

chapter four ICT growth strategies

4.1 Introduction: Strategies that work

The remarkable growth of the Information and Communication Technology (ICT) sector over the last two decades has transformed many economies. The drivers of economic growth have become more information-intensive and less dependent on natural resources. Affordable access to high-quality ICTs has become a key priority for policy-makers and businesses. Chapter two of this report examined disparities in access to ICTs and Chapter three reviewed trends in the deployment of ICTs. In this chapter, the focus shifts to ICT growth strategies or "e-strategies" and what can be done to promote the adoption of ICTs. Case studies from different regions are used to illustrate ICT growth strategies and key enablers in the transition towards modern ICT-intensive economies.

The WSIS process recognized that the development of national e-strategies is the responsibility of all stakeholders, not just governments (Box 4.1). During the Geneva Phase of WSIS, stakeholders committed to developing national e-strategies by 2005 and to achieving the WSIS goals by 2015. Many economies already have national strategies for the ICT sector, telecommunications and/or information technology. National growth strategies are path-dependent and no two economies start from the same point. Furthermore, strategies vary according to social policy objectives, the market and policy tools adopted, the size of the economy, income and demographic distribution, among other factors. There is no "one-size-fits-all" strategy for creating digital opportunity. As the WSIS outcome documents makes clear, each country must set its own specific targets, in accordance with national development policies and taking into account national circumstances.¹

Developing countries are often disadvantaged by limited infrastructure and human resources, insufficient policy incentives and scarce investment, while the high cost of services and other barriers may constrain growth in ICTs. There is a close correlation between digital opportunity and GDP per capita: digital opportunity tends to be greater in wealthier economies, but digital opportunity can also generate wealth, resulting in a positive feedback cycle.² Where both digital opportunity and wealth are limited, as is the case in some LDCs, it can be difficult to break out of the trap of limited investment in infrastructure. For instance, there were only two economies-Turkmenistan and Zimbabwe—that experienced falls in their Digital Opportunity Index (DOI) scores, between 2004-2006. In each case, their GDP per capita also fell in USD terms.

Countries with similar levels of digital opportunity may experience different growth outcomes depending on their policies. In some cases, for instance, these disparities may result from the adoption (or failure to adopt) of a particular technology.³ In certain cases, innovative technologies (or services) have been used by developing countries to leapfrog—examples include China, which is moving directly to broadband Internet access without a large installed base of dial-up Internet users; and India, which moved directly to digital mobile service without investing first in analogue services. In general, developed countries benefit from the faster adoption and greater diffusion of new technologies, while developing countries often experience faster rates of growth (in percentage terms).

Box 4.1: National e-strategies in the WSIS Geneva Plan of Action

"The effective participation of governments and all stakeholders is vital in developing the Information Society requiring cooperation and partnerships among all of them.

a) Development of national e-strategies, including the necessary human capacity-building, should be encouraged by all countries by 2005, taking into account different national circumstances.

b) Initiate at the national level a structured dialogue involving all relevant stakeholders, including through public/private partnerships, in devising e-strategies for the Information Society and for the exchange of best practices.

c) In developing and implementing national e-strategies, stakeholders should take into consideration local, regional and national needs and concerns. To maximize the benefits of initiatives undertaken, these should include the concept of sustainability. The private sector should be engaged in concrete projects to develop the Information Society at local, regional and national levels...."

Source: WSIS Geneva Plan of Action, Para 8.

As ICT policies and strategies are cross-cutting in nature, they are being mainstreamed into the frameworks for national strategies for development and poverty alleviation in many developing countries.⁴ This chapter illustrates different ICT growth strategies using a range of country case studies. The chapter begins by examining the role for government in leadership (Section 4.2), before examining market liberalization and competition (Section 4.3) privatization (Section 4.4), regulatory reforms (Section 4.5), the promotion of infrastructure (Section 4.6), an enabling environment for investment (Section 4.7), before concluding with the need to establish human resource policies (Section 4.8).

4.2 What role for government?

In market economies, both the public and private sector can promote digital opportunity. Government has an important role to play in establishing an enabling environment for investment and market competition, as well as intervening to achieve socio-economic goals in areas where normal market incentives may be insufficient to create balanced growth. In reality, the roles of governments and the private sector overlap and include additional elements:

- » First, positive incentives stimulating market dynamics: for instance, by establishing an enabling environment for investment, ensuring private sector participation or in promoting the take-up of broadband;
- » Second, measures preventing uneven development (for example, by use of regulatory criteria or restrictions) or counteracting negative effects (for instance, by combating the rise of spam).

4.2.1 Republic of Korea: The government's role in broadband deployment

Despite disputes over the role of government in a market economy, government-led initiatives can promote successful ICT deployment. The Government of Korea's successful deployment of broadband and its rapid transformation towards an Information Society is one notable example.

Ranked first in the DOI since 2002 (when it overtook lceland: see Table 3 in the Statistical Annex), Korea's success in digital opportunity is the result of a combination of: environmental factors (e.g. high literacy and school enrolment, tech-savvy consumers and a largely urbanized population); policy factors (e.g. a strong government push





towards the Information Society and high investment by the private sector in new technologies and services); and a highly competitive market structure. However, what sets Korea apart from many other economies is the strong guiding role played by government (Figure 4.1).

During the 1990s, Korea experienced unprecedented political, economic and social turmoil, including the North Korean nuclear crisis in 1994, the Asian financial crisis in 1997-8 and democratization. New momentum was needed to help Korea maintain economic growth. The Government recognized the role of ICTs as an engine for economic growth from an early stage. In order to prioritize ICT development, the Government centralized ICT-related functions previously scattered across different agencies in a new Ministry of Information and Communication (MIC) in 1994. MIC has played a central role in the planning and implementation of ICT development policy ever since.⁵ MIC launched an ambitious plan, the Korea Information Infrastructure Initiative (KII), in 1995 to roll out an advanced network infrastructure nationwide. Upgraded initiatives, such as the 'National Framework Plan for Informatization Promotion', 'Cyber Korea 21', 'e-Korea Vision 2006' and 'IT839', have followed the KII Initiative.

A key element in MIC's success in promoting broadband deployment was the establishment of a framework for facilities-based competition in 1998. In response to delays in unbundling the existing network (i.e. to promote service-based competition), new policy approaches were introduced to encourage infrastructure investment and competition in the broadband market. Open access to market and network technology triggered fierce competition with new entrants in network and service provision. Moreover, MIC held regular consultations with operators to seek broad consensus on its policy priorities of keeping user costs low and promoting access throughout the country. The Government also maintained asymmetric regulation for fair competition in the mobile market since 2000.

In order to maintain momentum in ICT roll-out and use, the Government has sought to stimulate market demand. Since investment in infrastructure alone is no guarantee of smooth development towards the Information Society, MIC introduced a series of policy measures to promote active usage of the Internet. Nationwide training programmes for PC and Internet skills were carried out, with government support. Large-scale education for children, housewives, the elderly and the disabled has raised the profile of ICTs on the national agenda. They have also given a positive image to manufacturing and service industries. In summary, targeted investments by the Government in infrastructure and usage promotion have maximized the benefits of broadband deployment.

4.2.2 Estonia: Leaping Tiger

Estonia has proved an ICT success story, due to Government-led initiatives and an early decision to transform the economy from a state-planned economy to a market-oriented economy. This year, it has entered the top twenty-five economies in digital opportunity with a DOI score of 0.65, the only Central and Eastern transition economy to make it to the top twenty-five (see Section 3.3.1). The incumbent was privatized in 1993, mobile competition introduced in 1994 and full service competition from 2002. Over half the Estonian population uses the Internet and Estonia has the highest Internet and broadband penetration in Central and Eastern Europe. Estonia's levels of ICT development exceed EU average (Figure 4.2), although it only joined the EU in 2004.

The Estonian Parliament adopted the "Principles of the Estonian Information Policy" as early as May 1998 as a roadmap for the country's development in ICTs. Annual information policy action plans are coordinated by the Ministry responsible for communications and specify detailed actions, responsibilities and targets. Various institutions have been established, such as the Informatics Council, which includes government and private sector experts that provide policy input. Different programmes have been created, focusing on specific areas.

In February 1996, the Government launched the "Tiger Leap" programme to modernize education. Tiger Leap had the slogan "one computer for every 20 pupils"6 and has helped provide IT facilities to schools. All schools had computers by 2000; by the start of 2003, 98 per cent were also connected to the Internet. ICTs have been integrated into the curriculum, as a subject and a tool for teaching other subjects. Over 100 software packages have been created in Estonian, covering history, culture, and nature. The Estonian Educational and Research Network (EENet) was created in 1993 as a nationwide scientific and educational computer network. By 2003, over 200'000 researchers, students, and teachers used the network and 455 institutions had a permanent connection. Most of the institutions (85 per cent) were schools and



Figure 4.2: Selected Information Society indicators, Estonia, 2005

Source: EUROSTAT.

universities, but they also included public Internet access points, libraries and archives.

