Analysis of opportunities and emerging issues in ICTs

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ICT4D GLOBAL POLICY FRAMEWORK

i. The most widely accepted vision for ICT4D, developed at the international level in 2005 through the World Summit on the Information Society (WSIS), is to move toward creating an inclusive Information Society, as detailed in the WSIS plan of action[1]. Its implementation has met with differing levels of success across the world, largely reflecting the different stages of development and the issues being confronted by the countries. Ten objectives have been set which can grouped in the following three areas: (1) connect key sectors with ICTs including health, education, public information centres and libraries with a special focus on isolated rural areas; (2) ensure the insertion of ICTs to education including the development of adapted curricula at all levels; (3) facilitate the development and access to content in all languages. The section of the WSIS action plan dealing specifically with agriculture is "C7. ICT applications: benefits in all aspects of life". (Commentators noted at the time that the technology focus was perhaps somewhat narrow and limited in scope of application[2])

ii. Crucially, the Plan stressed the need for multi-actors involvement[3]: (a) Governments have a leading role in developing and implementing comprehensive, forward looking and sustainable **national e-strategies** in dialogue with the private sector and civil society; (b) The commitment of the private sector is important, not only as a market player but also in a role in the wider sustainable development context in developing and diffusing information and communication technologies (ICTs), for infrastructure, content and applications; (c) The commitment and involvement of civil society is indispensible in creating an equitable Information Society, and in implementing ICT-related initiatives for development. (d) **International and regional institutions,** including international financial institutions, have a key role in integrating the use of ICTs in the development process and making available necessary resources for building the Information Society and for the evaluation of the progress made.

iii. In Developing countries, progressive (de-)regulations are fostering competition, thus improving telecommunication sector performance. For example, the liberalisation of the market in the mobile phone sector has resulted in improved services, cost reduction, and increased market penetration. A major challenge is "*…in terms of implementation, as many developing countries are still focused on physical deployment of ICTs, they do not yet have the capacity to extend them to e-government usage for the advantages of the efficiency of ICT in daily workflows systems and networks and the transparency and accountability it offers"* [World Bank, 2009].

CURRENT TRENDS

iv. The new ICT4D environment is dominated by two major developments: (1) the explosive growth and proliferation of mobile phone technologies and supporting wireless infrastructures and (2) thanks to infrastructural developments, the further penetration of the Internet (with the increasing availability of ICT access-points) and the rise of the so-called Social Web, Web2.0 or participatory web.

v. **Mobile telephony.** The use and potential of mobile phones is currently the dominant topic in ICT4D, given the rapid development and spread and of the technologies and their myriad uses.

[1] WSIS Plan of Action.2003. url: http://www.ictdevlibrary.org/downloads/01_wsis_action_plan.pdf [accessed 26-08-2010]
[2] See Aida Opoku-Mensah (2005). ICT Update 23 http://ictupdate.cta.int/en/content/download/565/27298/file/23_EN.pdf and ICT Update 29 http://ictupdate.cta.int/en/content/download/559/27278/file/29_EN.pdf
[3] Principles and elements of a Global Alliance for ICT and Development (Multi-stakeholder Forum). 12-2005

This growth has been driven primarily by wireless technologies and liberalization of telecommunications markets, which enabled faster and less costly network rollout. Between 2003 and 2008, the most dynamic economies in terms of increased mobile penetration were outside the developed world. A common feature among these economies is increased liberalization and in some cases catching up with neighbouring nations of similar economic circumstances [UNCTAD, 2009]. By the end of 2008, there were an estimated 4 billion mobile phones globally (Wireless Intelligence 2008 [1]). New telephone connections in low- and lower-middle-income countries have outnumbered those in upper-middle- and high-income countries since 1998 (World Bank 2008c). And virtually all new mobile customers in the coming years will be in developing countries (GSMA 2008). *"No technology has ever spread faster around the world"* (The Economist 2008a). Mobile communications have a particularly important impact in rural areas, which are home to nearly one-half of the world's population and 75 percent of the world's poor (World Bank 2007). The mobility, ease of use, flexible deployment, and relatively low and declining rollout costs of wireless technologies enable them to reach rural populations with low levels of income and literacy. The next billion mobile subscribers will consist mainly of the rural poor. Mobile operators are therefore taking innovative approaches to connect rural customers, and at the same time offer service such as m-banking (The Economist 2008a, Cranston, 2009). In contrast to many earlier ICT4D initiatives, the mobile sector is proving itself markedly more attentive to revenue and service models which meet the specific needs and contexts of both urban and rural populations.

