United Nations Conference on Trade and Development
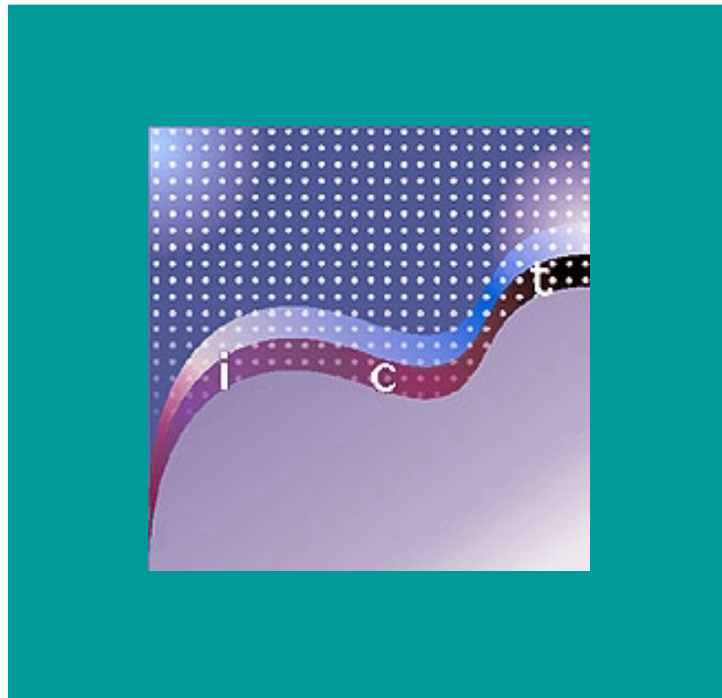
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Chapter 3: ICT strategies for development

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Chapter 3

ICT STRATEGIES FOR DEVELOPMENT

A. Introduction

As information and communications technologies (ICT) continue to spread into all sectors of social and economic life, they appear to be transforming our world into an information society.[1] While the rapid growth in the Internet's reach and use have occurred largely in the absence of government intervention, there is little doubt that policy action is required in such areas as regulating the telecommunications sector, establishing legal frameworks for e-business and building ICT-educated workers and citizens. Above all, however, the growing digital divide between developed and developing countries, rural and urban areas, men and women, skilled and unskilled citizens, and large and small enterprises has prompted an ongoing debate about the need for policy action, and calls for building an all-inclusive information society are becoming more and more prevalent. These developments highlight the need for a critical examination of ICT policies and strategies and their effectiveness for advancing the information society and economy in developing countries and thus bridging the digital divide. Such an examination will be the focus of this chapter.

1. ICT as an enabler for growth and development

It appears to be widely accepted that ICT have the potential to bring about many positive developments in the economies and societies of all countries. This is reflected in the current international debates on the information society – for example, within the framework of the UN ICT Task Force and the World Summit on the Information Society (WSIS).[2] Many developing countries, following the lead of their developed counterparts, are making serious efforts to develop policies designed to enhance the spread and use of ICT at the domestic level.

While there is general agreement that ICT will directly or indirectly affect all sectors of society and the economy, and that policies should therefore be as comprehensive as possible, this chapter argues that particular attention should be given to policies fostering the adoption of ICT by businesses. This is based on the assumption that, through the application of ICT, enterprises will become more competitive, new markets will be accessed and new employment opportunities created.[3] All of this will result in the generation of wealth, thus ensuring future sustainable economic growth.

This, in turn, will directly and indirectly affect other aspects of society and will foster the development of an information society. It is well known that, while the Internet and its predecessors have existed since the 1960s, only when businesses started to use the Internet in the mid-1990s did it really begin to take off.[4] In other words, the business community has played a central role in the advancement of the information society and will continue to do so.

Discussions on the advancement of the information society often call for policies designed to achieve the United Nations Millennium Development Goals (MDG), in particular the eradication of poverty. While achievement of the MDG must certainly be the ultimate objective of all development policies, one should keep in mind that, for example, the eradication of poverty will not happen through access to information by itself. It will be through the use of information and the creation of knowledge that economic livelihood can be improved and income generated; it will be through the creation of economic opportunities and the translation of ICT into economic benefits that people can be lifted out of poverty. Therefore, policies that encourage and enhance the use of ICT by the enterprise sector and private consumers will contribute directly to achieving the MDG.

Many developing countries are only beginning to tap the potential benefits of ICT. As a result, the gap

between developed and developing countries' use of ICT remains wide (see chapter 1). The underlying causes of this situation have been amply articulated. They include lack of awareness of what ICT can offer; insufficient telecommunications infrastructure and Internet connectivity; expensive Internet access; lack of adequate legal and regulatory frameworks; shortage of requisite human capacity; inadequate use of local language and content on the Internet; and lack of skills and entrepreneurship.

2.   The role of national strategies

To tackle these difficulties, Governments – often supported by the international community – have launched a number of initiatives aimed at promoting various aspects of the information society and economy.[5] This process has accelerated during the past year, driven by the momentum created by the WSIS and other forums. Initiatives are underway in the area of awareness raising, infrastructure building, telecommunications deregulation, education and labour force training, changes in legislation, and e-government.

The responsibility for taking action is usually distributed among various government offices and departments, as well as other actors in the society, with little coordination among them. However, as ICT are tools that can be applied across all sectors of an economy and society, deployment of ICT at the national level requires close coordination and coherence among various ICT-related activities and initiatives. As a result, much emphasis is being placed on the development and implementation of national strategies.

Since national strategies imply significant involvement by the public sector, one may ask whether a government-led strategy is the best choice or whether, to take the example of e-commerce, its growth should be left to market forces and self-regulation by business, especially given the rapid changes in the technologies on which it is based. How can public and business interests be addressed by the same policies?

The countries that are considered as having advanced the most in their ICT developments are those that implemented national strategies or ICT plans early on. For example, Singapore started as early as 1991 to develop a national ICT strategy, followed in 1993 by the United States and within five years by Canada, Japan and many European countries (Dutta, Lanvin and Paua 2003). Experience from these and other countries has shown that what matters is not so much the question of whether to implement a formal strat-

egy or not, but the type of approach and the degree to which the government will be involved in certain policies.[6]

Since the late 1990s, many developing countries have followed the example of developed countries and launched their own national ICT programmes and strategies. Particularly for developing countries, this undertaking first calls for a stocktaking exercise and reflection on best practice and past experiences. UNCTAD has organized a number of workshops and conferences to address the subject of national policies and strategies for the development of ICT and e-commerce in the developing countries. This chapter, drawing from the various inputs to these meetings, will address the questions posed above and will identify areas where policy action is needed; describe main areas and sectors of policy action; look at best practice based on experiences from developed and developing countries; and make suggestions regarding the implementation of these strategies.

Section B gives an overview of the main policy areas that should be covered by national strategies and provides suggestions based on lessons learned from previous efforts to implement strategies. Central to this discussion is the introduction of a model framework for the development of a national strategy, and particularly e-business policies. Section C looks at the stakeholders involved and the implementation of strategies. Section D presents Thailand's ICT strategy as an example of a developing country's effort to develop its information society. The final section draws conclusions and makes final recommendations on the development of national ICT strategies.

B. Key policy elements of ICT strategies

1.   A model framework for a national ICT strategy

Given the cross-cutting nature of ICT, which can be applied in areas as diverse as health, education and manufacturing, national ICT plans and strategies need to address a wide spectrum of policy sectors. But exactly which sectors should be included, and what policies will best promote the deployment and use of ICT in the productive sphere, or foster the development of a national information economy?

Chart 3.1 provides a model framework for the development of a national ICT strategy.[7] This framework

serves as a useful basis for explaining the policy areas that should be covered under such a strategy and showing how policies related to an information economy (including e-business and e-commerce),[8] the main focus of this chapter, fit into such a framework.

Accordingly, a framework for ICT strategies will cover a number of *sectors* that need to be targeted by specific *policies* (chart 3.1). Sectors are here divided into two groups, those primarily related to the information society (including education and health) and those primarily related to the information economy (including all industry sectors, trade, investment and finance). Along such a continuum of sectors, the government is placed somewhere in the middle, providing services to both the private and public sectors.

As chart 3.1 illustrates, there are different types of policies addressing these sectors:

- *Cross-cutting policies* will affect all of the described sectors. They include policies related to telecommunications infrastructure, research and technology development, awareness creation, information technology (IT) training and literacy, legal and regulatory issues and measurement and monitoring.

- *E-business policies* (including e-commerce policies) will particularly affect the economic sectors. They include policies related to the business and economic environment, enterprise development (especially promotion of small and medium-size enterprises, or SMEs) and development of the ICT industry.

- *E-society and e-government policies* include areas such as health, education, culture and the media, as well as government services and customs.

Within this general framework, this chapter is primarily concerned with e-business policies and cross-cutting policies, as they have an impact on the information economy and the adoption of ICT by the business sector. It is recognized that some of the cross-cutting policies discussed below – for example, those related to developing the telecommunications infrastructure or IT literacy and skills – overlap with policies designed to develop other elements of the continuum.

A preliminary survey by UNCTAD in 2002 revealed that many ICT strategies did not distinguish between e-business and other ICT policies.[9] The model framework provided in chart 3.1 explains how e-business

Chart 3.1

ICT policy model framework
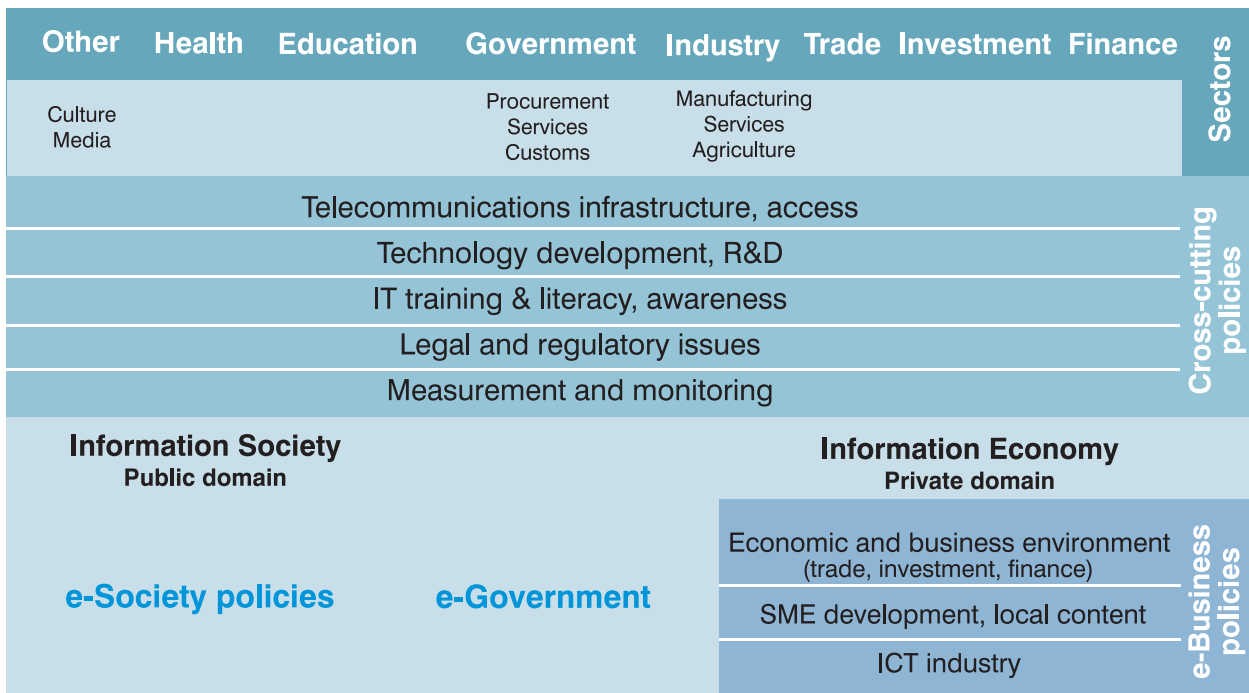
fits into the overall national ICT strategy. It also shows that e-business policies are at the heart of policies to promote the information economy.