Estonia has also been successful in e-government and ranks 19th out of 191 countries in the UN's global e-government report 2005⁷, higher than any other Central or Eastern European nation. The Government comprised some 64 public agencies staffed by 21'400 people in 2003. Nearly all staff needing a PC with Internet access have it. Estonia ranks fourth in the EU for interactive government services⁸, while three-quarters of all Estonian Internet users file their income taxes online.

In rural areas, the law requires that Estonia's 4'000 villages be connected to the PSTN network, if connection is technically possible. With mobile signal covering 99 per cent of the population, virtually all villages have access to voice services. The number of mobile subscriptions in Estonia has exceeded the population and, by the first quarter of 2005, 81 per cent of Estonian households had a mobile phone. In broadband, the KülaTee 3 (VillageWay 3) programme ensures that over 90 per cent of Estonian territory has broadband access, with the Government supporting broadband roll-out in rural areas. In community access, Estonia had 0.76 Public Internet Access Points (PIAPs) per 1'000 inhabitants in 2003, the highest among new EU member states. Government policy provides for free Internet access from PIAPs.

Tiger Leap is an apt name for Estonia's school ICT programme and, indeed, applies to the whole

country. The nation has taken a giant leap forward in ICTs. The word "tiger" implies a connection to the Asian Tigers, where rapid economic growth has made them developed economies. In the same way, Estonia is a Baltic tiger whose ICT sector today is as strong as most developed nations.

4.3 Market liberalization and competition

Market-focused strategies allow governments to meet social and economic goals, such as increasing access to ICTs and revenue from telecommunication services. Market reforms can boost productivity and profitability and stimulate investment, enhancing the performance of the ICT sector. Sector reform includes: (1) market liberalization and competition; (2) private sector participation; and (3) effective regulation. Liberalized markets are generally more efficient than markets under government control, and they are more likely to generate greater benefits for consumers and businesses.

Mobile and Internet markets are generally more competitive than fixed line markets, due to the proliferation of multiple new, private entrants in these markets (Figure 4.3). Basic voice services are less competitive than mobile services, but still, over 60 per cent of the world's economies have opened up their basic services market to some

Figure 4.3: Competition in basic services and cellular mobile markets worldwide



Source: ITU World Telecommunication Regulatory Database.

degree of competition (Figure 4.3, left chart). Europe is the most competitive region, in both basic and mobile services. Relatively speaking, Africa is less competitive, but still, more than half its markets were open to some form of competition by 2006.

Competition may take many different forms, however, as the experience of Vietnam's alternative approach to sector reform demonstrates.

4.3.1 Vietnam: Sector reform by a different model

At first glance, Vietnam may not seem to have an appropriate environment for high ICT growth: the incumbent operator has not been privatized, there is no separate regulator and foreign investment, although allowed, is limited by various constraints. Despite this, Vietnam has achieved one of the highest ICT growth rates over the last decade. One reason is that its economy has boomed, with per capita income almost doubling between 1997 and 2005. The rise in fixed and mobile penetration has matched the increase in per capita income (Figure 4.4).

Vietnam has progressed cautiously with ICT sector reform. In 1993, operations and supervision were separated, with the Directorate General of Posts and Telecommunications assuming responsibility for regulation and the state-owned Vietnam Posts and Telecommunications (VNPT) becoming the operator. Vietnam has allowed foreign investment in the ICT sector, but investment has been through Business Cooperation Contracts (BCCs), rather than direct equity stakes. BCCs are similar to Build-Operate-Transfer schemes, where the investor shares the revenue with local partners. At the end of the BCC, the assets revert to the local partners.

Vietnam's unique approach to liberalization has resulted in a fair degree of competition, through rivalry between different state-owned entities such as VNPT, municipal operators, the military and the electricity company. Although VNPT tends to dominate, there are now several operators in the fixed, long-distance, mobile and Internet markets. The wireless market provides an example of how the combination of different government entities and BCCs has resulted in a high level of competition. By 2007, there were six wireless operators:

- » VinaPhone: A GSM network owned by VNPT.
- » S-Fone: A BCC between SK Telecom of the Republic of Korea and SPT (Saigon Post and Telecommunications Service Corporation, the local operator in Ho Chi Minh City).
- » Mobifone: Vietnam's first GSM network, established as a BCC between Millicom and VNPT (through the Vietnam Mobile Services Company). The BCC ended in May 2005.

% 25 Fixed and mobile subscribers 20 2005 15 2004 10 2003 2002 5 2001 2000 1990 1998 1997 0 \$300 \$350 \$400 \$450 \$500 \$550 \$600 \$650 Gross National Income per capita, US\$

Figure 4.4: Per capita income and total teledensity in Vietnam, 1997-2005

Source: ITU World Telecommunication Indicators Database, adapted from General Statistics Office of Vietnam.

Millicom had hoped to convert its investment to an equity stake, but these efforts have not yet come to fruition.

- » EVN Telecom: A subsidiary of Electricity of Vietnam, with a CDMA 2000 1x EV-DO network.
- » VIETTEL: The telecommunication arm of the Vietnamese military. It operates a GSM network.
- » Hanoi Telecom: A BCC between the local operator in Hanoi and Hutchison Telecommunications.

While Vietnam's managed competition among government entities has contributed to its ICT sector development, it will need to pursue greater liberalization, if it is to become a regional ICT hub. The country joined the WTO in 2007 and Vietnam was obliged to further open up its ICT markets. Vietnam's WTO commitments include allowing a progressively higher degree of foreign participation, ending the requirement for BCCs and opening up markets to greater competition.

4.4 Privatization of incumbent operators

By the end of 2006, some 145 economies had fully or partly privatized their incumbent operators.⁹ Just over half of the world's developing countries had sold all or part of their incumbent operator (Figure 4.5). Of the 78 developing countries with partly or fully private telecom operators, around four-fifths initially sold assets to strategic foreign investors, with the remainder issuing public share offerings. Privatization and liberalization can unleash new market potential and emerging new markets have attracted considerable investment. Some US\$ 83 billion was raised through privatizations of incumbent public telecommunication operators in developing countries between 1990 and 2006.

The flow of funds over time shows that privatizations tend to cluster in one region over time, before investors move on to other regions. This suggests some degree of "imitation", with countries emulating their neighbors, and with investors vying for similar assets. The early 1990s was the era of Latin America, where ten incumbent operators were privatized. The tide then switched to Central and Eastern Europe. Apart from Albania and Bosnia Herzegovina, every incumbent telecom operator in Central and Eastern Europe has now been privatized. The least privatized region is the Commonwealth of Independent States. The type of privatization also varies by region. In general, in Asia, public offerings are preferred as a means of raising funds from the sale of government assets in incumbents, whereas in Africa and Latin America, stakes have been sold to strategic investors. Between 2005-06, developing country privatizations focused on the Arab States and neighboring countries. Many of these sales were to consortia headed by Arab investors or listings on domestic stock markets (see Table 4.1 and Box 4.2).

The remaining countries that would like to privatize their operators may find that investors are no longer as enthusiastic. While telecommunication privatizations were highly attractive in the 1990s, the gloss has worn off. For example, there were 39 privatization transactions between 1997-2001, but only 13 between 2002-2006. One reason is the burst of the dot.com bubble in 2000, which had a knock-on effect for the telecommunication sector. Another reason is that fixed line assets are no longer so valuable, now that mobile phones outnumber fixed lines by a ratio of 2:1 worldwide. Unless an incumbent has a mobile license (or good prospects for getting one), it is less attractive to investors.

Strategic operators from developed countries are withholding from foreign investment in the telecommunication sector in developing countries, while remaining investors are no longer willing to spend the high sums of the past. This lack of ready buyers has plagued a number of governments who have been trying to privatize their incumbents over recent years.¹⁰ Of the ten developing country privatizations in 2005-06, only three involved strategic investors from developed countries (Telefónica of Spain investing in Colombia; Terracom of the United States investing in Rwanda; and Telecom Italia, as part of a consortium investing in Turkey - see Table 4.1). The rest were either public offerings or sales to foreign investors from developing countries.