vi. The majority of mobile services have been based on SMS rather than web technologies although with the appearance of smartphones, the potential of mobile widgets and application stores which connect to the Internet are receiving greater attention (Cranston, 2009, Cranston and Painting, 2010). This is an example of technology convergence: in the private telecoms sector, the key players have decisively moved towards voice, data, and media services being transmitted over the same network. "Such convergence could have an enormous impact on economic and social development - increasing productivity, lowering transaction costs, facilitating trade, and increasing retail sales and tax revenues.... [4]". As technologies increasingly converge, it is quite likely that mobiles or handhelds (rather than the personal computer), will be the standard platform for accessing the Internet in the future. It is important that the necessary legal and regulatory frameworks are developed to harness the benefits of such technological convergence and to stimulate innovation.

vii. Mobile phones are at the vanguard of a wave of multi and single function mobile devices with networking capabilities which also include PDAs,MP3 players, netbooks, e-book readers and cameras. Concomitantly there has been an increased development in wireless technologies including Wifi, WiMax, LTE, Bluetooth, Mesh and mobile phone data channels (GSM, GPRS, 3G…). This is leading to an environment for service delivery and outreach characterised by *"…an unpredictable mash-up of phones, computers and innovative connectivity solutions*" (Steve Song, 2009). Notwithstanding the current popularity of SMS based services (essentially "walled gardens") the continued use of web technologies in the delivery of content and services is a key strategic consideration for the future in view of cross platform compatibilities and scalability.

viii. **Mobile phones** possess three channels of communication which are ripe for exploitation in different ways for mobile applications and services and content delivery (Boyera, 2009):

ix. Voice channel, for person to person communication. Automated, voice enabled services can be set up externally which are built on speech recognition and text to speech tools. VoiceXML is an international standard, widely promoted, which aims to bring the advantages of Web-based development and content delivery to interactive voice response applications. In view of the well-documented problems of literacy in developing countries, voice enabled services are seen as an important priority for development practitioners (e.g. for Q&A services) although have a number

4 World Bank. 2009. World Report: Information Communication for Development. P.29

of drawbacks, namely the costs of the infrastructure and the costs of speech recognition modules (some free/open source modules exist with limited functionality).

x. Signalling channel (SMS/USSD). SMS was first developed as a person to person communication medium with only a very limited size (160 characters), however, it has rapidly developed into the leading mobile platform for broadcasting information and requesting and receiving information and thus forms the basis of many successful services (e.g. Esoko). While popular (owing to the ubiquity of basic handsets), the technology is inherently limited and services are expensive to run (namely, the set up of the platform and the comparatively high cost of SMS messages). With the expected future evolution of mobile handsets and networks, the predominance of SMS is likely to wane. However, with the anticipated fall in SMS costs coupled with further integration of SMS applications with Web applications and content, SMS is likely to remain an important channel for the foreseeable future. The other signalling channel, USSD, is little used for service delivery owing to the dependence on the network provider and the lack of generic tools.

xi. Data services. This channel is used for connecting the handset to a targeted computer or network using IP (internet protocol) and is therefore used to connect to the Internet. Such data services are not available on all networks although the rapid rollout of technologies such as GPRS (2.5G), 3G, Wifi, Wimax and LTE are increasing the availability of a "mobile Internet" on handsets which is of huge significance for the delivery of mobile services and information using web technologies – a key strategic consideration. The potential of mobile application stores on smart phones is an added consideration and is likely to shape how the channel is used.

xii. **Smartphones** are top-end, sophisticated mobile phones with multi-functionality (including GPS, camera/video, 3G/Wifi/Bluetooth connectivity etc.) which also allow the user to install and run applications based on a specific operating system (Most lower end phones are able to run java based applications[5]). Applications are proving wildly popular in the developed North thanks to the success of the Apple iPhone and similar services from Google for the Android platform, Nokia with the Ovi Store, and Qualcomm with the Plaza service. In fact, the popularity is such that 25 billion downloads are predicted by 2015[6]. Moreover, mobile applications can facilitate access to development-oriented services on the Web. Together with development work on interfaces for illiterate users, there is a great potential to lower some of the barriers to access web based content and to integrate with other functionalities of mobile services such as location based services. Indeed, application stores can be considered as not only a new entry point to content for users, but also a service model for content developers such as organisations like CTA with an interest in expanding outreach to users.

