

Key Trends in ICT Development

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Part I of this report shows that information and communication technology (ICT) is playing a vital role in advancing economic growth and improving governance. The potential impact that ICT can have on individuals, businesses, and governments depends largely on how policies are formulated and technology and markets evolve. Thus, it is important for countries to possess timely ICT data and benchmarks to facilitate policy making that extends the reach of ICT and increases its development impact.

ICT development is multifaceted, ranging from the roll-out of telecommunications infrastructure—providing voice, data, and media services—and information applications tailored to specific sectors and functions (for example, banking and finance, land management, education, and health) to the implementation of electronic government (e-government) and the development of information technology (IT) and IT-enabled industries (including IT goods and services). There are many opportunities for developing countries to advance development through the innovative use of ICT. Banking services and job search text messaging services delivered through mobile phones and portable devices used by farmers and fishermen to track crop prices and market demand are a few examples that are changing the lives of people in developing countries.

Part II of the report includes this chapter describing the key trends in ICT development; sections titled ICT Performance Measures: Methodology and Findings, with its annex on

progress in measuring ICT, and User's Guide to ICT At-a-Glance Country Tables; and the ICT at-a-glance (AAG) tables for 150 economies. The tables contain 29 indicators on ICT sector structure, capacity, and performance.

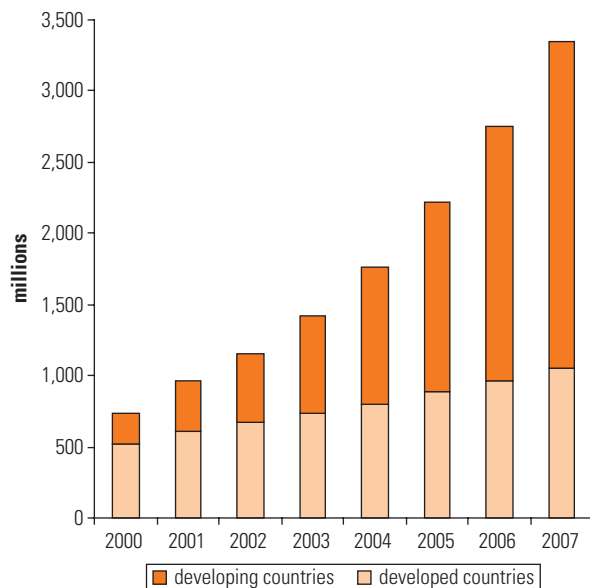
The present chapter uses the data from the AAG tables to demonstrate the progress that many developing countries have made in recent years in improving ICT access, use, quality, affordability, trade, and applications, and to show how that progress relates to enabling policies and regulations.

This ICT trends analysis and the ICT at-a-glance tables use standard World Bank income and region classifications. For income classification, every economy is classified as low income, middle income (subdivided into lower middle income and upper middle income), or high income based on gross national income (GNI) per capita. Regional groupings include only low- and middle-income economies and are based on the World Bank's operational regions, which may differ from common geographic designations. For further details on income and region classifications, see the section titled User's Guide to ICT At-a-Glance Country Tables.

Mobile Phones Have Narrowed the Gaps in Voice Communications Worldwide

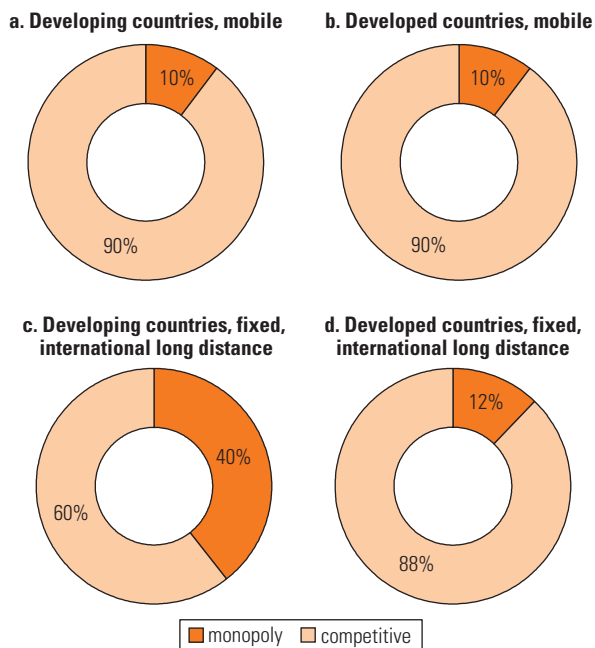
The overall trends in voice communications in developing countries are positive. At the end of 2007 there were about 1.1 billion fixed telephone lines and 3.3 billion mobile phone

Figure 1 Mobile Phone Subscriptions in Developing and Developed Countries, 2000–07



Source: International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database.