In a privatization, the flow of funds is usually from the investor to the government. Although there are cases where the capital base of the privatized company increases (which adds to the total funds available for investment), these are rare.¹¹ Instead, one of the main benefits of privatization is where the investor is strategic and confers know-how and technology transfer to its new subsidiary. Although this benefit is not available with public listings, fully or partially private companies tend to be more efficient and therefore more profitable, with greater access to external capital markets.



Figure 4.5: Number and value of privatizations of incumbent public telecommunication operators in developing countries*, 1990-2006

*Note: As a percentage of the 155 developing economies that had fully or partly privatized their incumbent telecom operators by the end of 2006.

Source: Adapted from ITU and World Bank.

Country	Company	% sold	Date sold	Price (US\$ m)	Note
Bulgaria	BTC	35%	Jan-05	\$ 424	Listing on Bulgarian Stock Exchange
Burkina Faso	ONATEL	51%	Dec-06	\$ 289	Private sale to Maroc Telecom (held by Vivendi)
Colombia	TELECOM	50%	Apr-06	\$ 368	Sale to Telefonica (Spain). Purchase to be invested in capital increase.
Egypt	Telecom Egypt	20%	Nov-05	\$ 890	Listing on Egyptian and London stock exchanges
Montenegro	Telekom Montenegro	51%	Apr-05	\$ 148	Private sale to Matáv (Hungary)
Oman	Omantel	30%	Jul-05	\$ 748	Listing on Muscat Securities Market
Pakistan	Pak-Telecom	26%	Mar-06	\$ 1′400	Private sale to ETISALAT (UAE).
Rwanda	Rwandatel	99%	Jun-05	\$ 20	Private sale to Terracom (US)
Sudan	SUDATEL	4%	2005	\$ 80	Ongoing sale of government shares on Khartoum, Bahrain and Abu Dhabi stock exchanges
Tunisia	Tunisie Tel- ecom	35%	Apr-06	\$ 2′250	Private sale to Telecom Dubai/Etisalat (UAE)
Turkey	Türk Telekom	55%	Nov-05	\$ 6'550	Private sale to Ojer Telekomünikasyon (Consortium led by Saudi Oger and Telecom Italia)

Table 4.1 Privatization transactions of incumbent operators in developing countries, 2005-06

Source: ITU/UNCTAD, adapted from company reports.

One of the difficulties in assessing the beneficial effects of privatization is that what is good for shareholders or governments may not be perceived as good for others. In general, privatizations may result in reduced headcount and employment in the quest to increase efficiency.

From a more global perspective, however, the growth of the ICT sector may result in more and new jobs. New business models are often based on skilled manpower, subcontracting, outsourcing and consultancy, which may stimulate the development of Small and Medium-sized Enterprises (SMEs) in the local ICT sector (which may have been previously "crowded out" by a monopoly incumbent). Indeed, often, SMEs are founded by former employees of the incumbent. Although rare, "reverse" foreign investment has also happened in a few countries, where an incumbent was initially sold to a foreign investor, but later reverted to government ownership.¹²

4.5 Reform of the regulatory environment

Besides market liberalization and private sector participation, the third most important element in the recipe for sector reform is effective regulation. Regulation can help ensure market competition and intervention to address areas of market failure, where market mechanisms alone may be insufficient to achieve desired policy outcomes (for example, in universal access). The majority of ITU Member States have now established a regulatory authority separate from government (Figure 4.6) and in charge of regulatory mechanisms to promote the use of ICTs (such as licensing strategies, spectrum allocation, interconnection settlements, dispute resolution, etc.).

Effective regulation has been a key to rapid ICT growth, in developed and developing countries alike. The regulator's mandate varies from one country to another and also evolves to match

Box 4.2: Privatization and FDI in the Moroccan telecom sector

Morocco is a good example of Foreign Direct Investment (FDI) in the telecommunication sector, as it has experienced both incumbent privatization to a strategic foreign operator, as well as foreign investment in a new mobile operator. It also illustrates the emerging trend of South-South FDI.

The government-owned incumbent operator, Maroc Telecom, was partially privatized in 2001, when 35 per cent of the operator was sold to Vivendi of France for US\$ 2.1 billion. This amount reverted to the Moroccan government, so there was no actual increase in capital expenditure from the foreign investor. Maroc Telecom was later listed on the Casablanca and Paris Stock Exchanges in 2004, when 14.9 per cent of government holdings were floated for US\$ 1 billion. Again, the money reverted to the state, with no actual increase in the company's capital. In 2005, Vivendi acquired an additional 16 per cent of government shares for US\$ 1.4 billion, with the purchase price going to the government. Furthermore, half of the amount paid by Vivendi was to be raised from Moroccan capital markets, resulting in local investment, rather than foreign.

Vivendi has accrued significant financial benefits from its investment in Maroc Telecom. Maroc Telecom has not taken on any new debt since privatization and has been reducing its old, pre-purchase debt. Maroc Telecom has proved financially robust, generating dividends every year since privatization. Indeed, Vivendi's share of accumulated dividends since purchase was US\$ 700 million and the market value of its holdings (based on the share price of December 2005) was around US\$ 5 billion, a premium of US\$ 3.5 billion over its initial investments.

Maroc Telecom has also emerged as a strategic foreign investor in its own right. It purchased 54 per cent of Mauritel, the incumbent operator of Mauritania, for US\$ 48 million in 2001 and paid US\$ 289 million in late 2006 for 51 per cent of ONATEL, the incumbent operator in Burkina Faso. This was followed by the purchase of 51 per cent of Gabon Telecom for US\$ 80 million in February 2007.

In addition to privatizing Marco Telecom, Morocco has also injected foreign investment into its telecommunication sector through the licensing of new operators. In 1999, a consortium comprising Telefónica of Spain, Portugal Telecom and local investors formed Médi Telecom and paid US\$ 1.1 billion for Morocco's second mobile license. The results have been impressive, with mobile penetration rising from just 1 per cent in 1999 to 41 per cent in 2005. Médi Telecom won the bid for Morocco's second fixed license in 2005, paying US\$ 8.3 million.

In total, the Moroccan government has earned around US\$ 5.6 billion from privatization receipts and license fees paid by foreign investors in the 7-year period between 1999 and February 2007, while outgoing FDI amounted to US\$ 417m (Box Figure 4.2). Morocco's privatization policy has also boosted its ICT sector and Morocco scored the highest rise in DOI scores between 2004 and 2006 (see Table 3.3 and Box 3.1).



Box Figure 4.2: Receipts by the Moroccan government from Foreign Direct Investment (FDI) in the telecommunication sector, 1999-February 2007

Note: Figures for 2007 relate to the first quarter only.

Source: Adapted from Vivendi, Maroc Telecom and ANRT.

progress in technologies and changing business models. Today, regulators may be expected to remove barriers to entry, monitor tariffs (for instance, to identify predatory pricing strategies), manage interconnection settlements, apply numbering policies and regulate radio spectrum etc. All these activities can help create a favorable investment climate and competition.

The regulatory framework should minimize barriers to investment, such as complex licensing regimes or excessive license fees. While many countries have begun reform through the establishment of a regulatory authority and allowing competition, they may not have simplified licensing procedures yet (Box 4.3). A number of developing countries still charge high license fees, limiting competition. Some countries also have multiple service-specific licenses, which are increasingly outdated given technological convergence, with inter-modal competition between platforms.

Another regulatory trend is "converged" regulation, covering the entire ICT sector (e.g., broadcasting, Internet and computing, as well as telecommunications). Converged regulators have been established in every region. This usually signifies the merger of existing regulators or establishing a new, consolidated regulator with an extended mandate to regulate both telecommunications and broadcasting. This shift is related to trends in unified licensing (Box 4.3) and regulatory forbearance.¹³ For example, an EU directive established a legislative framework and structure for the national regulatory bodies of the Member States, with a deadline of July 2003. However, only few countries, including Denmark, Finland, Ireland, Sweden and the UK managed to re-structure before this date. The United Kingdom has merged the responsibilities of five independent regulatory bodies to create OFCOM, its national regulatory agency with responsibilities for the ICT sector.¹⁴

As noted above, a sound regulatory environment and stable institutions are the key factors driving ICT growth. The following country case studies focus on trends towards unified licensing (Nigeria) and on innovation in spectrum management (Guatemala).

4.5.1 Nigeria: Unified licenses for the future

At the turn of the century, Nigeria had one of the most limited telecommunication networks in Africa, with a teledensity of less than one. Mainlines were concentrated in the major cities, waiting times for lines were measured in years and quality was poor. The analogue mobile system was not available outside the main urban areas. In response to the growing need for telecommunications and a modern infrastructure, Nigeria launched the National Telecommunications Policy (NTP) in September 2000.



