

Connecting the Bottom Billion: Introduction to the Toolkit on Strategies and Policies to Promote and Implement Community Access to ICTs

1. Introduction

Global experience of poor people using basic communication tools such as mobile phones suggests that information and communication technologies (ICTs) have vast empowering and development potential with huge impact on their quality of life. Use of mobile phones by the poor has increased their security, created more jobs, provided access to information and enhanced the flow of financial resources, thereby advancing social wellbeing and economic development.¹ The knowledge and networking capabilities of interactive and convergent technologies such as the internet present further opportunities for economic growth and social development by increasing access to education and health services and enhancing decision-making powers of the poor.

However, the poor in developing countries are still excluded from many ICT opportunities. Recent International Telecommunication Union (ITU) data show that about 94% of the African population does not have access to fixed telephones, computers and the internet.² Gaps also exist in terms of relevant content and ICT applications for social and economic development.

This introduction discusses the importance of pro-poor ICT access, the different tools and technologies available, and the major barriers the poor in developing countries face to bridge the access gap. The modules in this toolkit will look at experiences and lessons in pro-poor ICT access provision in terms of:

- Policy and regulatory issues
- The implementation of projects at the community level
- Advocacy strategies and approaches.

What is pro-poor access to ICTs?

Pro-poor ICT access refers to access to and use of ICTs to resolve concrete problems of everyday life³ by the poor and the groups working for them. Pro-poor ICT access assumes that:

- ICT tools and services should be affordable and accessible to the poor and to those working with or for them at reasonable prices.
- ICTs should be used meaningfully to address the challenges of poverty and secure broader development benefits.

¹ World Bank *The Role of Mobile Phones in Sustainable Poverty Reduction* (Washington: World Bank, 2008) siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/The_Role_of_Mobile_Phones_in_Sustainable_Rural_Poverty_Reduction_June_2008.pdf

² International Telecommunication Union *African Telecommunication/ICT Indicators 2008: At a crossroads* (Geneva: ITU, 2008)

³ Ricardo Gómez and Juliana Martínez *Internet... Why, and What For?* (San José: IDRC/Acceso, 2001) www.acceso.or.cr

- Relevant content that addresses the needs of the poor should be available to facilitate their use to resolve day-to-day challenges.

Pro-poor ICT access recognises that the availability and affordability of ICT tools alone cannot close the access gaps. It is essential to tailor ICT tools and services to the needs of the poor and build their capacities so that more people can use them, regardless of their economic status, sex, social class, language, ethnic group or other factors. Experience in Africa shows that the availability of cheaper mobile handsets such as Nokia 1100 coupled with short message service (SMS) and mobile banking were the major drivers of cellular network usage by the low-income population.⁴ The use of the internet requires that people not only get access to it but also know how and when to use tools such as email, search engines and web portals for different purposes.

A careful examination of the terms “poor”, “ICT” and “access” provides a better understanding of the significance of pro-poor ICT access.

Looking beyond income poverty: Poverty refers to the deprivation of economic, social and political wellbeing by a large majority of the world population. Amartya Sen, the Nobel laureate, argues that in individual freedom lies the capacity for political participation, economic development and social progress.⁵ Thus poverty is not only lack of adequate income (income poverty) but also the absence of the freedom and the ability to function at one’s full potential as a human being (“capability” poverty). Poverty could also be seen as the absence of wellbeing and happiness (wellbeing poverty), which to a great extent depends upon limited income and political freedom.⁶

The notion of income below USD 1 per day as a measure of poverty was also popularised by international financial institutions (IFIs) such as the World Bank. But assessing poverty levels involves complex calculations that measure access to health and education, and factors such as the rate of employment, child and maternal mortality rates and life expectancy are also often used to define the incidence of poverty. For example, the United Nations Development Programme (UNDP) provides a striking list of over 200 indicators for building its annual Human Development Index that ranks countries according to levels of poverty.⁷ The index illustrates the complexity and the multidimensional nature of poverty. It also highlights the importance of putting the cause, extent and alleviation of poverty at the centre of the access debate, not the ICTs themselves.

