A Dialogue on ICTs, Human Development, Growth, and Poverty Reduction

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In September 2003, IDRC organized A Dialogue on ICTs and Poverty: The Harvard Forum. The current paper has been drafted as background for a second Harvard Forum - A Dialogue on ICTs, Human Development, Growth and Poverty Reduction, September 2009. Six years later, much has changed. Trends highlighted at the Harvard Forum and elsewhere have progressed and many have accelerated. ICT regulation and policies have improved in many countries, often in response to good research and advocacy. There has been explosive growth in mobile phone access and use in all regions, with both private and non-profit operations servicing the ?bottom of the pyramid? (BoP) with very low-margin, high-volume business models.

In both poor and wealthy countries and populations, mobile phone use has enabled and facilitated the expansion of markets, social business and public services. An entire range of economic services, enabled by mobile phones, has emerged ? banking and financial transactions, marketing and distribution, employment services, personal services, and public services. [1] Beyond economic impacts, improvements are being made in other freedoms or dimensions of well-being: personal security, political participation and accountability, peace, dignity and opportunity.

Communication and networking enabled by information and communication technologies (ICTs) are proving in other related ways to be economically, socially, and politically transformative. Their central part in openness and in innovation is striking. Internationally, the spread and appropriation of ICTs has been a key dimension of globalization, urging societies to build communications systems and manage them well, develop infrastructure and the capacity to use it, and implement good policy and regulation. In the right environments, both business and non-profit enterprise have been very effective in rapidly expanding connectivity and services.

One should not forget the negative aspects and possibilities of communications-based transformations, such as mobile phones being used to fan violence, cyber crime and terrorism, and our vulnerability to disruption of communication. In addition, both nationally and internationally, control of communications is often contested, and openness a constant battle.

And yet, affordable mobile Internet ? smart phones and data services ? exists today in wealthier societies and could become near universal in the next generation. Compared to six years ago, there is ***much*** more development and research or knowledge base; both conceptual thinking about the transformative impacts of wide-spread communications, and empirical knowledge of ICT demand, use, costs, benefits and impacts.

There is so much activity and so many resources now that it is not possible to survey them thoroughly, and it is also challenging to draw out larger narratives. The main purpose of this paper is to provide glimpses of, and links to, a wide variety of research and action regarding ICTs, human development, innovation, growth and poverty reduction. In addition, for purposes of discussion, the following narratives are put forward with acknowledgement of their subjectivity.

Arguably there are five main stories which come together at many points in the literature: universal access, economic and social services, openness, human development and innovation.

Connectivity and universal access

The first story is the dramatic increase in ICT connectivity and use globally, with usage nearing universal in many developing as well as advanced countries. Usage is lowest in Africa, on average, but the growth rate is highest in that continent. The poorest of the poor are still unconnected, but very poor people spend surprisingly large fractions of disposable income on mobile phone use including calls, messages and other innovative techniques to communicate cheaply or for free (e.g., beeping and ?missed call? messages). Research shows that poor people, like others, value communication highly for social, economic, and other benefits. Both need and effective demand exist. Increasingly, so does supply, through low-price business and non-profit activity, as well as public support in infrastructure, policy and regulation, universal access schemes, and investment in the full range of public and social e-services.

So this is a story of demand on one side, and on the other, the combination of technology and all the processes (market, public, non-profit, political etc.) that produce affordable supply. Connectivity is the basis on which all the potential benefits (and costs) of ICTs rest. And while major increases have taken place with mobile phones, there is still a long way to go in many countries and poorest populations ? and in reaching universal broadband connectivity globally.

Services and beneficial access

A second of the five related stories is that of economic and social services enabled or facilitated by connectivity, referred to above ? financial, business and distribution, employment, personal and public services. Well known examples in all populations including the BoP include:

? finance - m-banking, remittance transfer, micro finance and insurance;
? distribution ? primary producers connecting directly with markets, reduced distribution margins and buyer oligopoly;
? employment and income - drivers and, casual workers getting jobs by phone and improving efficiency;
personal ? managing security, childcare and home services;
? public services - telehealth, distance education, many other public services.

