



Chapter 3

LEARNING FROM EXPERIENCE

Our ability to draw conclusive lessons from the experience of recent years in using ICTs for development and poverty reduction is limited somewhat by the fact that there has so far been little systematic evaluation of these efforts. However, it is already possible to discern some basic lessons that can serve as a guidepost for future efforts.

*ICTs and Economic Growth*¹⁰

One of the persistent debates in development circles is over the relative emphasis to give to growth and poverty reduction in national development strategies. While disagreement persists over the extent to which growth is good for the poor, it is hard to argue that sustained poverty reduction can occur without sustained long-term economic growth. Indeed, while none of the Millennium Development Goals is focused specifically on economic growth, it is difficult to imagine how any of the MDGs can be achieved without sustained growth.

Disagreement also persists on the impact of ICTs on growth, even in the richest countries, and on whether ICTs have led to the emergence of a “new economy.” The enthusiasm of the late 1990s in this regard has been tempered by the burst of the Internet bubble, the global economic slowdown of the last few years, and nagging questions about the long-term growth prospects of several of the world's largest — and most ICT-intensive — economies.

¹⁰ A good review of the recent literature on ICTs and growth can be found in Qiang, Pitt, and Ayers (2003).

These second thoughts have led, not surprisingly, to questions about whether and how ICTs can foster economic growth in developing countries. The logical first step in answering that question is to consider some of the causes of poor growth in those countries, and then explore how ICTs might help to address those causes. It is, of course, dangerous to make generalizations about developing country economies, since they vary enormously in size, endowments, challenges, and the nature and extent of poverty they contain. Most countries eligible for the Heavily Indebted Poor Countries (HIPC) debt relief program depend heavily on the export of primary commodities, in the context of increased global competition, declining prices, and persistent rich-country barriers to trade. At least in the short term, it is difficult for these countries to rely on export diversification to help promote economic growth, given their weak institutions and markets, low human capacity, and poor access to capital.

Some developing countries are, on the other hand, (at least in medium-term trends) high-growth economies that have, and are addressing, challenges in reducing the percentage of their population in poverty. Some are societies with high-growth enclaves that have not yet created adequate spillovers to broader growth and poverty reduction. In these cases, it is easier to see how ICT-enabled diversification and increased global trade could serve as an engine of long-term growth, although the spillover effects of ICT sector growth and ICT enclaves has yet to be demonstrated. (This should serve as a caution for those looking to “create their own Bangalores.”) Yet it is safe to say that the majority of developing countries are either low-growth economies or economies where recent growth is from a starting point of low per-capita income and, therefore, widespread poverty. Examining some of the common characteristics of these economies can help us to identify ways that ICTs might foster growth.

The majority of these countries are characterized by weak, poorly functioning domestic markets characterized by poor information flows, low levels of innovation within firms and sectors, inadequate infrastructure (roads, ports, telecommunications), and weak access to investment capital or to domestic and international partners. Access to international best practice and to technical and process innovations is therefore also weak. Low levels of education and skills, particularly among the poor, exacerbate the problems facing firms in these countries and contribute to their weak competitiveness in international markets, particularly in a global economy where “knowledge-value-added” goods and services are an increasing part of international trade. Domestic and foreign constraints on trade, ranging from poor infrastructure and inefficient or corrupt

Small and Medium Enterprises (SMEs) and ICTs

SMEs can be a significant engine of growth and jobs in developing countries, as they are in most OECD countries. They are often a major source of innovation in products and services, and particularly in adapting to the specific needs and desires of the communities they serve.

Furthermore, in many developing countries, a considerable percentage of local economic exchanges happen in the “informal economy,” either in the form of barter or in the cash purchase of goods and services between individuals operating under the radar screen of government regulation and taxation. Creating conditions for a vibrant SME sector helps many informal economy businesses transition to recognized and licensed small businesses, which integrates them better into local and regional markets, positions them better for growth and for expanding their market reach and share, and has the additional benefit for the government of creating tax revenues.

ICTs can help address many of the challenges to the creation and growth of SMEs. They can make them more efficient both by the direct impact of technology on production processes and business practices and by access to global best practice. They can broaden their access to markets, to suppliers, to domestic and international business partners, and to sources of capital. They can improve their access to customers and make it easier for existing customers to interact with them. In all these ways, ICTs can help SMEs serve as an engine of jobs and growth in developing countries.

Yet many of the most serious impediments to the emergence and growth of SMEs in developing countries have little to do with ICTs, or can only be marginally affected by the insertion of ICTs. One of the greatest impediments to SME creation in many developing countries is the complex, time-consuming, and often corruption-prone process of registering a new business and obtaining required permits and licenses. ICTs can help to automate and simplify this process, but *only* if the political will exists, both at the local and national level, to implement such reforms. Given the number — and the power — of those who have a stake in the existing, complex permitting process, this will for reform is often weak.

The focus on SMEs as an engine of growth in developing countries also points to what Sir Arthur Conan Doyle's famous detective, Sherlock Holmes, referred to as the problem of “the dog that didn't bark.” The predominance of SMEs in many developing countries is often partly due to the relative scarcity of large private firms and the difficulty SMEs face in trying to grow into larger firms serving larger (domestic and international) markets. Here again, ICTs can help, but the reasons for the scarcity of larger firms serving larger markets reside in deeper structural constraints — national and global — faced by the private sector in many developing countries. Without a clear focus on this bigger picture of the constraints on private sector growth in developing countries, ICT-led growth in the SME sector is likely to be limited both in its prospects and in its impact on broader economic growth.

customs systems to tariffs and subsidies, further weaken the ability of these economies to compete internationally, deepening the “poverty traps” in which all too many of these countries find themselves.

Given such circumstances, there are obviously, in principle, a number of ways in which ICTs, properly deployed, could help foster sustained economic growth in these countries. ICTs, and the technical and process innovations imbedded in their use, can enhance the efficiency of existing firms and sectors in the use of both labor and capital. They can expose existing firms to global knowledge and best practice. They can create new opportunities for both firms and individuals, both in the ICT sector itself and in ICT-enabled goods and services, both domestic and international — including, for example, overseas outsourcing of data entry and customer service. They can increase the transparency and efficiency of markets and of institutions that shape and regulate the domestic market — including, notably, government. They can improve access to capital and to partnerships, both domestic and foreign. They can improve efficiency and reduce opportunities for corruption in customs administration and other trade-related government services.

Yet ICTs are not a “magic pill” for the problems of developing countries with low growth. Sustained economic growth also depends on a range of other factors that, while they might be facilitated by ICTs to some extent, require concerted action in their own right. Perhaps most important, sustained growth depends on the creation, and continued support of, an appropriate enabling environment for private sector growth and innovation. While the role of government policy and regulation in this enabling environment is critical, equally important is clarifying the role of government and establishing its clear limits, and then making government as efficient, fair and transparent as possible in the execution of that role. This involves a number of extremely difficult decisions that often engage political, economic, and bureaucratic interests that are resistant to change. ICTs can help both provide the tools and mobilize support for these changes. They do not, however, take the place of the more difficult process of policy change and institutional reform.

Furthermore, ICTs do not automatically make firms, or entire sectors of the economy, more efficient and competitive. There is growing evidence from OECD countries that the contribution of ICTs to economic growth, and to the competitiveness of firms, depends crucially on factors other than (though enabled by) ICTs, including skills development, process innovation and organizational change. A common pitfall with ICTs — in the private sector and in government — is the assumption that the process and organizational changes implied by the

insertion of ICTs will indeed be engendered by those ICTs. This often proves not to be the case. As we shall see below, e-government initiatives often succumb to this costly and erroneous assumption.

Experience from OECD countries also indicates that a number of other factors shape the impact of ICTs on firm performance as well, including the size and age of the firm, the extent of competition, management quality, and the broader environment for innovation. This broader environment includes not only access to capital and to domestic and foreign research and development, but the flexibility of the labor market, conditions for and constraints on new-business creation, the strength and flexibility of domestic financial institutions and markets, and human capital/skills development. As a recent OECD report¹¹ concludes, developing countries need to focus on:

- Getting the fundamentals right, so that markets work and macroeconomic conditions are sound.
- Facilitating the diffusion of new technologies.
- Fostering a pro-innovation environment so future technologies will emerge and spread.
- Investing in human capital and adapting labor market institutions and policies to the changing nature of work.
- Improving the entrepreneurial environment to help commercialize new technologies.

The importance of openness to foreign direct investment (FDI) deserves particular mention. Even before the emergence of the ICT economy, FDI had shown itself to be a crucial source of innovation and growth for developing country firms and sectors because of the large amount of knowledge often imbedded in that investment and the international partnerships and market opportunities it engenders. Openness to FDI and, more broadly, trade openness are in most cases strongly correlated with growth in developing countries. Here again, ICTs can help both improve the environment for FDI and trade (both by enhancing the performance of domestic firms, markets and governments and by improving vital infrastructure) and increase the impact of FDI (by helping to disseminate and mainstream the innovations that FDI brings), but ICTs cannot substitute for the policy frameworks and the human, firm and institutional capacity necessary to attract FDI.

¹¹ Tambo in *OECD DAC Journal* (2003). See also the work of the *OECD Growth Study* at www.oecd.org/growth.