ICTs in the pro-poor context: The term ICT refers to a wide range of tools, applications and services that help to produce, store, process, distribute and exchange information. It refers to both the “old” ICTs like radio, television and telephone, and the “new” ICTs such as networked computers, satellite and wireless technologies and the internet. Pro-poor ICT access is concerned with the ability of the poor to get access to a wide spectrum of ICT tools, applications and services.

⁴ Ken Banks “Mobile Phones and the Digital Divide” *PC World* 29 July 2008
www.pcworld.com/article/149075/mobile_phones_and_the_digital_divide.html

⁵ Amartya Sen *Development as Freedom* (Oxford: Oxford University Press, 1999)

⁶ Swapna Mukhopadhyay “ICT and Poverty in East Africa: A Conceptual Framework” (paper presented at the Workshop on ICT and Poverty Reduction, Nairobi, Kenya, 17-19 January 2006)

⁷ United Nations Development Programme *Human Development Report 2007/2008* (New York: UNDP, 2007) hdr.undp.org

Access: The main objective of universal access is to reduce the divides that arise from geography (rural/urban), gender, physical disability, socioeconomic issues (income, race, caste and class) and skills (education). The notion of access covers the ability of, for instance, the urban poor, women, children and those with physical disabilities to enjoy similar benefits to those less marginalised.

In sum, while providing access to ICTs is critical, physical access alone cannot bridge the pro-poor ICT access gaps. ICTs will be insufficient if the technologies are not used effectively because they are not affordable; if poor people do not understand how to put them to use or if they are discouraged from using them due to policy and regulatory constraints; or if the local economy cannot sustain their use.

2. Why is pro-poor ICT access important?

Access to ICTs by the poor has become a key focus of policy makers and leaders of development institutions in recent years. This recognition is due to the significant potential impact of new technologies on economic growth and social development.

The main social and economic benefits of ICTs arise from their impact on governance. Enhanced government efficiency in service provision is directly relevant to the poor. ICT use in business, government and entertainment as well as by non-governmental organisations already has an influence on almost everyone's lives. ICTs could play a key role in:

- Increasing access to government information and entitlements
- Enabling the engagement and interaction of the public with government officials
- Increasing the transparency of the government's operations to make it more accountable and reduce corruption.

ICTs are also becoming crucial in terms of improving knowledge of human and constitutional rights – such as freedom of expression, political participation, ownership of land and accountability – which underpin sustainable poverty reduction. Mobile phones have become the major tools for organisation of voting in many developing countries. Progress has also been made in harnessing ICTs for community empowerment through the development of community databases, use of the internet for greater access to data and improved information flows between local communities and the government, and the dissemination of appropriate information to members of the community.

Labour time, land and energy are often the only “productive” assets of the poor. Thus tools that save their time have a significant economic potential. Mobile phones and the internet have shown that they can reduce valuable travel time for poor people. ICTs have also shown potential to reduce traditional dependence on intermediaries and exploitative market structures. For instance, rural farmers can check for prices of the grain they produce on global markets; women artisans can sell handicrafts directly to the consumers through the internet. Pro-poor ICT access can promote opportunities for livelihoods by increasing agricultural productivity and improving market access. The value of ICTs for poverty reduction comes also from their potential for generating income. E-commerce initiatives that link small and medium enterprises directly to global markets through the internet have the potential for increasing income and economic development.

