold as the basis of the information economy. However, such control can prove to be both technically and socially problematic. Technically because copy protection is often easily circumvented and socially *rejected* because the users and citizens of the information society can prove to be unwilling to accept such absolute comodification of the facts and information that compose their environment.

Responses to this concern range from the Digital Millennium Copyright Act in the United States (and similar legislation where else) which make copy protection (see DRM) circumvention illegal, to the free software, open source and copy left movements, which seek to encourage and disseminate the "freedom" of various information products (traditionally both as in "gratis" or free of cost, and liberty, as in freedom to use, explore and share).

2. Information and Communication Technologies for Development (ICT4D)

The notion of the knowledge-based economy (KbE) has featured prominently in national and EU industrial and policy discourse over the past few years. In part, this is linked to the EC's efforts to emphasis the increasing role of research and knowledge-based inputs for the future competitiveness of European industry.

Many national and EC industrial and policy initiatives have emphasized the potential of the digital media industries as significant new sources of jobs and wealth creation into the early 21st century

Information and Communication Technologies for Development (ICT4D) refers to the use of Information and Communication Technologies (ICTs) in the fields of socioeconomic development, international development and human rights. The theory behind this is that more and better information and communication furthers the development of a society.

Aside from its reliance on technology, ICT4D also requires an understanding of community development, poverty, agriculture, healthcare, and basic education. Richard Heeks suggests that the the I in ICT4D is related with “library and information sciences”, the C is associated with “communication studies", the T is linked with “information systems", and the D for “development studies”. It is aimed at bridging the digital divide and aid economic development by fostering equitable access to modern communications technologies. It is a powerful tool for economic and social development.

Other terms can also be used for "ICT4D" or "ICT4Dev" ("ICT for development") like ICTD ("ICT and development", which is used in a broader sense) and development informatics.

ICT4D can mean as dealing with disadvantaged populations anywhere in the world, but it is more seen with applications in developing countries. It concerns with directly applying information technology approaches to poverty reduction. ICTs can be applied directly, where in its use directly benefits the disadvantaged population, or indirectly, where in it can assist aid organisations or non-governmental organizations or governments or businesses to improve socio-economic conditions.

The field is an interdisciplinary research area through the growing number of conferences, workshops and publications.

This is partly due to the need for scientifically validated benchmarks and results, that can measure the effectiveness of current projects. This field has also produced an informal community of technical and social science researchers which rose out of the annual ICT4D conferences.

The motor of this incessant force of creative destruction is technological change.

Digital Information and Communication Technologies fulfill those requirements and therefore represent a general purpose technology that can transform an entire economy, leading to a modern, and more developed form of socio-economic and political organization often referred to as the post-industrial society, the fifth Kondratiev, Information society, digital age, and network society, among others.

The declared goal of ICT-for-development is to make use of this ongoing transformation by actively using the enabling technology to improve the living conditions of societies and segments of society. As in previous social transformations of this kind (industrial revolution, etc.), the resulting dynamic is an interplay between an enabling technology, normative guiding policies and strategies, and the resulting social transformation.

ICT for Development policies and projects are aimed at the promotion of normatively desired outcomes of this transformation, the minimization of negative effects, and the removal of eventual bottlenecks. In essence, there are two kinds of

interventions: positive feedback (incentives, projects, financing, subsidies, etc. that accentuate existing opportunities); and negative feedback (regulation and legislation, etc.) that limit and tame negative developments (diagonal yellow-red dimension in Figure).

3. ICT4D Impact

- *ICT for Education*

ICT for Education (ICT4E) is a subset of the ICT4D thrust. Globalization and technological change are one of the main goals of ICT.

One of its main sectors that should be changed and modified is education. ICTs greatly facilitate the acquisition and absorption of knowledge; offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for business and the poor. One of the greatest hardships endured by the poor, and by many others who live in the poorest countries, is their sense of isolation. The new communications technologies promise to reduce that sense of isolation, and open access to knowledge in ways unimaginable not long ago.