Financial and other transactions via mobile phones

- Mobile banking started in the Philippines in the first years of this decade. For the 2 providers, start up investment is estimated at $5-10 million. One processed $123 million/month of transactions in 2006, and the other processed $257,000/day and an additional $28.3 million for the year in remittances.
- In Kenya, Safaricom has a similar system, now with some 2 million users. The system in South Africa is smaller but growing. In Sri Lanka, ?Mobile ATM? began by using mobiles to confirm cash requests by users, who then got cash from a travelling agent; Post Offices later came in as cash providers.

- About 90% of world?s population doesn?t use banks, and a large and growing percentage of the non-banked uses mobiles; the potential banking business appears both massive and, like connectivity, probably low-margin and high volume in nature.
- Global remittances now amount to about $400 billion, and another estimated $200 billion unreported; SMS based transfer systems, inexpensive and convenient, are gaining ground quickly.
- Phones (SIM cards) are becoming all-purpose financial transactions devices, and there is no obvious limit to related transactions ? microfinance, micro insurance and non-financial e-services.
- Poor people don?t have much money, but they have some, and have micro-credit worthy activities. Mobile-based financial transactions potentially bring everyone into financial and other services on an affordable basis. To date, awareness of m-banking and financial services is lowest at the BoP, but there is interest among those who are aware.
- The transition to mobile broadband will happen, but will be slow; in the interim, SMS based systems are spreading or projected to spread to most countries. Business development opportunities are immense, and much of the business development takes place locally.
- The potential transformative implications for poorer populations are striking, as are the business and economic opportunities in developing countries.

Openness and open access

The third story is one that started before ?open software? and ?access to knowledge,? and has become a movement that pushes for openness in all the ?layers? of society: social, economic, legal, and technological (infrastructure, software/logic, content). In some areas and countries, openness is increasing through activities such as open source software, open government, open education, open hardware, and open access to academic journals. In other countries, it appears to be advancing more slowly and in terms of intellectual property protection, progress is highly contested and too often backwards in the case of developing countries. Open IP, open business models, open capital and open society concepts are expanding, and ICTs have been a major factor in all these developments, making it possible to communicate, organize, produce and consume more widely and collaboratively, and making ?closedness? increasingly more difficult to sustain.

Human development and capable access

The fourth story is one of human development and greater attention to individual, external and group capabilities and freedoms, as highest-level development objectives. Inspired by Sen?s capability approach, this movement advances combinations of economic development, social justice and social choice ? the last particularly for public goods, where markets do not function adequately, or in some cases do not function at all. Arrow?s ?impossibility theorem? (formally the ?General Possibility Theorem?) is a result of a breathtaking elegance of power, which showed that even some very mild conditions of reasonableness could not be simultaneously satisfied by any social choice procedure, within a very wide family. Only a dictatorship would avoid inconsistencies, but that of course would involve: (1) in politics, an extreme sacrifice or participatory decisions, and (2) in welfare economics, a gross inability to be sensitive to the heterogeneous interests of a diverse population?.

Addressing these problems fits well into a general program of strengthening social choice theory (and ?nonobituarial? welfare economics). In general, informational broadening, in one form or another, is an effective way of overcoming social choice pessimism and of avoiding impossibilities, and it leads directly to constructive approaches with viability and reach. Formal reasoning about postulated axioms (including their

compatibility and coherence), as well as informal understanding of values and norms (including their relevance and plausibility), both point in that productive direction. Indeed, the deep complementarity between formal and informal reasoning ? so central to the social sciences ? is well illustrated by developments in modern social choice theory.