Networks, Thresholds, and ICTs

One of the challenges facing developing countries in seeking to reap the economic and social benefits of ICTs is that these benefits seem to come primarily *after* ICTs have reached a certain “critical mass” in a country. When one examines earlier phases of technological innovation in developed countries, such as the introduction of the steam engine or electricity, it is clear that the impacts of these technologies on productivity, and thus on economic growth, came only after a considerable lag. There were two reasons for this. First, it took considerable time for the improvement to be adopted by the majority of firms. Second, it took additional time for them to reorganize their production to realize the efficiency gains from these new technologies.

The same seems to be true of computers and the Internet, according to recent research. While there is still significant argument about whether computers and ICTs have led to

measurable, sustainable productivity growth in OECD countries, there is broad agreement that these effects can begin to be felt only when those technologies reach a certain density in society.

On a related front, it is well understood that the benefits of ICT-enabled networks depend crucially on the size of the network. In the words of Robert Metcalfe's now-famous “law”: “The value of a network gains as the square of the number of users.” While it is true that there are many uses of ICTs in developing countries that do not depend on networks, the low telecommunications and Internet network density of many developing countries limit the opportunities for value-producing economic, social and political interactions, both domestic and international. They also reduce the attractiveness of the country as an economic partner. Thus, low network density can serve to reinforce the poverty traps afflicting many developing nations.

Improving the Livelihoods of the Poor

In addition to fostering broad economic growth, developing countries face the urgent challenge, reflected in the Millennium Development Goals, of reducing the large numbers of poor people in their midst by giving the poor sustainable opportunities to improve their livelihood and increase their income. The poor will often not be the first direct beneficiaries of ICT-led growth in developing countries, since many of the new opportunities created by this growth tend to be concentrated in urban areas and dependent on a certain level of education and skill. The challenge, then, is both to improve the current livelihoods of the poor and provide them with new opportunities appropriate to their circumstances while building their capacities and reducing their vulnerabilities so that, over time, they can broaden their economic opportunities as the economy itself grows and diversifies.

ICTs as Tools of Inequality? Power, Technology Rents, and Poverty

ICTs are not automatically tools of equal opportunity. Much depends on the social context into which they are inserted and the other capacities of individuals and groups. There is considerable evidence from the “Green Revolution” that early adopters of the new agricultural technologies gained a considerable advantage over other, often-poorer farmers, often to the point of putting them out of business. Similar examples exist from efforts to use ICTs for register rural land titles — a vital step in establishing the assets of rural farmers and thus easing their access to credit and government services. In some cases, those with first access to the new registration system have filed fraudulent claims to land owned by other farmers, claims that are then difficult and expensive to combat. Earlier systems of land registry that depended on local government agents did not in themselves prevent this type of fraud, since they were frequently the target of bribes (one of the problems that the new automated systems

were meant to alleviate). And paradoxically, the new, automated systems have not necessarily eliminated the human interface, since many poor, illiterate farmers need help in using the new registries.

This points to the broader problem that many ICTs require a certain level of skill, including literacy, which means that they risk reinforcing existing inequalities in capacity and therefore in access to services, rights and even assets. More generally, when ICTs are introduced into a poor community, those who already have more power, higher income, greater skills, and higher social status are more likely to gain access to those tools and use them to their benefit. This is particularly the case if use of the tools incurs some cost (even modest) for the user. For these reasons, it is particularly important to design ICT interventions in poor communities in ways that actively address these issues of status and differential access.

*a. ICTs and Rural Development*¹²

The majority of the world's poor (roughly 75% overall, 90% in Africa) live in rural and remote areas. Most depend primarily on agriculture for their livelihood. In addition, their agricultural production provides a vital resource for their country as a whole – not just food, but a major source of internationally tradable commodities and thus of national income. Therefore, the productivity of the agricultural sector in a developing country is of great importance not only to the rural poor but to the country as a whole.

The poverty of the rural poor is compounded in many ways by their physical isolation. That isolation translates, in most developing countries, into poor access to markets, weak physical infrastructure, poor health and education, weak access

¹² Good reviews of the role that ICTs can play in rural development can be found in Bhatnagar and Schwere (2000); Chapman and Slaymaker (2002); and Winrock International (2003).

to capital, and poor access to government services. Information and knowledge — about crop varieties, pests, strategies to increase yield, more efficient harvesting and processing technologies, weather and climate, prices and markets — are vital to farmers, but often difficult or costly to access. There are many ways in which ICTs, properly designed and deployed, can help increase access to vital information and knowledge. Yet it is important, first of all, to understand the livelihood strategies of the rural poor, the information and knowledge they do have, and the ways in which they absorb and use information and knowledge. The rural poor in fact possess a rich store of highly contextual (and therefore highly valuable) local knowledge: about which crops work best in which fields, about long-term trends in local agriculture, about local microclimates. They also have well-developed strategies for seeking and sharing information and knowledge — mostly oral, and heavily dependent on social networks and trusted information intermediaries.

This leads to two important points about using ICTs to help rural farmers. The first is that it is crucial to begin from an understanding of the information and knowledge assets of the rural poor in a given region or country, and then determine, in consultation with them, what their priority needs are for new or enhanced information or knowledge. The second point is that the new information or knowledge provided to them needs to be made available in a form that is appropriate and is affordable in terms of its demands on either their cash or noncash resources (including their time).

In addition to enhanced information and knowledge, rural farmers need better access to other resources, to markets for their products, and to a range of government services, including land titling, which is crucial to their ability to seek credit. ICTs can help markets and government institutions work more effectively for the poor by lowering transaction costs, providing better choice, and decreasing opportunities for various forms of rent-seeking, including local government corruption. At the same time, it is important to bear in mind that often, the most critical needs of rural farmers are for inputs other than information and knowledge, such as water, fertilizer, and power.

These improvements in the functioning of rural markets and government institutions can also help create the environment for non-agricultural economic development in rural areas. This is important for two reasons. First, diversifying the rural economy can have positive spillover effects for agriculture by enhancing rural access to infrastructure, credit, government services, and other products and

Information is Power, Sometimes. ICTs, Prices and Markets

A frequently touted benefit of ICTs for poor farmers is their increased access to current information on market prices, which permits them either to choose where to bring their goods, at what time, or to extract a fair price from the middlemen to whom they sell their goods. Similar benefits have been identified in fishing, in that owners of fishing boats can check prices in different ports before deciding where to bring their catch ashore.

It is true, in general, that more complete and current information about prices-at-market can help farmers and fishers secure better prices for their goods, and that ICTs can increase their access to this information in a timely fashion. However, their success in translating this information into better prices depends as well on a number of other factors that have little to do with ICTs. If a farmer has no means to transport his goods to market himself, and there is only one middleman to whom he can sell his goods, his ability to extract better prices from the middleman is limited. If he cannot afford to hold his goods off the market to wait for a better price because they are perishable, or he has limited

storage capacity, or he needs the money right away for other purposes, his negotiating leverage is limited.¹³

Furthermore, even when this price information is valuable and usable, it is not necessary for it to be delivered by the most advanced ICTs. Indeed, many rural farmers already have reasonably good access to price information at market by radio. There are only limited instances where more advanced ICTs (the Internet or mobile phones, for example) provide an appropriate and cost-effective improvement over radio — in particular, those cases where interactivity is required, such as price negotiation at a distance. It is almost always true that we can do with newer technologies many of the things we could already do with older technologies. The crucial question, however, remains whether the improvements offered by the new technology justify its increased cost. In the case of ICTs for price information in developing-country agriculture and fisheries, we need to get beyond the inspiring stories to some more rigorous analysis of costs and benefits.

¹³ *There is a particularly good discussion of this in Hewitt de Alcantara (2001), pp. 25-26.*

services valuable to farmers, while at the same time strengthening local demand for the farmers' products. Second, and just as important, broader rural development, by creating job opportunities and improving quality of life for the rural poor, can help to reduce what has become an endemic problem for many developing countries — the exodus of the rural poor to the cities.

Indigenous Crafts and e-Commerce

Many of the poor engage in traditional handicrafts of various sorts as a way to supplement their income. In many cultures, these handicrafts also provide a welcome (and rare) economic opportunity for women. Yet traditionally the markets for these handicrafts have been local or regional at best, since these craftspersons have rarely had the information or resources to tap into broader markets. In the past several years, there has been great optimism about the potential of the Internet to provide global markets for these crafts. Often with the help of local and global NGOs working in concert, craftspersons have been offered broader outlets for their goods through “indigenous crafts” websites, along with technical support and training to help them respond to new sets of customers. The supporting organizations aggregate supply and

demand, facilitate the commercial transactions, arrange shipping, and ensure quality control. While there have been some modest successes, they have been limited in size and seem difficult to scale up, for several reasons. First, although the commerce might be electronic, the goods are not, and the process of shipping them and receiving payment is still arduous for many craftspersons. Second, it is fairly clear that the global market for indigenous crafts is rather small and particularly sensitive to overall economic trends in richer countries. Third, even those international NGOs and for-profit firms that have sought to tap into this market and help indigenous craftspersons are having trouble finding sustainable business models, as reflected in the recent restructuring of one of the pioneers in this field, Peoplink.

b. ICTs and the Urban Poor

In recent decades, the number of the urban poor in many developing countries has increased markedly, both because of persistent poverty and population growth in cities and because of increased levels of migration from rural areas to urban and periurban areas. The migration mirrors a pattern witnessed in many OECD countries in the second half of the 20th century, as advances in agricultural productivity, the lack of non-agricultural job opportunities in the countryside, and perceptions of the city as a place of opportunity drew millions of rural dwellers to cities. The challenges posed for developing countries by this migration, however, are more acute for several reasons. First, much of the migration comes not because of the success of rural agricultural productivity (increasing the yield per unit of human labor, and thus reducing the need for agricultural workers) but because of the desperate state of life in the countryside. Second, in low-growth

environments, the opportunities for urban employment for these migrants from rural areas are scarce, particularly given their low level of education and skills. Third, the infrastructure and services of many cities in developing countries are already overtaxed and under-resourced, and the large influx of new, needy people adds additional strain. For lack of better options, many of the migrants end up in slums or “informal settlements”, where public infrastructure (even such basic infrastructure as water and sewer services) is often non-existent, disease and crime are rampant, and the poor have few rights or opportunities.¹⁴ Often, the influx is intensified by military conflict or ethnic strife. While the cash income of these poor people might improve as they move to the cities, thus signaling an “improvement” in their lives by the narrow measure of income poverty, their livelihoods usually do not improve and frequently worsen.