The other impact of ICT has been in the flow of financial resources from the "wealthy" to the "poor". Access to ICTs has cut the transaction cost and time of the flow of remittances; mobile banking has made the easy and low-cost transfer of credit and finances possible. A study by the International Fund for Agricultural Development (IFAD) in 2006 indicates that worldwide remittances now exceed development aid. Over 150 million migrant workers sent more than USD 300 billion home in 2006 compared with USD 104 billion in aid from donor nations and direct foreign investment of USD 167 billion.⁸ IFAD says: "New technologies, such as prepaid cards and the use of mobile phones, provide cheaper alternatives for transferring money, as well as lower account-to-account transaction costs."⁹

Globally, there has also been recognition for tapping into ICTs to achieve the Millennium Development Goals (MDGs). The MDGs aim to eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/AIDS, malaria and other diseases; ensure environmental sustainability; and develop a global partnership for development.¹⁰ ICTs are regarded as key instruments for enabling these goals. Target 5 of MDG 8 emphasises the need for public and private partnerships for expanding access to ICTs.

ICTs play a major role in teaching and learning, especially in delivery of course materials, facilitating research communications, and improving management and administration of schools and universities. Innovations in online learning and virtual laboratories have already empowered individuals and institutions to continue education without the barriers of distance and time. Opportunities in the health sector include health education and information dissemination. ICTs can bring communities and health facilities closer to each other through regular and systematic information exchange, and offer simple solutions for collecting and analysing information about disease to help make health interventions effective and relevant. ICTs have also been applied to promote better access to AIDS advice, counselling and test results without fear of being stigmatised.

3. Information technologies and tools for poverty alleviation

A wide range of ICT tools and technologies are available for the poor in their fight against poverty. These include low-cost and low-power computers, mobile and fixed wireless networks, fixed-line and fibre connections, internet and web services, traditional media like radio and television, and a host of content development tools and applications. These technologies have been undergoing significant changes that support their application by the poor.

The major trends in technologies and tools that favour poverty alleviation include:

- The convergence of broadcasting, computing and communications that has led to the plummeting costs and greater availability of a wide range of services
- New forms of wireless protocols (Wi-Fi, WiMAX, etc.) that have overcome the challenges of terrain, infrastructure and high cost

⁸ BBC News "Remittance cash 'tops world aid'" *BBC News* 18 October 2007
news.bbc.co.uk/2/hi/business/7047304.stm

⁹ IFAD website: www.ifad.org/events/remittances/maps/remittance.htm

¹⁰ United Nations Millennium Development Goals: www.un.org/millenniumgoals

- Low-cost handsets and pro-poor mobile applications
- The ubiquity of low-cost, low-power-consuming devices
- The proliferation of sustainable community networks
- The promises of development around Web 2.0.

Convergence: The convergence of broadcasting, computing and communications has been the key driver for the plummeting costs and greater availability of a wide range of services to the poor. Convergence is driving traditional telecommunication operators and broadcasters to move into each other's markets by offering a bundle of voice, data and image services. Cable companies are buying into broadcast services; mobile companies are acquiring internet service providers; equipment companies such as Apple are venturing into content and mobile phones; and content companies like Google are looking at satellite services for developing countries. The net benefits are positive to the poor due to better choice, higher quality and lower costs.

One of the main benefits of convergence has been the availability of cheap telephony over the internet. Voice over internet protocol (VoIP) telephony has driven the cost of communication down and disrupted the traditional regulation and business models of the traditional incumbents. The advent of digital television and radio is yet another potential benefit of convergence that brings benefits such as clearer sound and pictures, the possibility of receiving more channels, and flexibility for interaction and storing the broadcast for later use. The transition from analogue to digital is also expected to contribute to the "digital dividend", or the availability of spectrum that was used in the analogue world for delivering digital services to the population.

Convergence is also pushing investment in broadband infrastructure. In Africa, for example, a number of national backbone projects have been proposed by countries such as Burkina Faso, Burundi, Democratic Republic of Congo, Kenya, Rwanda, Tanzania and Uganda, along with submarine cable projects including the East African Submarine Cable System (EASSy) and SEACOM. The availability of cheap broadband access will contribute to meeting the communications needs of the poor.

Wireless technologies: The expansion of wireless technologies is another major trend that has brought opportunities for connectivity in rural and underserved areas. New broadband wireless standards like Wi-Fi¹¹ and WiMAX¹² are overcoming challenges of terrain, infrastructure and cost and are being deployed in underserved areas. Wi-Fi and WiMAX supply a large share of growing markets and public service use of the internet in communities, schools, health facilities, etc.