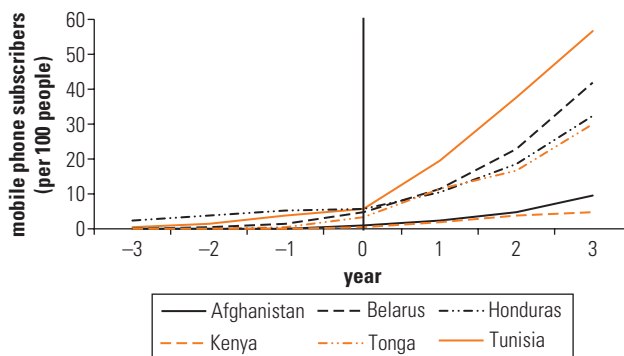
Figure 2 Status of Competition in Fixed and Mobile Telephony in Developing and Developed Countries, 2007



Source: ITU, World Telecommunication Regulatory Database; based on World Bank classification of economies.

Note: For the developing-country panel at the top, a sample of 127 countries was used; for that at the bottom, 134 countries. For the developed-country panels, a sample of 49 countries was used.

Figure 3 Mobile Telephony Penetration before and after the Introduction of Competition



Source: ITU, World Telecommunication/ICT Indicators Database.
 Note: Year 0 in the figure indicates the year of entry of a second mobile operator.

subscriptions worldwide. The proportion of mobile phone subscriptions in developing countries increased from about 30 percent of the world total in 2000 to more than 50 percent in 2004—and to almost 70 percent in 2007 (figure 1).

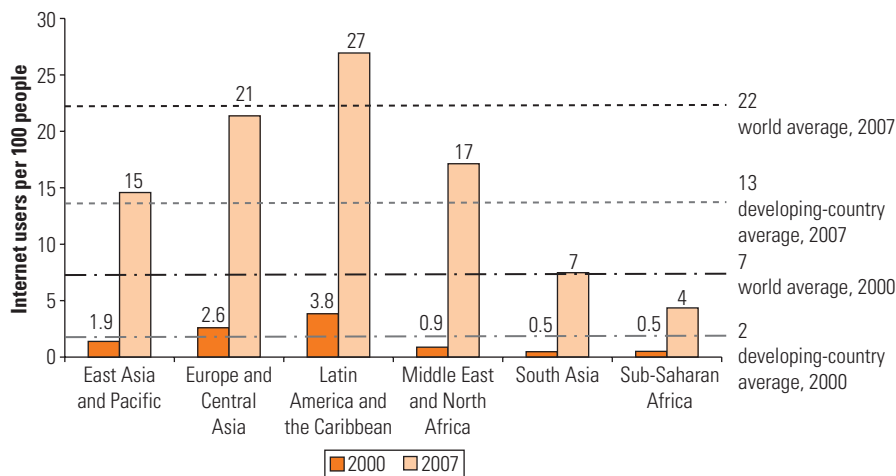
There are two principal reasons that the uptake of mobile telephony in developing countries has overtaken fixed-line service. First, wireless technology can be deployed more quickly because it requires less upfront investment in infrastructure than do fixed telephone systems. This translates to lower prices and hence stronger customer demand. Second, liberalization of fixed-line markets, which were often dominated by state-owned monopolies, started later, while mobile phone markets were generally opened to one or more new entrants from the start (figure 2).

The introduction of competition in the mobile telephony market has often led to an immediate growth in voice services (figure 3). Countries that have taken decisive steps to establish independent regulators and foster competition have seen notable improvements in sector performance. In some cases, the announcement of a plan to issue a new license has been effective in triggering growth, encouraging the existing mobile phone operator to improve service, reduce prices, and increase market penetration before the new entrant started operations.