Elements and priorities of national ICT strategies might differ between developed and developing countries (chart 3.2). In many less advanced countries, there is still widespread lack of knowledge about using the Internet in business. For these countries, enhancing awareness and public understanding of the benefits of ICT is often an important starting point in policy planning. Other priority areas for developing countries are basic access to ICT, low-cost hard- and software and the use of local-language Internet portals. Furthermore, in many developing countries a lack of local Internet content leads most people to buy online from foreign (mainly US and European) rather than local or even regional sites. Although business-to-consumer (B2C) e-commerce has only a minor share in global e-commerce, it may help SMEs in developing countries to export indigenous goods and services.

In developed countries, business interests appear higher on the policy agenda (WITSA 2002). Busi-

Chart 3.2

Strategy divide between developed and developing countries

Concerns of developing countries and LDCs

- **Basic telecommunications**
- **Basic access** to the Internet
- **Human capacity building**
- **Affordable access devices** (PCs, PDA)
- **National ICT policy and plan**
- Threat of **liberalization**
- Appropriate **software** (legal, compact, low-cost)
- **Local language** enabled on computers
- Creation of **local contents**
- **Portal sites**
- **e-Government** – government facilitation
- **Standards** in manufacturing, safety, health
- **IT-laws** (e-transactions, e-signatures, computer crime)
- **Security** – information, system, network
- **Authentication and certification**, PKI
- **Broadband access** (corporate, home)
- **IT HR** development
- **Regional networking** collaboration
- Opportunities from **liberalization and regionalization**
- **e-Marketplaces**
- **e-Payment** infrastructure
- **Consumer protection**
- **Cross-border certification**
- **Intellectual property rights** protection
- **Privacy**

Concerns of developed countries and industrial leaders

Source: Adapted from Dr. Thaweesak Koanantakol, Director, NECTEC, Thailand, Presentation given at UNCTAD-ESCAP Regional Conference on Electronic Commerce Strategies for Development, Bangkok, 20-22 November 2002

nesses worry about issues such as competition, trust and security, interoperability, intellectual property and an open market environment. Since the telecommunications sector is largely in private hands,[10] infrastructure and access are less of an issue for policy debate. Other priority areas for developed countries may include issues such as broadband access, the building of regional networks, market exchange, and cross-border certification. Recognition of a strategy divide between developed and developing countries is important, as it helps to better target the specific needs of developing countries.

One cross-cutting issue relevant for countries at all levels of development is that of gender imbalances related to the digital economy. While in some countries Internet access figures for women are catching up quickly with those for men, women are less present when it comes to actual use of the new technologies (see chapter 1). In many countries, women make up the majority of the rural population, which is often marginalized in terms of telecommunications infrastructure, education and training. Therefore, it is important to mainstream gender in all areas of national ICT strategies, and a number of international initiatives have been launched to that effect (see box 3.1).

The following sections provide an overview of policy areas relevant to the deployment and adoption of ICT across the economy, including cross-cutting policies. The main objective is to outline key issues and make suggestions for best practice, drawing extensively on country experiences presented at UNCTAD meetings.[11]

BOX 3.1

Gender mainstreaming in ICT

The questions of whether women have equal access to ICT; whether the new technologies enhance business opportunities for women, especially in developing countries; and what barriers women must overcome to participate actively in the information society, have been on the agenda of many national and international meetings and forums, governmental as well as non-governmental, and they are driven by the WSIS preparatory process. Much of the work at the international level focuses on how ICT can become a tool for the advancement and empowerment of women, including in areas such as education and training, health, and participation in public life and the productive sphere.

Within the United Nations, the Division for the Advancement of Women (DAW) has taken the lead in promoting the gender dimension in the ICT policy-making process. In collaboration with the International Telecommunication Union (ITU), which is manager of the Inter-Agency Task Force on Gender and ICT, and the UN ICT Task Force, DAW organized an Expert Group Meeting on the role of ICT for the advancement and empowerment of women in the Republic of Korea in November 2002. The result of the meeting contributed to the forty-seventh session of the UN Commission on the Status of Women (CSW), held in March 2003, which considered the subject of gender and ICT. In its agreed conclusions, the Commission urges Governments and other stakeholders to take action on 24 recommendations and to integrate gender into every facet of the WSIS. Most importantly, it calls on governments to "prioritize the integration of gender perspectives and ensure women's early and full participation when developing and implementing national policies, legislation, programmes, projects, strategies and regulatory and technical instruments in the area of information and communications technologies and media and communications, and create monitoring and accountability mechanisms to ensure implementation of gender-sensitive policies and regulations as well as to analyse the gender impact of such policies in consultation and collaboration with women information technology specialists, women's organizations and gender equality advocates" (UNCSW 2003). UNCTAD, as manager of the UN Task Force on Gender and Trade, is working to mainstream gender into its work on ICT and development.

There are many good examples of country-level initiatives to advance women's use of ICT. In the Republic of Korea, the Government has launched a gender-awareness IT project to bridge the gender digital divide in the country. It focuses on activities such as giving 8.5 million households high-speed Internet access, providing Internet training for 2 million housewives, and a range of other training measures pertaining to ICT use and e-business for women, including IT professionals.[a]

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[a] *Presentation by Prof. Kio Chung Kim, Asia Pacific Women's Information Center, Korea, at UNCTAD-ESCAP Regional Conference on E-Commerce Strategies for Development, Bangkok, 20-22 November 2002*

2. Awareness creation

In many developing countries, there is little awareness of various aspects of e-business and ICT, such as their benefits, legal and regulatory issues, best practices or technological solutions. This lack of awareness prevails at all levels, including government officials, entrepreneurs and consumers. Promoting the use of ICT and the Internet therefore ranks high on the e-business agendas of developing countries (UNCTAD 2002a).

Awareness can be heightened in a variety of ways, including through appropriate curricula in the education system, sharing of best practice, media campaigns, public demonstrations to familiarize stakeholders with the relevant technologies, government- and company-sponsored training, and workshops and conferences. The aim of these efforts should be to create an e-business culture in the country, recognizing the role culture plays in the business environment; the change of mindset among entrepreneurs, managers and executives is as important as the technological change itself.

Governments can set a valuable example by providing information and services online and using the Internet as an additional channel for communication with citizens (see section C.11). By stimulating demand for information networks, governments and other public agencies can play an important role in raising awareness of the usefulness of, for example, e-commerce, and in contributing to increased use of the new technologies. Governments also need to provide leadership in the area of e-business (e.g. by using e-procurement) and the use of online government services. Therefore, intensive awareness programmes should also be implemented in public offices at the executive level.

3. Telecommunications infrastructure

Without an appropriate network infrastructure, there will be little use of ICT by the business community. The network infrastructure needs to be accessible, affordable and of good quality. For many Governments, particularly in the developing world, the scope and modalities of telecommunications sector privatization, liberalization and regulation pose difficult problems, as private-sector-led approaches must be balanced with the demands of national public operators. Countries that have carried out telecommunications sector reforms have experienced significant improvements in access to telecommunications facilities (OECD 2002a). In most countries, opening up the sector to several providers has resulted in a higher number of users, lower prices and higher-quality services (see chart 3.3).

For example, Estonia was one of the first Central and Eastern European countries to open up its telecommunications market in the early 1990s. This move led to a rapid increase in the number of telephone lines and mobile telephone subscriptions; reduced prices; and constant growth in the telecommunications sector. Since approving its national ICT plan in 1999, Egypt has successfully increased nationwide telephone capacity and teledensity, the numbers of mobile phone subscribers and international circuits, and the capacity of international links to the Internet, meanwhile reducing access costs. Similar positive developments in telecommunications infrastructure and services have occurred in Bermuda, Chile, El Salvador and the Philippines since the introduction of competition into their telecommunications markets (OECD 2002a).

According to a recent study by the Organisation for Economic Co-operation and Development (OECD 2000), in the 1990s mobile phone density grew much faster, and prices fell more rapidly, in liberalized telecommunications markets. The study concludes that, for average prices to decline, pro-competitive legal frameworks have to be in place. Other studies (e.g. GTZ 2002) suggest that the success of reforms does not necessarily relate to a country's level of development but rather to the quality of its governance and institutional conditions.

China is a special case: in the 1990s it faced the world's fastest infrastructure deployment without privatization. It only started opening up its telecommunications market to competition in the late 1990s, and then allowed competition only among public operators. A strong commitment by the Government to invest heavily in the country's telecommunications infrastructure resulted in steep growth in the number of Internet subscribers (UNCTAD 2001).

While the introduction of competition and reform in all areas of telecommunications and data services are to be recommended, at the same time it is important to protect the interests of consumers with respect to price, quality and variety of services, as well as universal access. Other important measures include enhancing the capacity of the existing infrastructure by increasing bandwidth access and availability, and reducing Internet access costs for businesses and

CHART 3.3

Internet access and market structures (2001)

Countries	ISPs C= Competition M= Monopoly (Number of ISPs)	Tariffs (off peak; 30 hrs/month)
South Korea	C (270)	10.15
Sri Lanka	C(12)	11.97
Singapore	C (47)	12.17
China	C (59)	18.24
Australia	C (235)	23.32
Japan	C (234)	58.36
Cambodia	C (2)	129.56
Marshall Islands	C (2)	159.00
Maldives	M (1)	168.22
Papua New Guinea	M (1)	185.97
Tuvalu	M (1)	212.73
Kiribati	—	222.09

Source: ITU various publications; presentation by Dr. Eun-Ju Kim, ITU, at UNCTAD-ESCAP Regional Conference on Electronic Commerce Strategies for Development, Bangkok, 20-22 November 2002

households. Service providers could be encouraged to introduce alternative (and cheaper) devices and consider the possibilities of wireless technology.

Developing countries need to take into consideration that building telecommunications infrastructure is costly. In many cases, countries will need inflows of foreign direct investment (FDI) to improve domestic infrastructure. This means that, in addition to establishing a well-regulated telecommunications market, they also need to put in place policies to ensure an appropriate investment climate for foreign service providers. Effective implementation of the WTO Agreement on Basic Telecommunications could be useful in this respect.

4. Creating universal access to ICT

While telecommunications sector reforms usually result in improved quality and access to telecommunications services, market-driven infrastructure development often leaves out areas that are sparsely populated or are inhabited by underprivileged communities where investment in telecommunications development would not be profitable. Therefore, strategies relating to telecommunications, infrastructure and access need to take into account all segments of the society so as to minimize digital exclusion.

From a development point of view, the issue of universal access or universal service[12] is critical, given that many of the world's poor live in remote and

underserved areas. Providing access to ICT for all citizens often requires some kind of government intervention. There are several models and policy options for bringing the Internet and other technologies to the poor. The developed-country model of home-based and work-based access cannot easily be applied in developing countries.