Low cost, mass production and ease of integration with computers have made Wi-Fi one of the most-used wireless solutions for connection to the internet.¹³ WiMAX is following suit and increasingly becoming the choice for backhaul connection and in-

¹¹ Wi-Fi is a two-way high-speed radio communication network to connect to the internet without cables and wires. Wi-Fi is a popular term for wireless local area network, also known as IEEE 802.11, which is intended to link computers spanning a distance of about 100 metres.

¹² WiMAX is a wireless digital communications system, also known as IEEE 802.16, which is intended for wireless networks spanning relatively long distances. WiMAX can provide broadband wireless access up to 50 kilometres for fixed stations, and 5-15 kilometres for mobile stations.

¹³ Several large-scale capacity-building initiatives have been implemented in Africa, Latin America and other regions, where proliferation of community wireless networks can improve communities' access to ICT infrastructure, as well as control over a wide range of services enabled by access to the internet (VoIP communication, content production, etc.). Examples of such multi-partner initiatives are the regional training projects Capacity Building for Community Wireless Connectivity in Africa (www.apc.org/wireless) and the TRICALCAR project (www.apc.org/en/projects/lac/wireless-lac-tricalcar).

terconnecting users in large cities across geographic distances of up to 50 kilometres. Moreover, wireless technologies are:

- Adding online/offline functionality that allows users to work anywhere, any time, and without disruption, even when network connections are interrupted.
- Providing intelligent roaming capabilities when moving from hotspot to hotspot, which means users do not waste time reconnecting or lose critical data because of dropped connections.
- Enabling the flexibility to access data and applications on various computing devices, whether they are laptops, desktops, handhelds or servers.
- Provoking regulatory changes, especially in the management of spectrum.¹⁴

Mobile applications: Significant progress has also been made in the mobile sector in recent years in terms of network coverage, price of the handset, functionality and applications for social and economic development. The number of mobile subscribers has passed the 50% mark and was expected to reach over 61% of the world's population by the end of 2008.¹⁵ The mobile phone is slowly improving its storage capacity and battery life. It is facilitating internet access and taking over its competitors as a prime media device for downloading, storing and playing all kinds of media. The use of mobile phones for payments and transfer of resources is fuelling social and economic development, adding to the security of poor people.

Progress in the rolling out of third generation (3G)¹⁶ mobile networks has also been impressive in recent years. The total number of 3G subscribers using WCDMA and CDMA2000 grew by 45% in 2007 over the previous year to cross the 600-million mark, according to the ITU. While the use of 3G may not have a direct impact on the poor due to the high costs involved, innovations around broadband mobile access will likely have a significant impact for those working with poor people.

Low-cost, low-power computing: Innovations around low-cost and low-power computing have been progressing over the last five years, in particular in schools and in connecting "the next billion". The One Laptop per Child¹⁷ programme and Intel classmate PC¹⁸ are among recent initiatives that have fuelled interest and innovation around low-cost and low-power solutions.

Handheld computers ranging from small pocket computers to notebooks are now being offered for prices lower than USD 400. The ASUS Eee is one the most ultra-portable popular handheld computers in this price range. Many applications are being deployed to improve the lives of people living in remote areas by allowing them access to global information. For example, farmers may use handheld computers to access information on food prices and new agricultural techniques. Another example is the use of portable computers by healthcare workers to organise information on individuals in poor areas and transmit symptoms of diseases to a specialised doctor.

Sustainable community development networks: Great hope has been invested in community centres that provide communications (telephone, fax), internet and other

¹⁴ Gerard Smyth "Wireless Technologies Bridging the Digital Divide in Education" *International Journal of Emerging Technologies in Learning* 1, 1 (2006) www.mlearn.org.za/CD/papers/Smyth.pdf

¹⁵ ITU Statistics Newslog, 30 September 2008: www.itu.int/ITU-D/ict/newslog/default,date,2008-09-30.aspx

¹⁶ Third generation (3G) mobile technology offers high-speed communication while on the move.

