

IDA AT WORK

Information and Communications Technology: Connecting People and Markets

The Information and Communications Technology (ICT) sector has undergone a revolution over the last decade in all developing countries. Around \$30 billion was committed to investments in telecommunications networks in IDA countries between 1997 and 2007 and 53 percent of the population now live within reach of wireless networks. By 2007 there were over 250 million telephone subscribers (fixed and mobile) in IDA countries, and a further 318 million in countries borrowing from both IDA and the International Bank for Reconstruction and Development. This number has since continued to grow rapidly as prices fall and networks expand.

This growth in access to information and communications technology in IDA countries is boosting economic productivity, raising incomes of families and small businesses, and providing an important source of government revenue. The adoption of information and communications technology has also been broad-based, with mobile phones reaching many low-income families and those living in rural areas.

The performance of the sector has been driven by market liberalization, which has in turn stimulated private sector investment and competition. Almost US\$1 billion of IDA funds were committed between 1997 and 2009 to support ICT sector reform, regulatory capacity building, and infrastructure investment, in addition to a significant amount of advisory services.

At a glance

- Almost US\$1 billion of IDA funds was committed for activities related to information and communications technology between 1997 and 2009.
- IDA countries that have implemented significant ICT sector reforms generated around US\$30 billion in investment between 1997 and 2007. The annual revenue generated by the telecommunications sector in these countries is equivalent to around 4 percent of GDP.
- The number of telecom subscribers in IDA countries has risen from around 1 percent to over 25 percent of the population, or more than 250 million subscribers, within less than a decade. This number continues to increase.

The focus of IDA in the sector has now broadened, going beyond voice connectivity to developing broadband and promoting the use of information and communications applications to deliver public services. IDA's portfolio of technical assistance and investment projects in the latter areas continues to grow. IDA also works in partnership with the International Finance Corporation, the World Bank's private sector arm, in the telecommunications sector, allowing it to support both public and private investments.

IDA has had some notable successes, including a project in Afghanistan where IDA-supported sector reform increased the number of telephone subscriptions from 57,000 to almost 10 million between 2002 and 2009.



SECTORAL CONTEXT

IDA countries have witnessed a revolution in the ICT sector

Over the last 10 years, the ICT sector in IDA countries has undergone a revolution. Around US\$30 billion was invested into telecommunications businesses between 1997 and 2007, primarily by the private-sector. The proportion of the population living within range of wireless telephone networks increased dramatically from close to zero at the end of the 1990s to 53 percent by 2006. By the end of 2007 there were 250 million telephone subscribers in IDA countries, around 90 percent of whom were mobile subscribers.

IDA countries continue to see sustained growth in the sector. On average, there were around 20 million new telecommunications subscribers every year between 1996 and 2007 and the number of subscribers continues to increase. The average annual increase in telecommunications penetration for the first half of this period was less than 1 percentage point compared with nearly 3 percentage points in the second half of the period.

This growth has been surprisingly broad-based. Network investment was initially

focused on cities and towns but is rapidly extending into rural areas. In Sub-Saharan Africa, for example, more than 40 percent of the rural population is now living within range of the mobile networks. This figure is increasing every year.

The success of the mobile market is beginning to be replicated in other segments of the information and communications technology industry. For example, rates of Internet access in IDA countries have begun to rise, though from a very low base. The total number of Internet users in IDA countries has risen from less than 0.1 percent of the population to more than 4 percent in the last decade.

As networks have expanded and competition has intensified, prices have dropped dramatically. The average price of mobile calls in a group of IDA countries¹ fell by 15 percent per year over the period 2001-2008, but in some IDA countries mobile call tariffs have fallen by much more. In Bangladesh, for example, mobile tariffs have dropped by nearly 90 percent since 2000. Average mobile call prices there now lie between 1 and 2 cents (US) per minute, bringing pre-paid telephone services

1 . São Tomé and Príncipe, Ghana, Congo Rep., Kenya, Bangladesh, Sri Lanka, Nepal, Timor-Leste, Vietnam and Tajikistan. Source: Wireless Intelligence, 2009

The Impact of ICT on Small-Scale Fishing Enterprises in Kerala, India

More than 70 percent of adults in the Indian state of Kerala eat fish at least once a day, and more than 1 million people work in the fishing industry. Fishing is done primarily by small enterprises, working near home markets and traditionally selling their catches to a specific market. This causes large geographical disparities in market prices, according to local conditions of supply and demand. These disparities were so great that it was not uncommon for fish in some markets to be discarded because they could not be sold while there was an active trade going on in neighboring towns.