Education is seen as a vital input to addressing issues of poverty, gender equality and health in the MDGs. This has led to an expansion of demand for education at all levels. Given limited education budgets, the opposing demand for increased investment in education against widespread scarcity of resources puts intolerable pressure on many countries educational systems. Meeting these opposing demands through the traditional expansion of education systems, such as building schools, hiring teachers and equipping schools with adequate educational resources will be impossible in a conventional system of education. ICTs offer alternate solutions for providing access and equity, and for collaborative practices to optimize costs and effectively use resources.

ICT has been employed in many projects and researches for education the world over. The Hole in the Wall (also known as minimally invasive education) is one of the projects which focuses on the development of computer literacy and the improvement of learning. Other projects included the utilization of mobile phone technology to improve educational outcomes.

Since the education sector plays a vital role in economic development, Education System in developing countries should align with the fast evolving technology because technological literacy is one of the required skills in our current era. ICT can enhance the quality of education by increasing learner motivation and engagement, by facilitating the acquisition of basic skills and by enhancing teacher training which will eventually improve communication and exchange of information that will strengthen and create economic and social development.

- *ICT For Livelihood*

Agriculture is the most vital sector for ICT intervention most especially that majority of the population around the world realy on agriculture to live sustainably. Dr. Alexander G. Flor, author of the book ICT4D: Information and Communication Technology for Development, agriculture provides our most basic human needs that are food, clothing and shelter.

Ever since people have this natural way of thinking on how they can survive and make a living by harvesting crops used for food and fiber, raising livestock such as cow, sheep and poultry that produces animal products like wool, dairy and eggs, catching fish or any edible marine life for food or for sale, forestry and logging to grow and harvest timber to build shelter. With agriculture, people learned and acquired knowledge through sharing information with each other but of course this is not enough as there are also changes and developments in agriculture. Farmers should be able to take hold of updated information like prices, production techniques, services, storage, processing

and the like. Evidently, updated information with the change and developments in agriculture can be addressed by the effective use of ICT (the Internet, mobile phone, and other digital technologies).

Poor families in the rural areas have limited or no access at all to information and communication technology. However, these people also needs access to ICT since this technology would help lessen their expenses on their resources like time, labor, energy, and physical resources, thus, would have a greater positive impact on their livelihoods and incomes.

The lives of the rural poor could be alleviated through the application of information and communication technology through the following:

1. By supplying information to inform the policies, institutions, and processes that affect their livelihood options.
2. By providing access to information needed in order to pursue their livelihood strategies, including:
    - *Financial Capital* – online and mobile banking will allow rural poor to have greater access to banking facilities and provide a secure place for cash deposits and remittances.
    - *Human Capital* – using ICT will allow intermediaries or knowledge providers impart updated knowledge, techniques and new developments in technology to the locals.
    - *Physical Capital* – service providers will be able to monitor access to local services.
    - *Natural Capital* – access to information about availability and management of natural resources will be enhanced. Also, market access for agricultural products will be enforced. Lastly, ICT could provide early warning systems to reduce the hazard to natural disasters and food shortages.
    - *Social Capital* – connectivity, social networking, and contact for geographically disparate households will be reinforced.

In the advent of ICT it offers new opportunities to support development of the rural livelihoods. It strengthens the production and increased market coordination which are the main processes that can contribute to the future opportunity of the sector and create income for the people that depend on it.

- *ICT for Agriculture*

Farmers who have better access to ICT have better lives because of the following:

1. access to price information – farmers will be informed of the accurate current prices and the demands of the products. Hence, they will be able to competitively negotiate in the agricultural economy and their incomes will be improved.
2. access to agriculture information – according to the review of global and national agricultural information systems done by IICD with support from DFID in 2003, there is a need for coordination and streamlining of existing agriculture information sources, both internationally and within the developing countries. The information provided is usually too scientific that farmers cannot comprehend. Therefore, it is vital that the local information to be relayed to the farmers must be simplified.
3. access to national and international markets – Increasing the level of access of farmers is very vital in order to simplify contact between the sellers and the buyers, to publicize agricultural exports, facilitate online trading, and increase

the awareness of producers on potential market opportunities including consumer and price trends.

