

## IDA AT WORK

# ICT: Connecting People and Making Markets Work

The Information and Communications Technology (ICT) sector has undergone a revolution over the last 10 years in all developing countries. A total of \$16 billion was invested in the ICT sector in IDA countries between 1997 and 2006 and 56 percent of the population now live within reach of wireless networks. There are more than 260 million telephone subscribers (fixed and mobile) in IDA countries, and this number continues to grow rapidly as prices fall and networks expand.

This growth 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 ICT has also been surprisingly broad-based, with many low-income families and those living in rural areas accessing basic ICT services.

The performance of the sector has been driven by market liberalization that has stimulated private-sector investment and competition. IDA has been at the heart of these policy reforms in many countries. Approximately \$500 million of IDA funds were disbursed in 47 IDA countries between 1997 and 2007 to support sector reform, regulatory capacity building and infrastructure investment, in addition to a significant amount of non-lending advisory services.

### At a glance

- Approximately \$500 million of IDA funds were provided for ICT-related activities in 47 IDA countries between 1997 and 2007.
- IDA countries that have implemented deep sector reforms generated some \$16 billion in investment between 1997 and 2006. The annual revenue generated by the ICT 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 almost 19 percent of the population, or more than 260 million subscribers, within less than a decade.

IDA has had some notable successes, among them a project in Afghanistan where IDA-supported sector reform increased the number of telephone subscribers from 57,000 to more than 5 million in the space of five years between 2002 and 2007.

The focus of IDA has now broadened in the ICT sector, going beyond voice connectivity and assisting governments to develop broadband connectivity and use ICT applications for the delivery of public services. IDA also works in partnership with the IFC in the telecommunications sector, allowing it to support both public and private investments.



## SECTORAL CONTEXT

### The ICT revolution in developing countries.

Over the last 10 years, the ICT sector in IDA countries has undergone a revolution. A total of \$16 billion was invested between 1997 and 2006; more than 80 percent of it came from the private-sector. The proportion of the population living within range of the wireless telephone networks has increased dramatically from close to zero at the end of the 1990s to 56 percent by 2006. By end-2007 there were more than 260 million telephone subscribers in IDA countries, over 80 percent of which were mobile subscribers.

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 and this figure is increasing every year.

The sector continues to grow rapidly in IDA countries. On average, around 20 million new subscribers joined the networks every year between 1996 and 2007 and this growth rate

is actually increasing. The average annual increase in telecommunications penetration for the first half of the period was less than 1 percentage point compared with nearly 3 percentage points in the second half of the period.

The success of the mobile market is also beginning to be seen in other segments of the ICT industry. For example, rates of internet access in IDA countries have begun to rise, albeit it 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 the networks have expanded and the customer base increased, prices have fallen. Over the past three years, the average price of mobile services across all IDA countries fell by about 4 percent per year; but in some large IDA countries, such as Bangladesh, mobile call tariffs have fallen by around 30-40 percent per year since 2005. Average mobile call prices there now lie between 1 and 2 cents (US) per minute, bringing pre-paid telephone services 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 in providing services to low income users at affordable prices while making a profit. Examples of this innovation include per-second billing and recharge cards denominated in small units. Operators in East Africa, clients of the IFC, recently pioneered the establishment of 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 leading the development of mobile phone-based banking services.

### ICT use boosts economic productivity.

The ICT sector has a direct positive impact on poverty reduction by raising the productivity of small and medium-sized businesses (see box).

And its direct economic impact in developing countries can be measured by external investment: between 1997-2006, around 10 percent of total net FDI inflows in IDA countries went into the telecoms sector in IDA countries 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 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 couldn't 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, 30–40 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 9 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 4 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

## The ICT sector is a major source of government revenue.

On average, the revenue generated by ICT is equivalent to about 4 percent of GDP—from sales tax, sector levies, and corporate taxes. A recent World Bank study of the mobile industry in Bangladesh showed that between US\$317 million and US\$386 million in government revenues was generated by some 6.4 million mobile subscribers during 2005. In Afghanistan, Roshan, one of the mobile operators, contributed \$75 million in taxes and license fees over the period 2003-2006; in a country with a small formal sector and a low tax-base this number represents a very significant proportion of total government revenues. The decision to reform the telecommunications market also has short-term fiscal implications as licenses are often sold for significant sums.