In developing countries, it may be better to focus on shared-access models than on connecting all households, which would require large amounts of funding. For example, the use of ICT and the Internet can be broadened by setting up public access points or facilitating the provision of free Internet access in all public schools, universities and other public locations such as libraries, and by establishing telecentres throughout the country. At the same time, publicly subsidized community access centres should be business-oriented and work towards achieving self-sustainability. They should not compete with or distort the operation of Internet cafes that may have already been set up by local entrepreneurs. Good business models for such centres have been developed in Peru, where the establishment of private-sector-initiated Internet booths resulted in a high number of Internet users per Internet host (Hilbert and Katz 2003; DOI 2001). The RCP (Red Científica Peruana) model has been adopted by El Salvador, which is planning to open 100 new telecentres by the end of 2003.[13] Costa Rica has set up 187 telecentres, including in all local government headquarters, public libraries and 30 post offices. Egypt has established 305 IT clubs and telecentres, mainly in deprived and low-income communities. India's Community Information Centres (CIC) project covers eight states in the north-astern part of the country, where the rural population uses the centres primarily for Internet and email, word processing and computer training. Community Information Centres are being established with the help of The Asia Foundation in 22 provinces and municipalities across Cambodia. Located in the offices of local non-governmental organizations (NGOs), these centres feature Khmer-language World Wide Web portals and email services.

In a number of countries (e.g. the Bahamas, Brazil and Malaysia), Governments have successfully raised funds for universal access by channelling a percentage of telecommunications operators' gross income into special funds to finance public access points. These universal service obligations (USO) generate income from the incumbents and various public telecommunications services operators that can be used to provide access to rural and underprivileged groups. For example, Chile has used the funds to provide subsidies for the installation of public telephones (Dutta, Lanvin and Paua 2002). The goal of universal service should extend beyond simple telephony to embrace Internet access (as in Brazil) and broadband access to facilitate the use of e-commerce and e-business technologies.

Other possible government policies to promote universal access include the following:

• Allowing competition in order to foster a choice of services and suppliers as well as competitive prices

• Establishing special public-private partnerships to provide universal access (ICT access as a public good)

• Introducing concession agreements with telecommunications carriers and obliging them to ensure connectivity in rural and remote areas (as was done in Estonia; such a scheme failed in the Philippines, though) (Dutta, Lanvin and Paua 2002)

Countries will face a number of challenges in implementing policies for universal access to ICT. For example, they have to set up mechanisms to raise USO funds. Large developing countries, such as India, will face greater challenges to providing universal access than smaller ones, such as Costa Rica. Finally, without proper education and training, local content, sociocultural awareness and a stable social, economic and political environment, it will be difficult to make ICT available to all communities.

In conjunction with access to telecommunications networks and service, the development of appropriate technologies to address the needs of disadvantaged communities can be an effective way to bring ICT to remote areas. Examples include the Jhai Foundation's project in the Lao People's Democratic Republic and the Indian Simputer (see boxes 3.2 and 3.3). The use of open-source software is another recent development that is gaining increasing attention and that provides developing countries with cheap access to technologies (see chapter 4). The use of software, whether open-source or commercial, is contingent on access to affordable hardware. Possible policy models include subsidizing household ownership of personal computers (PCs) and establishing and subsidizing community access centres.

Box 3.2

The Jhai PC

Computers and Internet access is being brought to remote villages in the Lao People's Democratic Republic using solar- and muscle-powered systems and low-cost wireless technology. The Jhai Foundation,[a] a non-profit organization based in the United States, has developed a wireless voice and text communication system based on the Internet protocol (IP) and specially designed for use by villages in developing countries. Initial installation has been done in a group of five villages north of the capital, an area where 8,000 people were displaced during the military conflict in the late 1960s and early 1970s.

The system will have one public station in each village and is based on low-cost wireless PC technology (based on Wi-Fi, or wireless fidelity, technology) and the open-source Linux operating system, customized to allow access via the local Lao script. Electric power will be generated by solar- and muscle-powered systems. The computers connect to the Internet via a radio network and are powered by hulking batteries attached to stationary bicycles imported from India, with one minute of pedalling yielding five minutes of power. The organization hopes that the 6-watt Jhai computer will withstand the heat and rain to provide email and Web access as well as allow phone calls over the Internet. The system is being installed in full cooperation with village inhabitants; it was actually they who asked the Jhai Foundation for help accessing the Internet so that they could monitor prices for the rice, chickens and silk they sell in the nearest market. They also want to sell local textiles and handicrafts in Europe or the United States, and email and talk to relatives.

The network was designed and built for about $19,000 plus donated labour, and it is expected to cost the villages about $21 a month to operate. The project is expected to be sustainable and may be replicated in other locations. The Jhai Foundation reports it has received inquiries from 40 countries thus far.

One problem the project faces is stopping people from stealing the equipment, as solar panels are routinely stolen. Therefore, the Jhai Foundation is devoting great effort to an alarm system that still sounds minutes after being tripped, and even after all the wires connecting to it have been cut. Another question that has been raised is whether the project has set up a training programme and has made enough content available in Lao as well as some of the tribal languages of the indigenous population. Project staff members say that, although English-language Web sites will remain in English, villagers will be able to send and receive messages in their native language. Software will also feature menus translated into Lao. Village children will be trained to use the computers and the Web and will then teach older villagers to do the same.

The project was to be launched in May 2003 in Phon Kham village, 100 kilometres north of the capital, Vientiane, but it has been delayed by unresolved disputes between the Foundation and the Government of Cambodia.

The Jhai Foundation has also set up Internet learning centres in the Lao People's Democratic Republic, some of which have been handed over to the Government after the initial start-up phase. The centres, which are located in high schools in rural areas, aim to bring technology to students and teach them how to use Internet for educational purposes and communication with students from other countries, particularly India. The centres provide Internet access and offer practice in computer use and basic English to students age 10 and up.

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[a] *See www.jhai.org.*

BOX 3.3

The Indian Simputer

Developed by a team of Indian scientists and engineers, the Simputer is a hand-held device designed as a low-cost portable alternative to PCs. Its name stands for Simple Inexpensive Mobile People's Computer, and it is a shared device for a local community of users. Equipped with a smart card reader and writer, the Simputer can be personalized using a smart card for individual use on a changing basis. It can be linked to a PC for transfer and storage of information (it has only limited internal storage capacity). An interface based on Information Markup Language (IML) permits use based on sight, touch and audio, thus enabling use by illiterate people. The technology is based on GNU/Linux software technology that is open and modular and uses a chip low in power consumption. Thus, the Simputer runs on three rechargeable AAA batteries.

In November 2002, two Indian companies began commercial production of the Simputer. One of them, Encore Software Ltd., has already shipped about 1,000 Simputers from India and Singapore, where it has a second sales office. The company expects to exit the trial phase during 2003 and sell 25,000 to 50,000 Simputers in 2004 (Hindu Business Line 2003).

The second manufacturer, PicoPeta Simputers Ltd., sells its Simputer for Rs. 13,000 and is hoping to lower the price to Rs. 10,000 (approximately US$200) during 2003 as volumes increase. Large orders are expected from the Government of India in particular.

In India, the Simputer has already been successfully used in projects involving bringing technology to schools, providing microfinance for farmers in rural areas, and using e-governance to automate the process of land records procurement.[a]

[a] See www.picopeta.com/showcase for examples of Simputer projects.

5.   Human resources development

Most policy makers agree that unless businesses and consumers are educated about the opportunities and benefits offered by ICT, and unless they are trained to use the Internet, e-business will not take off. While access to computers and the Internet is essential, it is not enough; it is equally essential to create a demand for the new technologies and for e-commerce. Some have even argued that education, and not connectivity, is the main challenge for most developing countries seeking to participate in the digital economy (ILO 2001).

Education and training are fundamental to the widespread and effective use of new technologies. Since a networked society is essentially a knowledge society, many of the potential benefits of ICT relate directly to the capability to use data and information to create new knowledge. Therefore, human resources development (HRD) is considered to be a core component of an ICT strategy and one of the most challenging bottlenecks for developing countries seeking to

engage successfully in e-business. In many developing countries, the literacy rate is low, especially among women and girls, and the level of education is insufficient for full implementation of the changes in work organization that are required for the efficient adoption of ICT. Given the relatively fast technological change related to ICT, continuous learning is required. This means that even adults need to improve skills or acquire new ones on a regular basis.

Developing the human resources of the country and meeting the challenges of the e-business environment requires a commitment by the highest levels of government. Governments need to define their respective national value propositions based on their comparative advantages – including, for example, multilingual capacities – and focus their HRD on those areas. HRD plans should include a shift from transmitting information and knowledge to learning critical and creative thinking. Also, HRD policies should be designed to give men and women equal access to opportunities in the labour market.

One common dilemma for Governments is how to allocate the education budget. In many countries, public education services and universities operate in poor conditions, and improvements have implications for the education budget.[14] One way to increase resources is through partnering with the private sector or NGOs. Indeed, the implementation of national HRD policies for ICT could involve many different players, including Governments, private training institutes, international and regional organizations and NGOs.

Enhancing basic IT education

Governments can play an important role in enhancing digital literacy through the country's basic education system. Improving Internet access and the number of computers in schools and training teachers in the use of ICT in the classroom will contribute to a new generation of IT-literate children. At the same time, Governments need to be aware that an increase in the number of computers in schools will require training teachers to use the new technologies, as well as an increase in the number of technicians and other IT-literate people to operate and repair computers and teach software programmes.

Chile has been working to enhance national IT literacy through its Enlaces programme (see box 3.4).

Since putting in place its national ICT plan in 1999, Egypt has provided over 6,000 high-school and university students with basic IT training, and over 8,500 professionals with certified high-level training. The Republic of Korea has implemented a comprehensive plan for IT education in elementary and secondary schools. According to a survey carried out in 2000 by KRNIC (Korea Network Information Center),[15] most Koreans were first exposed to the Internet through school assignments (23%) or out of curiosity (24%), followed by business use (19%), everyday information (15%) and other means.

In low-income countries and remote communities, where education systems may have major deficiencies, community-based centres (such as telecentres) have proven successful in providing basic training in ICT literacy and raising awareness of the benefits of using the Internet. Media Lab Asia, an academic research programme with regional laboratories in five Indian states, strives to bring ICT capacity to people in rural India.[16] Stakeholders involved include MIT Media Lab,[17] academia, NGOs, the Government and industry. The programme brings digital connectivity to villages and trains rural young people in entrepreneurial skills.

It is important to remember that access to quality basic education should be the priority concern of all

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Box 3.4

Red Enlaces: 10 years of IT education in Chile

Launched by Chile's Ministry of Education in 1992, the Enlaces[a] programme is one of the early efforts by Governments to prepare students for the information society and to introduce ICT into a country's basic education system. The programme provides infrastructure (computers and Internet access), capacity building (for teachers) and content (educational software and Web sites). Enlaces is the main provider of ICT equipment in the country's schools; in 2001 it provided 80 per cent of equipment in primary schools and 59 per cent in secondary schools.

After 10 years in operation, in 2002 the programme was operating in 74 per cent of primary schools and 93 per cent of secondary schools, or a total of 77 per cent of all schools in Chile. It has managed to distribute computers to 72 per cent of schools (a total of 50,000 computers) and provide Internet connections to 56 per cent of schools. 60 per cent of teachers have been trained. The Government hopes to reach 100 per cent coverage by 2005.

The programme aims not only to provide access to the Internet and new technologies, but also to introduce the use of ICT into school curricula as a support medium for teaching. Results in this area have been limited thus far, since the programme has mainly focused on training staff members to use the system, rather than encouraging teachers to use ICT as a pedagogical tool. This remains one of the most important challenges for the future development of the programme (Hilbert and Katz 2003).

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[a] *www.redenlaces.cl*

Governments. Introducing computers into badly equipped schools with poor curricula will not produce better-educated citizens equipped for the challenges of the information society.

Labour force training and skills development

In addition to introducing basic computer education in schools, countries will also need IT professionals such as software engineers, programmers and other technical specialists, as well as businesspeople with IT skills. The demand for ICT-related skills is not limited to the ICT sector but arises in all areas of economic activity as ICT becomes an essential part of every enterprise. Skilled professionals must be attracted, developed and retained as an essential part of national ICT strategies.