Figure 4.6: Number of economies with a national telecommunication regulatory agency,

2003 2004 2005 A

Source: ITU World Telecommunication Regulatory Database.

Box 4.3: Licensing regimes

Licensing frameworks traditionally comprised a large number of different service and technology categories. Many countries used either individual licenses, class licenses or open entry to regulate telecommunications networks and services. Applicants had to apply for separate licenses in order to provide each service. Individual licenses can provide a higher degree of regulatory control over market entry, mainly in the case of targeted economic promotion policy or scarce resources (spectrum, numbering). Convergence transformed this categorization and regulators are optimizing licenses and simplifying licensing regimes. A growing number of regulators are adopting alternative approaches to rationalize the licensing regime, including:

1. General License Categories and Technology Neutrality: the underlying licensing reform is to introduce technology-neutral licenses that combine converged services or broaden the types of services that fall within a single license ("class licenses").

In Malaysia, the licensing framework previously consisted of 31 service-based licenses. Its new framework consists of four general and technology-neutral licenses: Network Facilities Provider (NFP); Network Services Provider (NSP); Application Services Provider (ASP); and Content Application Services (CSP - a special subset of application services that includes television and radio broadcast services and Internet content services).

2. Unified Licensing: under this regime, licenses are amalgamated into a single license covering a wide range of services.

In Kenya, the new licensing regime announced in September 2004 adopts a unified and technology-neutral licensing framework that allows any form of communications infrastructure to be used for any type of communications service. This licensing regime is simpler than the previous service-specific licensing regime (consisting of 46 types of licenses grouped into nine categories). Kenya is introducing its new regime gradually and has established a transition period during which it will issue three types of technology-neutral licenses i.e., individual network operator (major) licenses, non-facility based service provider (minor) licenses, and frequency licenses, before moving to its full unified licensing regime.

3. De-licensing: Many countries have moved towards a general authorization regime, in which operators are free to provide services subject to regulatory obligations. Typically, the operator must notify the regulator before, or shortly after, initiating service. However, operators do not have to wait for approval before commencing service.

The member states of the EU are moving to a simple authorization regime using minimal regulatory intervention and requiring individual licenses only where strictly necessary (e.g., for the use of scarce resources such as radio frequencies and numbering). The regime covers authorization of all electronic communications networks and services, regardless of whether or not they are provided to the public.

4. Eliminating License Requirements on New Converged Services: another way of addressing convergence is to eliminate filing requirements with the regulator on the basis that the services fall outside of the regulator's authority or because the regulator has decided to forbear from regulating a particular service.

The US followed this approach for ISPs offering email, Internet access and VoIP services. Services provided by ISPs are treated as unregulated "information services" to promote the development of the Internet.

5. Adherence to Regulatory Requirements and Obligations: as many regulatory functions were based on a license at inception, the move to forbear from licensing is viewed by some as eroding the regulator's authority over new entrants, leading to a license being issued, even when regulatory oversight is no longer required. Although a regulator may decide that certain categories of service or network providers are exempt from licensing requirements, regulators may still impose certain regulatory obligations on such providers (e.g., contributions towards universal service funds or compliance with emergency service requirements). For instance, although the FCC (the US regulator) has not implemented licensing, notification or registration requirements for ISPs, it has determined that certain VoIP providers must comply with emergency number (E911) requirements. This determination is part of a rule-making proceeding that was initiated by the FCC to determine whether VoIP services should be regulated and whether providers of such services should be subject to certain regulatory requirements.

Source: ITU/infoDev ICT Regulation Toolkit, available at www.ictregulationtoolkit.org/en/Section.2091.html.





Source: ITU World Telecommunication Indicators Database, adapted from Nigerian Communications Commission and MTN

The Government licensed a number of new service providers including:

- » Auction of three mobile cellular licenses in 2001 to MTN, Econet¹⁵ and the incumbent fixed line operator, NITEL;
- » Issuing a Second National Operator license to Globacom in 2002 for all services including mobile (i.e. a fourth license);
- » The award of over a dozen new local network operators licenses since 2000.

The results have been dramatic - teledensity has soared. New mobile subscriptions increased from 30'000 per month during 2001 to half a million per month in 2004, with 11 million mobile subscribers by March 2005. By June 2006 there were almost 26 million fixed and mobile subscribers for a teledensity of 22 subscribers per 100 inhabitants. The population coverage of mobile networks increased from around 5 per cent in 2000 to 75 per cent by June 2006 (Figure 4.7). Thousands of jobs have been created and access extended to many for the first time. Nigeria obtained a connection to the SAT3/WASC submarine fibre optic cable in 2002, significantly expanding its international communications capacity and global Internet bandwidth.

As a result of the liberalization, Nigeria now has one of the most competitive fixed and mobile markets in Africa. It has licensed over 20 private operators, accounting for 71 per cent of its 1.5 million fixed lines in operation at June 2006, far more than the incumbent. Nigeria has four mobile operators and the lowest industry concentration in Africa.¹⁶

This startling growth has not been without problems - mobile interconnection disputes have arisen and the privatization of the incumbent NITEL has also been subject to numerous setbacks.¹⁷ ISPs have complained about restrictions on access to the SAT fibre cable and the high prices charged by NITEL.¹⁸ The regulator, the NCC, has played a key role in overcoming these problems. For example, due to the lack of progress among the operators over mobile interconnection, NCC established rates to be followed by the mobile industry.¹⁹ Nigeria became one of the first countries in Africa to adopt the unified licensing approach in February 2006. In future, NCC will issue unified licenses allowing operators to provide multiple services under the terms of a single license (eliminating the distinction between fixed and mobile services, which was causing problems due to the mobility functionality of fixed wireless networks). This will enable operators to deploy new infrastructure and services more rapidly.

4.5.2 Guatemala: Spectrum innovator

In 1996, Guatemala signed peace accords. That same year, it also introduced sector reforms with its new General Telecommunications Law²⁰ minimizing license conditions, eliminating investment requirements and ending price controls. A regulator was created, the Superintendent's Office of Telecommunications (SIT), as well as a fund for rural telecommunications. One of the most innovative outcomes of the General Telecommunications Law was a new spectrum regime.

Under the law, spectrum is assigned through "Frequency Usufruct Titles" (TUFs). The TUF is valid during 15 years, during which owners can lease, sell, subdivide or consolidate spectrum, without actually owning it. The TUFs are auctioned by the SIT. 4'000 TUFs have been issued (with about half through auction) and almost the entire spectrum is in use. The TUF is a certificate containing information about the spectrum pertaining to it:

- » range of frequencies;
- » hours of operation;
- » maximum power transmitted;
- » maximum power emitted at the border of adjacent frequencies;

- » geographic coverage;
- » date of issue and expiry.

The back of the TUF is for endorsements, required whenever it is traded. The SIT maintains an inventory of assigned frequencies on its website.²¹

The country has also licensed several mobile operators. Guatemala's first mobile telephone operator, Comcel, started in 1990. It held a monopoly until 1999, when two additional operators (Telefónica of Spain and TELGUA, the incumbent fixed line operator) were licensed, following the telecom reforms of 1996. A fourth operator, BellSouth, began operations in 2001, but it was acquired by Telefónica in 2004. By 2006, there were three mobile companies operating. Two additional mobile licenses were issued in 2003, but have yet to begin operations.

Spectrum flexibility has lowered investment costs for mobile operators by making a large amount of spectrum available, lowering mobile interconnection charges and prices.²² Guatemala has the lowest mobile tariffs in Latin America and the highest mobile penetration in Central America (Figure 4.8), mainly due to the liberal spectrum environment.²³ Spectrum trading is being widely adopted elsewhere and was the focus of a recent ITU workshop.²⁴



Source: ITU World Telecommunication Indicators Database, adapted from regulatory and operator reports.

Box 4.4: The Government of India seeks to expand its USO fund to improve rural mobile infrastructure

In 2006, the Indian government extended financial support from the Universal Service Obligation (USO) Fund to mobile operators to create infrastructure in rural and remote areas, according to local press reports. The USO Fund, which previously provided subsidies only to basic telecoms operators for fixed-line services in rural areas, will now also cover mobile operators.

The USO Fund can be used for the creation of infrastructure such as towers, power supply and back-up, in rural and remote areas which are not covered by wireless signals. Telecommunications operators will utilize the infrastructure created with the support from USO Fund to extend mobile services in these areas and a maximum of three telecoms service providers will be able to share the new infrastructure. This will also be used for providing broadband services in villages. It is expected that approximately 10'000 wireless masts would be set up in different parts of the country. The scheme is aiming to increase the coverage of villages and other remote areas. With an estimated 670 million people living in low-income rural areas, around half India's population is poorly served by current fixed and mobile networks. Increasing rural teledensity levels is also a key to achieving the Department of Telecommunications' (DoT) target of 250 million subscribers in India by 2007.

