2 ICT for the Poor at Large Scale: Innovative Connections to Markets and Services

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The rapid spread of information and communication technologies (ICTs) has been accelerating economic and social change across all areas of human activity in past decades. Innovative technologies such as cellular telephones and wireless broadband are now reaching many parts of the developing world, including poor rural areas, and bringing in high hopes of positive development outcomes. These include accelerated economic growth, more jobs, reduced migration pressure from rural to urban areas, increased agricultural and industrial productivity, increased services and access to them, easier diffusion of innovations, and increased public administration efficiency. Yet, large inequalities remain in ICT access, both between and within countries, and large barriers continue to prevent positive outcomes for the poor. Realizing the large potential of ICTs for the poor entails a clear understanding of their needs and scaling up their connections to markets, services, and networks using ICTs.

ICTs serving the poor

Three fourths of the poor in developing countries live in rural areas and depend on agriculture-related activities. While the world is becoming more urban, the share of the poor living in rural areas remains much larger than the urban share (Figure 1). Even before the food and financial crisis hit in 2007-08, roughly 160 million people were living in ultra poverty, on less than 50 cents a day (Figure 2). The most severe deprivation has increasingly been concentrated in Sub-Saharan Africa, which has experienced a significant increase in the number of the ultra poor since 1990 and is currently home to three-quarters of the world's ultra poor people (Ahmed et al. 2007). The poor and the hungry tend to live in geographically adverse or remote areas, own few assets (including land), have limited access to credit markets, and are often excluded from social networks and political power.

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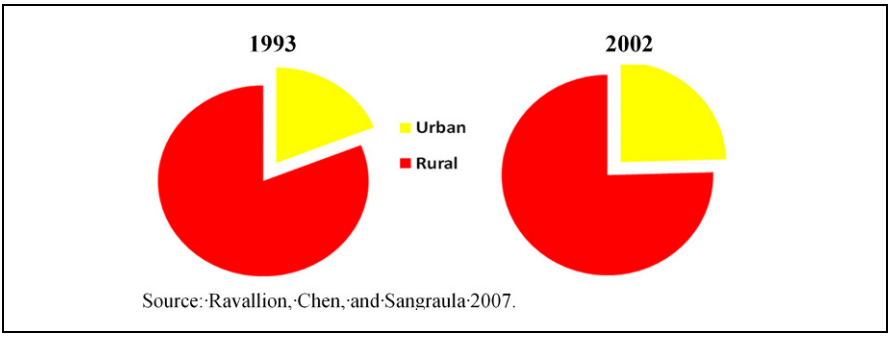


Figure 1: Urban and rural share of the poor in the developing world (%)

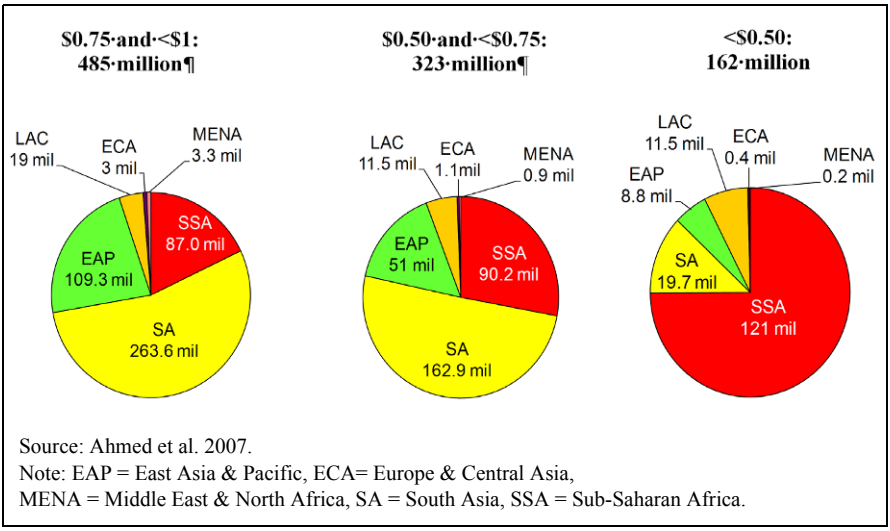
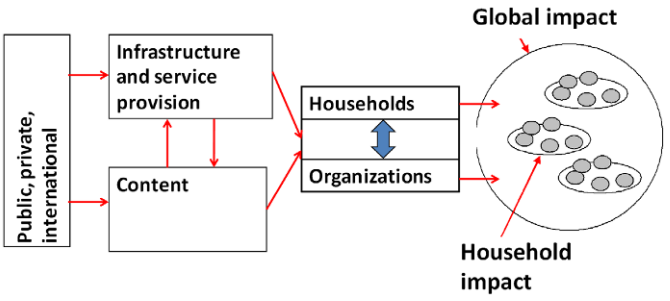