Access to Advanced ICT Services Is the Natural Next Step in Development

Although Internet use took off more recently and has not grown as rapidly as voice communications, the worldwide

Figure 4 Number of Internet Users by Region, 2000 and 2007



Source: ITU, World Telecommunication/ICT Indicators Database.

number of Internet users more than tripled between 2000 and 2007. In developing countries, the number of Internet users jumped about 10 times over the same period, from 76 million to 726 million. But the disparity in Internet penetration among developing countries and regions remains high, ranging from about 27 users per 100 people in Latin America and the Caribbean and 21 users per 100 people in Europe and Central Asia to 4 per 100 people in Sub-Saharan Africa in 2007 (figure 4). Unlike mobile phones, personal computers are often too costly for many households in developing countries. Public Internet access points, therefore, have played an important role in introducing the Internet to people in rural areas and low-income countries. Moreover, as wireless technology evolves and markets expand, more people in both developed and developing countries are using mobile phones to access the Internet.

The demand for always-on, high-capacity Internet services in both developed and developing countries is increasing. Advanced Internet service—i.e., beyond what can be achieved through dial-up connections—has become more important as the demand for data and value-added services grows. Broadband allows for large volumes of data to be transmitted and facilitates cheaper voice communications (for example, by routing calls over the Internet). It is also enabling voice, data, and media services to be transmitted over the same network. Such convergence could have an enormous impact on economic and social development—increasing productivity, lowering transaction costs, facilitating trade, and increasing retail sales and tax revenues. Where broadband has been

introduced in rural areas of developing countries, villagers and farmers have gained better access to market prices of crops, training, and job opportunities. However, in 2007, average broadband penetration in low-income economies was just 2 percent of the population and was concentrated in urban centers. Clearly, the benefits of broadband are not yet available to most people in developing economies.

Although the capacity of broadband service is measured by the advertised speed available to consumers, speed may be constrained by the availability of bandwidth, which is increasing faster in developed countries with robust infrastructure than in developing countries. In high-income economies, average per capita international bandwidth increased from 586 bits per second (bps) in 2000 to 18,240 bps in 2007. Among developing regions, Europe and Central Asia and Latin America and the Caribbean have the greatest capacity. Between 2000 and 2007, bandwidth per capita increased from 12 bps to 1,114 bps in Europe and Central Asia and from 8 bps to 1,126 bps in Latin America and the Caribbean. With improved fiber-optic connectivity, some countries in South Asia are seeing a rise in international bandwidth, yet in terms of international bandwidth per capita, South Asia and Sub-Saharan Africa are still well behind other regions (figure 5).

Broadband penetration is closely associated with per capita income (figure 6). The Republic of Korea, however, through ambitious policies and support for broadband infrastructure investments, now has one of the world’s highest rates of broadband subscribers—well above that

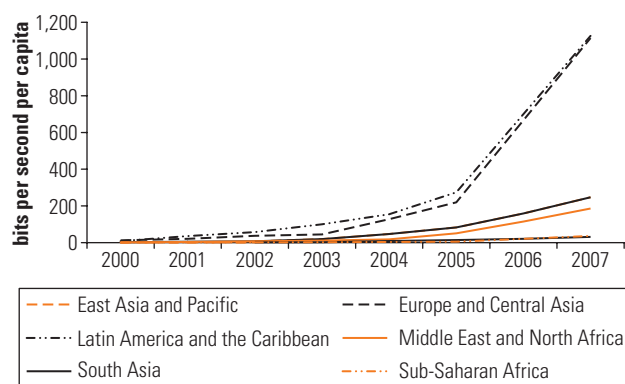
of many other economies with higher per capita incomes. Estonia has also made great progress through a national strategy to build an ICT-enabled economy. It is experiencing a surge in Internet and broadband use, triggered in part by the development of an electronic environment for its banking sector. Both countries have leveraged public-private partnerships to facilitate ICT development and aim to use ICT to increase connectivity between citizens, businesses, and government.