Source: Global Insight, 17 October 2006.

4.6 Infrastructure development

Infrastructure is one of the key foundations for building an Information Society and bringing the benefits of ICTs to all. The WSIS called for mobilization by different stakeholders to establish better and more extensive infrastructure. Infrastructure is now provided by alternative sources - for instance, many local authorities around the world have begun financing or constructing Wi-Fi networks, while mesh networks and peer-to-peer network infrastructures foresee end-users as being infrastructure providers.

The facilitation of the implementation of WSIS Action Line C2 at the international level is led by ITU²⁵ and should provide guidance on relevant topics, such as policy harmonization, regulation, financing mechanisms and the use of innovative technologies. The multi-stakeholder nature of the WSIS implementation process is useful as a new model for addressing universal service provision (see Box 4.4).

The following country case studies, on Tunisia, Netherlands and Pakistan, illustrate different aspects of infrastructure investment.

4.6.1 Tunisia of Tomorrow

Tunisia was the country that originally proposed the holding of a World Summit on the Information Society and it hosted the second Phase of the Summit in November 2005. The Tunisian government views ICTs as a key way for Tunisia to face the challenges of the 21st century. President Ben Ali's campaign motto during the 2004 elections was *Tunisie de Demain* ("Tunisia of Tomorrow").²⁶ ICTs figured prominently in the President's Election Platform for 2004-2009 and constitute one of the pillars is the construction of a knowledge economy.

Tunisia was the first African and Arab nation to connect to the Internet backbone in 1991. Since then, international Internet bandwidth has grown from 19.2 kbit/s to 600 Mbit/s in 2005. Connections to two submarine fibre networks (SEA-ME-WE and Italy-Tunisia) guarantee ample bandwidth. It has the second-highest fixed line penetration and the highest mobile and PC penetration among North African countries. While fixed line growth has slowed, mobile has taken off rapidly, following the award of a second license in 2002. The mobile network covers virtually the entire population. Tunisia has also been trialing 3G mobile systems.

Table 4.2: ICT indicators for North Africa, 2005

ICT Indicator	Algeria	Egypt	Morocco	Tunisia
Main lines per 100 inhabitants	7.8	14.6	4.4	12.5
Mobile subscribers per 100 inhabitants	41.5	18	40.9	52.6
PCs per 100 inhabitants	2.4	2.5	2.6	5.7
Internet hosts per 1000 inhabitants	2.3	121.3	825.6	4.2
Price of a local fixed line call	\$0.04	\$0.02	\$0.15	\$0.02
GDP per capita (PPP, US\$, 2005)	\$6'770	\$4′440	\$4′360	\$7′900
Internet users per 100 inhabitants	9.1	7	15.2	9.5
Literacy	69.8	55.6	50.7	74.3
DOI rank 2005/06 (181 economies)	91 st	118 th	108 th	86 th
GDP 2005 rank (181 economies)	83 rd	91 st	68 th	87 th

Source: ITU/UNCTAD/KADO Digital Opportunity Platform.

The Ministry of Communication Technologies is responsible for overall policy. The Tunisian Internet Agency (ATI) was established in March 1996 to promote use of the Internet in the country, while a regulator, the National Telecommunications Agency (INT) was established in 2001. Tunisia has liberalized its telecommunication sector through various reforms. Mobile competition was introduced in 2002, when a second license was issued to Orascom Telecom ("Tunisiana"). The duopoly expired in December 2004, but additional licenses have yet to be awarded. The incumbent operator was partially privatized in 2006 when a Dubai-led consortium paid US\$ 2.25 billion for a 35 per cent stake. Tunisie Telecom is now migrating its fixed network to an IP network. Its investment plans called for capital expenditure of DT 1.5 billion (US\$ 1.1 billion) between 2002-2006, 56 per cent more than the previous five-year period.²⁷ The operator introduced ADSL in 2003 and VoIP and is also installing Wi-Fi hotspots.

As a middle-income country, Tunisia faces the dual challenge of widening community and household access to ICTs. As noted, nearly all of the country has basic access to mobile telephony. The OECD basket of monthly mobile phone usage amounts to 4 per cent of average income; recharge cards are available for DT 5 (US\$3.82) with a validity of three months. By mid-2006, mobile penetration was 64 subscribers per 100 inhabitants.

Various government initiatives seek to contribute to widen access to ICTs to every Tunisian citizen, including:

- Publinets. The Tunisian government launched a programme of public access Internet centers (Publinets) in October 1998. The maximum tariff is DT 2 (US\$ 1.50) per hour, with large reductions for students, journalists and the handicapped. Publinets are run by entrepreneurs with financial assistance from the government. There are 250 Publinets nationwide, which also provide training.
- » Family PC. This programme aims to make one million computers available by 2009. Arrangements have been made with suppliers for desktops or portable PCs at prices no greater than DT 700 and 1'200 (US\$ 535 and 916) respectively, while local banks provide generous loans.

The Government is conscious of the importance of integrating national ICT initiatives and reforms into an overall strategy for digital opportunity. It recently adopted a new Orientation Law in the Digital Economy (no. 2007-13 of 19 Feb. 2007) on the establishment of the digital economy. This Law has been established following a dialogue between the Government and the private sector. The main objective of this Law is to foster Public-Private Partnerships in the ICT sector in order to contribute to enhancing export opportunities and speeding up the pace of job creation for higher-education graduates in this sector. Currently, Tunisia is elabourating an ICT strategy for 2007-2011²⁸ with support from the World Bank. Its strategy aims to achieve levels of ICT infrastructure equivalent to those of developed countries by 2011.

4.6.2 Netherlands: Broadband heaven

The Netherlands is fast developing its broadband infrastructure. By October 2006, broadband penetration had reached 29.8 subscribers per 100, equivalent to over half of all households.²⁹ As a member of the EU, the Netherlands adheres to regional ICT policy initiatives such as the eEurope Action Plans, which call for widespread broadband infrastructure.³⁰ Dutch ICT policy aims to be among the ICT leaders in Europe. Given the Netherlands' broadband penetration, it has been successful in meeting this goal.

Geography plays a large part in explaining Dutch broadband success. The country is flat and urbanized, with a high population density. These factors make it easy to roll out ICT infrastructure. Almost all houses have a fixed line telephone connection and 97 per cent have a cable television connection. While geography has contributed to the Netherlands' good connectivity, policy has also played a large role. The incumbent operator, KPN, was privatized in 1994 and a telecom regulator, "Onafhankelijke Post en Telecommunicatie Authoriteit" (OPTA), was created in 1997.

In broadband policy, the Dutch have loosely followed the *investment ladder* theory³¹, requiring the incumbent to open up its copper wire access network. Investment ladder theory suggests that competition increases, as newcomers grow in their ability to make investments. In the early stages of competition, where newcomers cannot yet make large levels of investment, resale can help to grow the market (including simple resale, bitstream access and unbundled local loop). The market moves up the investment ladder as newcomers invest more in their own technology. *Intermodal* competition is beneficial in this, in addition to *intra-modal*. In the Netherlands, cable TV has proved an effective competitor to DSL through the availability of Internet access via cable modem. As a result, the incumbent had a broadband market share of less than 45 per cent in October 2006.

The competition has also lowered prices and improved quality. Broadband pricing has dropped dramatically. KPN charged some \in 74 per Mbit/s in 2001 for DSL, but by 2006, this had fallen to \in 8. Users in turn want faster connections. By the end of 2005, over half of the incumbent's broadband subscribers were already at speeds greater than 3 Mbit/s. KPN has plans to provide fibre optic connections to all neighborhoods (i.e., fibre to the curb) as part of its Next-Generation Network (NGN) strategy. Already, by the end of 2005, fewer than half of all calls were made over the traditional PSTN telephone network.

From the experience of the Netherlands, effective competition is critical to achieving a high level of broadband. Competition policies have made a crucial difference in raising broadband penetration. Further steps include the promotion of both intra-modal and inter-modal competition by requiring incumbent operators to provide wholesale access to their networks, while encouraging the build-out of alternative infrastructure.





Source: Wilson, Joseph (2007), "Digital Opportunities in Pakistan", available at: www.itu.int/osg/spu/digital-bridges/materials/wilson-paper.pdf.

