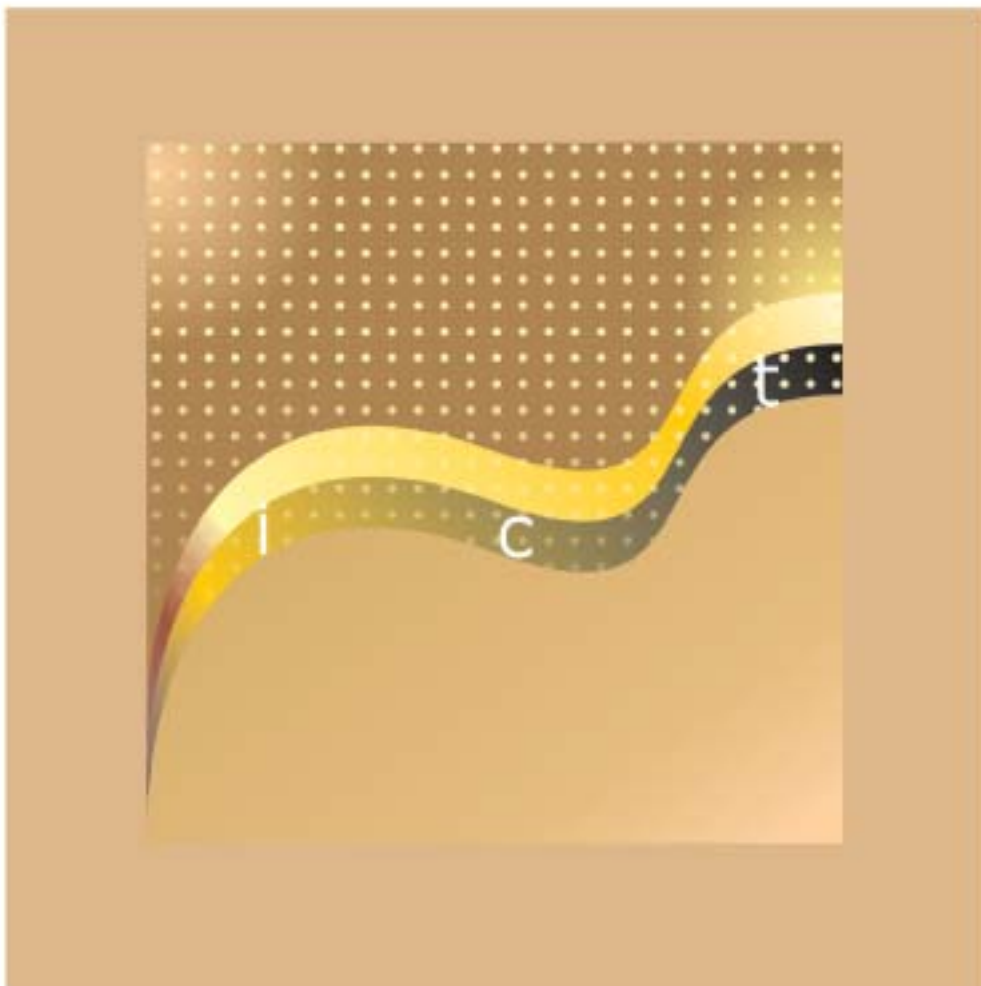United Nations Conference on Trade and Development

E-COMMERCE AND DEVELOPMENT REPORT 2004

Internet edition
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UNITED NATIONS
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Table 1.1

Internet users worldwide (thousands), 2000–2003

	2003	2002	2001	2000
Thousands	675 678	626 579	495 886	387 532
% change	7.84	26.36	27.96	..

Source: ITU (2004).

From the point of view of the relative positions of developed and developing countries, the situation has continued to move towards a growing presence of developing countries on the Internet, although this remains largely concentrated in a relatively small number of nations. Five countries (China, Republic of Korea, India, Brazil and Mexico) account for 61.52 per cent of all Internet users in the developing world. At the end of 2003, almost three out of four Internet users in developing countries lived in the developing countries of Asia, as did two thirds of all the new Internet users in the world. Table 1.2 shows the distribution of Internet users between the developed and the developing countries and the recent evolution of the number of Internet users by region.

Bearing in mind the fact that the data for 2003 are still incomplete, it should be noted that much (74.8 per cent) of the recorded growth in the number of Internet users in the world occurred in the developing world, and that the rate of growth of its Internet population (17.5 per cent) is eight and a half times higher than that of developed countries. Thus, according to ITU estimates, at the end of 2003 developing countries accounted for more than 36 per cent of all the Internet users in the world, and the share of developing countries in the Internet population of the world grew by nearly 50 per cent between 2000 and 2003 (see chart 1.1).

More detailed information is provided for a number of individual countries in table 1.3. The countries listed there have been selected on the basis of either their demographic and economic weight in their respective regions or of their above-average performance.

Table 1.2

Internet users by region, 2000–2003 (thousands)

	2003	%Growth	2002	%Growth	2001	% Growth	2000
Africa	12 123	21.38	9 988	63	6 119	34	4 559
Asia	243 406	15.25	211 202	40	150 535	38	109 257
Europe	188 997	7.24	176 232	23	143 584	30	110 824
Latin America and Caribbean	44 217	4.19	42 439	45	29 224	65	17 673
North America (2002)	175 110	0.00	175 110	12	156 823	14	136 971
Oceania	11 825	1.88	11 607	21	9 601	16	8 248
Developed countries	396 754	2.06	388 746	15	339 427	19	285 480
Developing countries	246 290	17.53	209 556	50	139 317	48	94 352
Others	32 634	15.41	28 277	65	17 142	123	7 700
Total	675 678	7.84	626 579	26.36	495 886	27.96	387 532

Source: ITU (2004) data and UNCTAD calculations.

Foreword

Information and communications technologies have considerable potential to promote development and economic growth. They can foster innovation and improve productivity. They can reduce transaction costs and make available, in mere seconds, the rich store of global knowledge. In the hands of developing countries, and especially small- and medium-sized enterprises, the use of ICTs can bring impressive gains in employment, gender equality and standards of living.

In recent years, international trade in ICT-related goods and services has grown faster than total trade. Some developing countries are making good use of ICT-generated opportunities to broaden their customer bases and increase their participation in international supply chains. But if all countries are to benefit, and if ICTs are to make a real impact on a country's economic prospects, more needs to be done to build capacities and create an enabling environment, nationally and internationally.

That effort will have to address broad, global issues such as Internet governance and the protection of intellectual property, as well as narrower, specific tasks such as ensuring that SMEs have access to ICTs. It is also likely to involve profound transformations on the part of individual workers and companies, and across economies as well. To accomplish such change with a minimum of disruption, policies need to be conceived and applied through a participatory approach. Such policies should also be firmly rooted in our overall struggle to defeat poverty and achieve other social goals.

This fourth E-commerce and Development Report discusses the effects of ICTs on the economies of developing countries and their enterprises, the costs and benefits of investing in ICTs and how societies can achieve higher rates of return on those investments. Its data and analysis are meant to provide a solid underpinning for the global debate on how best to implement the Plan of Action agreed to at the first phase of the World Summit on the Information Society (Geneva, December 2003). As we continue our efforts to spread the benefits of ICTs more widely and equitably, I am pleased to commend this report to a wide global audience.

Kofi A. Annan
Secretary-General of the United Nations

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List of abbreviations

A

ADR	alternative dispute resolution
ADSL	asymmetric digital subscriber line
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of South-East Asian Nations
ASP	applications service provider
ATI	Agence Tunisienne d'Internet

B

BDS	business development support
BOT	build-operate-transfer
BPO	business process outsourcing
BSD	Berkeley Software Distribution
B2B	business-to-business
B2C	business-to-consumer
B2G	business-to-government

C

CAD	computer-aided design
CAM	computer-aided manufacturing
CARICOM	Caribbean Community and Common Market
CC	Creative Commons
CCK	Centre de Calcul El-Khawarizmi
ccTLD	country code top level domain
CD	compact disc
CD-ROM	compact disc read-only memory
CERT	Centre des Etudes et Recherche en Télécommunication
CFC	Common Fund for Commodities
CIMSP	Centre informatique du Ministère de la Santé Publique
CNC	computer numerical control
CNI	Centre National de l'Informatique
CNS SSII	Chambre Nationale Syndicale des Sociétés de Services et d'Ingénierie Informatique
CNSS	Caisse Nationale de la Sécurité Sociale
CRM	customer relationship management

D

DAI	digital access index
DNS	Domain Name System
DRM	digital rights management
DSL	digital subscriber line
DSS	decision support systems
DVD	Digital Versatile/Video Disc

E

ECLAC	Economic Commission for Latin America and the Caribbean
ECOWAS	Economic Community of West African States
EDI	electronic data interchange
EIU	Economist Intelligence Unit
ERP	enterprise resource planning
ESCAP	Economic and Social Commission for Asia and the Pacific

| EU | European Union |
| Eurostat | Statistical Office of the European Communities |

F

FAMEX	Fonds d'accès aux marchés d'exportation
FAQ	frequently asked questions
FDI	foreign direct investment
FIPA	Foreign Investment Promotion Agency
FITI	Fonds d'Incitation à l'Innovation dans les Technologies de l'Information
FM	frequency modulation
FOPRODEX	Fonds de Promotion et Développement d'Exportation
FOPRODI	Fonds de Promotion et Développement d'Industrie
FOSS	free and open source software
FOSSFA	Free and Open Source Software Foundation for Africa
FSF	Free Software Foundation
FTP	file transfer protocol
FUNDES	Fundación para el Desarrollo Sostenible en América Latina

G

GATS	General Agreement on Trade in Services
GDP	gross domestic product
GIS	geographical information systems
GITR	Global Information Technology Report
GNI	gross national income
GNP	gross national product
GNU	GNU is not UNIX
GPL	General Public License
GPS	global positioning system
GUI	graphical user interface

H

| HRD | human resources development |
| HTTP | hypertext transfer protocol |

I

ICANN	Internet Corporation for Assigned Names and Numbers
ICC	International Chamber of Commerce
ICO	International Coffee Organization
ICTs	information and communication technologies
IDE	integrated development environment
IFPI	International Federation of the Phonographic Industry
IML	information markup language
INBMI	Institut National de Bureautique et de Micro-informatique
IP	Internet protocol
IPRs	intellectual property rights
IRESA	Institut de la Recherche et de l'Enseignement Supérieur Agricole
IRSIT	Institut Régional des Sciences Informatiques et des Télécommunications
ISDN	integrated services digital network
ISET'Com	Institut Supérieur des Études et de Recherches des Télécommunications
ISP	Internet service provider
IT	information technology
ITC	International Trade Centre UNCTAD/WTO
ITES	information-technology-enabled services
ITU	International Telecommunication Union

J

JIT	just-in-time (production)
J2EE	Java 2 Platform Enterprise Edition

K

Kbps	kilobits per second

L

LAN	local area network
LMS	Learning Management System

M

M&A	mergers and acquisitions
Mbps	megabits per second
MC	music cassette
MDG	Millennium Development Goals
MIDI	Musical Instrument Digital Interface
MIT	Massachusetts Institute of Technology
MNEs	multinational enterprises
mp3	Moving Picture Expert Group - 1/2 Audio Layer 3
MUST	Malaysia University of Science and Technology

N

NGO	non-governmental organization
NRI	networked readiness index

O

OCW	Open Course Ware
ODR	online dispute resolution
OECD	Organisation for Economic Co-operation and Development
OKI	Open Knowledge Initiative
OSD	Open Source Definition
OSFS	open-source and free software
OSI	Open Source Initiative

P

PC	personal computer
PDA	personal digital assistant
p2p	peer-to-peer

R

R&D	research and development
RIAA	Recording Industry Association of America
RITI	Régime d'Incitation à l'Innovation dans les Technologies de l'Information
RNRT	Réseau National de Recherche et de Technologie
RNS	Réseau National de Santé

S

SBTC	skill-biased technological change
SCAA	Specialty Coffee Association of America

SCM	supply chain management
SCORM	Shareable Courseware Object Reference Model
SIC	standard international classification
SME	small and medium-sized enterprise
SSL	secure sockets layer (protocol)
Sup'Com	Ecole Supérieure des Communications

T

3G	third-generation (wireless technology)
TAI	technology achievement index
TCO	total cost of ownership
TLD	Top Level Domain
TNC	transnational corporation

U

UDRP	Uniform Dispute Resolution Policy (of ICANN)
UNCITRAL	United Nations Commission on International Trade Law
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNITAR	Universiti Tun Adbul Razak
USO	universal service obligation

V

VCR	video cassette recorder
VoIP	voice-over Internet protocol
VSAT	Very Small Aperture Terminal

W

Wi-Fi	wireless fidelity
WIPO	World Intellectual Property Organization
WMA	Windows Media Audio
WSIS	World Summit on the Information Society
WTO	World Trade Organization

X

XML	extensible markup language

Explanatory Notes

The term dollars ($) refers to United States dollars unless otherwise stated. The term billion means 1,000 million.

Two dots (..) indicate that the data are not available or are not separately reported.

A hyphen (-) indicates that the amount is nil or negligible.

Because of rounding, details and percentages do not necessarily add up to totals.

Overview

1. INFORMATION AND COMMUNICATION TECHNOLOGIES FOR ECONOMIC DEVELOPMENT: ISSUES FOR INTERNATIONAL DIALOGUE

A. The reach of the Internet and the growth of e-commerce

At the end of 2003, nearly 676 million people (or 11.8 per cent of the total population of the world) had access to the Internet. This represents an increase of 49.5 million people or 7.8 per cent compared with the figures at the end of 2002. Developing countries account for more than 36 per cent of all the Internet users in the world and their share in the Internet population of the world grew by nearly 50 per cent between 2000 and 2003. However, Internet users in the developing world are concentrated in a handful of countries: China, the Republic of Korea, India, Brazil and Mexico account for 61.52 per cent of them. Almost 75 per cent of the growth in the number of Internet users in the world occurred in the developing world. In spite of rapid rates of improvement in the penetration ratios of developing countries, these remain ten times lower than the average of the developed world.

The number of Internet hosts worldwide grew by 35.8 per cent between January 2003 and January 2004, reaching a total of over 233 million, which represents a doubling of the growth rate in 2002. In terms of number of websites, as of June 2004 there were over 51,635,284 websites worldwide, 26.13 per cent more than a year before. The number of websites using the secure sockets layer protocol (SSL), which supports secure transactions, grew by 56.7 per cent between April 2003 and April 2004, reaching 300,000.

A comprehensive approach to the measurement of the diffusion, uptake and effects of ICTs across the world has been undertaken by Orbicom, the Network of UNESCO Chairs in Communications. Orbicom's model is based on a conceptual framework that incorporates not only considerations concerning connectivity and e-readiness, but also

ICT-relevant skills and the use that people and companies make of them. This is reflected in a country's *Infostate*, which aggregates *Infodensity* (available stocks of ICT capital and labour, including networks and ICT skills) and *Info-use* (uptake and consumption flows of ICTs as well as their intensity of use). The application of this approach has confirmed the huge gap that separates the most ICT-advanced countries, which have attained a *Infostate* valued at 200, from the lowest-ranking group of mostly African and Asian countries, with *Infostates* as low as 5. While the international digital divide seems to be closing, this is happening only at a slow rate and for the most part in middle-ranking to countries, while those in the most difficult situation are not seeing much progress. While income levels and higher *Infostates* show a positive correlation, notable exceptions exist: countries with similar levels of gross domestic product (GDP) show very different *Infostates,* and vice versa. ICT policy choices seem therefore to make a noticeable difference.

E-commerce growth

The available data from the United States and the European Union (EU) show that while the value of online transactions is increasing, it is not increasing at the same speed as that at which businesses connect to the Internet.

In the United States, e-commerce between enterprises (B2B), which in 2002 represented almost 93 per cent of all e-commerce, accounted for 16.28 per cent of all commercial transactions between enterprises. While overall transactions between enterprises (e-commerce and non e-commerce) fell in 2002, e-commerce B2B grew at a annual rate of 6.1 per cent. As for business-to-consumer e-commerce, sales in the first quarter of 2004 amounted to 1.9 per cent of total retail sales, a proportion that is nearly twice as large as that recorded in 2001. The annual rate of growth of retail e-com-

merce in the United States in the year to the end of the first quarter of 2004 was 28.1 per cent, while the growth of total retail in the same period was only 8.8 per cent.

Internet sales in the EU totalled $86 billion in 2001. Electronic data interchange and other non-Internet sales represented were four times greater than Internet sales, bringing the total e-commerce sales in the EU to about $430 billion in 2001.

Although some developing countries have started to collect ICT indicators through their official statistical systems, the data are not always comparable across countries or with those of developed countries. This calls for collective action at the international level to coordinate the methodological work and to work towards a global database of ICT indicators. The UNCTAD secretariat has launched a new data collection exercise to compile e-business statistics from developing countries and make them available in its annual *E-Commerce and Development Report*. The results can be found in chapter 1.

B.   The dialogue about ICT-for-development: Some suggestions

The question of Internet governance

The discussions throughout the World Summit on the Information Society (WSIS) process made it clear that a majority of developing countries feel that the status quo in this matter does not serve their interests well and needs to be changed. The establishment of some sort of intergovernmental mechanism has been proposed. Concerns have been expressed, for instance, about the dominance by a small group of countries over core Internet resources. Legal mechanisms based on the enforcement of private contracts (to be carried out essentially by the national courts of one country) are not necessarily the optimal way to settle international public policy issues. Some view the Internet as a new kind international public utility in which they feel they are not playing the role that is legitimately theirs.

Once the need to respond to questions such as those outlined above is understood, it is also necessary to admit that there are not many examples of concrete policy areas in which such responses

require the development of new Internet-specific international institutions, especially from the viewpoint of economic competitiveness. In fact, given the political will to tackle the issues, existing systems of international coordination, cooperation or rule-making could be sufficient to deal with many if not most of the governance problems posed by the development of the Internet.

A crude device to categorize the public policy issues that need to be addressed and the responses that could be explored in each case could be to distinguish between the management of the Internet as a global utility and the international governance issues posed by the use which people make of that utility.

Concerning the group of issues that could fall into the second category, international governance instruments already exist or could easily be devised. The substantive character of the issue in question, rather than the fact that the Internet is the medium through which the problematic activity is conducted, should be the determining criterion as to what level of "governance" (from consensus-building and cooperation to rule-making) and what instruments should be applied.

Concerning the other group of issues, such as the management of the Domain Name System and the operation of the root server system, many developing countries are not at ease with the limited influence of Governments in the structures in which policies are developed and implemented. Reaching a common definition of the interests of the international community that must be served by the system of Internet governance, and agreement about the way in which Governments should be involved in it, probably constitutes the most important aspect of the work to be done. Although at this stage of the discussion it is too early to make concrete institutional proposals, some of the features that they should have can be distinguished.

First, for any reform proposal to be viable it must provide strong evidence that it will ensure the continued stability and quality of service of the Internet, prevent its fragmentation and maintain the "bottom-up" processes through which standards and policies have been developed so far.

Second, no one-size-fits-all solution is likely to emerge. Questions in which technological and

policy issues are particularly intertwined are likely to be best treated within a network of international frameworks of cooperation and coordination.

Third, evolution is more likely to produce results than a voluntaristic top-down approach. The current system is the result of a process that has taken place over a remarkably short time and has has not yet reached a stage of maturity that is acceptable to all its stakeholders.

Developing countries need to assess the implications of different Internet governance models, including in terms of their impact on the capacity of their economies to benefit from the adoption of e-commerce and e-business practices. A sustained capacity-building effort for Internet policy-making is also needed so that the majority of the developing countries can effectively participate in the management/governance systems that may emerge from the WSIS process.

ICT and economic development in the run-up to the next phase of the WSIS

The WSIS Plan of Action emphasizes the role of national e-strategies as key instruments for the advancement of the information society in developing countries. It also calls for action to promote development-oriented ICT applications for all, in particular the use of ICT by small and medium-sized enterprises (SMEs) to foster innovation, achieve gains in productivity, reduce transaction costs and combat poverty. The treatment of these issues in the WSIS context should contribute to the emergence of a consensus about the national policies under which, and the international environment in which, a higher degree of ICT take-up

and usage can result in faster, more equitable economic growth.

The available data show that international trade in ICT goods and services has grown in recent years at a faster rate than total international trade and that it remains robust. However, in order to extend the reach of the positive effects of ICTs on the economic growth of the majority of developing countries an enabling environment for ICTs needs to be created at the national and international levels. Promotion and facilitation of the adoption of ICTs by enterprises, and particularly by SMEs, should also play a major role in this regard.

In order to go further in its treatment of the economic aspects of the information society, the second phase of the WSIS could explore answers to such questions as the following:

- What effects, positive or negative, are ICTs having on the economic prospects of developing countries? What lessons from available experience can be applied to ICT policy-making in the areas that affect trade, enterprise development or employment?

- What strategies have proved successful in terms of enabling enterprises, especially SMEs, to become more competitive through the use of ICTs?

- How can ICTs be used to facilitate the participation of developing countries' SMEs in national and international supply chains?

- What effects will ICT-induced changes, at the level of the firm and of the whole economy, have on labour markets? What policies may facilitate equitable outcomes for these processes?

2.   E-BUSINESS AND SMALL AND MEDIUM-SIZED ENTERPRISES

The adoption of ICTs by enterprises has grown considerably over the past few years, with more and more firms connecting to the Internet. Firms use ICTs for internal automation, for example of office and production processes, for customer relations and supply chain management, or for the management of distribution and logistics networks. Internet use may range from simple web-

site presence to the complete integration of business functions. The latter, however, is a major step for SMEs in developing countries and requires management and technical skills, as well as organizational changes and investments that can often not be afforded. The Report investigates the uptake of ICTs by SMEs in developing countries on the basis of available surveys and studies. It

thus provides an overview of ICT usage and e-business in SMEs and makes suggestions for policies that could enhance the adoption of ICTs by businesses.

The Report first provides an overview of how ICTs change traditional business processes, such as marketing, sales and purchases, production and inventory control or finance and human resource management. Looking at statistical evidence from developed countries, it shows that ICT usage usually increases with the size of companies, although SMEs have been found to have the greatest potential for productivity gains through e-business. But in order to achieve these benefits, firms also need to have good managerial capacities, technical skills and innovation, which may be harder for SMEs in developing countries to afford.

An assessment of ICT usage by SMEs in developing Asia and Africa shows that, generally speaking, many firms have connected to the Internet and actively use it for communicating with suppliers and customers. This is particularly true for companies in urban areas, whereas the urban–rural digital divide excludes many SMEs located outside the major cities. Nevertheless, in many cases Internet use is limited to the owner or managers of the enterprise, and little has been done to take full advantage of the opportunities offered by the new technologies. Studies show that profitability is key to SMEs' willingness to go online. Despite the fact that several studies have demonstrated the correlation between ICT adoption and firm profitability/productivity, one of the major reasons for not using ICTs (from the viewpoint of the company owner) is the perceived limited impact on business profitability, often coupled with the argument that few suppliers and customers are online. On the other hand, if companies experience a positive impact on their business, for example an increase in the number of customers, they are willing to invest in hardware and connectivity. In other words, the readiness of SMEs to invest in ICTs is not necessarily a cost factor.

A survey of SMEs in five Latin American countries (Chile, Colombia, Costa Rica, Mexico and Venezuela) – carried out jointly by UNCTAD and FUNDES – reveals details about the use of ICTs and the Internet at the firm level. The results show that the availability of personal computers (PCs), the Internet and ICTs is high among companies located in urban areas, and there are no significant differences between small and medium-sized companies as regards basic access to and use of the Internet (such as e-mail). However, the more complex tasks, in particular automating and integrating business processes, are carried out much less frequently by SMEs. E-commerce is still rare and small companies use more e-marketplaces, whereas medium-sized companies use company websites (of third parties or their own) for selling online. Service companies are the most active users of ICTs and the Internet, followed by trade and manufacturing (the least active). This corresponds to findings in other developing regions and is partly explained by the fact that functions such as marketing and selling services online require basic Internet access and website presence, and less system integration related to, for example, supply and value chain management, as is the case in manufacturing.

The main perceived barrier to Internet uptake is very similar across companies from both developed and developing countries. Firms already using the Internet consider the lack of network security to be the key problem, followed by slow and unstable connections. Another important finding is that for many companies the main reason not to go online is not the lack of technical skills, but the fact that doing so often depends on management capacities and the overall ICT awareness of the company owner.

The Report concludes that getting access to the Internet is not a major problem for most firms – even if connections are mostly slow. Much more difficult is to fully integrate the companies' business functions using ICTs, and even more so for SMEs in developing countries. The surveys also confirm that there is a certain evolution over time that all companies will go through when adopting ICTs. For SMEs, it is relatively easy to start using PCs, then connect to the Internet using e-mail, and thereafter set up a web page. However, introducing the Internet into their business activities (internal or external, including e-commerce) does not follow straight away and larger companies are more likely to automate their business processes (and to do so earlier) than smaller companies.

One explanation is that most SMEs have no defined e-business strategy. Putting in place more complex e-business systems, intranets or extranets, and linking up with suppliers' and customers' computer systems, both require not only technical know-how but also a solid analysis of the costs and benefits implied by the necessary investments,

and convincing arguments in favour of them. On the other hand, SMEs have the advantage of implementing strategic and organizational changes much more quickly (and at lower cost) than large companies. This flexibility should provide them with a competitive edge when it comes to the adoption of e-business.

The Report points to a few areas for policy-making. First, SMEs need access to reliable, low-cost connections, where dial-up services are often sufficient. Therefore, and to bridge the urban–rural divide, the emphasis should be on providing universal good-quality basic access. Naturally, this should be followed by high-speed connections to allow companies to move towards full integration of e-business. Second, trust in a legal and regulatory environment supportive of the Internet economy is essential if companies are to engage in e-business.

Third, if SMEs are to make the leap from simple (and low-cost) Internet use, such as e-mail and web search, to building e-business systems fully integrated with those of their customers and suppliers, additional investments are required, as well as the necessary technical and managerial skills to plan and successfully implement an e-business strategy. These are clearly areas where public and private agencies can play a crucial role in support of SMEs.

Finally, the review of the e-business surveys showed how difficult it is to make cross-country comparisons, even on such simple indicators as Internet and e-mail use or web site presence in companies, given the available data and statistics. In order to have a comparable and representative picture of ICT readiness and use, the continuous collection of data through official statistical sources is required.

3. CREATIVE INDUSTRIES AND DIGITAL AND INTERNET TECHNOLOGIES: THE CASE OF MUSIC

Music-making is a talent-based and laborious activity. Developed countries used to have advantages in technology, but the general progress in computing and the Internet is rapidly eliminating any difference. Developing countries need to look to using technologies to promote and popularize their musical capacities and seek earnings from performance. The global entertainment sector has recently been more concerned about restricting illicit use of copyrighted content, and thus may provide only marginally relevant guidance for artists and industry in developing countries.

Digital and Internet technologies and music are a near-perfect match. Music has escaped from its guardians – the recording and publishing companies – and is being freely exchanged and experienced on the Internet's peer-to-peer (p2p) networks. The music industry has recognized that the advance of broadband Internet and p2p technologies is foundational, and is reacting to contain possible damage until developments play out with greater clarity. Positions and arguments have become polarized. The music industry claims that, physical piracy aside, file sharing is hurting sales and, it follows, songwriters' and musicians' earnings – as well as their own corporate profits. Academia, consumer rights groups, and liberal

advocacy groups have frequently claimed the contrary, but often accept that file sharing of copyrighted content is plainly illegal.

Nonetheless, the entertainment industry has successfully argued for an increase in the strength of copyright legislation and enforcement with Governments and international organizations. In the meantime, it is seeking to develop a for-pay alternative to illegal p2p downloading. With one minor exception, none of these portals are p2p and therefore may not be universally accepted by consumers. Their popularity will be inversely related to the strength and diversity of the copy-protection technologies used and the variety of proprietary file standards. The creative and business power of the Internet will be greatly advanced when artists, industry and audiences discover how to commercialize p2p file sharing. Solutions were found in the past for other problematic technologies: FM radio, cassette tapes and videotape recorders. However, as current developments show, the large music companies are unlikely to set the pace, particularly since they are still recovering from the Internet bubble. This leaves the field wide open for technology companies that may not experience unmanageable levels of anxiety from the threat of technological change.

The opportunities offered by technology require a change in the business model of artists and industry alike. Changing business models is in itself a risky business. But the music industry is no stranger to risk taking. Indeed, only 5 to 10 per cent of its releases achieve profitability, albeit enormous. From the artists' perspective, digital and Internet technologies offer the opportunity of greater independence and artistic control. First, the Internet provides access to information on the commercial mechanics of the mainstream music business, allowing artists to assess what revenue mix (recording, song writing, performing, etc.) and accordingly, what investments, will maximize their income for a given degree of artistic and commercial freedom. Secondly, the capacities of modern digital recording and production technologies are ground-breaking: the ability of the Internet to introduce artists to an audience, distribute their music and provide a conduit for a more personal relationship has no historical parallel. From an audience perspective, even though modern law allows audiences only to "use" published or recorded music, most listeners experience a cognitive and emotional appropriation of a given composition: thus sharing music online may, mistakenly, not seem to be a breach of licence or property. In any case, it is rarely a breach of musicians' properties: the record companies or publishers typically acquire the copyrights from artists in return for expected royalties. While reimbursing publishing royalties is not an uncommon event, recording royalties are a less steady revenue stream.

Developed-country music markets are in their mature phase, and future growth will depend on convincing audiences to part with leisure time dedicated to other activities such as Internet browsing, watching films on DVD or playing computer games – a difficult proposition at best. Therefore, large developing-country music markets that have growth potential will continue to attract the interest of the "majors" provided that they can establish or improve and maintain work-able copyright environments. The international music industry will continue to lobby for eliminating any perceived trade restrictions on the import of cultural goods and services. At the same time, developing nations need to re-examine GATS support for "mode four" delivery of services through the movement of natural persons in order to improve conditions for travel their artists by when the latter are pursuing performance income.

Developing countries with large national and diaspora markets, such as Brazil, India and China, will improve their grasp of technology and will undoubtedly succeed in increasing international sales of CDs as well as venture into online for-pay downloading. The artistic and cultural communities need to fully appreciate the commercial details of the industry at an international level in order to optimize their revenue mix (recording, composing, performing). The essential question will be one of scaling costs to activities and choosing the appropriate technologies. Ambitions need to be given a realistic dimension, if being understood that the bulk of major releases do not achieve profitability. Given the statistical improbability of major earnings from recording, artists may be motivated to develop online activities more fully, assisting audiences' discovery of their talent and thus generating improved revenues in concert performance or by composing for other musicians. Because both traditional copyrights and liberal open-source licences require legislation and protection, developing countries need to have in place a legal framework and collecting agencies. This will also enable the development of strong national markets and interaction and business with the international entertainment industry. However, artists should not shy away from exploring open licensing under the impression that it means giving away work and music for free. The spectrum of choice is large, while the type of contracts offered by the "majors" to the select few and the give-away of the public domain are but two extreme variants.

4.   ONLINE HIGHER EDUCATION: ISSUES FOR DEVELOPING COUNTRIES

Online higher education, which involves the dissemination of, access to, and exploitation of higher education, including research, via the Internet, is being explored and promoted as a strategy to provide further access to education and technology for national and international students. It is also being used to promote ICT skills, provide additional revenues (or extra funding resources) and enhance the competitiveness of institutions and individuals, at both the national and the international level.

For example, in India students are able to obtain via the Internet a bachelor's degree in information technology (IT) from the Indira Gandhi Open University (IGNOU). IGNOU is building on its existing structure as a distance education provider. With a $200,000 budget it is providing online education to 10,000 students, with some content developed in-house and other bought from a provider in the United Kingdom.

The Report studies the impact and potential benefits of online higher education in developing countries by analysing the effect that the Internet is having on higher education and the international market in educational services. It provides an overview of current initiatives and indicates some of the key issues for assessing whether online higher education is a sound proposition for students, institutions, enterprises and Governments in developing countries, and if so, in what circumstances.

The current online higher education market is still small (compared with traditional face-to-face education) and fragmented (with multiple providers and self-developers providing flexibility, innovation and plurality but also some confusion). It is more established in developed countries, where a strong education system, a competitive market and ICT infrastructure are in place. These countries are also the major exporters of higher education services. In developing countries, the Internet is being progressively introduced into higher education catering mainly for those able to afford it. Online programs are concentrated in the most popular and marketable subject areas (business management, ICTs, and education) and the large majority are in English.

There are programmes like that of IGNOU around the globe – on small islands in the Pacific, in Africa, in South America and elsewhere. Online higher education initiatives emerge in different shapes and forms, from complete new virtual universities to traditional institutions incorporating the Internet to complement their services. The Report identifies five models of online higher education in developed and developing countries, which clearly arise from particular economic, educational and political contexts as well as from the particular needs and capacities that institutions have to provide innovative and progressive mechanisms for using the Internet. The strategies for adopting online higher education available to educational institutions in developing countries include customizing programmes to the local context, building on existing market presence or developing regional leadership, and/or options that exploit the experience of other institutions, such as partnerships in the provision of content and technology or in the recognition of diplomas.

Investment in online higher education whether by students, institutions or national Governments needs to be measured against other priorities and needs. The Report shows how the economic rationale to invest in online higher education is based not only on possible economies of scale, but also on the urgent need to find new funding sources, the potential efficiencies generated by specialization and "modularization" as well as new business models, and the pressure to compete with other providers.

The Internet amplifies current educational trends, including the increasing use of private–public partnerships and the involvement of private companies in education and the internationalization of higher education. It also allows the unbundling of education services, thus increasing the specialization of the different providers (who include teachers, IT providers, media and content creators, and institutional managers). More importantly, the Internet is calling into question current business models and is providing further options for accessing and using content and software, networking internationally and customizing and reusing

higher education services. In particular, it is questioning current models of academic research and publishing and current legal frameworks and practices in terms of quality assurance, accreditation and recognition measures as well as in terms of intellectual property rights.

Governments have an important responsibility to overcome financial, technological and development hurdles and promote the development of an educated population. They play a key role in maximizing the potential of online higher education initiatives, and particularly in ensuring that such initiatives narrow rather than increase digital divides and support local needs and culture. Suggestions in this connection include the following: creating awareness and encouraging collaboration and dialogue among different stakeholders; fostering a culture of learning; promoting coherence between educational and ICT strategies; supporting the use of open technology and open content

in higher education; providing incentives for investing in e-learning and online higher education so that educational goals are maximized; developing transparent quality assurance, accreditation and recognition measures; and monitoring and measuring economic, educational and social benefits and costs.

In conclusion, whether or not online higher education is a sound option for developing countries depends rather than on potential financial opportunities and on the overall capacity to meet specific educational and developmental goals. Governments' actions can contribute to making online higher education a sound proposition by creating an educational and policy environment that enables the expansion of higher education to previously excluded students, encourages relevant and appropriate learning content and processes, promotes innovation and investment in education, and recognizes students' needs and efforts.

5. E-GOVERNMENT: E-PROCUREMENT AND DEVELOPING E-BUSINESS CAPACITY

ICTs, and particularly the Internet, create the possibility of reorganizing and networking government services to make them more efficient, transparent and user-friendly. One important way in which these potential benefits can be realized is through e-procurement, by which government organizations use the Internet to procure/purchase goods and services from the private sector, advertise their needs, select vendors, manage service and fulfilment of contracts, and effect payments.

There are incomplete statistical data on the e-procurement market worldwide, although it can be generally stated that government is usually the largest purchaser in an economy and that the value of the market is of significant importance to national economies. For example, estimates of the ratio of total procurement for all levels of government in OECD countries were at almost 20 per cent of 1998 national GDP ($4.7 trillion), and at approximately 14 per cent ($816 billion) for non-OECD countries.

Although there are tangible benefits to e-procurement in the reduction of prices and process costs, the achievable return on investment of e-procurement projects remains hard to assess. Early corpo-

rate adopters of e-procurement claimed savings of between 8 and 15 per cent and returns on investment in under a year. However, once strategic sourcing starts to mature and is factored in, cost savings are reduced. Users of e-procurement systems could maximize short-term benefits by limiting initial deployment, and focusing on smaller categories first (e.g. office supplies) and on helping suppliers by, for example, offering payment upon receipt of advice of shipment.

Other benefits of e-procurement are in the areas of governance and administration. With respect to governance, e-procurement facilitates the implementation of transparent public decision-making and is a deterrent to lack of compliance and corruption. In terms of administrative processes, it may reduce bureaucracy (including overheads, or money spent on administration of services rather than their delivery) and save expense and time. E-procurement will also impact on the level of ICT skills among all system users.

Efficient online transactions with government agencies can also act as incentives for businesses of all sizes to adopt ICTs and e-business practices. In

fact, an e-procurement strategy should explicitly promote the use of the Internet and e-business systems among potential suppliers.

Success in the implementation of public e-procurement tends to result from broad consultation with representatives of government agencies and the private sector. A key objective of a strategy for all countries is to ensure that e-procurement is approached consistently across all spheres of government and that costs to suppliers are minimized. Furthermore, the process of developing an e-procurement strategy should go through a series of phases, each of which requires careful consideration. The process starts with the definition of the goals and vision of the project, followed by analysis and reform of the regulatory framework, analysis of existing processes, their re-engineering, the choice of a solution and platform, and the formulation and implementation of a plan, including the allocation and management of adequate resources, the training of human resources and often the empowering of lower-level management to take decisions.

An initial e-procurement strategy for a developing country does not necessarily entail a comprehensive e-procurement solution, such as an electronic tendering system, an electronic market place for the procurement of goods and services online, or a government website that provides a single point of entry to all government business opportunities. The implementation of e-procurement may begin with a single improvement, such as posting online updated tender information.

Any e-procurement system will require a high level of interoperability to ensure that no potential bidder is excluded because it does not use the same computer systems and applications as the Government. This can be enhanced by the use of open technologies. Also, free and open source software (FOSS) does not require suppliers to adapt their data to a proprietary format or convert them into such a format, such a requirement potentially increasing the costs of suppliers and constituting a barrier to smaller companies. In addition, the use of FOSS may encourage ICT spending with local companies and support local SMEs in the ICT sector. FOSS is also easily adaptable to local languages.

Nevertheless, proprietary e-procurement solutions remain an option for Governments. Agreements with vendors of proprietary solutions may provide them with a simplified way of ordering and acquiring products and licences; at the same time they would be able to track software licence acquisitions through online order confirmations and summaries. For a Government, acquiring original, proprietary software and licences allows it to benefit from the vendor's advice and latest technology.

The cost of commercially available e-procurement solutions will depend on whether they involve applications that are focused on sourcing activities (e.g. bidding, supplier registration, tender management) and/or purchasing activities (e.g. electronic invoicing and payments), or both. When an e-procurement solution is being created, the costs incurred by the following will have to be considered: licensing (software costs are believed to be only 10 per cent of the overall project costs), external and internal resources, implementation and maintenance, integration into existing resource planning solutions, process design, configuration and customization, training and communication, internal systems and bandwidth, software upgrades and reorganization costs. From an infrastructure point of view, however, e-procurement solutions can be stand-alone, with no more than a data interface with back-office systems. This is often seen as an interim solution until all resource planning platforms are integrated, such integration providing the greatest transaction cost benefits.

An option for financing the implementation of e-procurement is a build-operate-transfer (BOT) scheme, such as the one adopted by the Government of Malaysia in order to set up its e-procurement system, e-Perolehan. E-Perolehan was financed through a BOT scheme involving an e-commerce joint venture company consisting of Puncak Semangat Sdn. Bhd. and NTT Data Corporation, which undertook the total financing of the project in exchange for exclusive service operator rights in respect of the Malaysian supplier community. The value of transactions by the end of 2004 is estimated to reach 1 billion Malaysian ringgit ($260 million), with expected growth as adoption of the system expands. The average cost per transaction has been reduced from $250 to an average of $17.

E-procurement systems are best used for the purchase of those goods and services that are needed by all departments across an organization. These are typically commodities and include office supplies,

computers and related equipment, maintenance services, and facilities such as meeting rooms and travel. Those things required for the operations of specific departments – civil engineering services for the construction of a new road, for example – are more specific and specialized, and cannot benefit from the economies of scale that an e-procurement system requires in order to justify its cost.

Governments in developing countries must be aware that e-procurement does not necessarily mean a comprehensive e-procurement solution, but rather could entail cost-effective process improvements that steer a government department in the direction of e-procurement and are tailored to the available resources. For example, orders can be placed by e-mail, or via an integrated online order management system that extends across the length and breadth of the supply chain.

In order to classify the suitability of any e-procurement strategies, developing countries may need to consider more than the efficiency benefits, carefully evaluating the level of public and private sector e-readiness and the relevance of partial or fully integrated e-procurement to their own e-government and business development strategies.

On the one hand, it can be argued that there is little use in proposing e-procurement in countries where only certain suppliers will be in a position to take advantage of it, and where SMEs may be excluded from the public procurement market (offline and online). On the other hand, e-procurement can lead to the development of ICT and transactional capabilities in government that can be applied to other areas, as well as in the business community. Transitional measures can be adopted so that local suppliers that initially may not be able to access e-procurement systems are not excluded.

In any case, developing countries should bear in mind that the adoption of e-procurement can be a scalable process that will limit the waste of limited resources and allow users to gradually build up the relevant capabilities. To maximize initial adoption, projects should target first those agencies and suppliers that will have immediate use for e-procurement, enlisting their support and addressing the concerns of government workers whose role might change as a result of innovation. This is applicable to any e-government project.

Return on investment will be achieved over time in terms of cost savings and increased revenue. In the context of their e-government strategies and regardless of transactional capabilities, developing countries that have not already explored e-procurement could envisage the enhancement of G2B interaction by posting tender information and forms online, and promoting awareness within the business community and the registration of potential suppliers. A portal for transactional services can be a longer-term goal that will result from a general process reform that will entail consolidating and streamlining public procurement and related government processes, and enhancing their transparency.

6.   PROTECTING COMPETITIVENESS IN THE ICT SECTOR: THE CASE OF TUNISIA

The Report examines laws and regulatory regimes designed to control the use and abuse of personal data – that is, data that directly or indirectly identify the individual. In an information economy, particularly as manifested on the Internet and in electronic commerce, personal data have become an increasing by valuable asset. As a consequence, many developed nations have adopted laws and rules to control the use of such data, generally referred to as data protection laws. Different jurisdictions have chosen various approaches to the problem of data protection, and this has posed problems of coordination, especially in case of transborder flows of data. Privacy laws governing the processing of personal data are particularly comprehensive in Europe. In most European jurisdictions it is prohibited to transfer data to another jurisdiction that does not provide adequate protection. The "adequacy provision" could affect countries without such protection in their business with European countries. Developing countries wanting to participate in the global information economy and thereby facilitate the free flow of information from developed to developing countries therefore have to consider the need for similar laws and rules to protect an individual's private life.

The Report examines the types of personal data that are disclosed through our Internet-related activities, as well as through the use of the Internet by others to make available information concerning us. Such data are categorized as those that we consent to others collecting and using (consensual data) and those that are incidental to our activities, and are obtained with neither our knowledge nor consent (non-consensual data). Another category that receives special treatment in most legislations but whose borders vary according to the different traditions is that of sensitive data.

Privacy principles, or fair information processing principles, have been developed by various international organizations to protect an individual's right to privacy with regard to his/her personal data, and these are highlighted in the Report. There is general international agreement about the issues that should be addressed, including the process of collection, use and disclosure to others. The advantage of a principles-based approach to the regulation of data protection is the avoidance of technological redundancy, whether concerning mainframe computer systems or the Internet.

While there is general consensus concerning the principles underpinning data protection laws, the Report examines three different approaches to regulation of the issue: comprehensive, sectoral and self-regulatory or co-regulatory. The first of these involves the establishment of a regulatory authority to oversee compliance with the data protection regime and operate as a surrogate for individuals in the enforcement of their rights. The sectoral approach involves the adoption of rules addressing the specific concerns of an industry or trade practice, and is most often found in the banking and financial services sector, as well as among professionals such as doctors and lawyers. Self-regulation or co-regulation looks to those that collect and process personal data to adopt and comply with the data protection principles.

All three regulatory approaches address the issue of transborder data flows, and the ease with which information, including personal data, can be transferred across national borders, thereby potentially circumventing or avoiding the regulatory regime within which the personal data were originally obtained. Controls on the transborder flow of personal data from developed countries may act as a barrier to trade with developing countries. The Report examines the different legal mechanisms that may be used to avoid such barriers: adequate or comparable control regimes, contracts or "safe harbour" arrangements.

A survey of member States was carried out. It revealed a lack of understanding of the nature and importance of data protection regimes and a consequent need for educational initiatives to help developing countries address this problem.

Finally, certain policy recommendations are made in the Report concerning such matters as the regulatory costs involved for both the public and the private sector, and how to minimize them through sectoral and self-regulatory mechanisms, as well as through cooperation with regional trading partners.

7.   ASSESSING COMPETITIVENESS IN THE ICT SECTOR: THE CASE OF TUNISIA

According to recently published economic indices, Tunisia occupies a leading position among developing countries with respect to its development of ICTs and competitiveness. This in part reflects the efforts made by the Tunisian Government to implement ICT policies on infrastructure, institutions, legislation and education, and to create a supportive environment for the adoption of ICTs. As host to the second phase of the World Summit on the Information Society, the Government is determined to develop Tunisia into a knowledge-based society.

Most dependent on the ICT environment is the ICT sector itself. In Tunisia, the sector has been growing rapidly during the past five years, in particular software and IT services. In recognition of the important role that the sector plays in driving the country's technological development, one of the Government's priorities has been to develop a

strong and competitive ICT sector. The Report presents an analysis of the Tunisian ICT sector and identifies links between ICT policy measures, the national and international business environment, corporate strategies and enterprise performance. It also examines the extent to which national ICT policies enable ICT companies to enhance their competitiveness, particularly in foreign markets.

The analysis follows Porter's competitiveness diamond model and describes demand and factor conditions, related and supporting industries and firm structure and strategy, so as to determine the specific business environment the ICT sector is facing. It also critically evaluates the national ICT strategy, in particular with respect to ICT infrastructure, business development support and IT skills and education. The report finds that Internet usage is still fairly low in the country, despite efforts by the Government to improve access. While the supply of highly skilled labour in ICT-related fields is growing, overall adult literacy rates are still low. These are important areas for policy action to advance the Tunisian information society.

On the basis of a survey of IT service companies, the report concludes that companies need to prepare to take an important step, namely the leap from opportunity to strategy. This is particularly the case for firms planning to expand their export businesses. The survey reveals that for companies to keep their competitive advantages, they need to define clear strategies and carry them out successfully. Strategies have to reflect the firms' target markets. For example, companies focusing on the regional market (mainly the Arab region and Africa) need to develop competitive advantages based on firm-specific resources and their proximate business environment. Basic factor advantages, such as low labour cost, do not apply in the regional market, whereas cultural proximity is important. By contrast, firms focusing on export markets (for example, Western Europe) need to develop basic factor advantages and meet higher technological requirements, whereas cultural proximity is less critical.

The Report also suggests that the solutions and services offered by the firms are too widespread and that greater specialization could help increase the productivity of companies and hence their competitiveness. Companies entering the regional market or markets in developing countries should focus more on the value added of their products and services, whereas firms focusing on the European or North American market should take advantage of basic factor conditions available in Tunisia (such as low wages).

As far as the enabling business environment is concerned, and the success of government policies to promote the sector, the Report suggests that more needs to be done to address the particular needs of firms in the ICT sector. This includes the adoption of policies related to enhancing the ICT infrastructure, in particular as regards access, pricing and local content, and providing finance, skills and education, not only in IT-related fields, but also in project management and business development.

Chapter 1

INFORMATION AND COMMUNICATION TECHNOLOGIES FOR ECONOMIC DEVELOPMENT: ISSUES FOR INTERNATIONAL DIALOGUE

In line with the practice of the previous editions of the *E-Commerce and Development Report*, the purpose of this introductory chapter is to provide some background and context to the analysis contained in the chapters that follow, by describing some general facts and trends in the area of information and communication technologies (ICTs) and its application to economic activity that shape the environment in which the developments addressed by the Report take place.

In order to do so, this chapter will update the information on the conditions prevailing for the adoption of ICTs in developing countries and consider some of the processes through which policies addressing the ICT-related needs of developing countries can be conceived and carried out, particularly as the international community takes action to implement the action plan adopted at the first phase of the World Summit on the Information Society (WSIS), held in Geneva in December 2003. Accordingly, this chapter has two separate parts: the first one presents information, mainly of a quantitative nature, about the recent evolution of the basics facts of Internet access and its commercial applications; the second one deals with issues linked with the ICT-for-development debate, as seen from UNCTAD's perspective.

The member States of UNCTAD have mandated the organization to "contribute to the implementation of the WSIS Declaration of Principles and Plan of Action in the area of UNCTAD's competence, including as regards key development aspects of issues pending from the first phase of WSIS and in preparation for the second phase scheduled in Tunis in 2005".[1] Among the issues that were discussed more intensively all through the WSIS process but were left pending for further work following the conclusion of its first phase, the questions of the governance arrangements that should be applicable to the Internet and the

financing of ICTs for development have attracted particular attention across the whole spectrum of actors involved in the process. In accordance with the mandate received from UNCTAD XI, this chapter therefore presents some preliminary thoughts of the secretariat concerning the issue of Internet governance from the point of view of maximizing the benefits for the economies of developing countries. It also formulates some more general proposals as to how the broader questions concerning the economic aspects of the information society could be addressed by the second phase of the WSIS, to be held in Tunis in 2005.

A. The reach of the Internet and the growth of e-commerce

1. How the net is spreading

At the end of 2003, nearly 676 million people (or 11.8 per cent of the total population of the world) had access to the Internet, according to estimates by the International Telecommunication Union (ITU).[2] This represents an increase of 49.5 million people or 7.8 per cent compared with the figures at the end of 2002. Although the 2003 figures were only partially available when this chapter was being drafted, there are signs that the growth of the world's "Internet population" is slowing down – most of those who want to have Internet access in the developed world, and many of those who can afford it in developing countries, are now connected. However, the existence of a large potential demand in developing countries will ensure the addition of large numbers of new users to the global Internet in the short and medium terms. Table 1.1 shows the growth in the number of Internet users in the world for the period 2000–2003.

Table 1.1

Internet users worldwide (thousands), 2000–2003

	2003	2002	2001	2000
Thousands	675 678	626 579	495 886	387 532
% change	7.84	26.36	27.96	..

Source: ITU (2004).

From the point of view of the relative positions of developed and developing countries, the situation has continued to move towards a growing presence of developing countries on the Internet, although this remains largely concentrated in a relatively small number of nations. Five countries (China, Republic of Korea, India, Brazil and Mexico) account for 61.52 per cent of all Internet users in the developing world. At the end of 2003, almost three out of four Internet users in developing countries lived in the developing countries of Asia, as did two thirds of all the new Internet users in the world. Table 1.2 shows the distribution of Internet users between the developed and the developing countries and the recent evolution of the number of Internet users by region.

Bearing in mind the fact that the data for 2003 are still incomplete, it should be noted that much (74.8 per cent) of the recorded growth in the number of Internet users in the world occurred in the developing world, and that the rate of growth of its Internet population (17.5 per cent) is eight and a half times higher than that of developed countries. Thus, according to ITU estimates, at the end of 2003 developing countries accounted for more than 36 per cent of all the Internet users in the world, and the share of developing countries in the Internet population of the world grew by nearly 50 per cent between 2000 and 2003 (see chart 1.1).

More detailed information is provided for a number of individual countries in table 1.3. The countries listed there have been selected on the basis of either their demographic and economic weight in their respective regions or of their above-average performance.

Table 1.2

Internet users by region, 2000–2003 (thousands)

	2003	%Growth	2002	%Growth	2001	% Growth	2000
Africa	12 123	21.38	9 988	63	6 119	34	4 559
Asia	243 406	15.25	211 202	40	150 535	38	109 257
Europe	188 997	7.24	176 232	23	143 584	30	110 824
Latin America and Caribbean	44 217	4.19	42 439	45	29 224	65	17 673
North America (2002)	175 110	0.00	175 110	12	156 823	14	136 971
Oceania	11 825	1.88	11 607	21	9 601	16	8 248
Developed countries	396 754	2.06	388 746	15	339 427	19	285 480
Developing countries	246 290	17.53	209 556	50	139 317	48	94 352
Others	32 634	15.41	28 277	65	17 142	123	7 700
Total	675 678	7.84	626 579	26.36	495 886	27.96	387 532

Source: ITU (2004) data and UNCTAD calculations.

Chart 1.1

Internet users in developed and developing countries, 2000 and 2003
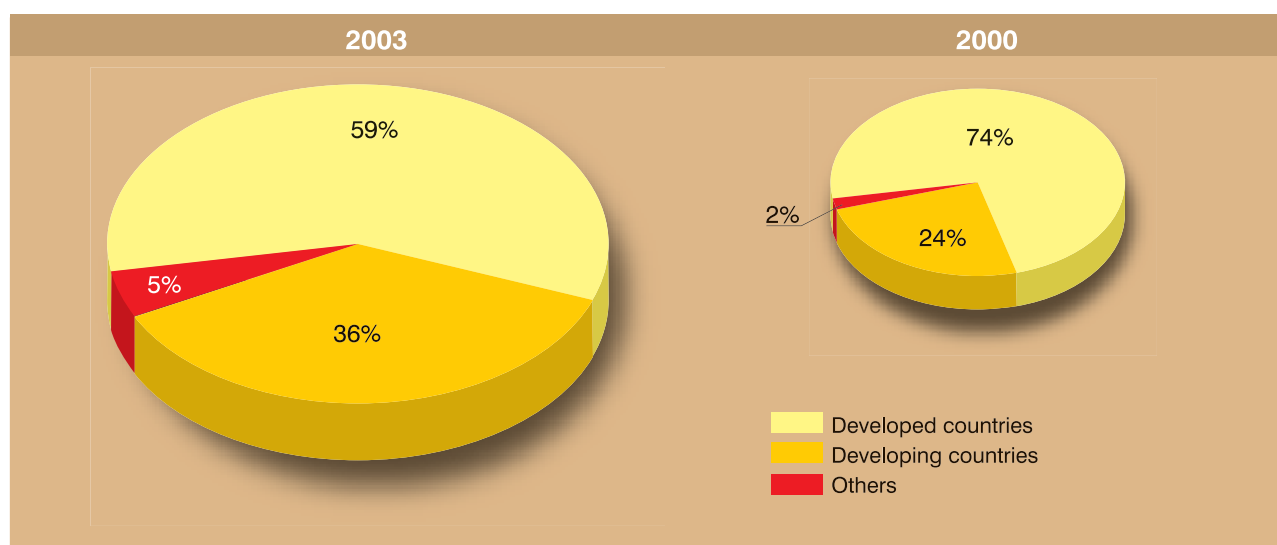
Source: ITU (2004) data and UNCTAD calculations.

Table 1.3

Internet users in selected economies *(thousands)*

	2003	2002	2001	2000	Change 2003–2002	Change 2003–2000	% change 2003–2002	% change 2003–2000
Africa	**12 123**	**9 988**	**6 119**	**4 559**	**2 134**	**7 564**	**21.37**	**165.92**
Algeria*	500	500	200	150	..	350	..	233.33
Egypt	2 700	1 900	600	450	800	2 250	42.11	500.00
Kenya*	400	400	200	200	..	200	..	100.00
Morocco	800	700	400	200	100	600	14.29	300.00
Nigeria	750	420	115	80	330	670	78.57	837.50
South Africa*	3 100	3 100	2 890	2 400	..	700	..	29.17
Togo	210	200	150	100	10	110	5.00	110.00
Tunisia	630	506	410	250	125	380	24.63	152.00
Zimbabwe*	500	500	100	50	..	450	..	900.00
Others**	2 533	1 763	1 054	679	770	1 854	43.70	273.21
Latin America & Caribbean	**44 217**	**42 439**	**29 224**	**17 673**	**1 778**	**26 544**	**4.19**	**150.20**
Argentina*	4 100	4 100	3 650	2 600	..	1 500	..	57.69
Brazil*	14 300	14 300	8 000	5 000	..	9 300	..	186.00
Chile*	3 576	3 576	3 102	2 537	..	1 038	..	40.92
Colombia	2 732	2 000	1 154	878	732	1 854	36.61	211.18
Mexico*	10 033	10 033	7 410	2 712	..	7 321	..	269.89
Peru	2 850	2 400	2 000	800	450	2 050	18.75	256.25
Venezuela*	1 274	1 274	1 153	820	..	454	..	55.41
Others***	5 352	4 756	2 756	2 325	596	3 027	12.53	130.17
North America*	**175 110**	**175 110**	**156 823**	**136 971**	**..**	**38 139**	**..**	**27.84**
United States*	159 000	159 000	142 823	124 000	..	35 000	..	28.23
Canada*	16 110	16 110	14 000	12 971	..	3 139	..	24.20

Table 1.3 (continued)

	2003	2002	2001	2000	Change 2003–2002	Change 2003–2000	% change 2003–2002	% change 2003–2000
Asia	**243 406**	**211 202**	**150 535**	**109 257**	**32 204**	**134 149**	**15.25**	**122.78**
China	79 500	59 100	33 700	22 500	20 400	57 000	34.52	253.33
Hong Kong (China)	3 213	2 919	2 601	1 855	294	1 358	10.07	73.18
India	18 481	16 580	7 000	5 500	1 901	12 981	11.47	236.02
Indonesia*	8 000	8 000	4 000	2 000	..	6 000	..	300.00
Israel*	2 000	2 000	1 800	1 270	..	730	..	57.48
Japan*	57 200	57 200	48 900	38 000	..	19 200	..	50.53
Korea, Rep. of	29 220	26 270	24 380	19 040	2 950	10 180	11.23	53.47
Malaysia	8 692	7 841	6 347	4 000	852	4 692	10.86	117.30
Philippines*	3 500	3 500	2 000	1 540	..	1 960	..	127.27
Singapore*	2 100	2 100	1 700	1 300	..	800	..	61.54
Taiwan P. of China	8 830	8 590	7 820	6 260	240	2 570	2.79	41.05
Thailand	6 031	4 800	3 536	2 300	1 231	3 731	25.65	162.23
Others**	16 639	12 302	6 751	3 692	4 337	12 947	35.25	350.71
Europe	**188 997**	**176 232**	**143 584**	**110 824**	**12 764**	**78 172**	**7.24**	**70.54**
France	21 900	18 716	15 653	8 460	3 184	13 440	17.01	158.87
Germany	39 000	36 000	31 000	24 800	3 000	14 200	8.33	57.26
Italy	18 500	19 900	15 600	13 200	-1 400	5 300	-7.04	40.15
Netherlands	8 500	8 200	7 900	7 000	300	1 500	3.66	21.43
Poland	8 970	8 880	3 800	2 800	90	6 170	1.01	220.36
Russian Federation*	6 000	6 000	4 300	2 900	..	3 100	..	106.90
Spain	9 789	7 856	7 388	5 486	1 933	4 303	24.61	78.44
Sweden*	5 125	5 125	4 600	4 048	..	1 077	..	26.61
Turkey	5 500	4 900	4 000	2 000	600	3 500	12.24	175.00
United Kingdom*	25 000	25 000	19 800	15 800	..	9 200	..	58.23
Others**	40 713	35 655	29 543	24 330	5 057	16 382	14.18	67.33
					0	0		
Oceania	**11 825**	**11 607**	**9 601**	**8 248**	**218**	**3 577**	**1.87**	**43.37**
Australia*	9 472	9 472	7 700	6 600	..	2 872	..	43.52
New Zealand	2 110	1 908	1 762	1 515	202	595	10.59	39.27
Others**	243	227	139	133	16	110	6.86	83.12

Source: ITU (2004) and UNCTAD calculations.

* 2002.

** Includes countries reporting data for 2003 and 2002.

*** Includes countries reporting data for 2003, 2002 and 2001.

These data indicate that in demographic terms the presence on the Internet of the developing countries as a whole is already large enough to represent a significant factor in the development of global, ICT-based social and economic exchanges. The picture looks less impressive, however, when relative magnitudes are considered. The low figures for Internet penetration (number of users as a share of the total population) indicate that the depth of penetration of ICTs into the social fabric remains, in most of them, far more limited than in industrialized nations. In spite of rapid rates of improvement in the penetration ratios of developing countries, these are ten times lower than the average of the developed world. Table 1.4 and chart 1.2 summarize information in this regard. Table 1.5 provides information for a number of selected countries, including countries that are not included in table 1.3 because of their small size but which have achieved penetration rates above the average of their region.

Table 1.4

Internet users per 10,000 people by region, 2002–2003

	2003	2002	% change
Africa	148	124	19.62
Asia	674	584	15.40
Europe	2 373	2 212	7.29
Latin America & Caribbean	832	808	2.97
North America*	5 476	5 476	..
Oceania	3 764	3 705	1.60
Developed countries	4 495	4 474	0.48
Developing countries	501	429	16.78
Others	1 000	837	19.50
World	1 108	1 028	7.77

Source: ITU (2004) and UNCTAD calculations.
*2002.

In addition to this demographic approach, another way to look at the growth of the Internet is to consider the evolution of the number of hosts that are connected to it. According to a survey sponsored by the Internet Systems Consortium and produced by Network Wizards, the number of Internet hosts worldwide grew by 35.8 per cent between January 2003 and January 2004, reaching a total of over 233 million.[3] This rate of growth is more than twice as rapid as that observed in 2002 and is similar to that of 2001 (see chart 1.3 for details of the growth over recent years).

Because the majority of existing hosts belong to generic top level domains (TLDs) such as .net or .com, which cannot be linked to a specific geograph-ical location, and because even hosts using country code TLDs (ccTLDs), for example .ad for Andorra or .zw for Zimbabwe, are not necessarily located physically in the corresponding country,[4] it is difficult to draw conclusions about the ranking and performance of countries in terms of their absolute and relative number of hosts. However, it is possible to detect some trends in terms of the growth in the use of particular ccTLDs that could be indicative of the attractiveness of a particular TLD. Such attractiveness may, at least in part, be indicative of the prevailing conditions for the spread of the Internet in the territory in question, although of course the regulatory and commercial environment under which a particular generic or country code TLD operates may be equally or even more significant.

Chart 1.2

Internet users per 10,000 people, 2003

Source: ITU (2004) data and UNCTAD calculations.

Chart 1.3

Internet hosts, 2000–2004
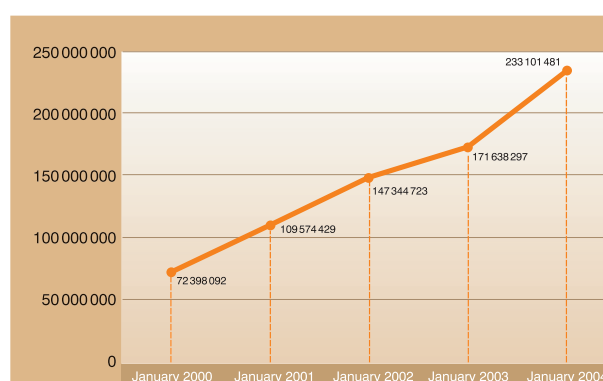
Source: Internet Systems Consortium (2004).