There are two overlapping sets of responses that developing country governments must make to these challenges. First, they must create the conditions for job creation and economic growth in urban areas and take measures to increase the opportunities for the poor to participate in that growth. Second, they must help the urban poor improve their current livelihoods and address their vulnerabilities. In simpler words, the challenge is to reduce over time the number of urban poor, and to make life more tolerable for those who remain in poverty. ICTs can help to address these challenges, but their role, once again, must be seen in a broader context.

ICT-enabled job creation and economic growth in developing countries are likely to be concentrated heavily in urban and periurban areas, at least in the early stages, because that is where the necessary ingredients of infrastructure, finance, government services and skilled workers are more heavily concentrated. The need for skills (even basic education and literacy) makes it more difficult for the urban poor to respond to these opportunities. Of course, there are opportunities for job creation and economic growth in developing countries that are facilitated by global ICT networks but are not themselves technology-intensive or dependent on a highly skilled workforce. The exodus of unskilled and semiskilled manufacturing jobs from OECD countries to developing countries is evidence of this. Yet the longer-term trend of imbedding simple skills in process technologies themselves (replacing semi-skilled workers with “smart machines”) means that, over time, the skill demands of even basic manufacturing jobs are likely to increase.

Thus education and training are an important, and obvious, component of providing opportunities for the urban poor to escape poverty and participate in economic growth, and ICTs, appropriately adapted, can certainly help to increase

¹⁴ A detailed examination of the severity of the problem can be found in the new report from the UN HABITAT Programme (United Nations Human Settlement Programme 2003).

access to, and the impact of, education and training opportunities. Yet even for those urban poor who seek to respond to these opportunities (where they exist), and especially for the bulk of the urban poor who do not yet have access to economic opportunities, the daily livelihood challenges facing them are daunting and can often serve as an impediment even to those who seek to respond to existing or new job opportunities.

A recent study for the United Kingdom Department for International Development (DFID) by the Intermediate Technologies Development Group (ITDG)¹⁵ identified eight critical livelihood issues facing the urban poor:

- Housing
- Money
- Water
- Waste
- Illness
- School
- Getting places
- Security

While many of these issues have an information component, in many cases it is not information that is lacking. The problem is, rather, the lack of personal and government resources, adequate infrastructure, coherent and well-implemented policies, and intermediary organizations that help, mobilize, and advocate for the urban poor. Even in urban areas that enjoy vibrant growth and considerable wealth, the urban poor can be caught in a poverty trap from which it is difficult to escape. The persistence of urban poverty in even the richest countries is testimony to this. ICTs can help, directly or indirectly, to address many of the dimensions of this urban poverty trap, by making government institutions more efficient and responsive, increasing the knowledge and skills of the urban poor, including knowledge about how to manage the livelihood issues listed above, and giving a stronger voice to the urban poor and their representatives. More generally, modern technology can help improve the living conditions of the urban poor, by increasing the supply of fresh water and access to sanitation services and increasing the reach of other vital infrastructure. Yet many of the difficult choices required to improve the lot of the urban poor are policy and resource decisions that ICTs can help enlighten and facilitate, but certainly not replace.

¹⁵ Schilderman (2002).



Information Intermediaries and the Poor

Both in urban and rural settings, the poor often rely on trusted intermediaries for information that is crucial to their livelihood. These intermediaries are individuals, informal networks, or formal organizations (particularly NGOs) that have, because of their resources, networks or experience, access to information and knowledge on a particular set of issues that is particularly important to the poor and difficult or costly for individual poor persons to access themselves. More generally, the poor tend to rely for information more on social networks and trusted interlocutors, and thus more on oral information, than on print and electronic sources of information. The reasons for this are complex and vary from country to country, but generally they have to do with a combination of trust, tradition and the lower transaction costs of seeking information from acquaintances.

For these reasons, many discussions about increasing the information and knowledge assets of the poor with ICTs have focused on information intermediaries. The logic behind this is straightforward. If these intermediaries are valuable and trusted sources of

information for the poor, and if it is too difficult for several reasons (cost, capacity, literacy, etc.) to provide ICT-enabled information services directly to the poor, then priority should be given to helping these intermediaries use ICTs to access information more easily, adapt it for the needs of their beneficiaries, and disseminate it more effectively to them.

It is important, however, to be attentive to the local context in pursuing such a strategy. The fact that the poor tend to give more credence to information from a known intermediary makes it all the more important that such information be accurate. While ICTs can help in this regard, social and cultural factors, including power relations within a community, can often shade the motives of these intermediaries, and thus the content of the information they provide, no matter how abundant their supply of more accurate information. Thus it is important to have some understanding of the social role and presumed interests of the intermediaries whose capacity is being strengthened with ICTs. For this reason, it is preferable wherever possible to focus on increasing the choice and variety of information sources available to the poor.

Remittances, Labor Mobility and ICTs

Cash remittances by workers employed in other countries are a substantial and important source of income for many families in developing countries, and a major source of foreign exchange earnings for those countries. Recent World Bank research¹⁶ indicates that remittance flows are the second-largest source, after foreign direct investment, of external funding for developing countries. In 2001, remittances to developing countries from overseas were estimated at \$72.3 billion. Their importance is especially acute for low-income countries, where in 2001 remittances accounted for 1.9 percent of GDP and 6.2 percent of imports. It is estimated that, during most of the 1990s, remittances exceeded official development assistance. For developing countries with significant rural poverty, *internal* remittances from family members who have moved to urban areas to work are also an important source of income for rural poor families, though it is much more difficult to compile aggregate data on these internal remittances.

The scale of overseas remittances points to the vital importance of labor mobility as a source of earnings for many developing countries (and for poor regions within those countries.) Yet these

mobile workers and their families face considerable challenges. Given the weakness of financial and banking systems in many developing countries and the constraints foreign workers face in using the formal banking system in their host countries (particularly acute for undocumented workers), sending remittances to one's family members can be an expensive and difficult process. For workers from Central and South American countries, for example (such as the huge number employed in the United States, one of the largest sources of workers' remittances), transaction costs for remittances average 13 percent and can exceed 20 percent.

Communication between foreign workers and their families back home are often difficult, but vital for several reasons. Family members need to be alerted to an impending remittance. Overseas relatives are often a key source of information on job opportunities. And the well-being of the workers and of their families back home depends in part on their ability to remain in regular contact. (Indeed, arranging remittances and "keeping in touch" with distant family members are the two main reasons that many rural poor people give for their willingness to spend scarce resources for access to telephone services.)

¹⁶ Ratha (2003)

ICTs can help to address these challenges in several ways. Improvements in the performance of banking systems in developing countries, and in access to banking services by the poor, can reduce the transaction costs of remittances, and protect poor workers from exploitation by unscrupulous or unreliable remittance services. Easing communications between workers and their families also reduces the time and money spent at both ends to arrange and verify these remittances. Easier access to information about overseas employment opportunities, and about rights and services available to migrant workers, can improve both the opportunities and choices available to workers and the conditions they encounter once they migrate.

Yet there are broader issues that shape the

remittance economy and the condition of migrant workers that only marginally relate to ICTs. The policies of both sending and receiving countries on labor mobility significantly shape the supply of opportunities for migrant workers. Increasing the access of the poor to banking services, and the costs they face in using those services, depends on broader banking and financial sector reform in developing countries, and on securing the rights of migrant workers in the countries to which they migrate for work. Indeed, increasing the reach and effectiveness of banking services for the poor (and particularly the rural poor) would have a double benefit; it would both reduce the cost and difficulty of remittances and more effectively inject the funds remitted into the recipient economy. This is especially true because, other than those cases where remittances support the basic costs of current subsistence

consumption for poor families, there is strong evidence that remittance funds are usually invested in the local economy, including in the creation and sustaining of new small businesses.



Increasing Capacities and Opportunities

One of the many deprivations that compound the misery of the poor and prevent their rise out of poverty is their lack of access to adequate education, training, skills development, and broader information and knowledge resources that could help them improve their lives and livelihoods. There has been increased emphasis in recent years on the importance of education, training, and access to global knowledge in the context of the emergence of globalized markets and the growth of knowledge-value-added goods and services within that global marketplace. Yet the importance of knowledge to sustainable development and poverty reduction long predates the “knowledge economy.”