Mobile phone services were introduced in Kerala in 1997 and expanded progressively along the coast and outwards from the major urban areas. Network coverage also extends 20–25 kilometers out to sea, allowing fishermen to find out the prices in different markets along the coast, decide where to land their catches, and agree on prices before landing their fish, effectively conducting auctions by phone.

The effects have been dramatic. After mobile phones were introduced, 30 percent–40 percent of fishermen began selling fish outside their home markets—compared with almost none beforehand. Within a few weeks this significantly reduced the dispersion in fish prices between markets. Prices on any given day now rarely differ by more than a few rupees per kilogram, compared with up to 10 rupees before. Moreover, there are almost no cases of wastage.

Mobile phones have resulted in an increase in fishermen's incomes. On average, daily revenues have risen by 205 rupees, while costs (including the cost of buying the phones) have increased by 72 rupees. Thus the profits of fishermen have jumped by 133 rupees a day—a nine percent increase. The introduction of mobile phones has also had a modest benefit for customers, with the average price of sardines falling by 0.39 rupees per kilogram, or just under four percent.

Source: Jensen, Robert. 2007 “The Digital Divide: Information (Technology), Market Performance and Welfare in the South Indian Fisheries Sector”. *The Quarterly Journal of Economics*; Vol. CXXII August 2007 Issue 3.

within financial reach of the majority of the population. A similar effect is being seen with the Internet - average prices for 20 hours per month of service in IDA countries fell by 37 percent over the same period.

The ICT industry in many IDA countries has become a major source of innovation, particularly when it comes to providing services to low income users at affordable prices while offering sustainable business opportunities. Examples include per-second billing and recharge cards denominated in small units. Operators in East Africa (who are IFC clients) recently pioneered free roaming across their networks, allowing users to move within the region and pay the same call charges that they pay in their home market. The same operators have also more recently been lead-

ing the development of mobile phone-based banking services.

Access to information and communications technology increases economic growth

The information and communications technology sector's contribution to economic growth is widely recognized. It is estimated that a 10 percent increase in teledensity² contributes to 0.6 percent of GDP growth³ and the consulting group McKinsey has estimated that

2. The number of telephone subscribers per 100 population.

3. See Lars-Hendrick Roller and Leonard Waverman, “Telecommunications Infrastructure and Economic Development: a Simultaneous Approach”, AER (2001) and Leonard Waverman, Meloria Meschi and Melvyn Fuss, “The impact of telecoms on economic growth in developing countries,” Vodafone Policy Services, 2005.

the economic impact of wireless in China has amounted to US\$108 billion, or five percent of GDP. More recent evidence indicates that the positive impact of ICT extends to new technologies such as Internet, including broadband and may, indeed, exceed the impact of traditional voice-based communications. It is estimated that every ten percentage points increase in broadband penetration results in 1.38 percentage points additional GDP growth in developing countries.⁴

One of the key ways in which this sector impacts the economy is through investment. Between 1997 and 2006, around 10 percent of total net foreign direct investment inflows in IDA countries went into the telecoms sector and the share of ICT in infrastructure private investment has increased, rising from 54 percent between 1993 and 1999 to 66 percent between 2000 and 2006.

The direct positive effect of information and communications technology on poverty reduction can be seen through its impact on small and medium-sized businesses.

The ICT sector is a major generator of revenues for governments of IDA countries

The ICT sector is a major generator of revenues for the government through taxes, sector levies and, in some cases, revenue-sharing arrangements. On average, the revenue generated by the ICT sector is equivalent to about four percent of GDP and a significant proportion of this is passed on to the government through sales tax, sector levies, and corporate taxes. A recent World Bank study of

4. See Christine Zhen-Wei Qiang and Carlo M. Rossotto with Kaoru Kimura, "Economic Impact of Broadband," in *Information and Communication for Development, 2009*. World Bank.

the mobile industry in Bangladesh showed that between over US\$300 million in government revenues was generated during 2005 alone; in Afghanistan, the telecommunications sector now contributes an estimated US\$75 million in taxes annually. The tax revenue generated by the ICT sector represents a significant proportion of total government revenues, particularly in countries with a small formal sector and limited tax-base.