High-skill professional ICT training is usually provided by universities and technical colleges, while lower-skill IT-related training can be offered by community colleges or similar training institutes, private-sector training centres, and in-house company training as well as over the Internet. A number of universities worldwide have started to offer programmes combining business and technical skills. Since women are particularly underrepresented in ICT-related professions, programmes supporting female enrolment are important elements of national strategies in the area of education and training.

Because ICT develop rapidly, the public sector has difficulty adapting its IT training curriculum accordingly. Therefore, the private sector, especially the IT industry, can play an important role in training the workforce. Yet Governments need to keep in mind that private training is often affordable only to the urban upper class and may leave out many members of the marginalized or rural labour force. Building public-private partnerships could be a good alternative: for example, Egypt has started a programme to train 5,000 young professionals a year in collaboration with numerous renowned multinationals established in Egypt, such as Microsoft, Oracle, IBM and Siemens. Other examples of countries that have initiated a number of IT training programmes are the Philippines (see box 3.5) and the Republic of Korea.

Increasing the number of HRD programmes and activities will be effective only if the education and training match the changing needs of the industries concerned. Upgrading teaching standards, encouraging faculty to acquire new knowledge, developing aca-

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BOX 3.5

IT training projects in the Philippines

At the country level, human capacity building for ICT may take various forms. For example, the Government of the Philippines has implemented the following projects:

• **Virtual Center for Technology Innovation in Information Technology.** Funded by the Department of Science and Technology, the centre provides training and certification programmes as well as e-learning facilities. Certification programmes are in computer networking, database systems, and Internet software development.

• **PCs for High School project.** Funded by the Department of Trade and Industry, it aims to provide computers with printers and modems to 1,000 of the 4,336 public schools in the country.

• **School Cyberfair project.** It recognizes high schools that produce the best websites telling a story about a programme or people in their local communities.

• **APEC Tel E-Commerce Skills Standards Project.** This project is an initiative of the Asia-Pacific Economic Cooperation (APEC) forums to develop e-commerce skills standards to improve the quality and consistency of human capital for e-commerce in the region. It covers subjects such as knowledge management, software development, website development and maintenance, order fulfilment, marketing, network technologies, outsourcing and project management.

Other projects include an online open university; an e-government awards mechanism to encourage the use of e-government services and facilities; a free online marketplace project sponsored by the World Bank, which includes training activities; and an Internet Day celebrated each year to build awareness of e-commerce and the Internet.

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demic exchange programmes, and fostering regular discussions between educational institutions and the private sector can contribute to the development of better human resources for e-business.

At the global level, the demand for IT skills has grown considerably over the past few years and has not been met by the supply of IT labour. As a result, there is a considerable shortage of IT skills, especially (but not only) in the developed countries (ILO 2001). To fill this labour shortage, some developed countries have hired high-skilled migrant labour, often from developing countries. This practice can be costly for developing countries such as India that have invested heavily in creating a domestic IT human resources pool and are facing increasing domestic demand for IT professionals. Hence, companies in developing countries need to consider providing attractive working conditions to prevent their IT professionals from looking for alternatives abroad. The availability of specialized IT skills in developing countries could help attract IT companies from developed countries to set up enterprises or subsidiaries in developing countries.

The following recommendations have resulted from UNCTAD meetings[18] discussing HRD policies for the development of ICT and e-commerce:

- Activities should preferably be conducted in provincial cities, as many programmes are often already available in capital cities.

- Activities should cater to the needs of SMEs, be tailored to local requirements, and involve both local and international resource persons.

- Activities need not only to encourage people to get online but also to prepare them for the difficulties they are likely to face in the process. Such an approach will increase user trust and confidence and reduce security problems.

- Copious information on best practice and barriers to e-commerce development is already available online free of charge and can be used to enhance the quality and relevance of HRD activities.

- E-commerce training courses should be constantly updated, as new innovations and practices emerge very rapidly in this field. Institutions in charge of HRD for e-commerce should provide appropriate incentives for keeping e-commerce courses up-to-date.

- Activities organized by regional or international organizations should preferably be conducted in partnership with local organizations responsible for HRD, such as universities.

6. Legal infrastructure[19]

The need for a legal infrastructure supportive of and conducive to e-business activities constitutes one of the main issues that policy makers should address when defining an ICT strategy. Lack of trust, security and harmonized national legislation, coupled with an increasing number of reported cybercrimes, viruses, spams and fraud, has become a major impediment to the expansion of the information economy. Providing an enabling legal framework is a key specific e-commerce element of a national ICT strategy, as it particularly affects the ability to conduct transactions online. Policy makers need to remember, however, that adjusting the legislative framework to e-commerce will not solve other, more fundamental problems inherent in the existing legal system of a country.

The main legal challenge of e-commerce is that tangible information is unavailable (i.e. there are no original paper documents, only electronic messages). This is often referred to as the dematerialization problem. Because of this and other unique characteristics of e-commerce, national legal frameworks need to be adapted to enable the development of e-commerce and give legal value to electronic documents and signatures. It may be useful for Governments to examine their legal infrastructure to see if paper-based form requirements prevent laws from being applied in an electronic environment.

Although it is well known that commerce and technology often advance ahead of the law and that historically the law has adapted to serve commercial and financial demands and facilitate trade, it is equally true that technology needs to take into account relevant legal requirements. This is very much the case with e-commerce, since the laws of many countries include strict requirements concerning issues such as negotiability and documents of title. Furthermore, efficient regulation of e-commerce issues such as spam and digital rights management requires that legislative solutions be accompanied by technical solutions.

National policy priorities need to be reflected in the legal framework in order to maximize certainty and encourage confidence in and use of e-commerce. The legal framework, a key element in the enabling environment, affects market participation. It is important

to hold a broad public dialogue and debate with all stakeholders before preparing e-commerce legislation so as to ensure fairness and an equitable balance between different interests at stake.

Legislation should aim at providing legal security and predictability and technological and commercial neutrality as well as removing barriers to accessing and using e-commerce. Thus, it is essential to ensure that online transactions are legally valid, binding and enforceable. In preparing legislation, Governments should not overregulate; party autonomy should be preserved; and the legislation adopted should be technology-neutral.

Important legal issues include electronic contracting, consumer protection, privacy and data protection, cybercrime, jurisdiction and applicable law, intellectual property rights (including digital rights management), alternative and online dispute resolution[20] and taxation.

Electronic signatures are a vital tool to ensure authentication of electronic communications. It is important that countries wishing to use various e-signature techniques enact appropriate legislation to ensure that electronic signatures can be used with legal effect. The United Nations Commission on International Trade Law (UNCITRAL) has developed Model Laws on E-Commerce and Electronic Signatures, primarily designed to enable e-commerce development as opposed to regulating e-commerce. While there are many electronic signature and authentication technologies, it is important to determine the extent to which a law on electronic signatures should prescribe a given type of signature or technology. A review of legislative and regulatory activity so far reveals three basic approaches:

- Minimalist approach (e.g. in Australia, the United Kingdom, the United States) – No specific protocol or technology is advocated. Legislation is limited to defining the circumstances under which an e-signature will fulfil existing legal requirements for tangible signatures.

- Prescriptive approach (e.g. in Argentina, India, Italy) – Asymmetric cryptography[21] is generally the approved means of creating a digital signature; operational and financial requirements are imposed on certification authorities and key holders. Prescriptive laws may create problems for cross-border transactions.

- "Two-tiered" approach (e.g. in the European Union, Pakistan, Singapore) – The first two approaches not being mutually exclusive, this approach combines them by prescribing standards for asymmetric cryptography operations while at the same time taking a broad view of what constitutes a valid e-signature.

A flexible approach to the legal issues raised by electronic signatures and authentication might be considered, not only to ensure the continuing usefulness and applicability of the law but also to take into account the business community's concerns that rule making may unnecessarily hinder the development of new techniques. The law should cover a diversity of existing techniques offering varying levels of reliability and security, while at the same time leaving room for techniques that may be developed in the future.

Privacy and data protection. Appropriate data protection legislation or appropriate guidelines regulating the collection, use, dissemination and protection of personal data to which business actors have access over the Internet are necessary. It is important to avoid undue restrictions on transborder data flows from countries where data are protected. To boost consumer confidence and as a complement to consumer protection legislation, policy makers might wish to consider the promotion of self-regulatory instruments such as trustmarks or "seals of approval", guidelines and codes of conduct.

Intellectual property protection. Authors, publishers, producers and content providers are increasingly demanding legal and technological answers to their concerns about copying and dissemination of digital material. Thus, in addition to appropriate copyright legislation and enforcement mechanisms, cooperation between Internet service providers (ISPs) and rights owners is very important. Technological protection measures such as digital rights management (DRM) systems are effective mechanisms that have been developed to protect digital content and prevent unauthorized use of copyrighted content. Their aim is to secure rights clearance and revenue collection. It is therefore important that, in addition to appropriate copyright legislation, intellectual property rights holders in developing countries have easy access to DRM systems in order to protect content. When implementing intellectual property legislation, Governments might consider ratifying the WIPO Internet Treaties.

Cybercrime. It is important for Governments to examine their legal frameworks and, where appropriate, enact legislation to criminalize activities that involve interference with infrastructure security and computer crime. In reviewing their criminal laws, Governments might consider taking into account the Council of Europe Convention on Cybercrime.

Taxation.[22] Fears of revenue losses from uncollected taxes and duties on Internet transactions have prompted many Governments to work towards internationally acceptable solutions for changing existing tax legislation to take account of e-business. The OECD, within the framework of its Model Tax Convention, has taken a lead in adapting existing frameworks to reflect the existence of e-commerce. Developing countries, even if they are not part of an OECD agreement on Internet taxation, should use the agreed-on rules as a basis for adjusting their own legislation and should start to develop efficient tax collection systems for e-commerce.

7. Economic and business environment

In addition to the telecommunications sector, which is clearly in greatest need of regulation, there are other policy areas that Governments need to address in order to create a business and economic environment that will facilitate the adoption of ICT by the business community. These areas relate to trade and investment, standard setting, and banking and finance.

Trade and investment

A policy framework that promotes open markets, competition and private-sector investment will attract companies not only in telecommunications but in other sectors that support and benefit from the information economy. Trade-related policy objectives should enable innovation, a key element in an economy and society that is increasingly becoming knowledge-based. Regulations should be internationally coordinated; otherwise they create uncertainties as to which rules apply. From a business point of view, non-discriminatory treatment of e-commerce is essential (WITSA 2002).

Active participation by Governments and commitments made in WTO multilateral trade negotiations could result in an environment that stimulates trade and investment. Policies could include a reduction of import tariffs and taxes on software and hardware, the temporary movement of skilled labour (as provided for in the GATS), participation in the Information Technology Agreement (ITA) or the customs moratorium on electronic transmissions. Further liberalization of the services sectors, especially services that can be provided digitally (e.g. computer-related services, business services, financial and insurance services), as well as communication services, could stimulate export growth in these sectors.

Common changes in trade policies include the lowering of import tariffs on computers and other hard- and software, which are important inputs into the domestic IT industry. As this measure typically results in lower prices, it has proved helpful for increasing the use of computers and ICT in general, and especially among SMEs. Examples of developing countries that have adopted this approach include the Government of Uganda, which removed all major taxes on computers and related equipment as of 1 July 2002. Ecuador eliminated import duties on computer hardware in January 2002 in an effort to increase the number of computers and Internet users in the country (US Commercial Service 2002).

In addition to recognition of the convergent nature of e-commerce, there is also increasing recognition of and reliance on general competition law principles to guard against anti-competitive activity in the e-commerce space.

Trade support services such as customs and logistics need to be made more efficient and to incorporate ICT into the management of cross-border transactions. Government measures to streamline regulations affecting customs and exports of intangibles, and to modernize customs systems, could be efficient ways of supporting the information economy.