xiii. **Broadband Internet connectivity:** There were an estimated 400 million fixed broadband subscribers around the world at the end of 2008. Developing countries accounted for almost 40 per cent of these subscriptions, making broadband one of the few ICTs where developed countries still represent the majority of users. The digital divide is particularly pronounced in the case of broadband: (a) average penetration was more than eight times higher in developed than in developing countries; (b) broadband speed - low-income countries' broadband connections generally remain relatively slow; (c) a "broadband price divide": the cost of using fixed broadband tends to be the highest in low-income countries. In spite of this, the fastest growing broadband markets are found in large emerging economies [UNCTAD, 2009]. In developing countries, broadband networks are developing mainly in the potentially profitable cities and intercity corridors while low income groups and people living in commercially less-attractive provincial and rural areas, tend to be left behind. The situation is likely to improve due to massive undersea cabling projects[7] underway: in July 2009 broadband internet access was brought East Africa thanks to the Seacom undersea cable which now links Kenya, Uganda,

[5] e.g. see http://masawa.org/

[6] See Perez (2010) 25 Billion Mobile App Downloads by 2015 http://goo.gl/USnb

[7] E.g. see http://www.cablemap.info/

Tanzania, Mozambique and South Africa to highspeed networks in Europe and India. By 2010, it is estimated that 21 countries in the East Africa will become connected thanks to the Eastern Africa Submarine Cable System (EASSy). This will have a great impact in a region otherwise dependent on expensive and sometimes unreliable satellite links to the internet.

xiv. **Social web (Web 2.0) tools and applications**. Along with the popularity of mobile phones, the rise of social web or web2.0 has been a major phenomenon in the past 5 years, fired by the emergence of cloud computing and massive "server farms" and the tumbling prices of hardware. Central to web2.0 philosophy has been the shift towards placing the users and their networks at the heart of the tools and applications, allowing unprecedented levels of information sharing, collaboration and "crowd sourcing" to political activism. These changes have caused turmoil in the publishing and media industries as they struggle to come to terms with the new landscape. Web2.0 is a tremendous opportunity for development organisations and one of the key strategic challenges is to consider ways of mainstreaming these practices in organisatonal behaviour. For the **open society**, there is a clear consensus that content (including local) needs to be collected and accessed by all. Also that there is "democratization" of innovation in which the users of products and services innovate for themselves (von Hippel, 2005), or at least participate in the co-creation of products and services. This is another form of harnessing collective intelligence that taps into the 10-40% of user-innovators – those users who engage in developing or modifying products (Henkel & von Hippel, 2003; von Hippel, 2005).

ICT4D SERVICES AND MARKET

xv. **ICT Global Market:** This sector is expanding, and developing Countries are seizing the opportunity to build local industries[8]. Emerging economies such as India, Costa Rica, Guyana, or Senegal have become key exporters of ICT goods and services. Given the large potential market for IT services and ITES (IT Enabled Services), there is an important opportunity for more countries to participate and benefit. The opportunity is especially attractive because only about 15 percent of the potential market, or about $65 billion in 2007, has been exploited so far. There also remains significant room for growth from new entrants: estimates by McKinsey suggest that only about 27 percent of the market potential will be realized by 2010. Countries that meet the requirements of the untapped IT and ITES market are likely to experience rapid growth in these industries. However, many countries have major gaps in their ability to compete in the IT services and ITES markets, most notably in relation to scarcity of skilled labour.

xvi. **Public-private partnerships (PPPs):** It is a win-win relationship between the government and various private sector players for the purpose of delivering a project or service by sharing the risks and rewards of the venture [World Bank, 2007]. This approach is increasingly used in developing countries for promoting e-government, ensure competitiveness, sustainability, and effective management of various ICT4D projects. In this model, private sector takes in general the lead for providing ICT infrastructure and services whereas the Public sector ensures a more liberalized and favorable policy and regulatory framework. PPP has been quite successfully applied in many developing countries such as […] Nigeria, where multiple broadband network companies have developed in competition with each other (World Bank, 2008). Competition is also emerging among companies that install submarine fiber-optic cables providing international broadband connectivity to developing countries, such as off the east coast of Africa, where three submarine fiber-optic cables are currently under development (Technology Review 2007). The key to the success of these projects will be ensuring that they are structured so that the private sector has sufficient incentives to invest and operate networks efficiently while also achieving the governments' policy objectives of broadband network rollout. However, there are key

8 The services sector is growing globally—it already accounts for 70 percent of employment and 73 percent of gross domestic product (GDP) in developed countries and for 35 percent of employment and 51 percent of GDP in developing countries (UNCTAD 2008).

obstacles that must be overcome, including clarifying public/private sector roles, developing solutions to poor infrastructure, and generating sufficient awareness of services among farmers. Issues to be considered includes more education of all stakeholders so as to have a good understanding of what PPPs imply.