The process of market reform itself also generates significant government revenues. Private investors transferred approximately US\$7.1 billion to governments of IDA countries through privatizations and license awards between 1997 and 2007. Table 1 provides some examples.

ICT is increasingly being used as a platform for service delivery

The widespread availability of telecommunications networks provides a platform over which both the public and private sector can deliver important services. Companies in IDA countries have pioneered the use of mobile phones for transferring money, making payments, and for the delivery of other financial services to the previously unbanked.

The public sector is also using information and communications networks to deliver services. In Ghana, the government has used ICT to improve the efficiency with which the customs clearance process is managed. Clearance times for cargo at Tema port have come down from 2-3 weeks to 1-2 days.⁵

5. The Ghana Community Network (GCNet) a joint venture with Société Générale de Surveillance of Switzerland and the Customs, Excise and Preventive Service as major partners. The clearance times stated were obtained from http://www.ghanatradenet.com/aboutus/mission_objectives.asp.

Table 1: Recent license-awards and privatization proceeds in selected IDA countries

Country	License award revenues
Afghanistan	4 licenses auctioned, US\$125 million
Bangladesh	Three broadband wireless licenses issued, US\$90 million
Bhutan	2nd mobile license auctioned, US\$17 million
Nepal	2nd mobile license auctioned for US\$ 25 million
Sri Lanka	Four 3G licenses and the fifth mobile license, US\$24 million
Kenya	Privatization of Kenya Telecom, US\$390 million
Mali	Privatization of incumbent operator, €275 million
Rwanda	Privatization of RwandaTel, US\$100 million
Ghana	Privatization of Ghana Telecom, US\$900 million

IDA CONTRIBUTIONS

IDA is in a strong position to provide technical and financial support to countries wishing to reform their ICT sector

ICT sector reform has been the main driver of performance in the telecommunications sector, in addition to technological advancement. There has been a global shift of policy in the telecommunications sector from development through state-owned enterprises to market liberalization and privatization of state-owned enterprises. By 2009, over 90 percent of IDA countries had introduced competition into their Internet and mobile markets, and more than 80 percent had established a separate regulatory authority for the sector. Sector performance further improves as the reforms deepen. In a recent World Bank study of 24 African countries—22

of them IDA countries—it was found that the mobile penetration rates increased by less than one percentage point per year when there were only two mobile operators in the market but by more than three percentage points per year when there were four or more operators competing. Increased competition has also been associated with drops in the price of mobile services and international calls.

The nature of IDA assistance has evolved with the evolution of government policy towards the information and communications technology sector. In the past, IDA projects typically focused on investment activities that aimed to increase access to ICT services, primarily through state-owned fixed-line operators. But from the middle of the 1990s, IDA support evolved to place greater emphasis on supporting the liberalization and privatization process, especially in the mobile market,

with growing attention to sound regulation and promoting access in rural areas. Since 1997, IDA has funded investment projects, technical assistance and analytical work in 47 IDA countries.

RESULTS ON THE GROUND

IDA support to governments has resulted in significant improvements in sector performance.

Sector reform

IDA supported the reform of the telecommunications sector in Afghanistan through a comprehensive package of capacity building, support for drafting of legislation and licenses, rehabilitation of the government's network, and improved postal service. From a single operator in 2002 with a barely functioning network, a competitive telecommunications market has developed with four licensed pri-

vate mobile operators, a combined fixed and mobile operator, and seven private Internet service providers. The sector has attracted nearly US\$500 million in private investments, accounting for 60 percent of all foreign direct investment in Afghanistan. As a result, the number of telephones in Afghanistan increased from 57,000 in 2002 to almost 10 million by 2009. Moreover, falling prices have made services more affordable. In 2002, it cost about US\$400 to own a mobile phone and US\$2 for every minute of talk time. Today, an Afghan can own a mobile phone for less than US\$50 and spend less than 10 cents per minute for talk time.

IDA has had similar success in Samoa, a Pacific island state with a population of around 200,000. By the end of the 1990s there was widespread dissatisfaction with the services being offered by Telecom New Zealand under a joint venture with the government.