Agency is central to the capability approach, as are opportunity and equity; equality in the case of gender. Wellbeing is measured in more spheres (political, social, cultural, ethical) and more dimensions than just the economic ones, including education, health, security, dignity and empowerment. Processes of building capabilities and freedoms, as well as making social choices, are critical and easily reversed through conflict, disaster or pandemic.

Informed public discourse is central in Prof. Sen?s writing and the capability approach, an essential ingredient taking many forms in the complex and typically difficult processes of social resolution and choice. Connections between informed public discourse and (open) communications are not hard to trace. And ICTs and communications, especially at the bottom of the pyramid intersect with capabilities and human development in other basic ways; several propositions are advanced in literature and experience, with some initial evidence and a need for further exploration, both conceptually and empirically.

? Communication enabled by ICTs, notably mobiles, is instrumental in building capabilities and enhancing freedoms. The evidence for economic capabilities is substantial, as noted above. The evidence for political, social, cultural and ethical freedoms is also substantial in the form of a large volume of cases and anecdotes.

? ?External capabilities? are defined as abilities to function that are conferred by direct connection or relationship with another person. Examples are numerous of information and communications technologies (ICT) enhancing development by augmenting external capabilities. Capabilities may reside in networks or, perhaps more precisely, capabilities reside in individuals or groups, but exist because of networks.

? Collective consumption is so extensive in communication enabled by ICT services that this communication is a part public good which, much like education, provides a fundamental base for expansion of capabilities and freedoms. When any individual is educated, healthy, connected, other individuals benefit. The mathematics of networking suggests that externalities or collective consumption benefits are in fact ***typically*** large, and clearly related to the extent of openness.

Open access and capable access appear to be strongly connected. Open access raises the level of the resources available to individuals and groups, to increase their capabilities. Open access also includes new means of interaction, participation and collaboration ? which are transforming relationships and represents new forms of social choice ? and are made possible by new information and communications technologies ? “ in particular the emergence of Web 2.0 as a social platform, but also more simple technologies like SMS that allo

? Increased capabilities occur if individuals or groups have the internal capacity (education level, health, political freedoms) to be able to use new technology resources. At the same time, clearly these very capacities are also enhanced by ICT usage, making for a potentially ?virtuous circle? of human development. It is possible that the new technologies and forms of social relationships both require and help generate a new set of skills, and perhaps also moral orientations toward acceptance of opposing inputs and information.

? If capabilities consist of internal capacities that interact with the constraining and enabling resources and factors which the external structure (social institutions, demographic forces, culture, etc) bestow on individuals, open access might be seen as one enabling factor in the external environment. Openness is a social arrangement that is enabled by ICTs and that catalyses the power of ICTs to bring development

benefits. Open content, for example, both in terms of open intellectual property and things like collaborative production drastically increase the amount of information available for productive use. But openness is also in turn based on the capabilities of individuals and capacity of a society built over years and decades.

Innovation and creative access

The fifth story is one of innovation, increasingly regarded as fundamental to development. Science and technology policy literature, and more recently innovation systems thinking, has long regarded ICT as a platform technology in a country?s innovation system; the other two being biotechnology and (emerging) nanotechnology. ICTs among other things are the carriers of technological knowledge and the links that connect the many essential parts of a national innovation system. Lately, considerable attention has focused on innovation in and for the BoP. Here again, ICTs play critical roles as catalysts, knowledge providers and propagators of innovations. Mobile phones, for example, enable or facilitate a range of economic and social innovations among poor populations.

In this context, it is useful to distinguish different aspects of innovation in terms of ***who*** is innovating. For example, Heek?s model of pro-poor (for the poor), para-poor (with the poor), and per-poor (by the poor) innovation, helps clarify that innovation emerges through combinations of these different activities. The proliferation of mobiles was driven both by innovative pricing schemes by telecoms businesses (pro-poor) and by users innovating with the relatively ?flexible? mobile technology (per poor) to create new forms of use that were otherwise not expected or intended.