4.6.3 Pakistan: Mobile-driven growth

In 2000, the Government of Pakistan established its first IT Policy. The vision was "to harness the potential of IT as a key contributor to the development of Pakistan".³² It aimed to:

- » Make the Government a facilitator and enabler to provide maximum opportunities to the private sector (local and foreign) to lead and invest in the development of IT in Pakistan.
- » Develop an extensive pool of trained IT manpower to meet local and export requirements.
- » Develop an enabling legislative and regulatory framework for IT-related issues.
- » Revitalize, emphasize and support Pakistan's dormant manufacturing and Research and Development (R&D) potential.
- » Establish an efficient and cost-effective infrastructure that provides equitable access to national and international networks and markets.

New regulations have been established to ensure the effective implementation of the IT Policy.

A liberalized environment and targeted policy incentives have boosted growth in the ICT sector

of Pakistan. Cellular usage grew ten times over just five years to reach 2.5 million at the end of 2005. The number of mobile subscribers increased from 0.22 to 18 per 100 inhabitants from 2000-05, which means that virtually every household within reach of mobile signal has at least one mobile phone. The main factor driving this growth was the shift from Receiving Party Pays (RPP) to Calling Party Pays (CPP). Prepaid cards costing less than US \$0.50 per month brought cell phones within the reach of ordinary people. Handset prices fell from over US\$ 300 to under US\$ 100. Moreover, cell phone users could keep their phone numbers even after their prepaid card expired, under the Mobile Number Portability Regulation 2005. These measures have all contributed to the greater affordability of mobile services (see Figure 4.9).

With policies ensuring that access to the Internet costs no more than a local phone call, Pakistan's government has installed Internet access in 1'700 locations, reaching some 90 per cent of the country's population. Household PC penetration grew from 0.03 to 35 per cent between 2000 and 2005. A national broadband policy was announced in 2004 to offer affordable, high-speed broadband services to corporate, commercial and residential areas. As the Government cannot bear the full cost of nationwide infrastructure, it has opened up the telecommunication market to foreign investment and competition. By opening the market, it is hoped that broadband access will become cheaper and more accessible.





Source: World Bank.

Box 4.5 Greenfield investment

New projects boost investment and enable growth

One way in which foreign investment can be injected into the telecommunications sector is through licensing new networks. The biggest by value have tended to be new mobile cellular licenses with much of the foreign investment covering the cost of licenses. However, the once-exclusive fixed line markets are also now beginning to open up and there has been increasing investment in second or third fixed line operators, as well as "Second National Operator" licenses, which allow licensees to offer a full range of services including fixed, long distance and mobile.

According to data from the World Bank's Private Participation in Infrastructure (PPI) database, there were some 565 Greenfield transactions in the telecommunication sector of developing countries between 1990-2005. The total value of license fees was some US\$ 33 billion (of which around one-third are accounted for by Brazil alone). The World Bank estimates that investment commitments for these new projects amounted to some US\$ 205 billion.

The extent to which developed countries have reduced foreign investment in the telecommunication networks of developing countries is reflected in Greenfield transactions in 2005. All except one of the transactions involved investors from Africa or the Middle East. South-South flows are driving FDI in developing countries, where a growing number of, mostly early-liberalized economies, are building growth strategies based on regional or international expansion. The two transactions involving a developed country investor were Millicom's investment in Chad and the launch of a new mobile operator in Oman (where Denmark's TDC is a secondary member of a consortium led by Qatar Telecom).

Country	Operator	Amount (US\$ m)	Investors
Afghanistan	Areeba Afghanistan	40	Fee paid by Investcom (Lebanon) for a mobile license.
Algeria	Consortium Algerien des Telecommunications	65	Orascom (Egypt) & Telecom Egypt. The consortium has committed to invest US\$ 400 million.
Bangladesh	Warid Telecom	50	Fee paid by Warid Telecom (UAE) for a mobile license.
Chad	Millicom Tchad	Not available	A mobile license awarded to Millicom of Luxembourg; amount of license or planned investment not published.
Iran	Irancell	350	MTN (South Africa).
Maldives	Wataniya Telecom	1	Mobile license won by Wataniya (Kuwait). Wataniya's investment in Maldives stood at US\$ 64 million.
Oman	Nawras Telecom	104	Q-Tel (Qatar) and TDC (Denmark).
Sierra Leone	Africell Sierra Leone	0.25	The fee paid by LINTEL (Lebanon) for a mobile license

Box Table 4.5: Selected greenfield telecommunication investments, 2005

Source: ITU, adapted from World Bank and various operator and regulator reports.

4.7 Attracting investment

Regulatory changes have to be coupled with appropriate incentives. The creation of an enabling environment is the foundation for a vibrant ICT sector and for maximizing the benefits of ICTs. The multiplier effect of investment incentives can help ensure a high return and contribute to the overall performance of the ICT sector. This section reviews national ICT strategies aimed at creating an enabling environment for investment.

4.7.1 Foreign Direct Investment (FDI)

As noted above, FDI has helped finance ICT infrastructure and develop telecommunication services in many countries since the 1990s. FDI has come into the telecom sector in two broad waves:

- » the first, in the early 1990s, arose in response to numerous privatizations of incumbent operators around the world (Figure 4.10);
- >> the second, in the mid- to late-1990s, flooded into new mobile markets. FDI also provides an additional source of revenue in licensing fees (Box 4.5). Technology-intensive FDI can trigger productivity gains and improve business processes, with important spillover effects in better management practices and technology-intensive skills.³³

Countries seeking to attract FDI must ensure that they have an adequate enabling environment (in political risk, taxation incentives, investment restrictions and regulatory environment). They can also allow high levels of foreign ownership/ control and commit to regional and global trade agreements offering flexibility and security to investors. However, many countries retain foreign investment caps that can inhibit investment in the ICT sector. For example, companies were reluctant to invest in India's telecommunication sector until the government lifted the cap on foreign ownership in any operator from 49 per cent to 72 per cent.³⁴ China is raising foreign investment limits in its mobile and wireline markets to 49 per cent by the end of 2006 and 2007 respectively.

Commitments to trade agreements help provide security to investors by enshrining telecommunications liberalization in multilateral treaties. If a country violates its commitment, it can then be brought before the trade organization. Some 69 countries have offered commitments at the WTO negotiations on basic telecommunications which entered into force on 1 January, 1998.³⁵ Other countries can also benefit, by using the WTO commitments as a lever for pursuing liberalization in their telecommunication sectors.

According to the World Bank, FDI in telecommunications jumped from \$2 billion in 1990 to \$33 billion in 1998 (Figure 4.10) — but gradually fell to about \$13 billion in 2002 and 2003.³⁶ While there



Figure 4.11: Foreign Direct Investment in India's computer services sector

Source: Reserve Bank of India.

are fewer opportunities today (given that many privatizations that have already occurred and fewer mobile licenses are being issued), there are still many opportunities in the broader ICT sector. Although data are scarce, investment is growing in terms of the number of transactions. However, values remain low, due to the underdeveloped state of Internet and computer services markets in most developing economies. Take African Lakes, the UK-based company that bought Africa Online in 1998. Although Africa Online operates in 8 countries and is the largest ISP in Africa outside of South Africa, African Lakes paid only US\$ 4.4 million to acquire it.37 Nonetheless, its value has grown massively, with Africa Online changing ownership nine years later for US\$ 20 million in February 1997, when South Africa's Telkom bought it.38

The golden era of large foreign investment in major infrastructure providers may seem to be over, but there is scope for investment in downstream activities, such as call centers, software development and outsourcing. This is occurring is India, where the FDI inflows into India's computer services sector rose from US\$ 166 million in 2004 to US\$ 770 million in 2006, when computer services accounted for 23 per cent of total FDI to India (Figure 4.11). This rise in FDI to India's computer services sector has fueled rapidly-growing IT-enabled export services, from just US\$ 753 million in 1996 to US\$ 23.6 billion by 2006. Today, India is the third-largest exporter of computer and information services in the world.

4.7.2 Tax incentives³⁹

In economies where the private sector is increasingly dominant as a result of privatization, one of the main areas where governments retain influence is the tax framework they offer to foreign investors to attract investment. A country's tax regime is a major part of its investment promotion strategy (which may also include steps to reduce bureaucracy, streamline customs and export procedures, and simplify permits and licensing procedures).

Asian governments were among the first to pioneer the use of fiscal and export incentives in reduced tax rates, waivers and exemptions to specific groups of investors to build comparative advantage.⁴⁰ Tax incentives are often offered to large Multi-National Corporations (MNCs) and listed companies, on a standardized or negotiated basis. Fiscal incentives are widely used in technology-intensive sectors with global production and supply chains dominated by MNCs. In many countries, government policy has sought to attract MNCs with their large resources of 'hot' capital with specific incentives.