Nigeria—Universal Access Program as part of Privatization Support Project

Nigeria continues to reap the benefits of a decade of aggressive sector reforms that have created an open regulatory framework and very competitive telecommunications markets. Figures released by the Nigeria Communication Commission in March 2009 indicate an outstanding growth trend. The current total number of subscribers (132.7 million) is a 50 percent increase over the previous year.^a Most of the growth is attributed to growth in the mobile sector, accounting for more than 95 percent of the Nigerian market.

The development in the sector has concentrated in key cities and urban centers where only about 30 percent of Nigerians live, leaving rural areas relatively underserved. The 2003 Communications Act included a provision by the Government to bridge this divide by establishing a Universal Service Provision Fund and expanding networks to underserved communities. IDA has also supported the government's efforts to expand ICT services into rural areas through providing subsidies on a competitive basis. The combined impact of the 25 percent subsidy,^b and use of CDMA technology is allowing the Universal Access operator to offer very competitive prices. The price of a call to another customer of the same network is N4 per minute compared to average of N18. The price of a call to other networks is N15/minute, which is about 50 percent lower than competitors. The UA Provider, GICELL is reported in local papers^c to have invested an additional US\$50 million of private funds in rural telephony and expecting to increase to US\$700 million between 2009–2011.

Notes:

a. NCC March 2008.

b. Estimate provided by GICELL.

c. Business Day June 2009.

IDA provided a technical assistance loan of US\$4.5 million which supported the government's liberalization of the sector and renegotiations with Telecom New Zealand. A new Telecommunications Act was passed in 2005 that provided the framework for competition and established an independent regulator. In 2006, the government awarded new cell phone network licenses, generating competition. The results were felt immediately: the number of mobile subscribers increased by 170 percent and the price of a call to the US fell by 55 percent within only one year.

Rural access

Promoting competition among private operators has been highly effective in delivering telecommunications services to rural areas. The previously-mentioned World Bank study of 24 African countries showed that mobile networks had quickly expanded to cover more than 50 percent of the population, including more than 40 percent of those living in rural areas. The same study showed that if effective competition were established, networks would continue to expand, reaching areas with more than 90 percent of the countries' population. Some form of financial incentive would be required for mobile operators to cover the remaining parts of the population at current price levels, but the universal service subsidy is much lower than had been expected, and certainly much lower than would have been required for extending fixed-line access.

THE EVOLVING AGENDA

As basic telecommunications services become more widely available in IDA countries, policymakers are turning their attention to new services. The nature of IDA support is also

changing accordingly to three areas of focus: broadband, the wider adoption of ICT in public services, and the development of the IT and IT-enabled services industry.