Affordability Unleashes the Potential Impact of ICT Services on Economic Growth

The price of ICT access continues to fall due to technological advances, market growth, and increased competition, a trend that is especially important in allowing people in developing countries to take full advantage of ICT services. In recent years, steep price reductions have contributed to the rapid expansion in mobile phone use in many countries (figure 1, figure 7). Increased use of prepaid service allows mobile customers to make payments in small amounts instead of having to commit to fixed monthly subscriptions. Such cards enable even low-income consumers to have access to mobile communications, leading to higher penetration rates in poor and rural areas.

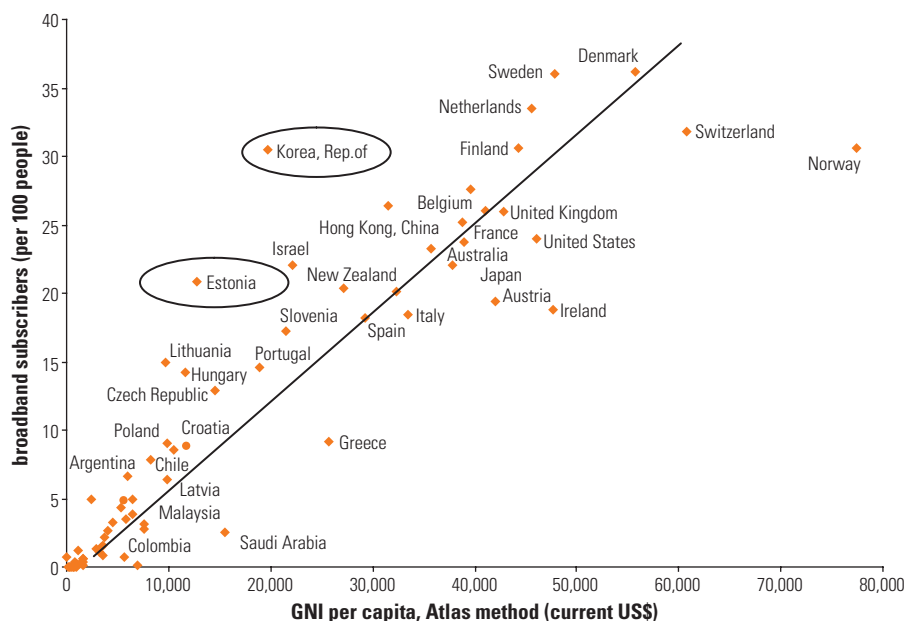
Pricing for Internet access has also been falling in many countries, including some in sub-Saharan Africa (figure 8). Still, the average price for Africa as a whole continues to be well above the world average. The gap in affordability is even more stark: in 2006, the Internet price basket for sub-Saharan Africa was about 62 percent of average monthly per capita income, while it was about 12 percent in South Asia, and less than 9 percent in all other developing regions. In high-income economies, Internet service costs less than 1 percent of average monthly income.

Figure 5 International Bandwidth in Developing Regions, 2000–07



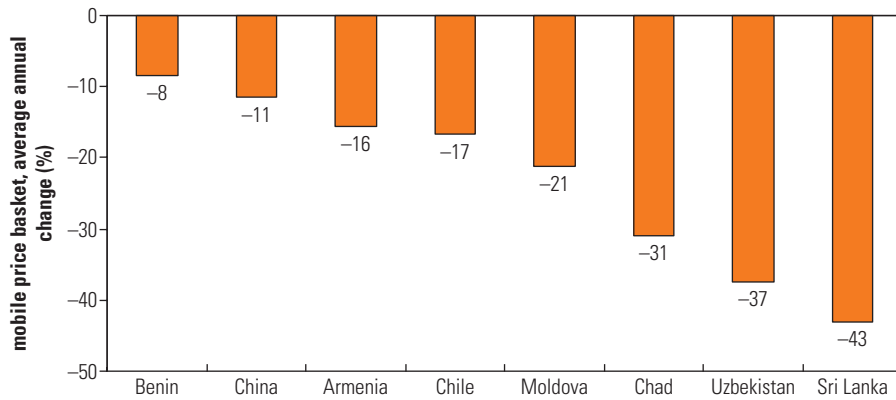
Sources: ITU, World Telecommunication/ICT Indicators Database; World Bank.

Figure 6 Broadband Penetration and Gross National Income in Various Economies, 2007



Sources: ITU, World Telecommunication/ICT Indicators Database; World Bank, World Development Indicators Database.