Based on a review of the incentives offered by twenty developing countries, virtually all countries offered tax incentives (in reduced rates, exemptions, tax holidays or stability agreements) for investment in manufacturing, technologyintensive and export sectors (Table 4.3). Some countries target specific fields (e.g., Singapore's targeted incentives in the infocomm and biotechnology sectors). Survey evidence suggests that investors do take tax incentives into account in deciding where to invest⁴¹, although critics argue that tax competition between neighboring countries has resulted in a "race to the bottom". Nevertheless, tax incentives to attract high-tech telecommunication investments are an important means of revitalizing a lackluster telecom sector.

4.8 Innovation-driven and human capacity-building strategies

Most recent growth in the ICT sector has involved targeted innovation and human capacity-building strategies. ICT skills are crucial to innovation. Likewise, ICT innovation plays an important role in raising productivity and competitiveness.⁴² Markets for basic services in most developed economies are now relatively mature and close to saturation. For many developed economies, innovation in products and services will continue to be one of the main drivers of future growth in the ICT sector. The development of an adequate pool of highly-skilled labour is the foundation for the success of national innovation policies. An example of this strategy is the case of Singapore.

4.8.1 Singapore: Innovation, Integration and Internationalization

Singapore is seeking to establish high, but sustained ICT growth, based on people-centered and innovation-driven national policies. Market and regulatory reforms have catalyzed growth in the ICT sector over the last decade. Singapore was one the first countries to introduce a nationwide ICT strategy. The National Computerization

Table 4.3: Investment Tax Incentives in Selected Developing Countries

Country	Investment Tax Credit (%)	Accelerated Depreciation (% per year)	Sectoral incentives	Export incentives	Regional incentives	Loss carry forward	Tax holidays (Years)	Corporation Tax rate (%)
Botswana	None	Mining+ capital allowances	Yes	Duty exemptions	No	5	None	25
Brazil	None	Yes	Yes	Yes	Yes	4	15	34
Ecuador	In tourism	5-10	Yes	Yes	Yes	N/a	20	25+15
Ethiopia	N/a	Yes	Yes	Yes	Yes	3-5	1-5	35
Ghana	None	5-20	Yes	Yes	Yes (-25-50%)	5	5-10	30-32.5
Kenya	None	Yes	Limited	Yes	No	Unlimited	10	30-37.5
Korea	6-10	Yes	Yes	Yes	No	3	5	15-25
Lesotho	None	5-25	Yes	Yes	No	N/a	None	15-35
Mauritius	10% anti- pollution	Yes	Yes	Extensive	No	Unlimited	0-10	15-35
Mexico	19-25	Yes	Yes	Yes	Yes	4	None	34
Nepal	None	5-25	Yes	Yes	Yes	N/a	5-10	20-30
Nigeria	5-20	No	Yes	Yes	No	4	3-5	30
Peru	None	3-20	Yes	Yes	Yes	4	None	27
Philippines	75-100	No	Yes	Yes	No	N/a	4-5	32
Rwanda	None	5-50	Yes	Yes	Yes	5	None	30
Singapore	33.3/3-50	Yes	Yes	Yes	No	Unlimited	5-10	20
Sri Lanka	None	Yes	Yes	Yes	Yes	6	5	30
Tanzania	None	25-100	Yes	Yes	Yes	5	2-5	30
Uganda	None	5-20	Yes	Yes	Yes	Unlimited	10	30

Note: N/a: Not available.

Source: Biggs (2007), adapted from UNCTAD Investment Policy Review series.

Plan was adopted in 1980. As a result, over the next five years, all government offices were computerized and the ICT services industry grew tenfold. The National IT Plan (1986-1991) and IT2000 (1992-1999) provided the framework for enabling online services, e-commerce and e-industry. Infocomm21 (2000-2003) identified the ICT sector as a government priority and key sector for growth. The program aimed to boost the competitiveness of Singaporean firms and enhance

quality of life through ICTs or "infocomm". In 2000, Singapore fully liberalized its telecommunication market, allowing competition in all markets and lifting all limits on direct and indirect foreign equity investment in Singaporean operators. The first e-Government Action Plan was also launched. The most recent national ICT strategy (2003-2006), Connected Singapore, focuses on enabling individuals, organizations and business to become more viable, efficient and innovative. In March

Table 4.4: The age divide in Singapore

AGE-DISAGGREGATED DOI	2005/06	15-29	45-59	60+
OPPORTUNITY	1.00	1.00	1.00	1.00
INFRASTRUCTURE	0.71	0.76	0.54	0.42
4. % households with a fixed-line telephone	0.98	0.98	0.98	0.98
5. % households with a computer	0.74	0.86	0.55	0.34
6. % households with Internet access at home	0.66	0.83	0.48	0.24
7. Mobile cellular subscribers per 100 inhabitants	0.98	0.87	0.61	0.38
8. Mobile Internet subscribers per 100 inhabitants	0.18	0.24	0.1	0.15
UTILIZATION	0.45	0.65	0.49	0.49
9. % individuals that used the Internet	0.49	0.83	0.48	0.24
10. Fixed broadband subscribers / total Internet subscribers	0.83	0.83	0.83	0.83
11. Mobile broadband subscribers / total mobile subscribers	0.04	0.28	0.16	0.39
DIGITAL OPPORTUNITY INDEX	0.72	0.80	0.68	0.63

Source: ITU/UNCTAD Digital Opportunity Platform, adapted from the Singapore Infocomm Development Agency (IDA).

2005, there were 35 Facilities-Based Operator (FBO) licensees that owned their own facilities and more than 700 Service-Based Operator (SBO) licensees that provided telecommunications services over third-party networks.⁴³

Today, Singaporeans enjoy easy and widespread access to advanced telecommunication networks and services. In its vision iN2015 for An Intelligent Nation, Global City, Powered by Infocomm, the Government views infocomm as integral to enabling growth in the economic and social spheres. Highly-skilled human resources, R&D and innovation are the key pillars of Singapore's strategy for growth. The ambitious targets of in2015 include creating 80'000 additional jobs, with 90 per cent of all households using broadband and 100 per cent computer ownership in households with school-age children.⁴⁴

Singapore was also the first country in the world to focus on computerized primary education. In 2002, there was a 2:1 pupil-computer ratio in all primary schools. The Ministry of Education has decided to move away from general purpose computer labs and to invest in the concept of classroom connectivity. Today, every classroom is connected to the Internet and the high-speed Singapore ONE backbone. Singapore already collects age-differentiated ICT data and this makes it possible to assess the age divide in Singapore, by calculating the DOI for different age groups (Table 4.4). Not surprisingly, the 15-29 age group does best, while the 60+ age group falls below the national average.

The vision of the Government of Singapore is to have "an infocomm-savvy workforce and globally competitive infocomm manpower to drive national economic competitiveness".⁴⁵ On the basis of digital opportunity among the young generation of tomorrow, Singapore's future seems bright and assured. The Government of Singapore has introduced a comprehensive plan, in2015, that seeks to address the age divide, among other issues.

4.9 Conclusions

Which strategies are likely to be the most successful in stimulating ICT growth? There are likely to be as many answers as there are economies, because ICT growth is specific to different national contexts, policy goals and market structures. Nevertheless, the review in this chapter shows that certain factors are common to most economies in growing their ICT sector; further, these factors need to be integrated and main-streamed into national growth strategies. Market reforms (including liberalization, privatization and competition) have proven vital enablers of

growth. Proactive regulation can increase productivity and spread the benefits of ICTs across different sectors. Developing extensive and adequate infrastructure capacity is a key to enhanced connectivity. Creating an enabling environment for investment is another driver. Last, but not least, a prosperous and inclusive Information Society could not be built without highly-skilled labour.

The case studies presented in this chapter show that success in ICTs is not the preserve of developed economies alone, but can serve to promote national socio-economic development at any stage of the development process, as part of an overall national growth strategy.