¹⁷ laptop.org

¹⁸ www.intel.com/intel/worldahead/classmatepc

auxiliary secretarial-related services as a way of enabling the poor to benefit from ICTs. Commonly known as “telecentres”, they have often failed to achieve this goal. This is frequently because attention was paid only to the hardware, and not to content or to the social context – a typical mistake in development interventions.

Recent adoption of wireless technologies, lessons from failures of community centres and experience of micro-financing have shown that community-based entrepreneurship models can sustain communication networks in underserved areas. Community-run networks that provide voice telephony, community radio, data networking and internet using wireless technologies have proved to be catalytic for employment, self-reliance and improved access to low cost communication. These networks not only enhance entrepreneurship and foster access to information and communication, but also help to retain the income and profit within communities.¹⁹

Web 2.0: Web 2.0 is a transition from an information resource web (Web 1.0) to a participatory web that allows users to control the web to get things done and form social networks. Web 2.0 websites allow users to do more than put information on the web or just retrieve information. Users can build on the interactive pages, run software applications entirely through a browser, or own the data and exercise control over that data.

The proliferation of user-generated content over the internet such as blogs, video sharing, social networking and podcasting has created a more socially connected web in which people can contribute as much as they can consume. Although the tools of Web 2.0 are developed and used by active users, there are significant opportunities for adapting Web 2.0 tools to collect, organise and share indigenous knowledge. This is important for sustainable development and economic growth.

These examples make it evident that new ICTs provide a multitude of choices for the poor if they are used effectively. However, many of the opportunities have not been tapped into due to a host of barriers, such as lack of awareness of the potential by policy makers, absence of the necessary regulatory frameworks, low levels of infrastructure and skills, and financial constraints.

4. Understanding the barriers to pro-poor ICT access

Pro-poor ICT access in developing countries faces a number of constraints. The absence and high cost of basic infrastructure such as roads, electricity and communication as well as illiteracy and social factors such as gender and ethnic disparity still remain the key barriers.

Infrastructure challenges: Access to basic communications networks is still a challenge to the majority of the poor, especially in countries with large rural communities. The combination of geographic distance, difficult terrain, lower population densities and economic hardships leaves little commercial incentive for undertaking the huge investments that are required to extend telecommunications infrastructure in rural areas. Progress in achieving universal access to ICTs has been slow in almost all developing countries either due to absence of strategies or inefficiency in disbursement of universal access funds.

¹⁹ Ian Howard *Unbounded possibilities: Observations on sustaining rural ICTs in Africa* (Montevideo: APC, 2008) www.apc.org/en/system/files/SustainingRuralICTs_0.pdf

Electric power: To implement ICT solutions in disadvantaged rural communities it is essential that the electric power to operate equipment is made available. Lack of electric power and its unreliability, when available, are major challenges to developing nations. Lack of cheap electricity in rural areas is one of the major contributors to the high cost of communication. Solutions including solar photovoltaics (PV), small wind-electric turbines, micro-hydro systems and clockwork induction motors were proposed to address the rural power generation and usage gaps, but these were unable to scale up and integrate into rural development plans.

Cost of hardware and software: The high cost of hardware, software and connectivity is another barrier to pro-poor ICT access. High cost can result in a significant proportion of poor people's overall incomes being extracted and diverted from meeting basic needs such as paying for school fees. The popularity of Nokia 1200 (an under-USD 30 mobile handset) and less than USD 1 of air time shows that connecting the next billion requires a considerable cost-cutting in ICT tools and services.