Technical standards

In choosing technological standards, it is crucial to consider their compatibility at the international level. Countries need to be aware of the fast pace of ICT convergence and the danger of "lock-in" effects for consumers in connection with use of certain technologies that do not meet internationally agreed standards or are not based on interoperability. These range from pay television to mobile phone standards to software (see chapter 4). As a general principle, open

standards should be chosen over proprietary ones (Hilbert and Katz 2003).

The availability of international technical standards could also facilitate resolution of the legal issues likely to arise in international transactions. Recent efforts by the United Nations Centre for Trade Facilitation and Electronic Business to develop XML standards for e-commerce could be useful.

Finance and payments[23]

The low level of credit card ownership in many developing countries is a major impediment to the spread of business-to-consumer (B2C) e-commerce. Governments are therefore encouraged to adopt flexible regulations and create a supportive institutional environment to encourage the introduction of e-payments, Internet banking, online trade finance and credit information, and other e-finance facilities relevant to SMEs, and to ensure public-private cooperation in these areas.

Estonia is a country that has become a leader in Internet banking (which now reaches 18 per cent of the population), not only among Eastern European countries but in world rankings, through a combination of easy-to-use software, free-of-charge transactions and behaviour changes resulting from the influence of the Nordic countries' IT culture on Estonia.[24] Thailand's e-payment strategy 2002–2004, under the leadership of the Bank of Thailand, has created an industry payment body to involve other stakeholders, in particular from commercial banks, which take leading responsibility for the development of e-payment systems and technologies.

Online security is a major factor limiting the development of e-business in many countries. Consumers consider credit card security their number one concern about online shopping. In some countries, like China, holders of credit or debit cards are liable for the amount of charges on their cards, even in cases where the card number is stolen.[25] In some developing countries there are very few secure servers, which increases the risk of credit or debit card misuse. Governments, in cooperation with the private sector, should foster the creation of an e-payment- and e-finance-friendly regulatory environment and the development of secure methods of electronic storage and transmission of commercial messages, electronic signatures and e-contracts.

8. Promoting e-business among SMEs and creating local content

Small and medium-size enterprises are the backbone of the economy – not only in developing countries – and employ the large majority of the workforce. Any strategy to promote the information economy and the adoption of ICT by the business sector therefore needs to consider the critical role of SMEs in creating employment and enhancing the gross domestic product (GDP). Through the use of ICT, SMEs can access important information related to products, markets, legal and regulatory requirements and finance; establish and maintain contacts with clients and business partners; make business processes more efficient; and improve firm organization and management, all of which contribute to increased competitiveness.

SMEs have many advantages that could allow them to spearhead e-business in some developing countries. These include their great adaptability and ability to keep up with change, a flexible structure to meet changing requirements, and a simple decision-making process, all of which fit well into the current rapidly changing e-business environment.

Yet bringing the benefits of ICT to SMEs, especially microbusinesses, in developing countries is also the most challenging task for policy makers and international aid agencies. Existing policies and programmes to promote SMEs need to integrate ICT-related components, taking into consideration the special situation of SMEs, which face the following problems, among others:

- limited access to finance that would enable them to introduce ICT into their organizational structures or venture into e-commerce

- limited human resources, including IT and foreign-language skills

- limited resources to buy expensive hardware and software

Therefore, some of the policies described above need to target SMEs through, for example, low-cost distribution of software (including possible use of open-source software), subsidized IT training programmes for SMEs, incubators, the availability of venture capital, and/or trade-related e-finance mechanisms for SMEs. Also, because SMEs have less credibility on the international market than large multinational

enterprises, they need help to improve the quality of their products and services in order to be able to sell them on the now much more accessible international market.[26]

In addition, policies that target the development of certain sectors of economic importance should focus on SMEs. These include sectors such as tourism and software and IT-related services. In order to promote SMEs' participation in the digital economy, the Government of Costa Rica has established an Internet portal (www.marketplacecostarica.com) that markets Costa Rican products and allows SMEs to establish business contacts and advertise their products at minimal cost. Jamaica has developed a set of sectoral plans that include support for e-business in dynamic sectors of the economy. SMEs need more and better information about potential market niches or diaspora markets (Africa) – for example, on business clients, types and volumes of product needs, and quality and other requirements. Mechanisms to help SMEs connect with prospective business clients in developed countries are very helpful and have been established in Uganda at no cost to entrepreneurs. Uganda has also adopted a partnership model for mentoring and twinning to start up e-businesses and is setting up the first e-business incubator, following models in Asia and North America.

In order for SMEs to realize the benefits of ICT, the generation of local content is vital. This issue is especially addressed in discussions of models and policies to enhance the adoption of ICT in rural areas, which requires the availability, in local languages, of information relevant to local communities. SMEs have shown more interest in e-commerce when efforts were made to facilitate the use of local languages (Hilbert and Katz 2003). A study on ICT usage in Costa Rica has shown that the lack of Spanish-language content is a major reason for the limited use of the Internet by businesses (Monge and Chacón 2002). Many developing countries have a rich cultural and historical heritage that is reflected in their music, handicrafts, local customs and traditions and in their popularity as tourist destinations. SME support programmes should help SMEs provide local content to both domestic and foreign consumers. The UNCTAD-initiated Global Trade Point Network (GTPNet)[27] is a good example of how SMEs from developing countries can use the Internet to expand their domestic and international markets.

9.   Promoting the ICT industry

By targeting certain industries and business sectors, Governments can play an important role in enhancing the development of e-business in the country. In a number of countries, development of the domestic ICT-producing sector[28] has been a priority in the national development strategy (e.g. in Malaysia and India, as described in box 3.6). Development of ICT hardware and software production is often pursued by establishing joint ventures or creating high-technology parks offering investment and export incentives. This requires the availability of capital, either public or private. Government funding can be particularly useful as seed capital to start-up companies and has been provided in countries such as Australia, Greece, Israel, Singapore and the Republic of Korea (Dutta, Lanvin and Paua 2003).

Governments wishing to develop the national ICT sector need to ensure that the industry is subject to competitive pressure; that it creates diversified producer capabilities; that it is adapted to local needs; and that it creates jobs directly and indirectly (in the long term) – that is, has spillover effects. For these policies to succeed, the government needs to work very closely with the business sector and respond to its very specific needs. At the same time, academia needs to be present in the policy making so that colleges' and universities' teaching programmes correspond to the needs of the emerging sector.

Experiences from countries that have chosen an ICT-led export focus show a positive impact on balance of payments and GDP (e.g. in Costa Rica and India). An ICT export focus may also help countries reduce their dependence on traditional commodity exports. On the other hand, this strategy may have only limited impact on the development of the national infrastructure and on other national development objectives. In India, where there was a strong focus on the ICT export sector, few benefits trickled down to the poor, and ICT infrastructure and access are still in bad shape in many rural areas.

Some studies have found that while a policy to globally position the domestic economy makes sectors more competitive and attracts FDI, it does not necessarily translate into social development, especially for vulnerable groups (DOI 2001). Similarly, if ICT developments are limited to closed technology parks or zones and are not combined with other policies in the area of education and training, the gains will not diffuse throughout the economy. Hence, more atten-

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Box 3.6

Promoting the ICT sector as a development strategy?

Malaysia and India are well-known examples of countries that have chosen an ICT sector strategy. In the case of Malaysia, a key policy strategy for the development of the ICT industry has been to facilitate a rapid transition of the telecommunications industry towards full competition. This strategy is being implemented through, among other means, the establishment of a universal service provision policy framework, with funding from both industry and the Government; moves towards cost-based tariffs, starting with tariff re-balancing for fixed-line services; opening up the last mile by issuing new licenses; legalizing the voice-over Internet protocol; and lifting controls over mobile telephony charges. These policies are complemented by the Multimedia Super Corridor (MSC) initiative, which includes the implementation of a number of flagship applications to develop the country's ICT industry.

The Indian example is based on a successful technology park strategy. Government policies to promote the IT services export industry included permitting duty-free imports of a number of key IT products; allowing 100 per cent foreign equity; deferring corporate income tax until 2010; dedicated data communication links; single-window Government clearance; and providing single-point custom bonding and export certification. This was complemented by support for incubators, human resources training, numerous e-governance initiatives and the unding for venture capital. The success of this strategy was greatly aided by the existence of a large pool of IT-skilled labour, to which new technology parks were set up in close proximity (e.g. in Bangalore).

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tion needs to be paid to linking these strategies to the domestic industry and other related policies (see Thailand's linking of incubators with other ICT-related policies). To yield their full potential, ICT need to be mainstreamed into all sectors, as was outlined in previous sections of this chapter.

10. Monitoring and measuring ICT usage[29]

The lack of reliable statistics and indicators for assessing e-business developments at the national and international levels has been a source of major concern and has received attention from policy makers in many countries. Data on the use of ICT are fundamental for facilitating well-informed decisions on how to formulate and implement ICT strategies and to benchmark a country's digital economy vis-à-vis those of other countries.

Countries that have started to collect statistics about the digital economy are already benefiting from the results. They are now in a position to benchmark their economies with those of competitors internationally, and they are able to identify the number of qualified people needed to advance their country's digital economy and to calculate the amount of investment funding needed to provide businesses with access to the

Internet. The United States is planning to include the measurement of e-commerce transactions in its entire statistical programme, which will enable it to measure the impact of e-commerce on the overall performance of the economy.[30] Both policy makers and businesspeople are able to take better-informed decisions about public policy measures and private investments in e-business-related sectors.

Recognizing the value of ICT data, policy makers designing national ICT strategies increasingly include in their programmes the need to measure the digital economy. For example, the European Union eEurope 2002 Action Plan includes a set of benchmark indicators to monitor progress towards its targets (Deiss 2002). In Japan, the Basic Law on Formation of an Advanced Information and Telecommunications Network Society ("Basic Law on IT") that came into force in January 2001 obliges the Government to work out a basic strategy to promote the formation of an advanced IT network society (the "E-Japan Strategy"), and also obliges the Government to prepare official statistics related to ICT.[31] In short, measuring the digital economy has been recognized as an important element in the development and planning of national ICT strategies.

Digital economy indicators and statistics are important for the design of ICT strategies in two ways.

- They help policy makers to better plan their strategies by identifying gaps and areas that need improvement.

- Basic information on the use of ICT by businesses and consumers is needed in order to assess the current and potential impact of the digital economy and thus to evaluate the impact of ICT strategies. This, in turn, leads to revised policies on how to best exploit the economic potential of the new technologies.

Even though the volume of e-commerce or the use of ICT by businesses may still be marginal in many developing countries, it is essential to start preparing ICT indicators now, for two reasons.

- The development and growth of the digital economy are irreversible. Businesses all over the world are increasingly using ICT in their business processes and are gradually moving towards e-business.

- The experiences of countries that have started to develop their e-statistics show that it takes several years to design and implement an optimal national strategy for measuring the digital economy. Hence, the earlier countries begin to work on their e-measurement strategy, the more likely they are to achieve good results at the time when e-business spreads to most parts of the developing world.

11. E-government

When developing ICT at the national level, Governments can assume three different roles (Dutta, Lanvin and Paua 2002). They can be

1. Producers of ICT – through the development and deployment of ICT goods and services and ICT infrastructure

2. Facilitators – through the creation of an enabling environment, including a conducive macroeconomic environment; a fiscal, legal and regulatory framework; and education policies

3. Leaders – by implementing e-government (i.e. becoming users of ICT), addressing digital divides in the country, and making ICT a national priority (e.g. through projects)

Based on this classification, *leaders* include countries and economies such as Singapore, the United States,

Finland, Canada, Sweden, the United Kingdom and Hong Kong (China) – all of them economically more advanced while also rating high on the network readiness scale. Leaders usually also have a strong *facilitator* role, encouraging competition and supporting market efficiency.