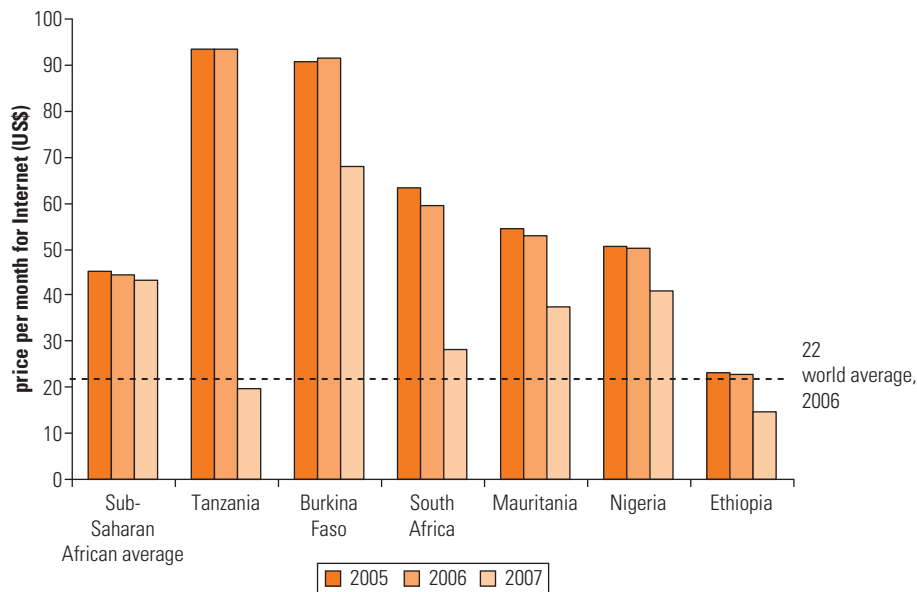
Figure 7 Average Annual Change in Price of Mobile Phone Services in Various Countries, 2004–06



Source: ITU, World Telecommunication/ICT Indicators Database.

Note: Mobile price basket is based on the Organisation for Economic Co-operation and Development (OECD) low user definition and is calculated based on the prepaid price for 25 calls per month spread over the same mobile network, other mobile networks, and mobile to fixed calls and during peak, off-peak, and weekend times. It also includes 30 text messages per month. Countries that have experienced significant price reductions in mobile phone service prices do not necessarily have the lowest prices.

Figure 8 Monthly Price of Internet Services in Various Sub-Saharan African Countries, 2005–07



Source: ITU, World Telecommunication/ICT Indicators Database.

Note: Price basket for Internet service is calculated based on the cheapest available tariff for accessing the Internet for 20 hours a month (10 hours peak and 10 hours off-peak). The basket does not include the telephone line rental but does include any telephone usage charges.

Developing Countries Are Benefiting from ICT Exports

Although the level of exports of ICT goods and services does not necessarily reflect high rates of ICT use in a country, it does indicate the importance of a country's ICT sector and its international competitiveness. As barriers to

trade in ICT goods and services are removed, opportunities for developing countries to benefit from such exports will likely grow.

Some developing countries have already become key exporters of ICT goods and services. The top-five exporters of ICT goods in 2006 were China (\$299 billion); the United

States (\$169 billion); Hong Kong, China (\$136 billion); Japan (\$125 billion); and Singapore (\$124 billion). In terms of the share of ICT goods exports in total goods exports, economies in the East Asia and Pacific Region were leaders: the Philippines (56 percent); Singapore (46 percent); Malaysia (45 percent); Hong Kong, China (42 percent); and China (31 percent).

Trade in ICT services includes communications services (telecommunications, business network services, teleconferencing, support services, and postal services) and computer and information services (databases, data processing, software design and development, maintenance and repair, and news agency services). India's software exports jumped from about \$1 billion in 1995 to \$22 billion in 2006, and generated employment of about 1.6 million people. India leads all other developing countries in exports of communication, computer, and information services as a share of total service exports, at 42 percent in 2006/07 (figure 9). Other developing countries on the top-10 list include Costa Rica, Guyana, the Republic of Yemen, Romania, and Senegal.