Simply put, access to education and knowledge helps the poor to improve their current livelihoods, address impediments and vulnerabilities that prevent them from seeking opportunities to improve their lives, and participate in new sectors of the economy that require greater skills and therefore offer higher incomes. Increasing the education and skills of the population more broadly is also central to any developing country's hopes to grow its economy and compete globally.

Yet education systems in most developing countries are severely challenged. Government budgets, plagued by low growth and high external debt, cannot provide adequate resources to provide quality education for all, even at the primary level. Teacher salaries alone account for most of the education budget in many developing countries, leaving few resources for infrastructure, teacher training, or books and curricular materials. Many poor communities do not even possess a barely adequate school building, or if they do it is largely devoid of even the most basic school supplies. In many countries, particularly in Africa, the teacher corps has been devastated by HIV/AIDS. This profoundly affects both the *quantity* of education available (since the teachers are not easily or quickly replaced) and its *quality* (since the replacement teachers are almost always less skilled than those lost to disease).

Poor parents often cannot afford the school fees, uniforms, and other expenses they are expected to bear in sending their children to school. Many poor parents keep their children, particularly the girls, out of school to help with the challenges of daily life, such as collecting water and firewood and working in the fields.

An increasingly globalized, knowledge-intensive economy puts further pressures on the educational system. Workers in developing countries urgently need new skills in order to attract globally mobile jobs in skilled production and service

sectors. Domestic innovation, which is important both as a source of new businesses and as a way to adapt global innovations to local needs, can be fueled only by a trained cadre of researchers, product developers, scientists and other specialists. They, in turn, urgently need greater access to global knowledge resources and to opportunities to collaborate with foreign colleagues. This also requires a substantial upgrading of both the infrastructure and the capacities of higher education institutions. Thus, the long-standing tension between the goal of universal primary education and the pressure to “skill up” the economy of a developing country in order to compete globally, and thus foster broad-based economic growth, becomes even more acute in the context of a global knowledge-based economy.

ICTs alone cannot solve the dilemmas and difficult choices that developing countries face in this domain. These issues go to the heart of a country's development and poverty reduction strategy and the urgent challenge of priority-setting. There are, however, a number of ways in which ICTs can help address these challenges, if applied judiciously within the context of an overall strategy.

ICTs can help make education bureaucracies more efficient and responsive, both by improving communication flows within them and between them and their various constituencies and by increasing their access to global knowledge and best practice in education. Education bureaucracies in developing countries (as in many developed countries) are often overcentralized, highly bureaucratic and hierarchical, and inefficient. Of course, as in other sectors, the insertion of ICTs into an otherwise-unreformed institution will not magically change it; ICTs can only enable and complement reform, not create it. However, the efficiencies they can help create could free resources (even within an unchanged education budget envelope) for other needs.

One of the most promising areas where ICT can help improve education quality and outcomes, and where we have considerable experience in the past several years, is in teacher training. Developing country educational systems are, in general, plagued by inadequate resources for teacher training and curriculum development, which means that, despite the best intentions of teachers, educational quality is often low. Teacher training has long been a priority of the development community, and the newest ICTs are not strictly necessary, nor are they sufficient, to provide quality teacher training. Books, radio and television programs, and even early computer-based teacher training programs have shown positive results long before the Internet. Yet creative combinations of the Internet (for content access and interactivity) and digitally stored training materials

(including CD-ROMs) can dramatically increase both the *reach* and the *yield* per unit of cost of teacher training efforts.

Here, however, a note of caution is necessary. As in any other application of ICTs, care must be exercised to design ICT-based teacher training programs to meet the specific, priority needs of teachers in a given country, and the measure of their success should be the improvement of the teachers' ability to provide their students with quality education. Networking teachers, both regionally and globally, to share teaching strategies, lesson plans and other experience can be highly valuable, but the measure of its success is the quality of education and the amount of improvement realized for the resources spent, relative to other options, not the number of teachers networked.

Of course, ICTs in the classroom benefit only those who attend school (and their teachers.) The much larger problem facing many developing countries is the substantial number of children, and especially girls, who do not attend school. Achieving universal primary education has been a goal of the international community for a number of years, but the impediments are enormous. ICTs can help in some small ways (e.g., increased efficiency of teacher training, modest savings from bureaucratic efficiencies), but the real impediments are inadequate education budgets, the inability or unwillingness of poor families to pay educational expenses, and the low priority given to girls' education in many cultures.

Given that primary and secondary education efforts are, naturally, locally based, since most children go to school in their own neighborhood or town, ICTs will in most cases serve as a supplemental resource to the "bricks and mortar" of actual classrooms and the students and teachers who interact there. In tertiary, post-graduate and professional education, on the other hand, the context and challenges are different, and the opportunities for using ICTs are considerable. Higher and professional education tends to be concentrated in larger towns and cities in most developing countries, given both the efficiencies of concentrating resources there and the proximity both to complementary resources (infrastructure, government services, private sector partnerships) and to opportunities for graduates. This concentration corresponds, fortunately, with higher levels of access to information and communications infrastructure.

Higher education and professional education, particularly in a knowledge-based global economy, crucially depend for their quality on access to global information and knowledge resources, interaction with peers both locally and globally, and the

ability to acquire, process and adapt large amounts of information and knowledge on demand for specific purposes. This is especially the case in scientific and technical education and training. Yet higher and professional education face the same resource and infrastructure challenges as primary and secondary education in most developing countries. Stories abound of developing country medical and technical universities with almost bare libraries, unable to afford the purchase of new books or subscriptions to scientific journals. The ability, therefore, to digitize and share these materials at near-zero marginal cost is potentially an enormous boon to developing countries. Similarly, the opportunity for students, researchers and faculty to interact with professional colleagues worldwide can add significantly to the quality of their work and permit them to absorb, and adapt to local circumstances, the best of the world's knowledge on their subject. Here again, however, the emphasis must be on the appropriateness of the tools to the priority needs of students, teachers and researchers.

As the recent experience of OECD countries has shown, in a knowledge-based economy learning does not end with formal schooling. Indeed, one of the distinctive characteristics of a successful knowledge-based economy is the ability of its working citizens to learn and adapt throughout the course of their productive lives. There are many elements to this adaptability, including policies and practices relating to labor mobility and firm creation and cultural norms relating to risk taking. Yet a crucial element is the demand for, and supply of, opportunities for lifelong learning and skills upgrading at all stages of an individual's productive life. For developing countries, skill upgrading of the workforce is a critical element in attracting foreign investment and jobs, fostering domestic innovation and new firm creation, and thus promoting broad-based economic growth. It is clear that ICTs can have, and have had, a substantial role in increasing the quality and supply of skills training in developing (and OECD) countries in recent years. The crucial, and difficult, issues in this area involve priority setting and the relative role of public and private resources. Many donor-financed or corporate-philanthropy financed ICT-based skills training programs focus on ICT-related skills and on learning foreign languages, notably English. Some of these programs charge fees, while others do not. In order to bring these programs to scale and make them sustainable, developing countries and donors need to make tough decisions about priorities for public investment in this area and then create the conditions for greater private sector involvement.

One of the challenges in making these decisions about public funding of skills development for the ICT economy is that there seems to be a threshold problem with skills as with ICTs. Once there is sufficient supply of ICT-related skills to attract

foreign investment and ICT-related jobs, paying demand for such skills increases, as does the supply of such skills training both by training institutions and by firms themselves. In developed countries, a good deal of skills upgrading happens *within* firms. Yet skills training alone does not attract new jobs absent other enabling conditions, as evidenced by the uneven success of “reskilling” programs even in the OECD countries, and developing country governments thus have to balance investment in skills enhancement designed to attract higher-paying jobs with other policy and resource priorities. The emphasis on advanced skills should not, of course, obscure the fundamental importance of basic education at all levels. A well-educated population can quickly acquire new skills.

Reducing Vulnerabilities

Poverty and illness go hand in hand and feed upon each other. Poor people are particularly prone to disease and illness for several related reasons. Their living conditions are often unsafe and unsanitary. Their access to safe water and waste disposal facilities is limited. Their diet is poor, low in both calories and nutrients. They are particularly prone to a variety of environmental hazards, such as household smoke from primitive cooking fuels and stoves. Their ability to preserve good health and to treat illness is further compromised by a shortage of medical personnel, medicines and health infrastructure. The medical personnel who do treat the poor are hampered not only by scarce supplies but by scarce information about new threats and new treatments and few opportunities to improve their own skills. These conditions, in turn, keep people trapped in poverty and often return to poverty those who had managed to escape it, because the medical and social safety nets in most developing countries are so weak.

The ravages of HIV/AIDS in developing countries (the full extent of which is only now becoming clear) have intensified this vicious circle of disease and poverty, depriving households of their wage-earner, turning countless children into orphans, and depriving communities of their teachers and other trained professionals, who are at least as prone to infection as the poor, and in some cases perhaps more so. Yet even before HIV/AIDS, developing countries were beset with other persistent and widespread diseases, including malaria and tuberculosis, that have decimated their population, weakened their economies, and deepened the “poverty trap” for individuals, communities and countries.

There are several ways that ICTs can help to address the health challenges facing developing countries. First, the capacity to monitor, respond to, and thus

hopefully control disease outbreaks and address their causes can be significantly enhanced by improving communication flows among, the knowledge available to, and the information-management capabilities of health care professionals at local, regional and national levels. In many cases, time is of the essence in responding to disease outbreaks, and faster communication and information-gathering can often make a dramatic difference in how well an outbreak is contained. More generally, the ability of health care providers to assemble and share timely information about health trends and needs enables a country's health care system to adapt more quickly and target resources more effectively.