Table 1.5

Internet users per 10,000 people, selected economies, 2001–2003

	2003	2002	2001
Africa**	**148**	**124**	**78**
Algeria*	160	160	65
Botswana*	349	349	297
Cape Verde	444	355	271
Egypt	393	282	93
Gabon	262	192	135
Gambia*	188	188	139
Kenya*	127	160	64
Lybian Arab Jamahiriya	289	225	36
Mauritius	1 229	1 033	883
Morocco	266	236	137
Namibia	338	267	246
Nigeria	61	35	10
Sao Tome & Principe	987	728	600
Senegal	217	104	102
Seychelles*	1 452	1 452	1 099
South Africa*	682	682	649
Swaziland	259	194	137
Togo	420	410	316
Tunisia	637	517	424
Zimbabwe*	430	430	87
Latin America & Caribbean*	**832**	**808**	**563**
Antigua & Barbuda*	1 282	1 282	904
Argentina*	1 120	1 120	1 008
Bahamas	2 649	1 923	551
Barbados	3 708	115.24	559.08
Belize*	1 089	1088.53	699.55
Brazil*	822	822	466
Chile*	2 375	2 375	2 014
Colombia	624	462	270
Costa Rica*	1 931	1 931	934
Guyana*	1 422	1 422	1 149
Jamaica*	2 285	2 285	383
Mexico*	985	985	738
Peru	1 039	897	766
Saint Kitss & Nevis*	2 128	2 128	781
Trinidad & Tobago*	1 060	1 060	923
Uruguay [2001]	1 190	1 190	1 190
Venezuela*	506	506	466
North America*	**5 476**	**5 476**	**4 964**
Canada*	5 129	5 129	4 500
United States*	5 514	5 514	5 015
Asia**	**674**	**584**	**417**
Bahrain	2 819	2 456	2 034
Brunei Darussalam (2001)	1 023	1 023	1 023
China	632	460	257
Hong Kong (China)	4 692	4 301	3 868
India	175	159	68

Table 1.5 *(continued)*

	2003	2002	2001
Indonesia*	377	377	191
Israel*	3 014	3 014	2 766
Japan*	4 489	4 489	3 842
Jordan	834	577	452
Korea, Rep. of	6 034	5 519	5 211
Kuwait	2 308	1 058	879
Lebanon*	1 171	1 171	776
Macao (China)	2 687	2 604	2 313
Malaysia	3 453	3 197	2 656
Oman*	709	709	484
Philippines*	440	440	256
Qatar	1 974	1 134	670
Singapore*	5 044	5 044	4 115
Taiwan Prov. of China	3 900	3 814	3 490
Thailand	965	776	577
United Arab Emirates	2 748	2 709	2 571
Europe**	**2 373**	**2 212**	**1 798**
Austria	4 620	4 147	3 922
Belgium*	3 283	3 283	3 104
Cyprus*	2 937	2 937	2 175
Czech Republic	2 683	2 563	1 467
Denmark*	5 128	5 128	4 295
Estonia*	3 277	3 277	3 005
Finland*	5 089	5 089	4 303
France	3 656	3 138	2 638
Germany	4 727	4 362	3 760
Iceland	6 747	6 479	5 993
Ireland	3 130	2 803	2 331
Italy	3 367	3 524	2 689
Latvia	4 057	1 331	723
Luxembourg*	3 700	3 700	3 640
Malta*	3 030	3 030	2 526
Netherlands	5 219	5 063	4 905
Norway*	5 026	5 026	4 642
Poland*	2 325	2 300	984
Russian Federation*	409	409	293
Slovakia	2 559	1 604	1 253
Slovenia*	3 758	3 758	3 008
Spain	2 391	1 931	1 827
Sweden	5 731	5 731	5 163
Switzerland*	3 510	3 510	3 070
Turkey	805	728	604
United Kingdom*	4 231	4 231	3 296
Oceania**	**3 764**	**3 705**	**3 124**
Australia*	4 817	4 817	3 972
New Zealand	5 262	4 840	4 612

Source: ITU (2004)
* 2002.
** Includes countries reporting data for 2003 and 2002.
*** Includes countries reporting data for 2003, 2002 and 2001.

Table 1.6
Number of hosts advertised in the Domain Name System

		2004	2003	% change
Networks	net	100 751 276	61 945 611	62.64
Commercial	com	48 688 919	40 555 072	20.06
Japan	jp	12 962 065	9 260 117	39.98
Educational	edu	7 576 992	7 459 219	1.58
Mistakes	arpa	6 146 841	6 387 463	-3.77
Italy	it	5 469 578	3 864 315	41.54
United Kingdom	uk	3 715 752	2 583 753	43.81
Germany	de	3 421 455	2 891 407	18.33
Netherlands	nl	3 419 182	2 415 286	41.56
Canada	ca	3 210 081	2 993 982	7.22
Brazil	br	3 163 349	2 237 527	41.38
Australia	au	2 847 763	2 564 339	11.05
Taiwan Province of China	tw	2 777 085	2 170 233	27.96
France	fr	2 770 836	2 157 628	28.42
United States	us	1 757 664	1 735 734	1.26
Sweden	se	1 539 917	1 209 266	27.34
Denmark	dk	1 467 415	1 154 053	27.15
Belgium	be	1 454 350	1 052 706	38.15
United States Military	mil	1 410 944	1 880 903	-24.99
Mexico	mx	1 333 406	1 107 795	20.37
Organizations	org	1332978	1 116 311	19.41
Poland	pl	1 296 766	843 475	53.74
Finland	fi	1 224 155	1 140 838	7.30
Spain	es	1 127 366	1 694 601	-33.47
Switzerland	ch	1 018 445	723 243	40.82
Norway	no	1 013 273	589 621	71.85
Austria	at	982 246	838 026	17.21
Argentina	ar	742 358	495 920	49.69
United States Government	gov	676 595	607 514	11.37
Israel	il	634 001	230 167	175.45
Russian Federation	ru	617 730	477 380	29.40
Hong Kong, China	hk	591 993	398 151	48.69
Singapore	sg	484 825	338 349	43.29
New Zealand	nz	474 395	432 957	9.57
Turkey	tr	344 859	199 823	72.58
Czech Republic	cz	315 974	239 885	31.72
Hungary	hu	313 576	254 462	23.23
Portugal	pt	299 923	291 355	2.94
South Africa	za	288 633	198 853	45.15
Republic of Korea	kr	253 242	407 318	-37.83
Unknown	..	250 416	236 291	5.98
Greece	gr	245 650	202 525	21.29
Chile	cl	202 429	135 155	49.78
China	cn	160 421	156 531	2.49
Romania	ro	141 202	91 670	54.03
Colombia	co	115 158	55 626	107.02
Estonia	ee	113 154	109 643	3.20

Table 1.6 (continued)

		2004	2003	% change
Ireland	ie	111 467	97 544	14.27
Malaysia	my	107 971	86 285	25.13
Iceland	is	106 296	68 282	55.67
Thailand	th	103 700	100 132	3.56
Slovakia	sk	98 788	80 660	22.47
United Arab Emirates	ae	97 200	56 679	71.49
Ukraine	ua	96 214	62 714	53.42
Uruguay	uy	87 630	78 660	11.40
India	in	86 871	78 595	10.53
Peru	pe	65 868	19 447	238.71
Dominican Republic	do	64 197	45 508	41.07
Indonesia	id	62 036	61 279	1.24
Cocos (Keeling) Is.	cc	58 296	35 684	63.37
Croatia	hr	53 333	40 933	30.29
Bulgaria	bg	51 424	29 257	75.77
Lithuania	lt	44 664	37 840	18.03
Philippines	ph	27 996	38 440	-27.17
Subtotal		**232 470 584**	**171 150 038**	**35.83**
World		**233 101 481**	**171 638 297**	**35.81**

Source: Internet Systems Consortium (2004).

Table 1.6 compares the number of hosts advertised in the Domain Name System (DNS) in January 2003 and in January 2004 for domain names accounting for over 99 per cent of all the hosts counted by the Internet Systems Consortium. Most of the top positions in the table are occupied by generic TLDs, under which the majority of hosts based in the United States and, increasingly, other countries operate. In January 2003, the only TLDs corresponding to developing countries that ranked among the first 40 by number of hosts were those of Brazil (.br), Taiwan Province of China (.tw), Mexico (.mx), Argentina (.ar), the Republic of Korea (.kr), Hong Kong (China) (.hk) and Singapore (.sg). By January 2004 the ccTLDs of Turkey (.tr) and South Africa (za) had joined the top 40 of the Internet Domain Name Survey of the Internet Software Consortium (ISC).

In terms of rates of growth, of the 26 TLDs that experienced above-average growth, 12 correspond to developing countries and another four to countries of Central and Eastern Europe. The ccTLDs of Peru (which more than tripled its host count) and Colombia (which doubled its host count) are

among the top performers. At the other end of the ranking, of the five TLDs that recorded a decrease in the number of hosts in 2003, two correspond to developing countries (.kr of the Republic of Korea and .ph of the Philippines). The most likely explanation for these movements is a migration towards generic TLDs, as other indicators (such as the number of Internet users and of computers available) in these two countries continued to grow in 2003.

The difficulty of drawing conclusions about the geographical distribution of hosts is illustrated by table 1.7, which contains data from the ITU (which in turn uses in part data from the ISC survey) and shows numbers that are rather different in several respects, notably the total number of hosts (which would have declined in 2003 by almost two thirds). The most likely explanation of this apparent contradiction seems to be the elimination from the data of information concerning generic TLDs which had until now been attributed to the United States, leading to a 98 per cent decrease in the number of hosts in the North American region.

Table 1.7

Internet hosts by region

	2003	% change	2002	% change	2001
Africa	348 699	43.40	243 171	-11.20	273 836
Asia	18 211 053	36.00	13 390 474	23.88	10 809 244
Europe	22 338 832	21.68	18 358 407	19.87	15 315 888
Latin American and Caribbean	5 897 866	38.79	4 249 420	24.92	3 401 580
North America	4 967 745	-95.80	118 305 940	8.45	109 083 612
Oceania	3 360 659	10.75	3 034 390	11.10	2 731 107
Developed countries	41 022 171	-72.08	146 943 541	10.79	132 631 004
Developing countries	11 457 617	32.19	8 667 836	17.71	7 363 438
Others	2 645 066	34.24	1 970 425	21.57	1 620 825
World	**55 124 854**	**-65.02**	**157 581 802**	**11.27**	**141 615 267**

Source: ITU (2004) data and UNCTAD calculations.

The main ways in which most Internet users use the Internet for business purposes are exchanging e-mail, accessing the World Wide Web (www) for information or transactional purposes or setting up a company website. Websites represent the main gateway to the Internet for both business-to-consumer and business-to-business transactions. The evolution of the number of www servers in the world therefore has some usefulness as an indicator of the growth of e-business. A regular survey conducted by the company Netcraft.com[5] found that as of June 2004 there were over 51,635,000 websites worldwide. This represents an increase of 26.13 per cent compared with the same month in 2003. The nearly 10.7 million new sites added to the Web in just one year represent a significant acceleration when it is remembered that the Web took 21 months to grow from 30 to 40 million sites. The number of active sites grew slightly faster – by 26.39 per cent–in the 12 months to June 2004.

One indicator of the use of the World Wide Web for business purposes is the number of websites using the secure socket layer protocol (SSL), which supports secure transactions (although most businesses use the Web for other purposes). According to another Netcraft survey, this grew by 56.7 per cent in the 12 months between April 2003 and April 2004, thus reaching 300,000.[6] Servers using SSL are used mostly for e-commerce, e-payments and e-banking transactions, as well any other transaction in which there is a need for secure exchange of information. Table 1.8 shows the changes in some of the aspects measured by the Netcraft surveys between 2003 and 2004.

Table 1.8

The World Wide Web, 2003-2004

	2003	2004	% growth
Host names (June to June)	40 936 076	51 635 284	26.14
Active sites (June to June)	17 284 461	21 846 167	26.39
SSL servers (April to April)	191 449	300 000	56.70

Source: Netcraft.com (2004a), (2004b).

2. Summing it all up

The paragraphs above show different angles from which one can evaluate the possibility of accessing and using ICTs, and particularly the Internet, in the various parts of the world. Attempts have been made to aggregate this information in e-readiness indicators, some of which were commented on in chapter 1 of the *E-Commerce and Development Report 2003*. More recently, the ITU has launched its digital access index, which aims at measuring the overall ability of people to access and use ICTs. It synthesizes information about eight variables corresponding to five categories (infrastructure, affordability, knowledge, quality and usage).[7]

Some interesting results of this exercise include the fact that three developing economies (the Republic of Korea, Hong Kong (China) and Taiwan Province of China) rank among the top ten, and above the United States, which ranked only eleventh. Of the five economies that had improved their performance most between 1998 and 2003, four (the three previously mentioned plus Singapore) were developing countries in Asia. Of the four categories of digital access into which countries were grouped according to their index (high, upper, medium and low), countries from Central and Eastern Europe, the Caribbean, the Gulf States and some emerging Latin American countries are predominant in the second one. Other developing countries ranked in the lower two categories, with the lowest five places corresponding to Africa, which only had one country (Mauritius) in the "upper access" category. A conclusion drawn by the authors of the ITU classification was that limited infrastructure could no longer be considered the main barrier that developing countries face with regard to ICTs. Affordability and education, two factors in which public policies can make a significant impact, are equally important factors. The good performance of several Asian countries would also point to the possibility of achieving high levels of accessibility to and use of ICTs without widespread familiarity with the English language, which is another factor commonly quoted as a bottleneck for the increased adoption of ICTs in developing countries.[8]

A more comprehensive approach has been taken by Orbicom, the Network of UNESCO Chairs in Communications, with which UNCTAD is now associated.[9] Starting from a project to devise a Digital Divide Index, which would track the diffusion and uptake of ICTs, Orbicom's project has developed into a model based on a conceptual framework that incorporates not only considerations concerning connectivity and e-readiness, but also ICT-relevant skills and the use that people and companies make of them. This is reflected in a country's *Infostate*, which aggregates *Infodensity* (available stocks of ICT capital and labour, including networks and ICT skills), and *Info-use* (uptake and consumption flows of ICTs as well as the intensity of their use).

A crude summary of the findings of the initial application of Orbicom's model would be the confirmation of the gap that separates the most ICT-advanced countries such as the United States and Canada, a number of Western European countries (all the Scandinavian countries, the Benelux countries, Switzerland, the United Kingdom and Germany) and a number of economies in Asia and the Pacific (Japan, Republic of Korea, Hong Kong (China), Singapore, Australia and New Zealand), all of which have attained very high *Infostate* (200 compared with a world average of 100), from the lowest-ranking group of mostly African countries (Chad, Ethiopia, Central African Republic, Eritrea and Malawi) and Asian countries (Myanmar and Bangladesh) with *Infostates* as low as 5. Both *Infodensity* and *Info-use* were found to be contributing to the digital divide between countries. From the point of view of the evolution of *Infostates* over time, all countries seem to be improving, but at widely varying paces. While the international digital divide seems to be closing, this is happening only at a slow rate and for the most part is attributable to countries towards the middle of the rankings, while those in the most difficult situation are not seeing much progress. While income levels and higher *Infostates* show a positive correlation, notable exceptions exist: countries with similar levels of gross domestic product (GDP) show very different *Infostates*, and vice versa. ICT policy choices can make a noticeable difference.

The data discussed above consistently point to the increasing availability of the material and immaterial basis on which e-business and e-commerce can grow, including in many developing countries. The effects of the crisis of confidence of 2001 in the potential of the "information economy" seem to have completely dissipated, and the conditions

for the growth of a digital economy are therefore more and more consolidated. The next section provides some information about the pace at which this is happening in the trend-setting e-commerce markets.

3.   The growth of e-commerce

The situation in the leading markets

Several chapters in this Report, as well as in Reports of previous years, refer to the rarity of statistically significant measurements of the value of e-commerce transactions in most countries, and particularly in the developing world. As the situation in this regard has not changed sufficiently to warrant a revision of the remarks made in the introductory chapters of the previous two Reports, this chapter will limit itself to a brief summary of the evolution of the value of e-commerce transactions in the world's earliest and largest adopter of e-commerce, the United States, which

represents by far the largest share of all e-commerce in the world and continues to set the trends which e-commerce and e-business follow. This information is complemented with a reference to a few notable elements of the statistical evidence recently published by Eurostat concerning the adoption of e-business in the European Union.

According to the United States Census Bureau, business-to-consumer (B2C) e-commerce sales in the first quarter of 2004 amounted to 1.9 per cent of total retail sales, a proportion that is nearly twice as large as that of 2001.[10] The annual rate of growth of retail e-commerce in the United States in the year to the end of the first quarter of 2004 was 28.1 per cent, while the rate of growth of total retail in the same period was only 8.8 per cent. On current trends, retail e-commerce in the United States could amount to $100 billion by mid-2006, at which moment it could represent between 2.5 and 3 per cent of total retail sales in that country. Table 1.9 summarizes B2C sales in the United States over the last three years.

Table 1.9
B2C sales in the United States, 2000-2003
(millions of US dollars)

	2003	% growth	2002	% growth	2001	% growth	2000
E-commerce	55 996	26.44	44 287	27.91	34 623	23.65	28 000
Total retail	3 399 544	5.25	3 230 122	2.32	3 156 754	2.82	3 070 186
E-commerce as a per cent of total retail	1.65	20.14	1.37	25.01	1.10	20.26	0.91

Source: US Census Bureau (2004b).

As for business-to-business e-commerce (B2B), the United States Census Bureau reports that in 2002 e-commerce represented 16.28 per cent of all commercial transactions between enterprises, and that B2B amounted to 92.7 per cent of all e-commerce in the United States.[11] In a sluggish economic environment that resulted in a decrease of 1.3 per cent in total B2B transactions (traditional and electronic) compared with 2001, e-commerce B2B grew at a annual rate of 6.1 per cent. This superior performance of e-commerce B2B compared with "traditional" transactions occurred in all the major economic sectors.

By sectors of activity, the weight of B2B e-commerce was highest in manufacturing, where it represented 19.6 per cent of the value of all shipments. E-commerce represented 10 per cent or more of shipments in 15 of the 21 industry groups into which manufacturing is divided

Table 1.10 compares the dollar figures for e-commerce and total commerce in B2B and B2C in the United States in 2001 and 2002.

Information compiled by Eurostat indicates that e-commerce sales made through the Internet by enterprises located in the European Union reached €95.6 billion (or $86.04 billion at 2001 average exchange rates) in 2001.[12] These sales would represent only 20 per cent of total e-commerce sales: according to the Eurostat survey, Internet sales amounted to 1 per cent of total sales, while electronic data interchange (EDI) and other non-Internet sales represented 4 per cent of total sales in 2001. This would bring total e-commerce sales in the EU to about $430 billion, less than 40 per cent of the total e-commerce sales estimates for the United States for the same year.

Table 1.10

US shipments, sales, revenues and e-commerce, 2002 and 2001
(billions of dollars)

	Value of shipments, sales, or revenue						Year to year % change		% distribution of E-commerce	
	2002			2001					2002	2001
	Total	E-commerce	%E-com-merce/ total	Total	E-commerce	%E-com-merce/ total	Total	E-com-merce	2002	2001
Total	14 675	1 157	7.88	14 585	1 080	7.40	0.60	7.10	100	100
B2B	6 582	1 072	16.29	6 672	1 010	15.14	-1.30	6.10	92.7	93.5
Manufacturing	3 840	752	19.58	3 971	724	18.23	-3.30	3.80	65	67
Merchant wholesale	2 742	320	11.67	2 701	286	10.59	1.50	11.70	27.7	26.5
B2C	8 093	85	1.05	7 913	70	0.88	2.30	21.40	7.3	6.5
Retail	3 230	44	1.36	3 157	34	1.08	2.30	29.30	3.8	3.2
Selected services	4 863	41	0.84	4 756	36	0.76	2.20	15.00	3.5	3.3

Source: US Census Bureau (2004b).
See www.census.gov/eos/www/papers/2002/2002finaltext.pdf for applicable notes and definitions affecting the interpretation of data.

Even when allowance is made for methodological differences and the existence of gaps in the data available for the EU (no information is available on the percentage of e-commerce sales in total sales for Belgium, France and the Netherlands), the difference in the significance of e-commerce for the two largest developed single markets remains considerable. This is in spite of the fact that ICTs have reached very high penetration levels across the EU, with 94 per cent of all enterprises using computers, 81 per cent having an Internet connection and 67 per cent having a website or a homepage. Of all enterprises, many more used the Internet to make purchases (24 per cent) than sales (10 per cent). Of the latter, 83 per cent made less than 10 per cent of their total sales through the Internet, and 46 per cent made less than 2 per cent of their total sales using the Internet.

From e-commerce to e-business statistics

The above discussion shows the scarcity of reliable data on the value of e-commerce, and not only in developing countries. Furthermore, the available data from the United States and the European Union show that while the value of online transactions is increasing, it is not increasing at the speed at which businesses connect to the Internet. This leads to a number of suggestions.

First, the focus on measuring e-commerce transactions might divert attention from measuring other uses of ICTs in businesses and therefore provide only limited information on the adoption of ICTs by enterprises. Therefore, more and more attention is being paid by statistical offices to the measurement of e-business – or more broadly the use of ICTs in enterprises for a variety of business activities that go beyond e-commerce. This is important since many of the efficiency gains related to the adoption of ICTs result from changes in business processes using ICTs, ranging from customer relationships and supply chain management to marketing, logistics and distribution.

Second, experience from measuring e-commerce in developed countries (and in a few developing countries; see chapter 2) has shown that in most cases, businesses are unable to specify the value of online purchases and sales, but are willing to provide information on whether they conduct business online. Therefore, the quality of data on the value of e-commerce transactions is unlikely to improve considerably in the near future.

Third, in developing countries, many companies are starting to use the Internet for various business functions, although they are not yet engaged in online transactions. This information needs to be

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Box 1.1

Partnership on Measuring ICT for Development

Recognizing the need for improved data and indicators on information society developments, a global initiative has been launched that brings together key stakeholders involved in the statistical measurement of ICTs to create a partnership that will contribute to closing the data gap at the international level, and in particular in developing countries. On the basis of the commitments of the partners, which include the ITU, OECD, UNCTAD, the UNESCO Institute for Statistics, the UN Regional Commissions, the UN ICT Task Force and the World Bank, the partnership will work towards defining and collecting a set of common ICT indicators and assisting developing countries in their efforts to produce information society statistics. This will be crucial to measuring the socio-economic impact of ICTs and their potential contribution to the implementation of the Millennium Development Goals (MDG), which is a major objective of the global "ICT for development" community.

The Partnership was officially launched during UNCTAD XI, held in São Paulo, Brazil, from 13 to 18 June 2004. Further information on the partnership is provided on the web site *measuring-ict.unctad.org*.

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captured in an analysis of the adoption of ICTs by businesses and its impact on development.

The WSIS Plan of Action points to the need to develop statistical indicators for benchmarking and performance evaluation, to follow up the implementation of the objectives, goals and targets of the Plan of Action and to track global progress in the use of ICTs. International cooperation is necessary for the setting up of coherent and internationally comparable indicator systems, taking into account different levels of development. Better data on ICT readiness, use and impact are needed in order to design, implement and evaluate ICT development policies.

Currently, there is no international database that provides information on the use of ICTs in enterprises in developing countries. The Organisation for Economic Cooperation and Development (OECD) and Eurostat have been compiling information for their respective member countries for a couple of years, following the collection of such data by national statistical offices.

Although some developing countries have started to collect ICT indicators through their official statistical systems, the data are not always comparable across countries, or with those of developed countries. This calls for collective action at the international level to coordinate the methodological work and to work towards a global database on ICT indicators. The UNCTAD secretariat has thus launched a new data collection exercise to compile e-business statistics from developing countries and make them available in its annual *E-Commerce and Development Report*. This is part of a global initiative among international and regional organiza-

tions to enhance the availability of ICT statistics in developing countries (see box 1.1).

At the time of completion of the draft of this Report, e-business statistics had been received from Argentina, Chile, Colombia, Morocco, Peru, the Philippines, Romania, the Russian Federation, Singapore and Thailand. Some of the results are presented in annex I. The tables feature the results of only a limited number of countries and few indicators, and thus provide neither a comprehensive overview nor comparable data on the use of ICTs in enterprises. However, they demonstrate that developing countries are increasingly becoming aware of the importance of collecting ICT indicators and statistics for policy-making, and for monitoring and benchmarking their information society developments.

Of course, any efforts such as those discussed above, undertaken at the international or national levels to ascertain the extent to which, and the ways in which, ICTs are affecting economic and social development, are justified only insofar as they provide inputs for ICT-for-development policy-making. Although this is an area in which the evolution of technology is a powerful factor of change that to some extent at least remains a given for developing countries, the choices that individuals and societies make have an equally important role in determining outcomes in terms of the impact of ICTs on development. The second part of this chapter looks briefly at some of the policy issues with an international dimension that developing countries and the international community in general should pay attention to in the coming months, particularly in the run-up to the second phase of the WSIS.

B. The dialogue about ICT-for-development: Some suggestions

1. The question of Internet governance

Given the profound impact of the Internet on multiple aspects of society, the debate about its future evolution and the role that different social players should have in deciding the direction it will take is bound to be an intense one. In such a debate, the technological implications of the issues involved are likely to be interpreted, to some extent at least, in the light of the real or perceived conflicts of interests – political, economic and cultural – regarding the development of what has become a global resource.

Even though there is no agreement among the participants in the debate about the exact delimitation of the processes that the term "Internet governance" designates, the discussions throughout the WSIS process made it clear that a majority of developing countries feel that the status quo does not serve their interests well and needs to be reformed. The establishment of some sort of intergovernmental mechanism has been proposed. Furthermore, the lack of satisfaction with current arrangements is not limited to the Governments of developing countries, although the analysis of what is not working and the solutions proposed may differ significantly among critics.

From another viewpoint, the rapid expansion of the Internet across the world, which is probably faster than that of previous technological revolutions, and the phenomenal growth of its commercial applications would support the view that the structures that underpin the development of the Internet serve their purpose well. According to this viewpoint, given the evolutionary nature of such structures and the extent to which they rely on coordination and cooperation among the members of the Internet community, the safest means to ensure the balanced growth of the Internet is to allow the evolutionary process to move on freely, avoiding as much as possible control that goes beyond monitoring and minimizing governmental involvement. From this viewpoint, some of the objections to the policy-making and coordination arrangements of the DNS and the root server system may concern more the processes through which these governance mechanisms operate than their outcome.

It may be true that there are not many examples of significant direct damage to developing-country economic interests caused by the operation of such systems as they stand today (a partial possible explanation being that most developing countries have so far had a shorter and narrower exposure to the Internet). However, in order to be effective in the long term, governance mechanisms must rely on their acceptance by the governed. Technical effectiveness alone does not necessarily provide legitimacy. While the very success of the Internet would point to the existence of a fundamental consensus among the original Internet community, such consensus is rapidly eroding. It is only a matter of time before a system lacking political support becomes a technically dysfunctional one. It is also important to keep in mind that the past is not always a reliable guide to the future and that changes in both the demand and the supply side of the market for Internet services may well render obsolete the arrangements that were so useful during the earlier phases of the emergence of the Internet.

The concerns of developing countries

The weaknesses of some of the governance structures of core aspects of the Internet are not merely a matter of principle or perception. The dominance by one or a few countries of core Internet resources can generate concerns about the potential for discriminatory treatment of other countries. For instance, it has been pointed out that some universities in the developed world hold more Internet Protocol (IP) addresses than many developing countries (and earn money renting them out). Legal mechanisms based on the enforcement of private contracts (to be carried out essentially by the national courts of one country) are not necessarily the optimal way to settle international public policy issues. As the Internet penetrates almost every aspect of social life, Governments are justified in seeing it as a type of vital international public utility, which cannot be managed without regard to internationally accepted principles such as the sovereign equality of States.

Also, measures intended to achieve desirable aims, such as the empowerment of private players and the reduction of undue governmental control, can go too far and result in the extension of neo-corporatist approaches and the predominance of special interest groups that may seriously undermine transparency, openness and the democratic

process. Since the Internet plays a growing role in the implementation of national development strategies, Governments as the only players in the development process that enjoy full democratic legitimacy have a clear interest in ensuring that the Internet evolves in a direction that is compatible with their development strategies and the protection of the public interest, for which – unlike any other actors – they are accountable to their populations. Unless globally endorsed responses are provided to these questions, societies that feel that their political, economic or cultural interests are not considered or are even at risk might develop their own individual responses, thus jeopardizing the greatest potential of the Internet as a tool for development, namely its universal reach.

The first step that needs to be taken in order to move the discussion forward is to ensure that all participants share some fundamental understanding of the nature of the arrangements being discussed, and of the interests at stake. In this regard, it is important that the position of the proponents of change be articulated beyond matters of principle and process, so that a discussion can be started in terms of specific interests, problems and impact on the ground, and a practical work programme. The fundamental interest of developing countries is to ensure that their specific needs and concerns are taken into consideration in any decision-making that will affect the evolution of the Internet and in particular its application to development problems, including those that may impact on the supply capacity and the competitiveness of their economies.

Governance "of" the Internet versus governance "on" the Internet

Once it is recognized that a political answer to these questions needs to be found, it is also necessary to admit that there are not many examples of concrete policy areas in which responses require the development of new Internet-specific international institutions, especially from the viewpoint of economic competitiveness. In fact, if there is the political will to tackle the issues, existing systems of international coordination, cooperation or rule-making appear to be sufficient to deal with many if not most of the governance problems posed by the development of the Internet. In this regard, a distinction has been suggested between "governance of the Internet" (that involves the

physical and logical infrastructure of the Internet, and would probably be more appropriately referred to as the management of the core resources of the Internet) and "governance on the Internet" (which concerns the activities that take place over the Internet, particularly the exchange of information, goods and services).

Of course, it is not possible to establish a clear-cut separation between all infrastructural/technological matters on one hand and political and socio-economic questions on the other. Policy decisions very often have technological implications, and vice versa. A crude device to categorize the public policy issues that need to be addressed and the responses that could be explored in each case could be to distinguish between the management of the Internet as a global utility and the international governance issues posed by the use that people make of that utility.

Concerning the group of issues that could fall into the "governance on the Internet" category, the most commonly quoted include matters such as content regulation, intellectual property (although these are also affected by the operation of the Internet Corporation for Assigned Names and Numbers (ICANN)), jurisdiction, competition policy (particularly in connection with the question of Internet interconnection costs and the imbalances in the relationship between tier 1 backbone operators and developing country Internet service providers (ISP) and smaller backbone operators), e-commerce taxation, consumer protection, security and spam. For most of these examples, international governance instruments already exist or could easily be devised. For example, the United Nations Commission on International Trade Law (UNCITRAL) and the Hague Conference on Private International Law provide forums that are suitable for addressing legal issues raised by the conducting of commercial or private transactions on the Internet. In other cases, efforts have already been undertaken at the regional level (for example, the Convention on Cybercrime of the Council of Europe), and if they are built on, a global international framework could be devised without major conceptual difficulties. In other cases, the nature of the problems is such that the optimal solution may involve a mixture of international law-enforcement cooperation and end-user awareness and action (for example, with regard to spam). In all these cases, the substantive character of the issue in question, rather than the

fact that the Internet is the medium through which the problematic activity is conducted, should be the determinant criterion as to what level of "governance" (from consensus building and cooperation to rule-making) and what instruments should be applied.

The problem of the imbalances in the distribution of the cost of international Internet interconnection systems exemplifies the situations in which existing frameworks may not be fully satisfactory, while the creation of specific Internet-focused governance instruments may not be a better option. The case for intervention in this area rests on the possible existence of restrictive business practices (RBP) by large backbone operators, resulting in unfairly high costs for developing country ISP and developing country Internet users, which thus aggravate the international digital divide. The problem being essentially one of international competition policy, its treatment presents well-known difficulties, particularly when it is developing countries that suffer the effects of the RBP and therefore stand little chance of benefiting from the activity of the competition authorities of the major players. In any event, an improvement in this situation is more likely to result from measures that address the general trade and development issues connected with competition policy in a manner that is consistent with the interests of developing countries than from the establishment of a comprehensive Internet regulatory system. The issue in the case of this example is therefore not so much the need for a new intergovernmental organization to deal with the issues raised by the Internet as the inadequacy of some aspects of the multilateral trade framework for dealing with the concerns of developing countries.

Reform, stability and performance

The management of the DNS that is performed by ICANN and the operation of the root server system that is in the hands of a small group of public and private sector entities are at the core of the "governance of the Internet" in the narrow sense. Equally important are a number of mainly membership-based organizations that support the development of many of the standards and policies that provide the "logical" infrastructure of the Internet. Setting out their strengths and weaknesses, and in particular those of ICANN, is beyond the scope of this section; but the fact that many developing countries are not at ease with the limited influence of Governments in ICANN and in particular with the purely advisory role of the Governmental Advisory Committee (GAC), must be recognized and addressed. In this regard, reaching a common definition of the interests of the international community that must be served by the system of Internet governance, and agreement about the way in which Governments should be involved in it, is probably the most important aspect of the work to be done before the second phase of WSIS. Although at this stage of the discussion it is too early to make concrete institutional proposals, some of the features that they should have can be distinguished.

First, it must be recognized that whatever the merits of the case for their reform, the loose constellation of organizations that have so far underpinned the development of the Internet have achieved remarkable success in ensuring the stability and unity of a highly decentralized network of networks, with no centre and no strong rule-making authority. For any reform proposal to be viable, not just technically but also politically, it must provide strong evidence that it will ensure the continued stability and quality of service of the Internet, prevent its fragmentation and maintain the "bottom-up" processes through which standards and policies have been developed so far.

Second, no one-size-fits-all solution is likely to emerge. In addition to the management of core resources (IP addresses, DNS, root servers, protocols), a number of questions in which technological and policy issues are particularly intertwined are likely to be best treated within an network of international frameworks (as opposed to a unified, structured organization) of cooperation and coordination for the development of the Internet. These include, for example, the regulation of the Whois database (in connection in particular with privacy protection concerns), security (from the viewpoint of the network and from the viewpoint of the user, which may sometimes enter into conflict), the dispute resolution system and the problem of multilingualism. In such a cooperative framework, flexibility should be a paramount consideration. For instance, not all stakeholders need to play an equally relevant role in addressing every matter, and some problems may require hard-and-fast rules and formal structures while others may not. Structural flexibility and lightness are also needed in order to prevent governance

solutions from being rendered obsolete by technological evolution.

Third, evolution is more likely to produce results than a voluntarist top-down approach. The current system of management of core Internet resources is the result of a process that has taken place over a remarkably short time. It is clear that this evolution has not yet reached a stage of maturity that is acceptable to all its stakeholders. Also, it must complete a process of genuine internationalization (which is not necessarily equivalent to full-fledged intergovernmentalization, but implies representativeness requirements beyond the participation of individuals/organizations of various nationalities). In the completion of that process it is essential to reconcile demands for change with the need to ensure the continued delivery of the critical services that ICANN and the root server system provide to the Internet community. If, as argued above, technical effectiveness alone does not confer legitimacy, ineffectiveness can ruin it.

Supporting the dialogue

The evolution of the governance framework towards a system that is more development-friendly would be facilitated if developing country players (both governmental and non-governmental) would identify concrete policy issues (as opposed to broad policy areas) in which their concerns and interests are not being considered adequately. Developing countries need to assess the implications of different Internet governance models, including in terms of their impact on the capacity of their economies to benefit from the adoption of e-commerce and e-business practices. This is an undertaking to which UNCTAD could contribute within the limits of its mandate in the trade and development area.

A sustained capacity-building effort of for Internet policy-making is needed so that the majority of the developing countries can effectively participate in the management/governance systems that may emerge from the WSIS process. This is another area in which UNCTAD can make a contribution within an international framework in which the United Nations ICT Task Force could play an important coordination role.

2. ICTs and economic development in the run-up to the next phase of the WSIS

The Plan of Action adopted at the WSIS in December 2003 includes a comprehensive list of "action lines" to be carried out by Governments, the international community, the business sector and civil society. All aspects of the information society, ranging from economic, legal, health and education matters to media, culture and the environment are addressed by the Plan of Action.[13] As the focal point in the UN system for the integrated treatment of trade and development and the interrelated issues of finance, technology investment and sustainable development, UNCTAD is involved in the dialogue concerning those matters in the WSIS Plan of Action that have a trade and development dimension. Thus, at its eleventh session, held in São Paulo in June 2004, a discussion took place concerning the trade and development aspects of the Plan of Action that should be acted upon before the next phase of the WSIS in November 2005.[14] On the basis of the outcome of that discussion, the next paragraphs will make a few suggestions about the ways in which the WSIS process could contribute to the progress of the economic dimension of the information society.

The Plan of Action emphasizes the role of national e-strategies as key instruments for the advancement of the information society in developing countries. It also calls for action to promote development-oriented ICT applications for all, in particular the use of ICTs by small and medium-sized enterprises (SMEs) to foster innovation, achieve gains in productivity, reduce transaction costs and combat poverty. Underlying this call for action is the assumption (supported by a growing amount of evidence) that the increased diffusion of ICTs makes a positive contribution to economic growth and development. The treatment of these issues in the WSIS context should contribute to the emergence of a consensus about the national policies under which, and the international environment in which, a higher degree of ICT take-up and use can result in faster, more equitable economic growth.

ICTs can open up new opportunities for developing countries' exports of goods and services. The available data show that international trade in ICT goods and services has grown in recent years at a

faster rate than total international trade and that it remains robust. Reductions in transaction and information-gathering costs make it easier for developing-country enterprises to broaden their customer base and to participate in international supply chains. The possibility of delivering services online rather than through a physical presence allows developing countries to benefit from their comparative advantage in some ICT-enabled labour-intensive services. Thus, those countries are gaining a world market share in the export of computer-related services, communication services and financial services. However, in order to extend the reach of the positive effects of ICTs on the economic growth of the majority of developing countries an enabling environment for ICTs needs to be created at the national and international levels.

At the national level, the promotion and the facilitation of the adoption of ICTs by the SMEs are likely to play a major role in this regard. Among the particular challenges that SMEs face in the use of ICTs for business development, aspects such as awareness, skill-building, access to finance for investment in ICTs and the possibility of using online payment facilities need particular attention

Changes are necessary in productive processes at the firm level, where the full effects of ICTs in terms of productivity and hence competitiveness often cannot materialize unless their adoption comes together with structural transformation. Such changes may impose costs on workers and should therefore be facilitated through mechanisms that ensure an equitable distribution of the costs and that help workers and firms to adjust to the new environment. ICT-for-development policies should include measures to help people face the cost of adjustment to the widespread use of ICTs.

To maximize the positive impact of ICTs on economic performance, the adoption of the technology must be supported by previous cultural change throughout the economy, and especially among the managerial levels of the enterprises. Such cultural change is necessary in order to implement the structural transformation without which ICT investments will not bear all their fruits. Because these transformations can be profound, rapid and costly for some of the people affected it is important to involve all social players

in ICT policy formulation. Such participatory approach should aim at making compatible the desired effects of ICTs on productivity and competitiveness with the attainment of social goals in terms of equity and integration.

In brief, in order to go further in its treatment of the economic aspects of the information society, the second phase of the WSIS could explore answers to questions such as the following:

- What effects, positive or negative, are ICTs having on the economic prospects of developing countries? What lessons from available experience can be applied to ICT policy-making in the areas that affect trade, enterprise development or employment?

- What strategies have proved successful in terms of enabling enterprises (especially SMEs) to become more competitive through the use of ICTs?

- How can ICTs be used to facilitate the participation of the SMEs of developing countries in national and international supply chains?

- What effects will ICT-induced changes, at the level of the firm and of the whole economy, have on labour markets? What policies may facilitate equitable outcomes for these processes?

These and other questions are to be addressed at a thematic meeting on the economic and social implications of ICTs as part of the WSIS II preparatory process that will be held in the first half of 2005. The outcome of this event is intended to provide the WSIS with suggestions on policies and programmes that can help countries to utilize ICTs for effective poverty eradication through the growth of economically sustainable enterprises.

In order to achieve this, sound analysis will be needed concerning how SMEs in developing countries are actually using ICTs, what benefits they obtain from them and at what costs, and how government policies can enhance the effectiveness of their investments in ICTs. Chapter 2 of this Report provides some answers to these and other questions as a contribution to a debate that should reach at the Tunis Summit some conclusions that can be translated into reality.

Annex I

ICT usage in enterprises in selected countries

Table 1.11

ICT usage in enterprises, 2002 or latest available year
(percentage)

Indicator	Argentina[1,3]	Chile	Colombia[1,3]	Morocco	Peru[3]	Philippines[3]	Romania	Russian Federation	Singapore	Thailand
Proportion of businesses with PCs	..	62.7	76.6	..	80.0	87.8	16.1	81.1	83.3	67.7
Proportion of employees using PCs	..	..	19.7	..	..	..	11.6	27.5	..	..
Proportion of businesses with an intranet	35.6	..	14.4	7.0	25.4	22.0	..	41.6	32.1	..
Proportion of businesses with an extranet	11.0	..	9.7	..	19.8	7.5	..	7.2	15.6	..
Proportion of businesses with Internet access	86.9	46.9	53.7	42.0	64.2	62.4	7.5	37.7	78.3	38.3
Proportion of employees using the Internet	..	10.3	9.0	..	25.4	..	5.9	6.4	..	..
Proportion of businesses with a website[2]	56.5	12.6	25.7	11.0	22.6	..	2.0	11.6	..	14.3
Proportion of businesses receiving orders over the Internet (i.e. Internet sales)	14.6	..	6.5	..	..	1.9	0.5	9.0	..	9.9
Proportion of businesses placing orders over the Internet (i.e. Internet purchases)	..	..	..	8.0	..	2.5	0.4	10.1	..	..

Source: National Statistical Offices.

Note: Microenterprises excluded

[1] Manufacturing sector only

[2] Colombia: of enterprises with Internet access

[3] Data for 2001.

Chart 1.4

Proportion of businesses with internet access (%) Colombia, 2001
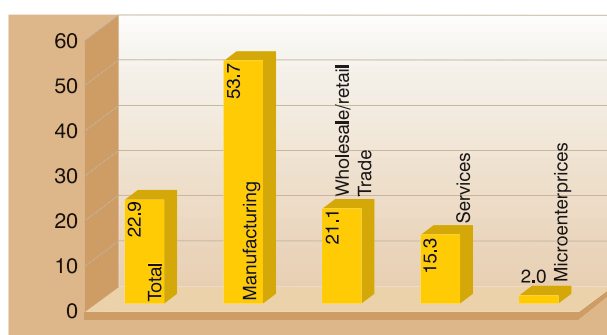
Source: National Statistical Office.

Chart 1.5

Proportion of businesses with a website (% of those with internet access) Colombia, 2001
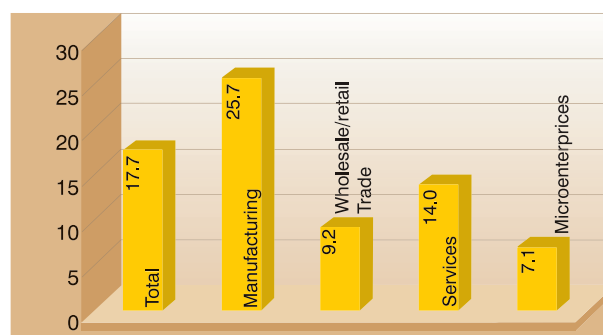
Source: National Statistical Office.

Chart 1.6

ICT usage by size of enterprises: Russian Federation, 2002
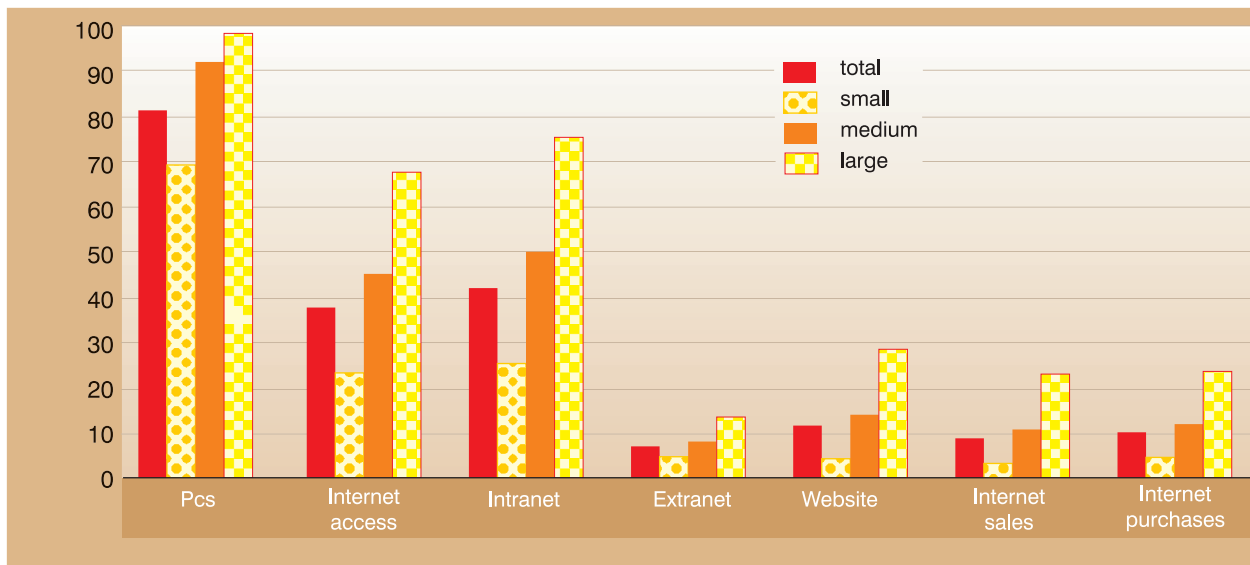
Source: National Statistical Office.

Chart 1.7

ICT usage by of enterprises (%): Russian Federation, 2001–2002
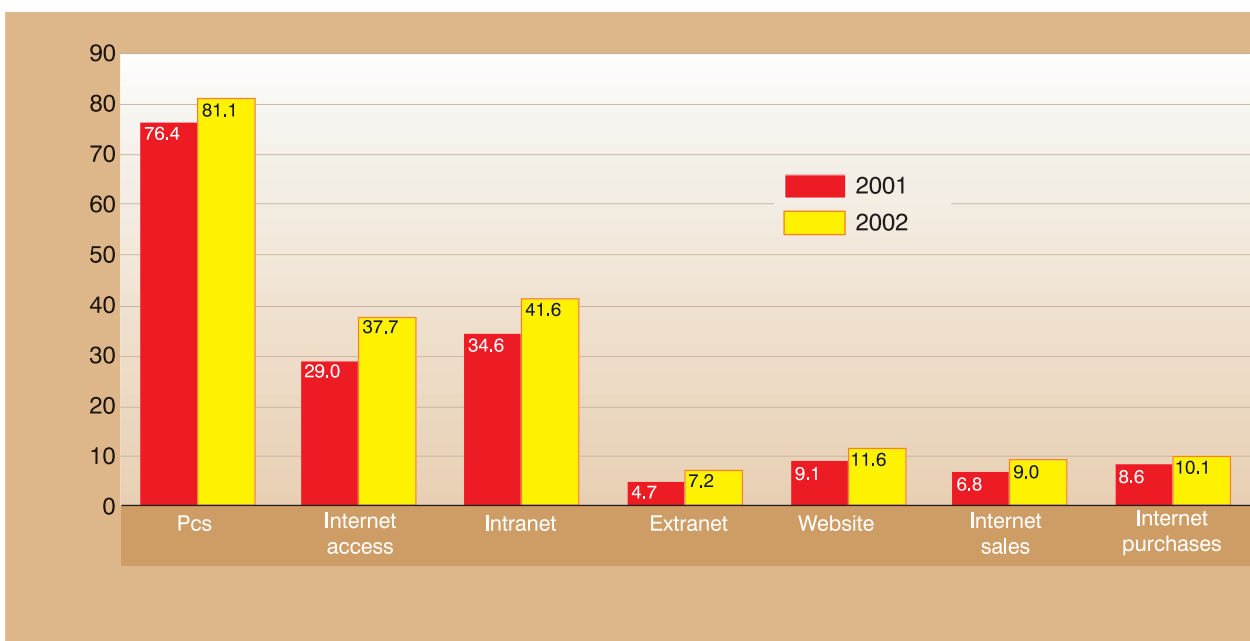
Source: National Statistical Office.

Chart 1.8

ICT usage by enterprises (%): Thailand, 2002–2003
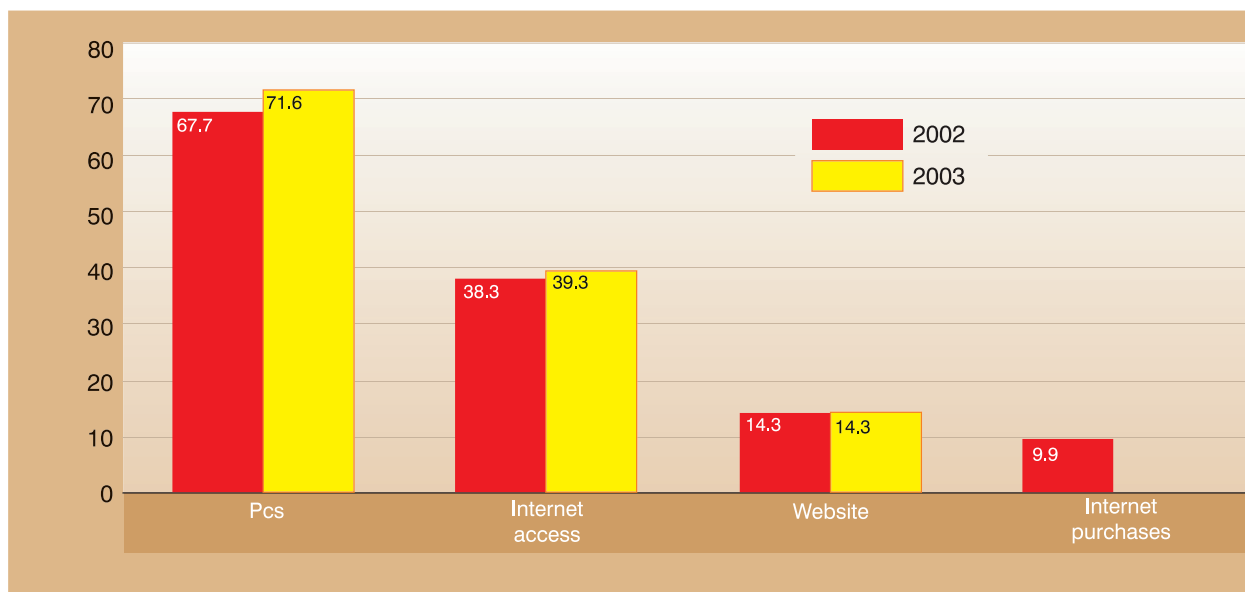
Source: National Statistical Office.

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Notes

1. See paragraph 62 of the São Paulo Consensus, TD/410 25, June 2004, adopted by UNCTAD XI, São Paulo 13–18 June 2004.

2. See ITU (2004).

3 See http://www.isc.org/ for details about the methodology of the survey.

4. It is also possible for the same computer to operate several virtual hosts, not all of which, theoretically at least, need to use the same TLD.

5. See Netcraft.com (2004b).

6. See Netcraft.com (2004b).

7. See ITU

8. Market size considerations are relevant in this context, as smaller markets may, among other things, be unable to support local-language versions of commercial software. Free and open-source software solutions may play a useful role in this regard.

9. See Orbicom (2003)

10. See United States Census Bureau (2004b)

11. See United States Census Bureau (2004a)

12. See Eurostat (2004).

13. See World Summit on the Information Society (2003).

14. See www.unctadxi.org/templates/Event____69.aspx for the full report and documentation of the thematic session of UNCTAD XI that dealt with ICTs as enablers for growth, development and competitiveness.

Chapter 2
E-BUSINESS AND SMEs

A. Introduction

With the continuous spread of the Internet and its related applications, the adoption of information and communication technologies (ICTs) by enterprises and firms is also growing. New e-business practices are more and more integrated into existing business processes, especially those of large firms in developed countries. Firms use ICTs for internal automation, for example of office and production processes, for customer relations and supply chain management, or for the management of distribution and logistics networks. Internet use may range from simple website presence to the complete integration of business functions.

As a result, e-business practices are increasingly becoming the subject of studies evaluating the impact of ICTs on economic growth and business performance, including in previous editions of the *E-Commerce and Development Report*. Unfortunately, most of the available data and studies focus on developed countries' firms, whereas little is known about the adoption of the Internet and e-business in developing country firms, particularly small and medium-sized enterprises (SMEs).

At the same time, global developments and competitive forces are increasingly driving firms in all countries towards adopting new ICT-based strategies and business practices. For example, the interaction with (foreign) suppliers and clients has already led most firms in developing countries to connect to the Internet for e-mail purposes. Although e-mailing is only the first step towards the adoption of ICTs, it is an important one; subsequently, firms usually set up their own website and start to use the Internet for information searches and marketing of their products and services.

Moving from simply connecting to the Internet towards integrating ICTs in business applications is a major step for SMEs in developing countries and requires management and technical skills, as well as organizational changes and investments that can

often not be afforded. At the same time, the commercial benefits resulting from such changes are not always obvious to small business owners, and in some cases firms may choose to adopt ICTs as a result of external forces and the need to remain competitive rather than direct increases in productivity.

This chapter will focus on the adoption of ICTs by SMEs in three developing country regions (Asia, Africa and Latin America). It will investigate which companies use ICTs according to sector, size, location or target markets (foreign or domestic); the costs and benefits of using ICTs from the viewpoint of SMEs; the specific circumstances faced by SMEs which may impact on ICT usage, such as access, quality, costs, skills or finance; and what kind of assistance they may need to enhance their e-business activities.

Most of the existing knowledge about the use of ICTs in enterprises or e-business, and its impact on business performance in the developing world, is based on anecdotal and case study evidence, whereas little statistical data on e-business are available. This chapter sets out to review the results of e-business survey data from selected Asian and African countries. It then presents and discusses the results of a survey on ICT usage by SMEs in five Latin American countries. The survey included questions related to access to and use of ICT and the Internet, the impact of and barriers to using ICT and perceived solutions that could address these constraints.

The next section looks at the potential and current adoption of ICTs by enterprises, using available data mainly from developed countries, and discusses the case of SMEs. Section C assesses the use of e-business by SMEs in developing Asian and African countries on the basis of case studies and available country surveys. Section D presents the survey carried out among SMEs in Latin America, and discusses its main results. Section E draws some conclusions and makes policy recommendations on the basis of findings from the Latin American survey and from studies carried out in other regions.

B.   Using ICTs in enterprises

During the late 1990s, much attention was paid to the emergence of e-commerce, or the move towards online purchases and sales. The figures for global business-to-business (B2B) e-commerce soared, with estimates ranging between $200 and 600 billion for the year 2000, and predicted to reach $12 trillion by 2006 (UNCTAD, 2001; Forrester, 2001). These estimates were largely produced by private data providers, who based their calculations on their own surveys and methodologies. As a result, the data from one source were usually not comparable with those from another.

Recognizing the need for more reliable and internationally comparable data and indicators, since the beginning of the millennium an increasing number of (mainly advanced) countries have started to collect ICT-related statistics – including e-commerce – on a regular basis, through their official national statistical systems.[1] From their results, we now know that the amount of e-commerce conducted is much less than anticipated a few years earlier and that – even in the most advanced countries – online purchases and sales account for only a small, albeit growing, share of total transactions.

However, the use of ICTs and the Internet in enterprises is not confined to e-commerce, or ordering and selling online. More attention needs to be paid to "where" firms are actually using the technologies within the firm, in their regular business activities. In fact, and this is where ICTs will have their most profound impact on business structures, they are increasingly incorporated into business activities such as customer acquisition and retention, finance and account management, product service and support, or logistics and inventory control. By automating some of these functions, companies integrate internal tasks and systems as well as their relations with suppliers and customers and their applications (box 2.1).

Box 2.1	
E-business processes	
Customer acquisition and retention	Customer relationship management (CRM); marketing campaign management, planning and execution; database marketing, direct marketing, telemarketing; electronic catalogue; Web activity analysis, Web advertising; call centres; arranging repairs and maintenance; handling customer complaints
E-commerce	Sale or purchase/procurement of goods or services (includes getting estimates, negotiating, ordering, arranging contracts); EDI; mobile commerce; integration of ordering system with that of customer/supplier; integrated invoicing and payment of customers; full integration with back-end system; use of extranet; secure transactions; automated payment of suppliers
Order fulfilment and order tracking	Order control, product control, order tracking; data processing that relates to order fulfilment or tracking; sales force automation
Logistics (inbound & outbound) and inventory control	Supply chain management (SCM); production and inventory control (including of raw materials, parts, finished goods), distribution control, management of inventory, management of customers' inventory, transportation and shipping, automated warehouse; arranging and managing transport, dispatch of goods, tracking, provision of services
Finance, budget and account management	Enterprise resource planning (ERP); managing, planning and evaluating finance; invoicing and payment systems; software systems (e.g. SAP)
Human resource management	External and internal recruitment, online job applications; automating of administrative tasks such as time reporting, payment of salaries and pension schemes, travel reimbursement, tracking working hours and production time; training; teleworking
Product service and support	Website support, frequently asked questions (FAQ), downloadable manuals, online queries; after-sales support
Research and development	Research, development and design of products, services or processes; computer-aided design (CAD), computer-aided manufacturing (CAM) and collaborative design;
Knowledge management	Systematically aggregating and disseminating information and knowledge within the company; content management system; e-learning

For example, upon receipt of an online order, product availability is automatically checked, accounting and logistics are notified, and new supplies are ordered. By merging functions such as order processing, payments and after-sales services, firms are able to reduce operational costs and provide better services. Some of the functions are internally linked, through the companies' computer systems, and some are linked or integrated with other companies' systems (those of suppliers or customers).

The use of the Internet improves customer relationship management (CRM) and allows firms to customize their services. Customized customer care allows companies to respond to customers in real time, thus improving customer confidence; moreover, customer preferences can be monitored and more targeted marketing strategies developed.

Through computer networks business processes such as ordering, transacting, fulfilment and delivery, inventory control and accounting can be streamlined and connected regardless of location. They can create value by offering enhanced order features, such as order status verification and back order information. Intra-firm and inter-firm computer networks allow companies to outsource certain activities, and to integrate activities throughout the value chain. They also improve supply chain management (SCM) using a just-in-time approach.

In summary, ICTs and the Internet can play a substantial role in implementing companies' major strategies for growth, such as increasing strategic marketing/promotional efforts, customer relations or the quality of products and services.

1. Evidence from developed countries

Since a number of statistical offices in developed countries have started to collect ICT usage data through business surveys during the past few years, there is now a much better understanding of the use and impact of ICTs on enterprises. Studies by the OECD (2002) and Eurostat (2004) provide the following evidence, based on official data sources.

- In 2003, on average 87 per cent of enterprises in the European Union (EU) had an Internet connection (up from 80 per cent in 2002).

- Companies use the Internet mainly for marketing purposes, while e-commerce still accounts for a small – albeit growing – proportion of overall sales: 0.4 to 1.8 per cent of total sales in 2000, with the highest figure in Sweden (13 per cent). Sales using electronic data interchange (EDI) are higher than those via the Internet, and purchasing is more common than selling (about twice as high). On the other hand, almost one third of companies with Internet access in the EU purchased at least some of their products online in 2001 (ranging from 8 per cent in Spain to 62 per cent in Sweden).

- Internet sales are mainly domestic or at the regional level, for example within Europe. E-commerce is greater in services than in manufacturing, and it features particularly in financial services, business services and wholesale trade. Only a few companies deliver their goods and services online, and few offer online payment facilities.

- Business-to-consumer (B2C) e-commerce still accounts for only a small share of e-commerce, but is growing. It is highest in Denmark, Sweden, the United Kingdom and the United States and covers mainly computer-related products, clothing and digitized products. In some countries, retail transactions are used as proxies for measuring B2C electronic transactions. The results show that they account for a small proportion of total sales, with the highest figures in the United States (with 1.9 per cent of total retail sales online in 2004; see chapter 1).[2] Despite the low value of its transactions, B2C e-commerce has received most attention, partly because issues such as consumer trust and data protection have received considerable attention from policy makers.

- Internet access usually increases with the size of companies, but in some countries (e.g. Denmark) even 85 per cent of microenterprises (with 5 to 9 employees) use the Internet. ICT usage depends on the nature of the business – it is more appropriate for some activities than for others. The Internet is more prevalent in certain sectors than in others. These include finance and insurance, business services and wholesale trade, whereas retail trade has the lowest Internet penetration rates.

- Available data also show that countries with lower access costs have a higher take-up of the Internet. The highest rate of ICT diffusion among OECD countries can be found in the United States, Canada, New Zealand, Australia, the Nordic countries and the Netherlands. And the cost of hardware and software is important for determining the level of investment.

- Key problems in Europe, defined as perceived barriers to Internet use by companies, include the lack of network security, slow or unstable communications, and legal uncertainties (concerning payments, contracts and deliveries). On the other hand, costs related to access to and use of the Internet are not perceived as major barriers.

As one of the pioneers in the collection of e-business statistics, the UK in its 2002 e-commerce survey included a number of questions on e-business processes (as set out in box 2.1). Generally speaking, responses showed that while about half of the large companies are using e-business-related systems, only 20 per cent of medium-sized firms (50 to 249 employees) and 8 per cent of small firms (10 to 49 employees) are doing so. Most common functions were integrated invoicing or payment systems, integrated production or service operating systems, and integrated logistics or delivery systems. The survey also found that firms that had linked one process to selling or purchasing often had linked at least three. This suggests that as firms start to integrate business processes, they do so for a number of activities. As regards the integration of companies' systems with those of suppliers and customers, a higher number of firms reported that they had linked with suppliers rather than with customers. But overall, less than 10 per cent of SMEs had their systems integrated with those of others (Goodridge and Clayton, 2004).

The Scottish e-business survey, carried out annually, revealed that dynamic (or fast-growing) companies are more likely to adopt e-business technologies or broadband. By contrast, companies that have not yet adopted e-business say that they do not see the value to their business or do not have the right skills to do so (Scottish Enterprise, 2003). The survey also found that the adoption of e-business increases with size, and changes from sector to sector, with a higher rate of adoption in services than in manufacturing (except for the use of websites). The adoption of broadband does not auto-matically lead to an increase in e-business practices, and is therefore not the main constraint on (or main enabler of) the adoption of e-business.

There is also now a growing amount of evidence concerning the impact of ICTs on business performance. During the past few years, a number of firm-level studies have shown the positive impact of ICT use on firm performance, in particular on labour productivity (UNCTAD, 2003a).

In a comprehensive cross-country study, an OECD-led consortium of researchers looked at the impact of ICT at the firm level, on the basis of official data sources for the use of ICT in enterprises from 13 OECD countries (OECD 2003, 2004a). They found a positive impact of ICT use on productivity in all of the country studies, with somewhat more significant results in the services sectors. For example, in Australia, firm-level econometric analysis revealed a positive link between ICT usage and productivity growth in all sectors studied. The productivity growth effect of using one particular technology, however, is greatest in the earlier years and seems to taper off over time (OECD, 2004a). In the United Kingdom, buying online has been shown to have a greater impact on firms' output growth than selling online, a fact which is explained by pricing effects and price transparency related to e-procurement, which allows companies to secure more competitive deals. Online suppliers, on the other hand, may suffer from the negative impact on prices related to e-marketing and online selling of goods.