Figure 2: Number of poor in the developing world by region (2004)

Development strategies, including ICTs for development, should serve growth and the needs of the poor, as they perceive them. The development of ICTs has not been a priority in many rural areas for long because primary infrastructure and social services — such as roads, electricity, education, and health services — are in such demand. It is perhaps wrongly assumed that demand for ICTs is much lower. Actually the poor are hungry for ICT, knowing well that information serves access to education, markets, and health services. ICTs deliver clear gains for rural households. Studies of impacts of ICTs on rural households have shown a wide range of positive impacts, including:

- time and cost savings,
- better information leading to improvements in decision-making,
- greater efficiency, productivity, and diversity (Leff 1984; Tschang et al. 2002; Andrew et al. 2003),
- lower input costs, higher output prices, and information on new technologies (Gotland et al. 2004), and
- expanded market reach.

Conceptually, impacts of ICTs at the global and household level can be examined in a broad framework (Figure 3). Actual impacts of ICTs on rural households can be measured by gains in welfare, under the assumption that monetary welfare improvements eventually bring about non-monetary welfare improvements. These assessments can also be done through different methodologies: compensating variation, willingness to pay, consumption functions, and matching techniques. Using compensating variation, cases studies of Bangladesh and Peru attempt to measure the welfare effect of telephone use compared with available alternatives, such as visiting in person, sending a messenger, or sending letters (Torero and von Braun 2006). In both cases, a considerable gap was found between current prices of alternative means and local telephone use. This gap can be used as an approximation of households' willingness to pay to have telephone access. Just within the poorest quintile, the minimum estimated gains in welfare from local telephone calls compared with regular mail were US$0.11 and US$1.62 for Bangladesh and Peru, respectively. In Laos, a comparison of households that were similar in all characteristics with the exception of access to phones showed that telephone access resulted in an increase of 22 percent in per capita total consumption and 24 percent in per capita cash-based consumption. These studies illustrate that, if used properly, ICTs can benefit the poor in rural areas.



Source: von Braun and Torero 2006.

Figure 3: Framework for ICT demand, supply, and impact

Impacts on the poor: Access to markets, services, and networks

But, exactly how do ICTs have an impact on the lives and livelihoods of the poor? Research has shown that ICTs can contribute to poverty alleviation by: making markets more accessible to households; improving the quality of public goods provision, such as health services; improving the quality of human resources, primarily through education; allowing more effective utilization of existing social networks, or extending them; and creating new institutional arrangements to strengthen the rights and powers of poor people and communities. Box 1 describes several examples of how ICTs have helped the poor by providing them access to markets, services, and networks.

The reduction of the information gap at a low cost is of central importance to the poor. ICTs can be a powerful tool in removing the information asymmetries that often prevent the poor in remote areas from accessing markets, thereby leading them to lower income outcomes. ICT adoption in agriculture can allow improvements in getting timely information about prices and quality requirements, extension and latest technological know-how, and weather and water resources. Evidence from India suggests that internet kiosks that provide wholesale price information and alternative market channels to soybean farmers has led to an increase in the monthly market price by 1-5 percent. Moreover, area under soybean production has also increased significantly (Goyal 2008).

The potential role of ICTs for enhancing public health is also clear. Cross-country analysis indicates that telecommunications investment may well be associated with improved health status. Prominent applications for health include the creation of "telemedicine" centers that offer medical advice or health information to rural inhabitants. When a village chief in South Africa was asked what services he would want for his village if he had to select from a telephone line, a school, and a clinic, the answer was a "telephone line" because it would enable him to lobby ministers in the capital about the school and clinic (Micevska 2006). The demand for ICTs by the poor is not just anecdotal, but empirical evidence also indicates that a simple, linear cross-country regression of the growth rate of fixed phone lines explains about 11 percent of the growth rate variance for life expectancy. Furthermore, recent services launched in the field of mobile-banking, such as the M-PESA service introduced by Safaricom in Kenya, have brought credit services to rural areas where banking infrastructure may not be present. The service is used by 5 million customers, which is more than twice the number using traditional retail banking (BBC 2009). Services such as these provide great examples for scaling-up the role of ICTs in areas where "real" infrastructure may be missing.