Second, ICTs can help improve hygiene and other health-related behaviors by disseminating more broadly what is known about the relationship between hygiene and health and specific information about disease-prevention strategies and behaviors. Here, as in so many other areas of development practice, these efforts long predate the emergence of advanced ICTs such as the Internet. What new ICTs bring to the effort is a dramatically enhanced ability to deliver information wherever and whenever it is needed, to combine and adapt it to specific needs and audiences, to connect health practitioners to share information, experiences and concerns, and to upgrade the quality and relevance of health and hygiene information regularly on the basis of global best practice. However, this is an area where there is much to learn from prior experience about the complicated relationship between information and action. HIV/AIDS campaigns are now encountering a lesson that earlier practitioners of “communications for social change” have struggled with for some time; new information does not necessarily lead to changed behavior. Here again, ICTs can play a valuable role, but they only enable change. They do not create it.

Third, ICTs can enhance the capacity and effectiveness of health care providers. Particularly in rural areas (where the majority of the world's poorest live), the shortage of health care professionals is exacerbated by their poor access to ongoing training and new knowledge and procedures. They also have limited opportunities to collaborate and consult with other trained professionals, particularly specialists who have more knowledge and experience in a given health discipline or with a specific disease or medical condition. By easing their access to knowledge and to colleagues, ICTs can help health care providers in poor communities to know more, act more decisively, and achieve better results for their patients.

Fourth, ICTs can help broaden access to health care, particularly by permitting forms of remote diagnosis and treatment in areas where local health care providers are few in number or have limited skills.

Yet is important to bear in mind that some of the most pressing health challenges facing developing countries have little to do with information, communication and knowledge flows, and hence with ICTs. Most notably, the lack of affordable access to vaccines and other medicines is a major impediment to improving health outcomes in developing countries. The recent controversy over price and patent issues related to HIV/AIDS treatments is only one example of this. And more fundamentally, the underlying causes of poor health in developing countries are so inextricably tied to deeper issues of persistent poverty that even the widespread use of ICTs in health care and disease prevention will go only so far in tackling the endemic health crises of poor populations. This in no way means that such efforts should be abandoned. It simply points to the importance of realism and priority-setting in the use of (scarce) developing country government and donor community resources in improving health and combating disease.

Environment and Natural Resource Management

Balancing growth with environmental stewardship and managing natural resources sustainably constitute a challenge that is not unique to developing countries. Yet it is particularly important to them because of the dependency of the poor (particularly the majority of the poor who depend on agriculture) on natural resource stocks, the vulnerability of the poor to environmental shocks, and long-term environmental and natural resource constraints on growth in many developing countries.

ICTs can help in several important ways with environmental and natural resource challenges. The combination of remote sensing technologies and communications networks can significantly improve monitoring of environmental conditions and natural resource stocks, They can also permit early warning of, and prompt response to, environmental emergencies. Increased awareness of and access to sustainable approaches in agriculture, forestry, and extractive industries can reduce environmental strains. “Cleaner” technologies in industry and agriculture can reduce pollution and lower consumption of energy, water and other resources. ICTs can also improve the monitoring of environmental abuses and the enforcement of environmental regulations, and empower citizens' groups to participate in this monitoring and enforcement. More generally, ICTs can help disseminate knowledge, and raise awareness, about environmental issues and sustainable livelihoods.

This public education, and the integration of environmental and sustainable development issues into public debate, is particularly important as developing

countries work to create the economic growth necessary to meet the Millennium Development Goals and combat poverty. It is important to bear in mind that some of the most significant environmental pressures facing developing countries have their roots in the poverty of those countries. Deforestation, to take just one example, is intensified both by the desperate need of the poor for fuel and their need for agricultural land. While improvements in agriculture, and in the overall economy, might ease those pressures, it will replace them with others common to growing economies, from motor vehicle and industrial pollution to mounting demands on water and an increased need for sanitation systems. In addition, some of the worst environmental conditions in developing countries (and those with the most immediate adverse effects on the population) can be found in the overcrowded poor districts of large cities. One of the greatest challenges for developing countries is to make their rapidly growing cities livable. ICTs for environmental management and sustainable development can help, but they are of course only one small part of the challenge, which has more to do with building national consensus around policies for sustainable growth.

The global context must be considered as well. Recent international negotiations on environmental issues reflect a growing consensus that environmental strains do not respect national borders, and that many of the most serious problems facing the environment, such as ozone depletion, global warming, depleted supplies of fresh water, require regional and global responses. ICTs can help raise awareness about these issues and give greater voice to the concerns of developing countries. However, as experience with the Kyoto Protocol shows, the real challenge in managing international environmental issues is getting all countries, particularly those whose impact on the environment is greatest, to agree on joint action. Once again, ICTs can help enable change and build coalitions in support of change, but they do not create it.

Enhancing Government Capacity, Efficiency and Accountability

The challenges facing developing country governments, at all levels, are enormous. They have to design and implement a vast array of complex and interdependent policies to promote economic growth and combat poverty and to provide a broad range of services to their citizens, and they need to do so with limited and increasingly strained resources, weak institutional and human capacity, and complex and contradictory domestic and international pressures. Even the most well-intentioned government officials in developing countries, therefore, are less effective

than they would like – and need – to be. To compound matters, weak institutions and mechanisms for public voice and participation in government, and for accountability of government institutions and officials, create opportunities for corruption, inefficiency, and the excessive influence of certain individuals or groups, even to the point of what social scientists call “state capture” by private interests. These problems manifest themselves not only at the national level but at all levels of government and public service. Indeed, the opportunities for corruption and private interests dominating public policy and government practice are often greater at the local level, since most services are delivered at that level and citizens have most of their interactions with government at that level.

Both in developed and developing countries, there has been great interest in recent years in the ways in which ICTs might make governments at all levels more effective, efficient and accountable. In fact, it is easy to perceive many of the challenges facing governments — and thus citizens — in developing countries as having an information and communication dimension, and thus to understand how ICTs could play a creative role.

Government officials, and the institutions in which they work, are hampered in many ways by poor information and knowledge flows. They often have weak access to even basic current data about the issues with which they deal and about trends elsewhere in the country. Information flows poorly within most government bureaucracies because of a combination of weak communications infrastructure, hierarchical structures, and rigid bureaucratic cultures. In addition, government officials have limited information on global best practice, and few opportunities for consultation and collaborative problem-solving with colleagues elsewhere. ICT can help in a variety of ways to address these problems, by helping to reorganize and speed up administrative procedures, increasing the volume and speed of information both within government institutions and between them and the larger society, training government officials in global best practice, and permitting greater collaboration and sharing of experience among government officials both within a country and across borders.

At the same time, citizens, and particularly the poor, often have limited information about their rights and the services available to them, about the structure and functioning of government agencies, and about procedures for requesting services. Because they also have limited information about the performance of government in delivering these services, they have little ability, individually or

collectively, to hold government accountable, and few outlets for expressing their concerns. Even where citizens are aware of their putative rights, exercising those rights (and even establishing their own legal status to assert those rights) can be burdensome because of complex and obscure procedures administered by sometimes self-interested public authorities. This applies not only to the poor person seeking to apply for government documents or services but also to the entrepreneur seeking to create a new business, since in many developing countries creating a new business requires a complex, costly and time-consuming set of permissions and documents, each of which provides an opportunity if not for graft, then at least for improper discretion on the part of government officials.

In such an environment, where incentives to perform for public benefit are weak, incentives to turn government resources to private advantage can be strong. Since the desired government service or document is highly valuable to applicants (either because their livelihood crucially depends on it or because it is an unavoidable step in creating a business or seeking out a new opportunity), and they have few opportunities either to call the official to task or to circumvent them, they often have little recourse but to pay the official the requested bribe. Strictly speaking, the problem is not that information is scarce. On the contrary, everyone knows what bribes are necessary, and everyone knows which officials are taking bribes. The problem lies with the structure of incentives and the power of the actors.

Nevertheless, ICTs can play an important role in combating corruption and making government institutions more transparent, by reducing the opportunities and incentives for and increasing the costs of corruption. The most obvious role for ICTs is to “disintermediate” between the citizen and the services, procedures and documents she requires by automating, and making widely accessible, many of the simpler procedures which have traditionally depended on the involvement of a local government bureaucrat. If a citizen can directly access a needed form, acquire required documents, permits and certifications, or register a new small business, using automated procedures, the opportunities for corruption are reduced.

ICTs can also empower individual citizens and groups to hold government officials publicly accountable, by widely disseminating information not only about the resources available to local governments and agreed performance measures for spending those resources, but also about the government's actual performance relative to those measures. Furthermore, ICTs can increase the

e-Government: Some Caveats

The experience of recent years in a number of countries leads to a number of caveats in designing an approach to e-government. First, ICTs do not, of themselves, change organizational cultures and practices. This is a lesson that should already have been learned from widespread efforts in the past few decades to automate government ministries, but the lessons from these past efforts are not widely known. The social organization of work, particularly in tradition-bound and highly hierarchical institutions such as government ministries, can significantly impede the takeup and effective use of ICTs. In many bureaucratic cultures, including those in some OECD countries, using a computer is viewed as a clerical function, “typing,” to be done by secretaries and clerks. In rich-country private sector firms, the widespread penetration of desktop computers in white-collar jobs coincided with, and was related to, the flattening of management hierarchies, the thinning of secretarial and clerical ranks, and the shifting of those lower end functions to a combination of “smarter” software and the expectation that workers further up the ladder would do their own typing. ICTs create the conditions for this shift in the culture and structure of organizations, but in government bureaucracies (and particularly in hierarchical cultures) resistance to this change can be substantial and long-standing. Nor, more generally, do ICTs of themselves create broader institutional reform and the redesign of government processes and procedures. An added source of resistance to

this restructuring, and the shrinkage of government payrolls which it often entails, is that the civil service is often a considerable source of employment, and patronage, in many developing countries.