The studies conclude that ICT usage contributes to enhanced business performance provided that it is complemented by other investments (e.g. in skills) and organizational changes. Organizational changes that enhance the benefits of ICTs include new strategies, new business practices and processes, and new organizational structures.

The studies also show that companies which are poorly managed and lack skills and innovation do not benefit from ICT usage. In other words, simply using ICTs does not automatically lead to increased returns on investments if other conditions are not in place. Hence, an important conclusion is that the economic impact of ICTs may be limited if no other investments or changes are being introduced at the same time. The studies also conclude that the benefits of investment in ICTs are not felt immediately, and that it takes time before returns on investment materialize.

2. The case of SMEs

Much of the evidence provided above does not specifically address the case of SMEs. One problem related to capturing SME adoption of ICT (or any other behaviour, for that matter) is related to the problem of size definition, which varies from country to country. Therefore, cross-country comparisons of SME surveys always have to take into consideration the size definition.

The studies carried out in some of the OECD countries revealed that the adoption of ICTs increases with size, especially the use of network technologies such as intranets, whereas most companies are connected to the Internet (charts 2.1 and 2.2). For example, in Europe, 79 per cent of large companies had an intranet in 2001, compared with only 25 per cent of small companies (Eurostat, 2004). Small firms use the Internet mainly for marketing purposes and to search for information concerning potential customers, suppliers and competitors, but also for e-banking and other types of financial services (in fact, the latter activity is more common in small than large enterprises in Europe). As far as e-commerce is concerned, smaller companies are less active: in particular, they buy less online than larger firms and their shares of Internet sales (of total sales) are much smaller (OECD, 2004b). But almost one third of European SMEs that use the Internet have received online orders (chart 2.3). Interestingly,

the Eurostat survey also revealed that those SMEs that have decided to engage in e-commerce are more intensive users than their larger counterparts. International competition will drive firms to use ICTs or implement B2B e-commerce. Furthermore, use of ICTs increases over time, as firms move to more complex forms of e-business. This holds for companies of all sizes.

At the same time, a Canadian study found that SMEs, while generally lagging behind in Internet uptake, have the greatest potential for productivity gains through e-business (CeBI, 2002). On the basis of a survey with around 2000 SMEs, they found that firms were able to increase revenues by 7 per cent, and decrease costs by 9.5 per cent (costs of goods sold) and 7.5 per cent (sales and administrative costs). Hence, companies run the risk of missing opportunities for business growth by not adopting e-business solutions.

Results from e-business surveys of Irish SMEs revealed that the number of firms connected to the Internet has levelled off at 84 per cent (2002), a 3 per cent increase only over the figure for 2001 (Chambers of Commerce of Ireland, 2002). However, an increasing number of SMEs have their own websites (55 per cent, an increase of 9 per cent over 2001) and are using the Internet for online ordering (46 per cent of SMEs) and e-banking (55 per cent, or 21 per cent more than in 2001). Thirty-three per cent of SMEs had an intranet and 17 per

Chart 2.1

Internet usage by size of enterprise, 2003
(percentages)
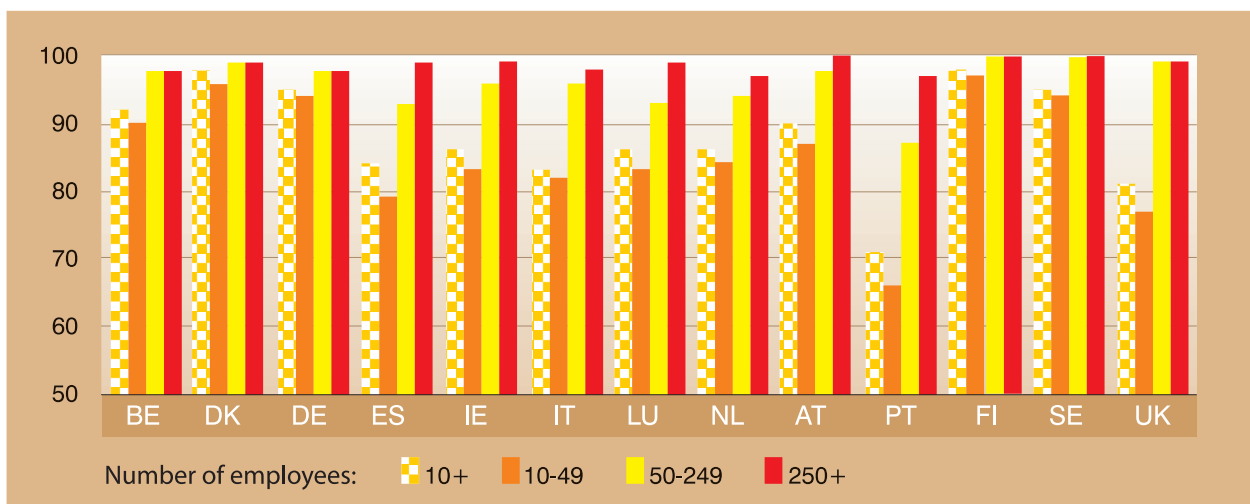
Source: Eurostat (2004).

Chart 2.2

**Internet usage by size of
enterprise: EU 15**
(percentages)
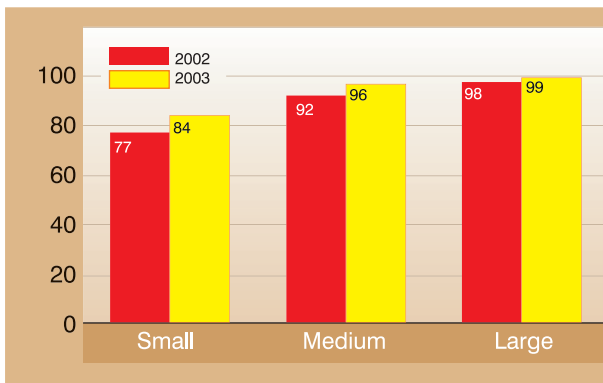
Source: Eurostat (2004).

cent an extranet; computer networking or the presence of local area networks (LANs) was more predominant in larger (i.e. medium-sized) firms (94 per cent compared with 65 per cent of small firms). Most common e-business applications were sourcing information and e-mailing with suppliers and customers. The surveys also showed that cost related to specialized technical skills was a major obstacle to the adoption of e-business. This was followed by security concerns with respect to providing confidential information (an increasing concern), cost of hardware, lack of broadband services in the country, and legal and regulatory uncertainties. The large majority of SMEs planned to increase their e-business investments over the next three years, with higher values for medium-sized compared with small firms.

From a policy perspective, information on SME use and the impact of ICTs is crucial. SMEs comprise the bulk of enterprises not only, but particularly, in developing countries. They normally employ the majority of the workers in the country, both in manufacturing and in services. At the same time, their contribution to gross domestic product (GDP) is often small, and they serve the domestic rather than the foreign market.

How are SMEs different? Generally speaking, the overall capacity to absorb the new technologies is lower in SMEs. Some of the constraints they face relate to access to finance, availability of skills and know-how, and international exposure. Legal uncertainties related to cross-border e-commerce and the need to keep up to date on latest e-commerce-related legislation (including in target markets) add another burden to SMEs, which often do not have legal departments.

Unlike large companies, SMEs do not have established brand names; these, however, play an important role as regards online business since customers prefer to put their trust in well-known brands rather than take the risk of buying from unknown companies over the Internet. But establishing brand names requires heavy investments in international marketing, which SMEs often cannot afford. While setting up a website may be cheap, promoting it effectively is expensive (UNCTAD, 2003b).

SMEs lack logistics networks for the prompt and reliable delivery of products, particularly in the case of B2C e-commerce. Since shipping and handling costs decrease with the volume of the transaction, SMEs are disadvantaged.

Chart 2.3

SMEs in Europe: Commercial activities using the Internet, 2001
(percentages)
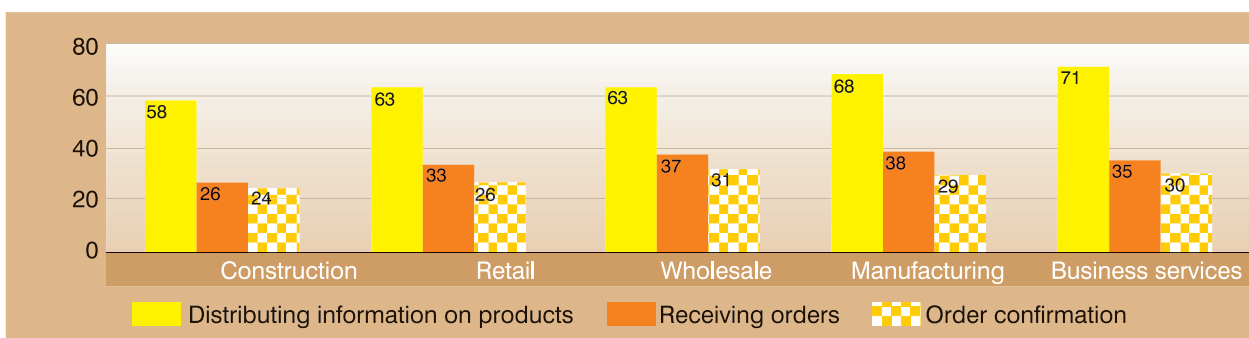
Source: European Commission (2002a).

On the other hand, there is a wealth of information available on the Internet, which can be very useful for SMEs' operations. This ranges from trade information, information about potential customers' profiles and creditworthiness, and model contracts, to manuals and guides on best business practices and how to engage successfully in exporting markets. The use of e-mail has proved to be a cost-effective means of communicating with suppliers and customers, and has replaced the use of fax in many SMEs.

Small companies also have certain features that favour the rapid adoption of ICTs. For example, their often hands-on managerial style allows quick decision-making and enables them to follow rapid technological changes.

Crucial to the adoption of e-business by SMEs are potential returns and profitability. Unless there is clear evidence that the use of ICTs will increase business profits, there is little incentive for small companies to invest in the new technologies and the skills necessary for exploiting them effectively (OECD, 2004b). While a certain level of connectivity is present in most companies, such as Internet access and a website providing company and product information, moving towards more complex e-business and e-commerce applications requires that benefits clearly outweigh costs. As pointed out earlier, the effective adoption of e-business often depends on complementary investments, such as those related to organizational and management changes and related training. This, however, could imply additional costs that SMEs may not be able to afford.

Available studies suggest that the adoption of ICTs by SMEs in developing countries is largely a market-driven process. Eventually, competitors and buyers will prompt SMEs to improve internal management and to use the Internet. Global competition is a driver of ICT uptake among SMEs, in particular those targeting the export market. For example, in certain industries (e.g. agricultural products, handicrafts) foreign buyers in developed countries already expect their suppliers (i.e. SMEs in developing countries) to participate effectively in the global online supply chain (see the case of Indonesia, below). In this case, foreign buyers want to be close to the producer in order to have more control over design, quality and delivery, and they therefore invest in educating and sup-

porting SMEs. This will lead to an increased uptake of ICTs by SMEs in developing countries.

C. Assessing e-business in developing countries

While the monitoring and measuring of ICT usage in enterprises is increasing among developed countries, in many developing countries no statistical indicators on e-business have been collected yet (box 2.2). Therefore, almost no quantitative analysis is available on the impact of ICTs on developing country firms and much of the available information is based on anecdotal and case study evidence.

This section will summarize the results of available e-business surveys and case studies on the adoption of ICTs in SMEs in selected countries of developing Asia and Africa. It is not meant to offer a comprehensive overview of e-business take-up in the developing world, but reflects data and information available at the time this Report was prepared. Most of the surveys and studies mentioned below were carried out on an ad hoc basis, responding to a specific demand (internationally, regionally or nationally) by researchers or policy makers. While no (solid) cross-country analysis can be performed, the section will extract some commonalities and differences among countries. The purpose is to highlight the particularities of e-business in developing countries' SMEs and the implications this may have for ICT-related policy-making.

1. E-business surveys in developing Asia

As shown in chapter 1 of this Report, Asia has over 200 million Internet users, a figure which represents growth of almost 100 per cent from 2000. China represents almost 28 per cent of that, followed by Japan with approximately 27 per cent. However, it is Singapore, with only 2.1 million users, that leads the rankings.

Asian countries/territories figure prominently in the e-readiness rankings of the Economist Intelligence Unit (EIU) and the *Global Information Technology Report (GITR)*.[3] Singapore (seventh) and Hong Kong SAR (ninth) are in the EIU top ten, while Singapore is also the second country after

Box 2.2

Towards official statistics on e-business

So far, few developing countries have started to systematically collect information society statistics, including e-commerce and e-business data. This is due to, among other things, the lack of awareness among policy makers of the need for information society statistics and indicators, as well as limited resources and capacities in national statistical offices.

The majority of developing countries are just beginning to recognize the importance of collecting ICT statistics, driven by the policy debates that are taking place at the international level, for example in the context of the WSIS. As a result of such debates, a number of initiatives are emerging with the objective of advancing the production of ICT statistics in developing countries and working towards international harmonization of the data and indicators (see chapter 1 and web site measuring-ict.unctad.org).

International comparability is crucial to the development of statistics and indicators in all areas, including on the information society. So far, most of the methodological work at the international level has been carried out by the OECD, which has started to work on common definitions, methodologies and model surveys for the collection of ICT indicators in the mid-1990s (OECD, 2002b). Since then, considerable progress has been made, as a result of which a number of OECD countries are now collecting e-business (and other ICT) indicators on a regular basis. For example, a model questionnaire on ICT usage in enterprises was adopted in 2001 and has since been used in many OECD countries. Similarly, EU members have used the model questionnaire to design their business and household surveys, which are carried out on an annual basis. Currently, a module on e-business activities is being developed; its aim is to collect ICT usage indicators related to customer acquisition and retention, finance and account management, product service and support, or logistics and inventory control.

International comparability of ICT indicators needs to take into consideration definitions of business size and industries. For example, cut-off numbers of employees for "small" companies may vary across countries, leading to shifting weights of different size groups (OECD, 2002b). In some countries, business surveys do not cover all sectors, and this can result in misleading international comparisons. The model surveys developed by the OECD help to harmonize the definition of indicators, thus contributing significantly to the international comparability of ICT data.

But to what extent can the definitions and model surveys that were developed in an advanced country context be applied to developing countries? Some of the main challenges which enterprises (and particular SMEs) in developing countries face include lack of management and ICT skills, international exposure, and trust in online payments or access to international credit cards, and slow and unreliable connections. In particular, there is no universal access to the Internet in most poor countries and huge urban–rural divides exist.

the United States in the Networked Readiness Index (NRI) ranking of the *GITR 2003-2004*. Other countries/territories high in both rankings are Japan, Taiwan Province of China, the Republic of Korea, Australia and New Zealand.

Increasingly, there are synergies between the region's leading operators and vendors, in particular in the telecommunications sector. For example, a Japanese mobile Internet provider has set up a research and development facility in China to develop fourth-generation technology (EIU, 2004). Also, Asia is an emerging market for outsourcing, as evidenced by India's IT-enabled service sector, call centres in the Philippines, customer help desk centres in Malaysia, and Korean-language and Japanese-language software production houses in China.[4] Basic connectivity and related investment remain low in many countries; for example, India ranks 46th in the EIU e-readiness ranking and 45th in the NRI ranking despite its strong outsourcing sector (estimated at $17 billion annually).

The Asia Foundation has carried out a project to survey the use of the Internet and e-commerce in four South-East Asian countries – Indonesia, the Philippines, Sri Lanka and Thailand.[5] The data were collected at the end of 2001. Since then, many companies have connected to the Internet and thus some of the results may look different today. Furthermore, the selection of SMEs for the survey was not based on a random sampling, because Internet penetration was too low at that stage (i.e. the number of companies using the Internet as a percentage of total Internet users was still very small). Therefore, the companies are not representative of all SMEs in each country and the surveys do not reveal how many companies use the Internet. Rather, they look at those that use the Internet, plus some non-users and prospective users.

Nevertheless, the surveys provide a useful overview of Internet uptake by SMEs in the four countries and find certain commonalities that can be applied to all of them. Generally speaking, the

studies revealed three types of SMEs: (i) Internet users, (ii) prospective Internet users, and (iii) traditional companies, namely those that have no intention of using the Internet in the future.

Internet users were found to be further advanced in areas such as production management and capacity, capital accumulation, accounting, marketing or English-language skills. The owners of these companies had advanced degrees or long-term experience in their industries; in fact, a strong link could be identified between the level of education and experience of the business owner/manager and the effectiveness of the company's Internet usage.

Companies that were *prospective Internet users* were working to improve their management standards, but were still struggling with internal challenges such as credit issues, financial management or obtaining short-term loans. However, they were aware of the importance of marketing and reaching out to customers.

Traditional companies (non-users) had a passive approach to doing business in general. Their main focus was on production, and not on market outreach. Non-users were characterized by a lack of awareness about the potential of ICTs and a management indifference to technological progress.

The surveys also revealed a certain pattern of Internet usage among SMEs: they usually start with e-mail before moving to setting up a website and using the Internet for research and IT development. E-mail was by far the most commonly used Internet application of SMEs, which used it for interacting with customers, followed by business-related research on the Internet. Websites are used to promote products rather than to carry out online transactions (or e-commerce). B2B e-commerce was almost non-existent, particularly at the domestic level. Exporters of both goods and services (e.g. the tourism industry) used the Internet much more than those selling to the domestic market. Country-specific evidence is presented in box 2.3.

The studies found that profitability is crucial to SMEs' willingness to go online. If companies experience a positive impact on their business, for example an increase in the number of customers, they are willing to invest in hardware and connectivity. In other words, the readiness of SMEs to invest in ICTs is not necessarily a cost factor.

SMEs located outside major cities are clearly disadvantaged in terms of Internet access. The rural–urban digital divide materializes in terms of higher connection fees, insufficient number of lines, and slow and unreliable connectivity. For example, in Thailand the main criterion for choosing an Internet service provider (ISP) was the connection speed.

Box 2.3

Examples of ICT usage by Asian SMEs

In Thailand, half of the companies surveyed had websites, in particular those active in the tourism sector. Around 40 per cent of these had online ordering applications, and 13 per cent were members of e-portals.

In the Philippines, while nearly all SMEs consider the Internet and e-commerce important, exporters were more inclined to use ICTs and the use of e-commerce was still very basic. The Internet was mainly used for communication and research and for maintaining business relationships through e-mail. Business deals were often closed in a face-to-face interaction, not online.

In Indonesia, the tourism sector is a very active user of the Internet. For example, in Bali, online travel companies support small hotels that do not have computers or the Internet by taking online orders for them. Hotels reported that their average occupancy rate increased from 20 to 90 per cent as a direct result of web listings. Ten per cent of the SMEs surveyed had sold online — for example, jewellery suppliers in Bali sell to retailers and individuals in other countries. In this case, online payment facilities are important for customers who do not want to disclose credit card information by regular mail or make international money transfers for low-value transactions. B2C e-commerce was almost non-existent, in particular at the domestic level, owing to high online payment and delivery costs. Domestic B2B e-commerce still relies on faxes to confirm orders and does not accept the legitimacy of e-mail confirmations.

Source: www.asiafoundation.org/ICT/surveys.html

The studies also revealed that e-payments were rare, and even for sales generated online most payments were made by bank transfer. Less than 30 per cent of SMEs with websites accepted online payments. An exception was in Sri Lanka, where 60 per cent of SMEs with websites were equipped for online transactions via credit cards. The main reasons for the low use of e-payments were security concerns in relation to Internet banking, fear of credit card fraud and fear that products would not be delivered or would be substandard.

The four country studies draw a number of note-worthy policy conclusions (further addressed in section E). Since neither cost nor technical ability was found to be the main barrier preventing the SMEs surveyed from going online, credit and training were not considered the most important policies to put in place and would not necessarily accelerate the adoption of ICTs by SMEs. The subsidization of SMEs' adoption of ICTs was thus not recommended by the authors. Rather, Governments should concentrate on the necessary regulatory and legal changes, such as e-commerce legislation (online contracts, fraud), banking laws to ensure that credit card and foreign currency transactions are affordable and enforceable, and deregulation in the telecommunications industry to lower costs and increase access outside major cities.

In another study, on the adoption of e-business by SMEs in three manufacturing sectors (garments, automobile components and electronic goods) in India, the authors found that the use of advanced e-business tools is greater in the electronic goods and garment sectors than in manufacturing (Lal, 2004). The study also revealed a strong correlation between the level of academic qualification (higher education) of the company manager and the intensity of ICT use by the firms; between the skill intensity of employees and ICT use; and between the size of the firm and the adoption of e-business. On the other hand, capital intensity (measured as capital employed per capita) did not seem to impact on the use of ICTs. The author also found a positive relationship between profitability and the level of intensity of ICT tools, with firms using more advanced e-business tools having achieved higher profitability, in particular in the electronic goods sector. This confirms findings from studies in more advanced countries, with

regard to the impact of ICTs on productivity (see section B).

2. Surveys and case studies from Africa

Africa is the region with the fewest Internet users, although their number has doubled since 2000 (see chapter 1), and information on ICT usage indicators is largely incomplete. South Africa represents nearly one third of Africa's Internet users and has the highest EIU and NRI rankings in the region (32nd and 37th, respectively).

However, uptake of Internet services, including broadband, has been modest at 7 per cent of the population. The EIU cites high costs and inadequate coverage of high-speed connections, partly owing to the lack of market competition. Nonetheless, South Africa has developed a competitive advantage in business service processing, and the Government spends over $1.2 billion annually on its own IT infrastructure, much of it supporting e-government interfaces. Elsewhere in the region, the national telecommunication company in Algeria is investing in next-generation mobile systems supplied by Chinese vendors. However, the rate of Internet penetration in Algeria is at 16 users per 1,000 people, owing to poor telecommunications infrastructure and high costs, and this poses difficulties for the development of e-commerce.

The UNECA SCAN-ICT project has carried out a number of country studies (Ethiopia, Ghana, Morocco, Mozambique, Senegal, Uganda) to assess the penetration of ICTs, including among businesses. In the case of Ghana (INIIT, 2002), 81 per cent of firms surveyed had Internet access, 35 per cent had Web presence and 16 per cent were engaged in e-commerce. In other countries, SCAN-ICT has obtained different insights related to ICT use by businesses. For example, lack of an e-commerce regulatory framework and adequate infrastructure was identified in Mozambique as an impediment in the development of e-business in the country. In Ethiopia, a closed market (government monopoly) posed obstacles to the development of ICT infrastructure and services, and there was a lack of awareness of the wider business applications of ICT (computers are viewed mainly as

office tools).[6] Nonetheless, Internet subscribers have increased in Ethiopia (over 6,000 subscribers in 2002, with 96 per cent in Addis Ababa and the rest in 11 other towns), and there were 2.5 subscribers per 1,000 people in the capital versus 0.24 in other towns. From 2001 to 2002, the number of local websites increased from 68 to 88. Information on other SCAN-ICT countries is given below.

In 2001, a survey was carried out in Senegal with medium-size and large industrial enterprises (UNRISD, 2002). Even though the survey did not include small enterprises, it is worth noting that the use of the Internet was very limited among the enterprises (hence it is likely to have been even lower among small firms). While almost all of the firms (92 per cent) were connected to the Internet, in most cases only the head of the enterprise had access (too costly, not necessary). The most common use of the Internet was for e-mail, and a small number of firms had their own website. E-mail was used to communicate primarily with suppliers, followed by internal company exchanges and customers. E-commerce and e-business were practically non-existent. By way of explaining why the Internet was not used very much, companies mentioned that the "profitability" or commercial usefulness and immediate returns for the investment in ICTs were not clear, or that surfing the Web wasted time. Another reason was that their partners, such as customers and suppliers, the Government, banks and insurance companies, were not using the Internet (yet) and therefore were not able to interact with them online. Given the poor telecommunications infrastructure in most of the countries of the Economic Community of West African States (ECOWAS), no commercial ties have been created through the Internet with partners at the regional level. Furthermore, concerns related to Internet security (virus transmissions, malfunctioning, privacy of information) prevented them from adopting the new technologies. Finally, the overall lack of local, "Senegalese" content useful for entrepreneurs (including business information, legal and regulatory documents, and administrative forms) was noted as a major reason for not using the Internet more frequently. At the same time, business owners felt that, in particular, online government could significantly contribute to reducing costs in terms of both time and transport.

Nevertheless, the use of the Internet has increased rapidly among medium-sized and large Senegalese firms, from 13 per cent in 1996 to 92 per cent in 2001. It is therefore assumed that the overall trend will be an increased adoption of ICTs, in particular website use, followed by more complex e-business applications.

The Government of Egypt, together with the InfoDev programme of the World Bank, carried out a study on the role of ICTs in developing SMEs in Egypt, focusing on the apparel and home-textiles sector (MCIT/InfoDev, 2003). In 2003, they surveyed approximately 70 per cent of all exporting firms in the sector, contributing to 95 per cent of the export volume. They found a clear relationship between the size of companies and their e-readiness and usage. Small firms (here defined as employing between 30 and 200 workers) were largely managed by the owner, who was often unaware of the different technologies and too busy with daily operations. At the same time, almost 100 per cent of small companies are connected to the Internet and use e-mail (i.e. this figure is similar to the one for medium-sized and large enterprises). The Internet is largely used for external communication with suppliers and customers via e-mail, and to a lesser extent for research and marketing. E-commerce was found to be of less importance to the development of their sales and marketing. Companies reported that lack of qualified personnel was the main barrier to further development of ICTs, but were reluctant to invest in staff training since they might not be able to retain these investments. Other reasons included the perception that there was no need to use ICTs and that many of the smaller operations could be carried out efficiently offline.

In 2002, the Moroccan Government conducted a large e-business survey of more than 4,000 firms in the industrial sector (food, textiles, chemicals, mechanical engineering, electronics) as a follow-up to a similar survey conducted in 1999.[7] They found that all firms have personal computers (PCs) (with an average of 8 PCs per company compared with 6 PCs in 1999); 42 per cent of firms were connected to the Internet (compared with 20 per cent in 1999); 11 per cent had a website (5 per cent in 1999); and 7 per cent had an intranet (question not asked in 1999) (table 2.1).

The Internet was primarily used for e-mailing and information search, followed by file transfer, and

Table 2.1

Results from e-business surveys, Morocco, 1999 and 2002

	1999	2002
Number of PCs per firm (ave.)	6	8
Internet connection (%)	20	42
Web presence (%)	5	11
Intranet (%)	---	7
E-commerce (%)	8	8

the search for suppliers and customers. The companies' websites were primarily used for dissemination of business information, followed by online orders. More than half the companies use third-party providers to host their websites. As far as e-commerce is concerned, 8 per cent of firms reported that they engaged in e-commerce (online ordering). It is important to note that this is the same as in 1999, and hence no increase in online transactions has occurred. Among the sectors, the most active ICT users were firms in the electronics and textiles/leather sectors, but the largest increase in Internet connection and website presence was among the food and mechanical sectors. The main perceived barrier to using ICTs was the cost of hardware and software and of ICT services, followed by the lack of IT skills and awareness.

The survey also revealed a clear correlation between the use of ICT and the size of the company with respect to the number of firms connected to the Internet or having websites or intranets. However, while the difference between small and medium-sized companies was less significant, major differences exist between SMEs and large companies. Although the survey was very comprehensive in its design, it did not include any questions concerning the use of ICTs for specific business processes, such as human resource management, customer relationship management or value chain management. Hence, no information is available on the firms' use of ICTs for internal business functions or integration with suppliers' and customers' systems.

In 2002, a survey of firms in the auto-components, food and beverage, electronic goods and engineering manufacturing sectors was conducted in Uganda and Nigeria (Oyelaran-Oyeyinka and Lal, 2004). The objective was to identify factors that influenced the adoption of e-business by SMEs,

including microenterprises. The authors found that, overall, the level of adoption of e-business was higher in the higher-skill sectors of electrical and electronic goods than in the more labour-intensive sectors of auto-components and food and beverages.

In the case of Uganda, only a few firms (3 out of 84 surveyed) were at an advanced level of e-business adoption. Most used the Internet for e-mailing, and little e-business in production processes or supply chain management was present. The authors concluded that in these cases e-business adoption was mainly driven by vendors, rather than by a change in the firms' business strategies. Firms engaged in trading (such as in the food and beverage sector) were greater users of e-business than those in manufacturing, mainly for coordinating their activities with customers and suppliers.

The Nigerian survey covered 105 SMEs and microenterprises (fewer than 10 employees) in the engineering sector. More than one third of the firms did not use any ICTs at all, primarily those whose managers had a low standard of academic qualifications. Those firms that adopted higher levels of e-business were all run by managers with an engineering background, and had more skilled employees (engineers and graduate degree holders) among the workforce. In other words, limited skill levels in SMEs were a key factor for low ICT usage.

Humphrey et al. (2004), in an e-commerce study carried out in 2002 with 47 SMEs from the garment sector in Bangladesh, Kenya and South Africa, found that while all of them had connections to the Internet, very few were conducting B2B e-commerce. About a third of the firms had an intranet, mainly those from South Africa, and it was used

for sharing databases and documents. Only 20 per cent of companies had used the Internet for buying and selling. This included e-mail orders, and therefore comparisons with other studies (not including e-mail orders/purchases) are limited. Similarly, looking at 27 SMEs in the horticulture sector in Kenya and South Africa, the authors found that while all of them used the Internet, only 19 per cent had their own website (13 per cent in Kenya and 25 per cent in South Africa) and only 7 per cent had an intranet. The companies used e-mail primarily to maintain their customer relationships. For example, Kenyan horticulture exporters sent daily e-mail attachments informing their importers in the United Kingdom about their planting schedules, output projections and delivery details. Producers from South Africa sent digital images to their importers showing the quality of their products. About 30 per cent of the companies surveyed had used the Internet for selling or purchasing goods or services, including via e-mail.

The International Trade Centre (ITC, 2004), as part of its e-Trade Bridge Programme, has evaluated a number of SMEs with regard to their use of ICTs and the impact of the latter. They found that, for example, in South Africa a company building model ships used the Web and e-mail effectively in order to enhance management capabilities in production and marketing and thus tap international markets. The adoption of ICTs successfully turned a small business into a global business employing 40 staff and with a turnover of $600,000 a year. Similarly, the Internet enabled a trade logistics provider in the United Republic of Tanzania to streamline and speed up business procedures concerning customs, tracking and handling, thus reducing costs and increasing productivity.

The results of the surveys and studies from developing Asia and Africa reviewed in this section show that, generally speaking, the number of SMEs connected to the Internet is quite high (even in African countries) but the adoption of e-business practices is quite low. Internet access is often limited to the company owner or manager and its main use is e-mailing and information search. While website presence and online ordering/selling are growing, they are growing much more slowly. Despite the fact that several studies have demonstrated the correlation between ICT adoption and firm profitability/productivity, one of the major reasons for not using the Internet (from the viewpoint of the company owner) is the lim-

ited impact on business profitability, often coupled with the argument that few suppliers and customers are online. Other constraints relate to cyber security, and lack of local content and the necessary legal environment (e-commerce, online payments etc.).

Few of the surveys presented above focused in detail on the use of ICTs in specific business functions (e.g. CRM, distribution and logistics). As mentioned at the beginning of the chapter, studying e-business is a rather recent phenomenon and even in OECD country surveys, e-business questions are only now being incorporated. The following section presents the result of an e-business survey conducted by UNCTAD in Latin America, which included several questions related to ICT adoption in business processes.

D. The case of Latin America: E-business survey results

Estimates of the number of Internet users in Latin America vary, but all sources point to rapid growth during the past few years (see chapter 1). Accenture estimated 44 million users in 2004, while eMarketer estimated 60.6 million.[8] Mobile phones are increasingly providing a channel for basic electronic services (subscriptions in the region grew by 18 per cent in 2003), although mobile Internet services are still in their infancy. The EIU e-readiness leaders in Latin America are Chile (29th) and Brazil (35th), which are also leaders in the NRI ranking (32nd and 39th, respectively). Interestingly, Argentina is 37th in the EIU e-readiness ranking, owing to its position as an outsourcing "powerhouse", but occupies 50th place in the NRI ranking, after Mexico and Costa Rica. Government and private initiatives are helping along progress in e-business; for example, a law on digital signatures was recently passed in Mexico and efforts are being made by the national telecommunications company to accelerate the installation of Internet services. In Brazil, a private group will install free broadband in State schools, contributing to an expected doubling of the country's broadband rate.

More data on e-commerce and e-business are becoming available, but they are still scarce. Recently, a number of Latin American countries started to include ICT questions in their business surveys, for example Argentina, Chile,

Colombia, Peru and Mexico (ECLAC, 2004). In most countries, however, data on e-business are not yet collected through the official statistical system on a regular basis, and therefore only limited data are available on the use and impact of ICTs in enterprises. Furthermore, some of the ICT-related questions that have been included in the country surveys differ between countries. As a result, the indicators collected are not always comparable across countries, or at the international level.

In order to assess the uptake of ICTs by SMEs in the region and to obtain comparable results across countries, UNCTAD, jointly with FUNDES (see box 2.4), has carried out an SME e-business survey in five Latin American countries – Chile, Colombia, Costa Rica, Mexico and Venezuela.

Using the FUNDES infrastructure (i.e. local call centres in the countries) and SME database, during the months of February and March 2004, telephone interviews were carried out with a total of

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Box 2.4

FUNDES: E-business for SMEs in Latin America

The Fundación para el Desarrollo Sostenible en América Latina (FUNDES) is a network of enterprises and private institutions that works to promote the competitiveness and sustainable development of small and medium-sized enterprises (SMEs) in Latin America. It has offices in 10 countries (Argentina, Bolivia, Colombia, Costa Rica, Chile, El Salvador, Guatemala, Mexico, Panama and Venezuela) as well as a training agreement with an institution in Peru. FUNDES has 280 employees and more than 400 consultants and facilitators, and approximately 80,000 SMEs are included in its database.

FUNDES provides services geared primarily to improving SMEs' access to information, know-how and technology (consulting and training), and access to finance, and to supporting the development of entrepreneurial initiatives. In this context, it appointed in 2000 an international e-business manager to lead projects related to the Internet and to develop and implement a FUNDES e-business strategy. It has offered a training programme on the Internet and e-commerce, as well as consulting services for technological innovation, product and services innovation, and business development on the Internet. FUNDES has also partnered with information technology providers (Tecno-PYME) to offer business server packages, including technical diagnosis and support, conceived specifically for SMEs.

Furthermore, FUNDES created the MIPYME online business portal (http://www.MIPYME.com/), which allows SMEs to register and interact with other enterprises in their country, region and economic sector. MIPYME.com is also essential to the organization of a networking initiative that matches large companies requiring products and services with SMEs offering to provide these; online tools are used to initiate contacts between potential buyers and suppliers and to schedule physical meetings. More than 2,100 SMEs participated in this networking initiative between 2001 and the first half of 2004, and 80 per cent of them conducted transactions. The networking initiative has provided some lessons:

- Success is determined by a link between the online and the real world (virtual contact and information exchange, followed by actual meetings).
- The promotion of ICT use by SMEs must offer added value to be successful.
- Results are important to SMEs, not the process itself.
- Quality control must be ensured in order to encourage continued participation by buyers.

In addition, all of FUNDES' services have been integrated into MIPYME.com: online consulting and assistance, auto-diagnosis and distance learning, networking, e-business services, information on country business/market indicators, access to entrepreneurial capital, financial intermediation and even online credit (Banco Santander, Chile). An example of an SME that benefited from FUNDES' roundtables organized through MIPYME.com is Negocios Múltiples de Panamá (Nemupasa), which gained new clients and contacted new potential suppliers. As an authorized distributor of multinational 3M and a partner of US-based Prime Meridian Trading Corp., Nemupasa was able to secure a contract as supplier to the Panama Canal authority and a number of private clients.

The strategic partners of FUNDES help mobilize resources for its work and include the World Bank's International Finance Corporation, the Multilateral Investment Fund of the Inter-American Development Bank, German and Swiss cooperation enterprises, the Andean Development Corporation, and foundations such as AVINA and Argidius.

Source: http://home.fundes.org/

Table 2.2

Latin American SME survey sample

	Manufacturing	Services	Wholesale and retail trade	Total
Small enterprises (11-50 employees)	87	85	87	259
Medium enterprises (51-200 employees)	64	67	64	195
Total	151	152	151	**454**

454 SMEs – 90 in Chile, 90 in Colombia, 92 in Costa Rica, 90 in Mexico and 92 in Venezuela. In each of the five countries, SMEs are classified differently. For the purpose of this survey, the following definition was used: small (11–50 employees) and medium (51–200 employees). The sample was stratified according to the size of companies, with a slight bias towards small companies (195 medium-size enterprises, 259 small enterprises) and certain economic sectors (see table 2.2). The companies included in the database are mainly located in the capital cities of these countries. Therefore, the urban–rural divide could not be analysed through this survey, and the survey results therefore represent only SMEs in urban areas.

The questionnaire was divided into four modules (see annex I for complete questionnaire):

Module A: General information on ICT systems (including availability of PCs, Internet, e-mail, intranet, extranet)

Module B: Use of Internet and ICT (including types of connection, type of use of Internet and website, e-commerce, use of ICTs for internal and external business processes)

Module C: Perceived impact of the use of ICT and Internet on SMEs

Module D: Perceived barriers and needs as regards the use of Internet and ICT in general

The latter two (perceived impact and barriers/ needs) are qualitative measures and therefore need to be interpreted with caution. In particular, using qualitative indicators for international comparisons is risky. On the other hand, if used in combination with quantitative indicators, they could

explain some of the differences in e-business across countries.

The survey carried out for this study is based on previous work on measuring e-business in the OECD. The OECD model questionnaire on ICT use in enterprises was used as a basis for preparing the questionnaire for this survey.[9] An effort was made to adapt the questions to the local context and to the particular methodology used for this survey (i.e. telephone survey). Some questions, such as those concerning e-commerce via EDI or computer-mediated networks other than the Internet, were excluded. On the other hand, questions about future needs regarding the use of ICTs were added. The questionnaire was therefore adapted to meet concerns and needs specific to SMEs in the countries surveyed.

1. Availability of ICTs (PCs, Internet, websites)

It was found that 97 per cent of the SMEs surveyed used PCs, 94 per cent used the Internet and 92 per cent used e-mail (chart 2.4). Interestingly, none of the companies used the Internet in public locations such as Internet cafes, and only a very small number used it at home. This shows that the Internet is easily available to SMEs in urban areas in the countries surveyed and that there is no need for the communal access points (for companies), as is often the case in rural areas. Furthermore, about half the companies had intranets, but only 14 per cent had extranets. While PC, Internet and e-mail usage was fairly similar among the five countries, intranet and extranet use was much higher in Chile and Venezuela than in Mexico and Costa Rica.

No major differences between small and medium companies were observed as regards PC, Internet and e-mail usage (although a somewhat higher

Chart 2.4

ICT use by SMEs, by country
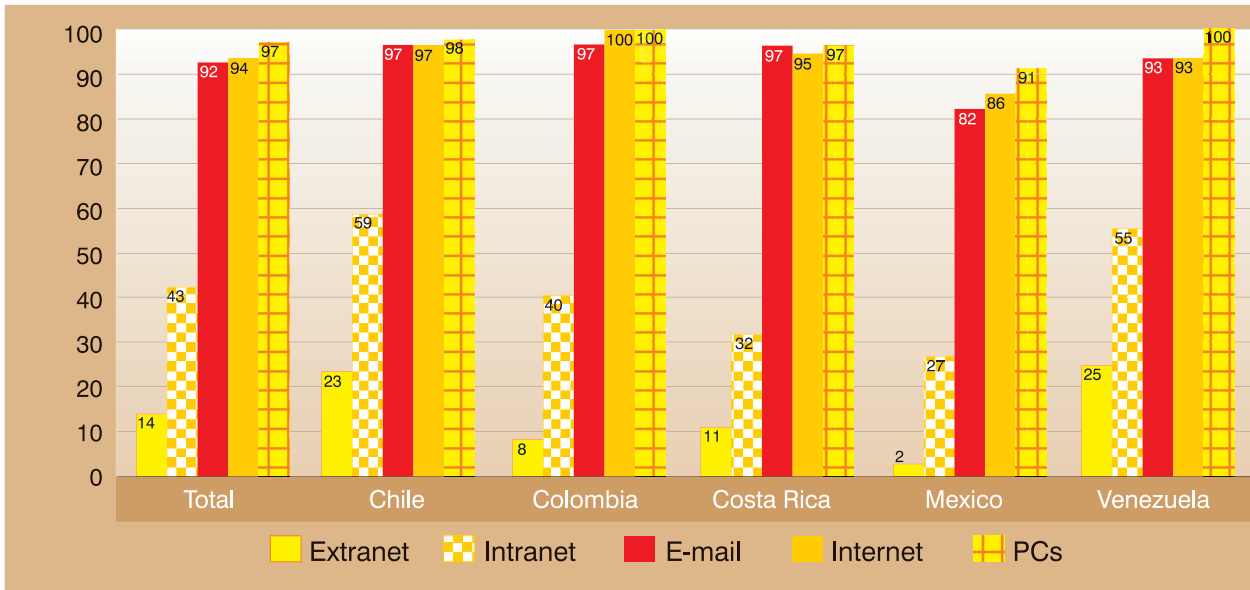
number of medium-sized companies was using e mail). On the other hand, 52 percent of medium-sized companies used intranets as compared with 35 per cent of small companies, while 15 per cent used extranets as compared with 12 per cent of small companies (chart 2.5).

As far as the different sectors are concerned, again, there are no major differences with regard to use of PCs, Internet and e-mail. But intranets were most common in services (53 per cent of all services companies), followed by the wholesale and retail trade (38 per cent) and manufacturing (37 per cent). Extranets were also most common in services companies, followed by manufacturing and trade.

In conclusion, the results show that the availability of PCs, Internet and ICT is high among companies located in urban areas, and there are no significant differences between small and medium-sized companies as regards basic access and use of the Internet (such as e-mail).

The most common type of Internet connection was fixed connections over 2 Mbps and analogue modem (32 per cent of all SMEs for each type), followed by fixed connections under 2 Mbps (16 per cent) and ISDN (13 per cent) (chart 2.6). Here, significant differences exist among the countries. For example, in Venezuela and Chile, fixed connections over 2 Mbps were the most common

Chart 2.5

Use of intranet and extranet by enterprise size
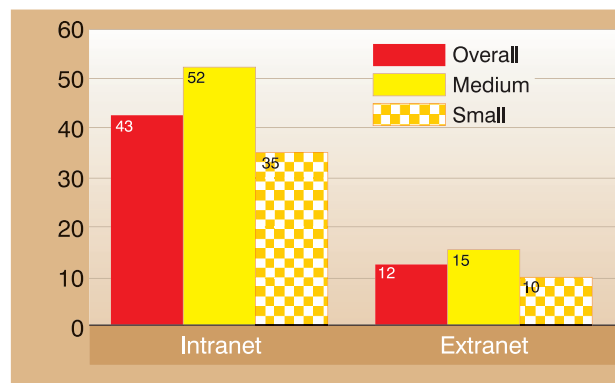
connection, whereas modem use was very low. In Mexico, fixed connections under 2 Mbps were the most common, in Costa Rica modem connections, and in Colombia ISDN (chart 2.7). Small enterprises were mainly using modem connections (40 per cent), whereas among medium-sized enterprises fixed connections over 2 Mbps were the most common (37 per cent). No major differences exist according to the activities of the enterprises.

2.   E-business

The module on e-business was the most complex one, comprising a range of questions about how

Chart 2.6

Types of Internet connection by country
(percentages)
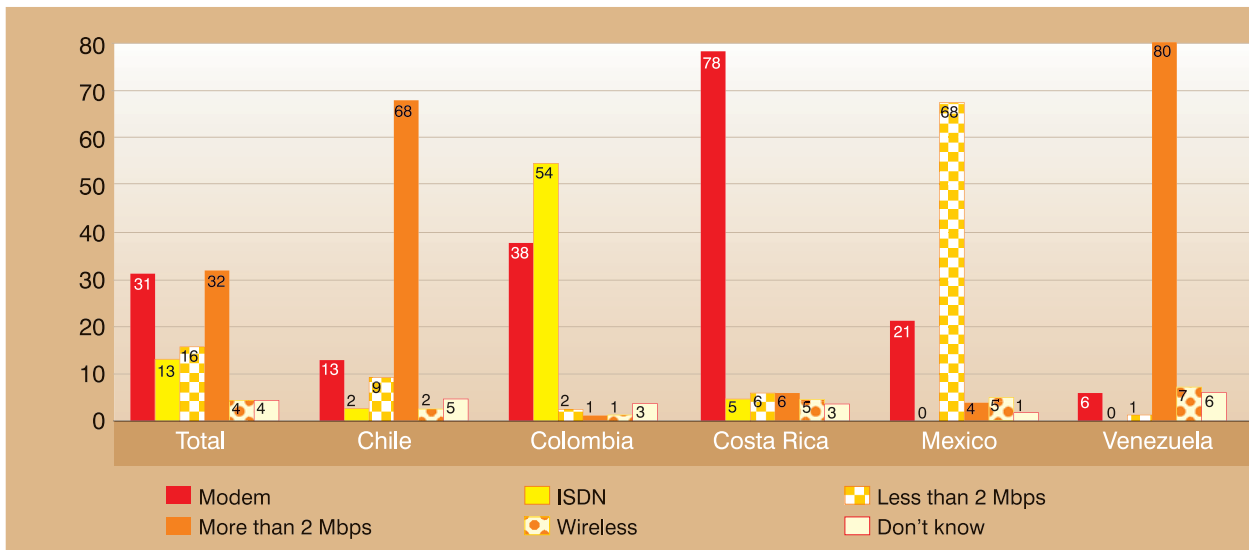
the companies use ICTs (e-mail, customer care, internal management etc.) and to what extent.

Among all companies, e-mail was the most common use of the Internet (98 per cent), followed by searching for information (90 per cent), banking and financial services (80 per cent), monitoring the market (54 per cent), communicating with public authorities (53 per cent) and looking for information concerning employment opportunities (27 per cent) (chart 2.8). With regard to differences among countries, as far as e-mailing and information search are concerned, values were similarly high. But in Venezuela, 95 per cent of firms use the Internet for financial services, compared with only 48 per cent in Mexico. Furthermore, Internet use for communicating with the Government was 77 per cent and 73 per cent in Colombia and Venezuela respectively, compared with 16 per cent in Mexico (chart 2.9). Service sector companies are more active users of the Internet, having above-average figures for all Internet activities, in particular as regards interaction with public authorities and monitoring the market.

Chart 2.7

Types of Internet connection by size
(percentages)
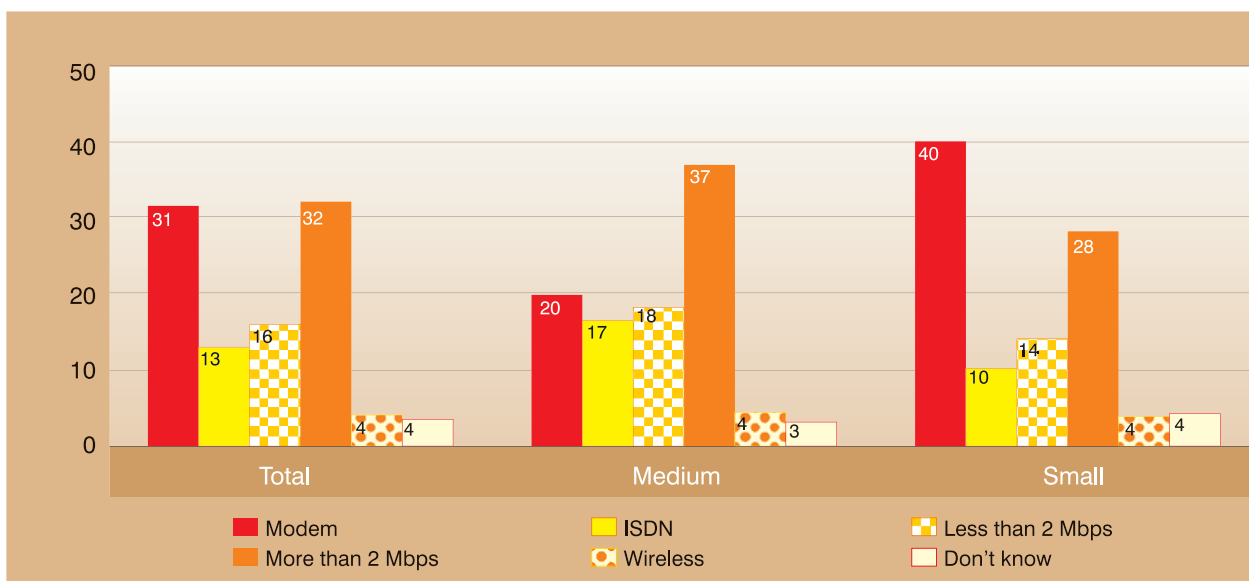
Chart 2.8

SMEs' use of Internet, by sector

(percentages)
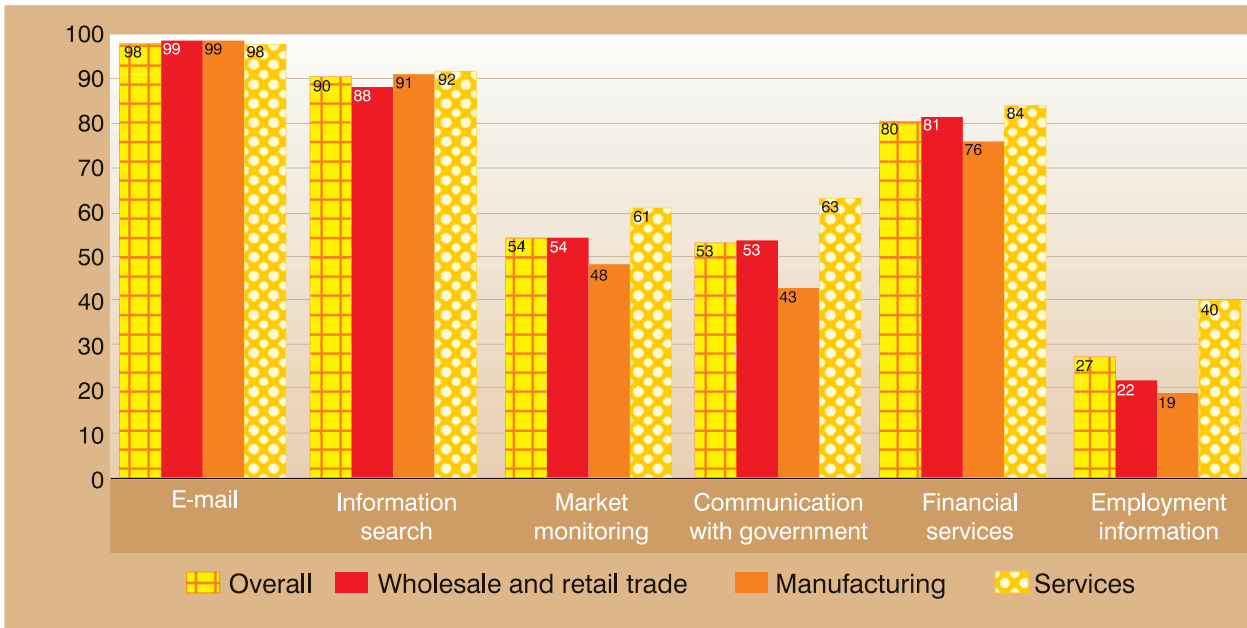
More than half of the companies had their own website and 22 per cent were considering creating one within the next two years. Those with websites mainly use them for customers to directly send inquiries to the company, for making available product information and for providing after-sales support (chart 2.10). Only 12 per cent of the companies offer secure online transactions or online payments via their websites. And only 9 per cent featured back-end integration with their suppliers/customers through their sites. The latter figure was particularly low among manufacturing firms. Again, services companies were the most active users of their website. One fourth of services companies with a website offer digital products through their sites.

Chart 2.9

SMEs' use of Internet, by country

(percentages)
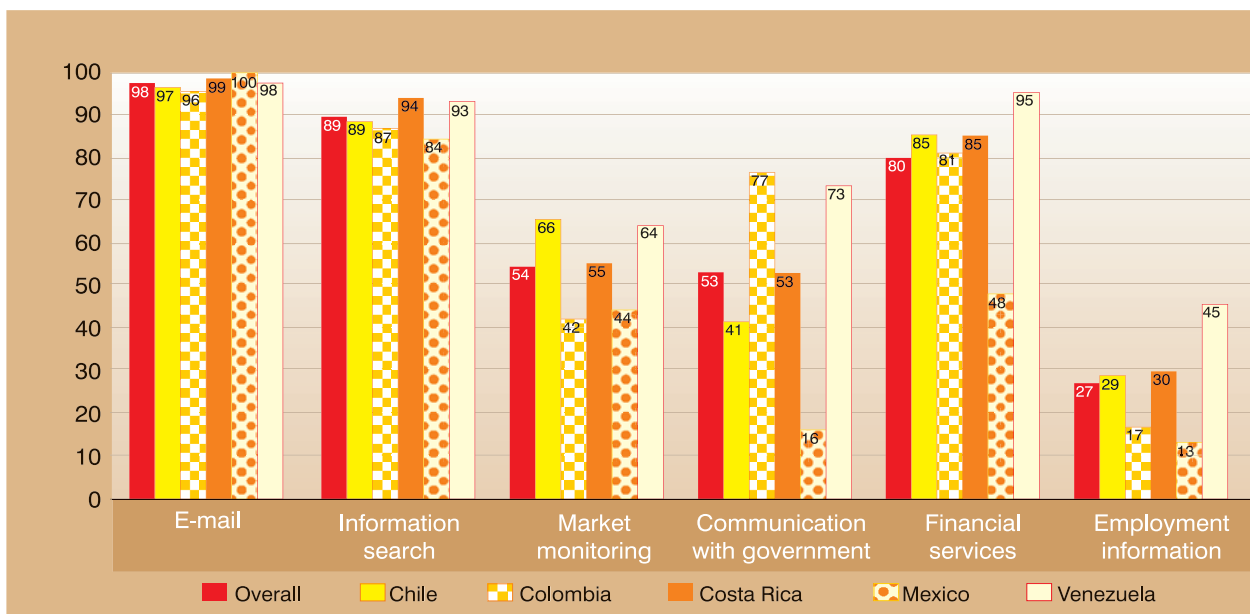
Chart 2.10

Website functionalities by sector
(percentages)

Legend: Overall | Wholesale and retail trade | Manufacturing | Services

Product information: 82, 82, 84, 81
Contact with clients: 83, 80, 76, 92
After-sales support: 37, 42, 32, 39
Secure transactions: 12, 11, 11, 14
Back-end integration: 9, 13, 1, 11
Online payments: 12, 13, 9, 14
Digital products: 12, 6, 1, 26

No major differences were found among the countries with respect to the number of companies with websites or planning to set up one in the next two years, except Mexico, where figures were lower in terms of companies with a website and higher for companies planning to create one in the near future. More medium-sized than small companies had websites, and more companies in the services sector compared with trade and manufacturing. While no major differences were observed with regard to size, small firms tend to use websites more for showcasing their products, whereas medium-sized firms largely use them for client contact.

As far as e-commerce — or the online ordering and selling of products — is concerned, purchases are much higher than sales (this is the case globally), with 38 per cent of all firms having purchased online during 2003 (two thirds from third-party websites, one third in e-marketplaces), compared with 13 per cent which had sold products over the Internet (charts 2.11 and 2.12). In some countries, firms were more engaged in online buying and selling, for example Costa Rica (59 per cent) and Chile (54 per cent), compared with Colombia (27 per cent) and Mexico (16 per cent) (chart 2.13). Asked about the amount of purchases made online, most firms either did not know the answer

or provided figures ranging from 1 to 90 per cent of total purchases.

Interestingly, no major difference could be observed with regard to firm size; in fact, the percentages of small firms buying and selling online were even slightly higher than those of medium-sized firms. But small firms use e-markets (rather than their own sites) more than medium-sized ones (chart 2.14). There are some interesting differences among the countries: as far as online purchases are concerned, firms in Costa Rica have mainly used e-marketplaces, whereas most of the firms in the other countries bought directly

Chart 2.11

Online transactions by sector
(percentages)

Legend: Online purchases | Online sales

Overall: 38, 13
Wholesale and retail trade: 37, 13
Manufacturing: 32, 8
Services: 42, 19
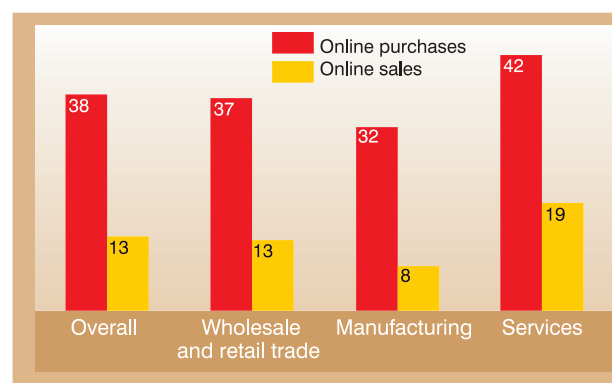
Chart 2.12

Internet transactions by sector (of total transactions)
(percentages)
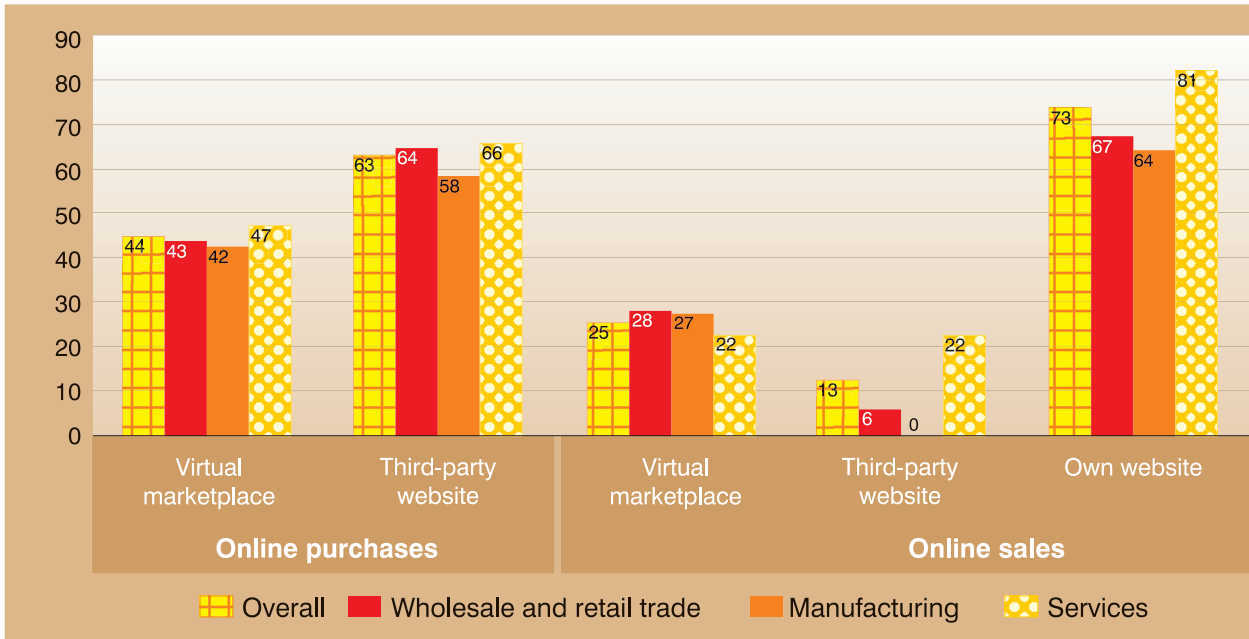
through other companies' websites. Similarly, Costa Rican firms made most of their online sales through either e-marketplaces or third-party websites, whereas, for example, firms from Chile and Colombia made all of their online sales through their own websites (chart 2.15).

The companies were also asked about the amount of online sales and purchases; however, this was difficult to answer for most of them and therefore the results are not conclusive. Similarly, most companies were unable to provide information on

the percentage of clients and suppliers found through the Internet. This confirms findings from surveys carried out in other regions, such as the European Union.

Using ICTs for internal business functions is becoming part of the business strategy of many enterprises in advanced countries (see section B) and the questionnaire therefore included questions concerning the use of computer networks for automating certain business tasks and integrating with systems of other companies. Among

Chart 2.13

Online transactions by country (only companies with Internet)
(percentages)
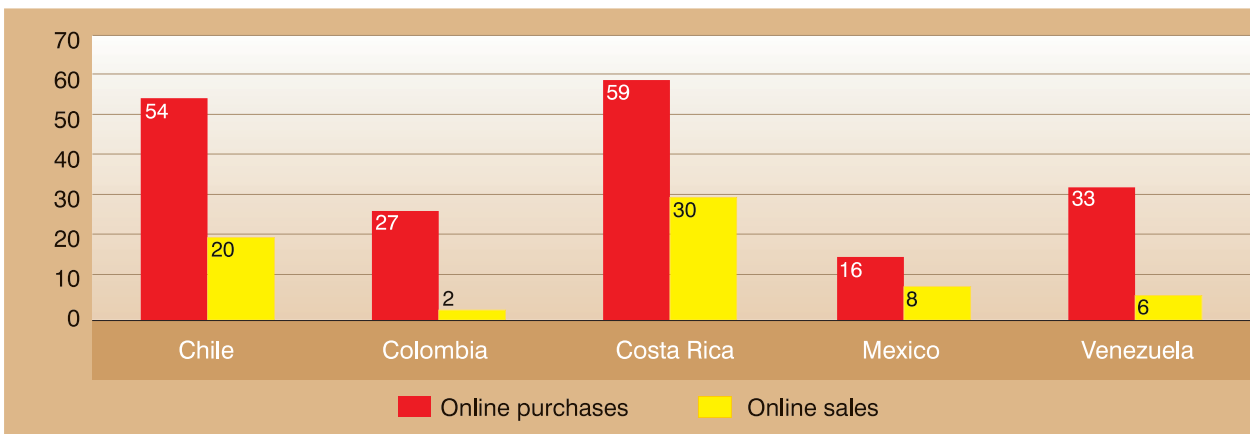
Chart 2.14

Online transactions by size

(percentages)
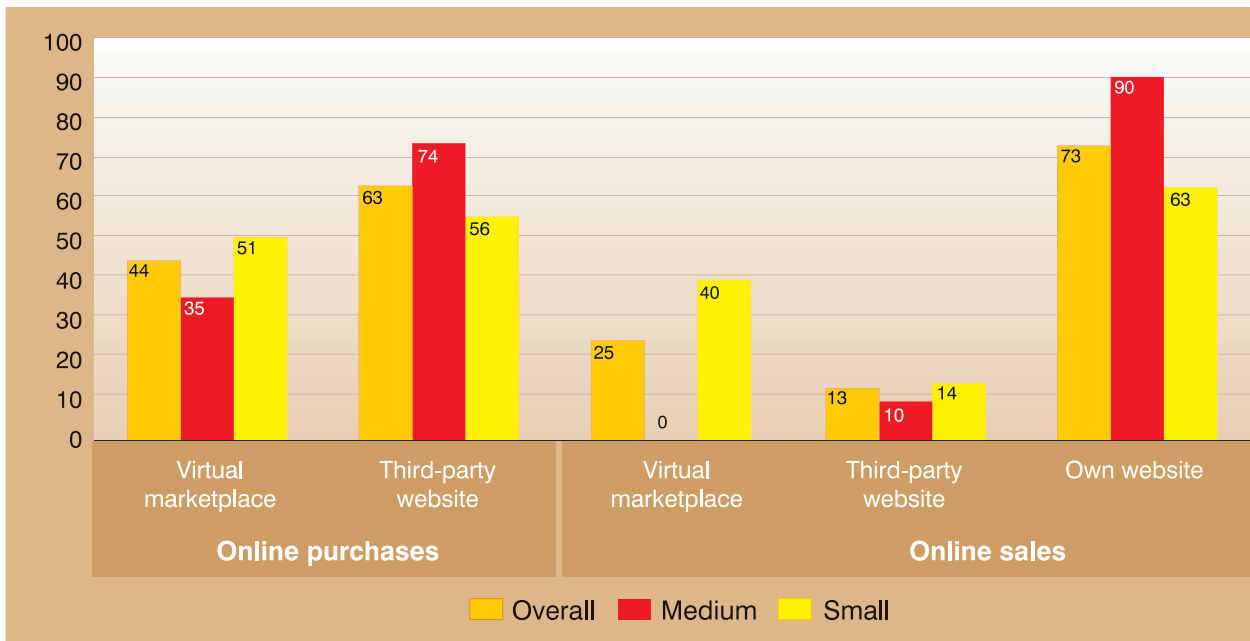
the SMEs surveyed, 48 per cent reported using an intranet, and 14 per cent use extranets. All of the firms that reported having an extranet also reported having an intranet, with higher percentages among medium-sized companies and those in services. Intranet and extranet use was more common in firms in Chile and Venezuela (59 and 55 per cent respectively of firms with intranets and 25 and 23 per cent of firms with extranets)

than in Mexico (27 per cent and 2 per cent respectively) (chart 2.4). As mentioned earlier, intranet and extranet use increases with firm size (chart 2.5).