Further Interconnection

While these five narratives ? connectivity, services, openness, human development and innovation ? may be different in many ways, they certainly overlap conceptually and in the examples covered in the survey paper which follows, particularly the Overviews of Chapter 1. Human development and innovation perspectives, for example, appear in many open access activities, and are beginning to appear in the ICT policy and regulatory research work aimed at universal access. Surveys of mobile phone use at the bottom of the pyramid suggest that ICT-enabled communications build human capabilities and freedoms while providing economic services and personal/family/social interaction and community relationships. For the poor too, isolation is changing quickly into connectedness.

A new strand of innovation systems research and activity addresses the design of technologies for human development, cognizant that new technologies usually expand some capabilities while contracting others, and focusing on technology innovation by and for people at the BoP. ICT access and usage is one particular focus of this work, and a recurring enabler in other strands of innovation. Mohammad Yunus speaks about ICTs and innovation in references quoted in Chapter 1 below. Innovation could itself be advanced as an end goal to which connectivity, services, openness and human development contribute. Alternatively, either human development or openness, broadly defined, could also cover much of the ground.

In applied and conceptual senses, it should not be surprising that connectivity, services, openness, human development and innovation ? or ***universal, beneficial, open, capable and innovative access*** perspectives and approaches - would have a lot in common. In many ways, they may represent a range of reinforcing factors. Connectivity enables openness which enables a greater range of capable access which in turn enables more openness and innovation. Patterns of interaction are certainly more complex than this, but there is some strength to the idea that an increase in any one enhances possibilities for all the others.

The distinctions made here may in fact be somewhat artificial, but they may also be useful in terms of policy, action and research ideas they suggest. More specifically, suggested implications for development policy, action and research in the literature summarized in this paper, and the narratives drawn out above, include the following.

Priorities for policy, action and research

1. The telecom and ICT policy/regulation research and advocacy work that has been very active and effective since the beginning of the millennium needs to continue. Crucial to all ICT-supported developments and movements is progress toward low-cost and universal access. Universal/affordable broadband access ? much of it mobile - appears possible for the coming generation, but will need concerted policy as well as technology and supply attention.
While much has been done to improve ICT policy and regulation in many countries, there are still too many exceptions. Further, regulation needs to keep up with rapidly changing technologies. And in addition, ICT regulation increasingly needs to mesh with regulation in other sectors ? most notably financial services ? " a challenge which has only begun to be addressed in most developing countries.

For the BoP of this generation, expansion of low-cost SMS based financial and other services looks to be taking off, with high value for applied research and policy analysis that helps support expansion and management of country systems and capacities.
The relationship between policy that determines the nature of the telecoms infrastructure, IP laws, etc. will have a large impact on the all layers of 'openness' in the future; this, in turn, will impact on the spread of content, the possibilities for participation, collaboration, building on the knowledge of others and, consequently, human development and innovation.

2. Research on mobile and ICT usage, particularly at the bottom of the pyramid (BoP), will continue to be very valuable for informing policy, market and social business development, and some of it might usefully include more attention to ways ICTs may strengthen a range of capabilities in individual, local and broader development contexts ? through both survey-based research and through case study and anthropological studies. Public, private and non-government ICT investments could become larger and more efficient as a result.

3. The trend, for open access thinking and activity to focus more on the BoP, could usefully be intensified. Compared to wealthier populations, BoP transformations supported by ICTs / communication / networking / information are substantial, but are in some ways different in nature, and start from a much smaller base. Health, education, livelihoods and other wellbeing and capability enhancing initiatives will continue to need and merit subsidy for the ?***very-BoP***,? and good investments and operations will need to be designed, built, managed and shared in e-government services, non-profit and business models.
What are the specific types of information whose openness and availability would be most valuable to BoP groups?

The first Harvard Forum directed research attention toward social entrepreneurship for connectivity and services for poorer populations. Six years later, one might: 1) expand that attention to include business and government as well as not-for-profit models; 2) maintain e-services focus on health, education and security; and c) underline the importance of telecenters as well as mobile phone access and usage.