The development impact extends to ICT use for public service delivery. In Ghana, for example, the government has been able to increase the speed at which the customs service is able to process imports and exports, and in India, the government significantly reduced the amount of bribes taken by government officials by automating the registration of land titles.

As the positive impacts of ICT have become better understood, governments of IDA countries have begun increasingly to prioritize the ICT sector thereby fostering the provision of affordable ICT services to as many people as possible.

## IDA CONTRIBUTIONS

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

**The key driver of the dramatic improvement in the sector has been the liberalization of telecommunications markets and opening up the sector to private investment.** This has happened progressively across IDA countries over the past 10 years. By 2006, more than 75 percent of IDA countries had liberalized their mobile markets and a similar proportion had established an independent regulatory authority.

In a recent World Bank study of 24 African countries—22 of them IDA countries—it was found that the annual growth in mobile subscriptions accelerates as competition deepens. The average growth of mobile

### Recent license-awards in selected IDA countries

Country	License award revenues
Afghanistan	3 licenses auctioned, US\$85m
Bangladesh	1 license auctioned. US\$50m
Bhutan	2nd mobile license auctioned for US\$ 17 million
Nepal	2nd mobile license auctioned for US\$ 25 million

penetration was less than 1 percentage point per year when there were only two mobile operators in the market but this increased to more than 3 percentage points per year when there were four or more operators competing. Increased competition is also associated with drops in the price of mobile services and international calls.

IDA has been closely involved in the sector reforms that have taken place in these countries. IDA support has been used to assist in policy reform, drafting new laws, issuing licenses, setting up regulatory authorities and privatizing incumbent operators. Between 1996 and 2007, IDA had projects with technology or communications components in 43 countries. In addition to these projects, IDA teams are engaged in many countries in an ongoing process of institutional capacity-building and policy dialogue.

The nature of IDA assistance has changed as sector policy has changed. In the past, IDA projects typically focused on investment activities, aimed at increasing access to ICT services, primarily through the fixed-line operator. But during the second half of the

1990s, IDA countries began re-focusing their ICT sector policies towards service delivery by the private sector and by mobile phones. IDA support evolved to place greater emphasis on supporting the liberalization and privatization process with growing attention to sound regulation and promoting access in rural areas.

IDA lending and technical assistance is now becoming more engaged in the use of ICT in delivering public services. Such “e-government” initiatives can result in significant improvements in the quality and transparency of public service provision.

### Results on the ground.

When IDA has supported countries implementing sector reforms, the results have been a major improvement in sector performance.

For example, 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 private 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 FDI in Afghanistan. As a result, the number of telephones in Afghanistan increased from 57,000 in 2002 to more than 5 million in 2007. About 17 of every 100 Afghans now have access to a phone. Moreover, falling prices have made services more affordable. In 2002, it cost about US\$400 to own a mobile

IDA involvement in the ICT sector	
Type of involvement	# countries in which IDA has been involved
Market liberalization	20
Privatization	22
Support to the regulatory framework	33
Rural access	12

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.

In Samoa—an island state with a population of around 200,000—there was, by the end of the 1990s, widespread dissatisfaction with the services being offered by Telecom New Zealand under a joint venture with the government. IDA provided a technical assistance loan of \$4.5 million which supported the government's liberalization of the sector and negotiation with Telecom New Zealand. A new Telecommunications Act was passed in 2005 which provided the framework for competition and established an independent regulator. In 2006, the government awarded new GSM 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.