The companies were asked a number of questions concerning the use of computer systems for various business functions, such as customer relationship management, value chain

Chart 2.15

Online transactions by country

(percentages)
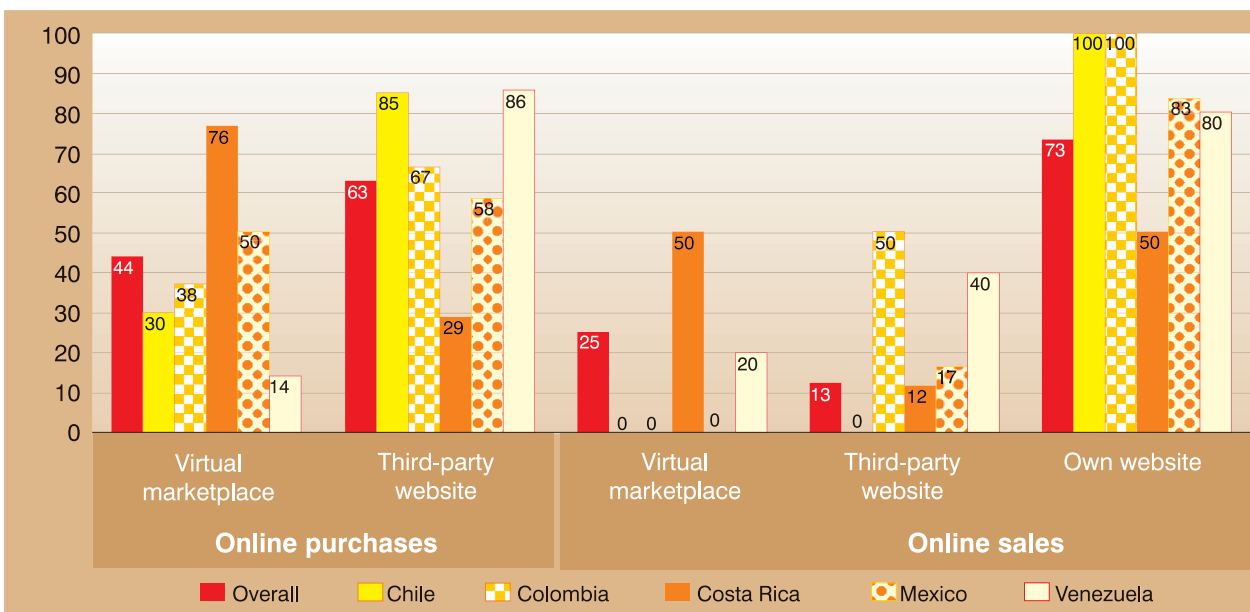
Chart 2.16

E-business processes by enterprise size (only companies with intranet)
(percentages)
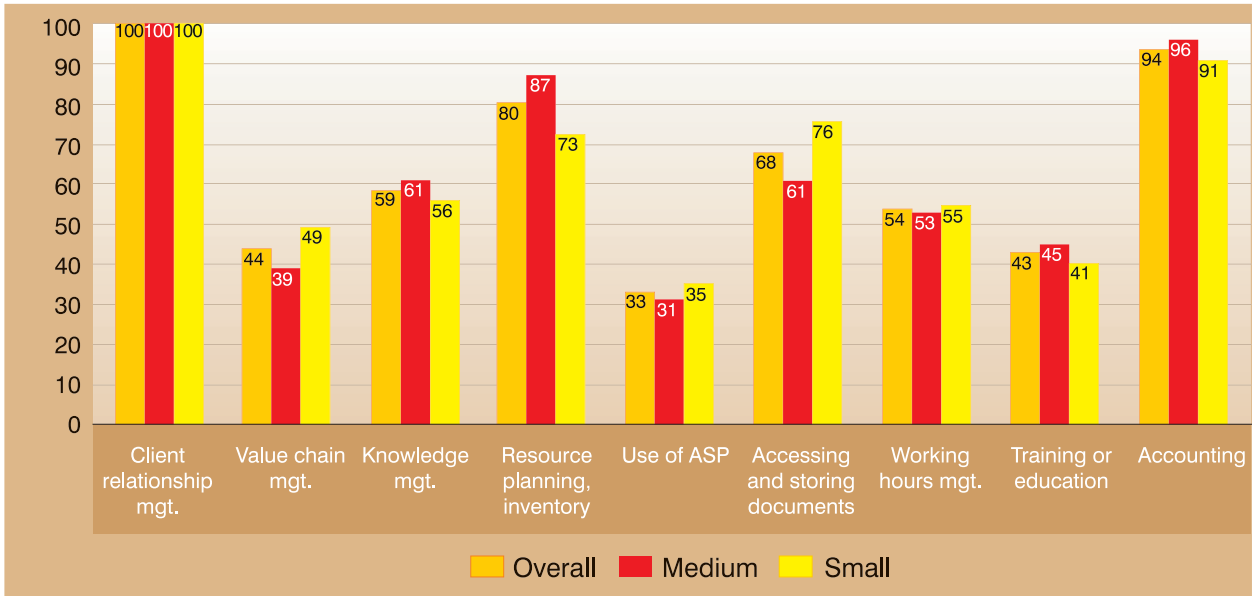
management, knowledge management, planning of resources and inventory, the use of application service providers, document control, management of working hours, training and accounting (see box 2.1). Some of these functions involve a higher degree of automation (e.g. value chain management) than others (e.g. document control).

From the survey results, it was not clear whether all companies understood the question in the same way. For example, a number of companies answered positively to the question about using computer systems for "accounting" and "document control" but negatively to the question about "intranet". It is possible that they simply meant that they used computers for managing their data-

Chart 2.17

E-business processes by sector (only companies with intranet)
(percentages)
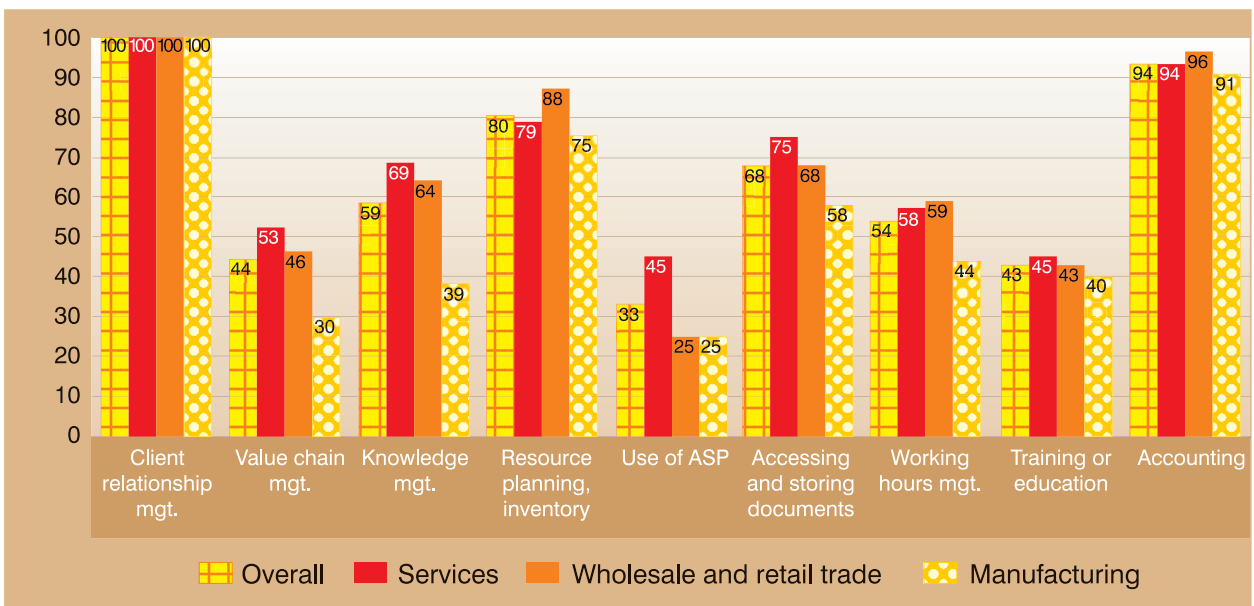
bases rather than a networked system of storing, retrieving and sharing data or an automated updating of information and databases. The question should have clearly specified the automation of business processes and system integration of certain functions, as opposed to using stand-alone computers for business tasks requiring human intervention.

Therefore, only those firms that indicated that they had an intranet (which include those with extranets) were selected, it being assumed that they would be at a more advanced stage of ICT usage for internal business processes. Those with intranets (and extranets) reported that they used computerized systems for a number of business functions. All firms reported that they used computerized systems for client relationship management, followed by accounting, resource planning and inventory, and document control. These were the most common applications, with more than three quarters of firms responding positively. Least common were the use of computerized systems for training or education (43 per cent) and the use of application service providers (ASPs) (33 per cent) (chart 2.16).

No clear difference was found with regard to the size of firms; in fact, higher values were reported from small firms for applying e-business for value chain management, ASPs, document control and working hours management. Those involved in service activities were clearly more active in applying online systems in their business tasks, with higher values for all applications (in order of importance): accounting, planning of resources and inventory, document control, customer care, knowledge management, management of working hours, training, management of value chain and the use of ASPs via the Internet. In particular, value chain management and ASP use were significantly higher among services companies, with 53 per cent and 45 per cent of firms respectively using these applications, compared with 30 per cent and 23 per cent of manufacturing firms (chart 2.17).

It may be noted that when tasks become more complex, in particular automating and integrating business processes, small companies are as active, and sometimes even more active users than medium-sized firms. While e-commerce is used by all companies, no matter what size and sector, small companies use more e-marketplaces, whereas medium-sized companies use company websites (of third parties or their own) for selling online. Services companies are the most active users of ICTs and the Internet, followed by trade and manufacturing (least active). This corresponds to findings elsewhere (see previous section) and is partly explained by the fact that functions such as marketing and selling services online require basic Internet access and website presence, and less system integration related to, for example, supply and value chain management, as is the case in manufacturing.

Chart 2.18

Perceived importance of ICTs by country
(percentages)
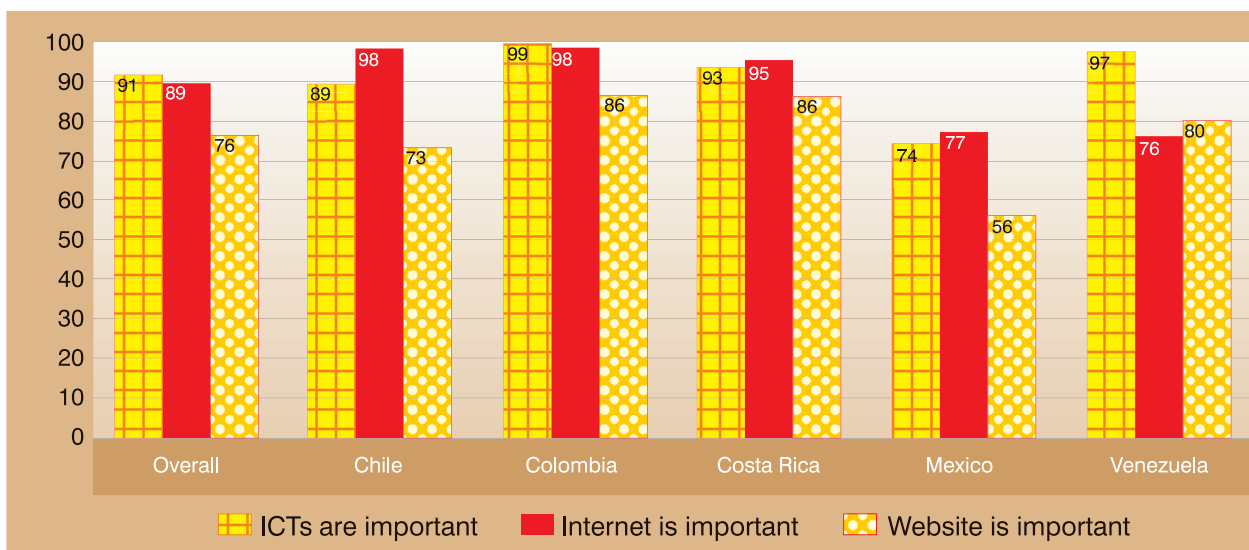
Chart 2.19

Perceived impact of ICTs by country
(percentages)
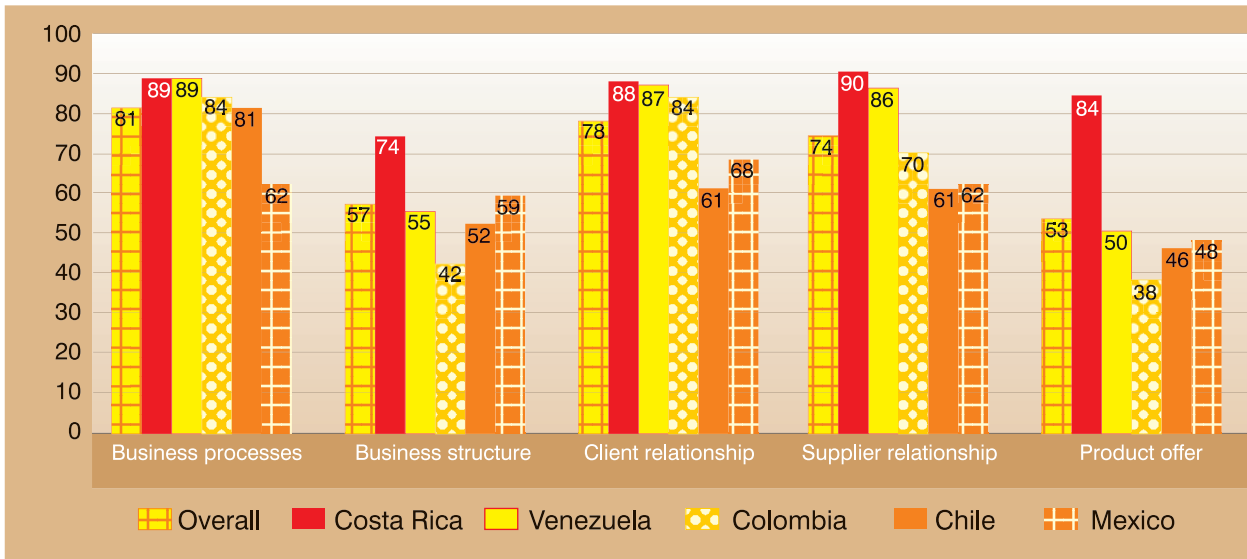
Some important differences among countries can be observed as regards the uptake of Internet and ICTs: most active users are firms in Chile and Colombia, followed by Venezuela. Firms in Mexico not only are less active online but also report more barriers to the uptake of the Internet and ICTs than those in other countries (see below). One explanation of this could be the sample, which mainly consists of companies located in Mexico City. It is likely that if the sample were taken from companies located in Monterrey, the business capital of the country, the intensity of ICT and Internet usage would have been higher.

3. Main perceived impact of using ICT

Almost all companies (90 per cent) consider the use of ICT and the Internet important to their businesses, and 76 per cent believe that having a website is important and are happy with their

Chart 2.20

Projected investment in ICTs by country
(percentages)
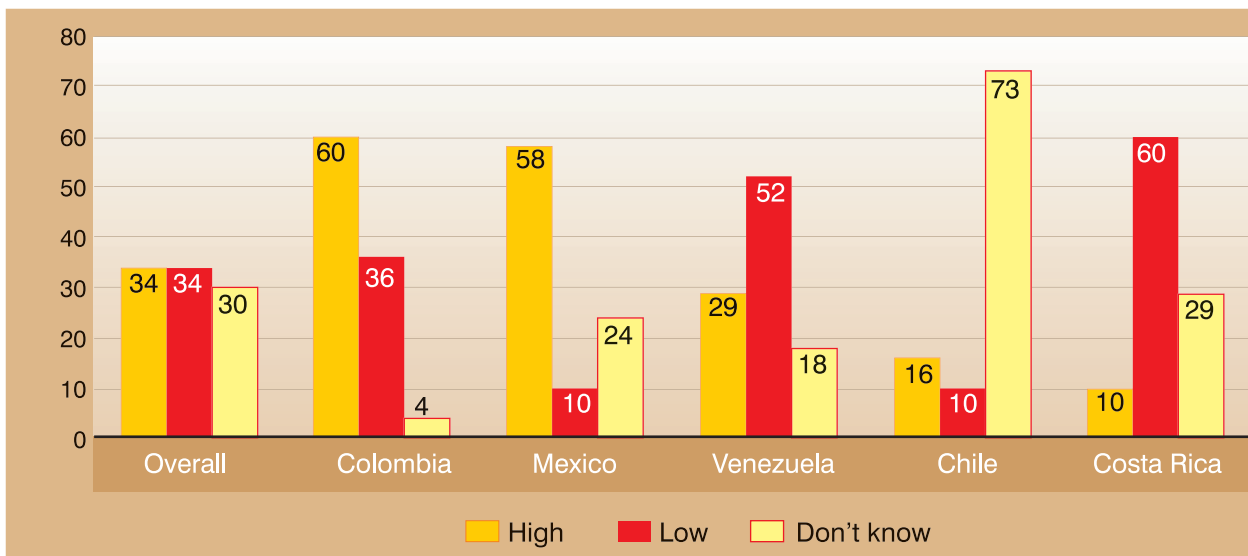
Chart 2.21

Barriers to ICT use by sector

(percentages)
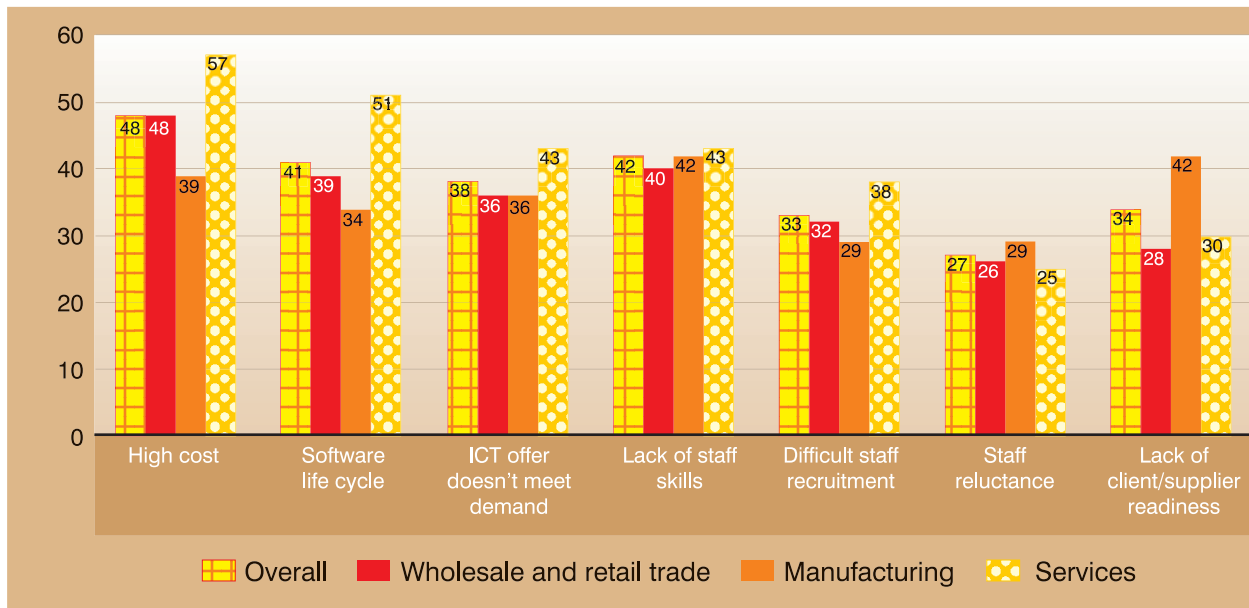
current use of ICTs. There are some differences, however, among the countries: while almost 100 per cent of businesses in Chile, Colombia and Costa Rica think that the Internet is important, the figures are somewhat lower in Mexico and Venezuela. Similarly, having a website has a higher priority in Colombia, Costa Rica and Venezuela than in the other countries (chart 2.18).

When respondents were asked about the main perceived impact or benefit resulting from ICT usage, they gave the following answers (in order of importance): change in business processes (81 per cent); customer relationship (78 per cent), supplier relationship (74 per cent), business structure (57 per cent), and change in products and services (53 per cent) (chart 2.19). It is worth mentioning that companies in Costa Rica were particularly positive about the impact of ICTs on their businesses, with very high percentages for each of the variables.

Interestingly, small companies considered the impact of ICTs more important than did medium-sized companies and were planning larger investments in ICTs for the next two years. They particularly mentioned the impact that ICTs have on the types of products and services offered and their overall business structure. Services companies consider having a website more important than do trade and manufacturing companies, and 61 per cent of them indicated that there had been a

change in products offered as a result of ICT, compared with 39 per cent of manufacturing firms.

The majority of enterprises (68 per cent) were planning further investments in ICTs during the next two years (high or low), while 30 per cent indicated they did not know yet (chart 2.20). However, there are some major differences among the countries: 96 per cent of companies in Colombia answered this question positively compared with only 26 per cent in Chile. This may reflect to some extent the current level of investment and the resulting needs for future investments. Small companies are ready to invest more in ICTs over the next two years. This shows the dynamics and rapid development of e-business adoption.

4. Main perceived barriers and needs to be addressed

Barriers to ICT use

Concerning the use of ICTs in enterprises, about half the companies reported that the costs related to ICTs have much influence; this is followed by insufficient knowledge of employees (42 per cent), the short life cycle of software (41 per cent), the fact that ICTs do not satisfy the needs of the enterprise (38 per cent), a lack of readiness on the part of clients or suppliers to use ICTs (34 per cent), and difficulties in finding and recruiting qualified employees (33 per cent) (chart 2.21). It is impor-

Chart 2.22

Barriers to ICT use by country
(percentages)

Legend: Mexico | Colombia | Venezuela | Costa Rica | Chile
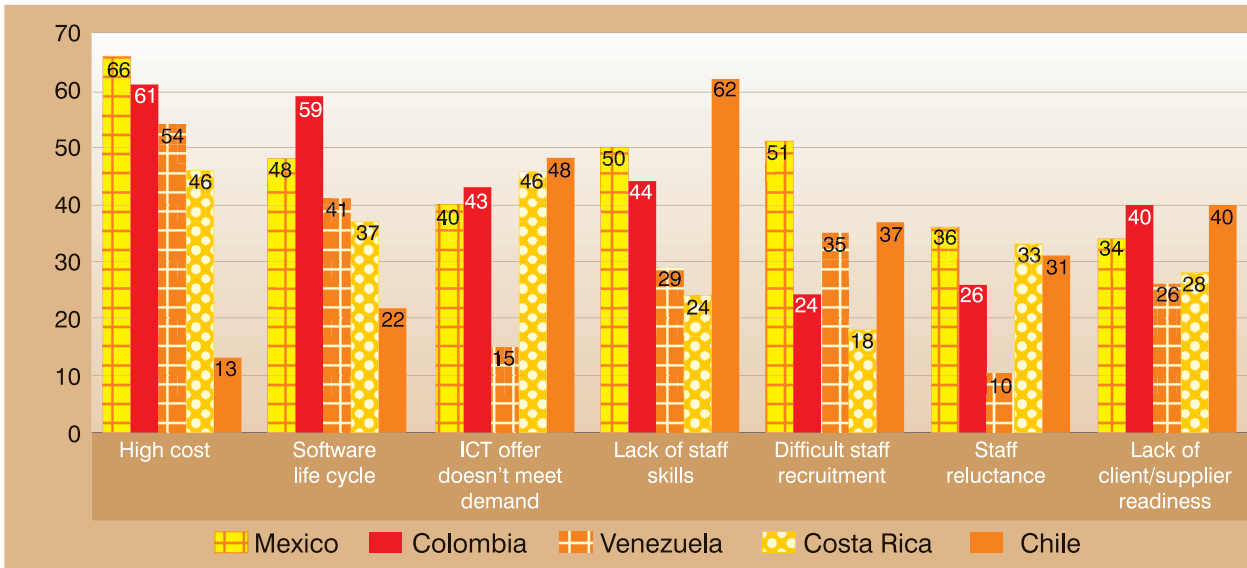
tant to note, however, that the companies that responded otherwise considered these barriers to have little influence on their use of ICTs.

The weight given to the various barriers differs among the countries. For example, while only 13 per cent of companies in Chile considered costs related to ICTs to be a problem, 66 per cent of Mexican companies considered this important (chart 2.22). Interestingly, a higher percentage of

medium-sized companies indicated that costs related to ICTs were the main factor influencing ICT use (55 per cent compared with 43 per cent of small companies), in particular companies in the services sectors. In the manufacturing sector, companies gave most weight to the notion that customers and suppliers were not ready to use the Internet (42 per cent compared with only 28 per cent of firms in the wholesale and retail trade).

Chart 2.23

Barriers to Internet use by sector
(percentages)

Legend: Overall | Wholesale and retail trade | Manufacturing | Services
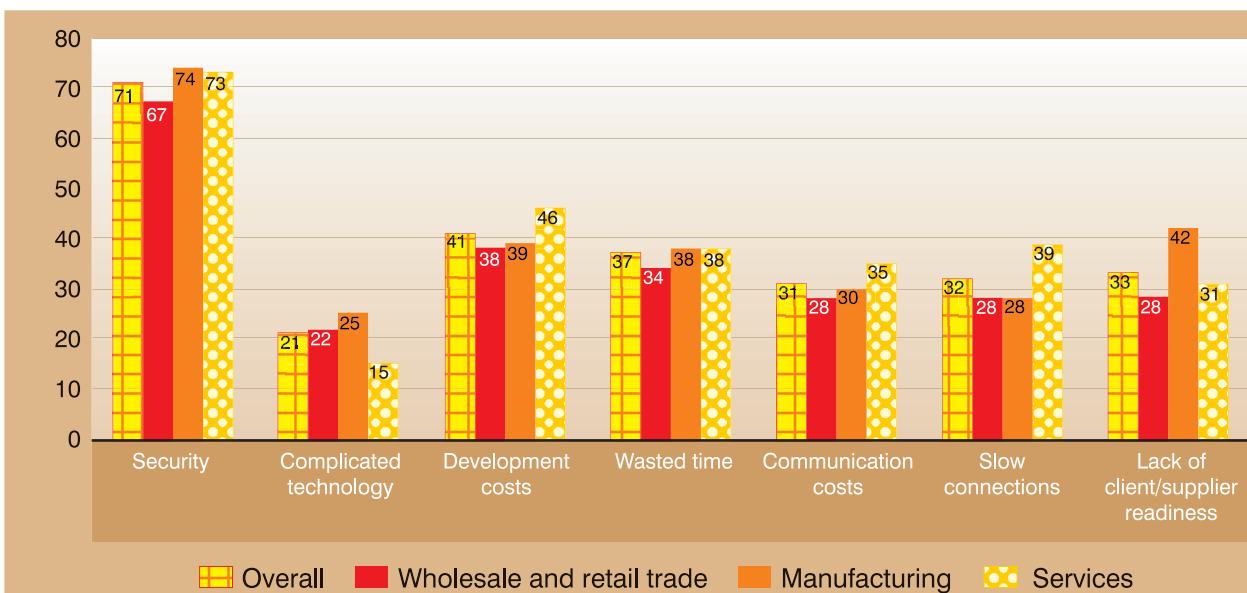
Chart 2.24
Barriers to Internet use by country
(percentages)

Mexico, Colombia, Venezuela, Chile, Costa Rica

Barrier	Mexico	Colombia	Venezuela	Chile	Costa Rica
Security	82	52	75	74	73
Complicated technology	44	14	10	10	25
Development costs	52	44	38	23	48
Wasted time	50	43	36	40	15
Communication costs	37	41	29	18	29
Slow connections	42	33	29	23	32
Lack of client/supplier readiness	40	36	15	53	24
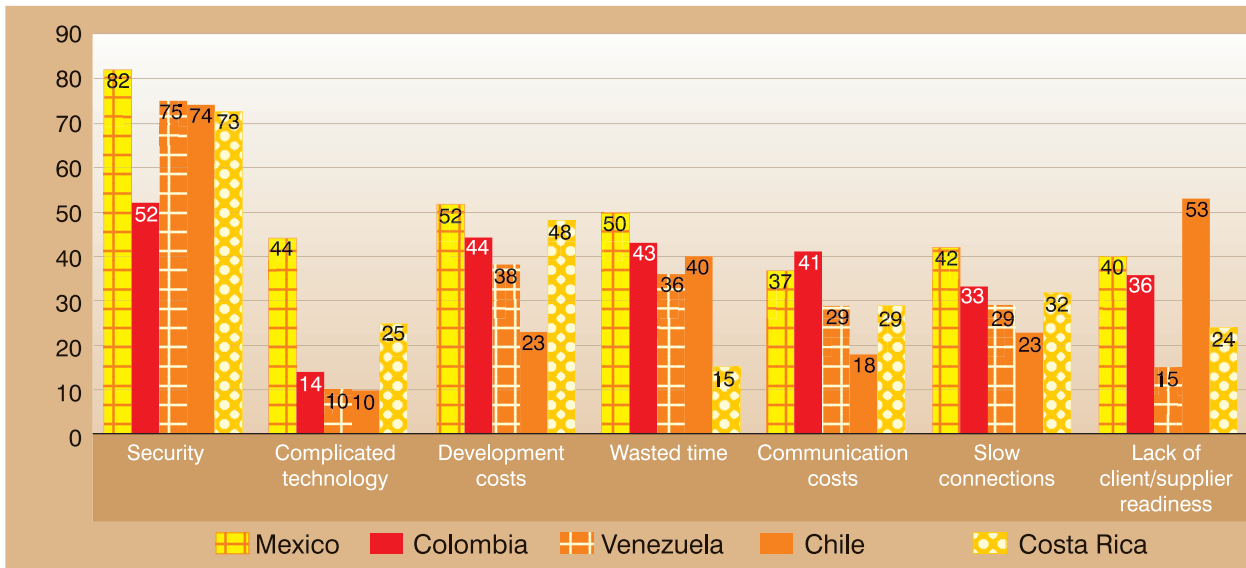
Barriers to Internet use

Security concerns were by far the greatest barrier to Internet use among all companies (71 per cent), followed by high development and maintenance costs (41 per cent), loss of time due to irrelevant Internet surfing (37 per cent), the non-preparedness of customers to use the Internet (33 per cent), and slow and unstable data transmission (32 per cent) (chart 2.23). All countries considered security concerns (including viruses) to be the most important factor influencing their companies' use of the Internet across all countries, firm sizes and sectors, but especially as regards medium-sized companies and those in manufacturing. This confirms similar findings in other countries and regions, and reflects one of the main current concerns of Internet use globally.

As with the use of ICTs, companies in manufacturing gave more weight to the fact that clients and suppliers were not ready to use the Internet. Services firms and small firms gave greater weight to the problem of slow/bad Internet connection.

Chart 2.25
Needs in respect of enhancing ICT and Internet use, by sector
(percentages)

Overall, Wholesale and retail trade, Manufacturing, Services

Need	Overall	Wholesale and retail trade	Manufacturing	Services
Staff training	81	83	77	85
Consultancy	60	60	53	67
Better hardware and software	67	66	59	76
Product compatibility	67	58	62	82
SME-specific products	58	52	54	67
Better connectivity	72	71	66	81
Access to credit	55	53	52	61

Chart 2.26
Needs in respect of enhancing ICT and Internet use, by country
(percentages)
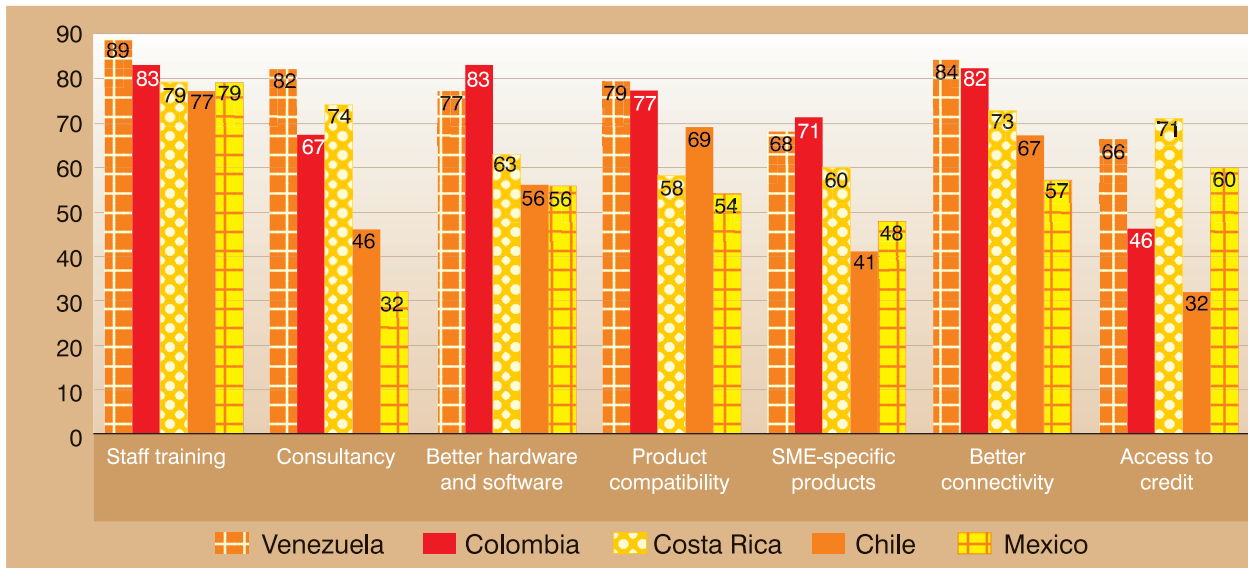
Other needs

A number of needs were identified, which if met could help SMEs to increase their use of ICTs and the Internet. The most important need with regard to the use of ICTs is the need to train employees. This is followed by (in order of importance) improved connectivity (speed, security etc.), better hardware and software, product compatibility, and consulting on strategy and implementation (chart 2.25). In all countries, staff training and improved connectivity were accorded great importance. However, there were some differences among the countries. For example, access to credit was more important for Mexico than for other countries; consulting on strategy and implementation was more important for Costa Rica; and product compatibility was more important for Chile (chart 2.26). Small companies have greater needs for consultancy on ICT business strategies and implementation, and for financing ICTs. Services companies need greater compatibility among products, improved connectivity, and better hardware and software, in particular software meeting the needs of SMEs. These could be customers for open-source software products, an increasing niche market in developing countries (UNCTAD, 2003a).

E.   Conclusions

A surprisingly large number of SMEs in developing countries are connected to the Internet. The results

of the surveys and studies presented in this chapter showed that in most cases, getting acess to the Internet was not a major problem for firms – even if connections are mostly slow (dial-up modem). Much more difficult is to fully integrate the companies' business functions using ICTs, and even more so for SMEs in developing countries, where frequently only managers have access to the Internet. The surveys also confirm that there is a certain degree of development that all companies will go through when adopting ICTs. This is illustrated in chart 2.27. It uses an S-curve, following an earlier graphical presentation frequently used to illustrate the pattern of ICT developments in countries.[10] A similar approach can be used concerning the development of e-business: for SMEs, it is relatively easy to start using PCs, then connect to the Internet using e-mail, and then set up a web page. However, the introduction of the Internet into their business activities (internal or external, including e-commerce) does not follow straightaway, and larger companies are more likely to automate their business processes (and to do so earlier) than smaller companies.

One explanation for this is that most SMEs have no defined e-business strategy. Using e-mail for communicating with suppliers and customers, and searching the Internet for business information have immediate, visible effects and are thus quickly adopted by companies. But putting in place more complex e-business systems, intranets or extranets, and linking up with suppliers' and customers' com-

Chart 2.27
E-Business development

Fully integrated business processes

Extranet

Ecommerce
ASP

ERP
CRM
SCM

Intranet

Integration with
suppliers' system
Invoicing and payment

HRM, finance
and account
Some logistics
and inventory control
Data sharing

PCs
E-mail
Web

Web presence

Product service
and support

E-mailing with
customers and
suppliers
Web info search

Level of e-business intensity

Time, business size, investment

puter systems, require not only technical know-how but also a solid analysis of the costs and benefits implied by the necessary investments, and convincing arguments in favour of them. In other words, SMEs need proof that e-business will benefit them. Needless to say, expected benefits (or the absence thereof) of ICT adoption also play an important role, in particular as they relate to cost savings/expenditures.

The results from Latin America, as well as the surveys from other regions that were reviewed, showed that there are significant differences among SMEs in different regions and countries with respect to the use of the Internet. For example, while mainly exporters in South Asia use the Internet, companies in Chile use it for domestic business, and in Europe it is mainly used at the regional level. In Asia, e-commerce sites/portals or e-marketplaces are irrelevant and have not yielded any successes, while in Latin America (in particular Costa Rica) a number of small firms use them for e-commerce activities. Even in developed countries ICT take-up by businesses differs among

countries with more or less equal (i.e. good) access to ICTs or level of skills.

This could be explained by differences in the access to and quality of connections; the use and availability of e-banking and credit cards; or the perception of security with respect to data privacy, virus attacks and other legal uncertainties. Many of these differences directly correspond to the prevailing legal and regulatory frameworks related to telecommunications, banking and finance, as well as trust in the legal system and enforcement of the law. There may also be important local and cultural factors influencing companies' level of e-business usage. This is an area where little work has been carried out, and thus requires further study.

While the Latin American survey did not cover firms located in rural areas, it demonstrated clearly the widespread availability of the Internet and PCs in urban areas. This is a common pattern across the developing countries, and has been confirmed by other studies. In urban areas, ICT use is fairly common, irrespective of the size of companies. But in

the rural areas of some developing countries, many small enterprises do not even have computers yet.

The main perceived barrier for Internet uptake is very similar across companies from both developed and developing countries. European, Latin American, African and Asian firms (already using the Internet) reported that the lack of network security was the key problem, followed by slow and unstable connections. An important finding from the studies is that for many companies the main reason not to go online is not the lack of technical skills and capacity, since in most developing countries, qualified personnel can be found, and they are growing in number. Rather, the use of ICTs depends on the capacity to manage the enterprise and on the level of education of the owner; the examples from Asia and Africa (Nigeria) showed that firms where owners had received higher education and had management skills were more likely to use new technologies.

Results from developed country studies evaluating the impact of ICT on firm productivity have demonstrated that complementary investments in human capital (i.e. skills), new business strategies and processes and new organizational structures are necessary in order for companies to reap higher benefits from the adoption of ICT. Companies that invested in these factors were also more intensive users of ICTs and the Internet.

For SMEs in developing countries, affording these complementary investments is more challenging. In those countries, it will take longer to see the impact of ICTs, even though many SMEs are already Internet users. An important distinction that needs to be made is between low-intensive users (computers, e-mail – at the lower end of the S-curve) and high-intensive users (intranets, extranets, full integration of business processes – at the upper end of the S-curve) and the related difference in impact of ICTs on business performance. On the other hand, SMEs have an advantage in that they can implement strategic and organizational changes much more quickly (and at lower cost) than large companies. This flexibility should provide them with a competitive ede when it comes to the adoption of e-business.

The results of the Latin American and other surveys provide information on how ICTs are used in SMEs. However, in order to evaluate the impact of ICT usage on business performance, further analysis – including time-series analysis - would be necessary. In particular, the link between integrating ICTs into certain internal business processes (e.g. automating supplier and customer relations) and labour productivity requires further micro-data analysis based on available statistical data, including data on ICT usage and labour productivity collected from various national business surveys.

The review of the e-business surveys showed how difficult it is to make cross-country comparisons, even on such simple indicators as Internet and e-mail use (is it used for communication, ordering or purchasing; how many employees have access, and how often?), or website presence in companies (is it the firm's own server or hosted by third-party providers?). Many surveys are conducted on an ad hoc basis, responding to a specific demand by researchers, business associations or government departments. As a result, the data often do not provide a comparable and representative picture of ICT readiness and use. Such a picture would require the continuous collection of data through official statistical sources. Demand by policy makers is crucial to speeding up the production of ICT-related statistics in developing countries.

A few policy directions can be provided on the basis of the above observations. First of all, the assessment of e-business in SMEs demonstrated that among the key barriers to Internet use are those related to connectivity (quality, speed, cost) and security concerns. These are clearly areas where Governments can and must take action. For example, to get started, SMEs need access to reliable, low-cost connections, where dial-up services are often sufficient. The reliability of the service is important for maintaining customer relationships. Therefore, and to bridge the urban–rural divide, emphasis should be placed on providing universal good–quality basic access, provided by a number of ISPs among which the enterprises can choose. Naturally, this should be followed by high-speed connections to allow companies to move towards full integration of e-business. Second, trust in a legal and regulatory environment supportive of the Internet economy is essential to companies for engaging in e-business. Third, for SMEs to make the leap from simple (and low-cost) Internet use, such as e-mail and web search, to building e-business systems fully integrated with those of their customers and suppliers requires additional investments, and technical and managerial skills to plan and successfully implement an e-business strategy. These are clearly areas where public and private agencies can play a crucial role in support of SMEs.

Annex I

Questionnaire on ICT usage and electronic commerce in SMEs

Modulo A: Información general sobre los sistemas TIC		
A1. ¿La empresa usa computadoras personales (PC),? (Filtro) **A1.1**. ¿Tiene pensado usar Computadoras dentro de los próximos 2 años?	Sí ☐ ⇓ ir a A3 Si ☐	No ☐ ⇓ ir a A1.1 No ☐

A2. Aunque su empresa actualmente no usa computadoras, ¿usa el Internet en instalaciones externas?
    A2.1. ¿Dónde? (marcar todas las opciones que apliquen)
	Sí ☐ → ir a A2.1.
	
	Internet Café
	Casa ☐
	         ⎬ ir a B2
	Otros ☐
		No ☐ → ir a E1

A3. ¿La empresa usa Internet? (Filtro) **A3.1**. ¿Piensa usar el Internet dentro de los próximos 2 años?	Si ☐ → ir a A4 Si ☐ → ir a B13	No ☐ → ir a A3.1. No ☐ → ir a B13
A4. ¿La empresa usa lo siguiente?	Si	No
E-mail	☐	☐
Extranet[1]	☐	☐

Modulo B: Uso del Internet y de TIC	
B1. ¿Actualmente, cuál es su tipo de conexión al Internet? (Varias respuestas posibles)	
MODEM análogo (Línea telefónica estándar)	☐
ISDN[2]	☐
Conexiones fijas de menos de 2Mbps (xDSL, ADSL, SDSL, etc.)	☐
Conexiones fijas de 2Mbps o más (Frame relay[3], otro servicio de red de banda ancha)	☐
Conexión inalámbrica (satélite, teléfono celular, otros)	☐
Otro (especifique)	☐
No sabe	☐
B2. ¿Para cuáles de las siguientes actividades usa el Internet? (Varias respuestas posibles)	
Correo electrónico	☐
Búsqueda de información	☐
Monitorear el mercado (por ejemplo precios)	☐
Comunicación con autoridades públicas	☐
Servicios bancarios y financieros	☐
Información sobre oportunidades de empleo (reclutamiento y búsqueda)	☐
B3. ¿La empresa tiene un sitio web? (Filtro) **B3.1**. ¿Tiene pensado establecer un sitio web en los próximos 2 años?	Si ☐ → ir a B4 No ☐ → ir a B3-1 Si ☐ → ir a B7 No ☐ → ir a B-7
B4. ¿Con cuáles funcionalidades cuenta el sitio web? (Varias respuestas posibles)	
Facilitar accesos a catálogos de productos, listas de precios, etcétera.	☐

[1] Una extensión segura a Internet que permite a usuarios externos acceder a (partes de) Intranet de la organización.

[2] **ISDN** = **I**ntegrated **S**ervices **D**igital **N**etwork. Es un sistema digital para la transmisión rápida de datos a través de la línea telefónica (cables de cobre).

[3] Servicio de transmisión de voz y datos a alta velocidad que permite la interconexión de redes de área local separadas geográficamente.

Inquietudes / funciones de contacto con la empresa	☐
Soporte posventa	☐
Capacidad de proveer transacciones seguras (por ejemplo a través de "firewalls" o servidores seguros)	☐
Integración con sistemas de Back End[4]	☐
Otro (especifique)	☐

B5 ¿Existe la posibilidad para que sus clientes de paguen en línea los productos? (E-Payment)		Si ☐	No ☐
B6. ¿Qué porcentaje de sus clientes ha sido obtenido por Internet?		%	
B7. ¿Su empresa entrega algún producto o servicio al 100% digital? **B7.1.** ¿Cuál?		Si☐→ ir a B7.1	Si☐→ ir a B7.1
B8. ¿La empresa compró productos a través de Internet en 2003? (Filtro) **B8.1.** ¿Dónde?	Si ☐ Mercado Virtual (Marketplace) ☐ Sitio Web de tercero ☐	No ☐ → ir a B10	No sabe ☐ ⇓ ir a B11
B9. Porcentaje del total de compras en Internet	%	No sabe ☐	
B10. ¿Con qué porcentaje de sus proveedores trabaja usted por Internet?		%	
B11. ¿La empresa vendió productos a través de Internet en 2003? (Filtro) **B11.1.** ¿Dónde?	Si ☐ Mercado Virtual (Marketplace) ☐ Sitio Web de tercero ☐ Propio Sitio ☐	No ☐ → ir a B13	No sabe ☐ → ir a B13
B12. Porcentaje del total de ventas	%	No sabe ☐	
B13. ¿La empresa usa Intranet?[5]		Si ☐ → ir a B14	No ☐ → ir a D1

B14. ¿En su empresa se usan sistemas de computación (o digitales) para lo siguiente?	Si	No
Gestión de la relación con los clientes	☐	☐
Gestión de la cadena de valor	☐	☐
Gestión de conocimiento	☐	☐
Planeación de recursos de la empresa, inventario	☐	☐
Utilización de aplicaciones directamente en Internet a través de un proveedor de servicios	☐	☐
Almacenamiento de (y acceso a) documentos	☐	☐
Manejo de las horas de trabajo	☐	☐
Entrenamiento o educación	☐	☐
Contabilidad	☐	☐

Modulo C: Impacto del uso del Internet y de las TIC en la PYME

	Si	No	No sabe
C1. ¿Actualmente, el uso de TIC en su empresa es importante?	☐	☐	☐
C1.1. ¿Será importante en los siguientes 2 años?	☐	☐	☐
C2. ¿Tener acceso al Internet es importante para su empresa?	☐	☐	☐

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[4] Integración del sitio web con los sistemas de la empresa para el intercambio automático de información de negocios (por ejemplo, con los sistemas de contabilidad e inventario).

[5] Una red de comunicación interna, usando el mismo protocolo que Internet.

	Si	No	No sabe
C3. ¿Tener un sitio web en Internet es importante para su empresa?	☐	☐	☐
C4. ¿Los procesos de la empresa han cambiado por el uso de TIC?	☐	☐	☐
C5. ¿La estructura de la empresa ha cambiado por el uso de TIC?	☐	☐	☐
C6. ¿El uso de TIC ha influido la relación con sus clientes?	☐	☐	☐
C7. ¿El uso de TIC ha influido la relación con sus proveedores?	☐	☐	☐
C8. ¿La oferta (productos y servicios) de su empresa ha cambiado por el uso de TIC?	☐	☐	☐
C9. ¿Está satisfecho con su actual uso de TIC?	☐	☐	☐
C10. ¿Cuánto invertirá en el uso de TIC en los próximos 2 años?	Poco ☐	Mucho ☐	No sabe ☐
Modulo D: Barreras y Necesidades en el uso del Internet y de las TIC en general			
D1. En su opinión, ¿Cuánto influyen las siguientes barreras en el uso de las TIC en su empresa?	Poco	Mucho	No sabe
Costos de las TIC	☐	☐	☐
Software tiene un ciclo de vida muy corto	☐	☐	☐
Oferta de las TIC no satisface las necesidades de la empresa	☐	☐	☐
El personal no tiene conocimientos suficientes	☐	☐	☐
Difícil encontrar y reclutar personal calificado	☐	☐	☐
El personal es renuente al uso de las TIC	☐	☐	☐
Clientes / Proveedores no están listos para usar las TIC	☐	☐	☐
Otro (especifique)	☐	☐	☐
D2. ¿Cuánto influyen las siguientes barreras en el uso del Internet en su empresa?	Poco	Mucho	No sabe
Seguridad (por ejemplo virus)	☐	☐	☐
Tecnología demasiado complicada	☐	☐	☐
Costos de desarrollo y mantenimiento demasiado altos	☐	☐	☐
Pérdida de tiempo de trabajo con navegación irrelevante	☐	☐	☐
Costos altos de la comunicación (conectividad)	☐	☐	☐
Comunicación de los datos lenta o inestable	☐	☐	☐
Clientes no están preparados para el uso de Internet	☐	☐	☐
Otro (especifique)	☐	☐	☐
D3. ¿Qué tan importante considera los siguientes factores para el uso de las TIC o del Internet en general?	Poco	Mucho	No sabe
Capacitación del personal	☐	☐	☐
Consultoría en la estrategia e implementación	☐	☐	☐
Mejores (nuevos) productos de hardware y software	☐	☐	☐
Compatibilidad de diferentes productos	☐	☐	☐
Productos específicos para PYMEs (software)	☐	☐	☐
Mejor desempeño (velocidad, seguridad, etc.) de la conectividad	☐	☐	☐
Acceso a crédito para invertir en las TIC y el Internet	☐	☐	☐
Otro (especifique)	☐	☐	☐

Módulo E: Información de la Empresa[6]	
E1. Nombre y Dirección de la empresa	
E2. Actividad de la empresa[7]	
E3. Nombre del Contacto (entrevistado)	
E4. Cargo en la empresa	
E5. No. de empleados a finales de 2003	
E6. Total volumen de venta (= turnover) en el 2003	

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[6] Los datos que se preguntan en este módulo se encuentran en el GoldMine y por lo tanto las preguntas tienen carácter de confirmación.

[7] Según definición debe de ser el dueño de la empresa, o el drector general, o el gerente general. Si no estos no están disponibles, el gerente de sistemas o el gerente de administración pueden responder a la encuesta.

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Notes

1. Early collectors of official statistics on ICT usage by enterprises include Australia, Canada, the Nordic countries, the United Kingdom and the United States.

2. These measurements exclude sectors such as financial services and travel and tourism.

3. Economist Intelligence Unit (2004) and World Economic Forum (2004).

4. For a detailed analysis of business process outsourcing and its potential for developing countries, see chapter 5 of the *E-Commerce and Development Report 2003*.

5. Asia Foundation (2003).

6. http://www.uneca.org/aisi/docs/SCANworkshop/ ICT%20PENETRATION%20AND%20USAGE%20IN%20ETHIOPIA2.ppt

7. Ministère de l'Industrie, du Commerce et des Télécommunications, Department du Commerce et de l'Industrie (2003).

8. See www.emarketer.com.

9. http://www.oecd.org/department/0,2688,en_2649_34449_1_1_1_1_1,00.html

10. Industry Canada has presented a graphical presentation of ICT developments in countries based on the S-curve in several of the documents of the OECD Working Party on Indicators for the Information Society (WPIIS). For further discussion, see for example chapter 1 of the *E-Commerce and Development Report 2001*.

Chapter 3

THE CREATIVE INDUSTRY AND DIGITAL AND INTERNET TECHNOLOGIES: THE CASE OF MUSIC

Digital and Internet technologies and music are a near-perfect match. In the past, technologies were used to enable music to reach growing audiences and to assist artistic creativity. But it now seems that developments have outdone themselves. Like a young adult who has discovered his or her power of mind and body, music has run away from its guardians – the recording and publishing industries – and is cavorting with appreciative audiences on the Internet's peer-to-peer networks. The music industry has recognized that these developments are foundational, and is adopting a dual approach for damage limitation until they play out with greater clarity. The first approach is to argue for an increase in the strength of copyright legislation and enforcement by Governments and international treaties. The second is to develop a commercially viable and legitimate alternative to the illegal but free downloading of copyrighted content. Despite some early success in several for-pay music download portals, the creative and business power of the Internet will be greatly advanced when artists, industry and audiences discover how to commercialize peer-to-peer (p2p) file sharing. Solutions were found for other problematic technologies: FM radio, cassette tapes and video tape recorders. Why, therefore, should it be different now?

The main problem is that the opportunities offered by technology require a change in the business model for artists and industry alike. Changing business models is in itself a risky business. But the music industry is no stranger to risk taking. Indeed, only 5 to 10 per cent of its releases achieve profitability. On the other hand, investors and stock markets have not been kind to the music industry since the Internet bubble burst in early 2000 and this may not promote boldness or visionary exploits.

From the artists' perspective, digital and Internet technologies offer the possibility of greater independence and artistic control. The Internet can provide access to information on the commercial mechanics of the mainstream music business,

allowing artists to assess what revenue mix (recording, song writing, performing, etc.) and, accordingly, what investments will maximize their income for a specific degree of artistic and commercial freedom. More importantly, the capacities of modern digital recording and production technologies and the ability of the Internet to introduce artists to an audience, distribute their music and provide a conduit for a more personal relationship are ground-breaking. Therefore, policy efforts in developing countries should focus on providing maximum discovery of musicians and musical cultures using the Internet and digital technologies and avoid generating anxieties about loosing out on possible, but actually improbable, stellar international recording royalty earnings. Modern and functional systems for copyright protection and royalty collection are needed in developing countries in order to develop strong national markets as well as to interact with the international entertainment industry. However, artists may have a preference for improved discovery over doubtful royalties and therefore should consider retaining control over their music and using all Internet technologies, including p2p file sharing and online distribution.

A. Introduction

Information and communication technologies (ICTs) and Internet technologies are having a profound effect on the global production, distribution and consumption of music as well as other audiovisual entertainment. Stimulated by news of music piracy and file sharing, the debate and speculations about the outcome of this process have received a fair amount of attention in popular and professional media. What will become increasingly important is the fact that the Internet enables change in existing business models and music industry structures. Public reactions from mainstream media groups have often been defensive. At the

same time, however, all of them are working to find ways to embrace and profit from the technology.

The digitization of cultural industry products, the increase in the access to and bandwidth of broadband connections and the development of global p2p file-sharing technologies are transforming music recordings into public goods.[1] In turn, p2p technologies have fuelled the discussion about the role, purpose and practicability of copyrights and the related legal remedies. Thus the development of digital rights management (DRM) technologies has assumed a prime position for the mainstream entertainment industries, as the realisation grows stronger that they may not be able to depend on litigation, and the threat of litigation, to enforce presumed earnings.

Music, film and literature are labour-intensive and talent-based creations. By decreasing entry costs and fixed outlays, digital and Internet technologies will enable an economic democratization of culture and creative industries. Therein lies the potential for developing countries' creative workers and entertainment industry: using the Internet they could enlarge their market and increase their earnings. However, there have been debates about the effects of globalization on cultural diversity and the possible role of the Internet in this process. Being a disruptive technology, the Internet presents both threats and opportunities. Those who are aware of the issues and have a strategic and positive approach will possibly improve their fortune or, at least, fare better than the competition. Developing countries and their creative industries need to be in the forefront of developments. Any venture based on assumptions of a commercial and technological status quo will lead to sunk costs and lost investment.

This chapter will discuss developments, and draw conclusions and make recommendations that may be useful for cultural sector and music industry leaders in developing countries. It will describe how the relationship between ICTs and music developed and the potential that technology brings to the production and distribution processes. It should encourage creative persons and companies to review their business and technology strategies and models, and will highlight new commercial possibilities. In order to do this it will review and perhaps question the commercial and normative understanding of the music medium and its industry.

The chapter will begin with an outline of the global and regional music business, with illustrations from several developing countries. It will review the traditional business model in order to assess what is really at risk for artists, given the unstoppable invasion of Internet-based technologies. This will be followed by an overview of technological history and developments. The chapter will then examine why the Internet will change the music business, and will discuss a number of pioneering real-world examples that may initiate a broad process of re-engineering of existing business models. In general, the chapter will try to convey how technological progress, the nature of the Internet and the change in the economic parameters of the music industry are co-dependent issues. Finally, the chapter will discuss the issue of intellectual property and its arch-enemy–piracy–and review non-restrictive or public licences and open-source record companies as possible solutions and enablers of both content and technological development.

B.   The international music industry

The global entertainment and media industry is estimated to earn about 1 trillion dollars of revenue.[2] Of this, the music industry generates about 35 billion dollars. Five "majors" currently dominate the global market for recorded music: Universal Music Group; Sony; Warner Music Group; Bertelsmann Music Group; and EMI.[3] These companies are part of larger entertainment conglomerates that produce content, software and hardware for entertainment. Estimates vary, but most accounts put the majors' share of the global market for recorded music at between 75 and 80 per cent. Table 3.1 gives their annual sales figures for several recent years. However, size is not the same as profitability and indeed, as noted earlier, markets and investors have not been too enthusiastic about the stocks of the majors' parent companies. Chart 3.1 indicates that, with the exception of Bertelsmann, all have underperformed with regard to the Dow Jones market index.

The recording industry has had an international dimension since its beginnings. The two early recording companies – the Gramophone Co. and Victor – were both established by Emile Berliner,[5] the inventor of the flat disc phonogram, in 1898

Table 3.1

Annual sales of major recording industry companies
(in millions of dollars)

	2002	2001	2000
Sony Music	4 830	4 568	6 240
EMI Group Plc	3 487	3 785	3 799
Universal Music Group	6 276	5 811	6 224
Warner Music Group	4 205	4 036	4 148
BMG	2 700	1 446	4 548
Total	**21 498**	**19 646**	**24 959**

Source: Hoovers.com and UCTAD estimates.[4]

and 1901 respectively. Victor covered the Americas, while the Gramophone Co. covered the United Kingdom, continental Europe and the British commonwealth, thus segmenting the international market between them. The Gramophone Co. sent recording engineers across Europe to "capture" performances from which records could be made (Gronow and Saunio, 1998). International talent was sought out and globally appealing content was an important business proposition – for example, the signing and huge success of Enrico Caruso by Victor, the repertoire of which consisted mostly of opera sung in Italian. The first Indian recording by the Gramophone Co. was made 1902. Among the most successful Indian artists was Gauhar Jan of Calcutta, a popular singer

of the Thumri genre – a light classical style popular in Northern India.[6]

The Odeon label of International Talking Machine Gmbh, Berlin, – established in 1904 and together with the French Pathé Records the main competition to Victor and the Gramophone Co. – pioneered similar explorations into the ethnic and local music of the developing world. By the end of its second year of business it claimed to have recorded over 10,000 titles in Arabic, Greek and Turkish. An important milestone was the signing of Salam Higazi, a very popular singer and often cited as the father of Egyptian stage music. What set Odeon apart was its business model. Odeon did not establish branches overseas. Instead, it

Chart 3.1

Stocks prices of the "majors", 2000-2004
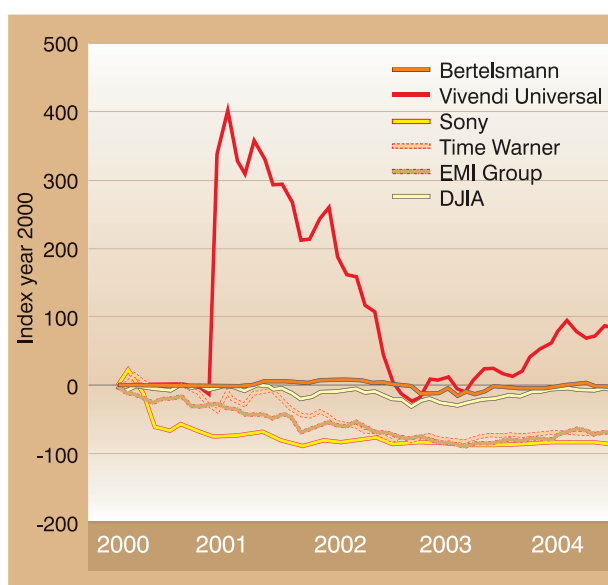
Source: Yahoo.com.

Chart 3.2

Market for recorded music (2002, in millions of dollars, by region)
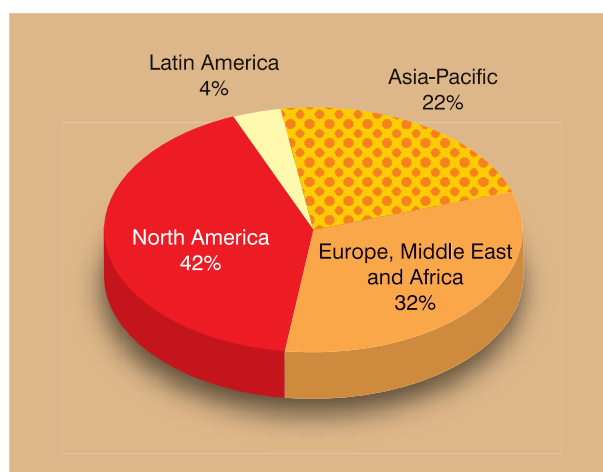
Source: Pricewaterhousecoopers (2002).