Box 1: ICT enables access to markets, services, and networks

Markets:

- 1700 internet kiosks and 45 warehouses have been set up in Madhya Pradesh, India since 2000 to provide whole price information. These kiosks have offered 1-5 percent higher wholesale prices to farmers (Goyal 2008).
- Ethiopia Commodity Exchange was set up in 2008 with the help of the International Food Policy Research Institute. The institution offers new ICT-enabled market information and trading systems for connecting buyers and sellers.
- Cell phone services phased in Niger, between 2001 and 2006, provided alternative cheaper search technology to grain traders and other market actors, thereby reducing grain price dispersion by a minimum of 6.4 percent (Aker 2008).
- Cell phone adoption by fishermen in Kerala, India has provided access to different market prices and opportunities to complete market transactions without being physically present. As a result, fishermen's profits have increased by 8 percent (Jensen 2007).

Services:

- M-PESA service for transferring money using a mobile phone was launched in March 2007 in Kenya by Safaricom. It was targeted to rural people without credit cards and currently has 5 million customers (BBC 2009).
- A telemedicine system established in Alto Amazonas in Peru has seven health centers and 32 health posts. The system has led to a net savings of $320,126 over a period of four years. (Martinez et al. 2007).

Networking:

- African Virtual University is the largest network of open distance and e-learning institutions in 27 African countries. The University allows students to save money spent on tuition and learn at their own individual pace (AVU 2009).
- Indira Gandhi National Open University is reaching out to 2 million students in India and 22 other countries. It has 140 distance education institutes and is helping the disadvantaged populations (IGNOU 2009).

Entertainment and Edutainment:

- In Bangladesh, small businesses using Grameen phones have been expanded to village video and music shops, thereby becoming the entertainment hubs in the villages.
- Awareness about AIDS in India is raised using games on mobile phones, such as playing cricket with condoms. The games were downloaded by 13.5 million users, and 74 percent of the players were between ages 16-35 in 2008 (Ramey 2008).

Additionally, ICTs promote greater inclusion of individuals within networks and, even more important, increase the diversity of participants by overcoming the barriers of physical distance and social standing. They have been used for educational purposes by providing educations programs through virtual classrooms and video and audio lectures. Such services allow for significant savings to students – in some cases students save as much as 80 percent of the costs of attending in person. Two such great examples are the African Virtual University and the Indira Gandhi National Open University. The African Virtual University is the largest network of open distance and e-learning institutions in Africa, and the Indira Gandhi National Open University has 140 distance education institutes that are reaching out to two million students in India and 33 other countries (AVU 2009 and IGNOU 2009).

An often overlooked, yet crucial aspect of ICTs is the various social networking mechanisms that they offer. By providing access to a range of "fun" and "edutainment" activities such as learning about AIDS through mobile games, ICTs are playing a significant role in bridging the social rural-urban divide – an aspect that cannot be ignored in any discussions about the widening rural-urban socio-economic divide (Ramey 2008).

Some commentators hold much more skeptical views of the benefits of ICTs for development. They argue that access to ICTs largely depends on education, income, and wealth and the so-called digital divide is only a part of a much broader development divide. Limited education, inappropriate language skills, or lack of resources could prevent disadvantaged groups from accessing ICTs, ultimately exacerbating information gaps and increasing income inequality between and within countries.

Coverage and adoption: Are the poor left behind?

The variety of views about the role ICTs are also partly based on the widening digital divide between low income countries and the rest of the world. While the gap between middle income and the world seems to converging for fixed and mobile phone subscribers, the gap for the low income countries and the world is diverging from 1975 to 2005 (Figure 4). This disparity is also observed within countries. Studies based on household surveys in Peru show that the average number of telephone calls per month for the bottom income quartile is 0.5, whereas it is 6.9 calls for the top income quartile (Table 1).

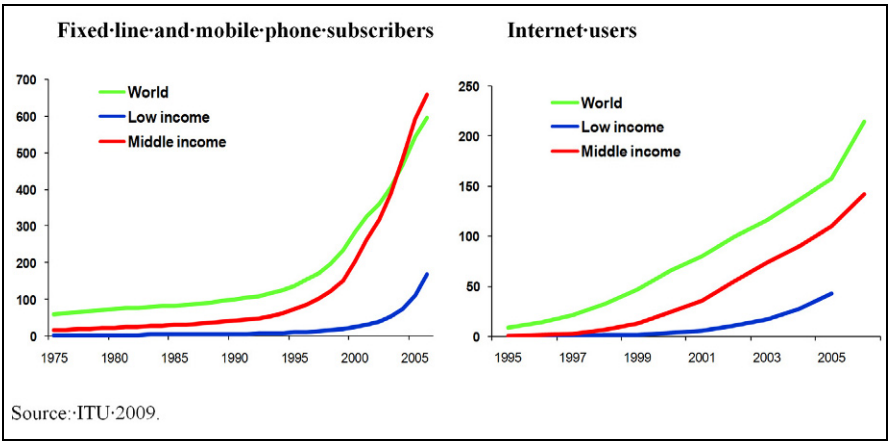


Figure 4: ICT adoption (per 1,000 people) 1995-2007

	Household income 1/	Use of public phone 2/	Avg. travel time 3/	Average call 4/	Direct monthly exp. on phone **5/**
Income group					
Bottom 25%	35	65%	80	0.5	0.6
Top 25%	463	88%	27	6.9	6.2