Notes for Chapter Four

- 1 See WSIS Geneva Plan of Action, para 5, available at: www.itu.int/wsis/documents/doc_multi. asp?lang=en&id=2316|0.
- 2 For instance, in the European Union, the ICT Sector is growing faster than the general economy and contributed nearly 50 per cent of productivity growth between 2000 and 2004: see i2010 Second annual report (2006), available from: http://ec.europa.eu/information_society/newsroom/cf/itemdetail.cfm?item_id=3303.
- 3 For instance, France's early start with non-IP-based interactive media, such as the videotext-based minitel system, arguably slowed the pace at which it initially adopted the Internet.
- 4 See "Information Society and Information Policy", Chapter 2 of G.S. Oh (2005), "The Process of Korean Information Policy", Korea Information Strategy Development Institute.
- 5 See the review by the Overseas Development Institute (Chapman and Slaymaker, 2002), in the UNCTAD Information Economy Report 2006, available at: www.unctad.org/Templates/WebFlyer.asp?intltemID=3991&lang=1.
- 6 UNDP (2000), The Estonian Tiger Leap into the 21st Century, available from: www.esis.ee/ist2000/background/tiigrihype/contents.html
- 7 UNPAN (2005), "Global E-government Readiness Report 2005: From E-government to E-inclusion", available from: www.unpan.org/egovernment5.asp
- 8 EU (2005), "Information Society Benchmarking Report", available from: http://europa.eu.int/information_society/ eeurope/i2010/docs/benchmarking/051222%20Final%20Benchmarking%20Report.pdf
- 9 Statistics are from the ITU World Telecommunication Regulatory Database, available through the ICT Eye portal see: www.itu.int/ITU-D/ICTEYE/Default.aspx.
- 10 For example, Albania has been attempting to privatize incumbent AlbTelecom since 2002, when it was announced that it would be partially privatized by the end of that year. The deadline passed and an agreement was eventually reached on the sale in 2005, but it was later cancelled. The government then announced that the sale would take place by the end of 2006, but that deadline has also passed (www.itu.int/ituweblogs/treg/Albtelecom+Privatisatio n+Process+To+Begin+By+End+2006.aspx). Likewise, efforts to privatize Nigeria's incumbent operator NITEL have been ongoing since 2001, see: www.state.gov/e/eb/ifd/2005/43036.htm
- 11 One exception was the 2006 sale of 50 per cent of Colombia's TELECOM to Telefónica of Spain. The funds will be used for a capital increase in TELECOM instead of accruing to the government: "Telefónica Takes Control of Colombia Telecom." April 7, 2006, Press Release.
- 12 One example is Ghana, where 30 per cent of the incumbent was sold in 1997 for US\$ 38 million to a consortium headed by Telekom Malaysia. The government later cancelled the agreement in 2002 and was taken to court by Telekom Malaysia. The case was finally settled by international arbitration in 2005, with the Ghanaian government agreeing to pay US\$ 52.2 million. Another example is Yemen where the license of the TeleYemen joint venture between Cable and Wireless of the UK and the Yemeni government came to an end in 2003. The Yemen government subsequently awarded a five-year contract to France Télécom to manage the company, but with no equity stake.
- 13 For more information on this subject, see ITU "Trends in Telecommunication Reform Report 2007: On the Road to NGN", available at: www.itu.int/pub/D-REG-TTR.9-2007.
- 14 For more information, OFCOM's website can be found at: www.ofcom.org.uk/.
- 15 Econet Nigeria's shareholding has been the subject of ongoing disputes. See: iafrica.com, "Econet Nigeria dispute nears end". February 8, 2005. Available at: http://business.iafrica.com/news/411769.htm. In 2006, MTC of Kuwait purchased 60 per cent of the company and rebranded it. See: Celtel. "Celtel International acquires controlling stake in Vmobile Nigeria", Press Release, May 31, 2006. Available at: www.mtctelecom.com/muse/obj/lang.default/portal. view/content/About%20us/Worldwide%20Presence/Nigeria
- 16 As measured by the Hirschmann-Herfindahl Index, which was 3'341 at December 2005, World Bank, "Information & Communications for Development 26: Policies and Trends". The Hirschmann-Herfindahl Index (HHI) is a common measure of industry concentration, computed by summing the square roots of the market shares of each company. An HHI of 10'000 = monopoly.
- 17 www.firstglobalselect.com/scripts/cgiip.exe/WService=globalone001/globalone/htm/news_article. r?vcnews-id=218814
- 18 www.cipaco.org/spip.php?article505
- 19 Nigerian Communications Commission, Determination of Interconnection Rate, June 21, 2006.
- 20 Guatemalan Republic (1996), General Telecommunications Law, available at: www.sit.gob.gt/docs/lgt.pdf
- 21 See: www.sit.gob.gt/regulaciondefrecuencia.html
- 22 After Paraguay, Guatemala has the largest amount of spectrum available for mobile operators in Latin America. See Hazlett, Thomas W. and Munoz, Roberto E., "Spectrum Allocation in Latin America: An Economic Analysis" (September 2006), George Mason Law & Economics Research Paper No. 06-44. Available at SSRN: http://ssrn. com/abstract=928521

- 23 "The empirical evidence gleaned across the four estimated equations is consistent with the hypothesis that spectrum reforms in Guatemala and El Salvador have resulted both in expanded deployment of radio spectrum and in less concentrated markets... Given that Guatemala and El Salvador have succeeded in having much more bandwidth deployed by operators than in the average Latin American regime (approximately 139 MHz to 90 MHz), competition has been enabled." Hazlett, Thomas W., Ibarguen, Giancarlo and Leighton, Wayne A., "Property Rights to Radio Spectrum in Guatemala and El Salvador: An Experiment in Liberalization" (10 March 2006). George Mason Law & Economics Research Paper No. 06-07. Available at SSRN: http://ssrn.com/abstract=889409
- 24 The ITU/Ugo Bordoni Foundation workshop "Market mechanisms for spectrum management" was held at ITU in Geneva, 22-23 January 2007. More information is available at: www.itu.int/osg/spu/stn/spectrum/index.html.
- 25 ITU was selected by WSIS as the facilitator for WSIS Action Line C2 (information and communication infrastructure), with assistance from the Association for Progressive Communications (APC) and NGO. For more detail about WSIS Action Line C2, and the third facilitation meeting due to taking place on 16 May 2007 in Geneva, see: www.itu.int/ wsis/c2/index.html#16-May-2007.
- 26 "Le Programme Electoral du Président Zine El Abidine Ben Ali, 2004-2009", available from: www.benali. tn/francais/pdf/benali2004_fr.pdf
- 27 www.itu.int/ITU-D/imt-2000/documents/Tunis2005/Presentations/Day%201/Presentation_Houerbi.pdf
- 28 http://web.worldbank.org/external/projects/main?pagePK=64283627&piPK=64290415&theSitePK=40941&menuP K=228424&Projectid=P088929
- 29 See "12th EU Telecom Rules implementation report", available at: http://ec.europa.eu/information_society/news-room/cf/document.cfm?action=display&doc_id=258.
- 30 See: http://europa.eu.int/information_society/eeurope/2005/index_en.htm
- 31 See: http://erg.eu.int/doc/publications/erg_05_23_broadbd_mrkt_comp_report_p.pdf
- 32 Wilson, J. (2007), "Digital opportunities in Pakistan", input for the DOF 2006, available from: www.itu.int/osg/spu/ digitalbridges/materials/wilson-paper.pdf
- 33 See Machin and Van Reenen (1998), "Technology and Changes in Skill Structure: Evidence from Seven OECD Countries". Quarterly Journal of Economics 443: 195–226, WEF, Global Competitiveness Report 2006.
- 34 See: www.networkworld.com/news/2007/020707-verizon-enters-indias-long-distance.html
- 35 See: www.wto.org/english/news_e/pres97_e/data3.htm
- 36 wwwwds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2006/04/20/000012009_20060420105118/ Rendered/PDF/359240PAPER0In1010FFICIAL0USE0ONLY1.pdf
- 37 See: www.nationaudio.com/News/EastAfrican/03122000/Features/Supplement4.htm
- 38 See: www.telkom.co.za/pls/portal/docs/page/contents/minisites/ir/sens/sensarticle_197.pdf
- 39 This section is based on the research and analysis in "ICT Tax incentives", Phillippa Biggs, ITU (forthcoming).
- 40 Lall, Sanjaya, "Competitiveness, FDI and Technological Activity in East Asia", 2003, Edward Elgar Publishing Ltd, UK.
- 41 Morrisset & Pirnia (2000), World Bank, Working Paper 2509, "How Tax Policy and Incentives Affect FDI", World Bank, Washington.
- 42 Lindbaek, J. (1997). "Emerging Economies: How Long Will The Low-Wage Advantage Last?", Background paper for a speech by IFC Executive Vice President, APPI Meeting, October 1997, Helsinki.
- 43 See: www.itu.int/osg/spu/ni/ubiquitous/Papers/UNSSingaporeCaseStudy.pdf
- 44 For more information on Singapore's iN2015 strategy, see: www.in2015.sg/.
- 45 See: www.ida.gov.sg/Manpower/20060414201723.aspx