Table 3.2
Music CD and music cassette (MC) sales volumes
(in millions of units)*

	CD 2003	CD 2002	MC 2003	CD+MC 2003		CD 2003	CD 2002	MC 2003	CD+MC 2003
					continued				
1. United States	746	803	17	763	32. Denmark	10	12	0	10
2. United Kingdom	234	222	1	235	33. Finland	10	10	0	10
3. Japan	206	229	4	210	34. Saudi Arabia	0	0	7	7
4. Germany	147	179	16	163	35. Colombia	7	8	0	7
5. India	15	9	138	153	36. New Zealand	7	8	0	7
6. France	118	130	3	121	37. Greece	7	7	0	7
7. Russian Federation	30	18	85	115	38. Ireland	7	8	0	7
8. China	34	23	42	76	39. Chile	5	6	1	6
9. Brazil	58	80	0	58	40. Israel	6	4	0	6
10. Mexico	54	51	2	56	41. Malaysia	2	2	3	5
11. Spain	54	62	1	55	42. Philippines	3	3	2	5
12. Australia	53	49	0	53	43. Singapore	5	5	0	5
13. Canada	53	57	0	53	44. Hungary	3	3	2	5
14. Pakistan	2	1	36	38	45. United Arab Emirates	1	1	3	4
15. Indonesia	3	2	34	37	46. Czech Republic	3	3	1	4
16. Italy	36	37	1	37	47. Croatia	2	1	0	2
17. Turkey	11	5	25	36	48. Venezuela	1	2	0	1
18. Netherlands	25	28	0	25	49. Peru	1	0	0	1
19. Sweden	24	26	0	24	50. Ecuador	1	1	0	1
20. Thailand	9	10	14	23	51. Estonia	1	1	0	1
21. Republic of Korea	16	21	4	20	52. Iceland	1	1	0	1
22. Switzerland	18	21	1	19	53. Slovakia	1	1	0	1
23. South Africa	12	12	6	18	54. Slovenia	1	1	0	1
24. Ukraine	7	3	11	18	**Total**	**3126**	**2 252**	**4 66**	**2 602**
25. Belgium	16	18	0	16	*of which*				
26. Portugal	12	12	3	15	**Developed market economies**	**1830**	**1968**		**1882**
27. Austria	14	15	0	14	*in percentage*	87.5	87.4		72.3
28. Norway	13	15	0	13	**Developing countries and transition economy countries**	**306**	**284**		**720**
29. Poland	10	10	2	12	*in percentage*	*14.3*	*12.6*		*27.7*
30. Argentina	10	6	1	11					
31. Hong Kong	11	10	0	11					

* Values of zero indicate that fewer than 500,000 units were reported. All values have been rounded of to the nearest million.
Source: IFPI (2004).

appointed local agents whose task was to solicit artists, plan repertoire and then request technical recording services from Odeon in Berlin, which were consequently performed by a visiting engineer. The master recordings would be shipped back to Odeon in Berlin for finalization and reproduction. The records were then "re-exported" back to their indigenous markets (Vernon, 1997).

Despite its cosmopolitan beginnings, the overall performance of the music industry depends to a large extent on the global marketing and success of Anglo-American popular music. Chart 3.2 shows the regional distribution of the recorded music market. With the exception of the odd hit (e.g. Valens' *La Bamba*) or attempts at performing "foreign" material by mainstream artists (e.g. Martin singing *Volare* or Sinatra singing the Brazilian compositions of Carlos Jobim), it was only towards the end of the last century that the global music market showed signs of renewed geographical diversification. Already in 1980 one third of

Table 3.3
25 Largest markets by CD sales volume in 2003
(in millions of units)

1.	United States	746	16.	Switzerland	18
2.	United Kingdom	234	17.	Republic of Korea	16
3.	Japan	206	18.	Belgium	16
4.	Germany	147	19.	India	15
5.	France	118	20.	Austria	14
6.	Brazil	58	21.	Norway	13
7.	Mexico	54	22.	South Africa	12
8.	Spain	54	23.	Portugal	12
9.	Australia	53	24.	Turkey	11
10.	Canada	53	25.	Argentina	10
11.	China*	45			
12.	Italy	36	**Total**		**2020**
13.	Russian Federation	30	*of which*		
14.	Netherlands	25	**Developing and transition economy countries**		**251**
15.	Sweden	24	*in percentage*		*12.4*

*Figures for China include those of Hong Kong (China).
Source: IFPI (2004).

Warner Music's revenues came from non-United States artists, increasing to more than half by the mid-1990s.[7] Similarly, EMI earns significant revenues from foreign artists and embraces a number of foreign labels, such as Electrola (Germany), Path Orient and ChinaCo (China), GramCo (India) and Colombia Nipponophone (Japan). In the same vein, Polygram — the former Philips/Siemens music business now part of the Universal Group — attributed half of its revenues to non-Anglo-American popular music production and had in the past set up factories in Egypt, Nigeria and Brazil.[8] Until the 1970s the music industry transnationals were largely based in the United States, with the exception of Philips/Polygram. The 1980s saw the entry of Japanese interests (Sony and Matsushita) and European corporations (Bertelsmann and Vivendi).

Tables 3.2 and 3.3 give figures for music CD and cassette sales in countries that have total reported sales above one million units. In terms of unit sales volume, developing countries and transition economies account for about 14 per cent of the global market for recorded music. When sales are measured in retail value expressed in dollars, developing countries represent only 6.7 per cent of global commerce. Adding the transition economies brings this up to 8 per cent. An important reason for the difference between the volume and value figures is the significant sales of low-cost music cassette media in those countries, often surpassing CD sales in large multiples. Not all music is an internationally tradable item and creating local content may not require the sizeable investments typical of mainstream productions in developed markets. In 1999, two thirds of total music sales were not traded internationally, but produced and consumed locally. National sales of locally produced music range from 40 per cent in Europe to, unsurprisingly, since it is the world's largest producer and market, over 90 per cent in the United States. Latin America and Asia fall somewhere between these figures, while for Africa the figure is below one third. International Federation of Phonogram Industries (IFPI) data released in 2001 indicated that the share of recordings by local artists signed to local music labels rose from 58 to 68 per cent of sales between 1991 and 2000. The growth in local music spanned all regions, except Africa and the Middle East. The following country discussions will serve to better illustrate issues and concerns specific to the music industry in developing countries.

India has a music market worth $144 million and is the largest developing country market in terms of unit volumes. It has been successful in establishing a close link between music and its enormous film industry: film music accounts for over 70 per cent of the total music market. The Indian Music Industry (IMI) organization has over 50 members,

including local branches of the majors. The distribution system for cassettes, and CDs and vinyl records remains anarchic and piracy is a major concern. The IMI claims that India is the world's largest pirate market in terms of unit volumes and sixth in terms of value. Music cassette sales outnumber CD sales eight times. A large export market created by Indians living abroad has begun to emerge and Indian producers need to explore the full range of possibilities for tapping this potential. This may be an important impetus for assessing the possibilities of digital technologies and e-commerce for music, and an obvious one when considering the apparent success of "offshore" portals such as the UK-based Audiorec.co.uk.

In 2003 Brazil was the ninth largest market for recorded music in terms of unit volumes, representing a retail value of $309 million. It employs an estimated 8,000 people directly, and a further 55,000 indirectly in the retail trade, publishing and radio broadcasting. It has built a strong local repertoire that has grown to 79 per cent of sales in 2001, up from just under 60 per cent a decade earlier.[9] However, the five majors control most of the local market. Nonetheless, the Som Livre and Music Abril labels, owned by the large Brazilian cable television and broadband ISP Net Serviços de Comunicação and multimedia company Grupo Abril respectively, managed to enter the top ten best selling-music rankings in 2000 and 2001 with a combined four titles per year. Like India, Brazil has significant piracy problems and, according to IFPI, globally ranks as the third most pirated market, only behind China and the Russian Federation.[10] Given the size of the domestic market, the local music portal iMusica, discussed in greater detail in section G, has been offering for-pay downloads for several years.

South Africa is the largest African music market, generating combined CD and cassette media sales volumes of 18 millions units, valued at about $160 million in retail sales. Sales of music cassettes represent one third. Unlike in Brazil or India, most sales come from international titles. In 2000, the Association of the South African Music Industry (RISA) categorized 62 per cent of all units sold as "international". This, however, represented a retail value of 77 per cent. RISA's membership consists of more than 50 businesses and includes the international majors. Piracy is an important problem and estimates place it at between 40 and 45 per cent of the market in units, or around $65

million in value. While cassettes have been the biggest problem in the past, CD piracy has sharply caught up.[11]

In the Philippines there are 39 companies affiliated with the Philippine Association of Recording Companies (PARI) and several independents. Data collected from PARI show peak sales of 11.8 million units in 1997, declining to 5.6 million in 2003. Piracy is rampant and contraband media represents 25 to 50 per cent of the market. Popular music from the West had a 60 per cent market share in 1996, and much of the locally generated 35 per cent was music imitative of or derived from internationally successful reportoire.[12]

It is interesting to note that a number of historically significant national entertainment industries and musical "hot-spots" have all but disappeared from the global market. The five majors were all present in the Nigerian market that generated sales of 20 million units in 1993. However, a combination of political and economic instability, physical piracy, and the resulting departure of the majors by the mid-1990s, caused unit sales to drop to 8 million by 1996. Today, piracy is estimated to account for 85 per cent of total of sales. This moved the business to many smaller labels with more limited resources, making the enforcement of copyright and other contractual arrangements difficult, and thereby reducing possibilities for Nigerian artists wishing to enter the international market.[13] Another opportunity missed because of economic and political strife is the music of the Congo region. Congolese music, widely popular internationally, resulted from a mix of traditional music and Cuban styles, in particular rumbas, brought "back" on 78 rpm records produced by HMV. In 1955 the Congolese market was purchasing 600,000 records a year and this increased to 1 million by 1970. However, after several decades of economic downturn and civil war, many of its best musicians have emigrated and local purchasing power is inadequate to support a significant recording industry, in spite of a population of 55 million.[14]

Jamaica is another example of a successful musical milieu with an underdeveloped national market. In spite of the global success of its artists, whose international sales are worth anywhere between $1 and $2 billion, the local market managed to generate sales of only $5.5 million and move barely 0.5 million CDs, music cassettes and vinyl

records in 2002.[15] Since the 1990s, several initiatives have been launched by Jamaican agencies and regional and international bodies, such as UNCTAD, WIPO and CARICOM, to support the growth of the music industry and in particular to strengthen the enforcement of copyright. However, such efforts have not succeeded in securing the involvement and trust of the musicians, performers, producers and record labels.[16] In 2003 the Recording Industry Association of Jamaica was founded, in what will hopefully be a more fruitful effort to grow the domestic market in line with the international success of its music.

C.   The business of music

Today, musicians have a choice between dealing with the traditional recording industry, and managing their own business in a way that would require profoundly embracing Internet technologies. In order to deal with this dilemma, it is useful to consider the mainstream options from a financial perspective. The following discussion owes much to Krasilovsky, Shemel and Gross (2003) and the numerical examples are provided in order to follow industry practice in the United States, it being the largest market and the one in which many musicians, including those from developing countries, hope to achieve success. It should be noted that more favourable contractual terms and greater paying rights, reflecting smaller overall sales volumes, may be offered to musicians in other developed countries.

For royalties to materialize, a composition is usually recorded and published: two separate and distinct activities. In practice, an artist may perform on a recording, may be the composer, or both. Two different contracts govern these activities: recording contracts and publishing contracts.

Recording artists' royalties are paid in return for recording music under a "work for hire" recording contract. Such contracts transfer the copyrights of the recording from the artists to the record company, in return for the payment of royalties. The record company will also pay a separate royalty to the composer in order to acquire the "mechanical right" to reproduce the composition.[17] On signing, a type of credit is provided to artists in the form of an advance that is recoverable from artists' royalties. The record company earns all income from the sales of the CD in excess of royalties owed. Typically, no royalties are paid before the full advance is recovered. If the record does not sell and the advance recovery fails, the artists' debt will be rolled over to the next CD, as specified under the contract.

Recording royalties for newcomers are usually 9 to 13 per cent of the retail price of a full-length CD (Krasilovsky, Shemel and Gross, 2003; Rapaport, 2003; Hesmondhalgh, 2003, citing Caves, 2000). After a number of deductions and adjustments, artists' recording royalties are closer to 4 per cent or $0.66 per CD sold. Box 3.1 and table 3.4 describe some elements of this process. Whether an artist can generate net royalty revenue may not be precisely related to the revenue of the record company. Given different assumptions and on the basis of the terms agreed in the contract outlining responsibilities and amounts to be spent in production and promotion, an artist may earn net royalties while the record company may not manage a profit on the artist. The opposite is also possible (case C), where the company earns a substantial sum, but the artist is left on the verge of debt, eventually "saved" by song-writing royalties but still left with many expenses to cover. It is also important to remember that a record company's profits on the overall talent portfolio may vary either because of poor sales or because of more mundane financial or management issues that can affect any business or industry. Earned income will need to cover management and administration costs, as well as losses from less successful releases.

The figures in table 3.4 indicate that under certain conditions artists may not have a financial interest in recording "expensive" projects. The notion of investing in high-quality production and promotion to ensure the success of a CD – case D – may be, however, more financially purposeful for the record company while mainly appealing to a sense of self-value, accomplishment or genuine interest of artists in working in a top-notch production environment. Thus, establishing realistic expectations about an artist's particular mix of revenue streams from recording, song writing or performing concerts can be a difficult exercise. Recording may not be a financially satisfying and secure strategy, in particular if the "artist" is a group or ensemble and monies are split many ways, especially if the CD will not turn "gold" in the United States.

Table 3.4

Theoretical cost breakdown of artists' and record companies' income: Four cases
(in millions of dollars)

	Case A 35% no-sale reserve		Case B Full sale of distribution		Case C Enhanced quality full sales		Case D Going for gold 500,000 copies	
	%	$	%	$	%	$	%	$
1. Retail price of CD	100.00	16.00	100.00	16.00	100.00	16.00	100.00	16.00
2. Recording artist royalty	12.00	1.92	12.00	1.92	12.00	1.92	12.00	1.92
3. - Producer royalty	3.00	0.48	3.00	0.48	3.00	0.48	3.00	0.48
4. Net recording artist royalty	9.00	1.44	9.00	1.44	9.00	1.44	9.00	1.44
5. - Cost of packaging	17.50	0.25	17.50	0.25	17.50	0.25	17.50	0.25
6. Sub-total	7.43	1.19	7.43	1.19	7.43	1.19	7.43	1.19
7. - Deduction for free goods	15.00	0.18	15.00	0.18	15.00	0.18	15.00	0.18
8. Sub-total	6.31	1.01	6.31	1.01	6.31	1.01	6.31	1.01
9. - Reserve against returns	35.00	0.35	0.00	0.00	0.00	0.00	0.00	0.00
10. Sub-total	4.10	0.66	6.31	1.01	6.31	1.01	6.31	1.01
11. Royalty income on 250,000 CDs	4.10	164 093	6.31	252 450	6.31	252 450	6.31	504 900
12. - Recovery of recording advance		100 000		100 000		250 000		350 000
13. Net recording royalty income before expenses		64 093		152 450		2 450		154 900
14. Net mechanical rights royalty for songwriting at 50% of $0.60 per CD (paid through publisher)		48 750		75 000		75 000		150 000
15. Management fees (10% of advance)		10 000		10 000		25 000		50 000
16. Legal fees		10 000		10 000		10 000		20 000
17. Promotional activities (10% of 26+27)		15 000		15 000		30 000		60 000
18. **Total artist royalty income**		**77 843**		**192 450**		**12 450**		**174 900**
19. Wholesale price of CD (50% discount)		8		8		8		8
20. Record company distribution of 250,000 CDs		2 000 000		2 000 000		2 000 000		4 000 000
21. - Manufacturing and distribution at $3 per CD		750 000		750 000		750 000		1 000 000
22. - Recording royalties payable less advance		64 093		152 450		2 450		154 900
23. - Mechanical rights royalties paid to publisher		97 500		97 500		97 500		300 000
24. - Free goods		300 000		300 000		300 000		600 000
25. - Reserve against returns (deduction in case A)		700 000		0		0		0
26. - Production of promotional video		100 000		100 000		200 000		400 000
27. - Promotional activities		50 000		50 000		100 000		200 000
Sub-total 21 through 27		2 061 593		1 449 950		1 449 950		3 154 900
28. **Total record company income**		**-61 593**		**550 050**		**550 050**		**1 345 100**
29. **Total publishing company income**		**48 750**		**48 750**		**48 750**		**150 000**
30. **Total music industry income**		**-12 843**		**598 800**		**598 800**		**1 495 100**

The theoretical sales figure of 250,000 should be put in perspective with national recording industry rankings. Table 3.5 presents an overview of rankings in several developed and developing country markets. It is clear that generating revenue from sales of technically high-quality recordings requires an international outreach. Perhaps only the United States' markets can absorb sufficient numbers of units and generate large enough revenue streams to motivate investment by artists and industry in recording for profit. Considering the limited requirements of the Irish or South African ratings, or the fact that most Indian sales are of low-cost cassettes, we realize that international artists and music industries need to be rigorous in matching their production and marketing investments to the market. Given these risky economics, musicians, especially those from developing countries not targeting the mainstream Anglo-American market, may accordingly adjust their financial expectations about international recording ambitions and contracts and can seek other revenue streams.

Box 3.1[18]

Recording music: Who earns what?

Looking at case A in table 3.4, we start upbeat with a 12 per cent royalty on a $16 CD. The producer will earn a flat fee as well as a producer's royalty, typically 3 per cent, of the absolute royalty. Then, from the remaining 9 per cent, there is a 10 per cent to 25 per cent "cost of packaging" deducted, which leaves the artist on average 7.43 per cent. The justification is that the royalty should be based on the recording and not on the sales appeal added by the packaging. In return, the record company typically absorbs all the costs of artwork and packaging. The next deduction of, on average, 15 per cent is for "free goods" and this leaves the artist with 6.31 per cent. Free goods are records given away to retailers in order to enhance promotional campaigns and enable sales or special discounts for a limited period. Retailers are also entitled to return unsold CD stocks, and artists are not paid any royalty for these. To make a provision for such returns, record companies hold back a percentage of royalties, say 35 per cent, leaving the artist with a 4.10 per cent royalty or $0.66 per printed and distributed CD.

While technical costs and facilities have become less expensive with improvements in digital recording technologies, substantial sums can be spent on human skills needed to produce a professional product. These may be various engineering skills, arranging skills and the skills of session musicians. Record companies may express or prescribe preferences for a sophisticated (and costly) recording and production environment in order to ensure an even and commercially viable product, eventually reducing the leeway that artists may have in managing the disbursement of their advance. Sometimes one part of the advance may be used exclusively for recording and will be placed in a special recording fund.

A professional recording and master ready for CD reproduction can easily cost $100,000. Thus the artist will need to convince the record company to print and distribute at least 250,000 copies of a CD in order to generate an income of $64,093 before management, legal and promotion expense are deducted. If the artist is also the composer, he or she may receive additional royalties in accordance with the mechanical rights contract. If the CD does not sell much over 140,000 copies, the artist-cum-songwriter is indebted to the company and will try to make good with the next recording, supported by a new advance. Revenue from the new CD will go to returning all outstanding advances, including those from past projects under the same contract.

The figures and relative proportions in table 3.4 should not be taken to represent any real-world average. Readers may replace figures and generate their own worst- or best-case scenarios. The calculations assume that the artists compose and arrange their own material. They also assume a 50 per cent commission on songwriting royalties (lines 20 and 29). Publishing royalties in the table are fixed at $0.60, as is the practice in the United States; other markets may offer different or better terms and conditions. Royalties for public performance and broadcast are not included since the conventions on these vary from country to country. Not all costs on the artists' side are included as they may vary as well. These may be costs of subsistence, equipment, training or hiring of additional arrangers and musicians during recording. Costs of manufacturing (line 21) at $3 per CD become overstated with larger quantities and may drop to $2 or less (line 21, case D). Artists' costs for promotional activities (line 17) can also vary greatly as either a proportional or fixed contribution to the overall budget activities (line 27) and are subject to negotiation. The overall promotion budget size (17+26+27) can vary during the life cycle of a CD, with potentially ambiguous results for both artists and companies. The record company may impose other deductions on artists, such as those for breakage of CDs in shipment and for the risk of using new technologies. Budgets for promotion can be as much as 20 per cent of wholesale revenue (line 20) for productions with popular commercial potential. Depending on the negotiating power of the artists, all, some or none of these will be recovered from artists' royalties. If the total promotional costs in case D were to be split half-half between the artist and the record company, the artist would incur a net loss of $95,100 while the music industry income would rise to $1,765,100.

If the recording artists are also the original authors (composers) of their music they may seek to earn from the sales of sheet music, broadcast, third party performance, synchronization (e.g. use in films or advertisements) and re-recording (i.e. cover versions) of their works.[19] In order to realize this, artists need to assign their interests as songwriters, through a publisher, to a licence-collecting organization, which would then be entitled to collect the corresponding royalties. The publisher may be an affiliate of the record company, an independent publisher or a company owned by the artist. Even from a superficial glance, it is obvious that the interaction between the different recording and publishing interests can lead to a variety of tensions and situations. The record company may naturally prefer to have the artist publish with its own affiliated publisher. It may also discourage artists wishing to retain copyrights and ownership of their material by offering less advantageous mechanical rights contracts for recording self-written material, usually referred to as "controlled compositions".

A lack of a dependable licence-collecting infrastructure can be a sufficient motive for artists in developing countries to leave their home countries and re-establish themselves abroad. Musicians will also emigrate to seek the most traditional and historically oldest revenue stream: giving for-pay concerts. Concerts can still have revenue potential for artists whose music need not compromise its expression in order to fit into current trends and musical fashions. While the need to give concerts may be a forgone conclusion for musicians in developed countries, it can indeed be a problem

Table 3.5
How many sales for a hit record?

	Gold	Platinum
United States	500 000	1 000 000
Germany	150 000	300 000
United Kingdom*	100 000	300 000
France	100 000	300 000
Japan	100 000	250 000
India**	100 000	200 000
Brazil	50 000	125 000
Australia	35 000	70 000
South Africa	25 000	50 000
Argentina	20 000	40 000
Ireland	7 500	10 000

*Includes only full-priced vinyl, cassette and CD sales. *Mi-priced and budget media need to sell double this quantity for the same rating.*
** Does not include film soundtracks.

for developing country artists owing to various restrictions on travel and labour regulations. Temporary work visas in developed markets are granted to commercially successful, internationally renowned or culturally significant performers. However, this may not extend to supporting staff such as technicians, management or even accompanying musicians or family, if these are not an established element of the group or ensemble performance.[20] Thus permanent emigration is seen as a neater solution. Developing countries may have a policy preference to keep as many artists living and creating at home, while performing internationally, rather than emigrating altogether. At the level of international trade policy, performing music abroad falls under "mode four" of the General Agreement on Trade in Services, whereby services are agreed to be provided "through presence of natural persons of a Member in the territory of any other Member"[21] Governments of developing countries may choose to promote the fullest liberalization of "mode four", in particular when confronted with monolithic requests for full liberalization of trade in creative and cultural goods or delivery through commercial presence.[22]

The financial success of concerts and touring depends on the ability of audiences to "discover" the artists and their music, and on enticing them into attending. Music discovery was traditionally done by radio as well as through music societies and fan clubs. Today, music television channels

can be ultimately decisive for artists' discovery. But it is the Internet and its associated technologies, which will be discussed in greater detail in part E, that promise vastly improved possibilities for artists to approach and establish a more intimate relationship with their audiences. In comparison with radio or music television, using the Internet is affordable and accessible for many artists. The Web allows artistic control and expression. It also permits audiences to conduct their discovery experience in their own time and at their own pace, unforced by radio and television programme scheduling. However, it is not a trouble-free zone as the Internet is not necessarily a public domain and its components, ranging from the domain name to the content files, can become corporate property through recording or publishing contracts.

D.   The development of music technology

The objectives of applying technology to music have remained the same over centuries and apply equally to digital technologies and the Internet. The first objective is to improve the physical and creative interaction between musicians and their creative medium. The second is to increase outreach and discovery, and improve the musical experience of the audience.[23] The following discussion explains how music moved to the digital medium incrementally and in a purposeful way, intertwined with the evolution of very closely related information and communication technologies.

Modern music technology started to develop with the broad deployment of electrical power.[24] But it was the invention of the phonogram by Edison in 1877 and its successor, the gramophone, by Berliner in 1884, and radio technology by Marconi and Tesla in the 1890s that pushed music into fundamental and irreversible technological development. These had two important consequences. The first is that they achieved a spatial and temporal dissociation of artist and audience. The second is that they helped improve outreach. Coincidentally, both also relied on the crucial invention in 1907 of the vacuum tube, the predecessor of the modern-day transistor, which allowed the amplification of minute electrical signals received on radios or played on gramophones, as well as the development of modern-day computers. Valve

and transistor technology allowed fewer musicians to play to larger settings and audiences than previously possible, through the development and use of vocal and instrument amplification. Together with radio, these developments changed the commercial parameters of the music business. Concerts in large venues in urban areas, where popular interest could be better satisfied, became a reality. Sales of phonograms became an important source of revenue. Finally, by airing phonograms, radio stations no longer required the physical presence of performing artists in their live studios and greatly diversified their broadcast content.

Continued innovation led to several important technologies prior to the digital revolution. In fact, the controversial "rip, mix and burn" marketing of Apple, which some interpreted as promoting piracy,[25] or equally Burton's disruptive Grey Album music[26] have an established ancestry. Apple and Burton are distinctive in that they democratize the underlying technology and its use, and challenge our notions of what is fair and acceptable in creative activity, but they are not foundational.

The critical music technologies in the second half of the twentieth century were magnetic tape and multi-track recording, followed by the development and commercialization of electronic instruments. Recording on magnetic tape enabled the emergence of *musique concrète*. Also known as electro-acoustics, it consisted of music produced from editing together tape-recorded fragments of natural and industrial sounds. Pioneered by Schaeffer in the late 1940s and 1950s, it was the first music that exclusively used technology as a creative medium.

Multitrack recording, whereby several separate performances of any number of instruments or voices playing the same composition can be recorded in perfect synchronization on separate "tracks", and later mixed to achieve a desired "soundscape", dramatically changed the approach to musical composition and production. AMPEX Co. and Les Paul, an accomplished pop, jazz and country guitarist, introduced the first multitrack recorders in 1954. An important effect was, again, the temporal and spatial dissociation of musicians, some of whom would never meet in person yet would be performing "together" on the final product. While creative critique sometimes finds fault with this approach (Théberge, 1989) it has permitted well-crafted and

technically accomplished results, with the Beatles' *Sgt. Pepper's Lonely Hearts Club Band* and Jimi Hendrix's *Electric Ladyland* being frequently cited as pioneering works embracing these new technologies. Another development that used multitrack recording technology to dislocate space and time, as well as purpose, was Zappa's pioneering of xenochrony, whereby unrelated instrument performances from different musical compositions are taken out of their original context and reassembled into new compositions.[27]

Electronic instruments, or synthesizers as they are commonly called, used technology derived from electronic analogue computers and laboratory test equipment.[28] Their creative purpose was twofold. The first was to produce purely synthesized timbres that did not resemble or copy real-world sounds. The second was to imitate common instruments in order to provide cheaper and more manageable music production, the idea being that an accomplished organ or piano player playing a synthesizer with acceptable string or organ sounds could resolve the logistical or physical variables and problems of organizing a string ensemble or accessing a church organ. While many, if not most, synthesizers were developed to be "generalists", each model eventually had its own "sound" and idiosyncrasies. This led, again, to ergonomic complications and prompted the entry of the first digital technology devised specially for music: MIDI.

The MIDI (Musical Instrument Digital Interface) standard was launched in 1983 and was developed by a group of leading synthesizer manufacturers. Its initial objective was to enable musicians to link different synthesizers together and play all of them using only one keyboard. To do so, it set out a communications standard and a physical interface standard. An immediate benefit was the development of sequencers in the form of dedicated hardware or as computer software. Sequencers generate music on a synthesizer by sending it a stream of MIDI instructions, each instruction defining the pitch, duration and timbre of a note or a group of notes to be played, in a timed sequence. These sequences can then be saved as a computer file. Sequencers enabled the pre-programming and computerized performance of complex musical passages. They also enabled the endless editing and rearrangement of a particular performance. MIDI song files are small and portable, and thus were not restricted by modest computer chip or disk memory capacity.

The next important musical technology developments were digital sampling and the closely related development of the music compact disc, or "CD" as it is commonly known. The music CD was introduced in 1980 by Sony and Philips and mass production was underway after 1982. The original sampling synthesizer was the Fairlight CMI, which was first available in 1979. Both inventions rely on sampling: the process of converting, in the case of music, sound into digital information and, on playback, back into sound.[29]

This transformation of music into digital information, through MIDI but more so through sampling and music CDs, enabled its convergence with personal computer technology. On the recording technology side, sampling and MIDI merged into computer software that today handles both pre-programmed and sampled human performances in the same musical composition. In a further spatial and temporal detachment, computer-based recording has achieved non-linear and non-destructive editing. Particular musical fragments can now be moved around or duplicated in time with seemingly endless possibilities of undoing, just like the cut-copy-and-paste functions used in any word processor to edit and finalize a text.

The treatment of music as "files", using personal computers with CD drives and specialized software for ripping,[30] editing and re-recording music, has enabled audiences to manage their listening experience with improved interactivity. The development of compression techniques, such as mp3, that reduce music CD file sizes by 90 per cent and the development of user-friendly software and of high-capacity portable music devices, such as the iPod or Nomad, have led to an increase in audiences owning their listening experience, removing the limitations of the original medium – for example, the compact disc or radio – regarding how and when music is enjoyed.

Finally, p2p technologies and the growth of broadband Internet connectivity have generated a broad range of responses from audiences, artists and industry. p2p allows every connected computer, even one with a simple telephone dial-up, to become a node and a server. Some would argue that this is essentially a fulfilment of the original technological objective of the Internet. This tech-

nological decentralization of the Internet inevitably leads to greater empowerment of users and a reduction of possibilities for control and management of information flows and content. Because the music industry has relied on the imperfections and inefficiencies of carrier media and distribution technologies to add value, control processes and generate revenue, it has not welcomed the progress and popularity of p2p applications.

To digress, most technology developments have found important use in the processes of music creation, distribution and consumption, often satisfying diverse and different needs of artists, industry and audiences. For musicians, spatial and temporal dissociations may reach new heights with collaborations made possible by transmitting sound files using the Internet and generating joint performances using the conduit of cyberspace. As the renowned producer and artist Wyclef Jean explained, "We're in the hard disk Pro Tools generation now…you can be in Tennessee and I can be in New York, and if you get an idea you can play the part and email it to me and I can add to it and send it back to you. I do that with Missy [Elliott] all the time." [31]

For the music industry, the Internet has also generated an enormous potential for outreach and marketing. Most technologies have enabled freedoms by reducing the restrictions of time and space for these same processes. The social role of music may also be changing as technologies support individual experience while reducing opportunities for human interaction and collective cultural gratification. What few clearly expected was the effect of the rapid development and simultaneous deployment of the broadband Internet and p2p networks. The next part of the chapter will discuss the disruptive effects of the Internet and the threats and opportunities presented to the music business.

E.   Internet, music and change

The disruptive nature of the Internet and Web technologies can be best appreciated by comparing the structure of the traditional music business with that of the Internet. What we see today is the process of music exploring ways to use the Internet and assimilating and incorporating certain characteristics. Charts 3.3, 3.4 and 3.5 describe

Chart 3.3
Music industry structure and processes

Technology in the traditional structure of the music business is developed from within the recording industry or by its distribution and marketing segments. Functions are well defined and process and content flows are unidirectional. This leads to smart but static standards in applications, technologies and business models (e.g. the compact disc or retail distribution). It also disallows swapping of roles between artists and consumers, who are at the "ends" of the process and thus technologically and commercially disenfranchised. The interaction between new approved technologies occurs in isolated hotspots where its disruptiveness can be controlled or minimized, perhaps to the detriment of innovation. The use of p2p technologies is outside the "system".

Artists

Music Industry: production and publishing

Distribution

Marketing

Retail

Internet

Broadcast
Television
Radio

Live concerts

Offline

Online

CD sales
Amazon, B&N, Tower

Internet downloads
i Tunes, Napster

**p2p internet-based applications and networks:
Kazaa, Overnet, Winmx**

Physical Media   Discovery   Performance

Audience

some basic structures and establish links between processes that are central to change.

Looking at the bottom of chart 3.3 we can recognize the modes in which consumers engage with music as an art and entertainment, as well as channels used by artists to deliver, interact with the audience and establish feedback. The most commonplace mode, ever since the mass commercialization of the gramophone, has been the acquisition and enjoyment of physical media, most often in the form of a music CD and to a decreasing extent of cassette tapes and vinyl records.

Another important mode is that of discovery. The quantitative disproportion between available music and a person's capacity to select and appreciate it has already reached an immeasurable magnitude. The freedb.org database of music CDs, an open database maintained by users and published under the General Public License,[32] alone lists more than 1.3 million titles.[33] The online retailer Amazon.com offers several million book, music and film titles in various media. Thus the process and capacity for discovery are crucial for establishing an artist and securing consumers' financial preferences vis-à-vis other artists

or genres, or even other types of experience or entertainment, such as film, sport and other hobbies, learning or recreational activities.

Finally, the experience of physical performance of music is a fundamental mode of engagement that, while sometimes enhanced by digital technologies, offers the human interaction and artist–audience feedback that is missing from, say, listening to a compact disc or surfing the Web. Performance offers an opportunity for musicians to directly generate revenue, either by playing for an audience or by playing as hired musicians in recording studios. Performance-based revenue is crucially important when we recognize that the recording industry manages profitability on only 5 to 10 per cent of its portfolio, a fact which indicates that the majority of actually signed artists cannot count on earnings from CD sales. Any revenue achieved from selling compact discs is typically used to pay back advances as described in part C of this chapter.

It is also important to recognize that music has an important social role in all cultures and that its accessibility to collective appreciation is an important element of its popularity and universality. Whereas collective experience in the past was only possible during a performance, Internet and digital

technologies enable a near-collective experience through online communities (discovery) and file sharing (media). The three modes of physical media, live performance and discovery do not have clear boundaries. Indeed, it is easy to see how performance can be a discovery experience for consumers, or talent hunters from the recording industry. It is also debatable whether for-pay download services, such as iTunes or Napster, are used to obtain content or are made for discovery that may eventually lead to the purchase of a compact disc or a concert ticket.

Looking again at chart 3.3 we find a fairly intact traditional music industry that has seen some adoption of Internet technologies. It still relies heavily on distribution through retail, and marketing discovery through broadcast channels. The most obvious advance is in e-commerce retail, where music compact discs are sold online and delivered by postal mail or courier. E-commerce retailers frequently offer previews in the form of short and low-quality audio downloads, editorial reviews and discussion and appraisal forums for amateurs and fans in order to assist discovery.

They also offer genre-based portals and guidance for consumers as well as the possibility for individuals to construct their own portal of critical appraisal and recommendations. Another technology used as a marketing-discovery aid is the tracking of browsing behaviour and the analysis of purchase patterns of consumers. On the basis of such intelligence, online retailers try to second-guess and promote artists to individual consumers by e-mail or during a browsing session. Dedicated artist websites have also emerged and their role is mainly to engage in distribution and marketing activities within the framework of traditional industry structures. A number of notable exceptions are described in section F.

Traditionally, most of the technology for production and distribution of music is owned and managed by the established business of recording, marketing and distribution and therefore, historically, most of the innovation – such as FM Radio (invented by RCA) or the music compact disc and cassette tape (developed by Sony and Philips, and Philips) – occurred in this locus as well. What is not

Chart 3.4
The layered structure of the Internet

Internet user

Content

Applications
(www,e-mail,instant messaging,VoIP, p2p)

Transport (TCP) and protocol (IP)
Software: prepares data for transmission or reception and handles Internet addresses and data routing

Physical network & links

Internet

Applications

Content

Internet host

Content is created and accessed through applications that reside on the "ends" of the network, and on the PCs and servers of users and hosts. The transport and protocol (TCP/IP) and the physical network are neutral and do not interact with the applications or content, thus leaving each other unaffected. It provides for a sturdy network whose sole objective is efficient transmission and robustness. "Smart" applications on the ends of a "stupid" network are an ideal medium for innovation in both content and technology because they allow endless experimentation, development and deployment.
Flows are two-way and typical users can become hosts when using p2p technologies.

so obvious is that any process that pushes production and distribution technology out to the ends of the system, to artists and consumers, can undermine traditional structures and business models. Chart 3.4 describes the Internet and allows some insight into its radical concept and nature. The future structure of the music industry will be a result of the interaction of the Internet and the traditional industry, and a brief appreciation of the Internet's design is fundamental to gaining an insight about possible changes in the near and medium term.

The defining characteristic of the Internet is its freedom. It realizes this through a layered structure, the openness of the Transmission Control Protocol and the Internet Protocol software (often abbreviated as TCP/IP), its end-to-end environment for applications and content and its dominant open and free application – namely, the World Wide Web (Benkler, 2000; Lessig, 2001; Solum and Chung, 2003). The layered construction is established in such a way that innovation and improvements in any layer do not require adaptive responses in any other layer to maintain existing functionality. Adaptation is considered only from the point of view of taking advantage of the improved environment to provide better functionality, content or service. Thus, a change in the Internet protocol – for example, the deployment of IPv6 – will not require a rewriting of websites. Similarly, the development of a new web browser does not affect the functionality of the TCP with regard to how it manages data packets. A new optic fibre cable in the Indian Ocean will not require any change in the content of websites or the html standard. The TCP/IP software that manages data transfer and the physical network that carries the data do not "know" what these data mean. In order to "sniff out" data, an agency may need to establish a user or a host and develop applications running on computers above and connecting through the TCP/IP layer. Cementing its openness, the TCP/IP software and its source code are in the public domain, while the HTML code of many websites is accessible through a browser.[34]

Most critically, the end-to-end nature means that applications and content are developed, installed and run on computers that are on the perimeter of the network. The consequence is that new technologies for users and hosts – or by analogy, consumers and artists – can be developed regardless of the network. There are no real obstacles in developing a new web browser or establishing a new website, as far as the physical network and data transport layer are concerned.

The Internet still has two broad classes of computers. There are those that are used only for browsing and are typically linked through a telephone dial-up, DSL or cable ISP service. Then, there are those that are servers that store and hand out websites to browsers. But two new technologies are blurring this distinction. The first is the availability of always-on flat-fee broadband connections for subscribers. Matched with a fixed IP number, such computers become de facto servers. Peer-to-peer technologies for file sharing (Kazaa, Morpheus, Overnet) or telephony (Skype) are capable of converting even a modest home PC with a dial-up Internet connection into a server, albeit a modest one. Because of the end-to-end nature of the Internet, such p2p applications are developed and run irrespective of the technology of the lower layers. Beyond the policy and control of the owners of the computers and the contract conditions with their Internet service provider (ISP), there is little in the network itself that can be used to technically restrict or control applications and content.

These technical and conceptual freedoms and openness are the driving forces of much of the information revolution of the past ten years. Indeed, who would have invested in developing e-commerce storefronts or media player applications tied down by technical or legal restrictions enforced by optic fibre operators or hardware producers? Information systems based on closed technologies, such as non-Web services provided by CompuServe or Prodigy, have disappeared and open and free technologies are gaining favour in all fields that are touched by the Internet.[35]

The question is, how will this affect the music industry and how quickly will changes come about? The assumption is that the fundamental nature of the Internet will not change in the medium term. This is an issue in itself – it is related to the increasingly important discussion on Internet governance and cannot be done justice in this chapter. Chart 3.5 speculates by exaggerating certain established trends. The first obvious change is that the unidirectional production and flows described in chart 3.3 will cease as artists, consumers and industry become increasingly net-

Chart 3.5
Music industry affected by the Internet
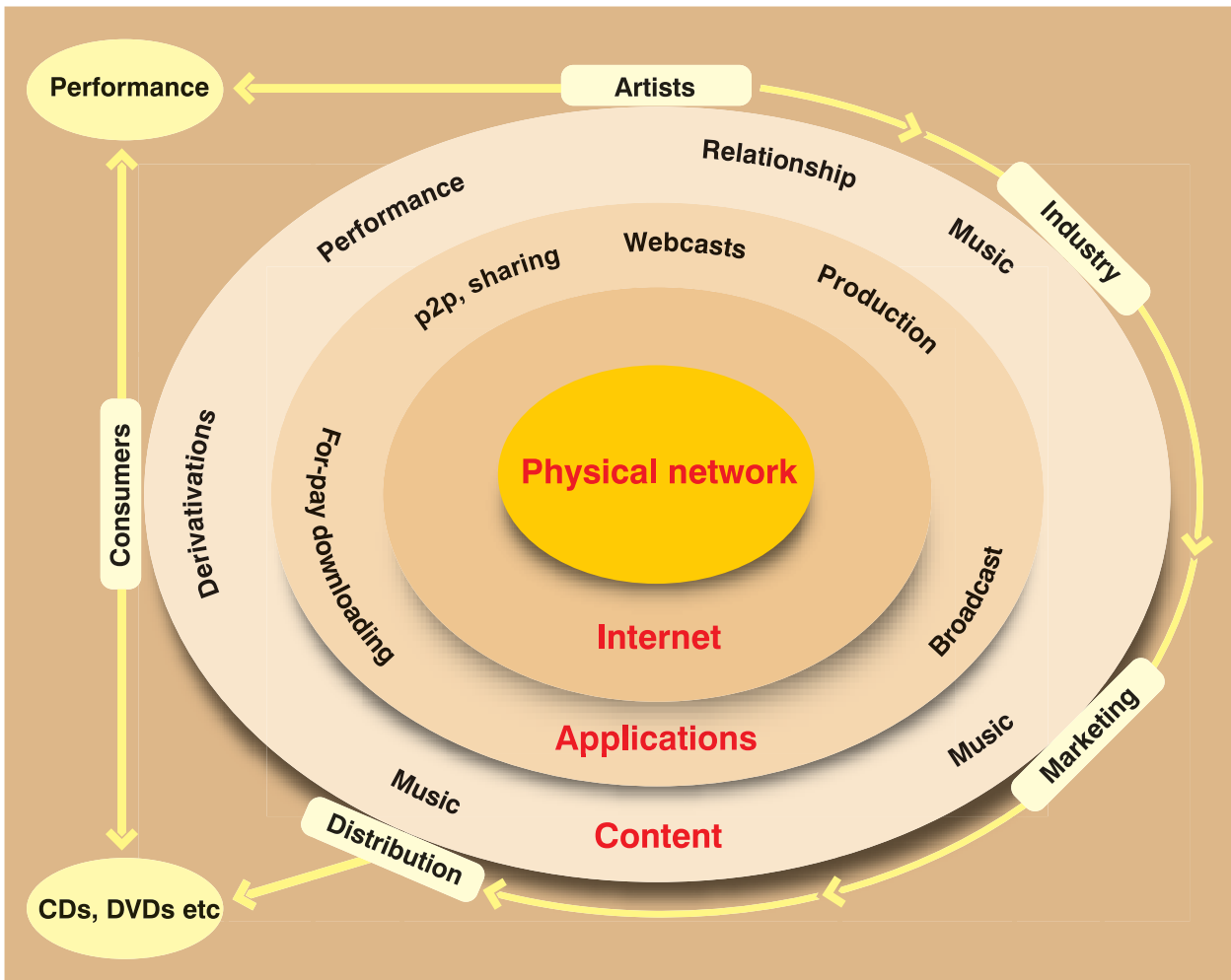
worked through Internet technologies. The second is that the functions of production, distribution and marketing in chart 3.3 will "become" applications, more neutral and less subject to the uncertainties of the interaction between artists and business. Thus, technology moves out from the industry and becomes the shared property of all who wish to participate in music, creatively and commercially. p2p technologies will become internalized as some form of contract and compensation mechanism evolves to legalize and accommodate file sharing of copyrighted content. Matching this development, we see an expansion of the production of derivative works by fans. While digital derivation remains a legally dubious activity, and a plainly illegal one if derivative compositions contain recognizable samples and are publicly redistributed, it is technically achievable with off-the-shelf software and computer hardware. Another new type of content is the development of greater interactivity at artist websites, including various

marketing devices and e-commerce capabilities. Many such websites have developed to the point where the online activity they generate can be called an artist–audience "relationship". Moreover, many artist websites have become the prime locus of their interaction with the public, circumventing traditional marketing and broadcasting support provided by the music industry, the amount depending on perceived commercial potential.

The most discussed disruptive application has been that of file sharing using peer-to-peer technologies. File sharing is an excellent example of the capacities for innovation provided by the end-to-end and layered characteristics of the Internet. In combination with the development of software for extracting files from CDs and DVDs, file sharing has prompted the music industry to research into digital rights management (DRM) technologies that technically restrict the use of digital

media and invest in litigation. However, the music industry has scaled down its efforts to litigate against p2p technology providers following a defeat in the court case against Grokster and Streamcast, and has turned to litigation against individuals who have violated copyrights and licences by redistributing music without permission.[36, 37] However, suing customers may not be a sustainable business model. Because companies have a different strategic relationship with clients than they do with competitors, suing clients may not generate positive public opinion and could alienate potential consumers.[38] Developing commercial and technical solutions that support Internet-based distribution may ultimately present better value for artists, audiences and industry. Specific cases of Internet applications are discussed in the next section in order to highlight possibilities and current practice.

F.   Technologies and applications

The history of technology adoption in music is one of artists and their audience using computers and the Internet to enhance, share and thus popularize their creativity, and of the reactions by the mainstream industry to limit any perceived or potential damage. The controversies that we see today over p2p file sharing have precedents in the disputes about radio, in particular FM radio, and video-cassette recording (VCR) technologies.[39,40] While it may be exaggerated to accuse the music industry of luddism, especially since much of today's recording and distribution technology was developed by the industry, which continues to refine it, the technology it did develop in the past was either financially inaccessible to individuals or restricted through regulation. Not everyone could run a radio station, while duplication of video-tapes and vinyl records required substantial investment. In contrast, just about any individual in the developed world, and many in developing countries, can establish a website offering musical content that is produced on a personal computer at a technically acceptable level. Computers and the Internet have changed the economics, and artists and audiences are enjoying unseen technological freedoms. Empowerment often has something to do with rights, and copyrights and permissions are foundational elements of the music industry and will be examined in section G.

The mainstream recording industry indicates that setting up legitimate for-pay online music portals is a significantly more complex task than designing a peer-to-peer protocol and designing the client program to be installed on a user's computer.[41] A recent industry publication describes several elements that need to be in place before Internet distribution can achieve the required levels of service and quality. The first issue is the need for a large digital catalogue: consumers will be disappointed with limited content. The second is the need for high-performance Internet infrastructure. The third issue is supplying safe and virus-free files, and a fourth one is providing secure payment systems. The fifth issue is the development of a consumer-friendly digital rights management system. Finally, the greatest problem is clearing recordings and compositions with various copyright holders. Suffice it to say that, with the partial exception of the last two issues, none of these considerations are novel or specific to music. Indeed, finding a good balance between DRM and consumer utility, since these are practically opposite notions, requires wisdom and experience. However, clearing rights should not be a problem for an industry where a few companies and their affiliates own the majority of recording and publishing rights.

The discussion that follows will review several technologies and portals. The first – free software – has been at the root of many of the copyright issues to be discussed in section G. Two of these – Napster and MP3.com – have suffered a heavy legal onslaught from the music industry. While they may regain prominence in the near future, their nature will bear little resemblance to their original incarnations. The third – Apples's iTunes Music Store – has got off to a good start, in part because its Chief Executive Officer (CEO), Steve Jobs, has managed to establish communication with the mainstream music industry, being a media insider as CEO of Pixar, the hugely successful animation company. An insightful development is the Brazilian download portal iMusica. It clearly demonstrates that music and Internet distribution are not the proprietary domain of developed markets.[42] File-sharing technologies such as Kazaa, Morpheus or Wippit will also be briefly considered. The discussion will then review several interesting directions taken by individual artists in embracing Internet technologies and engaging their audi-

ences with media, discovery and performance. Several Internet portals dedicated to promoting unsigned or undiscovered talent as well as operations with a business-to-business profile will also be reviewed.

1.   Free and open source applications[43]

A number of digital technologies used in recording and production are functionally independent of the Internet. Most of these technologies are, unlike the Internet, proprietary. This means that their source code is secret and their use is subject to licences and copyrights. However, a number of new software applications for use in music have been developed as free and open source software (FOSS) – software that does not hide its code and whose licence permits redistribution, copying and sharing of improved or altered source code. Box 3.2 describes several applications that can be freely used, but also altered and adapted to local language, needs or user habits. As with any instrument, the output of these programs will depend on the creativity and inspiration of the artist. Indeed, some of these programs may not yet provide all the functionality as the proprietary industry-standard applications. However, from a didactic perspective, they are well placed for use in educational institutions dedicated to music and computer science at all levels. Experience in creative use or programming can be fed back into improving these programs. Finally, the skills acquired by using any one of these programs is highly relevant and transportable if the opportunity arises to work in a mainstream music industry technological environment. FOSS programs may have particular value for developing countries as they allow localization and, given their affordability, can be tried by aspiring or established artists or "tech-savvy" amateurs without their having to invest significant means, beyond their own time and effort.[44]

2.   Napster

The first major disruptive Internet technology to affect the music industry was Napster. Today, Napster is a legitimate for-pay music download portal that bears little resemblance to its initial incarnation. First released in May 1999, Napster was created by Shawn Fanning as a file-sharing service. Its initial success was enabled by the growth of Internet connectivity and by the devel-opment of the highly efficient MPEG-1/2 Audio Layer 3 file compression technology, more commonly known as mp3.

The original Napster had two components. The first was the client software that was installed on users' computers. The client allowed people to discover and download music. The second was a centralized database that provided information about which songs could be found on what computer and the links for downloading them. In this sense, Napster was not a pure peer-to-peer application.

It became very popular for several reasons. It allowed the general public to obtain music online without having to purchase an entire compact disc of songs, the majority of which generated little interest or attention. It allowed users to discover music with greater insight than with the very short and low-fidelity sound clips sometimes provided by online retailers. Napster enabled users to share unofficial and unreleased recordings and deepen their insight of the creativity of their favoured artist. Finally, Napster was an application developed by exploiting the end-to-end nature of the Internet. All that was necessary was for users to install the software on the computers they used for browsing the Web. Neither the physical network nor the transport functions of the Internet needed to make any technical adjustments or allocate permissions as they could not discern between data packets of web pages or song files.

Not surprisingly, the Recording Industry Association of America (RIAA) – an association of major recording companies – filed a class action suit against Napster on 7 December 1999.[45] The legal process that followed generated many headlines and eventually gave Napster a great deal of publicity. It is estimated that Napster use peaked in February 2001.[46]

The United States courts eventually ruled that the principal activity of Napster was related to copyright violation and its servers were ordered to be shut down in July 2001. After this Napster continued efforts to re-establish itself as a subscription-based music service but failed and went into bankruptcy during acquisition negotiations with Bertelsmann AG.

What made Napster legally vulnerable was its incomplete reliance on peer-to-peer technologies. Because it used centralized servers to carry searchable information and links to song files, it became

Box 3.2
Free and open source software for music

An increasing number of free or open source software applications are available for making and listening to music. Most of them run on the GNU/Linux operating system. Some have been released in versions that will run in Microsoft Windows or Apple's MacOS. The following list is illustrative and not comprehensive. For a detailed assessment, readers should consult http://sourceforge.net or http://freshmeat.net/, as well as the specialized web page http://linux-sound.org/ . A qualified review of several advanced programs for professional recording can be found in the February 2003 volume of the *Sound on Sound* music trade magazine.[i] Product descriptions are taken directly from the project websites with minimum edits and their accuracy cannot be guaranteed.

Agnula

The main task of Agnula (a GNU/Linux audio distribution) is the development of two reference distributions for the GNU/Linux operating system completely based on free software and completely devoted to professional and consumer audio applications and multimedia development. One distribution will be Debian-based (DeMuDi) and the other will be Red Hat-based (ReHMuDi). The European Commission originally funded the Agnula project.[ii] After the end of the funded period, Agnula will be continuing as a volunteer-based free software project.

Operating system: GNU/Linux; website: http://www.agnula.org/

Rosegarden

Rosegarden is a professional audio and MIDI sequencer, score editor, and general-purpose music composition and editing environment. It is an easy-to-learn, attractive application that runs on Linux, ideal for composers, musicians, music students, and small studio or home recording environments. It is currently in a beta release phase, in preparation for a full 1.0 release later in 2004.

Operating system: GNU/Linux; website: http://www.rosegardenmusic.com/

Audacity

Audacity is a free audio editor. It can record sounds, play sounds, import and export WAV, AIFF, Ogg Vorbis and mp3 files. It can edit sounds using Cut, Copy and Paste (with unlimited Undo), mix tracks together, or apply effects to recordings. Audacity is written in C and C++, using the wxWidgets cross-platform toolkit.

Operating system: GNU/Linux, Windows, MacOS; website: http://audacity.sourceforge.net/

Ardour

Ardour is a digital audio workstation. It can record, edit and mix multi-track audio. It is used to produce CDs, mix video soundtracks and experiment with new ideas about music and sound. Ardour capabilities include multichannel recording, non-linear, non-destructive editing with unlimited undo/redo, full automation support, a mixer whose capabilities rival high-end hardware consoles, and sound effects.

Operating system: GNU/Linux; website: http://ardour.org/

JAMin

JAMin stands for "JACK Audio Connection Kit Audio Mastering interface". JAMin is designed to perform professional audio mastering of stereo sound recordings. Mastering means preparing a recording for mass reproduction and is a critical and final phase in the production process.

Operating system: GNU/Linux; website: http://jamin.sourceforge.net/

Sweep

Sweep is a multi-channel audio file editor with a difference. A virtual stylus, replacing the ubiquitous cursor, allows users to scrub through a file and reach an exact place in a song to make an edit. The virtual stylus has been programmed to mimic the performance of a real turntable, thus enabling its use in production as well as for live DJ performance. Sweep was developed with support from Pixar, the animated film studio that produced Toy Story and Finding Nemo, and the Australian Commonwealth Scientific and Industrial Research Organisation.

Operating system: GNU/Linux, NetBSD Sun/Solaris; website: http://www.metadecks.org/software/sweep/index.html

Mixxx

Mixxx provides access and playback of Ogg Vorbis, mp3 and wave files for a live DJ performance. Sounds can be edited for pitch and a beat track and automatic tempo synchronization facilitates mixing in correct beat and rhythm. Filters, a crossfader, and speed controls are provided.

Operating system: GNU/Linux, Windows, MacOS; Website: http://mixxx.sourceforge.net/

CDex

CDex is a tool focused on ripping and converting music from CDs into an mp3 files for storage on a PC hard drive. It has built in support for many mp3 encoders and provides numerous options for managing media files. Curiously for free software, it is available only for use under Windows.

Operating system: Windows; Website: http://cdexos.sourceforge.net/

Grip

Grip is a CD player and CD ripper for the Gnome desktop. It has the ripping capabilities of the program cdparanoia built-in, but can also use external rippers. It also provides an automated frontend for a variety of encoders in order to transform ripped files into MP3s or other compressed formats. Internet disc lookups are supported for retrieving track information from disc database servers. Grip works with DigitalDJ to provide a unified "computerized" version of one's music collection.

Operating system: GNU/Linux, FreeBSD, Sun/Solaris; with GNOME; website: http://nostatic.org/grip/

[i] See http://www.soundonsound.com/sos/feb03/articles/linuxaudio.asp.

[ii] See http://www.agnula.org/documentation/project_documentation/AGNULA_ec/view.

a straightforward target for the recording industry and arguably an accomplice in the crime of copyright violation. This particular insight was well taken by the recording industry, which may have started anticipating that future file-sharing systems would very likely be based on pure peer-to-peer technologies.[47] Thus, on 25 June 2003, the RIAA announced that it would file civil lawsuits against individual computer users for engaging in illegal file sharing, instead of pursuing peer-to-peer software developers.

Today, Napster is owned by Roxio Inc., which is well known for the development of popular software for copying and burning compact discs on personal computers, and the reinvented for-pay Napster music download portal may make a good match for its existing business. The new portal has been in operation since 9 October 2003, and had generated 5 million downloads and attracted roughly 1.5 million subscribers by the end of February 2004. While impressive at first glance, these figures are modest in comparison with Apple Computer's iTunes Music Store.

3.   MP3.com

Not to be confused with the file compression technology, MP3.com was set up in 1998 by Michael Robertson,[48] who later founded LindowsOS – a user-friendly open source operating system directly competing with Microsoft Windows – and SIPphone, an Internet telephony technology.

The website addressed the needs of both audiences and artists. With regard to audiences, it allowed anyone to download songs from its server provided that users could prove that they had the required rights and permissions because they owned a physical and legal copy. To do this, a user would put a CD in his or her computer drive. The details of the CD were then sent to MP3.com and validated as "owned" after which a personalized online folder with songs from that CD was set up. With a password the user could listen to the songs from anywhere on the Internet. Therefore, MP3.com was not giving anything that the user did not have in the first place.

By giving users access to their own content, and by inspecting this content, MP3.com was able to discover their preferences. This information was then used to promote the music of independent musicians associated with MP3.com. The services provided to artists included hosting, charts defined by genre and geographical area, as well as statistical data indicating which of their songs were more popular. There was no charge for downloading independent artists' music and revenue was generated through online advertisements.

To implement this scheme, MP3.com needed to have its own set of CDs to copy and transfer to users' folders. Requiring users to themselves rip and upload entire CDs was seen as a technically unnecessary complication. Furthermore, MP3.com assumed that such copying would fall under users' "fair use" provisions of copyright law. On 22 January 2000, several days after the my.mp3.com service was launched, the RIAA and the major recording companies sued MP3.com for copyright infringement, claiming that the electronic copies on MP3.com's servers were in fact subject to licensing obligations.

MP3.com quickly settled with all the plaintiffs except Universal/Vivendi, with which a settlement was reached only nine months later after a court ruled that MP3.com had intentionally violated copyrights.[49] In a peculiar developemnt, one year later Vivendi bought MP3.com in order to boost its online music activities and then proceeded to sue for malpractice the lawyers that were originally advising MP3.com on their my.mp3.com scheme and defence. Having little success with developing online activities, in November 2003 Vivendi sold the MP3.com domain and technology to the CNET media company. However, the archive of independent music, containing more than a million songs by 250,000 artists, was to be deleted on 2 December 2003.[50, 51] Fortunately, the GarageBand and Trusonic portals have acquired a legitimate copy of the archive and are asking former MP3.com independent artists to visit www.MP3isBack.com and recover their music and regenerate their artist web pages.[52]

4.   iTunes Music Store

The iTunes Music Store, a for-pay music download service set up by Apple Computer, was introduced on 28 April 2003. In its first year of operation it had 70 million downloads at 99 cents a piece from a catalogue of 700,000 songs from all major music companies and over 450 independent music labels. Generally viewed as a success, initial sales were limited to United States residents holding credit cards.[53] This was followed up with a

solid European debut on 15 June 2004, achieving 800,000 downloads during the first week. Following its successful launch in Europe, in line with its "rip, mix and burn" credo, users can save songs to an unlimited number of compact discs or iPod devices after download, although there are some restrictions on duplicating entire playlists.[54]

The success of the iTunes Music Store, in spite of the availability of free music files on p2p file-sharing networks such as Kazaa or Overnet, has surprised many. We can speculate as to the reasons, some of which are certainly a large catalogue and high-quality song sample previews. The iTunes website is well designed and the interface for downloading and purchasing songs is straightforward, in particular when compared to the daunting technology of certain p2p clients. Furthermore, songs are encoded and reproduced with an advanced compression technology (MPEG-4 and QuickTime 6) that some consider superior to standard MP3 quality.[55] Other features, such as lightweight restrictions on copying and one-click purchasing, are seen as an advantage. However, none of these are likely to remain unmatched by other online services. Thus the success of iTunes Music Store has to be linked to other issues.

One of those issues has to be the winning linkage between the iPod personal media player hardware and the music download service, from both a technological and a business perspective. It has been suggested that Apple may be tolerating losses on iTunes in order to support its best-selling iPod hardware.[56] The other issue is related to tapping into the almost captive Apple market. For many years, Apple users have been paying premium prices for technology that has an implied higher functionality and better user interface. The legendary relationship of trust between Apple and its devotees indicates that audiences are prepared to pay if their needs can be addressed with a well-designed and quality product. Indeed, it is entirely possible to crack the residual copy protection on tunes sold by Apple and disrupt the system. However, there is no evidence that this is done to any substantial extent. As mentioned before, an important advantage for Apple has been securing the cooperation of the mainstream music industry, no doubt through experience and capacities developed through its media sibling Pixar.

5. iMusica Brazil

iMusica Brazil was launched in July 2000 by Ideiasnet, the first Brazilian technology company listed on the São Paulo stock exchange. It carries the largest online selection of Brazilian music and provides links to software for playback, creating play lists and burning CDs. iMusica carries more than 60,000 song titles. Its technology also powers the MSN Brazil, Musical MPB and Americanas.com music download portals. iMusica has licence agreements with EMI, BMG, Abril Music and Som Livre among others. Downloads cost about 0.99 Reals per song title (about $0.33) and are provided in Microsoft Windows Media Audio (WMA) format, but not in mp3 because it does not incorporate DRM technology to control copyright; therefore, iMusica uses Microsoft's DRM 7 technology as well.[57] Further, iMusica asserts that WMA files have superior audio quality compared with mp3 files of the same size. Once downloaded, songs will not play on other computers. However, songs can be burned to CD for reproduction on players that support the WMA format.

6. Peer-to-peer networks

p2p programmes have become the focus of discontent among copyright-based industries and have been accused of being the cause and enabler of content piracy. While file sharing of copyrighted content beyond provisions for fair use is illegal in most countries, producing the software that allows file sharing, redistributing it and installing it on a personal computer are not. The major alleged effect has been the decrease in income from CD sales of record companies, and consequently a decrease in royalty payments to recording artists. Given that less than 10 per cent of recording artists manage to generate a profit for their record companies and the majority are probably not earning any significant income for themselves either, it is interesting to ask whether they should really be worried.[58] Indeed, a number of artists have expressed a range of levels of acceptance, from simple tolerance to encouraging the sharing of content that is purely of interest to devoted fans, such as concert performances. A list of such artists has been posted on the Electronic Frontier Federation website.[59]

While Napster was the original file-sharing program, Kazaa is today probably the most popular. The Kazaa client is installed on a personal computer and uses the FastTrack protocol, as do Grokster and iMesh – two other client applications – to access content on all computers accessing the peer network running on FastTrack at that

moment. Niklas Zennström and Janus Friis developed the FastTrack protocol in 2001. Sharman Networks bought Kazaa in January 2002 and has continued developing the program for the Microsoft Windows operating system. Users prefer Kazaa mainly because it is the application with the largest installed user base. At any given moment there are several million users online.

Gnutella is more a project than just another p2p application. Originally developed for AOL, it was abandoned when management realized its disruptive potential.[60] It too used the FastTrack protocol but eventually developed its own protocol, which is maintained and advanced by the Gnutella developers forum. The original Gnutella was supposed to be released under a free software licence, hence the "GNU" in the name. Today, a significant part of the Gnutella project is open source, including a number of clients (Limewire, Shareaza, Gnucleus). Morpheus is a p2p client that can search all the major file-sharing networks and connect with users of Kazaa, iMesh, eDonkey, Overnet, Grokster, Gnutella, LimeWire and G2. It also enables VoIP voice-chat among users and utilizes public proxy networks for privacy protection.