Source: Chong, Galdo, Torero 2008.
Note: All income figures are in dollars. The exchange rate employed is 1US$=3.38S/ (World Bank, 2001)
1/ Average monthly income of the household including both farm and non-farm income in US dollars
2/ Refers to the head of the household. 3/ Walking average travel time to reach to the nearest publicly accessible telephone in minutes. 4/ Average number of calls per month. 5/ Includes rates, only.

Table 1: Access gap within countries: Peru household survey

Even though the digital divide between countries is significant, there are still reasons for hope. Mobile phone penetration throughout the world has been rapidly increasing. In just the last ten years, mobile subscribers throughout the world have been on a rise. For example, in Sub-Saharan Africa, more than 40 percent of rural areas are now connected to mobile networks (World Bank 2008). The number of mobile subscribers per 100 people in many developing countries has significantly increased in just a period of seven years, from 2000 to 2007 (Figure 5). Noticeable progress has been achieved in developing countries of Latin America, Sub-Saharan Africa, and Asia. Potentials for providing Internet access for the “other 5 billion” are also on the rise as 16 new satellites are planned to cover all points between 45°N and 45°S by late 2010 (Figure 6 and Financial Times 2008).

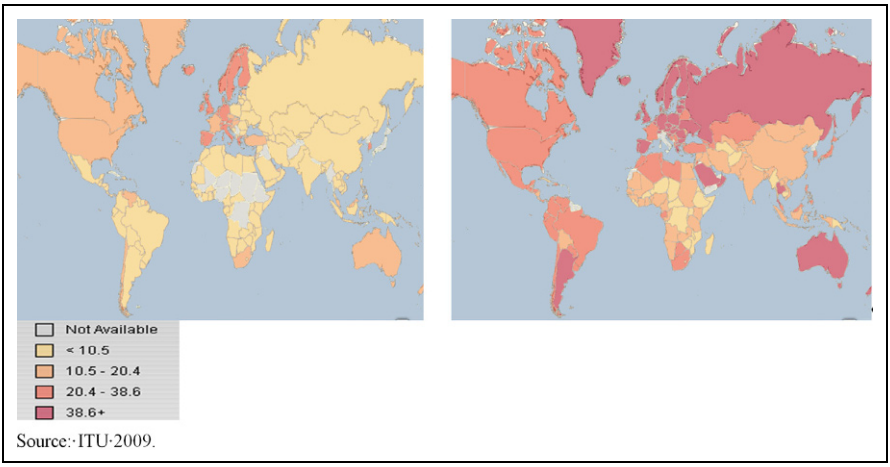


Figure 5: Mobile subscribers per 100 People

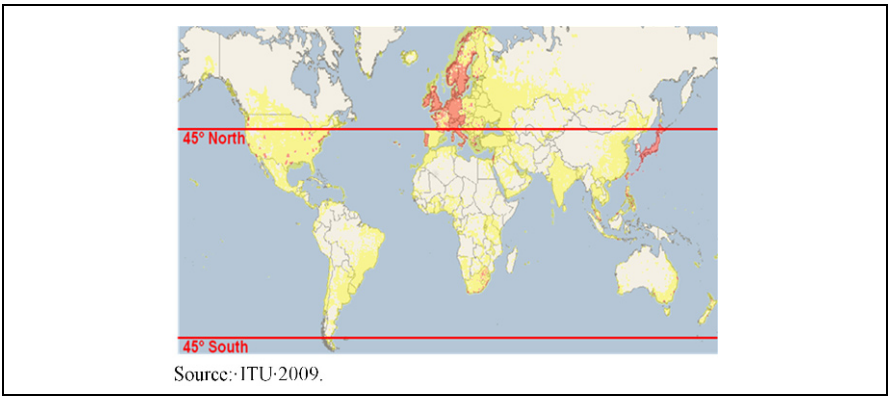
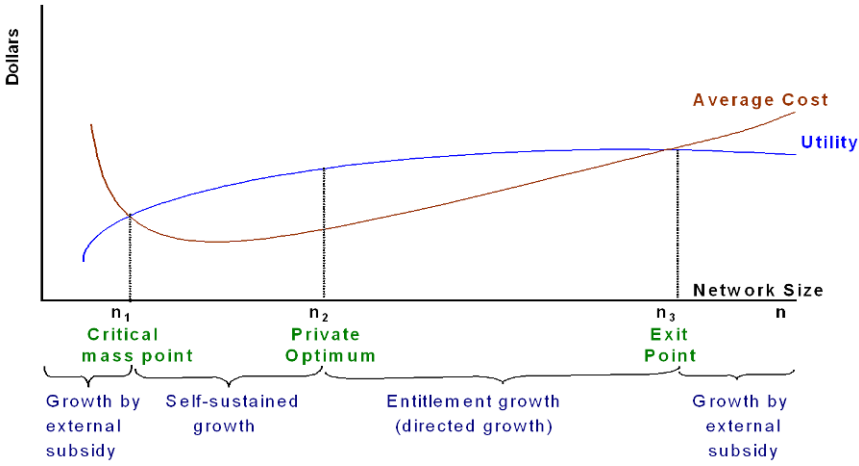