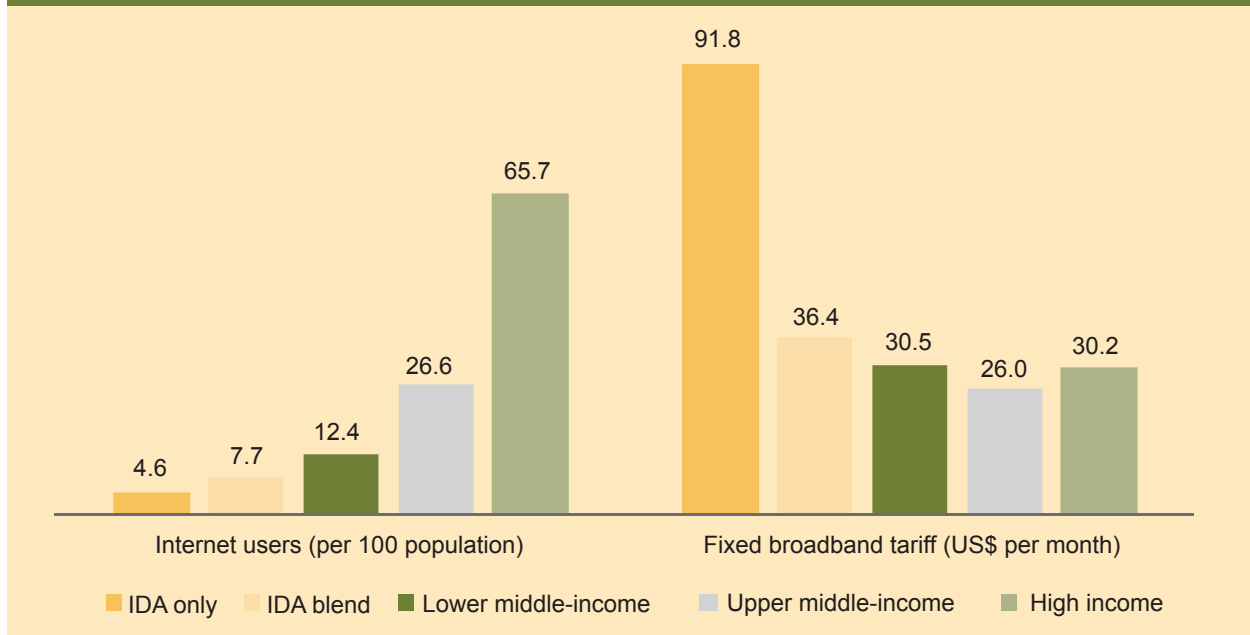
Broadband

Access to the Internet is rapidly growing in developed countries and broadband is becoming increasingly important in business and personal lives. However, despite some recent improvements, access to the Internet in IDA countries remains very limited and prices are prohibitively high (Figure 1).

IDA's technical assistance and investment lending is increasingly targeting the broadband market. A good example of this is IDA's support for the Eastern African Submarine Fiber-Optic Cable, a submarine communications cable running along the East coast of Africa. IDA was closely involved in the initial stages of development including the feasibility studies, the financial structure and the policy framework. Financing for the project was subsequently provided by the International Finance Corporation and other development finance institutions, also showcasing the partnership between IDA and the International Finance Corporation in the sector.

IDA's portfolio of broadband activities has increased rapidly over the past two years. A key component of this has been the Regional Communications Infrastructure Program in Eastern and Southern Africa. This program will extend the geographic reach of broadband networks and contribute to lower prices for international capacity, while contributing to improved government efficiency and transparency through selected e-government applications. The Board of the World Bank approved an overall funding envelope of

Figure 1: Internet Access in IDA Countries Compared with Higher-Income Countries



Source: International Telecommunication Union.

US\$424 million for the Regional Communications Infrastructure Program in 2007. Burundi, Kenya and Madagascar participated in the first phase, obtaining US\$164.5 million. This was followed in 2008 by Rwanda (US\$24 million) and, in phase three, by Malawi, Mozambique, and Tanzania, (US\$151 million). The project in each country is tailored to suit its specific needs. In Burundi, for example, the project is supporting the development of the broadband communications infrastructure in a partnership between the government and the private sector operators. This will connect all of the districts of the country and be run on an open-access basis. In Rwanda and Malawi, the project will finance the purchase of broadband services, thereby stimulating the development of the international fiber-optic links.

IDA's program of support for broadband infrastructure continues to expand. A project to

develop a fiber along long-distance electricity transmission lines in Democratic Republic of Congo was approved by the Board of the World Bank in 2009. Similar projects are under development in Central Africa to connect Cameroon, Chad and the Central African Republic while in West Africa, IDA is supporting greater connectivity among countries by utilizing the regional electricity transmission infrastructure.

Broadening the use of ICT

As ICT services become more widely available, governments are looking to expand their use in the delivery of public services. IDA is increasing its support to governments this area, providing US\$18 million to support e-government services in Ethiopia, US\$39 million for a project in Ghana, and US\$93 million for similar activities in Vietnam, for example. The review (see box) of the e-Rwanda project

e-Government in Rwanda

The government of Rwanda has been a leader in Africa of the use of ICT in the delivery of public services. IDA has been supporting the government through the eRwanda project, funded by a US\$10 million grant. The objectives of the project are to increase the efficiency and effectiveness of some of the government's internal functions and to use technology to help the government deliver services and information.

The project has installed networks in government ministries and in district offices around the country and provided the training for staff to use them. It has supported the development of a government portal, which will link all government information and websites. Government ministries have also developed websites, both for their internal purposes as well as for information dissemination to the citizens.

The project has also provided ICT services to parts of the population that currently do not have access. It has supported telecenters in rural areas and an ICT bus (or mobile telecenter) that will be traveling throughout the country.