While most p2p applications require a user to sign up and provide some personal details, and can reveal these if needed, FreeNet, WinMX and WinNY are p2p applications that offer a certain degree of anonymity to users. This has attracted both criticism and praise from various political, economic and moral positions.

In contrast, the goal of the BitTorrent p2p system is to provide efficient file-sharing to a large group of people by having everybody that downloads a file also upload it to others. To achieve this, a small file with a ".torrent" extension is placed on a website or distributed by e-mail. The torrent file contains information for the downloading and assembly of the file as it is received from many different computers. Thus a download will benefit from a combined bandwidth of all uploading computers. Unlike in the case of FreeNet, WinMY and WinNY, the fact that the torrent files are placed online reveals the identity of the computer. Also, BitTorrent does not offer a search facility to find files by name.

p2p networks, like the Internet on which they run, do not distinguish between copyrighted, free-and-open or public domain material. But this is a matter of choice. Unlike the networks described, the Wippit music portal aims to create a subscription-based p2p network consisting of legitimately licensed recordings. Downloads can be achieved per song starting at $0.49. Unlimited downloads are available for monthly ($22.99) or yearly ($89.99) subscriptions. Wippit has a wide range of musical styles and formats, including mobile phone ring tones. Its catalogue includes more than 200 record labels, including EMI and BMG. Using the Wippit p2p client, subscribers can search for music by artist name, song title, album name, track number, genre or year. Wippit uses a central registry allowing only material that is recognized as legitimate to be swapped.

p2p applications are improving and growing in number daily, and it is difficult to see what can stop them, beyond a dramatic reconfiguration of the Internet and its protocols. In a sense, p2p is a near-final step to the goal of eradicating any difference between browser-only computers and server-computers, and turning the Internet into a truly flat network without hierarchy. This is its destiny by design. Thus, the media and music industry are faced with the option of exploring how to change their business model to embrace and profit from p2p or to seek ways to uproot and change the Internet. Public advocacy groups, such as the Electronic Frontier Federation are suggesting voluntary collective licensing schemes: in exchange for a subscription fee, file-sharing music fans will be left free to download whatever they like, using whatever software works best for them, with positive effects on earnings for copyright owners, innovation and improvement of Internet applications and growth of the global online music catalogue.[61] Finally, there has been speculation that free p2p networks may go the way of free ISPs – for reliable quality and service many consumers have chosen to subscribe to broadband Internet providers.

7.   Individual artists and technology

Artistic expression is often personal, or sometimes reflects interactions of several defined individuals. The experience of music is deeply personal as well, although it has important social roles in many cultures. Thus it can be no surprise that fans willingly flock to artists' websites, hoping to "disintermediate" their experience by establishing at least a virtual relationship with their favourites. Artists, as discussed earlier in the chapter, are no strangers

to technology and sometimes manage to develop a distinctive online presence beyond the generic boxed and tabbed e-commerce or corporate portals of the mainstream music business. The key issue for every artist portal is to provide a proper balance of media, discovery and performance modes. Unfortunately, websites of independent but established artists from developing countries are nearly non-existent, and those that have world-class functionality, such the websites of Salif Keita and Anjelique Kidjo, are set up and managed by their record companies – Universal and Sony in these two cases.

Marillion.com

Being described as "the least cool band in the world – or the best-kept secret in the music industry"[62] may, at first glance, not provide much leverage for stardom. What it did provide, however, was release from the restrictions of the standard contracts and business processes of the traditional music industry. After their contract with EMI ran out in 1996, Marillion formed their own label and embarked on developing an intimate relationship with their audience, often through the clever use of digital and Internet technologies. While the website can be analysed at length for content and complexity, it is far more interesting to point out several distinctive features.

The e-commerce potential of the website has been used not only to sell existing CDs, but also to raise finance to advance the production of future work to generate and advance. Marillion have pioneered pre-ordering of scheduled CDs using bonus material as premium for fans willing to part with their money in advance. Finance is obtained on the base of an artistic track record and the interest is paid in music.

Marillion make extensive use of e-mail to communicate with their audience. Audiences in discovery mode are offered a free Marillion Crash Course CD if they send an e-mail containing their name, postal address and date of birth, plus the name of the website, magazine, newspaper or other medium where they first heard of the offer. The CD is permanently updated to keep abreast of the group's musical direction. The feedback provides basic demographic information, including data about geographical distribution – a useful tool in planning performances and tours. An e-mail vehicle, the Marillion eWeb, is used to provide current news and information. The band members and management can be contacted individually by e-mail from the contact page.

In 2003 Marillion asked their audience to alter, edit and remix the music from their Anoraknophobia CD. In return, it offered for pay an unmixed version of the album in which the instrument and vocal recordings for each song had been separated, allowing users to recombine them and thus produce alternative versions. The most successful reconstructions were issued on a CD in July 2004 and the selected contributors received a prize of £500 per song. Marillion have managed to strike a different balance in their relationship with their audience, which in some ways reduces and in other ways increases their control over their art. Much of it has to do with empowerment assisted by digital and Internet technologies. This approach has recently led to their first top 10 chart success since 1987.[63]

Mash-ups

Creative intervention on established works using digital editing technology is becoming a popular process, the most recent method being so-called mash-ups, which involves the morphing of disparate genres and performances in a process reminiscent of Zappa's xenochronic experimentation. Because permissions from several copyright owners are difficult to coordinate, most mash-ups are never legally published.[64] Established artists seem to have caught on to the marketing and discovery power of mash-ups, in particular as it may rekindle interest in their less recent catalogue of work. Similar to the case of the Marillion remix project, David Bowie is offering the opportunity to fans to remix his work. Bowie has posted 31 high-quality 30–40 second sound samples from various compositions on his website and has asked fans to derive new songs by recombining bits and pieces of existing ones. Prizes are offered and the most successful mixes will be posted as well.[65] The current controversy over mash-ups was sparked by the non-commercial release of the collection of mash-ups called the "Grey Album". The recordings feature vocal tracks from Jay-Z's "The Black Album" laid atop music from the Beatles' "White Album".[66] EMI, the copyright owners, have threatened legal action.

Creative licence

Completely different in nature and intent, the website of Neil Young (www.neilyoung.com) is designed to support the artistic vision of his latest work and provides little e-commerce functionality. It does provide, however, extensive commentary on the content, lyrics as well as full-length streams of all the songs, and video footage of performances. Closer to main street, the portal of folk musician Kate Rusby (www.katerusby.com) is a well-executed and particularly navigable and discoverable structure. An independent artist, Rusby has managed to sell more than 60,000 CDs and establish an attentive audience.

Jololi, the label of the established Senegalese artist Youssou N'Dour, was founded in 1996. The recording studio Xippi was already in place, and there was clearly a great deal of interest in new Senegalese talent from overseas after the success of Youssou N'Dour's album "Wommat". The Jololi website (www.jololi.com) is well designed and provides a high level of discovery and good navigability. Artist overviews, biographies and discographies are provided with some audio clips as well. There is a definite African flavour in the design and there has been no rush to eye-catching or gimmicky presentation. Jololi has started to make inroads into the international market and has entered into licensing arrangements with various distributors throughout Europe, including Real World, World Circuit, DeLabel and Virgin.

The well-known Caribbean musician Eddy Grant has developed an extensive website in support of his label Ice Records, which he founded to carry the release in 1977 of his first solo album, "Message Man". The website (www.icerecords.com) and label are much more than storefronts. They provide an interesting glimpse into the musical traditions of the region and the efforts to maintain the musical heritage with new productions but also by acquiring and reissuing historical recordings of artists such as Lord Kitchener or Roaring Lion. The website offers one-minute quality audio previews of almost 100 songs in the Ice Records catalogue. Grant's discussions about music in general and in the Caribbean, as well as his takes on global issues, give an interesting insight into the man and the artist, uncommon in the mainstream industry that often "produces" and public image for the artist to "match" the music and its target audience. The website gives details on the artists it produces and has e-commerce capacities enabling the purchase of CDs.

8. Online intermediaries and services

During the last 10 years a number of portals have emerged whose sole purpose is to promote undiscovered or unsigned musical talent or to intermediate and bring existing talent to the Internet. A number of these will be briefly described here. They may serve as examples for setting up local and regional portals in developing countries in order to promote local talent and culture. It is interesting to see where the portal owners are domiciled and to realize that the Internet and its domains are not reserved for anyone in particular, not the least for developing country artists or businesses. For example, a query on "Jamaica music portal" will return a top hit on Reggae-Train.com, a portal with a domain owned by a US entity that forwards its e-commerce to Amazon.com. Given the accessibility and the price of technology, there is nothing stopping established artists or music industries from developing countries promoting their culture and products online.

One of the first portals was the Internet Underground Music Archive (IUMA). IUMA pioneered the delivery of music on the Internet in 1993 and has hosted over 25,000 artists and 100,000 songs. It provides artists with promotional and community tools such as an individual and customized web page for posting information and files for streaming or download, sells CDs, creates message boards and fan lists, manages fan e-mail, and finally showcases artists' music to IUMA industry partners.

Another original online portal, GarageBand.com, was founded in October 1999 to create a merit-based system for evaluating the artistry of emerging musicians. In 2001, it attempted to establish itself as a new record label but failing to secure broad distribution and promotion, it was forced to shut down its website in February 2002. Fortunately, already in May 2002 the site was re-opened and Evolution Artists Inc acquired GarageBand.com's assets. GarageBand.com offers a range of free and paid services to musicians, including concert promotion and consultancy. Content evaluation is done using Internet-based peer reviews and aims to provide a well-organized ranking of the best new independent music. The process starts when a song is received. But to submit a song, an artist needs to have rated at least 30 compositions by other artists. Listeners are randomly assigned to review new songs, and rankings are produced on the basis of their ratings. While major labels and

publishers have signed many of GarageBand.com's top-ranking artists, it is the opportunity to earn unbiased feedback and recognition that provides immediate value for musicians.

On Demand Distribution (OD2) is a European distributor of online music. However, it does not run its own music portal but provides Internet-based technologies and music content to websites such as Virgin Downloads, FNAC and Media Markt, thus squarely placing it in the B2B category. OD2 provides a complete end-to-end solution, including encoding of source material, pre- and post- release promotion, distribution, and revenue, licence and royalty management. Its objective is to sell and promote its music portfolio through online retailers while ensuring that record labels and artists receive compensation. Its services and technologies support a variety of formats, including mp3, WMA and ring tones, perform encryption for secure distribution, and provide hosting and turnkey e-commerce site development. OD2 sold one million downloads through its European retail partners during the first three months of 2004, in what is a tenfold increase on the same period last year and a 100 per cent increase over the last quarter of 2003.[67]

Founded in April 1999, Vitaminic is a European portal for the promotion and distribution of music over the Internet. It combines content from major record companies, independent labels and unsigned artists, offering them the opportunity to promote and sell their music. It currently has 10 local websites, of which nine are in Europe (Italy, United Kingdom, Germany, France, Spain, Netherlands, Sweden, Denmark and Ireland) and one is in the United States. All the local sites reflect the individual markets in which they operate. Unusually for such a business, Vitaminic was listed at Nuovo Mercato of the Italian Stock Exchange in Milan in October 2000, shortly after receiving $20 million of venture capital funding from four international investors.[68]

The opportunity to intermediate independent artists by using technology has been an obvious prospect for Amazon.com. As early as 1995, it set up the Advantage Program, a portal for artists and publishers to promote and sell their titles through Amazon.com. The Advantage Program recently hit the headlines when the rock band Pearl Jam decided to join. Before signing up new artists, it is important to establish that they own the rights to their work. Once this has been ascertained, they consign copies of their inventory to the Amazon.com warehouse. Amazon manages any orders and shipping, and monitors inventories.

Other portals worth inspecting for best practice are Peoplesound.com, Mudhut.co.uk, Getsigned.com, Artistdirect.com and CDBaby.com. Each is differently balanced in that one will cater to audiences seeking free downloads and a discovery experience, another will push for-pay services for aspiring artists while yet another will try to establish credibility as an insider regarding future talent and trends. In most cases, musicians can manage better contractual terms and conditions than by signing with the majors or any of their subsidiaries. The trade-off for achieving a higher royalty percentage is that online promoters may not have the marketing and promotional infrastructure to match the talent. Thus, truly excellent songwriters and performers may not maximize their commercial or celebrity potential. However, they would necessarily remain in charge of their artistic development.

G. Music copyrights, piracy and derivations

International copyright law is governed by the Berne Convention for the Protection of Literary and Artistic Works,[69] the UNESCO Universal Copyright Convention,[70] the Geneva Convention for the Protection of Producers of Phonograms,[71] the World Intellectual Property Organization (WIPO) Copyright Treaty[72] and the WIPO Phonograms and Performances Treaty.[73] Other legislation and treaties of importance are the European Union Copyright Directive,[74] and the European Union Information Society Directive,[75] and the Digital Millennium Copyright Act[76], the Audio Home Recording Act[77] and the No Electronic Theft Act of the United States.

1. Copyrights

A general discussion on the role of copyrights in music and creative activities can be found in many places (Lessig, 2004; Vaidhyanathan, 2003), including UNCTAD's own analysis of this issue (UNCTAD, 2000). While nobody can deny copyright protection a role in creative and cultural industries, it is necessary to approach this issue in a balanced way analysing the function of property in an environment where the commons, or public

domain, is an equally indispensable input into creative processes and production. Intellectual property is not an absolute, and to appropriate all content to a rent-seeking entity is a misguided ambition. "Just because some regulation is good, it doesn't follow that more regulation is better."[78]

Since copyright is often discussed from a legal and technical perspective, it may be useful to revisit its economic role and purpose. Human thought and creativity are abundant. As resources they are peculiar in that they grow with use. The Internet and ICT take this notion to its extreme. Copyright takes a free expression of the human mind and restricts its use, thereby producing scarcity. Thus it aligns two diverging historical developments. The first is the constant improvement in communication, which generates an exponential increase in the volumes of "content". The second is the need for scarcity, which will prompt economic agents to develop and trade "content" in markets. Music under copyright is (more) scarce and therefore can have market value. Investment in its commercialization and promotion may then be forthcoming, and it could become a traded product, available to the multitude through the mechanism of the market. The Internet decreases content scarcity, while societies fearing change strengthen copyrights and develop technologies, such as DRM, to increase scarcity and counteract this trend. If the capacity to restrict and control content is finite, while content growth may be infinite, the endgame seems futile.

To complicate matters further, digital and Internet technologies have increased the scope of "copying" and clouded our notions about what it is exactly. The potential for confusion becomes clearer when we consider two more conflicting issues. The first is that modern law assigns, by default, a restrictive copyright to all published content, including everything uploaded to the Internet. Content does not need to be registered, although it may be advantageous to do so, and no obvious copyright statements need to be included. The second issue is that computers access Internet content by requesting a copy of the files contained on a web server, loading the copy into memory or on the hard disk drive and then presenting these files in a browser, thus technically breaking the implied copyright. While trivial in 99 per cent of cases, this incompatibility serves to illustrate the inappropriateness of traditional copyright specifi-

cally for Internet activities and more generally for the future information society.

There is certainly no lack of controversy about recent developments in copyright laws and regimes, the effects of which have been to increase the power of rights owners and decrease the growth of the public domain. Depending on ethical, political or economic perspectives, this can be seen as a positive or a negative process. From a developing country's economic perspective, the short-term outcome is a net increased cost of access, with a consequential possible decrease in access to copyrighted materials, precisely because the majority of rights holders are from the developed world. The medium-term perspective is one of alleged opportunity and will depend on developing countries' managing to develop and hold on to copyrightable content, as well as developing professional and legal capacities to collect royalty payments, enforce rights and remedy infringement.

Having copyright law in place may be necessary but is insufficient. Without a legal system that is cost-efficient and willing to provide and enforce legal remedy, compensating those whose rights have been infringed, copyright law is a paper tiger. Without publishers and collecting societies to license works, monitor use and collect and redistribute royalties, copyright rents cannot be secured. An often-cited example is that of Jamaica. Its artists represent a 3.5 per cent share of the global music market and generate about $385 million of the royalties received by collecting societies in developed countries. Jamaica's own collecting societies lack the capacity to manage this income. There are estimates that, with enhanced collection capacity, Jamaican artists would significantly increase their copyright revenues and generate at least a 3 per cent increase in gross domestic product.[79]

But not all developing countries have significant music exports. Thus, the practical feasibility of collecting societies acting on behalf of artists from developing countries exporting small volumes of copyrighted material is not a foregone conclusion. While modern copyright regulation needs to be in place to provide economic compatibility in our increasingly globalized world, it does not need to be used always, by everyone and at any price. And perhaps the modern music industry of the developed world, with its dependence on copyright

rents and concentrated markets, does not have to be the unique model for every artist or cultural milieu, particularly in places where collective experience and ownership and use of the commons have strong roots and tradition in music and the arts.

2.   Piracy

Until recently, music piracy could be generally defined as the violation of copyrights by making unlicensed physical copies of released music – on CDs, music cassettes or vinyl records. Indeed, the IFPI Commercial Piracy Report 2003 analyses specifically physical piracy. It reports that worldwide one in three CDs is pirated. The total value of sales of pirated media was $4.6 billion. Several of the largest developing country music markets, such as Brazil, China and Mexico, were evaluated as having physical media piracy levels of over 50 per cent.

Moving to the Internet, there is little dilemma about the illegality of sharing music under copyright through p2p networks and the activities of ripping for redistribution, uploading and downloading music without permission. On the other hand, most of the technologies that enable users to engage in illegitimate activity are legal because they have thoroughly legitimate uses: ripping, sharing and burning music and other content under fair use provisions, from media that is owned by the user or comes from the public domain. Thus Internet file sharing has led the mainstream music industry to cry foul and use its political and financial influence to assert its interests.

Legislation and litigation aimed at curbing Internet piracy of music seek validity in legal logic and theory. However, many – including the recording industry – see this as an important but insufficient argument. The power of conviction lies with proving that there is quantifiable and important economic damage done by piracy. However, calculating lost sales from the number of illegitimate files in circulation in global p2p networks requires many assumptions. Equally difficult is establishing a causal relationship between file-sharing activity and CD sales. There are too many factors that can explain away the global drop in sales. The end of the vinyl replacement market, greater time and money spent on DVDs, computer games and the Internet, or the general post-Internet bubble economic downturns are commonly cited reasons. One recent study (Oberholzer and Strumpf, 2004) has concluded that there is no statistically significant effect

from music file sharing on p2p networks on CD sales and will have no impact on the supply of music. Other studies (Liebowitz, 2003) have expressed different views but question the ultimate severity of the p2p effect on the recording industry. Finally, improved discovery using p2p networks may have prevented what would otherwise have been unwanted or disappointing purchases.

The first casualty of strengthened enforcement and litigation is the notion that copyright is needed to provide incentives and motivate creativity and innovation in music. If we consider the imbalance in contract the majority of recording artists endure, described in part C, such incentives have probably been realized only to a very limited extent. Thus, the purpose of copyright in stimulating the "innovation and creativity" of artists is downgraded to protecting the "investments" of corporations. Given that investments are made, and the corresponding financial risks incurred, by giving advances to artists recoverable from sales, the business model can easily degenerate into managing a poorly performing advance portfolio, perhaps partly because of the moral hazard presented in the security of earnings acquired through copyright monopolies in a concentrated industry. Restructuring and changing business models can be a slow and risky process and big companies may choose to let more "expendable" entities spearhead change and conduct experiments. What is successful can be eventually brought in line with what is "acceptable" through litigation or buyouts, but usually both.

The second casualty is the public domain. Strengthened legislation has only extended the scope and duration of rights held and bars content from entering the public domain. A secondary problem is that, given these extensions, seeking permissions becomes a critical legal activity that requires resources beyond the reach of many artists. Finally, keeping content out of the public domain and under copyright is pointless if the content has no commercial potential. Thus music that is "out of print" may remain trapped and eventually forgotten: a disservice to audiences and artists alike.

The third casualty is the scope of fair use. DRM lessens the need for copyright law as it overrides restrictions imposed by a copyright contract and reintroduces them through technological locks and keys. Under copyright, users rights had some flexibility and fair use could be subject to debate and litigation. Replacing copyrights with DRM technology

removes the partial but useful flexibility of a contract between people. But DRM technology is not unbreakable and thus national legislation and international treatise have been introduced and annotated to criminalize the breaking of DRM locks and the related exchange of information and tools. This can result in an unnecessary criminalization of legitimate and fair use with devices, such as computers or DVD and CD players, that run on free and open-source software.[80]

3.   Open solutions[81]

What starts out as a binary issue – restrictive copyright or public domain – may eventually resolve itself through a balanced and nuanced approach, in particular with the assistance of Internet and digital technologies. The quest for alternatives started with the FOSS movement, which sought to give programmers and users freedoms of use by using copyright to restrict appropriation. Its counterparts in the creative industries are the Creative Commons (CC) project and open-source record labels, and are in part a reaction against what some musicians see as excessive control of music through overly restrictive copyrights that hamper derivative works. As derivation is at the heart of the creative musical processes, musicians need to reappropriate and reinterpret music and sounds to enable them to create truly innovative music. Music is, in essence, an art of derivation that is inspired by and, often unashamedly copies, existing compositions or performances. Digital technologies have not changed this; they have just made it easier. Direct quotations in popular music are not uncommon – an obvious example from the pre-Internet era is Madonna's derivation of "Like a virgin" from the Four Tops' tune "I can't help myself", or the The Jam's derivation of their song "Start" from the Beatles' classic "Taxman". Jazz music is extremely derivative, while many traditional genres such as Raï or Blues have little or no sense of ownership and are based on commons. While derivation using musical ideas in abstraction can be positively argued for, the use of excerpts or samples of a copyrighted composition or recording is subject to seeking and acquiring permissions. If this is not done, the deriving artist may be asked in court to prove the insignificance of the material used in relation to the new composition, in terms of both quality and quantity. In this sense, the notions of the acceptability of using, say, up to eight musical bars or 10 seconds are misguided.[82]

The basic premise for the CC project is that too often the debate over creative control tends to the extremes. At one end is a vision of total control — a world in which every possible use of a work is regulated and in which "all rights reserved" (and then some) is the norm. At the other end is a vision of anarchy — a world in which creators enjoy a wide range of freedom but are left vulnerable to exploitation. Balance, compromise and moderation have become endangered species. To provide a remedy and an alternative, CC uses copyrights to create public goods: creative works that are set free for certain uses. Through a variety of its carefully worded licences, it offers artists ways to protect their works while encouraging specified freedoms of use by declaring "some (but not all) rights reserved".[83]

In December 2002, CC released a set of copyright licences that are free for public use and that draw inspiration in part from the Free Software Foundation's GNU General Public License (GNU GPL). CC has developed a Web application that helps people dedicate their creative works to the public domain, or retain their copyright while licensing them as free for certain uses, on certain conditions. CC licences are specifically designed for creative works and activities, such as websites, scholarship, music, film, photography, literature, courseware, and so forth.

The objective is not only to increase online content, but also to make access to that content cheaper and easier. To that end, CC has developed metadata that can be used to associate creative works with their public domain or licence status in a computer- or machine-readable way. This will enable people to develop and use online search applications to find, for example, songs that are free to use provided that the original composer and/or performer is credited, or songs that may be copied, distributed or sampled with no restrictions, or with clearly defined limits. Eliminating the need for legal intermediation, the CC project aims to contribute to reducing barriers to creativity.

Loca Records is an independent British record label that releases music under Copyleft licences that allow freedoms similar to those of the GNU GPL, including copying, re-release, modification and sampling, with the requirement that the new work uses the same licence. Loca's first two releases – in 1999 – were under the GNU GPL. Subsequent releases have been on the EFF Open Audio License.[84] Loca is now releasing all work under the Creative Commons licence known as

Attribution-ShareAlike. One notable difference between the Creative Commons licence and free or open-source licences such as the GNU GPL is that it does not require that the unmixed source tracks be made available. Loca is planning a proper free/open-source release that will contain a selection of samples that were used to produce the compositions, together with the final music.

Magnatune is a small record label from California that produces music under a variety of licences, including the Attribution-NonCommercial-Share-Alike licence from the Creative Commons. It currently sells music for download through its website. John Buckman, CEO of the e-mail software company Lyris, founded Magnatune in spring 2003. Magnatune makes non-exclusive agreements with artists, and gives them 50 per cent of any proceeds from online sales or licensing. Users can stream and download music in mp3 format, without being charged, before making a buying decision. Even though using liberal licensing is not a new idea in itself, Magnatune is one of the first and most visible companies to try to build a business in music around this idea.

Opsound is a portal that provides links to music released under open source or copyleft licences. The website tries to facilitate open content music by indexing songs and aiding a community. Opsound has no facilities for money transfers. Most new songs are licensed under the Creative Commons Attribution-ShareAlike 1.0 licence. Popularity charts were added towards the end of 2003 and the beginning of 2004. Many compositions are available labelled as "remix ready" whereby the artist indicates the willingness to provide the unmixed source tracks on request.

H.   Conclusions

The international music industry has entered a turbulent period. No stranger to technology, it should have no problem in extrapolating past trends into future developments. The nature of its reaction is, however, a different matter. While for-pay download sites such as Apple's iTunes have been doing well, true success will come when p2p networks and file sharing become fully legitimized through subscriptions or indirect earnings such as advertising. Unfortunately, the majors are unlikely to lead the charge, particularly since they are still recovering from the Internet bubble. This leaves the field wide open for technology companies that

may not experience unmanageable levels of anxiety from the threat of technological change.

Music markets in developed countries are in their mature phase and future growth will depend on convincing audiences to part with leisure time dedicated to other activities: a difficult proposition at best. Large music markets in developing countries have growth potential and will continue to attract the interest of the majors, provided that they can establish workable copyright environments. The international industry will continue to lobby for the elimination of any perceived trade restrictions on the import of cultural goods and services. At the same time developing nations need to re-examine GATS support for "mode four" delivery of services through the movement of natural persons in order to improve conditions for their artists' work and travel when pursuing performance income.

Developing countries with large national and diaspora markets, such as Brazil, India and China, will improve their grasp of technology and will undoubtedly succeed in increasing international sales of CDs, as well as venture into online for-pay downloading. The artistic and cultural communities need to fully appreciate the commercial mechanics of the industry at an international level in order to assess what mix of activities and corresponding revenues (recording, composing and performing), and technologies, will maximise their earnings and provide for the greatest continuity, stability and success in their artistic careers.

The main issue will be one of scaling costs to activities and choosing the appropriate technologies. Ambitions need to be realistically dimensioned, it being understood that the majority of major releases do not achieve profitability. Given the general improbability of major earnings from recording, artists may be motivated to develop online activities more fully, assisting audience discovery and thus generating improved revenues in concert performance or will compose for other musicians. Because both traditional copyrights and liberal open-source licences' require legislation and protection, developing countries need to have in place a legal environment and collecting agencies. Artists should not shy away from exploring open licensing under the impression that it means giving away work and music for free. The spectrum of choice is large, while the type of contracts offered by the majors to the selected few are but one variant.

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Notes

1. Public goods are those that simultaneously satisfy the criteria of non-rivalry and non-excludability. The consumption of a non-rival good by one consumer does not decrease its utility for another consumer. Non-excludability implies that it is difficult, if not impossible, to charge people money for the use of the good. Examples of non-excludability are breathing air and walking through a public park.

2. See http://www.pwcglobal.com/e&m/outlook/Outlook2002_ExecSummary_Final.pdf.

3. At the time of writing, Bertelsmann and Sony have finalized the merger of their recorded music divisions, which is likely to attract some regulatory attention on both sides of the Atlantic. Time-Warner's plans to leave the music industry may lead to some form of merger of its music divisions with EMI, or a sale of those divisions to a consortium led by Edgar Bronfman.

4. Estimate for BMG sales based on http://www.bertelsmann.com/documents/en/Unternehmen-spraesentation_weiss_e_300104.pdf.

5. Victor was a result of the merger between Emile Berliner's Berliner Gramophone Company, which produced flat disc phonograms, and the Consolidated Talking Machine Company, which manufactured players for records.

6. See: http://www.mustrad.org.uk/articles/gauhar.htm and http://www.tribuneindia.com/2002/20020526/spectrum/main7.htm.

7. Forbes, 17 July 1995 (check original source).

8. For a detailed description of the development and business economics of Polygram, see Bakker H (2003).

9. See http://www.abpd.org.br/dados/decada90.htm.

10 See http://www.ifpi.org/site-content/press/20030710.html.

11. Figures as reported at the annual RISA meeting by by Russell Crawford, Chairman of the Anti-Piracy Sub-Committee.

12. See Letts and Ingles (2003).

13. See Letts and Nzewi (2003).

14. See *The Economist,* Rumba in the jungle, 18 December 2003. http://www.economist.com/printedition/displayStory.cfm?Story_ID=2281725.

15. IFPI, *The Recording Industry: World Sales 2003*, 2004.

16. UNESCO Global Alliance for Cultural Diversity, see: http://portal.unesco.org/culture/en/ev.php-URL_ID=17176&URL_DO=DO_TOPIC&URL_SECTION=201.html.

17. Typically, a number of recordings are contracted for delivery over a specified period of time. If contractually agreed, the copyrights and the physical master recordings may revert back to the artist after a certain period. This is, however, more an exception than a rule. The master recording is the unique final product from which all copies are made. The master was usually produced on high-speed stereo magnetic tape, whereas today a number of analogue and digital formats are used. A mechanical right is the right to reproduce copyrighted material in a fixed medium, such as CDs or music cassettes. Royalties are also paid in exchange for the rights for music publishing and performance. However, the chapter will not go into this issue as it may dilute the discussion because it requires a discussion of broadcast, which cannot be done justice within the scope of this chapter. See Krasilovsky, Shemel and Gross (2003) for a comprehensive discussion of music recording, publishing and performance contracts and rights.

18. The discussion here owes much to the excellent analysis by Krasilovsky, Shemel and Gross (2003). For a more colourful description of the mechanics of the music business see Steve Albini's The problem with music, in T Frank and M Weiland, 1997; (eds.) *Commodify Your Dissent: Salvos from the Baffler*, New York, W.W. Norton and Co.; and Courtney Love's "Courtney Love does the math" at http://dir.salon.com/tech/feature/2000/06/14/love/index.html.

19. It may be necessary to note that there is an established musical convention for songwriting, whereby the artist does not, in principle, produce recordings for public commercial distribution under a contract with a record company. Songwriters write songs and music for sale, using the intermediation of a publishing company. The rights they sell depend on the ultimate use: mechanical rights to a record company, performance rights to a radio station, synchronization rights to a film studio, and so forth.

20. See Krasilovsky, Shemel and Gross (2003), chapter 40, "Work permits for foreign artists"

21. See http://www.wto.org/english/docs_e/legal_e/26-gats_01_e.htm.

22. An excellent example of this position preoccupied with opening markets rather than creating opportunities for artists from developing countries is the IFPI Response to the EC Consultation Document on the GATS 2000/WTO Negotiations concerning Audiovisual Services (Music and Recreational Software) and Cultural Services, which opens with the statement that "The European music industry urges the Commission and Member States to pursue a proactive agenda during the GATS discussions that will help to eradicate trade barriers and open up difficult markets". The difficult markets listed in the text represent 4.3 per cent of global CD sales. See http://www.ifpi.org/site-content/library/gats-questionaire.pdf.

23. Technology and music have a deep-rooted relationship that goes back to before modern digital technologies. A casual visit to any museum with a collection of musical instruments will reveal the complexity and extent of the efforts of instrument craftsmen, the seminal music technologists, to improve existing design and test innovations.

24. Some may debate this and go further back in time. Undoubtedly, the pace of past improvements and innovations will seem rather slow by today's standards. For example, the invention of the piano forte by Cristofori in 1698 and its development by Silbermann in the 1730s and 1740s (Bach had apparently provided critique, although the scope of his involvement and acceptance of the instrument is controversial) led to a modern form of the concert piano that was only finalized in the mid-nineteenth century, with major improvements such as an iron frame and double action. The saxophone, a widely popular but non-classical instrument, was invented in 1846 by Sax and was consigned to use in military marching bands before jazz styles eventually increased its use and exposure, but only 70 years later. Both instruments provided greater sound volume and stability than their predecessors, to the benefit of musicians and audiences. The same developments led to music inspired by and highlighting these new capacities. For more details see http://www.baroquemusic.org/silblegacy.html and http://www.jackgibbons.com/composers/bach.htm, and the online discussion at http://www.bach-cantatas.com/NonVocal/Var-Italian-DVD.htm.

25. See http://www.asia.apple.com/hardware/ads/ripmixburn-long.html and http://www.macworld.com/2001/10/macbeat/rip/.

26. See   http://www.illegal-art.org/audio/grey.html,   http://www.rollingstone.com/news/newsarticle.asp?nid=19292   and   http://www.nytimes.com/2004/02/25/arts/music/25REMI.html?ex=1083297600&end12f9e50d04773c2&ei=5070.

27. See http://mixonline.com/ar/audio_mothers_sound/.

28.   Originally, their purpose was experimental and their use was mainly in academic study. The slow replacement of the vacuum tube with transistor technology led to reduced size and greater reliability and operational stability and increased consideration of them in mainstream use. Robert Moog created the first playable and configurable music synthesizer in 1964.

29. The speed of this process is critical for the quality of real-time music recording and reproduction. The speed, or "sampling rate", indicates how many times per second a sound will be measured or, going the other way, how many data measurements will be read and assembled to reproduce one second of sound. The bit depth of each reading indicates the size of information acquired in one read. The standard for music CDs is 44,100 samples per second, each sample being assigned one of 65,535 discreet values, i.e. "16 bits" in technical language.

30. Ripping is the process of extracting one or several songs from a music CD and copying them to a computer hard disk. This entails translating the CD format, also known as the Red Book audio CD standard (or IEC 908), into a computer file format, such as .wav, .mp3, .ogg or .wma.

31. Quoted from Sound on Sound (2004) Wyclef Jean, Producer, July issue.

32. See UNCTAD (2003a), in particular chapter 4, and the Free Software Foundation at www.gnu.org .

33. See: http://www.freedb.org/freedb_stats.php.

34. To see the source code of a website in Internet Explorer click View > Source on the menu; in the Mozilla web browser click View > Page Source; this "bare all" nature of web pages enabled the fast adoption and broadest use of the World Wide Web and html standard as the main Internet platform. Amateurs and experts alike could learn from each other and share clever or effective solutions.

35 .   See UNCTAD (2003a), in particular chapter 4, and the Free Software Foundation at www.gnu.org.

36. The full text of the ruling is available at: http://www.grokster.com/files/030425_order_on_motions.pdf .

37. See Schultz (2003).

38. For a more detailed discussion on why "suing your client" may not be a good busines, see practice Shell (2003).

39. For interesting descriptions of the dispute between the FM radio inventor Edwin Howard Armstrong and his one-time employer, RCA, which reportedly saw FM technology competing with its AM radio network, see http://www.webstationone.com/fecha/armstrong.htm, http://users.erols.com/oldradio/ehabio.htm, http://world.std.com/~jlr/doom/armstrng.htm and Lessig (2004: 4-8).

40. See Lessig (2004: 76).

41. IFPI (2004) Online Music Report 2004, http://www.ifpi.org/site-content/library/online-music-report-2004.pdf.

42. An increasing number of for-pay music download portals are coming online, such as RealRhapsody WalMart Music Downloads. They are similar in nature and may provide a competitive environment to the benefit of consumers. However, they are not conceptually, commercially or technically distinctive and are therefore not reviewed.

43. For a detailed examination of the free and open source software phenomenon, see UNCTAD (2003a).

44. See UNCTAD (2003), chapter 4.

45. See http://www.lawguru.com/newsletters/2000/05/32016.html.

46. BBC reporting of Media Metrix figures, http://news.bbc.co.uk/2/hi/business/2234947.stm.

47. Following a ruling by the Central District Court of California on 23 April 2003 releasing the creators of the competing file-sharing programme Grokster from liability related to copyright infringement, a change of strategy was in order. See http://www.eff.org/IP/P2P/MGM_v_Grokster/030425_morpheus_win_pr.php and the actual text of the court decision at http://www.grokster.com/files/030425_order_on_motions.pdf . The decision has been appealed; details on the case can be seen at http://eff.org/IP/P2P/MGM_v_Grokster/.

48. The domain name was registered on 17 December 1997.

49. See http://www.lawguru.com/newsletters/2000/05/32016.html.

50. See http://www.theregister.co.uk/2003/11/15/hungover_cnet_wakes_up_next/.

51. See http://asia.cnet.com/newstech/industry/0,39001143,39158242,00.htm.

52. See GarageBand to Revive Old MP3.com Archive, *The Wall Street Journal Online*, 18 April, http://www.goodnightkiss.com/mp3restored.html.

53. Sceptics may point out that iTunes performance should be measured against global sales of 1 billion CDs or 10 billion songs. However, sceptics may also consider that many people do not listen to more than one or two songs from any CD anyway and that iTunes downloads are expressions of real moneyed demand and interest, while 80 per cent of CD content is a forced purchase imposed by the global production and distribution monopoly.

54. See http://www.apple.com/pr/library/2004/apr/28itunes.html.

55 "Standard" is taken to mean sound quality as provided by an Mp3 encoded 128 kilobit per second data stream. In comparison, uncompressed data from a standard compact disc streams at approximately 1,400 kilobits per second.

56. See http://www.theregister.co.uk/2004/06/23/apple_itunes_first_week/.

57. See Good-Bye, MP3; Hello, DRM! , *PC Magazine*, 458 The assertion of low overall profitability is an accepted industry figure; see http://www.riaa.com/news/marketingdata/cost.asp.

59.   See: http://www.eff.org/share/.

60.   See Maverick programmers prepare to unleash anarchy on the Web, *The Wall Street Journal*, 27 March.

61.   For a detailed description of the proposed mechanism see A better way forward: Voluntary collective licensing of music file sharing, Electronic Frontiers Federation, http://www.eff.org/share/collective_lic_wp.php.

62.   See http://www.soundonsound.com/sos/sep03/articles/marillion.htm.

63.   See http://www.billboard.com/bb/daily/article_display.jsp?vnu_content_id=1000496380.

64.   See http://www.salon.com/tech/feature/2002/08/01/bootlegs/print.html.

65.   See http://www.acidplanet.com/contests/davidbowie/?ref=neverfollow.

66.   See http://www.billboard.com/bb/daily/article_display.jsp?vnu_content_id=1000455930.

67.   See http://www.ondemanddistribution.com/eng/press/pressdetails.asp?id=264.

68.   See http://www.vcbuzz.com/new/vc.cgi?cobrand=icom&company=12561.

69.   The full text can be found at: http://www.wipo.int/clea/docs/en/wo/wo001en.htm.

70.   Most of the States parties to the Universal Copyright Convention (UCC) have become parties to the Berne Convention, rendering the UCC largely irrelevant today.

71.   The full text can be found at http://www.wipo.int/clea/docs/en/wo/wo023en.htm .

72.   The full text is available at http://www.wipo.int/documents/en/diplconf/distrib/94dc.htm.

73.   The full text is available at http://www.wipo.int/clea/docs/en/wo/wo034en.htm.

74.   The full text is available at http://europa.eu.int/eur-lex/pri/en/oj/dat/2001/l_167/l_16720010622-en00100019.pdf.

75.   The full text is available at http://europa.eu.int/eur-lex/pri/en/oj/dat/2001/l_167/l_16720010622en-00100019.pdf.

76 http://www.copyright.gov/legislation/dmca.pdf.

77 It is interesting to note that the Audio Home Recording Act did not foresee the use of computer hard drives as audio recording devices and is thus largely irrelevant to the current debate on p2p technologies and file sharing.

78.   Lessig (2004), accessed on 6 May 2004, at http://www.jus.uio.no/sisu/freeculture.lawrence.lessig/doc.txt.

79.   See http://www.iprcommission.org/graphic/Views_articles/Legal_Times.htm.

80.   See http://www.gnu.org/philosophy/right-to-read.html.

81.   See UNCTAD (2003).

82.   See Mayer (2004).

83.   See http://creativecommons.org/.

84.   See http://www.eff.org/IP/Open_licenses/eff_oal.html.

85.   See http://creativecommons.org/licenses/by-sa/1.0/.

Chapter 4

ONLINE HIGHER EDUCATION:
ISSUES FOR DEVELOPING COUNTRIES

A.   Introduction

Education, given its important role in the economic, political and cultural development of any State, is potentially one of the key sectors where information and communication technologies (ICTs) are applied. The opportunities presented by ICTs to change the content of and approach to learning as well as to extend the reach of educational institutions could have a profound effect on development. The Internet has the potential to overcome geographical and time barriers, and to allow students to study in any place at any time. Students in India are following a full technical degree online. Massachusetts Institute of Technology (MIT) course content is available online to anyone interested. Finnish students can complete their degrees by attending several universities without leaving home. Researchers, teachers and students are communicating globally.

While there has been much debate about the potential advantages and disadvantages of online higher education from a pedagogical point of view, its study from an economic and policy perspective is limited. Stakeholders in online higher education, such as a small university seeking to expand and improve what it offers, a ministry of education questioning how best to meet educational needs, an innovative entrepreneur or a student with limited resources wishing to receive higher education, are interested in finding out whether developing countries can benefit from online education, whether it can be developed locally and how much it costs. Stakeholders want to be reassured about the actual and potential value of online education, so as to assess whether it is worth the investment. Governments and institutions, particularly those in developing countries, want more information about online education, are concerned about what their role would be, and ask for possible strategies to maximize the benefits of online higher education.

The provision of education results from a combination of policy action and market processes within the context of any given economy and society. The purpose of this chapter is to inform the educational policy process by analysing how higher education services are provided and traded (either commercially or not) and outlining some of the trends resulting from the use of the Internet in the provision of higher education.

1.   Some definitions

In order to clarify the variety of terms related to the subject, a number of definitions will be used in this chapter. The education sector includes basic education (the acquisition of literacy and numerical skills), secondary education, higher education (also known as tertiary education) and, more specialized professional training, as well as what is called "lifelong-learning" – the necessity to continually update and learn new skills through either corporate workplace learning or access to community education. In some countries, educational services, in addition to the above-mentioned instructional activities, also include activities designed to support educational processes (for example, educational testing services or student exchange programme services). Arguably, education also extends into other kinds of cultural and leisure activities – visiting a museum, watching a television documentary, going to the theatre or reading a book. In all of these areas, ICTs – and in particular the use of the Internet – are having an impact on why and how people access learning and what they use it for.

This chapter will be devoted to the higher education sector defined as post-secondary education, including both "technical and vocational education" (e.g. teacher training) and "education leading to a university degree" (namely, graduate, post-graduate and doctoral studies).[1] The reason for focusing on this sector is that international trade in higher education is more relevant for national Governments. In 1999, OECD countries' international trade in higher educational services was estimated at $30 billion (Larsen et al., 2002).

The potential uses of ICTs in education are vast: from radio and television programmes to the use of CD-ROMs, e-mails and the World Wide Web. Our analysis will focus on one concrete application: the Internet. The Internet has a number of uses within education: disseminating learning content, enabling communication between students and teachers, and engaging in and publishing research. The use of the Internet for education, including the use of websites and e-mail, has come to be known as online education.

Online courses frequently use the Internet in combination with other delivery modes. For example, they may require attendance at a two-day face-to-face seminar or may provide some course materials by mail. In this chapter we therefore recognize that online education does not necessarily entail 100 per cent online provision, and will consider online courses to be those where most of the content delivery and interaction is online.

E-learning is a broader notion than online learning and equally has no universally acknowledged or standard definition. In this chapter, we will use the most inclusive definition[2] of e-learning, which embraces every kind of teaching and learn-

ing situation using some element of electronic or digital resourcing (radio, audiocassettes, videocassettes, TV, personal computers, e-mail, Web) and considers online education a subset of e-learning.

Another concept is blended learning. As the name suggests, blended learning is learning that combines different modes of student engagement. In practice, the use of blended learning has been limited to the combination of online learning with face-to-face instruction.

Chart 4.1 provides an overview of these different concepts and how they will be referred to in this chapter. It also recognizes how ICTs have been applied both to complement face-to-face course delivery (e.g. by posting course information on the Web) and to support distance-learning courses (e.g. by providing e-mail communications between students and teachers).

2.   The focus of this chapter

This chapter provides an overall analysis of online higher education and its implications for developing countries. Beyond the scope of this chapter are

Chart 4.1
The e-learning continuum to online education
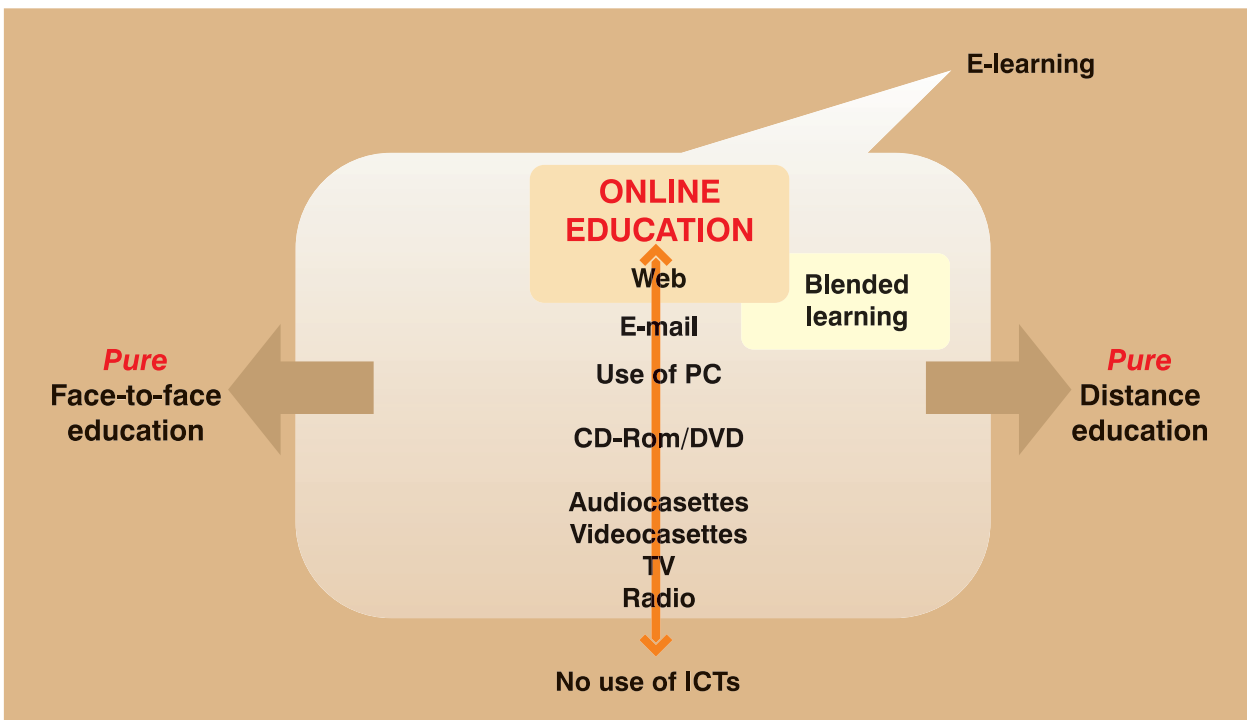
debates about the pedagogical effectiveness of online education or about the relative cost-efficiency of online education as opposed to traditional education.

The chapter benefits from a background survey on the economic costs and benefits of e-learning in institutions of higher education that was undertaken with a small sample of universities either currently engaged in, or planning to invest in, online education. The results of the survey (complemented with parallel research) are summarized in annex I. On the basis of the survey results, five models of the provision of online education have emerged, as described later. Additional information in the chapter comes from existing published materials and interviews with e-learning practitioners and educational managers.

The chapter is divided into four sections. Section A provides an introduction to what is understood by the term "online higher education". Section B discusses the importance of higher education for economic and social development and provides an overview of the higher education market. Section C explores the online higher education market. It begins by explaining current drivers behind the development of online higher education and providing an overview of this market and the effects of the Internet on the internationalization of higher education. After highlighting existing models of online higher education, the section reviews the economic rationale of investing in online education. In addition, it reviews the current status of the technology market and of the legal framework in which online higher education operates, as well as the influence of these two factors on the dissemination, and use of, and access to, higher education. The concluding section summarizes the impact of the Internet on higher education, and its implications, offering some recommendations for developing countries. It is hoped that the final conclusions will help to stimulate rigorous discussions on the use of online higher education and its impact on developing countries.

B.   The higher education market

1.   Education and economic growth

Education and human capital are recognized drivers of economic growth and social progress. According to a joint OECD–UNESCO study (2003), human capital has a stronger positive impact on growth in the group of developing countries covered by the study[3] than in OECD countries. Increasing the availability of human capital depends critically on extending years of study and completion rates beyond basic education. Access to and participation in education are more limited in developing countries, particularly in secondary and tertiary education, where costs can be prohibitively high.

Investment in education should be guided by how it can help eliminate social disparities and promote sustainable economic growth. Extending the benefits of education means addressing constraints in terms of both public and private resources, as well as institutional and individual resources. Public spending on education is an investment that benefits the poor (OECD–UNESCO, 2003). However, the extent of public funding is frequently contested as soon as participation in education extends beyond basic primary education: in other words, should secondary and tertiary education be subsidised by the State? Given these pressures, developing countries have resorted more to private financing than developed ones (OECD–UNESCO, 2003). Extending user fees as a means of cost recovery can be seen as a tool both for and against equity. It can be argued that tuition fees in tertiary education can be justified on the basis of the individual return on investment from higher education. However, the private costs of tertiary education can be a barrier to the inclusion of qualified students and is therefore an important policy concern if the policy aim is to eliminate social and economic disparities.

The externality of higher education means that when students invest in education they are not only benefiting themselves but are also increasing the general knowledge available in society and therefore contributing to economic and social development. Higher education serves a number of important functions that are central to the development of nations – training teachers, lawyers, engineers, and so forth. It also has a social and cultural function both in providing social cohesion and in transmitting certain important social values. These functions make education, to some degree, a public good. For this reason, even the most ardent liberalizers acknowledge that there is some role for the State to play in regulating higher education. However, in almost all other areas of discussion about higher education in general and its online provision in particular, there is considerable debate.

<table>
<tr><td colspan="3" align="center">Box 4.1

Educational priorities and contexts</td></tr>
<tr><td align="center">Low-income countries</td><td align="center">Middle-income countries</td><td align="center">OECD countries</td></tr>
<tr>
<td>Basic education for all by 2015
Address inequities, particularly female enrolment
Training of teachers
Access to ICTs
Wealth growth
Quality and locally meaningful content and curriculum
Affordable teaching materials and textbooks
Use of mother tongue
Community involvement</td>
<td>Develop secondary and tertiary education
Competition with OECD educational institutions
Develop access to ICTs
Education statistics
Demographic pressure
Bridging inequality
International recognition of accreditation</td>
<td>Ensure quality of learning for all
Teacher shortages
Continuous learning
Financing lifelong learning
Increasing diversity of students
Competitive educational services
Attract new students
Excellence
Promotion of ICTs</td>
</tr>
<tr><td colspan="3"><i>Source:</i> OECD-UNESCO (2003); Johnston (2004); World Education Forum (2000).</td></tr>
</table>

As box 4.1 summarizes, educational objectives and priorities frequently depend on the level of economic development of a country. This is by no means an exhaustive summary (countries within the same region, do have different needs) but it provides an overview of the different priorities countries have as regards higher education and the different types of programmes they might concentrate on.

2. The higher education market

In 20 years, the number of higher education students has doubled, from 48 million to 102 millions

students a year. The greatest increase has been in developing regions (see chart 4.2 and table 4.1).

The different visions of the role of government in regulating and providing higher education have resulted in a number of overlapping, competing and complementary models of how and why higher education should be promoted and provided. During the period 1980–2000, a market model of higher education was in the ascendant both in developed countries (English-speaking countries and parts of Western Europe) and developing countries. In developing countries education in general has seen varying patterns of privatization. Whereas some developing countries have

Chart 4.2
World enrolments in higher education, 1980–2000
(number of students by region)
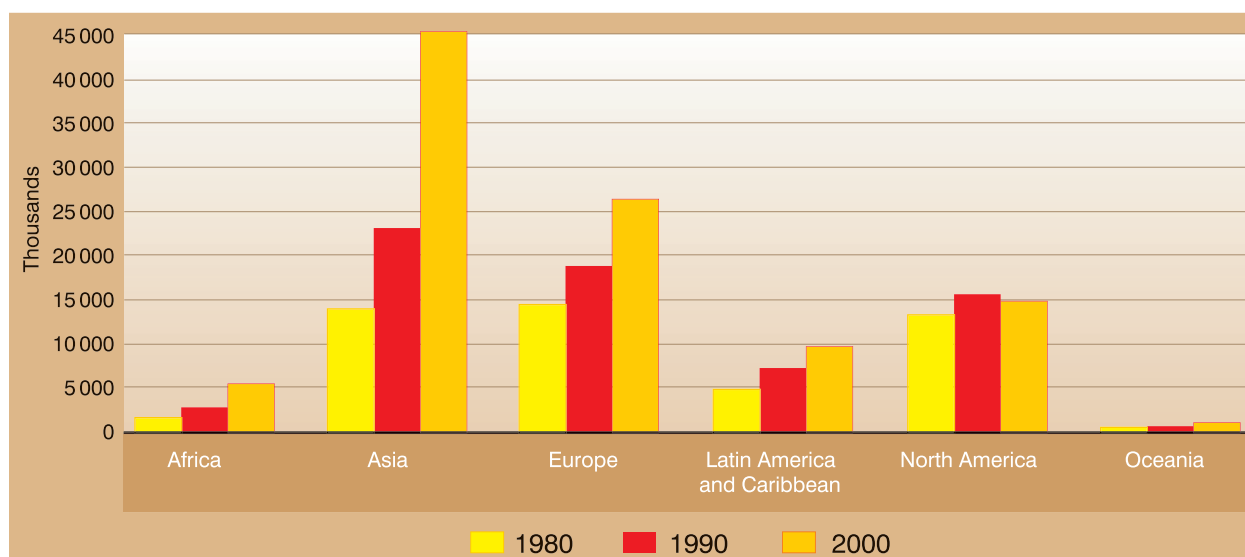
Table 4.1
World enrolments in higher education, 1980-2000
(number of students)

Region	2000	1990	1980	Growth 1990-2000 (%)
Africa	5 408 984	2 605 164	1 577 539	108
Asia	45 590 448	23 089 008	13 918 898	97
Europe	26 345 700	18 715 897	14 560 094	41
Latin America and Caribbean	9 707 743	7 118 894	4 819 294	36
North America	14 807 741	15 626 951	13 269 645	-5
Oceania	1 029 037	607 385	408 041	69
Developing countries	**56 475 671**	**30 005 952**	**17 814 199**	**88**
Developed countries	**46 413 982**	**37 757 347**	**30 739 312**	**23**
Total	**102 889 653**	**67 763 299**	**48 553 511**	**52**

Source: World Bank (2000); UNESCO Institute of Statistics (2004).

pursued government-led education (in India nearly all tertiary education is publicly funded), in others (Chile) more than 70 per cent of the total amount spent on higher education comes from private sources (OECD–UNESCO, 2003). This is by no means uncontested – particularly by students who are now expected to pay (higher) fees and by staff who have seen their pay and work conditions casualized.

Besides teaching, research is the second main activity in which universities engage. The capacity to undertake original research is also fundamental to higher education institutions and society in general. Research capacity attracts funding (from the private sector, Governments and foundations) and adds to the reputation of an institution, which it can then translate into increased demand by students and the ability to charge higher fees. Research is validated through publications. Currently, the system of research publishing has one major inconsistency: while university professors and researchers provide their knowledge for free for publication in specialized journals to access research by others they or their universities need to pay a subscription for the journal. According to Oxford Analytica,[4] the six largest publishers publish 40 per cent of all scientific, technical and medical journals, and Reed Elsevier alone leads with 25 per cent of the market. The prices for traditional journals have been rising sharply for several years, increasing the gap between those who can afford access to information and those who cannot.

3. International trade in higher education services

Higher education has value for individuals, institutions, States and other associated service providers (e.g. academic publishers). OECD countries' trade in educational services was around $30 billions in 1999, equivalent to 3 per cent of their total export services (Larsen et al., 2002). The five major exporters of educational services in 2000 (all in millions of dollars) were the United States (10,280), the United Kingdom (3,758), Australia (2155), Canada (796) and New Zealand (199).

International trade in higher education services takes place through the following four modes of supply: (i) cross-border supply: the provision of online degrees to students in another country; (ii) consumption abroad: students move abroad to take a course; (iii) commercial presence: a university setting up a campus in another country; and (iv) presence of natural persons: professors moving between institutions in different countries. It is in the movement of students (mode ii) where most international trade takes place. In 2001–2002, there were over two million students studying abroad (UNESCO, 2004), and chart 4.3 provides an overview of where those students came from and where they went to study. The net exporter regions are North America, Europe and Oceania, while net importer regions are Asia, Africa and South America.

Chart 4.3

Number of foreign students in higher education, by hosting region and region of origin, 2001-1002
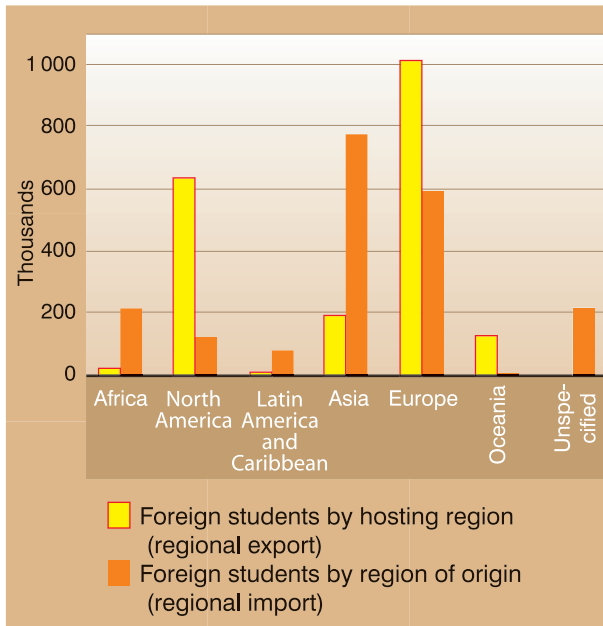
Source: UNESCO (2004).

Data on the exports in the other modes of supply are practically non-existent, but the size of such exports is thought to be limited. For example, Larsen et al. (2002) estimate that in 2000 there were 6,250 foreign distance learning students at Australian universities, corresponding to 6 per cent of all foreign students. In the United Kingdom, the Open University (the largest UK distance education provider) currently has 28,381 overseas distance students,[5] while the country received a total of 225,722 foreign students in 2001–2002 (UNESCO, 2004).

International trade in educational services is not new: selling educational services, studying abroad and establishing educational institutions are conventional features of academic life. What is new is the impetus (at least in some countries) to further liberalize the education sector, and the responses by other actors such as teachers, students and education managers to this opening up of the education market. Higher education services are subject to progressive liberalization under the General Agreement on Trade in Services (GATS). The GATS is flexible in the sense that countries can tailor commitments to specific modes of supply and can even leave entire sectors (i.e. education) without any commitment. Thus, in the contested context described below, it is no surprise to see

multilateral negotiations in education progressing at a slow pace and those Governments driving for open education markets (e.g. the United States) taking advantage of other options such as bilateral agreements.

Proponents of liberalizing the higher education market claim that increased competition will lead to more choice and increased quality through facilitating educational institutions' access to foreign markets by providing individuals with a wider choice of educational services, by increasing opportunities for teachers to work abroad and by increasing competition and thus reducing prices for students. Governments promoting the liberalization of education include those currently leading in the export of educational services and with a strong private education market in the English language, such as the United States and Australia. Under the current round of GATS multilateral negotiations (2000–2005) only four countries (United States, Australia, New Zealand and Japan) have provided a negotiation proposal. Interestingly, the United States, Australia and New Zealand are significant producers of e-learning materials and distance education packages and are the main exporters of educational services. In addition, the export of educational services for Australia, New Zealand and the United States amounted to 11.8 per cent, 4.7 per cent and 3.5 per cent of all services exports.

Opponents of liberalization argue that the opening up of educational services undermines public provision, and can hinder the quality, relevance and equality of access to education. Leaving the provision of education to market forces may provide more flexible outcomes, better adapted to the skills that the market demands at lower prices. However, it is argued that these potential gains will be at the cost of alienating non-commercial education, eroding local cultures and creating a two-tier educational system where only those with sufficient resources will be able to pick and choose from a menu of competing global providers.

In summary, there is a consensus that globalization and liberalization are placing new demands on, and posing new challenges to, equitable access to higher education as well as promoting the emergence of competition in knowledge provision, and creating the need for new quality assurance approaches (see box 4.2). Liberalization also

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Box 4.2
The effects of the internationalization of education

CONSENSUS	DEBATE
New demands on higher education Emergence of competitors in knowledge provision Challenges to access and equity Need for new quality assurance approaches *Source:* UNESCO (2001).	Erosion of role of nation State Private HE: Threat/opportunity or norm? Mobility vs. brain drain Unbundling of academic functions

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raises questions about Governments' ability to discriminate between national and international providers of education as well as between domestic or foreign students. The changing role of Governments in this regard will have an impact on the autonomy of individual higher education institutions and on the role that Governments play in regulating higher education. Liberalization also reinforces private provision, which exacerbates inequality in low- and middle-income countries, where only a limited percentage of the population can afford private education. Finally, the internationalization of education provides many benefits by further enhancing the mobility of students, such as wider options for qualified students and exposure to different cultures. However, it is also one of the processes that can lead to "brain drain", with competent students leaving their countries of origin and taking their skills with them. There is also the potential for middle-income counties with well-developed higher education institutions to attract overseas students by entering into price competition with established universities in developed countries. The supply and consumption of these services might be an interesting topic for discussion in the context of South–South co-operation.

C. Online higher education

1. Why are developing countries using online higher education?

Given the above debates about access to and provision of higher education, the introduction of online higher education in the current context raises many questions.

Online higher education provides different benefits and opportunities for students, higher education institutions, Governments and educational service providers. By analysing these different factors we have identified six key drivers responsible for the current adoption and promotion of online higher education in developing countries: first, to develop educational capacity; second, to improve quality; third, to increase access to higher education; fourth, to raise revenue; fifth, to enhance the uptake of ICT skills and infrastructure, so as to promote a knowledge economy; and sixth, online higher education is a survival and marketing strategy.

Each stakeholder has different needs and priorities. For example, established universities with high brand recognition are using online education to capitalize on their existing reputation and to expand enrolments. National Governments are funding new virtual universities through public/private partnerships so as to find ways of expanding access to education without a significant rise in the education budget. Not every stakeholder accepts the validity of all six drivers, neither from the economic nor from the educational point of view. For example, it can be argued that investing in online education may not be the best way of increasing either capacity or access and that traditional distance education may well cover this objective more effectively. Nevertheless, there are (as already stated) six main drives of online higher education. They are described below.

1. To develop educational capacity. The Internet makes it possible to reach more people over a wider area with limited access to traditional education in general or to specific higher education institutions. In this sense, online higher education is an extension of the distance learning

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Box 4.3

Virtual University of Pakistan

"The driving force for the Virtual University [was] a nationwide shortage of quality faculty in…higher education. ICT was the only way to overcome these issues."