Figure 6: GSM coverage

The cost and utility of ICT expansion depend on the network size (Figure 7). Expanding the outreach of ICTs then hinges on providing an enabling environment and allowing private markets to participate. Using data from 43 countries, studies have shown that wireless phone penetration is higher in countries that have a developed telecommunication infrastructure, greater competition in markets for mobile phones, lower costs for network provision, and fewer standards for wireless penetration (Kauffman and Techatassanasoontorn 2005). However, evidence studying the expansion of mobile telephony suggests that the role of superior political institutions on diffusion is much smaller when compared to the spread of fixed line telephones and internet (Andonova and Diaz-Serrano 2008).



Source: Noam 2001.

Figure 7: Costs and utility of ICT expansion

The spread of mobile phones in the absence of strong institutions becomes crucial if the growth-telecommunications links are explored. Estimates for 113 countries over a 20-year period show that a 1 percent increase in the telecommunications penetration rate might be expected to lead to a 0.03 percent increase in GDP (Torero, Chowdhury, and Bedi 2006). At the same time, models for different country groups reveal that telecommunications infrastructure has a nonlinear effect on economic output, particularly for lower and higher middle-income countries. These results imply that telecommunications networks needs to reach a critical mass to have a discernible impact on economic output. In particular, growth effects were found to be strongest in areas with telecommunications penetration rates of 5-15 percent. With the fast pace at which mobile phones are expanding in many countries throughout the world, the potential for ICTs to have growth effects looks much more optimistic.

Despite these great potentials, however, the opportunities of the digital age are not equally accessible, and the poor people have been left behind. The demand – and at time the struggle – for access by poor people is accelerating in many countries. Lack of exploitation of the opportunities that ICT holds for the developing world applies to both, the public and private sectors, as well as the community and household levels.

Making ICTs pro-poor: Institutions, policies, and actions

The central question then is what *can* ICTs do and what *needs* to be done to make ICTs truly pro-poor? The lessons learnt from the many cases of ICTs for development clearly show that they are an opportunity, but not a panacea for development. For the potential benefits of ICTs to be realized in developing countries, many prerequisites need to be put in place: prompt deregulation, effective competition among service providers, free movement and adoption of technologies, targeted and competitive subsidies to reduce the access gap, and institutional arrangements to increase the use of ICTs in the provision of public goods. Successfully harnessing the power of ICT could make a substantial contribution to achieving the MDGs, both directly, through the delivery of public services, and indirectly, through the creation of new economic opportunities. Thus, looking forward, the main areas for greatest impact and expansion are:

- agricultural market information,
- micro-finance and m-banking,
- health and nutrition services,
- low-cost distance education, and
- environmental services/CO_2 markets.

Given the diverse potential benefits of ICTs, especially in the provision of public goods, subsidies traditionally used for poverty alleviation could be adapted to create incentives for the use of ICTs. For example, conditional cash transfer programs, which are largely tied to education or health, could be implemented at the community level to provide Internet access to children where educational and health services are delivered.

"3C"s are crucial for advancing ICTs for development: *connectivity, capability* to use the new tools, and relevant *content* provided in accessible and useful forms. Connectivity has been a priority, and it is a prerequisite for the other two "Cs". But given the speed at which technologies are evolving and can move –unconstrained by overly restrictive licenses and global patenting –costs could fall significantly, facilitating adoption. Hence, we should emphasize the need for all three "C's" to progress in tandem."

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