Governments play an important role as users of ICT. They use ICT for reforming government; promoting e-government projects at all levels of government; enabling online tax payments (for citizens) and online procurement (for businesses); mainstreaming ICT in areas such as health, education and the legal system; and customs automation. Governments should give high priority to security, privacy and consumer protection and should involve civil society as much as possible in decision making.

According to a United Nations report (2002), the world's 10 most advanced e-governments in 2001 were those of the United States, Australia, New Zealand, Singapore, Norway, Canada, the United Kingdom, the Netherlands, Denmark and Germany. Examples of developing countries with high e-government capacity include the Republic of Korea, Brazil, the United Arab Emirates, Mexico, Kuwait, Argentina, Bahrain, Uruguay, Chile and Lebanon.

Good examples of developing-country Governments taking an active role as users of ICT include the Government of the Republic of Korea, which is using the Internet heavily to purchase materials for state-run companies (up to 50 per cent of purchases were online in 2002). Supplies, contracts, deliveries and the like are handled electronically, based on electronic data interchange (EDI) systems, and e-business applications are used in the evaluation of management of public companies.

The Government of Brazil has used incentives to promote online income tax payments, discouraging paper-based filing and providing faster processing of online filing of tax returns. As a result, in 2000 – only four years after the introduction of the online system – 90 per cent of income tax declarations were submitted via the Internet (Hilbert and Katz 2003). Through its Post Office programmes, the Government provides a number of services to citizens, ranging from free email to export process simplification for SMEs. This has resulted in the growth of SME exports from less than $1 million (1999) to $43 million (2001).

Chart 3.4

Stakeholders in ICT policy making

● IT Industry	● Industry representatives
● Business associations	● Donors
● Banks	● Ministries (trade, science and technology, customs, education, telecommunications, industry, finance, etc)
● Freight forwarders	
● Lawyers	● NGOs
● Development organizations	● Universities
● Women's groups	● Consumers
● Other public institutions	● Telecom regulators

C. Stakeholders and implementation of strategies

The development and implementation of national ICT strategies is perhaps the biggest challenge policy makers face. At the start of such a process, the following questions need to be addressed:

- How will the implementation of the strategy be organized and coordinated?

- Who are the main partners and stakeholders involved in the implementation process?

- Which policy areas should be given priority over others as far as resources are concerned?

- What institutional aspects need to be taken into consideration?

Given the complexity and cross-cutting nature of ICT, a holistic approach is essential to a national ICT strategy, as far as both sectors and stakeholders are concerned. It will be difficult to create awareness at the political level or to adopt a state-of-the-art regulatory framework unless the elements of an ICT strategy are rooted in the reality of the national economy. Therefore, stakeholders from all areas of the society and economy should be involved: public institutions (telecommunications, education, health, trade and industry, economic development, juridical, customs), the business sector (service providers as well as representatives from all industry sectors, especially the ICT sector), academia, NGOs, standardization bodies, and Internet governance (see chart 3.4).

Given the array of involved stakeholders, which can have very diverse agendas and priorities, it is obvious that conflicting concerns will have to be addressed. The government may be more concerned with social and political issues (e.g. SME promotion, marginalized communities, schools), whereas the private sector, being more profit-driven, will focus on urban and other areas having a high population density. In such a situation, all stakeholders need to make an effort to compromise and find a balance between the different needs.

For the public sector, it will be important to take into account the concerns of the private sector and civil society. While it may be more feasible to work with the private sector through representative organizations (as business executives are usually too busy), it should be kept in mind that such organizations can only advise, not be implementing partners.

According to the Alliance for Global Business, an international private-sector group, "business self-regulation and the voluntary use of empowering technologies should be the main drivers behind the creation of trust across the whole spectrum of users and providers of e-commerce goods and services" (AGB 2002). Governments, on the other hand, should provide a stable and predictable environment enabling enforcement of e-contracts, protection of intellectual property and safeguarding of competition. While a "hands-off" approach by the government may be appropriate in certain areas, government intervention is required in others such as intellectual property protection, taxation, and the removal of barriers to competition in providing ICT infrastructure. In addition, given that e-business largely transcends borders,

issues such as interoperability and global standards become important. Therefore, government policies should be internationally coordinated and compatible, and should facilitate interoperability.

The coordination of national ICT strategies at the governmental level needs to be well prepared. This involves the identification of a national authority responsible for the coordination. Experience from countries (e.g. Costa Rica, Estonia, Jamaica, Malaysia, Thailand) has shown that, rather than giving the responsibility to an existing government office, such as the telecommunications authority, the ministry of science and technology or the ministry of communications, it may be more effective to create an inter-ministerial authority or committee that is directly under the presidency or the office of the head of state. Such a horizontal body is better placed to address the cross-cutting nature of the subject and the far-reaching impact of ICT in the country. Furthermore, the characteristics of the implementing authority can heavily influence the design and implementation of the strategy, and a newly created body is likely to be more open to structural innovations (Coppock and Maclay 2002). Decisions related to the national ICT strategy should be taken at the highest policy-making level and require strong leadership from the top for the deployment of ICT in the country. Furthermore, the role and responsibilities of the national ICT authority need to be clearly defined.

A number of possible problems may arise in the implementation process, such as power struggles among officials responsible for different policy areas, fear of loss of responsibilities, or unwillingness to cooperate among the different public offices. Competition among different authorities is often a major impediment to implementing a national strategy. Therefore, funds for ICT projects (e.g. by the international donor community) should be channelled through one coordinating office. Finally, creating a good working relationship between the public and private sectors and civil society is still a relatively new task for many government officials and thus will take time.

Effective implementation of national ICT strategies also calls for a change of thinking among political leaders. Given that ICT are a fairly new phenomenon, awareness raising is needed not only among businesses and individuals but also among policy makers within the government, in order to preclude hostility among middle-level officials towards ICT-related developments.

As far as the design of ICT-related policies is concerned, a reasonable approach is to mainstream ICT components in respective policies, rather than "adding" another policy layer or reform. In other words, ICT need to become integrated parts of any restructuring, reforms or new programmes envisaged by the government. To do otherwise may lead to a waste of resources and the overlapping of work among different public programmes.

Many of the policies identified under such a national strategy will have to be implemented simultaneously, as they will complement one another. Others may have to follow a certain sequence, as they will build on one another. The timing of the implementation of ICT policies has to be carefully planned by the coordinating authority, in close cooperation with the stakeholders responsible for the implementation.

Finally, policies need to define precise goals and objectives, which need to correspond to previously identified needs and priorities. These need to be checked regularly through a periodic review of the national ICT strategy.[32] For this purpose, it is necessary to define measurable criteria, indicators and benchmarks that will be used for the evaluation and assessment of strategies, addressing questions such as whether the strategy has worked, or what has been the impact of a certain policy. This involves the need to develop a thorough e-measurement strategy at the national level.

D. Case study: Thailand's National ICT Strategy[33]

1. History

In the early 1990s, the Government of Thailand recognized ICT as a potential enabler for national economic and social development and for strengthening the country's competitiveness. In 1992, it set up the National IT Committee (NITC), a high-level body chaired by the Prime Minister and with members from both the public and private sectors. The NITC was given the responsibility for overseeing and developing ICT policies in the country.

In 1996, the first national IT policy plan (IT 2000) was endorsed. It focused on three core development agendas: a national information infrastructure; ICT capacity building; and good governance through the

use of ICT. IT 2000 provided a roadmap for the country's ICT policies for 1995–2000 and a solid framework and directions for subsequent plans and policies.

In response to rapid global developments in ICT, involving technological advances as well as the diffusion of ICT to all sectors of the economy, the NICT revised the IT 2000 and developed, in cooperation with other partners, a 10-year national ICT policy framework – IT 2010 – that went through public consultation in 2001 and was approved and endorsed by the Government in March 2002. IT 2010 covers the period 2001–10. The new plan incorporates experience gained from the implementation of IT 2000, as well as national and global developments in sectors related to the production and use of ICT. It also establishes a clear link to the national economic and social development plan, taking into account Thailand's overall development goals.

2.   Framework and key elements

IT 2010 was designed as a blueprint for the country's development towards a "knowledge-based and sustainable economy" (NECTEC 2002). Its emphasis is thus not merely on the technology aspect but also on

the use of ICT for economic and social development. The plan is built on three key principles: (i) building human capital; (ii) strengthening information infrastructure and industry; and (iii) promoting innovation. It identifies five "flagship" sectors: (a) e-government; (b) e-commerce (see box 3.7); (c) e-industry; (d) e-education; and (e) e-society. The development of each sector must be harmonized with that of all the others and must comply with the three guiding principles. Another new feature of IT 2010 is its explicit integration into the country's Ninth (2002–06) and Tenth (2007–11) National Social and Economic Development Plans.

While IT 2010 identifies rather long-term policies, the National ICT Master Plan 2002–06, approved by the Cabinet in September 2002, identifies more specific strategies and work programmes and sets clear targets for the five-year period. It includes seven strategies or policy targets:

1. Promote the ICT industry in the country, especially the software industry[34]

2. Use ICT to develop quality of life

3. Reform and build capacity in ICT research and development

Box 3.7

Thailand's e-commerce policy framework

As one of the flagships of IT 2010, Thailand's national e-commerce vision is to strengthen the competitive advantage of Thai entrepreneurs, especially SMEs, by using e-commerce as a vehicle for exporting goods and services and also for domestic trade. This policy framework was initially developed by both public and private stakeholders starting in October 2000, and later refined and incorporated into IT 2010 and the National ICT Master Plan.

To accomplish the e-commerce objectives, the Government must implement eight strategies:

•   declare e-commerce as the national trade strategy and proactively engage in international trade

•   raise public awareness and understanding

•   create trust and confidence by developing a legal framework

•   promote interoperable payment systems and security

•   promote and facilitate SMEs' e-commerce development

•   develop human resources

Box 3.7 (*continued*)

- collect indicators and create databases necessary for measuring and monitoring e-commerce development

- provide adequate and affordable IT infrastructure

These strategies are in line with the following policies:

1. The Government should recognize e-commerce as the national trade strategy that should be included in the Ninth and Tenth National Plans for Social and Economic Development.

2. The Government should support and provide measures facilitating the private sector's and consumers' e-commerce activities, aiming at building trust and confidence among entrepreneurs and consumers.

3. The Government should enhance the competitiveness of SMEs in the global economy.

4. The Government should minimize any restrictions that would obstruct such development.

5. The Government should give priority to streamlining public administration by putting in place electronic media and information technology and setting up e-government services.

6. The Government, together with the private sector, should monitor and set up e-commerce-related indicators and databases, and should study policies and guidelines for their development at both international and regional forums.

Source: National Electronic and Computer Technology Center (NECTEC), Thailand; see www.ecommerce.or.th.

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4. Enhance potential social infrastructure for future competitiveness

5. Promote entrepreneurship with a view to expanding exports

6. Facilitate SMEs' efforts to utilize ICT

7. Deploy ICT for government administration and services and develop e-government procurement

3. Design and implementation: institutional aspects

Under the chairmanship of the Prime Minister, the NITC has the mandate to promote ICT deployment and use in the country. All policy-related work in ICT, including implementation of the ICT master plan and coordination among government agencies to develop e-services and e-government, has been transferred to a new Ministry of ICT created in October 2002.

IT 2010 is built on a number of lessons learned from, and improvements on, IT 2000, including the following:

- Leadership must come from the top (the Prime Minister).

- Integration with other development policies is fundamental.

- Stakeholders from the private and public sectors must participate from the beginning.

- Implementation plans must be explicit.