ICT Applications Are Transforming Government and Commerce

Between 2000 and 2007, the ICT sector accounted for 3 to 7 percent of GDP, regardless of the country's level of income. With robust ICT infrastructure as a foundation, countries are using ICT applications to further develop

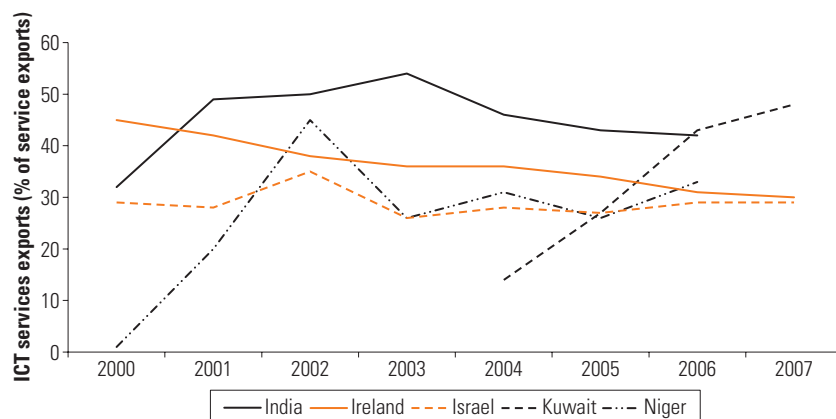
specific sectors. And developing countries are well positioned to benefit from adopting new ICT applications because they often do not have the added expenses of maintaining and transitioning from legacy IT systems to newer technologies.

Governments are increasingly important users of ICT, particularly in the context of e-government, making them a major actor in fostering ICT uptake and setting IT standards. E-government initiatives usually aim to make public administration more efficient, increase government accountability and transparency, and improve delivery of public services to citizens and businesses.

The United Nations Web Measure Index (table 1) evaluates the availability and sophistication of governments' Web presence and use. A look at the five indicators that make up the index shows not only that governments in developed countries are much higher up the ICT adoption ladder but that they are at a more advanced stage where ICT has been embedded in daily workflows—easing transactions, recordkeeping, and sharing of information among government agencies and between government, citizens, and businesses. Many developing countries are still at an earlier stage, focused on physical implementation of IT systems and networks.

In terms of advancement of e-commerce, developing countries have less than one-hundredth the number of secure servers as developed countries (table 1). A secure, reliable business-enabling environment is a key element of successful e-commerce. Privacy and security concerns

Figure 9 ICT Service Exports as a Percentage of Total Service Exports for the Top-Five Countries, 2000–06/07



Source: International Monetary Fund (IMF), Balance of Payments Statistics Yearbook Database.

Note: The most recent data available for India and Niger are from 2006.

Table 1 Measures of E-Government and E-Commerce in Developing and Developed Countries

Country group	Web measure index, 2007	E-Commerce (secure Internet servers per 1 million people), December 2008
Developed	0.61	662.6
Developing	0.27	5.2
Ratio of developed to developing	2.2	128.1

Sources: UNPAN 2008; Netcraft Secure Server Survey; based on World Bank classification of economies.

about the transmission of personal or financial information over the Internet are major issues for both consumers and firms and may explain why they may be reluctant to use the Internet to make transactions. The number of secure servers indicates how many companies are conducting encrypted transactions over the Internet. Differences in this measure are stark. While developed countries had about 662 such servers per 1 million people in December 2008, developing countries had about 5. Canada alone, with 30,200 secure servers, had more than all developing countries combined, with 28,399.

Conclusion

Countries that have taken steps to create a competitive market environment for ICT generally have a larger share of people using ICT services than those that have not. One important outcome of competition is that it lowers prices for ICT services. But while prices are falling rapidly, ICT services are still unaffordable for many people in low-income countries. As a

result, a large share of the population in these countries has yet to realize the potential of ICT for economic and social development.

Among ICT services, voice communications, particularly mobile telephony, has led the way. Access to new services such as broadband remains limited in developing countries. Yet the expansion of broadband networks plays a catalytic role in the development of trade and e-government. In some developing countries, trade in ICT goods and services has sparked export-led growth and job creation. ICT applications are also transforming how governments deliver public services to citizens and businesses.

References

- IMF (International Monetary Fund). Balance of Payments Statistics Yearbook Database. Washington, DC: IMF.
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