4. increasing production efficiency – due to several environmental threats such as climate change, drought, poor soil, erosion and pests, the livelihood of farmers are unstable. Thus, the flow of information regarding new techniques in production would open up new opportunities to farmers by documenting and sharing their experiences.
5. creating an conducive policy environment – through the flow of information from the farmers to policy makers, a favorable policy on development and sustainable growth of the agriculture sector will be achieved.

➢ *ICT4D for Other Sectors*

In 2003, the World Summit on the Information Society (WSIS) held in Geneva, Switzerland came up with concrete steps on how ICT can support sustainable development in the fields of public administration, business, education and training, health, employment, environment, agriculture and science.

The WSIS Plan of Action identified the following as sectors that can benefit from the applications of ICT4D:

- ***E-government***

The e-government action plan involves applications aimed at promoting transparency to improve efficiency and strengthen citizen relations; needs-based initiatives and services to achieve a more efficient allocation of resources and public goods; and international cooperation initiatives to enhance transparency, accountability and efficiency at all levels of government.

- ***E-business***

Governments, international organizations and the private sector are encouraged to promote the benefits of international trade and e-business; stimulate private sector investment, foster new applications, content development and public/private partnerships; and adapt policies that favor assistance to and growth of SMMEs in the ICT industry to stimulate economic growth and job creation.

A specific sector that has received some attention has been tourism. Roger Harris was perhaps one of the first to showcase the possible benefits. His work focused on a remote location in Malaysia and highlighted some of the possibilities of small tourism operators using the internet. Others have shown the possibilities for small tourism operators in using the internet and ICT to improve business and local livelihoods.

- ***E-learning***

Capacity building and ICT literacy are essential to benefit fully from the Information Society. ICT contributions to e-learning include the delivery of education and training of teachers, offering improved conditions for lifelong learning, and improving professional skills.

- ***E-health***

ICTs can aid in collaborative efforts to create a reliable, timely, high quality and affordable health care and health information systems, and to promote continuous medical training, education, and research. WSIS also promotes the use of ICTs to facilitate access to the world's medical knowledge, improve common information systems, improve and extend health care and health information systems to remote and underserved areas, and provide medical and humanitarian assistance during disasters and emergencies.

- ***E-employment***

The e-employment action plan includes the development of best practices for e-workers and e-employers; raising productivity, growth and well-being by promoting

new ways of organizing work and business; promotion of teleworking with focus on job creation and skilled worker retention; and increasing the number of women in ICT through early intervention programs in science and technology.

- ***E-environment***

The government, civil society and private sector are encouraged to use and promote ICTs as instruments for environmental protection and the sustainable use of natural resources; to implement green computing programs; and to establish monitoring systems to forecast and monitor the impact of natural and man-made disasters.

- ***E-agriculture***

WSIS recognizes the role of ICT in the systematic dissemination of agricultural information to provide ready access to comprehensive, up-to-date and detailed knowledge and information, particularly in rural areas. It also encourages public-private partnerships to maximize the use of ICTs as an instrument to improve production.

- ***E-science***

The plan of action for e-science involves affordable and reliable high-speed Internet connection for all universities and research institutions; electronic publishing, differential pricing and open access initiatives; use of peer-to-peer technology for knowledge sharing; long-term systematic and efficient collection, dissemination and preservation of essential scientific digital data; and principles and metadata standards to facilitate cooperation and effective use of collected scientific information and data.

- ***E-security***

The number of prevalent crimes online and offline, local and international (terrorism and acts to it) has led to the increased development of arsenals (including ICT) to preempt and enforce proper security measures that lead to it and put public security, peace and order a number one priority.

Information and communication technology (ICT) offers the promise of fundamentally changing the lives of much of the world's population. In its various forms, ICT affects many of the processes of business and government, how individuals live, work and interact, and the quality of the natural and built environment.

The development of internationally comparable ICT statistics is essential for governments to be able to adequately design, implement, monitor and evaluate ICT policies. This need was emphasized in the Geneva Plan of Action, paragraph 28, from the first phase of the World Summit on the Information Society (WSIS): "A realistic international performance evaluation and benchmarking (both qualitative and quantitative), through comparable statistical indicators and research results, should be developed to follow up the implementation of the objectives, goals and targets in the Plan of Action, taking into account different national circumstances." (ITU, 2005)

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