ISSUES TO CONSIDER

Key Principles

Taking a 'people first' approach, by concentrating on capacity building and education, ensuring appropriate regulation and ethical practices and dealing with infrastructural issues as they relate to rural communities, the benefits of the new technologies can be available to all.

ICT Update (2009)

xvii. **People first – development and ICT**. The ICT4D 2.0 Manifesto (Heeks, 2009) summarises the situation as follows: "ICT4D 1.0 initially took an invention-down approach – bringing new technologies into development contexts – much more than it took a use-up approach of understanding how existing technologies were being applied within poor communities … If ICT4D 2.0 does shift the invention—use balance, that would mean: Less emphasis on what might be used … and more emphasis on what is actually used … Less emphasis on fundamental technical innovation; and more emphasis on application and business model innovation …Less emphasis on piloting and sustaining new applications, and more emphasis on assessing and scaling existing applications."

xviii. It is important to keep in mind that the technologies should not overshadow people and institutions. Thus, the Centre should ensure the effective involvement of ACP stakeholders in the design and implementation of ICT4D programmes. While looking at the environment, the Centre is well placed to continue acting as a network facilitator and capacity building enabler in order to assist ACP stakeholders to address emerging issues with regards to ICT inclusion in rural areas.

Areas of interventions

Awareness raising, capacity building and access to content and services could be the key areas to focus on.

xix. There is a need for support and donor agencies such to be increasingly involved in the global debates and initiatives and be willing to contribute intellectual and financial resources within the framework of its mandate and capacities. This involvement can be done through physical and virtual participation to strategic meetings and conferences. More importantly, these agencies should continue to support the effective participation of rural communities of developing countries in these debates through direct support and by sharing with the international community ACP ICT4D field experiences.

xx. ICT4D awareness bulletins such as the CTA "ICT Update" are important resources which can contribute to document the progress of many ICT projects and trends in ACP countries and the contributions ICTs have made to agricultural and rural development. Currently produced on a bi-monthly basis, the ICT Update bulletin could be expanded to raise awareness regularly on the potential of emerging technologies (e.g. VoiceXML) and innovations in the use of existing technologies.

xxi. In addition, within there is a need for joint effort in developing an ICT4D Observatory a platform which will systematically monitor and document ICT4D projects in ACP rural areas and lessons learned from their adoptions.. This would further the understanding of the commonalities and differences in context between the different developing regions of the world, highlight the specific challenges in the different application fields and possibly investigate the role of emerging social networks in Development, and how tools/applications/approaches could take advantage of these existing virtual communities

xxii. Developing organisations such as CTA should pay attention in the promotion of field experiences through for example study visits and country events. Study visits will help promoting the best (ACP and other) practices thus constitute learning experiences for ACP stakeholders. Country events could serve as a platform for highlighting key achievements of projects supported by these agencies in a particular country. These events can both serve as promotional and monitoring tools.

xxiii. Support should be provided to organisations and institutions which are delivering tailored training programmes to the need expressed by the regions with a clear link to the global agendas. For example, many ICT4D networks in ACP countries are currently involved in improving competences in business process outsourcing ICT services such as digitization of records for government ministries, national private sectors etc. Support should be provided to these organizations to play a lead role in these trainings including the provision of accredited certifications to trainees, important for self promotion and career development.

xxiv. Another area to explore is the collaboration with Universities for opening ICT learning opportunities to grass route organisations and networks. This collaboration can be done through the development of adapted curricula and training materials. Institutions to consider include the Virtual African University, the Campus francophone or the commonwealth of learning.

xxv. With regards to increasing access to content, donor and support agencies should consider ways to encourage local ICT innovations especially young entrepreneurs involved in the development and adaptation of ICT applications.

xxvi. Regarding open access initiatives and other standards initiatives, more support should be provided to a number of initiatives including (a) the development or improvement