The Virtual University of Pakistan emerged from a study carried out in 2001 by the Ministry of Information Technology in Pakistan on the feasibility of online university education. The driving force behind the university is the lack of academic faculty, in particular in IT. Quality staff can be found in only a few elite institutions where access is not easy and the cost is beyond the reach of the average citizen of Pakistan. The Virtual University brings together faculty and content onto a single platform that is more accessible and less costly than conventional education. The Virtual University also creates original content, which it makes available to other institutions via an Intranet. It also offers professional development courses in order to disseminate knowledge and expertise and make them more accessible.

Source: UNCTAD e-learning questionnaire survey response, 2004.

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model. For example, the United Kingdom's Open University has long been providing distance education for UK and non-UK students, and it is now incorporating new technologies in the dissemination of education (see annex I). The arrival of the Internet has brought additional access at a distance in the sense that most traditional and well-known universities did not engage in distance education, whereas they may do so now through online delivery. An example of a new institution that has been set up to increase capacity as a motive for investing in e-learning is the University of Pakistan, as explained in box 4.3.

2.   To improve the quality of learning.   There is a strong argument that the use of ICTs can increase the effectiveness and quality of learning by providing increased customization, more flexibility and student choice. In the UNCTAD survey, the Virtual University of Monterrey emphasizes the pedagogical benefits of e-learning: (a) it promotes the development of skills and attitudes, in addition to subject area knowledge; and (b) it offers students the possibility of extending their learning (via links, databases, etc.). However, teachers, students and employers have long contested the quality of online education, and there is a widespread perception that online degrees are of a poorer quality than those based on traditional study. In contrast, as part of a wider lobby promoting the values of ICTs and the Internet, there are groups, within both the educational and the IT community, that assert the value of e-learning in raising educational standards and effectiveness.[6]

3.   To increase access (particularly for marginalized populations).   E-learning can be used to provide innovative solutions to address specific access issues that might make it difficult for potential students to participate in higher education. For example, the University of Palestine has attempted to use an element of online learning to enable students to interact with tutors when they are physically unable to reach the university because of roadblocks and other security measures in Gaza.[7]

4.   To achieve cost-efficiencies.   The possibility of e-learning to expand capacity and access brings with it potential cost-efficiencies (reaching more students for less money) through reducing the cost per unit (or student) and therefore improving an institution's financial position. For many developed country institutions whose budgets have been reduced and which are facing increased domestic competition for funding, the potential to expand their market globally through virtual campuses and other e-learning ventures has been a strong driver. However, the argument that online education provides economies of scale, and thus cost-efficiencies, is contested. Depending on the infrastructure available, the initial start-up costs may be high and, if quality is to be maintained, the cost reduction per additional student numbers will be minimal. Thus, investing in online education solely for the sake of cost-efficiency is a high risk for any provider. In addition to economies of scale, the application of ICTs to education does provide other potential economic

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advantages: from the possibility of reselling educational content to third parties to opportunities to increase administrative efficiency, and from better student management systems and access to better information for decision-making to improved communications.

5. To enhance the uptake of ICT skills and infrastructure, so as to promote a knowledge economy. Perhaps the key driver for online education at the macro-policy level is that it will enhance ICT skills and infrastructure, and thus serve to reinforce the promotion of a "knowledge economy". Developing an e-learning strategy can complement other national ICT policies. Indeed, there are synergies between different sectors. For example, in the United Kingdom, the Department of Trade and Industry has targeted educational and training services – in particular online education – as a key area for overseas export. The export potential of UK education is underpinned by national investment by the Department for Education and Skills in creating a market for online material through measures such as e-learning credits. One of the potential benefits for Governments in adopting an e-learning strategy is that it can promote the use of ICTs and contribute to the development and use of ICT infrastructure (universities are early adopters of ICTs). Moreover, it can provide a market for related industries, including software, content development, media and other educational services.

6. Because it's there: survival and marketing strategy. There is also the perception that e-learning is worth investing in because, to some degree, it represents "the future" and if some institutions have e-learning capacity, then other universities need to invest in order to be able to compete. For example, in response to the question about motivation for e-learning the University of Jzvaskyla, Finland, replied "*necessity…because of European development and Bologna processes in higher education*".[8] Similarly, Monterrey University makes a selling point of using the most up-to-date technologies available: "(the university) uses the most advanced technological, multimedia, and audiovisual resources for instruction".[9]

Governments' economic and cultural rationale

In addition to the above-mentioned drivers of online higher education, we should add two additional economic and cultural rationales for a Government to promote online higher education: (i) the belief that it can help bridge the digital divide, within and between countries, and (ii) the desire to promote local content for domestic use and for export.

In today's globalized information society, falling behind in access to and use of ICTs (often referred to as the digital divide) can lead to lost economic and development opportunities, and can exacerbate existing inequalities between and within countries. To overcome this digital divide, it is necessary to develop ICT infrastructure and skills as well as an understanding of the appropriate use and application of ICTs relevant to different needs and contexts. However, unless underserved populations (including rural, women, disabled and lower-income students) are consciously and proactively targeted, any national digital divide will increase. Using online education to bridge the digital divide is an attractive proposition, but it will only happen if a coherent inclusive strategy is put in place together with the necessary resources. Partnerships with private enterprises can partially alleviate resources restraints. Currently, international donors, private enterprises and other players have a strong interest in investing in online education.

In the information society, information obviously has essential value. Economies are increasingly dependent on both the information that is available to them and the resources with which to use it. But for this information to be valuable, it has to be relevant to the user, and to the latter's context and purpose. This applies to every user, from the savvy IT student to the basic reader, for every context, from the international market to a small rural community, and for every use and sector from services to agriculture. One of the concerns about the proliferation of online education is the dominance of developed countries in producing and disseminating content and information: most Internet content is in English and originates in developed countries. The effects can already be seen: citizens are unable to access relevant information because it is in a language they do not understand, is irrelevant to their context and incompatible with their existing level of technology and skills. Given that professional content is largely created and shared through universities, online higher education offers an opportunity for national Governments interested in devoting efforts and resources to the creation, promotion

and use of local content. New initiatives such as open content and open source (see section on technology) are putting in place some of the necessary frameworks for the open sharing of information.

2.   The online higher education market

Online higher education is a potentially profitable global market. The OECD[10] predicted in 2001 that there will be 30–80 million online students in the world by 2025. The online higher education market is composed of goods and services that include software applications that enable interaction via the Internet, course content, support services (such as accreditation or education management) and the actual dissemination of education (e.g. the interaction between teacher and student(s)). In addition, online higher education requires products not restricted to the specific online higher education market, such as ICT infrastructure. Table 4.2 presents an overview of the different stakeholders and interests in online

higher education. With online education new stakeholders have entered the higher education market (such as ICT providers – both of infrastructure and of applications), and the bargaining power (that is, the importance and power of a given actor within the market) of existing stakeholders has changed. Potentially, teachers are losing influence to software developers who create structures and systems for teachers to fit their content into. Some students can have increased power because they can now choose among different educational providers, even without leaving home.

Any projection about the size of the online market has to be treated with caution since only a limited number of official statistics include specific indicators on the use of online education and there are not yet internationally comparable indicators. Most indicators related to ICTs and education have been produced for e-learning in general, for primary and secondary education (such as the number of computers per students) or for the corporate market, and this leaves a large information

Table 4.2

Framework of e-learning in higher education: Main uses and stakeholders

Areas of investment Stakeholders with example	ICT infrastructure	Course delivery and administration	Content and ICT applications	Accreditation services	Students (fees, subsidies)
National Governments E.g.: UK	X		X	X	X
Public university E.g.: Indira Gandhi Open Univ.	X	X	X	X	X
Private university E.g.: Univ. of Monterrey	X	X	X	X	X
ICT Infrastructure/ telecoms sector E.g. Cisco	X				
ICT applications sector E.g: Web CT	X	X	X	X	
Media and publishing E.g.: BBC			X		
University staff Professors and support		X	X	X	X
Students as consumers*				X	X
Educational services providers, e.g.: EdExcel		X	X	X	
International community e.g.: donors / foundations	X	X	X		X

*Students have a dual role as both the consumer of educational services and an area for investment. Clearly, different kinds of students have varying degrees of power and autonomy – not least, a different ability to pay international fees.

Table 4.3
E-learning readiness ranking, 2003

	Score (of 10)	Rank		Score (of 10)	Rank		Score (of 10)	Rank
Sweden	8.42	1	Italy	7.07	21	Romania	4.91	41
Canada	8.4	2	Spain	6.98	22	Venezuela	4.82	42
United States	8.37	3	Japan	6.53	23	Philippines	4.8	43
Finland	8.25	4	Greece	6.52	24	Russian Fed.	4.65	44
South Korea	8.24	5	Malaysia	6.48	25	India	4.56	45
Singapore	8	6	Israel	6.34	26	China	4.52	46
Denmark	7.98	7	Portugal	6.33	27	Saudi Arabia	4.5	47
United Kingdom	7.93	8	Chile	6.13	28	Ukraine	4.38	48
Norway	7.91	9	Czech Republic	6.11	29	Ecuador	4.38	48
Switzerland	7.72	10	Hungary	6.09	30	Turkey	4.33	50
Australia	7.71	11	Mexico	5.96	31	Egypt	3.98	51
Ireland	7.6	12	Argentina	5.86	32	Kazakhstan	3.79	52
Netherlands	7.59	13	Poland	5.73	33	Indonesia	3.67	53
France	7.51	14	Brazil	5.63	34	Azerbaijan	3.67	53
Austria	7.49	15	Slovakia	5.51	35	Sri Lanka	3.66	55
Taiwan P of C	7.47	16	Thailand	5.11	36	Algeria	3.52	56
Germany	7.45	17	Peru	5.1	37	Viet Nam	3.32	57
New Zealand	7.37	18	Colombia	5.05	38	Pakistan	3.22	58
Hong Kong (China)	7.34	19	Bulgaria	5.04	39	Islamic Rep. of Iran	3.06	59
Belgium	7.19	20	South Africa	4.96	40	Nigeria	2.82	60

Source: Economist Intelligence Unit (2003a)

gap in online higher education. Thus, current estimates on the impact of online higher education are based on these other variables or on the impact of the distance education market.

The Economist Intelligence Unit ranking (2003a) grades 60 countries according to their e-learning readiness. In other words, it ranks countries on their ability to produce, use and expand Internet-based learning – both informal and formal, at work and at school, in government and throughout society. This ranking assesses e-learning on the basis of four categories: education (Internet access and use among teachers and students, including equality considerations), industry (use in different sectors), government (its support for e-learning) and society (populations' access to and use of the

Internet, including attitudes and overall level of education). Within each category the assessment is based on four factors that make e-learning possible: connectivity – "the quality and extent of Internet infrastructure"; capability – "a country's ability to deliver and consume e-learning, based on literacy rates, and trends in training and education"; content – "the quality and pervasiveness of online learning materials" and culture – "behaviours, beliefs and institutions that support e-learning". Although the ranking examines a broader sector than higher education, it does provide some kind of map of the state of e-learning internationally. Among the leaders are the Nordic countries, the United States and Canada, the United Kingdom, Switzerland, Australia and East Asian tigers (Republic of Korea and Singapore). All these

countries are recognized as having strong educational systems and high levels of ICT penetration, as well as a competitive market. They are then followed by other European countries and other Asian countries. In the middle ranking there are some of the most developed Eastern European countries (Czech Republic, Hungary, Poland and Slovakia), as well as the most developed Latin American nations (Chile, Mexico, Argentina and Brazil). These countries have in general benefited from government policies and from a commitment to exploring different ways of funding ICT investment. Counter-intuitively, given their strong investment in ICTs, South Africa only ranks 40th, and surprisingly India and China, despite their large distance education markets, are towards the bottom of the rankings. Given the limitations of the data presented we can judge that India's high score in the industry category is brought down by low scores in the other categories, while China's score is particularly low in the education category.

According to IDC analysts,[11] the corporate e-learning market was valued at $6.6 billion in 2002, of which $5.2 billion was in the United States. This figure is expected to rise to $23.7 billion in 2006. The expansion of e-learning in corporate organizations benefits from, among other things, having available ICT infrastructure, having resources for training, and in the case of international dissemination of e-learning the opportunity to save on travel costs. Much of the literature agrees that for a wide range of policy reasons, such as equality motivations or ability to raise funds, financial returns in higher education are not as secure as they are in the corporate e-learning market. Thus we can expect the size of the online higher education market to be smaller.

From this analysis, it is clear that the United States is the market leader in the use and export of online higher education. With an estimated 80 per cent share of the corporate e-learning sector, it is expected to have a high market share in the online higher education market. The Sloan Consortium estimates that in the autumn of 2002 over 1.6 million students in the United States took at least one online course, which represents 11 per cent of all US students. Over one third of those students (578,000) took all their courses online. Moreover, Worldwidelearn[12] cites a report by Capella University estimating that "distance learning is expected to increase in the US by 900 percent to include 750,000 students fully online by 2005".

Japan's Ministry of Public Management (2002) puts the value of Japan's e-learning revenues in 2003 at $770 million. According to NetLearning,[13] the Japanese e-learning market is a small proportion of that in the United States, only one thirtieth. In particular, the value of the corporate e-learning market was $290 million in 2003. This is a great difference, even when the fact that Japanese GDP is only half of United States GDP is taken into account.

In Canada there is a strong higher education market both for English-speaking and for French-speaking students, and Canadian education has a good international reputation. Athabasca University, which is regarded as the Canadian Open University, claims to be the first to offer an online MBA and currently hosts over 30,000 students (both online and at a distance).

In Australia all universities are engaged in online education to some extent, and 207 courses are fully online. Australia is a regional leader for higher education, able to attract Asian students looking for education in English close to home. For example, Australia increased the share of international students studying in Australian post-secondary institutions through distance learning and offshore programmes from 18 per cent to 35 per cent between 1997 and 2001 (OECD–CERI 2002).

The United Kingdom has a long tradition of distance education, for example the Open University (see annex I), and is further promoting e-learning and online education in its national and international market. Despite the uncertainty surrounding the UK eUniversity programme, a government-backed initiative to market online courses of UK universities abroad (see annex I), other universities are investing heavily in international online education. For example, the University of Liverpool has signed a 10-year agreement with Sylvan Learning Systems (a large US higher education company) to provide its courses online.

In Eastern Europe, online education is patchy. The good higher education infrastructure is not always matched by extensive access to and use of ICT. Nevertheless the newcomers in the European Union expect that accession will help minimize major obstacles such as expensive ICT hardware and the scarcity of quality content, limited digital literacy and language skills. Know-how for the future includes experience in government pub-

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Box 4.4.

Bolivia wants a national policy on virtual education

"In Bolivia, unfortunately, there is no national policy to tackle the challenges of distance education in public universities, although we know that there have been some sporadic and isolated attempts. On the other hand, private educational institutions are still just consolidating their space in the university system in traditional terms."

The main challenges and hurdles that this form of learning (online) has to confront in Bolivia are "a truly diversified incomprehension of what virtual education means. Bolivian society in general and the education community in particular are very conservative, deeply reticent about changes, about adapting to the new courses and to opportunities for studying, and about being trained and informed. Another big hurdle is at the level of technological infrastructure and access to such infrastructure by the majority of the students."

These circumstances could be avoided "with greater information and promotion of the use and potential of virtual education through, and not primarily by, the Ministry of Education. It will be necessary to combine with State policies that allow countries on the continent to aggressively promote the use of new technologies to the benefit of education."

Garret Aillón, Rector of the Andean University Simon Bolivar, at the inauguration of the first virtual experiences in its Centre for Distance Education.

Source: Translated and adapted from www.elearningamericalatina.com.

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lic–private initiatives in e-learning as well as international collaboration at the higher education level. For example, Hungary has one degree – in law – offered fully through the Internet, by the Pázamány Péter Catholic University,[14] and the Government of Hungary is proposing a searchable database of learning material.[15]

In Latin America and the Caribbean, the Monterrey Virtual University (an offshoot of the offline Monterrey University) has been able to establish itself as a market leader (see section 4). Countries such as Argentina, Chile and Brazil are popular destinations for private e-learning enterprises. There are already a number of online courses from US providers such as the University of Phoenix, UNext and the Monterrey Virtual University, as well as a limited number of traditional universities offering online courses. An example of the latter is the Universidad Virtual de Quilmes in Argentina, which in collaboration with the Universtitat Oberta de Catalunya in Barcelona, has launched a private virtual university. In Peru, the Inter-American Development Bank backed the Instituto Tecnológico Superior, a private business and technology school, to develop virtual professional training programmes.[16] These are not formal higher education courses, but seven-week courses. Their success confirms that with the necessary backing, online education can be successful in attracting students. But countries that are less developed (whether in terms of technologies or higher education in general) are finding it difficult to benefit from e-learning and even less from online education. The example of Bolivia (box 4.4) provides a useful corrective to some of the claims about higher education by illustrating many of the challenges that some countries face regarding online education.

In Asia, online education is growing in the richer and more technically advanced developing countries. For example, in Malaysia there are two institutions playing a leading role in the regional online higher education market: UNITAR (Universiti Tun Abdul Razak), a private virtual university offering 20 academic programmes in the field of business, IT and social sciences to more than 8,000 students at 11 study centres in Malaysia, Cambodia and Thailand, and MUST, the Malaysia University of Science and Technology (see section 3.4), a private research institution set up in collaboration with the Massachusetts Institute of Technology. In contrast, India and China have a long tradition of open and distance education, with experience in the application of technologies to education, such as satellite and radio, but for the moment online higher education is only starting to be developed.

In Africa there is the African Virtual University, originally created by the World Bank and now a donor-led and mixed distance/e-learning initiative. For French-speaking countries there is a specific initiative funded by the Francophonie: the Campus Numérique Francophone, which establishes

ICT-equipped centres to promote the use of online learning in universities in French-speaking West Africa (including in Dakar, Senegal; Cotonou, Benin; and Lomé, Togo). Additionally, there are a multitude of donor-led educational projects, focused on bringing new technologies into African education, such as teacher training in South Africa.

However, the adoption of online education has not been entirely successful. Dramatic failures have already been hitting the headlines: Hawkridge (2003) cites, among others, Fathom ($40 million), a Columbia University initiative; New York Online ($20 million) from New York University; Temple University, which shut down its business without offering a single course; and the UK Open University initiative to establish itself in the United States (£9 million). Additionally, the latest disappointment in online international higher education has been the UK eUniversity (see subsection 5). The reasons for these failures are varied, including problems of accreditation, lack of transparent governance and above all the failure to sell the product and attract enough students. These examples prove that the availability of funding and resources does not guarantee the sustainability of a project.

Trends in the online higher education market

As we have seen, most developing countries are progressively introducing ICT into their education systems subject to the availability of Internet infrastructure and ICT skills. The use of the Internet for higher education is still very limited, but technology in general has long been used to provide education, both through computers in schools and through distance education. The difference between offering one course online and a full degree online is also becoming more relevant for students. Universities that want to be able to reach students at a distance are making every effort to deliver full degrees online or to promote recognition of their individual courses so that the courses can count towards degrees of other universities (thus reinforcing a process of modularization).

Online higher education in many cases evolves from distance education. Open universities (public universities with minimal or non-traditional entry requirements for students, often providing education at a distance), such as in India and the United Kingdom, have long been using technology in a number of ways (radio, TV, videocassettes) to deliver courses at a distance. The transformation from distance to online education is a more natural evolution: instructors are familiar with teaching at a distance, the university already has a structure to develop course materials, and students are used to interacting with teachers and one another across space and time. In marketing terms, online delivery has given more credibility to distance education, which has often been seen as second best to traditional, face-to-face higher education. It seems that Governments are more inclined to provide funding for online projects than to fund distance education. For example, according to Tu and Twu (2002), in Taiwan Province of China the Government was assigning between $3,125 and $9,375 for a traditional university student, while the expenditure for a distance education student is $625.

One of the trends we have seen in higher education is the growth of private providers and an increasingly blurred division between private and public provision. In the United States, with its particular pattern of private higher education, only 4 to 5 per cent of all students are enrolled with for-profit providers. However, 33 per cent of all online students are enrolled with the same provider (Howell et al., 2003). It would seem that private for-profit interests are leading in providing online educational services. Additionally, several public institutions are providing online education through a for-profit institution, such as the failed New York University Online initiative. As in offline education, alliances between for-profit and not-for-profit organizations, and between private and public institutions, provide strategic benefits but also carry governance and sustainability risks, as well as access, equality, quality and ownership implications.

3. The Internet's impact on the international trade in higher education

The opening of trade in educational services is surrounded by uncertainty and current data are insufficient to provide an accurate picture of the value of international trade in online educational services. Nevertheless, some hypotheses about the impact of the Internet on the international trade in higher education can be formulated.

The Internet is promoting international trade in higher education services by facilitating the dissemination of educational content and services through online distribution. Paulsen (2004) indicates that there are 200,000 courses available on the Internet. Whether this is an exaggeration or reality, it gives a flavour of the enormous variety of online educational supply.

Online education is also promoting trade in other modes of supplying higher educational services, such as the movement of students and commercial presence. Online educational providers generally need to work with, or are requested to set up, a local subsidiary to better support students and market their programmes as well as for assessment purposes. Moreover, blended learning is in many cases becoming a preferred mode for engaging in education.

Online education offers an additional mode of entry to educational institutions that want to provide their services in countries with protective educational markets. It should be noted in this regard that developed countries are the major exporters of online higher education services, and developing nations are the net importers of such services. Given that few countries have regulations covering the provision of online services by foreign entities, online education can be a more attractive option for foreign suppliers to offer higher education services in a given country. If national Governments limit the establishment of commercial education providers, the Internet makes it possible to circumvent regulatory barriers (UNCTAD, 2002a).

Online education is becoming an option for students who have difficulties in travelling abroad, and this is particularly relevant for citizens from developing countries. Multiple forces are shaping the direction and numbers of students crossing borders. In general, more restrictive entry regulations for students favour online education or other international and regional markets. The passage of the US Patriot Act has been linked to a decrease of up to 30 per cent in the number of international students enrolled in US colleges and universities (Jaeger and Burnett 2003). This could promote other destinations, such as Australia or the United Kingdom, and online education. But travel restrictions can also jeopardize online education. A large number of online courses still require attendance at short workshops, and visa regulations tend to discriminate against online students (for example, the number of online courses that an international student can take while studying in the United States so that they count for visa purposes has been drastically reduced).

The application of ICTs to education is allowing for the unbundling of academic functions, which in turn promotes international trade in educational services by fostering specialization and customization of educational services. The unbundling of academic functions occurs when multiple players intervene in the education supply chain: one party may create the course content, another delivers it, a third institution manages the resources, another provides the accreditation, and so on. The drawback to the unbundling of academic functions is that it challenges ownership and control of the educational service, and can consequently jeopardize its quality.

The Internet is also increasing trade in higher education services by facilitating the reuse and reselling of higher education resources to serve the lifelong learning needs of the information society. In a rapidly changing, technology-dependent economy, lifelong learning has become increasingly important for ensuring the necessary and continuous updating of skills (languages, professional skills etc.). As a consequence, the rise of lifelong learning is accelerating the convergence of different educational sectors, including corporate training, higher education and the "other" key sector in international education (language training). As the Internet is already widely used in the corporate training sector, one might expect its use in higher education to further facilitate the reuse and trade of educational services from one sector to another.

4. Models of online higher education

On the basis of an UNCTAD survey of e-learning in higher education carried out in January–March 2004 on a small sample of universities currently engaged in, or planning to invest in, online education, we have identified five different models of how online higher education is being adopted. These models illustrate the different strategies being followed in developing countries for providing online higher education.

Examples from this survey have been used throughout this chapter to analyse the key issues in terms

of the opportunities and challenges for developing country Governments and higher education institutions in pursuing online higher education. Annex I provides a full summary of the survey.

Traditional university going online

University of Monterrey, Mexico; Mauritius University; National University of Lesotho

Established traditional universities are increasingly using e-learning to deliver and support some courses. A number of universities are already providing some courses completely online in addition to the traditional courses they offer.

A well-known case is the Virtual University of the Instituto Tecnológico de Estudios Superiores de Monterrey (ITEMS), one of Latin America's most prestigious private universities. ITEMS has long experience in using ICTs to provide courses and is famous for its television-based distance education. In the late 1990s it started to incorporate the Internet into its teaching and today many of its postgraduate degrees are offered primarily online, with satellite television as a supplement. In 2001 the university had more than 1,200 students studying exclusively online, and around 12,000 students using blended programmes.[17] The policy of the Virtual University is to offer all of its courses online as from 2004.

Open and/or distance university going online

Indira Gandhi Open University, India; UK Open University

Open universities and distance learning universities have long experience in providing distance education using ICTs to support and/or replace face-to-face course provision, including television and radio broadcasting, cassettes and videocassettes. These universities are taking further steps in the use of media technology, using the Internet to provide education.

The Indira Gandhi Open University (IGNOU) caters to the Indian market and is currently serving 10,000 students online out of a total of 334,415 students. It has a history of broadcasting educational content, and has strategic partnerships with Doordashan, India's National Broadcaster and All India Radio. Its major strengths reside in the large domestic market, and an already established support network of regional centres and staff. With a total budget of $14 million, the cost to deliver their online provision is $200,000. The institution buys pre-existing content from other institutions that specialize in particular educational disciplines. For example, IGNOU has entered into collaboration with the EDEXEL foundation in the United Kingdom, whereby some of the pre-existing content of the institution is used for the online IGNOU Bachelor in Information Technology and Advanced Diploma in Information technology.[18] IGNOU also creates its own content.

Independent online courses

LEAD, United Kingdom; UN University; UNCTAD TrainForTrade

This model of online higher education refers to stand-alone online courses or programmes that are part of general educational provision or a capacity development initiative. These courses may be provided by universities or by other non-traditional capacity-building institutions. Particularly in the case of non-universities these courses often do not provide formal accreditation.

UNCTAD's TrainForTrade programme aims at training government officials on key trade issues. Such courses seek to expand the impact of the organization by providing training and developing capacities through the application of ICTs to training. Courses are developed in conjunction with specialized staff of the organization, and are delivered using online techniques. The programme is largely based on donations from Governments.

Consortiums of institutions providing access to online learning

Finnish Virtual University; UK eUniversity; Malaysia University of Science and Technology; Massachusetts Institute of Technology, United States

Online higher education can also be provided through international e-learning partnerships between developed and developing country institutions. This model has the potential for the transfer of know-how and technology.

The Malaysia University of Science and Technology (MUST)[19] was conceived and planned as a

world-class university to cater for the needs of the science and technology sector in Malaysia. The establishment of MUST was announced in 1997 just before the regional economic downturn of 1998. This slump significantly hampered the establishment of the university. However, the idea was resurrected in December 2000 after MUST received financial assistance from the Government in the form of a conditional grant to train highly skilled researchers and scientists for Malaysia. MUST is a research-driven university focused on postgraduate training that aims to attract the best students from the South-East Asian region. It is a private organization that benefits from collaboration with the Massachusetts Institute of Technology (MIT), which provide human resource and curriculum development support. MUST confers its own degrees but benefits in terms of reputation from the association with MIT.

"Start-up" online university

Arab Open University; Virtual University of Pakistan; Virtual University of Small States of the Commowealth.

In some cases completely new online universities are being created. In developing countries, national or regional governments have promoted such universities, which are quite a new phenomenon in these countries.

For example, the Commonwealth of Learning is currently developing the concept of a Virtual University of Small States of the Commonwealth, with a proposed budget of $21 million for the first five years. This project engages small States in Africa, the Caribbean and the Pacific in a collaborative effort to pool resources and knowledge so as to build capacity collectively, as well as to increase access to research and development capacity across national borders, facilitate the exchange of students and teachers, and recognize one another's courses so as to provide greater transferability. The Virtual University of Small States of the Commonwealth does not count as online higher education as such, but it is a first step towards using ICTs in higher education. If successful, it will lay the foundation for a future infrastructure in which to offer online learning.

One of the key issues to examine in any model of online education is governance. Uncertainties and confusion about this issue have too often led to the economic failure of the online education enterprise. Lack of clear governance also impacts on the achievement of the initial educational or developmental aims. Public institutions setting up a private enterprise to deliver online education have found that sooner or later the organizational culture has an impact on the management and control of the newer initiative. Every initiative has to negotiate the different professional values and practices of educators, ICT professionals and educational managers. Governance issues also arise in consortiums where multiple actors join forces and have to negotiate different objectives, collaborate and use joint resources. Open universities face lower cultural barriers to the management of these changes, given the fact that online provision is carried out within the existing structure.

5.   Investing in online higher education

As with any public investment in ICTs the most substantial objections to online education arise from the opportunity cost of investing in ICTs and not in other programmes judged to be more vital. Four criteria help determine financial decisions for any investment, including online higher education: profitability, affordability, sustainability and efficiency.

The most common question regarding the **profitability** of online education is whether it is cheaper than traditional education. A starting point for answering this question is to examine the cost structure of e-learning courses. Traditionally, studies scrutinizing the comparative value of different educational models (face-to-face, distance and by extension online education) focused on a cost accountancy exercise. Such studies were primarily concerned with comparing the unitary cost per student or per course. However, as described above, there are a variety of online education models. Therefore, unless applied to a specific case, any cost structure analysis can only serve as guidance. Additionally, this type of analysis is particularly difficult in the field of education, where educational institutions tend to have ill-defined cost centres.

The general economic argument for online education is based on economies of scale. Online education is potentially cheaper than face-to-face education when a large number of students are targeted. Theoretically, the additional cost per student is limited, and therefore a large customer base allows the recovery of the significant investments made

on infrastructure and on product development. For example, the Monterrey Virtual University claims that online courses are cheaper than face-to-face courses (see annex I). However, the economies-of-scale argument has yet to be proved. Some large-scale e-learning programmes have failed despite their aim of reaching more customers (students). For example, the UK eUniversity project, which has cost £62 million (approximately $114 million) (see annex I), aimed at jointly marketing UK online courses abroad but only managed to recruit 900 students (instead of the 5,000 targeted) in its first year of operation. Secondly, the economic rationale for some online educational projects, in particular those on the model of "independent online courses" (as described above), is not based on economies of scale but on providing valuable knowledge in a specific field and on being financed by donors and/or users. For example, UNCTAD's TrainForTrade programme depends on donor funding, the content (and even the software) is developed in-house, and competition is limited to the search for donor monies. The content is highly specialized, and based on the core of the organization's knowledge. While it provides opportunities for the dissemination of knowledge, concerns about self-sustainability, particularly in an increasingly competitive environment, and because of the limits to funding (for example, if the e-learning fashion were to pass), should be addressed. Thirdly, experience shows that currently a large number of projects have still not gone beyond (or have failed before finishing) the pilot phase, and thus it is difficult to judge where full-size projects could be successful. Finally, quality and customization raise doubts about any possible economies of scale for online higher education. Maintaining an acceptable tutor/student ratio cannot be achieved cheaply without alienating teachers, and customization to local culture involves a high degree of content and pedagogical expertise that requires a significant proportion of any budget.

However, there is a broader question regarding the importance of cost: does it really matter if online education is cheaper than traditional education? Interestingly, while in the wider e-learning literature, reducing costs is seen as a major motivating factor for institutions, several of our respondents actually claimed that online courses were more expensive than their offline equivalents, and yet they are prepared to invest in online higher education. Therefore, there are other fac-tors that make the investment in online education worthwhile. From the individual point of view students will be assessing whether their efforts will be remunerated in terms of increased life opportunities, private institutions may look at further utilizing existing infrastructure, increasing loyalty and improving the quality of their services, and educational policy makers will be seeking to increase access and further ICT skills.

Without doubt some institutions in developed countries are enjoying returns on their investment in online education, but the potential for developing countries may be more constrained. For example, online provision increases international competition for students, which in turn has an impact on the ability of institutions in developing countries charging higher prices to non-resident students, given their low brand recognition or their catchment area (students from other low-/middle-income countries in the region). Table 4.4 provides some anecdotal examples regarding tuition fees of online MBAs, and the difference between the cost for a national and an international student.

Affordability, or the question of whether Governments, institutions and students can afford online education is a related issue that can be overlooked in the profitability criteria. Is the Government's educational budget able to afford the provision of online education? Would lower-income students be able to access online higher education? It can be argued that national Governments' investment in online higher education is justified when it allows the participation of students from lower-income levels. But as we saw in the introduction, online education tends to be associated with private provision, particularly in higher education. In some cases, such as MUST, the online project has only gone ahead when the national Government has been able to confirm funding for all national students participating in the programme.

It seems that much of the boom in ICTs in education is being promoted by developed economies and that international funding provides a strong driving force. However, the capacity of international funding to finance higher education is rather limited, in terms of both time and the proportion of overall spending.[20] Thus national Governments are entrusted with the responsibility of taking crucial financing decisions for higher educa-

Table 4.4

Comparative tuition fees for online MBA: Foreign vs. national students

	Tuition fee for international students ($)	Tuition fee for national students ($)	Difference
Developed countries			
Open University (UK)	22 028	17 860	23%
Athabasca University (Canada)	34 338	28 635	20%
Golden Gold University (US)*	37 440	37 440	0%
Developing Countries			
Virtual Monterrey (Mexico)	3 950	3 950	0%
UNITAR (Malaysia)	15 000	15 000	0%

Source: www.open.ac.uk, www.athabascau.ca, www.ggu.edu, www.ruv.itesm.mx, www.unitary.edu.my. Official prices as shown in April 2004.
*International students are not eligible for US grants and pay $90 for visa administration.

tion, by investing themselves and/or encouraging the private sector to invest.

The third major criterion is the economic **sustainability** of any online education programme. Governments of developed countries and international organizations, including the World Bank and the United Nations, have been actively involved in promoting new online higher education initiatives. The question arises as to what will happen at the end of the programme when the specific funds earmarked for online education have been used and the programme is handed to the local institution, and/or when the funding priorities and private investment interest shift to other areas.

ICTs increase specialization, which in turn can bring more **efficiency** to the educational sector by enhancing internal organization, communication and knowledge sharing, and by allowing teachers to specialize in their field of expertise. As described in the next section, the Internet is providing new business models that promote open access to education and research information.

The Internet is also allowing the unbundling of academic functions and thus specialization, as well as promoting the convergence of different educational sectors, by facilitating the reuse of educational content. This can yield new efficiencies and markets, and allow for local customization. However, unbundling can also bring with it possible loss of ownership of educational resources and processes.

Additionally, the efficiency of online education needs to be measured against educational objectives and context. It is clear that what is efficient in a developed economy, with an already established ICT coverage, may not be so efficient for a low-income economy where the number of people with access to the Internet is much smaller.

To summarize: traditionally, the financial analysis of higher education has focused on two areas – firstly, comparing the cost of producing a course or educating a student, and secondly on analysing individual initiatives and their profitability. Both areas of analysis cast doubts on the profitability of online learning, and although there are potential earnings with economies of scale and individual financial success stories, there have already been many failures and there may be more when donors withdraw their funds. Analysis of the three other criteria – affordability, sustainability and efficiency – are also necessary in order to evaluate the economic viability of online higher education, and in particular to enable national Governments to take sound decisions.

6. Technological infrastructure and applications

Technology is not neutral, neither economically nor pedagogically. From an economics perspective, the use (or lack of use) of different technologies has a variable impact on access, cost, efficiency and ownership. What follows is a brief presentation of different online education technologies and their markets, as well as an analysis of

their impact. The description given recognizes infrastructural issues and focuses on the most recent debates on ICT applications for online education.

ICT infrastructure

The use and the adoption of online higher education require ICT infrastructure. To maximize the use of ICTs in education computers and software are indispensable, and in the particular case of online learning access to the Internet is also a prerequisite. Reliable and fast connectivity, as well as sufficient bandwidth, are of particular importance in order to make full use of the range of e-learning software and applications – from animated simulations used to enhance learning in engineering or medicine to video conferencing for increased interactivity between students and teachers at a distance. The ability of a region, State or nation to

develop e-learning depends on the existence of a strong ICT infrastructure. For example, the Survey of e-Learning Readiness prepared by the Economist Intelligence Unit's (EIU), when compared with the EIU's broader e-Readiness Survey, shows a strong correlation between e-learning readiness and general ICT readiness (see chart 4.4).

However, as the outliers in the EIU's survey illustrates, connectivity is just one part of the picture. The building of knowledge economies and of the related human-resource capacity also requires the availability of non-electronic information and knowledge sources (e.g. libraries, books and journals available to the public), competent educational management, a culture of change and sufficient educational funds. A corollary then is that if online education is to be successful, funding of ICT infrastructure should not be at the expense of other knowledge resources.

Chart 4.4
E-learning readiness and e-readiness
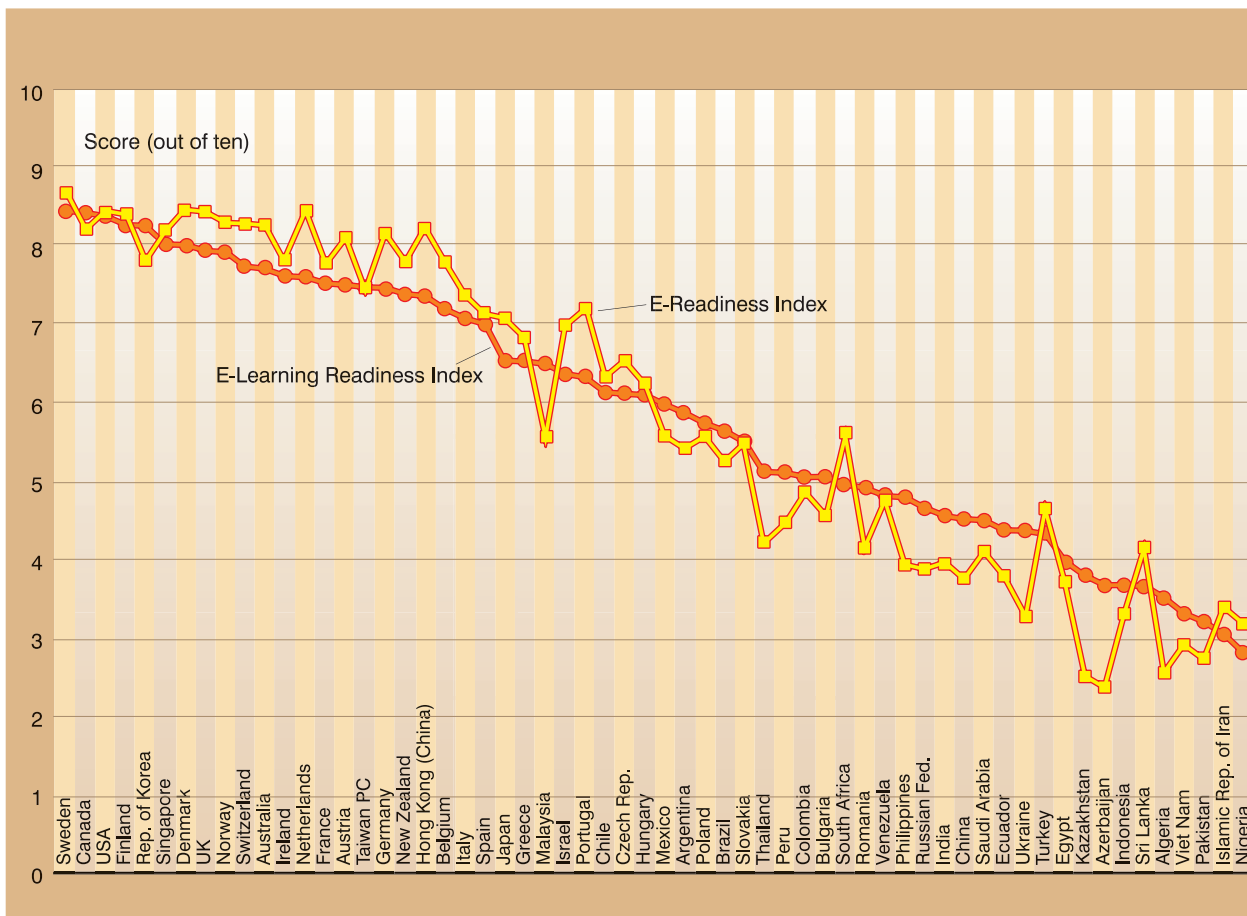
*UNCTAD based on EIU (2003a) and EIU (2003b).

For stakeholders producing or providing education in developing nations the question is how best to maximize the potential of online education and the technological infrastructure available to achieve their objectives. Some providers or Governments believe that the only way forward is to increase connectivity or improve access to new technology. However, others, particularly local developers and providers, defend the use of low or intermediate technology or concentrating access provision in community or distance learning centres, such as the ones used by Indira Gandhi Open University.

ICT applications: Content production, delivery and course management

The Internet has had a major impact on education in terms of both content creation and distribution. Digital technology has facilitated the creation and distribution of content, but the Internet is also allowing wider access to these tools so as to create and share knowledge through global resource exchange and instant/distant content discussion. What follows is an examination of the structures and products that support online content creation, delivery and management.

Designers and teachers use a wide variety of tools to create content, such as word processors, presentation software, audio, video and animation. They also use ICT tools to evaluate students (e.g. assessment tools). Moreover, they use ICT-based communication to enhance teacher–student or student–student interaction. Traditional methods, such as audiocassettes and videocassettes, are and will continue to be widely used in developing countries, for example by the Indira Gandhi University in India, and even in online courses provided by Western institutions (e.g. the UK Open University). To state the obvious: the creation and delivery of content requires course management, and vice versa, and both are reliant on the infrastructure available. For example, distributing content through videoconference will only be possible if the intended audience has access to videoconferencing equipment as well as the knowledge and motivation to use it.

Educational materials for online education are normally referred to as **courseware,** and **learning objects** are the modular units of instruction that can be stored and searched through databases and networks, used and reused, aggregated or re-engineered to suit the purposes of multiple institutions, faculty members or instructional developers (Commonwealth of Learning, 2003). These courseware systems are at the core of online education. Producing such systems is expensive, but their value is maximized if they are designed to be flexible, customizable, interoperable, easy to update and reused. Online education should be more than simply the posting of educational information online. It is the provision via the Internet of fully realized courses, with curriculum, bibliography, pedagogical sequence and so on.

The large majority of online courses are developed in the fields of business management and ICT-related areas. These are popular areas in traditional higher education, but additionally, they have proved good for online learning because they can be standardized and generally require less face-to-face interaction or practice outside the computer. However, other subjects such as education and primary health care studies, which would normally require a strong face-to-face/practical experience, are also popular online courses. Suppliers of online education primarily focus on courses that can be easily produced and reproduced, but also on where there is a large demand. Internet delivery is particularly popular with postgraduate courses, presumably because of their shorter duration and greater independence, as well as their popularity with full-time professionals. A survey of online education and services in Australia (Bell et al., 2002) shows that the courses most repeated are those leading to e-commerce and online education diplomas – that is, the object, as well as the means of study, is the Internet – and that 90 percent of the online courses at universities are at postgraduate level. But as we have seen with the different models of online higher education, other business models are used in distributing online specialized content since this specialization is the core and strength of the providing institution. One such example would be the Master's programme in Leadership for Sustainable Development delivered by LEAD (an international network of individuals and organizations committed to sustainable development, focused on development activities), and accredited by Middlesex University in the United Kingdom. The programme, funded by private donors, supports a limited number of international students to become leaders and maintains a network for sustainable development.

Box 4.5

Examples of projects for open academic and scientific journals

The Public Library of Science was founded by Nobel Prize winner Dr. Harold Varmus and fellow researchers Patrick Brown and Michael Eisen; the Free Online Scholarship (FOS) movement; the creation of the widely read (for profit) BioMed Central to provide "immediate free access to peer-reviewed biomedical research"; the Budapest Open Access Initiative (which has been endorsed by 210 organizations), and similar projects seek to promote new business models for publishing that allow academic and scientific information to be more widely available to the research community.

Other efforts to provide reduced price or free access to researchers in developing countries include the Health InterNetwork, which was introduced at the UN Millennium Summit in the year 2000; a number of projects sponsored by the International Network for the Availability of Scientific Publications; eIFL.Net (Electronic Information for Libraries), a foundation that "strives to lead, negotiate, support and advocate for the wide availability of electronic resources by library users in transition and developing countries"; and a new effort by the Creative Commons to create a licence for free access to copyrighted materials in developing countries.

Source: South Centre (2003).

Open content

The growth of the Internet has led to increased availability of content and, as with public libraries, there is a demand for knowledge to be shared and freely or cheaply accessible. A well-known initiative to make courses publicly available online is Open Courseware. A renowned example is the Massachussetts Institute of Technology (MIT) OpenCourseWare (OCW) initiative, which makes selected MIT courses online available for free (thanks to a $11 million donation from the William and Flora Hewlett Foundation and the Andrew W. Mellon Foundation.[21] The MIT initiative does not result in the full course being available on line or in any user of the OCW gaining an MIT degree. Posting information online is not the same as providing an online course. In some cases, all that is posted on the OCW site is the syllabus and bibliography. Whether because of intellectual property rights restrictions (see next section on legal issues) or management motivations, OCW does not offer access to lectures, explanations and discussions or to the key readings For most users the OCW initiative is not sufficient, particularly for those in developing countries where access to reading material is limited. An additional obstacle is that all information is in English and OCW's plans are that it will continue this way (UNESCO, 2002). Higher education institutions from developing countries are greatly interested in pursuing an open courseware initiative, but not at any price. They have cultural and language concerns as well as the more general infrastructure concern, and they recognize current intellectual property rights barriers. The interest lies in access-

ing information but also making accessible information from their own countries and communities. Currently, there are informal knowledge-sharing initiatives targeting the needs of developing nations, such as the international Open Knowledge Network consortium, but not at the specific level of higher education.

Professionals from developed and developing countries have suggested (UNESCO, 2002) that open courseware, should:

1. Provide educational resources for college and university faculties to adapt them in accordance with their curricular and pedagogical needs;

2. Include the technology to support open, meaningful access and use of courseware;

3. Include at a minimum the course description, syllabus, calendar and at least one of the following: lecture notes, demonstrations, simulations, illustrations or learning objects.

Research and publication

The Internet is also having a major impact on research and publication. It has led to information being available to more people, new publication opportunities, networking being enhanced through newsgroups and other mechanisms for collaborating across borders. For most scholars in developed countries it is almost unimaginable to engage in research without access to the Internet. The Web has produced a huge increase in "grey literature" – online publication of research outside

the traditional mechanisms of academic publishing. The opening up of knowledge through online databases and journals has had a transforming effect. However, access to a large number of established refereed journals and databases is still controlled through subscription, and the ownership of the intellectual property contained in journals is tightly controlled by publishers.[22]

Secondly, the Internet is challenging and transforming academic research and publishing by establishing new models of peer review and publishing which will influence the balance of power as regards who owns intellectual assets (see box 4.5 for some examples). This shift has the potential to democratize not just access to knowledge but also ownership and control over how that knowledge is used, with clear benefits and advantages for institutions in developing countries.

Additionally, the separation between production and distribution, as in traditional higher education, is blurred. In some cases online content is developed by the provider, the teacher himself/ herself or the university (e.g. LEAD develops its own high-quality content), while at other times external content is used, adapted or not (e.g. the Arab Open University adapts materials from the UK Open University).

Content management

Content is provided primarily through Learning Management Systems (LMS). The newer and more advanced version (Learning Content Management Systems) offers additional features that focus on content management and authoring. LMS integrate the management of content – online modules and communication tools – with student registration and administration procedures. They enable an institution to develop electronic learning materials, to offer these courses electronically, and then to use the same system to test and evaluate the students and to generate student databases in which individual results and progress can be charted (Paulsen, 2003).

Universities use commercial and in-house learning management systems to manage their online programmes. The market for LMS is estimated at around $500 million (see table 4.5). There are two major international players: WebCT (United States), a privately held company, created in 1995 with $125 million secured through six rounds of equity financing, which has a 33.5 per cent market share in the United States; and Blackboard (United States), which had a total revenue of $92.5 million in 2003, has 5.3 million active users at more than 1,600 institutions in more than 70 countries and has a 42.5 per cent market share in the United States, covering all educational sectors (Hawkins et al., 2003).

The LMS market is still at an early stage of development. With over 140 commercial offerings worldwide the market is highly competitive with few leaders, mainly based in the United States, but with low market share. For example, Bersin[26] maintains that the market share of the largest player is no more than 7 per cent of the market. A European study found as many as 52 different commercial and 35 self-developed LMS in 113 educational institutions. Moreover, institutions do not seem to be especially loyal to a particular brand, switching between different packages or using several systems in one university. For example, a survey of Australian universities found that out of 40 respondents, 29 used WebCT, 20 had their own in-house system and 17 were using Blackboard.

The LMS market will be expanding (with new and updated products, and a diversified language offer) and is expected to undergo some consolidation through the merger of providers. The provision of more languages and features, together with increased standardization or open source systems development, will reduce institutions' incentive to develop their own software. However, economic rationale does not always play a part in opting for the in-house development of a system; rather, decisions are often driven by the bargaining power and interests of ICT departments. Evidence from a

Table 4.5

Learning management systems market
(millions of dollars)

ESTIMATIONS BY:	2001	2003	2004	2006
IDC	$ 800			$3'600
Simba Information	$ 200			
Lifelong Learning Report			$ 529	
Bersin & Associates		$ 350		

Source: hr. com (2004)[23], HighBeam Research (2004)[24], Bersin (2004)[25]

study of LMS systems in European institutions (Paulsen, 2003) suggests that IT sections of universities and other institutions attach great importance to developing their own platform and not buying programmes developed by others. For example, in the United States only 7.2 per cent of institutions have developed their own LMS (Hawkins et al., 2003), whereas in Europe 35 out of 113 (32 per cent) have developed their own system. Universities have developed and/or acquired their own LMS, benefiting from available free and open source systems or from partnerships with other institutions (e.g. the UK Open University and the Arab Open University).

Open applications

ICTs have allowed the production and distribution of content in a variety of electronic formats incorporating different media. The ability to use content on different platforms is an asset, particularly in education, where the potential for content exchange is unlimited. Currently, there are two complementary approaches to ensure interoperability and transferability: free and open source software, and open standards. Although their approaches differ, international initiatives such as SCORM and the OKI (explained below) are playing a central role in promoting openness and reusability of content.

Free and open-source software (FOSS) is software that has made its source code public, and allows users to modify the programme and thus customize and adapt it to particular needs.[27]

FOSS, already widely used for web server technology, has a more limited presence in desktop software. However, in the field of education, it has the potential to become widely used in management systems and on desktops. Firstly, universities are at the centre of open software development that is, there is a strong connection between users and developers, which facilitates the continuous updating and support that ICT software requires. The list of current open source course management software (see annex II) shows how most software is developed in or with the support of a university. Secondly, the positive externalities of education provide a strong incentive for sharing and maximizing the use of existing technology and content. Thirdly, FOSS, at least until there is a full commitment to interoperability, can provide the necessary communication links between

different IT platforms and tools. Finally, the education software sector is still in its infancy and neither the commercial nor the FOSS market has a monopoly; consequently, early developers have the opportunity to find a niche.

One FOSS example[28] is the Open Knowledge Initiative (OKI) course-management system. This developed from collaboration among top US and UK universities. Led in the United States by MIT, and supported by a philanthropic donation, the OKI is a scalable and sustainable reference platform designed for Internet-enabled education, which specifically addresses the needs of higher education. As its web page notes, where possible it uses open standards and its code is available to everybody, including commercial vendors.

A study (Harris and Yanosky, 2004) of 117 institutions involved in e-learning (87 in the United States and 30 elsewhere) showed that when institutions bought new e-learning products, in 16 per cent of cases they would choose free and open source, while 80 per cent would choose commercial products, and only 4 per cent would choose in-house development.

The second approach to ensure interoperability is the commitment to and use of **open standards** both by commercial and by open-source packages. Open standards are transparent descriptions of data and behaviour that form the basis of interoperability. They are crucial for maximizing the use and reuse of different media and content, and they guarantee interoperability, which open source software per se does not. However, in practice, developers and providers show different levels of commitment to open standards.[29] Because they wish to protect their product or to reduce software development time, standardization is not always regarded as suitable.

An example of an open standard that has achieved some success in corporate learning programmes in the United States is the Sharable Courseware Object Reference Model (SCORM) initiative. This initiative, which began in 1997, is part of a wider US government programme for distributing learning. Its aim is to foster the creation of reusable learning content. The initiative has identified critical technical interface points around which standards for web-based learning technologies might be developed. The first ver-

sion was released on 31 January, 2000, and since then 64 LMS have adopted SCORM standards (www.adlnet.org).

It should be noted that the ability to use content on different platforms and to connect different systems provides further efficiencies. In terms of ICT efficiency the optimum choice to promote interoperability is a combination of open source and open systems. Some institutions have already paid a high price in entering into contracts with fixed technology systems, and those that have to take decisions in the future will benefit from analysing the potential costs of all the options available.

7.   The legal framework

As we have seen, access to, and cost, ownership and efficiency of, online education are conditioned by technology, but also by the broader policy context and particularly the existing legal framework and the general level of ICT skills. The legal framework affecting online higher education extends from specific regulations in the field of education (recognition of titles, accreditation of educational institutions, curriculum design, teachers' qualifications etc.) to broader legal issues, including intellectual property rights, commercial law, security and authentication, electronic payment systems, consumer protection, applicable law, and fiscal and customs regulations. Both sets of regulations shape the ability to buy, sell, develop and use online higher education. For example, in order to sell a degree online an institution needs to be accredited and, the degree needs to be recognized; students want to be protected against provision default and unauthorized use of their personal data, course developers want to control the use of their work and Governments want to control the quality of online educational programmes.

Of the various legal issues[30] affecting online higher education, this chapter highlights two of particular relevance for developing countries: accreditation and recognition, and intellectual property rights (IPRs). These issues are of special interest to developing countries since these are the countries that suffer most from lack of access to, and recognition of, their knowledge resources, and are the net importers of online higher education.

Accreditation and recognition

Accreditation is the currency of higher education. While learning for its own sake has cultural value and in some circumstances can be viewed as a leisure activity, in economic terms it is accredited and certified qualifications that count. Through appropriate quality assurance approaches and accreditation systems, Governments and accredited institutions ensure and promote quality in higher education, support the transferability of degrees across states, regions or nations and guarantee the authenticity of a degree.

National quality assurance and accreditation systems vary from one country to another and in many developing countries are non-existent. The lack of trust in a national accreditation system seriously undermines its educational credibility both nationally and internationally. Each government has its own policies to provide accreditation; for example, in the United States accreditation is provided through independent not-for-profit organizations, and the only role of the US Department of Education is to oversee such accreditation institutions, not the actual educational institutions themselves. This high degree of institutional autonomy contrasts with European education systems (such as those in Germany and France), where autonomy to borrow money, to invest in new products and, therefore, to market degrees online and internationally is more limited.

As regards accreditation, online higher education is an issue in the key areas of quality, transferability, authenticity and branding. The growth of harder-to-regulate online higher education, as well as the increase in the number of higher education students, and the internationalization and privatization of education, provides challenges for national accreditation systems. Online education increases the number of programmes and individual modules, as well as the number of institutions offering educational services. This creates problems of evaluation, inspection and examination, and educational services providers may find it easier to circumvent local regulation by going online.

Quality assurance and accreditation systems tend to be weak in most developing countries, particularly in Africa and the Arab regions. However, in the light of increasing demand for and supply of higher education, accreditation systems are being revised in those regions. Countries such as Malay-

sia and South Africa are already working on updating their quality assurance and accreditation systems. For example, South Africa established a Higher Education Quality Committee in May 2001 to tackle the large number of private institutions offering higher education programmes illegally (OECD–CERI 2003).

Despite the current initiatives to update national accreditation systems, they tend to ignore the specific features of online education, leaving this mode of delivery in a limbo (at best). But there are some innovative examples: in India the National Assessment and Accreditation Council has now been asked to prepare for the responsibility of accrediting the international educational offerings in all forms, including electronically (OECD–CERI 2003).

The existence of national systems of accreditation means that institutions recognized in one country are not automatically recognized in another. For example, the UK Open University has failed to gain accreditation in the United States. Online higher education circumvents this obstacle: it allows institutions recognized in one country to provide online education in another country without needing a specific accreditation since the qualification on offer will be accredited in the exporting country. In online education what counts is the ability for a nation and/or institution to develop a reputable and desirable brand for its online courses.

However, in some cases accreditation systems aiming to ensure quality make requirements that can hamper the flexibility of online higher education internationally. Examples include making it compulsory to have a national licence to work (for example, as a lawyer) or for students to engage in some element of face-to-face contact so as to minimize the risk of cheating, or even requiring the same curriculum as the home-campus version. All these are part of the Malaysian quality assurance framework.

Renowned university brands sell well offline and provide a valuable asset for their online endeavours. Additionally, other universities have successfully built their brand and recognition solely online (i.e. the University of Phoenix). Students look for recognition, either through brand value or accreditation of their studies by developed country institutions or developing country

regional leaders (i.e. the African Virtual University). Developing countries in particular suffer from poor recognition of their degrees, and the arrival of online education is a further threat. Before the advent of the Internet, poor institutions sought partnerships with counterparts in richer countries that could provide them with the established brand recognition. With online courses, students who have the requisite resources can increasingly study in prestigious universities while staying at home and opt for the more internationally valuable foreign degrees.

In summary, it is likely that in online higher education both branding and accreditation will play an important role in shaping the market. But they must not be confused: branding provides the marketing value, while accreditation makes a course valid.

Additionally, there is the question of the validity of an online course if the institution cannot be sure who actually took an online examination. For example, the Arab Open University insists on a physical written examination as a part of its assessment process so as to compare to and validate online assessment.[31] In consequence, ensuring authenticity for e-learning courses may imply added costs, such as the establishment of centres for examination purposes, which may have an impact on financial sustainability. The UK Open University supports this extra cost by charging a fee to students who want to be examined outside centres already established. The submission of written assignments, as in offline education, also creates concerns over the authenticity of students' work. The Internet has amplified the options for plagiarism or even "pay & get your essay" services. For example, www.ivyessays.com offers essay services from $12.99 per page, or for $14.95 one can have a monthly subscription to www.digitaltermpapers.com and have access to its database of essays. Institutions are exploring a combination of physical presence, technical tools and pedagogical measures to overcome authenticity issues.

Currently, there is no single international accreditation body for either online or offline higher education. Education has traditionally been in the national domain, and thus most regulations are at the national level. In order to be meaningful, global education requires transparent and recognizable standards of accreditation, but the debated

search for an international accreditation system is in itself being questioned. Organizations from developed countries reject the idea of developing an international accreditation system on quality grounds. And organizations in developing countries dislike supranational regulations that could limit a country's cultural identity and might fail to take into account the different levels of development.

International measures to assure students of the value and transferability of their studies have developed primarily in a second area – one that is complementary to accreditation, namely recognition. Most of the initiatives to recognize titles granted by educational institutions in other countries are at a regional level. The principal ones are the regional conventions (Africa, Arab region, Asia and Pacific, Europe, Latin America and the Caribbean, and the Mediterranean region) on the recognition of qualifications. While the European region is renowned for its efforts (as part of its deeper integration) to recognize different national qualifications at a regional level (known as the European Bologna process), other regions have not been so successful in achieving such results (UNESCO, 2001).

In certain professions, such as teaching, medicine, law and architecture, professional certification is essential in order to be able to work. This certification is greatly restricted on a geographical basis. For example, obtaining a degree in medicine in Spain does not allow the holder of that degree to work in the United States. Moreover, professional certifications usually have a strong face-to-face and practice component: for example, no one would want to be operated on by a surgeon with a purely online degree. Thus, it is not surprising for courses leading to the professional qualifications just mentioned to have a limited presence in the online sector.

In specific cases, online courses can lead to industry-standard certifications, which are very valuable in themselves. The Cisco Networking Academy is a successful example. Launched in 1997, it has provided basic Internet technology skills to nearly 300,000 students through over 10,000 academies, preparing them for industry-wide certificates. The reasons for its success are clear: it has access to a large amount of funding, has a standardized curriculum, and benefits from an excellent network infrastructure, as well as strong partnerships and marketing. This model has enabled the Academy to operate in 33 of the world's least developed countries.

Intellectual property rights

IPRs play a role in determining the ability to access, produce, copy and distribute content and specific expressions of knowledge. Having access to knowledge does not prevent others from benefiting from such knowledge. However, economic policy has long supported the need to grant temporary property rights to innovators so as to enable a return on their investments and thus encourage them to continue innovating, thereby contributing to a society in general. On the other hand, IPRs also act as a deterrent to innovation by limiting free access to knowledge and information. The effects are notably greater for developing countries that lack resources to pay for access, and that are net importers of such goods and services.

Since education is a (contested) public good,[32] and is strongly based on knowledge, the application of IPRs to education is of particular importance. The arrival of the Internet has aggravated the conflict in several ways. The Internet is promoting more knowledge exchange around the world – from developed to developing countries, and vice versa. Since online education services derive from diverse sources (music, software, content, design, media, etc.) they are also restricted by varied protecting rights, which are now enforced by both technical and legal methods. Moreover, free public access to knowledge (e.g. through libraries) is not guaranteed through the Internet.

There are a few initiatives taking place in different spheres to ensure that the public enjoys further access to knowledge. Leading examples are the previously mentioned open source software, content and standards initiatives. As these initiatives become more widely known to both the public and content and software creators they should be able to expect stronger support. The more important policy question is whether policy makers and institutional managers in local, national and international arenas will be able to recognize and promote the benefits of open knowledge sharing and to establish adequate legal frameworks and practices for ensuring this sharing, in particular for developing countries.

D. Conclusion: The Internet's impact on, and implications for, higher education

In a world where access to, and use and creation of, knowledge is central to social and economic development, higher education is in increasing demand. Online higher education is in some cases providing further educational options for students, promoting the sharing of information and knowledge worldwide, reinforcing ICT use and access, and supplementing traditional modes of supply of education.

Data measuring the size and shape of the online higher education market in developing countries are limited. Nevertheless, estimates speak of a small volume of online-only higher education courses in developing countries, with higher concentrations in more developed nations and among elite populations, particularly catering for the "earner-learner" – that is, professional, postgraduate – student population, and in high-demand subjects. For the time being online higher education is a niche market, particularly in developing countries.

Current initiatives in the use of ICTs in education in developing countries are concentrated on the progressive use of ICTs in education (CD ROMs, e-mail communications, basic acquisition of ICT skills etc.) rather than on purely online higher education. Face-to-face delivery and traditional distance education continue to provide the bulk of education. The opportunities to develop online higher education include an expanding higher education population, a strong interest in developing ICT-based skills and education, and an interest in financing ICTs. Further opportunities are also available, in some cases because of the existing educational infrastructure, and the prospects and resources offered by other forerunners. On the other hand, institutions face a series of constraints in developing online higher education. As the UNCTAD survey has shown, these include the lack of access to ICT infrastructure, the high cost of ICTs, the lack of ICT skills, international competition and student preference for face-to-face teaching.

The lack of **access** to ICT infrastructure and applications is often highlighted as being of particular importance to developing countries. While this is true, there are some examples of innovative and appropriate methods of using technology. Similarly, there are open approaches (open software, open standards, open content and diversity) that can promote wider access to technology and content. Moreover, ICT capacity will continue to increase in developing countries, making the expansion of online education possible.

The **economic drivers** to invest in higher education consist of more than simply the desire to directly reduce the costs of education. The assumption that online education is cheaper than traditional education is questionable as cost-savings examples have not been properly verified. In each case, a review of the cost of online higher education in terms of affordability, profitability, efficiency and sustainability is necessary for understanding and evaluating the rationale and implications of investing in online higher education.