Social and cultural challenges: ICTs can service specific development goals, but this requires both knowledge of appropriate technologies and appreciation of how these technologies can be deployed to address concrete development problems. The problem of illiteracy in developing countries is a main concern, especially as ICTs are very much text-based in nature. Illiteracy also goes hand in hand with poverty, and limited education can be a key barrier that prevents disadvantaged segments of the population from accessing ICTs, ultimately exacerbating information and poverty gaps. Innovations that use intermediaries and provide technological solutions such as text-to-speech and touch screens are important to promote access to the illiterate. Other related social factors include unfamiliarity with the dominant languages of the internet, absence of training in computer skills, and the fact that the information delivered by ICTs is not that valuable to them.

Gender and other barriers: Although the gap is narrowing, there is also a significant polarisation of access to ICTs along the contours of gender and physical disability. This was exacerbated by a lack of initiatives to correct the imbalances between men and women and those with and without physical disabilities at policy and programme implementation levels.

Policy and regulatory frameworks: Policy and regulatory provisions in many countries are still far behind the potential of ICTs discussed above. Government regulations often fail to recognise the possibilities offered by ICTs. A substantial number of developing countries still control access and protect incumbent operators. In other countries there is a tendency for a few operators to collude on prices and services, thus creating barriers to competition.

While sector reform in some countries has increased access to basic communication, especially mobile phones, the underlying policy goals of delivering affordable access to the population have not been realised in most countries. The rush towards privatisation of inefficient incumbents has not yielded the expected results due to a lack of other reform elements, such as competition and effective regulation. Similarly, the enthusiasm for development of national ICT policies and e-strategies aimed at overcoming the digital divide did not produce the expected digital opportunities, due to an overemphasis on blueprints with less attention to institutional capabilities, resources, markets and governance and policy coordination issues at national levels. The focus of e-strategies on lists of activities at the national

level has also been one of the major obstacles for investment in core aspects such as capacity building, infrastructure and innovations at the community level.

There has also been a significant divergence between sector reform agendas and efforts to develop national ICT policies in recent years. Sector reform efforts failed to recognise the implication of integrated ICT policies, while national ICT strategies fell short of capitalising on ICT sector reform efforts for creating competitive environments for affordable access. The deviation between the two routes and failure to integrate policy objectives for affordable access with that of application and content was one of the major shortcomings of policy processes over the last decade.

Policy and managerial capacity: There is a significant lack of policy and managerial capabilities in developing countries that has often resulted in inadequately planned and executed ICT projects. On one hand, there is a lack of demonstrated benefits from ICTs in addressing ground-level development challenges. On the other hand, there has been a significant focus on pilot projects that were unable to scale up and make a significant long-lasting impact. This has been exacerbated by the lack of participation by poor and pro-poor groups in public policy and decision-making processes. A focus on ICT-based solutions by technology experts means that information and knowledge that arise in poor communities are often ignored.

The absence of adequate financing is another challenge to pro-poor ICT access. Donor funding has been the main source of financing for ICT initiatives in most countries, but a few donor-funded projects have proven to be self-sustaining once external assistance (financial and material) has run out.

5. The road ahead

The ICT opportunities and trends discussed above and the challenges of poverty necessitate creative approaches to pro-poor ICT access that are grounded in community participation, appropriate choice of technological tools and relevant content. A number of barriers still stand against widening the potential of ICTs for poverty alleviation, including unfavourable policy and regulatory environments, absence of adequate applications and tools, and lack of financial resources.

Government policies and regulation are perhaps the most constraining barrier of all. It is difficult to mobilise resources and forge public and private partnership without enabling government policies, laws and regulations. Policies also affect ICT infrastructure provision (including in the last mile) and investment in applications, services and content. One major area where policy and regulation have considerable implication is spectrum management for the deployment of broadband wireless networks in rural areas. Another area pertains to the rules regulating micro-payments and mobile banking.

Pro-poor ICT access requires concerted efforts in addressing these policy challenges through capacity building and advocacy at all levels. A community-driven approach supported by an enabling policy environment will have potential for mobilising resources, promoting public and private partnerships, and utilising complementary tools and technologies to bridge the access gaps of the poor.

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