Even when there is widespread commitment to bureaucratic reform, the task can be monumental and expensive. Converting handwritten records, reskilling staff, installing computers and networks, and retooling procedures can require enormous commitments of money and manpower. And since the costs are more immediate and visible than the benefits, resistance can easily mount given other pressures and priorities.

The ability of ICTs to make governments “smarter” both in the formation and implementation of policy is limited, of course, by the fact that policy making and implementation are complex and often highly political processes where, even if there is a “best” solution, it is not always the one that prevails. This is not to deny the importance of increasing the information and knowledge available to policy makers and civil servants, and the benefits of ICTs in this regard. It is simply to insert a note of caution that few government decisions, in any country, are made by purely disinterested parties on the basis of the best information available to them. Furthermore, there is often a significant disparity between a general policy and the various instances of its implementation.

This, however, is where the third type of “e-Government” can be useful: increasing the transparency and accountability of government officials by increasing public information and voice. The ability of government officials at all levels to exercise undue discretion or profit personally in the making and implementation of policies and the provision of government services can be diminished if more citizens know what services they are entitled to, what procedures are normal, and what resources government has committed to spend on public services in their community. It can also enable citizens to band together to seek redress of grievances, push for the removal of corrupt or incompetent officials, and work for equal rights for minorities and disadvantaged groups.

Here again, of course, ICTs by themselves do not create change. If broader structures of power and privilege are resistant, if community social capital is weak and trust among citizens is weak, the empowering potential of ICTs is not likely to be realized. It is also important to recognize that those who most urgently need government services and who are most likely to be discriminated against in the provision of those services — the poor, minority groups — are also those least likely to be able to use ICTs effectively unless the ICTs are specifically designed for their needs or unless there are strong intermediary organizations helping to press their interests.





participation of citizens in decision-making, implementation and monitoring at the local level both by disseminating information about pending issues and by helping to aggregate and share the views and concerns of local citizens. While more traditional communications media such as radio and newspapers have an important role in this regard (including the vital investigative role of journalists), newer ICTs permit more forms of horizontal, many-to-many communications on issues of public importance and give citizens more opportunities to organize around their interests and priorities.

However, it is important to bear in mind that ICTs cannot substitute for, and cannot in themselves bring about, more fundamental and crucial reforms in the functioning and accountability of government, the relations among levels of government, and the norms and expectations held by both leaders and citizens about the role of government in society and the standards of conduct of government officials. Successful applications of ICTs that tangibly improve the performance and accountability of government institutions can, in certain cases, create a virtuous cycle of expectations and improvements, as citizens come to understand that they can demand better of their government institutions and have the tools and strategies (and the self-organization) to do so. Here as elsewhere, however, ICTs are mere instruments (although, under certain conditions, powerful instruments) of more fundamental and difficult changes.

Participation, Empowerment and the Strengthening of Civil Society

ICTs can play an important role in informing and empowering citizens and strengthening the capacities of a wide range of civil society organizations and institutions. This is important not only in increasing the demand for good

governance and strengthening the voice of citizens in government policy, but for a more fundamental reason. There is increasing evidence that a dense and complex layer of social institutions, formal and informal groups, and networks of interaction and common interest between the individual citizen and the state is good both for the stability and responsiveness of the political system and for the economy and society as a whole. This social capital enables richer and more diverse views to surface on important societal issues, empowers groups to address common concerns and interests without necessarily relying on government intervention, and can even help the emergence of social consensus by permitting multidirectional debate and sharing of information among those with different perspectives through mechanisms that are not directly tied to the formal political and governmental structure. By facilitating new forms of many-to-many communication, collaboration, and information-sharing, both within a given country and among groups with similar interests and concerns across borders, ICTs can add to the vibrancy of civil society institutions and networks as a check on government, a source of ideas and innovations, and an outlet for the interests, concerns and desires for solidarity on the part of individuals and groups.

This is particularly important to the poor. One of the clearest messages of recent research on the experience of poverty is that the poor feel isolated, powerless and neglected. By facilitating contact and joint action among the poor and their advocates in civil society, ICTs can help to reduce the isolation of the poor, bring their issues and needs onto the national agenda, and increase pressure on government for pro-poor policies and services. Just as important, ICTs can help the poor preserve and share their knowledge and cultures, and learn from each other about concrete ways to address their own challenges.

By definition, however, the poor have scarce resources, and the burdens of their daily lives often leave them little discretionary time to engage in activities designed to protect their interests and articulate their needs. Their limited education, and in many cases illiteracy, puts them at a disadvantage when faced with sophisticated ICTs that are not adapted to their most pressing needs, their modes of communication (including a frequent preference for oral communication), their cultural norms, and the social contexts in which they typically interact and pursue joint action. Thus it is particularly important that ICTs intended for direct use by the poor be both appropriate in their design and deployment and affordable by their intended users, either individually or in groups. Giving voice to the poor is meaningful only if the poor are able to use a voice — a means of public expression — that is comfortable and meaningful to them.

ICTs and Information-rich Societies: The Role of the Media

Broadcast and print media have long played an important role in creating information-rich societies; improving the performance and transparency of markets, firms and government institutions; informing public debate (and broadening participation in that debate); and enabling a variety of groups and interests to organize and express their preferences. While the role of the media in promoting participation and accountability in politics and government is well recognized, it is equally important as a tool of healthy markets, which depend as much on the free flow of information as on the flow of capital, labor and other assets.

New ICTs certainly add both to the ways in which existing media organizations can reach, and interact with, their audiences, and to the options for creating new types of news and information services. The Internet, mobile phones, and digital cameras can make “everyone a reporter”, and diversify both the sources of information and the range of views on issues of public importance. Community radio networks can give voice to those who were previously limited to being passive listeners, and can increase access to locally-relevant and contextual information and viewpoints. The extremely low barriers to entry in creating Web-based news and information sites or communicating to a wide audience through email make it less likely that minority or unpopular views will be filtered out, and more difficult for the powerful or special interests to prevent the dissemination of information.

Yet the new, and much more diverse, ICT-enabled media environment is a mixed blessing, both for developed and developing countries.¹⁷ The reduction of government restrictions on broadcasting, and the reduced prominence of (and funding for) public broadcasting in many countries has led to greater diversity of news sources, but also in many cases to private media monopolies and to the growth of global media conglomerates. This often leads to a dramatic reduction in public-service broadcasting, an increased emphasis on entertainment over information and public debate, and commercial and political influence on content and analysis. It has also led, in many developing countries, to a greater concentration of media resources in more populated areas and a reduced emphasis on coverage of issues relevant to the poor and rural populations. At the same time, the often-overwhelming diversity of information sources can paradoxically lead to a reduction of trust in all sources, or to a form of self-imposed “information myopia” where individuals only rely on sources that match their narrow ideological or political predispositions. This is not a situation unique to ICTs; newspapers in most countries have long had an identifiable political leaning. What is new is the ability of individuals to filter more completely what types of news and views they are exposed to.

This is not to imply that diversification of media sources, and the elimination of government monopolies or restrictions on broadcasting, are bad things. It is simply to point out that,

¹⁷ The Panos Institute has covered these issues extensively and thoughtfully. See www.panos.org.uk

once again, ICTs are just tools, and the consequences of the use of those tools will depend on broader economic, social, political and cultural factors. This serves as a useful reminder that, in this as in so many areas of ICT policy, it is vital to be clear about objectives. The goal of media policy in the ICT age is to foster the growth of an information-rich environment where many voices are heard, public debate is robust, citizens and consumers are empowered, and markets and institutions are efficient and responsive. The most effective path to this goal will vary from country to country, but in every case the diversity and private initiative made possible by ICTs and by liberalization and privatization of the media sector do not eliminate the need for thoughtful government policy, smart regulation and carefully-targeted public investment.



Three Broader Challenges

There are three broader challenges facing developing countries as they seek to harness the power of ICTs as tools of economic growth, social welfare and poverty alleviation. Successfully addressing these broader challenges is in many ways a necessary condition for success in the more specific areas of ICT application enumerated above.

Building a Policy and Enabling Environment for ICT-enabled Growth and Poverty Reduction

Perhaps the most important role of developing country governments, in cooperation with civil society and the private sector, in creating the conditions for ICT-enabled growth is the creation of policy and regulatory frameworks — and capacity to carry through on them — that promote the spread of ICT infrastructure, foster ICT-led innovation, increase incentives for risk-taking and new business development, enable new and growing businesses to access capital and other resources, and more broadly encourage the free flow of information and knowledge within society.

The advent of a global, interconnected economy, where ICT-enabled innovation is a key element of international competitiveness, adds new urgency to these measures. Yet the recent hype about the newest ICTs should not obscure the fact that many of the key steps that developing countries need to take have not changed fundamentally in the past decade. The ICT economy might add new dimensions or complications, but it does not change some of the fundamentals.