4. The trend toward accepting agency (beyond just participation) in development initiatives could become

more general, suggesting more knowledge and networking around truly participatory service and benefit delivery models that work. While there is a substantial knowledge base here, it could be made clearer with respect to investments which are more and less transformational in terms of capabilities, and more likely sustainable by consequence.
Poor grade 4 kids can learn biotech along with daily health knowledge and core subjects, if all the pieces are in place for that to happen: school, teacher, sufficient nutrition/health and inclusion/security to attend, Internet, content, language etc. Priorities are not easy to set, and again agency is a primary basis, aided by human, knowledge and financial resources outside the BoP and internationally. A lot is known, so the volume of development investment should be increased in this area, and the ***very applied*** supporting research done.

5. Innovation system literature, among other things, says ?experiment, learn, improve? at all levels. Supporting innovation throughout society and in the BoP is a current trend of research and development in the science, technology and innovation systems area which merits more knowledge, action and experience building, and it connects with further research mentioned above on ICT usage and capability building at the BoP.
The relatively recent focus of innovation thinking on capabilities looks valuable to pursue. Helping design both product and social technologies from the point of view of (poor) users and their capability enhancement ? and agency ? is challenging. Different designs can affect some capabilities positively and others negatively. Assisting people in the BoP to optimize their ICT-related technologies and innovation is a promising area of research.

6. At this time, one cannot forget that the processes of increasing ICT contribution to human development, sustainable growth and poverty reduction are particularly challenged by global financial and economic crises. Over the coming months and more, many organizations will be monitoring the impacts of the global crisis on economies, businesses and employment, public services and households - and both identifying and carrying out key mitigation measures. Negative impacts have and will spread through all forms of international ?transactions? - falls in credit, exports, remittances, foreign direct and portfolio investment, ODA and flows of knowledge.
Impacts on communications systems and more particularly on their users could be substantially negative, arresting progress in economic and the other spheres, with particular impact on the poorest. At stake in all sectors are advances in incomes, jobs, work, education, health, security, equity and social functionality. Good management and responses will be central to reducing negative impacts. ICT research and support systems are being scrabbled together and need more backing on an urgent basis as of the time of writing in early 2009.

In the current global economic conditions, the ways in which ICTs can strengthen social safety nets, and both national and international risk mitigation capacities more broadly, merit particular attention in research, policy and investment. It is becoming clear that recovery and sustained development will require the confidence (consumer, investor) provided by sufficient social security and risk mitigation. For example, Mohammad Yunus emphasizes the advantages of microfinance ? including ICT-enabled microfinance - over big banking as a stable credit mechanism for large parts of the world?s population. Micro-insurance ? including ICT-enabled ? is an under-studied and under-utilized element of social protection.

The extent and roles of international proprietary and open knowledge flows in globalization and development needs clearer research, together with the impact of the current crises on these flows and the consequences for developing countries and the BoP. Research tends to focus on more easily measured international transactions ? trade, investment, credit, remittances, aid ? but in an increasingly knowledge based economy,

knowledge flows independent of other transactions (such as foreign direct investment) need to be better understood.

7. Finally, global warming and carbon emission are problems urgently needing action. The materials in the paper point to some areas where ICTs are particularly important in adaptation to global warming, but not to a full range of areas of mitigation and adaptation including: energy policy and alternative energies; carbon sequestration; disaster management and preparation for growing incidence of different forms of natural disaster; markets in carbon credits and internalizing the full costs of burning carbon. The role of ICTs and ***informed public discourse*** is likely to be central in all aspects of global warming. Imaginative and forward looking ICT-related research in this area looks likely to be high in return.

[1] These include well known examples like: m-banking, remittance transfer, micro finance and insurance; farmers and fishers connecting directly with markets, reduced distribution margins and buyer oligopoly; drivers and, casual workers getting jobs by phone and improving efficiency; child and house care services; telehealth and distance education.

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