The policy of competition among private operators has been highly successful 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 the population in rural areas. The same study showed that if effective competition was 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 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. There are a number of mechanisms for doing this and IDA has been involved in setting them up in many countries (see box).

### Uganda Energy for Rural Transformation Project (ERTP)

As of 1999 Uganda had achieved a national teledensity (fixed and mobile) of about 1 telephone per 100 inhabitants, slightly above the average for Sub-Saharan Africa (excluding South Africa). But with most phone lines concentrated in the Kampala area, rural teledensity was far lower. Indeed, only 380 of the 920 sub-counties in Uganda were expected to have any kind of telephone service by 2001. Internet services, still in their infancy, also were limited to Kampala. The ICT component of IDA's Energy for Rural Transformation Project (ERTP) was designed to address this problem.

IDA had already provided the government of Uganda with assistance in designing and implementing structural reforms in the telecommunications sector, including the 1997 Communications Act; creating a regulatory authority for communications; and incorporating and privatizing Uganda Telecommunications Ltd. in 2000 and implementing market liberalization

In July 2001, the two mobile operators declared that they could not serve 154 of the country's 920 sub-counties on a commercial basis, forfeiting their exclusivity in these areas. These sub-counties hence became the target areas for a subsidy provided under IDA's ERTTP project. This was done through an output-based aid mechanism whereby providers are paid *ex post* based on the services that they have established. Within two years, about half of the roll out agreements in two of the three regions included in the bidding had been implemented. In parallel, 32 Internet points of presence (POPs) in as many district capitals were tendered, with two firms winning the contracts with combined subsidy requirements of less than \$1 million.

## The evolving agenda.

Access to the internet is growing rapidly across the developing world and is increasingly a government priority. One important element of the communications network infrastructure that is required to deliver broadband services are backbone networks—the high-capacity networks at the core of the electronic communications systems which carry high volumes of data traffic. These networks are underdeveloped in many IDA countries, and IDA is working with governments to promote them. This work involves a combination of policy and regulatory reforms aimed at stimulating private investment and public support for these networks in areas that the private sector does not find commercially attractive. One example is a \$20 million project in Burundi in which IDA funds support a joint venture between national operators to cooperatively build and operate backbone network infrastructure that would be run on an open access basis. Another is the Eastern African Submarine Fiber-Optic Cable (EASSy), a submarine communications cable running along the East coast of Africa. IDA supported the initial stages of development including the policy framework. Financing for the project has been provided by the IFC, in partnership with other Development Finance Institutions. In fact, IDA countries are an increasingly important part of the IFC's business in the ICT sector, accounting for 75% of the value of new investments during FY08.

Support for e-Government activities is also becoming increasingly important in IDA countries, particularly as a complement to other work that IDA is doing in the areas of public sector reform, good governance and public service delivery (see box).

### e-Government in Rwanda

Rwanda has been an African pioneer of the use of ICT in delivering public services through its TRACnet system. This is a GSM-based system for the collection, retrieval and analysis of health information which has been deployed in each of Rwanda's health centers. It uses existing technology and runs over the basic voice networks, which have been deployed by the private telecommunications operators so the government bears no infrastructure investment costs.

Rwanda is now expanding the use of ICT in public service delivery through IDA's \$10million eRwanda project. This project supports the development of information and technology applications that benefit the public.

The e-government projects undertaken by IDA come in many different forms. For example, the US\$40 million IDA e-Ghana project is helping the government to generate growth and employment through public-private partnerships to develop the technologically enabled services industry and improve the efficiency and transparency of government services.

### 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 major development success and can help create a platform

for growth in other sectors. Policy reform and the improvement of public sector governance have triggered large amounts of private investment, greatly improved service delivery, more jobs, and sustainably increased government revenues. IDA has supported the majority of countries implementing such reforms.

Following on from 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 using ICT to improve public service delivery. Both of these areas present major challenges at the policy and the financing level. The support of IDA 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. How-

ever, 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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