- Measuring and monitoring mechanisms are needed.

Therefore, for successful implementation of IT 2010, the national ICT development strategy imposes five conditions (Thuvasethakul and Koanantakool 2002):

1. Information, contents and knowledge must receive priority over investment in infrastructure and equipment (i.e. the ability to translate data into information and knowledge and apply it for the benefit of social and economic development).

2. Development of human resources must be carried out on a consistent and continual basis so as to increase the supply of knowledge workers.

3. The national digital divide (including infrastructure, literacy, cultural and management divides) must be reduced.

4. A permanent and clear-cut leadership mechanism must be established.

5. A link between the policies and operations of the NITC and those of the national telecommunications and broadcasting committees must be established.

The leadership mechanism established under the Thai national ICT strategy deserves particular attention. The national ICT development policy identifies this as one of the key criteria for the successful implementation of a national strategy. The ICT plan specifies that the Prime Minister must chair the NITC and cannot delegate this role to anyone else. The NITC is supported by an ICT Policy Office that is responsible for facilitating the policy's implementation, monitoring, appraisal and evaluation. The office is an independent entity and does not need to comply with cumbersome official regulations that might slow down its work. An ICT Operations Support Office facilitates the implementation of policies, providing technology and project supervision and management. It also supports public agencies in their restructuring efforts under the e-government programme. Stakeholders from the private sector are expected to participate in most of the operations. Both offices must closely coordinate their activities in implementing policies set by the NITC.

The Government works closely with other stakeholders in implementation – for example, with the Communications Authority of Thailand in providing various telecommunications services as well as new services such as e-payments (in cooperation with banks) and online shopping; with the Telephone Organization of Thailand to build a network to support EDI and e-commerce; and with several commercial banks to provide Internet banking and e-payment services.

A number of Government agencies are responsible for implementing the national ICT strategy:

- The Department of Revenue is working on e-government, especially introducing e-filing services for personal income tax and e-filing and payment services for value-added tax.

- The Department of Export Promotion has launched an e-commerce project to help Thai manufacturers and exporters trade online with the international business community.

- The Office of the Prime Minister is coordinating the development of e-government procurement, aiming to reduce cost, improve the productivity of public procurement, increase transparency, and provide businesses with better access to more efficient government markets.

- E-commerce facilitation for SMEs and community development is carried out by the Department of Community Development, Ministry of Interior, through its "Thai Tambon project" (see section D.4), and by the Thai National Electronics and Computer Technology Center (NECTEC) through the establishment of telecentres and community access centres, in cooperation with other local organizations. The aim here is not simply to provide access to the Internet, but to develop appropriate e-commerce business models for the local community (and in close collaboration with it).

- The Department of Foreign Trade, Ministry of Commerce, is working on issuing import and export certificates using EDI systems via the Internet. The Customs Department has launched projects to develop EDI for import/export processing systems and cargo control systems.

- The Ministry of Education is coordinating the SchoolNet project (see section D.4).

ICT-related laws have been enacted (e.g. the Electronic Transactions Act, 2001), and further laws are being reviewed (data protection, computer crime, national information infrastructure) or drafted (electronic funds transfer), under the responsibility of the NITC.

By the end of 2002, each government agency had submitted to the NITC its ICT operation plans, following the seven major strategies outlined in the National ICT Master Plan.[35] These were then combined into an integrated ICT plan, which is the blueprint for transforming the ICT Master Plan into an operational plan and enables ICT development to be harmonized at the national level.

4.   Achievements

Under the implementation of IT 2000, some pro-
grammes achieved their goals while others fell far
short, especially those relating to capacity building
and e-government (partly because of the recession in
the late 1990s). Nevertheless, to date a number of
projects and programmes have been launched, with
the following results:

- Two national Internet exchange points have
  been set up, which have considerably improved
  the speed and reliability of domestic intercon-
  nection.[36]

- 1,100 public Internet booths have been estab-
  lished in all provinces and most districts (July
  2002) by the Communications Authority of
  Thailand and the Telephone Organization of
  Thailand; users have to purchase smart cards to
  use the booths. The number of Internet users
  in Thailand more than doubled from 2000 (2.3
  million) to 2002 (4.8 million).[37]

- A Thai-language Linux operating system was
  developed by NECTEC and a local-brand
  quality PC programme was promoted. In 2002
  the Linux Thai Language Extension (Linux
  TLE) received broad acceptance from compu-
  ter users who could not afford expensive
  licensed commercial software. Later in 2002, an
  office suite called Office TLE, based on
  OpenOffice, was released. In March 2003, fol-
  lowing the success of the low-cost local-brand
  PC programme, the Ministry of ICT success-
  fully released low-cost PCs and notebook com-
  puters (costing about $250 and $500 respec-
  tively) for the mass market. As of May 2003,
  over 160,000 machines had been delivered.
  They use Linux TLE and Office TLE and
  come with a one-year maintenance warranty.

- SchoolNet Thailand has been launched, target-
  ing five areas: Internet connection; technical
  support; content development; teacher train-
  ing; and promotion of Internet use for class-
  room activities. As of June 2003, SchoolNet
  had connected 4,787 schools to the Internet. In
  the area of technical support, a Linux-based
  school Internet server has been developed by
  NECTEC and distributed to schools as free-
  ware. In the area of content development, a
  digital library of educational sites in the Thai
  language has been created, with content inputs
  from teachers and students. More than 250,000

teachers have been trained (as of May 2003), or
about 50 per cent of the total number of teach-
ers. SchoolNet is expected to merge with the
Ministry of Education's educational network
(EdNet) to cover schools nationwide.

- The Government Information Network
  (GINet) has set up a high-speed virtual private
  network service for accessing government
  agencies throughout the country and provides
  a range of online services to its clients. For
  example, the number of personal income tax
  returns filed online is steadily rising. It totalled
  63,000 in 2002 and 70,000 for the first two
  months of 2003 (Bangkok Post, 11 March
  2003).

- The Electronic Transactions Bill came into
  effect in April 2002. It includes provisions for
  electronic signatures.

- Tambon Net (also known as Internet Tambon),
  an initiative by the Department of Local
  Administration, under the Ministry of Interior
  and supported by Prime Minister Thaksin
  Shinawatra, is aimed at establishing Internet
  access points in all *tambons* (subdistricts) in
  Thailand. In May 2003, 4,000 tambons (out of
  7,200 targeted for 2004) were connected to the
  Internet, selling 15,000 different items on
  43,000 webpages and advertising 6,300 tourism
  spots. The Internet is used by local administra-
  tions and for e-commerce projects related to
  another government programme, One District,
  One Product, aimed at promoting local com-
  munity-based products in the country. The
  programme helps local communities market
  and sell over the Internet products ranging
  from cultural products and agricultural and
  food products to office supplies and tourist
  services. Information provided on the sites
  includes general information about the tam-
  bon, its administration and transportation, as
  well as information on products, tourist loca-
  tions, hotels and restaurants. The goal is to
  facilitate the buying and selling of rural prod-
  ucts and promote tourism at the tambon level.
  Tambon Net is regarded as a good example of
  rural development using the Internet. It has
  increased the average monthly community
  income by $240, to $730.[38] It has expanded the
  sellers' market to Bangkok and other big cities
  (both retailers and wholesalers), as well as for-
  eign markets.

- E-marketplaces have emerged in sectors such as food, oil, textiles and automobiles. Specific sectors that have been successful in e-business (and were targeted by e-commerce policies) include fashion (gems, jewellery, clothes), tourism and distribution.

5.   Monitoring and evaluation

The National ICT Master Plan includes as an important element the measurement and monitoring of ICT developments and usage in the country, as a basis for policy evaluation and revision. Therefore, considerable efforts have been made during the past few years to initiate e-measurement programmes in the country.

Thailand has participated actively in the e-ASEAN Readiness Assessment since its launch in 2001. It is designed to evaluate the readiness of ASEAN member countries with respect to ICT investment, spending, Internet hosts, Internet access costs and related areas. In a second stage, the e-ASEAN measurement framework focuses on measuring ICT usage, including Internet use by households, enterprises and government. Thailand has carried out a number of surveys in this regard:

- Two e-commerce website surveys were carried out in 2000 and 2001. The results showed that the proportion of sites offering e-commerce had increased from 6 per cent to 12 per cent over the period. Tourism was found to be the sector most frequently featuring e-commerce applications, including online transactions. This partly reflects the Government's selection of tourism as a pilot sector for the promotion of business-to-business (B2B) e-commerce in the country. Other sectors employing Web-based e-commerce applications are the computer, apparels/cosmetics, florist and handicrafts industries. The 2002 survey will build on the experiences of the first two surveys and collect more specific data and indicators.

- Internet user profile surveys were carried out in 2000, 2001 and 2002. The 2002 survey revealed, for example, that about 50 per cent of users were located in Bangkok (62.5 per cent if Bangkok's suburbs are included, and 88 per cent if all other urban areas are considered). Although this figure is decreasing (i.e. it was even higher in the previous years), it still points to the huge urban-rural gap that needs to be

bridged as far as Internet penetration and usage is concerned. The survey results also showed that almost all Internet users had some English language skills, which points to the need for Thai-language local content. As far as online (B2C) purchases are concerned, 76 per cent of users have never made a purchase online, mainly because they cannot see/feel the product (40.5 per cent), do not trust merchandisers (32.7 per cent) or do not want to reveal credit card numbers (27.3 per cent).

- The first household survey including questions on ICT usage was implemented in 2001, and the first business survey including questions on ICT and e-commerce usage was carried out in 2002. The results show that, for example, 10.5 per cent of business establishments countrywide have Internet access, and 50 per cent of those are located in Bangkok. Only 7.6 per cent of the businesses that have Internet access have their own sites.

6.   The way forward

The Government of Thailand has made a considerable effort to give ICT developments high priority on its development agenda. The Prime Minister is fully committed to supporting the country's transformation into an information society. This high-level support and commitment will continue to play a considerable role in the country's advancement in ICT.

Nevertheless, the challenges are also considerable, given that the country has only recently started to implement ICT, that it has undergone a serious economic recession and that it started with low levels of ICT penetration. Widespread ICT deployment and use thus remain long-term policy goals.

The following areas seem particularly in need of future attention and policy action:

- Reform of the telecommunications sector. While competition in mobile services produced rapid growth in the number of mobile phone users in 2001–2002, which resulted in mobile density being well above fixed-line density (26 per cent penetration compared to 10 per cent for fixed-line, or 72.7 percent of total telephone subscribers in 2002[39]), two state-run telecommunications providers and the lack of an independent regulator keep costs high.

- Introduction of competition into the international Internet bandwidth market in particular. Currently the lack of competition results in low and expensive bandwidth, in particular vis-à-vis some of Thailand's neighbours (e.g. Malaysia and Singapore).

- Connecting rural Thailand. The overwhelming majority of Internet users are located in Bangkok and other urban areas, while rural communities remain largely excluded from the information society. In addition to the establishment of physical infrastructure (already well under way through various projects mentioned above), more Thai-language content is needed if farmers and others in remote communities who lack foreign-language skills are to develop an interest in using the information provided through the Internet.

- Increasing the number of "knowledge workers" and creating an ICT-educated society, as stipulated in the IT 2010 development goals. In order to achieve the target of 30 per cent of the total workforce (compared to the current share of 12 per cent), comprehensive HRD plans and educational reforms will have to be implemented.

- Better data on the information society. While several initiatives have been launched to measure ICT deployment and use in the country, large gaps remain in the data necessary to identify specific areas in need of policy action.