First and foremost, many developing countries still need to make considerable progress in liberalizing their telecommunications sector, dismantling state monopolies, promoting private investment in infrastructure and services, and increasing competition in all sectors of the telecommunications market. The importance of this cannot be overstated, and even more so in the age of the Internet. Even before the advent of the Internet, there was abundant evidence that developing countries with liberalized telecommunications markets enjoyed not only better telecommunications infrastructure and services but positive spillovers into other areas of the economy. Competition brings innovation, greater efficiency, and wider, more rapid rollout of services. Even if recent innovations such as wireless networks and more creative use of satellites might enable developing countries to leapfrog over some of the fixed infrastructure requirements of earlier stages of

telecommunications development (“stringing copper”) or gain significantly greater performance per unit of cost (fiber optic cable, digital switches, etc.), the fact remains that buildout of telecommunications and related ICT infrastructure requires vast amounts of capital, far beyond what most developing country governments, with their already-strained budgets, can possibly afford. Of course, until recently one of the strong incentives for governments to preserve their national telecoms monopolies or dominant positions was the significant amount of revenue that they generated for the government budget, mostly from settlement payments on international calls. Yet the reform of the settlement rate system is reducing those revenues, and the opportunity costs of maintaining the monopolies are increasing as ICT-led growth increasingly risks passing these countries by.

Reducing the government's ownership role in the telecommunications sector does not mean its departure from the scene. Indeed, telecom reform is truly effective only if the government at the same time develops an independent regulatory capacity which ensures an even playing field for all competitors, adherence to agreed rules and commitments, and protection of the rights of customers.

The advent of the Internet and other new ICTs does not change the fundamental importance of these reforms. It adds some new complexities – about spectrum management for wireless communications, Internet infrastructure and content issues, intellectual property and related ownership issues of digital information, among others – but it does not fundamentally change the urgency of sector reform. Nor does it diminish the importance of policies relating to earlier ICTs such as radio, which can be a powerful tool of communication, knowledge-sharing and public dialogue and education. At the same time, given the considerable advantages that ICTs can offer to individuals, groups and institutions in society, the importance of ensuring broad access to ICTs, especially to the poor and isolated, takes on increased urgency.

Telecom sector reform – and, more broadly, coherent policy for promoting the spread of ICTs – is only one element of the policy framework necessary to foster ICT-led growth and poverty reduction. Other aspects of the enabling environment for private-sector-led growth are equally crucial. Capacity for domestic innovation and new-business creation and the ability to attract foreign direct investment are key elements of a vibrant ICT economy in developing countries. Yet many developing countries still remain fairly inhospitable environments for private sector growth and new-business development. Access to capital, both for existing and new businesses, is often difficult because of weak banking systems and financial

markets. Rigid labor markets and strict rules about business closures impede the mobility of labor and capital necessary to fuel innovation. Securing the necessary permits to open a new business can often be an extremely time-consuming and expensive process, with many often-obscure requirements and ample opportunity for improper discretion, favoritism, and corruption on the part of local officials. Just as important, the ability of small businesses that innovate successfully to become *larger* businesses and reach out to broader domestic and international markets is equally hampered by weak infrastructure, poor access to capital, and weak opportunities for international partnership.

ICTs can help to address some of these impediments to the creation of an enabling environment for private-sector growth. However, in the absence of these broader efforts, ICTs alone will not create growth or reduce poverty. In other words, the relative supply of ICTs in a country and their successful penetration into all sectors of society as tools of growth and opportunity are symptoms of deeper changes. To the extent that ICTs can help build the desire and capacity for those deeper changes (by awareness-raising, training, and consensus-building), facilitate their implementation (e.g., through greater efficiency, transparency and accountability of institutions and markets), and spread the benefits of these deeper policy and structural changes more broadly throughout society, they are a vital tool even at the early stages of building ICT-enabled growth and poverty reduction. Yet ICTs by themselves do not create these deeper and more difficult changes in policy environments and in the roles and capacities of governments, markets and other societal institutions. The opportunities posed by ICTs, and the risks of being left behind, make the hard work of policy and institutional reform in developing countries more urgent; they do not, however, substitute for it.

Ensuring Access for All

Even the poorest have information and communication needs that are central to their lives and livelihoods. The institutions and markets on which they depend, and the various people who provide services to them (health workers, teachers, local government officials, etc.) also depend heavily for their effectiveness on the efficient flow of information and communications. The poor, in fact, often spend significant amounts of the modest resources they have in money, time, and labor to meet their information and communication needs, such as requesting government services, learning about prices for their goods, accessing new

information that will make them more efficient as farmers, seeking health information and health services, and communicating with relatives. As discussed above, ICTs have significant potential to improve the lives and livelihoods of the poor and reduce the vulnerabilities that keep them in, or return them to, poverty.

Yet ensuring access for all to ICTs is an ongoing challenge for virtually every developing country (as it has proved to be for many rich countries as well). The majority of the world's poorest live in rural and remote areas, and the costs of building out ICT infrastructure to rural areas is often prohibitively expensive, or at least not commercially viable. Even those poor who live in urban and peri-urban areas often live in slums or neighborhoods that are poorly serviced by all public infrastructures — not only telecommunications, but power, water, sanitation, roads, etc. Second, the poor in most cases cannot afford their own telecommunications services even if they were available, and public access points for shared services have until recently been underprovided in poor areas.

These problems of universal access long predate the Internet. Even in the richest countries, buildout of telephone services to rural and poor areas required proactive government policy and a variety of cross-subsidies, access funds, and other measures for supporting universal access. Fortunately, much has been learned from the successes and failures of these earlier efforts, and these lessons can be useful, if appropriately adapted, to the needs of developing countries. Furthermore, a number of developing countries have pioneered approaches to increasing access to telecommunications that combine the creativity and resources of the private sector with carefully targeted government policies, benchmarks and resources that extend the reach of the market and make provision for those currently beyond its reach.

The emergence of new ICTs, the opportunities they create, and the risk they pose of leaving the poor further behind, however, have led to a number of creative approaches to broadening the access of the poor, particularly the rural poor, to ICTs. One of the most widespread approaches is based on the same principle as a public telephone booth: aggregating the demand of a group of users who cannot individually afford service, and centrally locating access in a place that is reachable by a sufficiently large group of potential users. While many of these ICT public access point experiments have been lumped under the general heading of “telecenters,” they vary considerably along at least three dimensions:

Rural Access to ICTs – Combining Policy Pull and Technology Push

Extending access to ICTs to rural areas, where the majority of the world's poorest live, is a crucial and difficult challenge for developing countries. Even in developed countries, the buildout of telecommunications infrastructure to rural areas, and the achievement of universal service or at least universal access, required in most cases substantial public investment and strong public policy measures. In recent years, experience with telecom sector liberalization has demonstrated that, given proper conditions, the market can prove effective in extending the communications network to rural areas and providing services to the poor. Recent technical innovations – including wireless technologies – add to the menu of options for extending service in an affordable and sustainable manner, particularly by reducing the fixed costs of communications infrastructure. Yet in most developing countries, universal – or even widespread – access to information and communication networks and services will require some combination of creative government policy to optimize conditions for private investment, technical innovation to get the most impact from that investment, and public investment to reach the poorest and most isolated. Given both the importance of extending access and the high costs of doing so, it is extremely important to find the proper balance among these elements, which will be different for each country. The first step is to distinguish between

those rural areas, and customers, that could be served by the market in a liberalized telecommunications regime with proper regulation and proper incentives for private investment, and those that would still be “beyond the market” even under optimal conditions.¹⁸ Creating policy frameworks that encourage private investment in rural areas (including, most fundamentally, eliminating government telecom monopolies and liberalizing the telecom sector) can create conditions where private investment and technological innovation extend the scope of those who can be served by the market. To reach those who would still be excluded, universal access policies and public investment are often necessary. Yet they are most effective when they serve as leverage to attract private investment, by helping to make the poorer and more isolated market segments commercially viable in the medium term.

The Chilean experience with “smart subsidies”, for example, shows how a modest amount of public subsidy can mobilize substantial private investment for rural access.¹⁹

¹⁸Two especially good discussions of these issues are Navas-Sabater, Dymond and Juntunen (2002) and Caspary and O'Connor (2003).

¹⁹Wellenius (1997) provides a good overview of the Chilean experience.

- Financing and ownership model: some are heavily donor- and/or government-financed and offer their services for free to members of a community (at least for an initial period); some are completely private and solely dependent on income from users; some earn part of their income from related products and services;
- Range of services: some are simple phone kiosks; others offer computer use and Internet access as well; still others add on various sorts of training, both in ICT-related fields and in other subjects;
- Links with other institutions and services: some are free-standing; other are tied to other public services such as post offices, government offices, hospitals, and schools. In fact, some are an outgrowth of projects originally designed to provide ICTs for other purposes (such as school computer centers that have become community telecenters after school hours.)

This variety might give the impression that each of these projects has emerged from an analysis of the specific needs and priorities, ability to pay, and market conditions of a given community. Unfortunately, this has often not been the case, and developing countries now abound in examples of telecenters that are not sustainable, in the long term, or that were never widely used because they were ill-adapted to the needs of the community, its social dynamics, or physical and environmental constraints. The opportunity now exists to learn from these experiments, and to design models of community access that address the urgent needs of poor communities without crowding out private sector innovation and without unsustainable inputs of public monies in the long term.