Finally, the project is also developing ICT applications for providing public services to the public. For example, eSoko (launched in June 2009) provides agricultural market price information and telemedicine equipment is being installed in two hospitals to link them to the King Faisal Hospital in Kigali.

provides a more detailed picture of how IDA is supporting governments in the use of ICT in the delivery of public services.

IT/ITES services

The increasing coverage and capacity of ICT networks is opening up new opportunities for economic growth and development in IDA countries. IDA is supporting governments to develop their IT and IT-enabled business sectors, following the lead of countries like India and the Philippines. The e-Ghana project, for example, is helping the government to generate growth and employment through public-private partnerships to develop the technologically enabled services industry.

LOOKING AHEAD

“We have high expectations of ICT and its transformative effects in all areas of the economy and society,” said Rwanda's President Paul Kagame in 2006. *“Communications technology has fundamentally changed the*

way people live, work, and interact socially, and we in Rwanda have no intention of being left behind or standing still as the rest of the globe moves forward at an ever increasing pace.”

The reform of the telecommunications sector in IDA countries has been a success, driving economic growth, creating opportunities and providing a platform for growth across the economy. Policy reform and the improvement of public sector governance have triggered large amounts of private investment, greatly improved service delivery, brought more jobs, and sustainably increased government revenues. IDA has supported the majority of countries implementing such reforms.

Building on this success, the ICT agenda in IDA countries is evolving. The key priorities will be catching up with the rest of the world in terms of broadband connectivity and broadening the use of ICT across government, including health, education and rural development. Both of these areas present major challenges

Ghana Project—Leveraging Public/Private Partnerships to Develop the IT/IT Enabled Services Sector

Ghana's information and communications technologies sector has registered one of the most significant growth rates in Africa. The government's proactive policy and regulatory interventions, combined with support from the World Bank Group and other development partners, has resulted in a competitive and vibrant industry, with teledensity of close to 50 percent and more than US\$150 million of private investment in the sector since 2000. The US\$40 million World Bank-funded eGhana project is building on these successes, and providing additional support for further harnessing Ghana's competitiveness in the IT-enabled services industry. According to McKinsey & Co. the global market for IT Enabled Services is about US\$475 billion of which only 15 percent has been realized so far, with India being the most dominant player. eGhana's primary objective is to generate growth and employment and support the government's efforts to capture a portion of this lucrative industry through the use of public-private partnerships and the opportunities offered by information and communications technologies.

In partnership with the government and the private sector, project funds have contributed to the creation of a government-managed ITES Secretariat and a Private Industry Association – the Ghana Association of Software and IT Companies (GASSCOM). These organizations are collaborating very effectively to improve Ghana's competitiveness in the ITES sector and their efforts to increase visibility, improve skills sets and standards, and investment promotion are beginning to pay off. The 2009 AT Kearney Global Services Location Index has ranked Ghana #15 out of 50 countries, globally, in terms of location, attractiveness, and #1 in terms of financial attractiveness. Close to 20 ITES companies are currently registered with GASSCOM, and over 1,000 jobs have been created during the last two years. The additional partnership between the public and private sector to train some 50 training institutions and 6,000 business process outsourcing agents in the second half of 2009 is expected to further strengthen Ghana's position as one of the most attractive locations for ITES business in Africa.

at the policy and the financing levels. IDA's support can play a key role in ensuring that they are both successful.

Broadband is currently very expensive in IDA countries and only available to small sections of the population. The falling price of personal computers, improvements in international communications infrastructure and innovation in broadband wireless standards mean that many of the obstacles facing widespread broadband roll-out are being overcome. However, key bottlenecks remain. Government policy and regulatory frameworks continue to constrain investment in the sector. Reliance upon traditional radio-spectrum management techniques is limiting market entry and innovation while the lack of high-capacity domestic backbone networks is raising the costs for companies entering the market.

IDA's technical expertise in these areas and the availability of financial resources to support targeted public intervention to overcome the infrastructure bottlenecks will be a major area of activity for IDA in the future.

Moreover, as widespread and low-cost connectivity is already becoming a reality in most IDA countries, it provides an extraordinary opportunity for the public sector to improve its service delivery. This is already happening in some countries, but other countries and more applications will follow. This will require significant technical expertise and financial support, both of which IDA is in a position to provide.

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