E. Conclusions

Developing the right policy framework for the deployment of ICT is a challenging task. As we have seen, establishing a network infrastructure is not enough. People must be trained to use it and to exploit commercially the information and knowledge that it makes available. Regulatory frameworks need to be put in place to provide companies and consumers with the confidence and security they require to use the Internet. Financing needs to be available for infrastructure development (including FDI) and SME development. Finally, local content needs to be created to enable small businesses and underprivileged people to go online. While awareness raising is important, e-business will still grow slowly in some countries, and people will start using the technologies only when they have experienced their immediate benefits. In places with a management or business culture that

is open to and ready for change, the use of new tools and the digitization of business processes will advance more quickly.

How much of this activity should be left to market developments, and to what extent should government be involved? Obviously, without the initiative of the business community, the information economy will not take off. But, as this chapter has demonstrated, there is no doubt that Governments will have to play an important role, both in developed and developing countries, in promoting and facilitating the development of the information society and economy.

First and foremost, Governments should lead by example by adopting e-government practices. Among the developed countries, the Governments of the United States and Iceland have the highest degree of involvement in ICT developments at the national level. It is also interesting to note that the Governments of high-income countries are playing a bigger role in ICT in many economic sectors than the Governments of lower-income countries (Dutta, Lanvin and Paua 2003). Especially in the early stages of ICT deployment, Governments play an important role as leaders, providing vision, raising awareness and enhancing the profile of ICT development by making it a national priority.

Governments should play an active role without interfering with local competitive market forces. They should be active players but not become substitutes for private-sector action; they should focus especially on facilitating the entry of smaller, underprivileged players into the marketplace. Government intervention is particularly needed when the market fails. There is a real danger that rural and remote areas will be left out, as the private sector has few incentives to provide universal access to telecommunications services. Other key areas are those related to educational, legal and regulatory issues. Governments also have a role to play in integrating SMEs into the information economy, in particular in developing countries.

The following recommendations summarize some of the key issues related to the development of national ICT strategies:

- *The need for leadership from the top.* In the countries that have shown most success in the deployment of ICT, a strong commitment from the head of state to introducing the necessary changes was crucial. This included having the strategies or national ICT committees be directed by the office of the head of state.

- *The need to involve all stakeholders.* E-business and ICT development is a multidimensional issue, and the design and implementation of effective ICT strategies require the involvement of all stakeholders, including high-level government representatives, business organizations, civil society and consumers. Successful experiences have shown that the establishment of an entity at the highest level of government that includes all stakeholders is a key element of an ICT strategy. By providing a framework, Governments can play an important role in ensuring that stakeholders are fully involved.

- *The need for a holistic approach.* A national ICT strategy is comprised of a package of measures complementing one another. Implementing only a few policies would be insufficient, since areas where no action was taken might undermine the effectiveness of those policies that were put in place. Thus areas such as legal issues, awareness, human resources development, infrastructure and access, market regulation and e-government have to be considered together and developed in parallel. All of this requires a coherent approach and strong coordination at the national level.

- *The need for a liberalized economic environment.* The success of e-business is enhanced through reforms, including liberalization of areas such as telecommunications, trade and finance systems. However, such a strategy can affect social cohesion if it is not accompanied by remedial measures taking into account the needs of people and regions that might be negatively affected. Far-reaching liberalization measures of this nature need to be instituted in the context of broader national economic structural reforms. Further, liberalization should ideally be introduced consistently in all sectors or services. Liberalizing some sectors while leaving others untouched could prevent the full implementation of strategies.

- *The need to monitor e-developments.* The lack of readily available data on the use of ICT and e-commerce by the business sector and households is a major obstacle to identifying priority areas of policy action; monitoring, assessing and revising ICT strategies; and benchmarking national economies vis-à-vis those of other countries. Governments should therefore start to develop and collect data and indicators regarding the use of ICT by businesses. In par-allel, they should participate in international debates on ICT indicators aimed at harmonizing data and statistics at the international level.

- *The need to tailor e-strategies to individual countries' requirements.* While a range of ICT strategies could be applied to developing countries in general, no single set of strategies can fit the conditions and requirements of all developing countries. In practice, alternative strategies exist for the viable development of e-business in different countries. In order to succeed, an ICT strategy has to be tailored to the economic, social and political environment of a particular country, leveraging the emerging body of international good practice and bearing in mind issues such as harmonization and interoperability.

Notwithstanding the important role of government in initiating and implementing national ICT strategies, in the final analysis much of the required investment needs to come from the private sector. Experience shows that the private sector has been the most innovative player and the major driving force behind e-business and ICT deployment. In general, the modalities of application of technology to business activities are more efficiently decided by the market than by government. An ICT strategy that combines public intervention with private-sector initiative in a mutually supportive manner is the only viable option.

Perhaps most important aspect of all, in preparing ICT strategies and programmes, is a comprehensive approach that integrates ICT into the country's broader economic and social development strategies and policies. Linking ICT policies to other development policies, in areas such as education, trade and investment, produces benefits from synergies between different elements and ensures a more broad-based diffusion of ICT. In other words, ICT strategies should never be decoupled from broader development policy frameworks but rather mainstreamed into these policies.

The international community will have to play an important role in supporting developing countries' efforts to develop their national ICT strategies. This fact has been fully recognized by the WSIS preparatory process, including in the statement that "ICT should be part of any strategy aimed at achieving the Millennium Development Goals (MDG) of combating poverty, hunger, disease, illiteracy, environmental degradation and gender inequality. Without the widespread and innovative use of ICT, the MDG may prove impossible to attain" (WSIS 2003).

Notes

1. The World Summit on the Information Society (WSIS) Regional Conference of Latin America and the Caribbean, held in Bávaro (Dominican Republic) on 29–31 January 2003, defines the information society as follows: "The information society is an economic and social system where knowledge and information constitute the fundamental sources of well-being and progress… [I]t represents an opportunity for our countries and societies, so long as it is understood that the development of that society within a global and local context requires a deeper appreciation of fundamental principles such as those of respect for human rights within the broader context of fundamental rights, democracy, environmental protection, the advancement of peace, the right to development, fundamental freedoms, economic progress and social equity." See *www.indotel.org.do/WSIS/Docs/f_declaration/final_declaration_Bavaro.pdf.*

2. The first meeting of the WSIS will take place in Geneva on 10–12 December 2003 and the second meeting in Tunis on 16–17 November 2005.

3. For more details on the economic impact of ICT, see chapter 2.

4. This was made possible by the development of HTML (hypertext markup language), which allowed the creation of hypertext documents and their publication on the World Wide Web. Hypertext links make it possible to direct users to other webpages with just a click of the mouse.

5. Non-governmental organizations, too, have incorporated ICT into their development programmes, both at the national and international levels.

6. For example, the EU approach is more government-led and highly structured, while the US approach is more bottom-up, self-regulating and led by the private sector.

7. A number of WSIS documents have referred to "e-strategies" for development of the information society. Given that the prefix *e-* often implies "electronic", this discussion will avoid the term and instead refer to *ICT strategies,* a more accurate term for describing the process of promoting and supporting the spread of ICT in society, which in turn leads to the development of the information society.

8. The chapter will mainly use the term *e-business* rather than *e-commerce.* E-commerce is normally understood as trade conducted electronically and does not include other uses of ICT, such as the digitization of production systems. The concept of e-business, on the other hand, is broader and includes the integration of electronic means (mainly network technologies) into business processes (Hilbert and Katz 2003). Since this chapter is concerned with the use of ICT in commerce and business, the term *e-business* is more appropriate.

9. This has been confirmed by a study carried out by Coppock and Maclay (2002).

10. According to the ITU (2002), in 2001 there were 113 countries with fully or partly privatized telecommunications operators (a figure that included all developed countries), and 86 countries with no private operators (all of which were developing countries).

11. Many of the examples cited in this section are based on country presentations given at various UNCTAD meetings. In these cases, no references to published documents are provided.

12. The ITU's definition of universal service refers to availability, non-discriminatory access and widespread affordability of telephone services (measured by the percentage of households with a telephone). Generally the term *universal service* is taken to mean the availability of a telephone in every home or office, while *universal access* means each person is within a reasonable distance of a public-access telephone. Recently, the concept has been broadened to cover ICT services more generally and Internet access services in particular (ITU 1998).

13. 40 telecentres were in operation by March 2003; see *www.infocentros.org.sv.*

14. Costa Rica solved this problem by redirecting its defence funding to education; this was further enhanced by a 1998 constitutional reform mandating that 6 per cent of GNP be invested in education (Dutta, Lanvin and Paua 2002).

15. See *www.nic.or.kr/www/English.*

16. See *www.medialabasia.org.*

17. Massachusetts Institute of Technology; see *www.media.mit.edu.*

18. These include a regional conference on e-strategies held in Curaçao (June 2002), an Expert Meeting on "E-Commerce Strategies for Development" held in Geneva (July 2002) and a regional conference on e-strategies held in Bangkok (November 2002).

19. A comprehensive overview of policies that should be implemented to adjust the legal framework to ICT and e-business is provided in UNCTAD (2001).

20. See chapter 7 of this report.

21. In asymmetric cryptography, a pair of keys are used to encrypt and decrypt a message so that it arrives securely (see *searchsecurity.techtarget.com/sDefinition/0,,sid14_gci836964,00.html*).

22. See UNCTAD (2001) for a discussion of recent developments in the area of taxation and electronic commerce.

23. The subjects of e-finance and e-payments are dealt with at length in UNCTAD (2001, 2002b).

24. "Estonian Transition into Information Society", presentation by Linnar Viik at the UNCTAD Expert Meeting on Electronic Commerce Strategies for Development: The Basic Elements of an Enabling Environment for E-Commerce, Geneva, 10–12 July 2002.

25. Mann C (2003). Achieving the benefits of connectivity and global e-commerce. Paper presented at the UNCTAD Expert Meeting on Electronic Commerce Strategies for Development: The Basic Elements of an Enabling Environment for E-Commerce, Geneva, 10–12 July.

26. One suggestion made at an UNCTAD meeting, and which may apply more to the private than the public sector, was to establish a credibility certification label for SMEs. This would help particularly African companies, which are considered risky in the international market.

27. For more information, see *www.wtpfed.org*.

28. For a definition of the ICT sector, see OECD (2002b).

29. For a discussion of information society measurements and their relevance for developing countries, see UNCTAD (2003b).

30. For progress made in collecting e-statistics in the United States, see Mesenbourg (2001).

31. Kitada H (2002). Japanese ICT statistics and new JSIC with the Information and Communications Division. Paper presented at the seventeenth meeting of the Voorburg Group on Service Statistics, Nantes, 23–27 September.

32. For example, the EU approach included the adoption of a series of two-year action plans, each building on the last and shaped by input from benchmarking studies (Coppock and Maclay 2002). A number of countries from the ASEAN region have applied a similar tactic.

33. This section is largely based on information provided by the Thai National Electronics and Computer Technology Center (NECTEC); see *www.nectec.or.th, www.nitc.go.th* and *www.ecommerce.or.th*.

34. A cluster of IT development centres are to be set up to promote the development of the ICT sector, especially in the area of software development, as the software industry is believed to bring in large amounts of foreign currency. At the end of 2002, the Government committed 1 billion baht to the development of an IT knowledge park project in Chiang Mai. Other software parks are envisaged for Phitsanulok, Phuket, Khon Kaen, Koh Samui and Koh Chang, all located outside Bangkok (*Bangkok Post* 2002).

35. The national ICT master plan includes a total of 1,085 proposed projects worth 23,510 million baht.

36. For updated information on bandwidth, data volume and interconnection maps, see *www.nectec.or.th/internet*.

37. Available at www.itu.int.

38. Kittipong Tameyapradit (2002). Telephone Organization of Thailand, Presentation at the APT Seminar on Digital Opportunity for All, Chiang Rai, Thailand, 29 July – 1 August.

39. Based on ITU data, available at www.itu.int.

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