Innovations in hardware, software, products and services in recent years have helped to extend access and to generate new models of how to serve the needs of the poor. Innovations has proceeded along several promising, and complementary, dimensions:

- “Thinking outside the box” — new information appliances. While many early ICT projects focused on getting computers to individuals, groups and institutions in developing countries, the combination of disappointing results with many of these efforts and technical innovation has led many to focus more on developing more flexible and affordable (and locally appropriate) information appliances for developing country users, and on ways of adapting new information appliances originally developed in OECD countries (such as PDAs and multifunction mobile phones) to the needs of developing countries. Efforts



Telecenters: Learning from Failure

One of the most popular approaches to increasing ICT access in rural and poor urban and periurban areas has been the creation of multipurpose "telecenters" offering some combination of telephone, computer and Internet access, along with, in many cases, training in ICT and related business skills. These telecenters, most of them donor funded in their early years, represent the high end of a spectrum of models for aggregating demand to address the inability of individuals and families to afford service independently.

Although detailed evidence on these telecenters is still spotty, it is increasingly clear that most of the larger and more elaborate, and therefore costly, telecenters have proved unsustainable both because of their recurring costs and because of low demand. Many were created in the initial wave of donor enthusiasm for increasing ICT access, often with inadequate user involvement, unclear business models, and core funding that was not sustainable over time. Furthermore, their creation did little to create momentum for needed change in the broader enabling conditions for increased ICT access (telecoms sector reform, innovation in technology and financial models for rural access, broader infrastructure challenges facing rural areas). At the same time, other models that focused first on providing a core set of services and

emphasizing private ownership and innovation, such as the privately-owned phone shops in Senegal, have had more success. The contrast points to a common mistake in ICT-for-development approaches. The donor-driven telecenter represented an attempt to address directly a problem of differential access by providing access. More sustainable approaches are based on a deeper assessment of the underlying reasons for the problem (regulatory restrictions on sale of telecom services, inadequate incentives for innovation in providing access to rural and poor populations) and a focus on addressing those underlying reasons, so as to create the conditions for a sustainable, private-sector-driven, response to the problem.

This is not to say that public funds should never be expended to expand rural access. Indeed, given the urgent need of developing country governments to provide better services to their rural poor, and to improve conditions for economic growth and sustainable livelihoods in rural areas, extending access to ICTs is a legitimate concern. The challenge is to focus on strategies that maximize the opportunities for private sector initiative and target public funds strategically where private initiative is insufficient and the needs of the poor are most acute.

have focused both on technical innovation (including new appliances such as the “Simputer”, which is really closer to a PDA than to a computer) and on creating applications relevant to developing country needs, such as PDA-based educational, diagnostic and reporting tools for rural health workers.

- Simplifying, and customizing, hardware and software. Most globally available computer hardware and software has been optimized for rich-country uses. The hardware depends on environmental conditions (steady power supply, temperature and dust control) that are hard to replicate in many developing countries, particularly in rural areas. The software is so complex and loaded with features that it requires relatively high levels of computer processing power and user ability. There are several promising experiments in designing more environmentally robust, power-flexible, modular computers, and simpler software more adapted to the needs and capacities of developing country users. The “open source” software movement has, not surprisingly, attracted considerable interest and spawned much innovation in developing countries, both because of the greater flexibility that open source software provides for adapting applications to local needs and because of the daunting cost of purchase or licensing of proprietary software.
- Innovative uses of existing technology. Voice mail is a relatively mature technology that, until recently, was largely restricted to those who already have individual telephone service. Yet there are several ways that it can be useful to the poor when combined with existing public telephone services, such as phone booths and phones in post offices. Providing individuals and families with voice mail accounts accessible from any telephone gives them an ability to receive messages from distant family members, service providers, government agencies, business partners and others. Voice mail, combined with customized software, can also serve as a valuable tool for information access and remote reporting by health care workers, environmental monitors, and others providing valuable services to the poor in remote areas.²⁰

Technical innovations such as Internet connectivity by satellite, the expansion and increased flexibility of wireless networks (including wireless local loop for telephony and wireless Internet access), and the improvements in Voice-over-Internet-Protocol (VoIP), provide opportunities for rapidly expanding access by the poor (including the rural poor) to information and communication services. Yet, in many

²⁰ A particularly interesting example is the work of Voxiva (www.voxiva.net).

Getting Unwired: Are Wireless Networks the Answer for Developing Countries?

Thanks in part to increased competition and private investment in the mobile market, enabled by government liberalization of the sector, mobile penetration has surpassed fixed-line penetration in many developing countries, and average annual growth rates in mobile phones have dramatically outstripped growth in landlines.

This heightened interest in mobile technologies has focused not only on cellular mobile telephones, but on wireless local loop technologies for the "last mile" connection from exchanges to individual homes and businesses as well -- given that this connection is a significant component in the upfront investment in creating a new subscriber. More recently, interest has also turned to the potential of wireless Internet networks (often called "wi-fi" networks) to increase access to broadband services, both Internet and multi-function phones, in developing countries. One of the attractive features of wi-fi broadband Internet is that, within the wireless footprint of the transmitter, the marginal cost of adding another user is practically zero, except for the user's access device.

Wireless telephony is clearly an area of major growth potential and creativity for developing countries. And wireless broadband offers interesting possibilities for new models of Internet

service provision. Yet the buildout of wireless infrastructure and services in developing countries faces a set of familiar challenges that do not disappear simply because of innovations such as wi-fi broadband. The capacity of developing country governments to manage the radio spectrum and license new services effectively and transparently in ways that promote broad-based development and include the poor, and particularly the rural poor, is still highly uneven. Weak telecommunications and Internet backbone in many developing countries, including the persistent problem of international routing of most Internet traffic and insufficient or nonexistent national Internet exchange points, creates price distortions and inefficiencies that limit the spread of Internet services. And access for the poor is still hampered by issues of cost and limited buildout in rural areas. Even the creation of wireless hotspots for free Internet access does not erase either the cost of access devices or the other economic, social, and cultural impediments that the poor face in accessing and using ICTs.

Wireless technologies, then, hold out considerable hope as a tool for expanding access. They are not a magic pill, however, and the development community should be careful to avoid making them the latest fad for pilot projects.

developing countries, government regulations (and the interests of government-dominated telecommunications companies) restrict or prohibit the rollout of these innovations. Extending access to all, therefore, requires a careful combination of policy and regulatory reform, technical innovation, and the proper balance of public and private investment. This is, fortunately, an area where much has been learned in recent years, from both successes and failures, and sharing those lessons more effectively will help create support for the policy changes necessary to reap the benefits of ICTs for all.

Social Inclusion

Technology is not automatically a force for opportunity and social inclusion, and this caution applies to ICTs. In fact, depending on how they are designed, deployed, and accessed, ICTs can deepen and solidify existing economic, political, and social inequalities. They can also serve as tools to mobilize prejudice and inflame social tensions. Thus, in addition to ensuring widespread access to ICTs and their benefits for the poor and disadvantaged, developing country governments need to take proactive measures to ensure that ICTs serve as tools of social inclusion.

Gender is an important element of this challenge, though not the only one. It is noteworthy that several of the Millennium Development Goals focus primarily on increasing opportunities for, and reducing the vulnerabilities faced by, women and girls. Women play complex and vital roles in developing countries, and there are several compelling ways in which improving the lot of women and girls dramatically increases the welfare of society as a whole. Women with higher levels of education have fewer children; those children tend to be healthier; and they have a greater chance of rising out of poverty. Households with higher levels of female education tend to have higher incomes.

Yet for many reasons women often are prevented from securing equal access to, and the benefits from, ICTs. First and foremost, educational opportunities continue to be poorer for women than for men in most developing countries, despite some progress in increasing school enrollment for girls. This is reflected in the fact that nearly two-thirds of the world's illiterate population is female, and roughly half of all women in developing countries are illiterate. Deprived of basic educational skills, these women are then further deprived of the new opportunities for education and skills enhancement that come with ICTs. In addition, even those girls and women who do have access to primary and secondary education are constrained by the

multiple and time-consuming economic and social roles played by women in developing countries. Even if they can find time, cultural constraints on women (on where they can appear in public, under what circumstances, with whom) in many countries limit their ability to access ICTs in public access points such as libraries, cyber-cafes or telecenters. And their ability to pay for these services is limited by the fact that, in many countries, women have little control over family income and little discretionary income of their own.

If ICTs are to serve as a tool of social inclusion and empowerment and economic opportunity for women, particular efforts need to be made to provide access opportunities, tools and content particularly suited to the priority needs of women. Yet at the same time, it is important to pay attention to the ways in which ICTs can reinforce existing gender inequalities. For example, the still-sharp gender division of labor in many developing countries is not automatically reduced by ICTs. The tendency of women to be concentrated in low-wage, low-skill manufacturing and service occupations can in fact be reinforced by the siting of such jobs in locations where larger numbers of women are available, a mobility that is facilitated by ICTs.

More broadly, developing country governments, and their partners in civil society and in the international community, need to ensure that traditionally excluded and disadvantaged groups within society (the handicapped, ethnic and religious minorities, etc.) have access to ICTs in ways that are relevant to their specific needs and circumstances and that create new economic and social opportunities for them. Absent such efforts, these groups are likely to be further marginalized as they miss out on the economic, educational, health, and livelihood benefits of ICTs.