The Internet is in some cases shifting the cost of online higher education from the Government onto other providers (public–private partnerships), from the institution to the students (in the form of increased fees), from national to international providers (through sponsorships and partnership agreements) and from national to international students (by charging differential fees to non-domestic students). Thus, online higher education is being financed by a number of stakeholders with different interests, and although there is a momentum to invest in ICTs for online education, private investors are not always governed by educational priorities nor by the imperative to bridge the digital divide or to promote local content.

ICTs increase specialization, which in turn can bring more **efficiency** to the educational sector by enhancing internal organization, communication and knowledge sharing, and by allowing teachers to specialize in their field of expertise. Additionally, the Internet is encouraging new thinking about the validity of current business models for the provision of education and access to research. The Internet has impacted on thinking about the purpose and profitability of academic research and publishing, as well as having forced consideration of the value of open systems in technology, thus prompting similar debates in higher education about the use of open content and open technology.

The Internet has expanded the diffusion of knowledge but it has also altered the terms of **ownership of knowledge**, with pulls in different directions. On the one hand, it has increased access to knowledge by making accessible research, publications and networking opportunities. On the other hand, the desire to control intellectual property leads to increased privatization of knowledge. Further clarification regarding the application of regulatory issues to online education, including intellectual property rights, is necessary in order to allow transparency and confidence. Proven initiatives such as FOSS, open standards or open content benefit common ownership and use of information.

The Internet has further internationalized (the trade in) education, and is increasing access to international higher education services, both online and offline. These effects contrast with the fact that developing countries tend to be at a disadvantage in the international education arena, where institutions in developed countries attract most international students, and degrees from developing countries are far from being fully recognized in developed nations. The Internet is promoting competition for international students and thus it increases pressure on developing countries' institutions. Additionally, online higher education requires further strengthening of quality assurance and recognition processes.

Recommendations

On the basis of the above analysis a number of suggestions are provided below for Governments and educational institutions in developing countries.

Despite the growing competition that developing country institutions face in the provision of higher education from developed countries, they still have a broad range of strategies that they can use to attract students. Firstly, they can differentiate their courses through local content/language. Secondly, they can gain recognition of their institutions and courses by attaining international accreditation either on their own terms or through association with a developed country or regional institution. Thirdly, they can maximize the advantages of geographical presence in a market. Finally, they can pursue a strategy of developing regional leadership, although this is clearly not a strategy that all institutions can succeed in pursuing.

One important role of Governments is to ensure that the current widespread enthusiasm for online education[33] does not overshadow the wider objectives that they set for initiatives such as reaching students who are under-represented (owing to disability or geography, or for some other reason), providing local knowledge, and reducing the digital divide. Governments have the opportunity to pursue policies that redress existing online higher education deficiencies and that maximize educational and developmental outcomes. Some of the options available to Governments to ensure that online higher education has a positive impact on reducing the digital and educational gap are set out below.

- Creating awareness and encouraging collaboration and dialogue between educational professionals, the IT sector and other stakeholders (such as students). There are multiple stakeholders with different interests in online higher education. A better understanding of each other's interests, aims and strengths facilitates the promotion, design and implementation of online educational initiatives.

- Fostering a culture of learning, through investing in traditional resources (books, teachers) and technologies. Funding online infrastructure and applications should not be at the expense of traditional knowledge resources, and local content and existing expertise are a valuable resource to be supported and promoted.

- Promoting coherence between educational and ICT strategies. The use of the Internet in education has the potential to, among other things, provide wider access to knowledge, promote ICT skills and enhance educational networks as well as international presence. However, ICTs are only tools to achieve educational objectives. Relevant ministries within Governments need to consider broader educational strategies when thinking about e-learning so that e-learning strategies meet current and future national educational priorities. There should also be coherence with the general e-strategy, so that measures to solve common concerns regarding infrastructure, skills and the use of open systems are consistently reflected in both sets of strategies.

- Supporting the use of open technology and open content in higher education. The use of free and open source software encourages the deepening of ICT skills and allows for local customization, and as with open standards, it promotes the interoperability of different e-learning tools. Open content is a valuable option for developing countries, both to access foreign content and to further disseminate local content. Governments play a role in promoting open initiatives, in particular in the field of higher education, by promoting their use in universities.

- Providing incentives for investing in e-learning and online higher education so that educational goals are maximized – for example, regulating the provision of online higher education, and promoting long-term sustainable partnerships between different actors (e.g. a software company and a university) that set minimum quality and reach requirements. The aim should be to enable an educational environment that provides equitable access to education and that is aware of the limits of a competitive environment.

- Developing transparent quality assurance, accreditation and recognition measures both nationally and globally, through consultation with key stakeholders, ongoing evaluation and consensus, so as to ensure that they cover the specific nature of online higher education and that they allow the achievement of particular educational goals.

- Monitoring and measuring the economic, educational and social benefits and/or costs of e-learning in general, and online higher education in particular, as well as carrying independent and rigorous research into the uses of online learning, so as to be able to benchmark and evaluate the efficiency of e-learning initiatives and return on investment.

In the light of the assessment made in this chapter of the experience acquired so far, it is not possible to give a categorical answer to the question of whether online higher education is a sound proposition for developing countries. Governments' best option is to analyse the benefits of online higher education from the overall development perspective, including national educational objectives, and the competitiveness and quality of the online education on offer, with a full analysis of the financial restraints and the opportunities offered by partnerships and open source-software/content approaches.

In conclusion, online higher education can fulfil some of the promises made on its behalf to the extent that the educational and policy environment enables the expansion of higher education to previously excluded students, encourages relevant and appropriate learning content and processes, promotes innovation and investment in education, and recognizes students' needs and efforts.

Annex I

MODELS OF ONLINE HIGHER EDUCATION

UNCTAD conducted an in-depth survey on e-learning in selected higher education institutions. The findings of the survey, which have been complemented with parallel research, are summarized in five broad models as follows:

Model 1: Traditional university going online

Model 2: Open university going online

Model 3: Independent online courses (from non-traditional capacity-building institutions)

Model 4: Consortiums of institutions providing access to online learning

Model 5: Start up institutions using e-learning

MODEL 1: Traditional university going online			
Examples:	Monterrey Virtual University www.ruv.itesm.mx/	Mauritius University www.uom.ac.mu	National University of Lesotho www.nul.ls
Budget/ finance:	$700 million per annum	$2.5 million	No data available
Online cost:	$30 million Cheaper than offline	More expensive than offline (for business and IT courses)	Not providing online courses at the moment
Cost structure (e-learning)	Regular budget. Primarily funded through students' fees.	Regular budget: student fees ($2 million) and government funding ($0.5 million)	Not applicable
Reach:	12,190 online students (5,586 Master & 6,604 undergraduate) Total number students: 93,797 National & international students. 16 programmes and 216 courses	National	National
Content:	Creates own content	Creates own content, and buys pre-existing content from India, South Africa, UK and USA.	Not applicable
Accreditation:	Yes, Monterrey University	Own	Own
IT strength:	Robust, IT University, mixed tools	Creates its own content	Commitment to investing in ICT and exploring the possibilities of e-learning
Bargaining power:	University of Monterrey (institution)	Negligible	Poor
Partnerships:	With graduate programmes, continuous education providers, social programmes.	No formal partnerships but receives donations of free software from Microsoft; buys content from India, South Africa, UK and USA	None as yet, although the university receives funding from private sponsors and charities
Demand:	Spanish-speaking students in Latin America and United States.	National	National
Strengths/ Opportunities:	Name recognition, accreditation, regional leadership, cost-effective	Creates own content, commitment to using ICTs, expanding provision.	Commitment to expanding access to education and to innovation
Weaknesses/threats:	Tutoring. Students' preference for face-to-face learning.	Transition to new culture, lack of access to ICTs, lack of funding	Lack of financial resources, lack of qualified staff, absence of national ICT policy framework to support e-learning. Weak higher education
Trading opportunities:	International	Plans to deliver one IT course internationally through a partner institution	None

MODEL 2: Open and/or distance university going online		
Examples:	Indira Gandhi Open University www.ignou.ac.in	UK Open University www.open.ac.uk
Budget/ finance:	$14 million	$400 million
Online cost:	$0.2 million	30 million spent on e-learning
Cost structure (e-learning):	Student fees, government funding. All funding has conditions attached except student fees. Low fees.	Combination of student fees (international and home students) and government funding. Also attracts significant research funding for e-learning and has partnerships with a number of organizations, including MIT and Research Machines (the UK's leading educational technology company)
Reach:	334,415 students (10,000 online students, 60% of them are employed) International part-time students	160,000 students and their tutors are online (3/4 of total number of students)
Content:	Own and pre-existing content. Wide variety of formats and sources. Publishing and design are the main cost driver.	Creates its own online content as well as partnships in creating broadcast material with the BBC. Online content, largely lecturer- and department-driven
Accreditation:	Own degrees and diplomas recognized nationally. Possible credit transfer to & from other universities.	Own degrees, which it also offers internationally.
IT strength:	Broadcasting (TV and radio). Progressively introducing online courses	Broadcasting – partnership with BBC, publishing. Centre for innovation and R&D in e-learning within the university
Bargaining power:	Management and academic community. Government (representation on management board)	Size, expertise, tradition, resources
Partnerships:	Doordashan India's National Broadcaster; All India Radio; Government of India, Department of Electronics; EdExcel UK	National Broadcaster (BBC). Today it has partnerships and/or students in 31 countries.
Demand:	High national demand. Over 11 million students	National and international
Strengths/ Opportunities:	Large domestic market and demand. Distribution and support network. Increasing national economic investment in education	General strong institutional position. Institute of Educational Technology engages on research on the use of e-learning.
Weaknesses/threats:	Availability of suitable software and hardware, low penetration of the Internet and low demand for online programmes. High cost of ICT. Poor primary education	Increased global competition; Residual suspicion of the quality of "distance education"; inability to operate in the USA
Trading opportunities:	Delivery of services through other institutions in India	Began offering degree courses overseas in 1982. 28,381 overseas students and 42,710 students in collaborative teaching programmes.

Sources: Open University. See e-learning and the Open University (2003). Available at http://www.open.ac.uk/elearning/index.shtml, as well as the factsheet "The Open University worldwide", available at http://www.3.open.ac.uk/media/factsheets/Information%20about%20The%20Open%20University/The%20Open%20University%20 Worldwide.pdf

MODEL 3: Independent online courses (from non-traditional capacity-building institutions)		
Examples:	LEAD www.lead.org	United Nations University www.unu.edu
Budget/ finance:	$5 million	$30 million / year
Online cost:	Not applicable	$50,000 per course. More expensive than offline, except ICT courses
Cost structure:	Non-regular	Regular and non-regular, government, endowments, fees
Reach:	Limited. 100 national and international students have graduated.	National & international, part-time students
Content:	Own high quality	Own research
Accreditation:	Master in Professional Studies, accredited by Middlesex University, UK	None; occasionally a course may count for an external degree
IT strength:	Limited, progressive	Progressive
Bargaining power:	IT industry, publishers, institution management	Primarily, IT industry and infrastructure providers (pricing policies present real obstacles). To a lesser extent, institutional management and publishers.
Partnerships:	Higher education institutions, learning network, foundations, NGOs	UN, higher education institutions, businesses
Demand:	Part-time environment specialist students	Support for traditional capacity development activities.
Strengths/ Opportunities:	Quality, specialized	Well-known brand name. Specialist expertise
Weaknesses/ threats:	Funding, costs, human resources	Staff resistance, lack of expertise and student support
Trading opportunities:	Provision of services	None. Some envisaged in the future through partner.
Quality measured:	Questionnaire, external evaluator, students' feedback	

Sources: LEAD. See LEAD International Masters Program. Available at www.lead.org

MODEL 4: Consortia of institutions providing access to online learning		
Examples:	Finnish Virtual University (University of Jyväskylä) www.virtuaaliyliopisto.fi	UK eUniversity www.ukeu.com
Budget/ finance:	$102 million	$114 million from UK government funding, plus student fees.
Online cost:	Finnish Virtual University: $480,000 Online costs as much as offline	Variable from institution to institution $37 million invested in the custom built learning platform from Sun Microsystems
Cost structure (e-learning):	The government finances almost the totality (95%)	Joint venture between UK universities and the private sector with government funding plus student fees
Reach:	National and international	International
Content:	Develops own content, and buys electronic publications and journals, mostly from US/ UK publishers.	Provided by partner universities
Accreditation:	Yes, own university	Yes, through each of the individual universities involved
IT strength:	Mixed tools. National prominent e-readiness	Integrated, web-based learning management software
Bargaining power:	Management and teachers, followed by publishers	UK university partners, UK government ministries (education and department for trade and industry)
Partnerships:	Finnish Virtual University is associated with Finnish universities to provide 450 courses.	Technology from Sun Microsystems 20 UK universities providing course content (including University of Cambridge, University of Manchester, University of Leeds) International partners from 16 countries (including Beijing Foreign Studies University) International corporate and IT partners
Demand:	5000 Finnish Students	Low
Strengths/ Opportunities:	Individual courses, accreditation. Network of 16 disciplines. Government's interest in investing in higher education.	UK universities' brand name, high demand for English-language higher education, government supported project, promotion by the Department of Trade and Industry
Weaknesses/ threats:	The engagement of departments and faculty. Competes with other online courses offered internationally. Conditioned by funding	Lack of demand for e-learning Complicated governance, conflicting priorities between different stakeholders
Trading opportunities:	National / international	International

Sources: Observer (2004), Observatory on Borderless Higher Education (as cited by Schmoller (2004), "UkeU extract from 'Update on the future of the UK eUniversity – finished as an independent organisation, but dit it have to be this way?". Available at www.schmoller.net/mailings/ukeu.html), UK Parliament (See UK Parliament, House of Commons Hansard, Written Answers for 22 March 2004. Available at www.parliament.the-stationery-office.co.uk).

MODEL 5: Start-up institutions using e-learning		
Examples:	Arab Open University www.arabou.org	Virtual University of Pakistan www.vu.edu.pk/
Budget/finance:	$12 million	Private university set up with $11 million for 4 years. Government funded with student fees
Online cost:	Data not available. Delivering online cheaper than offline.	$11 million for 4 years
Cost structure (e-learning):	Regular course budget. The AGFUND (a regional development institute) provides 70% of total funding and students' fees cover the other 30%	$4.7 million have been allocated for online content. A regular State budget has not yet been developed
Reach:	Regional	National, with some international students from the region
Content:	Buy in from UK Open University with some local adaptation	Creates own content and uses learning management system.
Accreditation:	Arab Open University	Pakistan Virtual University
IT strength:	Integrated use of ICTs in all aspects of university course delivery	Online university offering all courses electronically
Bargaining power:	No data available	Teachers and university management
Partnerships:	UK Open University, AGFUND, UNESCO	Partner with private sector institutions in order to provide access across the whole country
Demand:	High for University Education in the Arab region	High. Strong motivation on the part of students and high student demand
Strengths/ Opportunities:	Regional reach	
Weaknesses/ Threats:	Low skills base, training needed for university teachers, infrastructure limitations. Regional competition from Syrian Virtual University	Lack of quality faculty with local language facility, lack of quality primary and secondary education, pre-university entrance. Lack of face-to-face interaction.
Trading opportunities:	Recruiting students from the Middle East and North Africa; no plans to sell or deliver product	Delivers its courses through a network of private sector partners each with separate ownership. Nationally rather than internationally

Annex II

INDICATIVE LIST OF OPEN SOURCE MANAGEMENT SYSTEMS

Product name	Sponsor/developer	Country of origin	Licence type
Adept	http://adept.sourceforge.net/users/index.html	Russian Fed.	GPL
ATutor 1.2	University of Toronto	Canada	GPL
Bazaar 7	University of Athabasca	Canada	GPL
Bodington	University of Leeds	UK	Bodington System Software License
CHEF	University of Michigan	USA	
Caroline 1.4	Université Catholique de Louvain	France	GPL
CassWeb 2.0	University of California Los Angeles	USA	GPL
Coursework	Stanford University	USA	
dokeos	dokeos	Belgium	GPL
eClass.Net	Tulane University	USA	BSD
eConf	University of Namur	Belgium	GPL
Eduzope/Eduplone	Coalition (Infrae, Plone, others)	Europe	GPL
eLecture Online Lecturing System	Christian and Thomas Lang (Karl-Franzens-Universität Graz)	Austria	
Eedge 1.2	Chuck Wight (University of Utah)	USA	GPL
eTutor	University of Ottawa	Canada	GPL
Fle3	University of Art and Design Helsinki	Finland	GPL
Freestyle Learning	University of Münster	Germany	
GANESHA	Anéma Formation	France	GPL
H2O Project	Harvard Law School	USA	GPL
Ilias	University of Cologne	Germany	GPL
Interact	Christchurch College of Education	New Zealand	GPL
Interactive Learning Environment (ILE)	Brad Cox	USA	BSD/MIT
Internet Course Reader	TeleLearning National Centre of Excellence	Canada	LGPL
Jones e-education V2002	Jones Advisory Group	USA	
KEWL	University of Western Cape	South Africa	
LearnLoop	IT university in Gothenburg	Sweden	GPL
LogiCampus	Tap Internet & Tarrant County College	USA	Custom licence
LON-CAPA	Michigan State University	USA	GPL
.LRN	MIT/Heidelberg	USA/Germany	GPL
OLAT	University of Zurich	Switzerland	Apache style
Manhattan Virtual Classroom 2.3	Western New England College	USA	GPL
MmerDesk 1.5.3.1	Ionstream	Finland	GPL
MnITS Internet Teaching System	Daniel Bartholomew	USA	GPL
Moodle 1.1	Martin Dougiamas	Australia	GPL
OpenCourse	Paul Jones	USA	GPL
Open Learning Management System (O-LMS)	University of Utah	USA	?
OpenUSS	University of Münster	Germany	GPL
Segue	Middlebury College	USA	
Shadownet	University of Missouri-Columbia	USA	GPL
Spaghettilearning.com		Italy	GPL
STeam	Univeristy of Paderborn	Germany	
TextWeaver	San Diego State University	USA	GNU Lesser Public Licence (LGPL)
Uni Open Platform	FernUniversität in Hagen	Germany	GPL
WBT-Master	Graz University of Technology	Austria	GPL
Whiteboard	Todd Templeton	USA	GPL

Source: www.edtechpost.ca/pmwiki/pmwiki.php/EdTechPost/OpenSourceCourseManagementSystems.

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Notes

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28. For an expanded list of examples of free and open source software relevant to education see UNESCO's Free Software portal www.unesco.org/webworld/portal_freesoft/index.shtml

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Chapter 5

E-GOVERNMENT: E-PROCUREMENT AND DEVELOPING E-BUSINESS CAPACITY

A. Introduction

This publication addressed the issue of e-government in 2001 (UNCTAD, 2001) and provided a few starting points for countries to take into consideration when launching e-government projects. E-government initiatives have proliferated since then, and the wealth of related practical and theoretical information has increased exponentially. International attention to the subject was evidenced during the first phase of the World Summit on the Information Society (WSIS).[1] According to the WSIS Plan of Action, e-government strategies are needed to make public administration more transparent, efficient and democratic, creating an enabling environment for maximizing the benefits of the information society. E-government applications should also strengthen the relationship between Governments and citizens, in particular through the use of the Internet.

E-government aims to make the interaction between government and citizens (G2C), government and the business sector (G2B) and government institutions themselves (G2G) more convenient, inexpensive and transparent. In this sense, it is analogous to e-commerce, which allows businesses to transact with each other more efficiently (B2B) and brings customers closer to businesses (B2C). For the purposes of this chapter, e-government is Internet-based, providing solutions that link the back and the front offices of government, including by moving from paper-based to electronic processes, and always considering the best interest of citizens (citizen-centric).

Information and communication technologies (ICTs), in particular the Internet, have the potential to bring about profound changes in the ways that government is managed and organized, its services are provided, and its business is conducted. The Internet can overcome barriers of dis-

tance and time to bring together information from multiple sources, creating the possibility of reorganizing and networking government services to make them more efficient, transparent and user-friendly. In addition, the impact of e-government on the economic and social environment is being increasingly explored.

One important way in which the potential benefits of e-government can be realized is through procurement, by which government organizations procure/purchase goods and services from the private sector, advertise their needs, select vendors, manage service and fulfilment contracts, and effect payments. In most countries the public sector is the largest economic actor, whether in terms of employment, expenditure or revenue. Public e-procurement projects can significantly impact on the management of these vast resources, and thereby the overall efficiency of the economy and the competitiveness of local enterprises (public and private). However, although most countries have some kind of e-government initiative, many developing countries do not have the transactional capabilities needed for public e-procurement.

This chapter will first provide an overview of e-government, including services and transactions. It will then introduce e-procurement as a service of e-government and lay out some specific implications of public e-procurement for e-business in developing countries. Lastly, it will address how developing economies can maximize the potential benefits of e-procurement.

B. Overview of e-government

Companies and Governments use ICTs to deliver better services, and a web presence can add value through the provision of online services. However, the public sector has lagged behind the pri-

vate sector in embracing the Internet for this purpose. Early e-government visions were premised on the notion that online services would cost less and offer a more efficient and personalized service to citizens, but many of these visions lacked an effective implementation plan (Accenture, 2003).

The implementation of e-government and the consequent changes in or reorganization of the administration and bureaucracy require thorough deliberation and planning. Owing to the complexity of comprehensive e-government implementation, at one end of the spectrum several e-government efforts have been stalled at a basic level, with an online presence that is limited to providing information on government activities and services. At the other end of the spectrum some e-government initiatives have resulted in the bundling of services, accessed through a portal and delivered by the Internet. The ultimate goal is government service integration, seamless delivery and electronically mediated procurement of goods and services. In pursuit of this goal, Governments have realized that successful e-government requires a transformation in the way they operate and the administrative culture. E-government is not just about utilizing the Internet for delivering government information and services to citizens, but about taking the conventional structure of government and removing the barriers that prevent the efficient and integrated delivery of services. E-government combines technology, people and processes so as to deliver services in a citizen-centric manner.

Economic considerations play a role in the development of e-government. New technology may help reduce the cost of some government activities, but e-government aims to optimize internal administration costs while at the same time improving citizen services. Although in the short term e-government may increase some costs, since services have to be offered both online and offline, there are savings and other benefits from streamlined business processes, integrated operations and increased productivity. As the prevalence of online services grows in relation to over-the-counter transactions, which usually are costlier in terms of paperwork and staff time, cost reductions should become increasingly apparent. Other issues such as the opportunity cost of using offline services and facilities have also fostered the development of e-government. E-government is conven

ient for citizens who have growing demands on their time and have difficulties in attending government offices.

Political considerations also play a role, as Governments re-examine the way they serve their citizens because of higher public expectations with respect to what the Government should provide and the expansion of the Internet. E-government increases the accessibility of public administration for the population, and allows citizens to become informed at their own convenience and on their own initiative. Although disparities of wealth in developing countries might limit the full benefits of e-government to some citizens (those that are "connected"), it can also be argued that increased citizen empowerment can free government resources for other purposes such as social development and increasing connectivity.

Governments around the world are pursuing e-government in one form or another. For example, most European Union (EU) member States have developed strategies for online government and the EU has stated that e-government is one of its main objectives for the e-Europe initiative. The European Commission also benchmarks e-government progress every six months. A recent United Nations report on benchmarking e-government confirms that e-governance initiatives around the world are increasing (UNDPEPA, 2002). Such initiatives promote the prospect of faster, less costly and more efficient citizen-driven online government services. E-government has allowed several Governments to use technology to enhance access to and delivery of services to citizens, business partners and employees (Deloitte Research, 2002). This confirms the notion that e-government is not a shortcut to economic development or savings but rather a tool for achieving these goals (I-Ways, 2002).

Chart 5.1 illustrates the e-government prevalence of UN member States in 2001 (UNDPEPA, 2002).[2] Although almost 89 per cent of countries have at least one governmental website, only 19 per cent have single-entry portals and 9 per cent have online transaction capacity. Forty-four per cent have a national government website that can serve as de facto single-entry portals, and the same percentage have local (sub-national) government websites. However, UNDPEPA indicates that over 25 per cent of official websites contained one-way information (often of a political and/or pub

Chart 5.1

E-government prevalence
of 190 UN member States in 2001

of information between the citizen and the Government (Deloitte Research, 2002). On the other hand, developing countries might face some factors that stall the progress of e-government, as shown in table 5.1.

1. E-government services and transactions

E-government projects may include an online capability for non-commercial services as well as for commercial transactions. Non-commercial services may be useful for gaining experience in the development of online systems. Successful online services in developing countries include public information (publication of academic results, information on nearby government facilities, tax self-assessment, online health information, public education content), facilitation of payments (electronic submission of tax returns, payment of fines), and other services (appointments for government services such as the collection of refuse, reporting of crimes). Government services that are well suited to online commercial transactions include applications for identification documents (passport, electoral card) and licences (driver's licence, motor vehicle registration, TV licence), as well as registration for the collection of taxes. UNCTAD's highly successful Automated System for Customs Data (ASYCUDA), which uses ICTs to improve the efficiency and transparency of customs operations in nearly 100 countries, provides an interesting example of the feasibility and impact of e-government initiatives in developing countries.[4]

lic relations nature) and did not deliver services to or obtain feedback from citizens.

E-government leaders (often industrialized countries) are focusing on delivering benefits through technology and a citizen-centric approach, providing government officials with customer service training and greater decision-making authority. The number of Governments around the world that are embracing Internet technologies to link legacy systems[3] and track citizen information is increasing. This has helped to increase the prevalence of citizen self-service and the two-way flow

Table 5.1

Factors stalling e-government

Factors	Symptoms	Consequences
Institutional weakness	Insufficient planning; unclear objectives	Inadequately designed systems; cost overruns
Human resources	Shortage of qualified personnel; lack of professional training	Insufficient support; isolation from sources of technology
Funding arrangements	Underestimation of project costs and recurrent expenditures	Unfinished projects; higher maintenance costs
Local environment	Lack of qualified technical support (vendor representation, back-up systems and/or parts)	Implementation and maintenance problems are difficult to resolve
Technology and information changes	Limited and/or inappropriate hardware and software	System incompatibility; overreliance on customer applications

Source: UNPAN (2004).

Each of these transactions has an associated process that might be initiated electronically and concluded manually. However, to maximize the benefits of the electronic transaction, an electronic response would be ideal. For example, an electronic application for a passport should result in an electronic communication acknowledging the application as well as an electronic communication informing the applicant of the outcome (which may be that the passport was posted at a specific time).

The basic level of e-government (providing information) is primarily a one-way communication and does not include any automated transactional capability. The response of the citizen or firm still requires that they visit a government office to collect and complete a form, or telephone a contact centre for further information. At the next level, forms may be made available online for downloading and printing, but they must still be subsequently completed in the traditional way and then delivered to an office for processing in the traditional way. Specific inquiries could also be made by e-mail or telephone.

Already at this level of the evolution of e-government, financial transactions may be possible. These make use of facilities provided by commercial banks to enable payments to government accounts against personal account numbers, or payments by Governments to suppliers and others using Internet-enabled electronic banking. Of course, these are only available to individuals and firms with bank accounts and access to the Internet, and forms of payment such as credit cards will not be available to everyone.

Two-way information transactions become possible when forms are available for completion online. Government provides information about the services offered or the obligations of citizens or firms, and additionally provides the means to make applications or comply with obligations electronically. Organizations can then go through several stages of sophistication in the way that they process this electronically submitted information. At the most basic it may be printed out by a government official and acted on in the normal way. This is no different from receiving the application through the post or by fax. But if administrative processes have been re-engineered and automated, the submitted information can be automatically entered into databases, processed or

routed to relevant officials for authorization. If such authorizations can be made electronically, using digital signatures or some similar approach, processing can be speeded up still further. Individuals can be informed of the progress or outcome of their application by e-mail. Certificates or licences can be collected in person, posted or even delivered in a secure electronic format.

Even if individuals do not themselves have access to the Internet, they can still interact with service agents at contact centres by telephone or in person – in each case the service agents can themselves use electronic forms and access customer information databases to initiate service requests on behalf of citizens.

At its most sophisticated, a single website may provide access to a wide selection of government services, not just those of a single agency. Information and financial transactions are possible, with the system collecting all relevant information from the user and then processing it seamlessly through a number of interlinked systems of the various departments or agencies concerned.

A recent study by Brown University indicated that only 16 per cent of government agencies around the world are offering online services (West, 2003). While this represents an increase from the previous version of that study, research shows that Governments have much room for growth in order to realize the promise of e-government. On the other hand, some Governments have developed briskly. Italy, for example, had no high-level targets in 2000 with respect to e-government service delivery (UNCTAD, 2001), but in 2003 it was cited as a model for e-procurement to be exported to other countries. On the basis of an estimated 23 billion euro ($28 billion) of public money spent on acquisition of goods and services in 2003, it was reported that e-procurement in Italy would help save an estimated 3.7 billion euro ($4.5 billion), 21 per cent more than the savings achieved in 2002.[5]

The decision to place government services online, as well as which services, must be the subject of a number of criteria. For example, the state of New York (New York State Office for Technology, 2001) uses a set of criteria that serve as useful general guidance for other Governments. They include the impact and visibility of the service (expected number of transactions and customers),

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Box 5.1

Singapore: Best practice for e-government services

"The vision of the Singapore Government is to be a leading e-Government to better serve the nation in the digital economy." Deputy Prime Minister Tony Tan at the launch of Singapore's e-Government Action Plan, June 2000

Singapore's e-service portal http://www.ecitizen.gov.sg/ is a clearinghouse for citizen services and information, with links to practically all Singaporean government websites. The "eCitizen" site provides over 100 services, while other sites contain a large amount of press releases, speeches and databases. The relative prevalence of privacy statements, audio and video clips, and PDA access also puts Singapore's websites ahead of those of other nations in technical sophistication. Two other notable websites are those of the Housing and Development Board and the Singapore Police Force, offering 38 and 17 e-services respectively.

E-government initiatives directly linked to e-business include Singapore's G2B portal http://www.business.gov.sg/, which is the first entry point for all local and international businesses to access a full suite of aggregated and integrated G2B information and services. The portal provides easy and convenient online access to government agencies at all times and saves money and time for businesses. For example, incorporating a new company through the business portal now requires a flat fee of 300 Singapore dollars ($175) and two hours, whereas previously it took from 1,200 to 35,000 Singapore dollars ($700 to $20,400), depending on company size, and two days. This is in line with the Government's drive to promote a pro-enterprise environment and facilitate business growth in Singapore.

In addition, Singapore's e-procurement portal, the Government Electronic Business Centre (GeBiz) at http://www.gebiz.gov.sg, is an integrated, end-to-end online procurement system for the public sector, developed for efficiency/cost saving as well as for strategic reasons, and open to both local and international suppliers. In addition to providing greater consistency and transparency in public procurement practices, the Singaporean Government sees GeBIZ as a stimulus to the development of e-commerce in the country. In 2002, more than 3,800 tenders were issued and 6,500 quotations were published, and the total value of electronic transactions during that year was approximately 262 million Singapore dollars (over $152 million). The number of public sector users exceeds 12,000 (up from 3,000 in 2001) and GeBiz suppliers number approximately 8,800.

Sources: Pascual (2003); West (2003); http://www.egov.gov.sg/g2b.htm.

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the ease of implementation (level of difficulty, length of implementation, staff requirements), revenue and cost and, equally important, the impact on the citizen (does it impact economic development, improve the quality of life, promote health/safety?). This last criterion is essential to the citizen-centric vision of e-government, which is exemplified in box 5.1 by Singapore, a best practice for e-government services.

2. E-business systems and infrastructure

As is the case in other large organizations, e-business systems can improve the exchange and management of information within Governments, as well as their delivery of services. E-business systems that are particularly relevant to e-government are those that help integrate the front and back office of government, namely communication and collaboration systems, internal business systems and e-commerce systems.

Communication and collaboration systems, such as e-mail, voice mail and conferencing, are relatively easy to introduce. E-mail is ubiquitous and available to anyone with a computer and an Internet connection. Participation in discussion forums or the use of chat systems, which can be used for propagating knowledge within government offices, does not require additional capital expenditure. Digital communication in government allows rapid distribution and sharing of documents at almost no incremental cost, as well as storage and retrieval, with a high potential for reduction of costs such as paper distribution. Widespread adoption of communication and collaboration systems in the public sector requires that employees have access to the necessary tools – networked computers, digital telephone systems, and so forth. In addition, portals providing information about and access to government services can form the basis of transactional systems, starting with customer requests for information (including inter-agency), and progressing to the

electronic distribution of forms and the online submission of applications.

Internal business systems include resource planning, customer relationship management and human resource management systems. These improve the management of information within government by centralizing access and storage of data in a single network. Updates are shared, and information is distributed along standardized workflow paths. Analytical and other procedures such as invoice generation or reporting can be automated. Internal business systems are particularly useful in organizations such as government that operate from multiple locations. However, Governments may find such systems costly when there are paper-based processes that work and there might be other pressing developmental needs. In addition, the success of such systems requires the reengineering of entrenched bureaucratic procedures. The benefits derived can only be justified if there is an accepted need to treat the public as customers, improve service delivery and improve internal efficiency.

E-commerce systems enable G2B or G2C transactions, the former of which may include electronic order placement and payments to suppliers. An appropriate transaction processing system can help Governments to, for example, overcome lengthy procedures for payment to suppliers and facilitate the payment of taxes and other levies by citizens.

The costs involved in establishing e-business systems in government organizations, including the cost of related infrastructure, should be counterbalanced by the interests of the community, ensuring that effective delivery of services is achieved at the lowest optimal cost for users. Like businesses, Governments must make difficult resource allocation decisions: how best to make use of limited resources to achieve defined goals. Developing countries may prioritize other demands on resources, such as poverty alleviation programmes, low-cost housing or public health issues, which may overwhelm arguments for investing in e-business systems, even if such systems will contribute to managing those governmental priorities.

In addition, developing countries will be concerned about the relevance of e-business systems for placing services and transactions online, when significant numbers of citizens may not have ready Internet access. Therefore, an e-government strategy should also consider the development of the implementation environment (the level of public access, the ICT sector, and e-government skills), and the enabling of alternative information and communication channels. Citizen access to e-government may be provided by "gateway" call centres (single point of access) and walk-in centres distributed throughout a country. Box 5.2 showcases the example of Tshwane Metro, a municipality in South Africa that made a successful decision to invest in e-government infrastructure.

Cost-saving justifications for adopting e-business systems in government are also supported by some intangibles. The implementation of e-government implies benefits from process re-engineering in terms of efficiency, from developing/improving capabilities in forecasting and planning, and from the learning opportunity related to management skills and technologies. In addition, it may be argued that the failure of developing countries to adopt e-government will further exacerbate the notorious digital divide and reduce the global competitiveness of their economies.

Therefore, key principles that e-government must adhere to are that: (i) services should be built around citizens' choices; (ii) government services should become more accessible; (iii) social inclusion should be facilitated; (iv) information should be provided in a responsible manner; and (v) government resources should be used effectively and efficiently (UNDPEPA, 2002).

C.   E-procurement

Private procurement and public procurement have a fundamental difference. While a private company may wish to have a fair and open process in order to obtain the best possible price, the public sector has a duty to its citizens to use open and transparent procedures that can bear scrutiny for fairness.

Therefore, an open public procurement process should seek to ensure that all interested suppliers are aware of tenders, and that no one respondent has any kind of advantage as a result of, for example, inside information. Transparency requires clear and unambiguous requirements for a tender submission to be considered, and the evaluation

Box 5.2

South Africa: Successful investment in e-government infrastructure

Tshwane Metro is a municipality of Pretoria, South Africa. It has more than 15,000 employees spread across multiple geographical locations. In 2001 as a part of its e-government strategy, it began to rationalize its telecommunications network and reduce reliance on Telkom, the national telecoms provider, through network consolidation and reduction of administrative and technical overheads. Prior to the rationalization project it had separate management of its voice services (supplied by Telkom) and data networks (WAN links also from Telkom), as well as electricity telemetry networks, mobile phone routers and other infrastructure. The Administration had more lines than it needed and an unacceptable level of costs.

The Administration adopted a far-reaching strategy based on user needs, legal options opened up by the terms of a Private Telecommunications Network (PTN) licence available from the Independent Communications Authority of South Africa (ICASA) and technology developments. All Metro facilities (buildings) are linked in a single, privately owned network that carry all traffic; thus no "internal" traffic (between Tshwane Metro staff and information systems) crosses the Public Switched Telephone Network (PSTN). Technical and administrative control is greatly enhanced.

A single switchboard (PABX, which is a private automatic branch exchange or voice server) was established for all incoming calls into Tshwane Metro, which greatly simplifies both administration and technical management. User policy is also uniform across the organization. Outgoing calls are routed to either the PSTN or directly to mobile phone networks as appropriate. A single 4MB Internet connection is used for e-mail to third parties and web browsing. Internet Protocol is used to carry voice calls within the Metro network.

Net cost savings of approximately 5 million rand ($790,000) per month were realized through a combination of reduced Telkom costs, removal of redundant systems, more efficient management, better uptime and associated improved productivity. Network rollout has been funded through these cost savings. Despite reduced cash flow during the installation period, operational expenditure savings have recovered the initial capital expenditure. The estimated payback period for the 80 million rand ($12.6 million) investment is 24 months. Other benefits are a faster service (bandwidth prioritizes voice applications), which is more flexible and user-friendly (every council employee is available on a extension; the phone number directory is directly linked to the HR database and published on the intranet), and has allowed for operational rationalization. In other words, Tshwane now has a major asset rather than a recurrent expense.

With such telecommunications infrastructure in place, Tshwane and places like it are in a far better position to attract investment in the form of new companies or the expansion of existing facilities. E-government telecommunications networks and related facilities, accompanied by local ICT service providers, can thus make cities and regions more attractive business locations by helping government to function and supply services more efficiently, including e-procurement, and contribute to an environment for business competitiveness.

Source: Interviews with Herman Claassen, Facilities Manager (Telecommunications Networks), City of Tshwane; and Michael Smales of Bytes Communication Systems. February 2004.

and awarding of subsequent contracts must follow an established, consistent and documented procedure. The requirements should be reasonable and capable of being met by any qualified respondent, and the individuals responsible for evaluation should have no pecuniary or other personal interest in the outcome. Additionally, procurement processes should strive to be responsive by delivering prompt decisions and communicating these decisions to all concerned parties in reasonable time. Providing feedback about winning bids is an important market signal that enables prices to be continually adjusted and so ensures a competitive market. E-procurement systems can help to ensure that public procurement meets these standards in the following ways.

E-procurement is one of the first areas in which Governments entering into the transactional phase of e-government tend to venture. The transactional phase is when the Government is capable of making services available online and transacting with other parties (World Bank, 2002). There are incomplete statistical data on the e-procurement market worldwide, although it can be generally asserted that government is usually the largest purchaser in an economy and that the value of the market is of significant importance to national economies (see subsection 5 below, "E-procurement as an enabler of e-business"). Data are available for some e-government leaders, namely for the North American markets and the European Union. For example, in 2002 the total EU public

procurement market was worth 1.5 trillion euro ($1.8 trillion) or over 16 per cent of EU GDP (European Commission, 2004). According to the Organisation for Economic Co-operation and Development (OECD), the ratio of total procurement (consumption and investment expenditure) for all levels of government in OECD countries was estimated at almost 20 per cent of 1998 national GDP (or $4.7 trillion), and at approximately 14 per cent ($816 billion) for non-OECD countries (OECD, 2002). The OECD estimated that total government procurement worldwide in 1998 was roughly equivalent to 82 per cent of world merchandise and commercial services exports.

1. Developing an e-procurement strategy

With respect to the difficulties related to the implementation of public e-procurement, it should be noted that success is always the result of a broad consultation with representatives from government agencies and the private sector. A key objective of a strategy for all countries is to ensure that e-procurement is approached consistently across all spheres of government and costs to suppliers are minimized. Furthermore, the process of developing an e-procurement strategy should go through a series of phases, each of which requires careful consideration.

Phase 1 – Goals and vision. A strategy for public e-procurement needs to establish its main goals and vision, which might approximate the following:

- To automate the Government's procurement process and reduce duplication in purchasing;

- To achieve procurement transparency and accountability from an open system;

- To reduce procurement costs and ensure that government obtains better value for money from its suppliers;

- To increase the number (and thus the choice) of government suppliers;

- To provide all enterprises, including small and medium-sized enterprises (SMEs), equal access to government procurement information and equal opportunity for participation.

The formulation of goals ensures that e-procurement strategies have a valid rationale, clarifies the establishment of their "business case" and will help identify expected benefits. Explicit goals determine the scope and nature of the e-procurement strategy, as well as of its development and implementation.

Phase 2 – Regulatory framework. Once the goals and vision of an e-procurement strategy are clear, there needs to be stocktaking of the procurement regulatory framework, including statutes, case law and administrative laws (Steinberg, 2003). The identification and analysis of the regulatory framework will identify any bureaucratic impediments to e-procurement or conflicts with public sector purchasing laws.

Phase 3 – Analysis of existing processes. A review of existing procurement processes must include an assessment of the procurement needs of the Government and determine its readiness to implement e-procurement. It should also include an audit of government spending, an analysis of the items procured, an analysis of supplier profiles, and an assessment of staff capabilities and skills.

Phase 4 – Process re-engineering. Following the review of existing procurement processes and the identification of bottlenecks or inefficiencies, a re-engineering plan should be drafted with a view to achieving the goals and vision defined in phase 1. Such a plan requires a decision on areas or processes that can or should be automated as a priority, as well as item categories that are suitable for e-procurement.

Phase 5 – Choosing a solution and platform. Choosing the correct solution and platform will require a cost-benefit and/or risk analysis to compare various e-procurement solutions and their impact. Developing countries may benefit from exploring open system solutions and non-proprietary software, which are interoperable and scalable through all government agencies. A business case must accompany the solution chosen, and must consider among other things the implications of charging a fee for suppliers to access the e-procurement system.

Phase 6 – Formulation and implementation of a plan. The formulation and implementation of the chosen e-procurement solution will include the allocation and management of adequate resources

Chart 5.2

Steps to e-government and e-procurement: The Finnish model
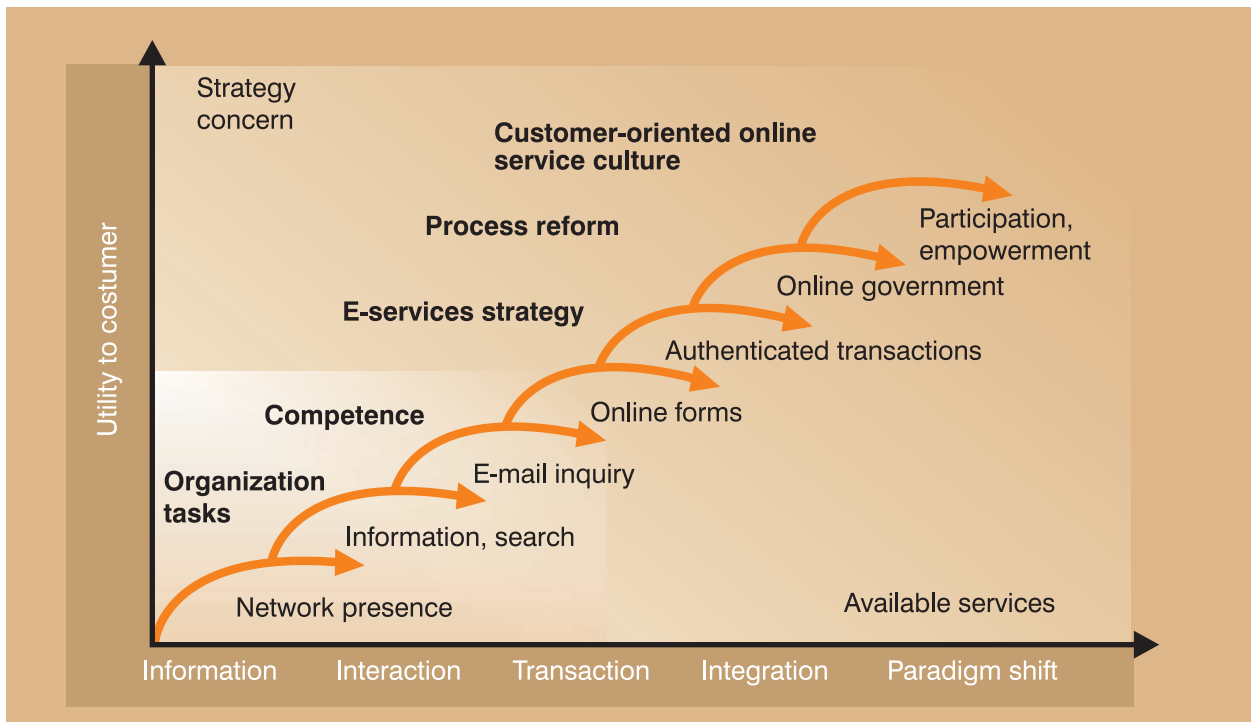
(financial and human resources). In addition to technical training of human resources, implementation will often entail empowering lower-level management to take decisions (thus training for new responsibilities is also needed). Training is particularly important in order for government users to understand the benefits of the system and to change management cultures related to previous procurement processes. Cost savings could be undermined if a system is not utilized to its full potential. In addition, the solution must be promoted among current and potential suppliers.

In order to implement its e-procurement strategy, the Government of Finland applied a model that follows seven steps towards e-government and e-procurement, in which each step is associated with a level of transaction capability, as shown in chart 5.2 (Finland Government, 2003).

The Finnish model shows the increased sophistication of each level of e-procurement, from network presence providing only tender contact information online (step 1) through to allowing the electronic application/submission of tenders and authentication of transactions (step 5), and their administrative follow-up (step 6). In step 7, fully supported and seamless e-procurement allows end-to-end electronic automation of all previous steps,

and there is optimal participation and empowerment of all users (purchasers and suppliers).

However, it should be noted that an initial e-procurement strategy for a developing country does not necessarily entail a comprehensive e-procurement solution – such as an electronic tendering system, an electronic market place for the procurement of goods and services online, or a government website that provides a single point of entry to all government business opportunities. The implementation of e-procurement may begin with a single improvement, such as posting online updated tender information.

2. The role of open technologies and proprietary solutions

To be sure, any e-procurement system will require a high level of interoperability, which can be enhanced by the use of open technologies and is consistent with the aims of making those systems more cost-efficient, open, transparent and accountable (Dravis, 2003). Interoperability in the design of e-procurement systems helps to ensure that no potential bidder is excluded because it does not use the same computer systems and applications as the Government.

Box 5.3

The e-GP portal: A guide for developing countries

At the beginning of 2003, an electronic government procurement (e-GP) working group was created under the Multilateral Development Banks (MDBs) Procurement Harmonization Process. The e-GP website at http://www.mdb-egp.org/ was launched in March 2004 and is jointly sponsored by the Asian Development Bank, the Inter-American Development Bank and the World Bank. It provides a single point of entry to all the information developed and all the tools created under the e-GP Working Group. Such information, including a tool kit, is aimed at helping countries plan and benefit from their e-procurement strategies and achieve benefits.

The e-GP tool kit provides strategic guidelines on the planning, management, implementation and support of public e-procurement. The planning guidelines refer to the development of a country's institutional base, making a diagnosis of the current procurement environment, the elaboration of a strategic plan, the selection of adequate standards, and the elaboration of a roadmap for the implementation of public e-procurement that incorporates best practices from around the world. The website also has an e-procurement interactive map that provides country-specific information on e-procurement practices, including success stories and lessons learned.

Source: http://www.mdb-egp.org/.

An example of successful use of open standards for e-procurement may be found in the United Kingdom.[6] The Office of Government Commerce (OGC) recently launched a single IT language for government suppliers to conduct business with the public sector. The language is based on the OGC interoperability requirements and an open standard (BASDA eBIS-XML or the Business Application Software Developers Association's e-business interchange standard extensible mark-up language) and will be used by public sector bodies for electronic invoicing and ordering. It should be noted that adaptations of BASDA eBIS-XML are currently being used by over 100 organizations across Europe. The adoption of a single standard in the United Kingdom has helped overcome difficulties in exchanging information and conducting business effectively between suppliers and public sector customers who used different IT systems. Government departments and their suppliers found the technology very easy to implement and use. Other benefits from using e-procurement in the United Kingdom include contractual savings, current financial information on what is being spent with each supplier, lower levels of irregular purchasing, and improved commercial relationships with suppliers.

There have been some examples of in-house development of e-procurement systems within government. The Manchester City Council in the United Kingdom is engaged in in-house development of an e-procurement system with a direct ordering facility.[7] Australia's Department of Public Works

(DPWS) successfully developed its own e-procurement system, which was put at the service of Sydney Water, the country's largest water utility service provider (New South Wales Government, 2002).

Furthermore, free and open-source software (FOSS) used by Governments for e-procurement processes does not require suppliers to adopt or convert their data into a proprietary format, which may increase the costs of suppliers and constitute a barrier to smaller companies. FOSS has other features that are worth considering when investing public funds in e-procurement systems, such as availability to the public, maximal choice, no royalties or inflexible licences, and reduced discrimination against users. In addition, the use of FOSS may encourage ICT spending with local companies, support local SMEs in the ICT sector, enhance local knowledge of "primary source" material (i.e. source code), and impact on the application of broad standards and mechanisms for collaboration, quality assurance and the distribution of ICT products (i.e. software standards). FOSS is also adaptable to user profiles, such as in the case of adapting to local languages (e.g. www.translate.org.za). A detailed analysis of the implications for FOSS for ICT policy and development can be found in chapter 4 of the *E-Commerce and Development Report 2003* (UNCTAD, 2003).

Of course, proprietary e-procurement solutions remain an option for Governments. For example,

the Philippines' government has entered into an agreement with Microsoft for the acquisition of products and licences.[8] The agreement provides government agencies with a simplified way of ordering and acquiring Microsoft products and licences while being able to track software licence acquisitions through online order confirmations and summaries. For the Government, acquiring original, proprietary software and licences symbolizes support for intellectual property rights legislation and a stand against software piracy; it also allows it to benefit from Microsoft advice and the latest technology. In this case, the vendor becomes a strategic partner in e-procurement that will assist in the development of the system and enable the Government to properly manage and maximize its resources. Annex I contains a brief overview of the main e-procurement vendors worldwide and their products.

The cost of commercially available e-procurement solutions will depend on whether the solutions involve applications that are focused on sourcing activities (e.g. bidding, supplier registration, tender management) or purchasing activities (e.g. electronic invoicing and payments), or both. When building an e-procurement solution, the following costs will have to be considered: licensing (software costs are believed to be only 10 per cent of the overall project costs), external and internal resources, implementation and maintenance, integration into existing resource planning solutions, process design, configuration and customization, training and communication, internal systems and bandwidth, software upgrades, and reorganization costs (Buy IT, 2002a). From the point of view of infrastructure, however, e-procurement solutions can be stand-alone, with no more than a data interface with back office systems. This is often seen as an interim solution until integration of all resource planning platforms has been achieved, such integration providing the greatest transaction cost benefits. Of course, the size of the public sector, in particular national budget and expenditure, must be large enough to sustain (make viable) the implementation of an e-procurement system.

An option for financing the implementation of e-procurement is a build-operate-transfer (BOT) scheme, such as the one adopted by the Government of Malaysia in order to set up its e-procurement system e-Perolehan.[9] The system allows the Government of Malaysia to purchase goods and services over the Internet and currently offers four modules (central contract, direct purchase, request for quotation and request for tender) as well as access to an electronic catalogue. E-Perolehan was financed through a BOT scheme involving an e-commerce joint venture company bringing together Puncak Semangat Sdn. Bhd. and NTT Data Corporation, which undertook the total financing of the project in exchange for exclusive service operator rights to the Malaysian supplier community. Suppliers can host their products and prices online free of charge, thus reducing their overhead costs, while the Government benefits from a streamlined procurement process and readily accessible pricing information.

In the first quarter of 2004, e-Perolehan had approximately 51,000 registered suppliers, of which about 12 per cent were ready to conduct business with the Government. It is expected that by the end of 2004, there will be 60,000 registered suppliers, 39 per cent of which will be ready to conduct business with the Government. The value of transactions by the end of 2004 is estimated to reach 1 billion Malaysian ringgit ($260 million), with expected growth as adoption of the system expands. The average cost per transaction has been reduced from $250 to an average of $17.

3.   Costs and benefits

Certainly, there are tangible benefits flowing from e-procurement in terms of reduction of prices (through competitive bidding and transparent negotiation with suppliers) and process costs. Nonetheless, the achievable return on investment (ROI) of e-procurement projects remains an elusive equation. Early corporate adopters of e-procurement claimed savings of between 8 and 15 per cent and returns on investment in under a year; however, these figures are now becoming more realistic (Buy IT, 2002b). Initial annual savings may be roughly twice the investment costs, but once strategic sourcing starts to mature and is factored in, cost savings are reduced. The main savings drivers for public e-procurement are the same as for corporate e-procurement (transactional benefits, compliance benefits, management information benefits, price benefits and payment benefits), always compounded by the imperative of serving the citizen. Users of e-procurement systems could maximize short-term benefits by limiting initial deployment, focusing on smaller categories first (e.g. office supplies) and on helping suppliers by,

for example, offering payment upon receipt of notice of shipment.

Other benefits of e-procurement are in the areas of governance and administration. With respect to governance, e-procurement facilitates the implementation of transparent public decision-making and is an impediment to lack of compliance and to corruption. In terms of administrative processes, e-procurement may reduce bureaucracy (including "overheads", or money spent on administration of services rather than their delivery) and save expenses and time. It will also impact on the level of ICT skills among all system users.

The development and implementation of e-procurement in an e-government strategy depends on public stakeholders being able to tap into appropriate ICT skills. The skills needed for any IT implementation include ICT strategy development, master systems planning and project management, business modelling and process analysis, requirement analysis and system specification, application design, application development, including implementation and testing, configuration and change management, and deployment and impact assessment. These high-level skills are a prerequisite for any programming or implementation. Since government is often already the single largest employer in a country, it may also be the single largest purchaser of IT and has considerable potential to stimulate the development of IT skills (whether employed internally or by contracted suppliers) through e-government projects. For example, a procurement policy that requires applications to make use of open source software will stimulate the development of open source skills and the adoption of open source business models in the local IT industry.

Human resources for the development of e-procurement (or an e-government strategy for that matter) may be permanently hired and so reside inside the organization, or be contracted from the private sector as needed. Each approach has merits: large organizations may be sufficiently diverse and of a scale to be able to make use of the full range of skills on a full-time basis and avoid the premium charged by contractors. But even large organizations are unlikely to be at the "cutting edge" of all ICTs, and so may find themselves unable to identify or make use of the most current or appropriate skills and technologies. On the other hand, those that choose to contract skills as

needed are able to draw from a larger pool of talent, and to choose the most appropriate ICTs for each project. This will come at a higher cost, but the quality of each project should be better. The development of ICT skills for e-procurement should be driven by expected functionality and needs, to be translated into system specifications and requirements (i.e. the "mechanics" of e-procurement).

4. Mechanics of e-procurement

There are four basic elements to e-procurement, as follows:

- **Online tenders:** Potential bidders should be able to search and identify tenders easily. Online tenders enable suppliers to have real-time access and the Government to reduce paper and printing costs. Tender forms might also be available online and might be submitted electronically, or through an automated process.

- **Electronic invoices:** Where regulations and resources allow it, invoices might be received electronically.

- **Electronic payments:** Electronic funds transfers may require the approval of payments through authenticated digital signatures and a process management system.

- **Automated process integration:** End-to-end e-procurement requires electronic automation of all of the above elements. See annex I for a list of the major suppliers of these systems.

Electronic communication can help to ensure that all interested suppliers are aware of tenders. Tender notices can be posted on a website (rather than a physical notice board or published in a newspaper) that is accessible at all times, without the need to physically visit a government office or subscribe to a publication. Tender notices can be categorized on such websites to help potential bidders easily find those that they are most interested in. More proactively, tender notices can be sent by e-mail to registered suppliers who have previously expressed an interest (and proven capability) in specific categories of tender – construction, training, or consulting, for example. Tenders should facilitate the registration of bidders, including for those geographically distant from government offices. Electronic communications methods can

Table 5.2

Best practice in e-procurement functions

Function	Best practice	Alternative
Quoting/tendering process	Open tender – buyer advertises the business opportunity online free of charge. Closed tender – buyer advises selected suppliers of the inquiry/tender. Buyer makes the tender information available online and (where applicable) allows the suppliers to submit their tender documentation electronically.	Buyer accepts inquiries and sends tender documentation by e-mail.
Ordering from the supplier	Buyer transmits orders to the supplier using open standards (agency must negotiate a contracted rate with supplier that is lower than the once off ordering price)	Buyer orders directly from a catalogue (e.g. from supplier website or e-mail offer) using e-mail, fax or hard copy. Agency negotiates a contracted rate with supplier that is lower than the one-off ordering price.
Making payment	Buyer pays suppliers by electronic means, e.g. through direct transfer – receipt sent electronically.	Payment made electronically and receipt sent by post.
Liaising with suppliers	Buyer and supplier liaise via secure e-mail.	Buyer and supplier liaise via e-mail and fax.
Browsing supplier catalogues	Supplier maintains an online catalogue, which can be browsed electronically (self-hosted or within an e-marketplace).	If supplier cannot establish an online catalogue, a buyer (government agency) may accept catalogue data electronically and upload then into shared internal systems, if cost-effective.
Internal approval process	The approvals process is automated and implemented electronically.	The internal approval process should be documented and objective criteria put in place for approving orders.
Receiving invoices/statements	The agency requires all suppliers to submit their invoices electronically and the invoice is then matched with the order. Invoice approved electronically.	Objective criteria implemented for approval of payment to suppliers on receipt of paper or e-mailed invoice.
Accessing e-marketplaces	Buyer accesses supplier catalogue in an open marketplace (open access, based on open standards).	Buyer accesses supplier catalogue in a closed marketplace (using a closed marketplace will make accessing the information more cost-effective for the agency concerned).

also be used to distribute tender documents, making them available for download and instantly reducing the waiting time for a bidder to receive such documents. The websites for tender notices and documents should provide information about procedures, so that everyone can be confident that they are being treated equally, and officials can be held to a common standard.

The submission of tenders can be more complex as it may involve the bidder in including certificates or other documentation proving competency or compliance with some other requirement, such as tax affairs being up to date. This potential problem can be reduced by requiring bidders to register as approved suppliers so that they do not need to prove their competency ever time they submit a tender. Once this is done, it should be reasonable for tender submissions to be submitted digitally. Provided that they are in the required format (preferably non-proprietary), this presents no technical problems other than the competent use of e-mail and an electronic filing system.

Once suppliers have been contracted, e-procurement systems can also be usefully employed to ensure compliance with procurement policies. Doing so enforces standardization throughout an organization, with resulting benefits through lower prices because of guaranteed volume; reduced costs and better service because of standardized maintenance of a reduced range of equipment; and reduced overheads associated with dealing with a limited number of suppliers.

E-procurement systems are best used for the purchase of those goods and services that are needed by all departments across the organization. These are typically commodities and include office supplies, computers and related equipment, maintenance services, and such items as meeting rooms and travel. Those things required for the operations of specific departments – civil engineering services for the construction of a new road, for example – are more specific and specialized, and cannot benefit from the economies of scale that an e-procurement system requires in order to justify its cost.

E-procurement systems typically run on an intranet,[10] on which catalogues of goods and services can be made available, purchases requested and approved, purchase orders generated (for external vendors) or works orders (for internal services) routed through the intranet or by e-mail to the appropriate supplier. Once supplied, delivery notes are reconciled with purchase orders and invoices, and payments are made and allocated. Purchases and moves can also be linked to asset management systems to keep track of the location and condition of assets, and depreciation costs allocated accordingly.

As explained above, Governments in developing countries must be aware that e-procurement does not necessarily mean a comprehensive e-procurement solution; rather, it could entail cost-effective process improvements that steer a government department in the direction of e-procurement and are tailored to the available resources. For example, orders can be placed by e-mail, or via an integrated online order management system that extends across the length and breadth of the supply chain. Table 5.2 lists a number of procurement functions viewed from a "best practice" and "alternative" perspective.[11] The "best practice" column will generally require the implementation of a comprehensive e-procurement system with an ideal level of resources, and the "alternative" column can be an option for countries with more limited resources.

5. E-procurement as an enabler of e-business

Since there are limited data on the e-procurement market, there little evidence regarding the impact of e-procurement on e-business. Nonetheless, increasingly there are indications that e-procure-

ment plays a role as an enabler of e-business, including for SMEs. In an European survey, firms with 50 or more workers felt that electronic media and e-procurement were the solution to the heavy procedural costs involved in bidding for public tenders, but small firms did not mention electronic solutions as a way out of the problems they faced in these markets (European Commission, 2004). The EU promotes the use of e-procurement in order to achieve cost reductions for firms and authorities, increase transparency and procedural efficiency without prejudice to competition, and allow easier cost comparisons and examination of tenders within the European Community. At the same time, it warns that the upfront costs of shifting to e-procurement should not be underestimated either for firms or authorities and may represent an obstacle for smaller firms, and that national uncoordinated e-procurement solutions could "fragment" the market.[12]

As a large purchaser, government is an attractive customer for large and small suppliers alike. The introduction of effective e-procurement systems by Governments may impact on the local economy both internally and in the way that it trades with others. Procurement processes that are open and transparent can help to set lower market prices and drive down costs, favouring efficient producers. This might attract low-cost producers into the market to the benefit of all consumers and encourage local suppliers to improve their competitiveness (quality and efficiency) in the domestic and/or international trade.

Part of the developmental role of government is to ensure the provision of key economic infrastructure – roads, electricity and other utilities, ports, health facilities, and so forth – that enables or supports business formation, investment and growth. As Governments – especially at the local level – move more of their own processes online, they also find it attractive to build telecommunications networks to link buildings and other facilities (see box 5.2). It can be argued that open and transparent procurement processes can help free funds to be channelled into economic infrastructure, ensuring that it is of good quality and has been purchased on the best conditions and/or at the best price. Finally, efficient online transactions with government agencies can act as incentives for businesses of all sizes to install computers, improve networks and build up basic ICT infrastructure and skills. If more business processes are

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Box 5.4

A local, low-cost and open solution in South Africa

The Knowledge Economy E-Government branch of the Western Cape Government in South Africa uses both traditional and new electronic channels to advertise tenders and reach a broader range of suppliers, especially SMEs in the ICT sector. Companies that collect tender documents register in order to provide a contact, receive information on the tender and ensure an audit trail. The webpage http://capeonline.org/cmstender contains the tender documents and instructions on how to use them. Tenders are submitted through the traditional process, while invoices are submitted electronically and printed out. The printed uoriginal" is processed through the traditional process. A small local software development company provided the solution used by the Western Cape Government, which turned out to be a cost-effective alternative to imported "customizable" software since the system could be built up using open source software. The Government incurred little or no extra cost for the use of the technology in the enhanced procurement process. All the staff had access to e-mail and the organization already owned a couple of Internet-connected web servers, which was all that was required.

Source: http://capeonline.org/cmstender.

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computerized, automated or moved online, this might encourage a virtuous circle of investment in ICTs accompanied by more efficient local businesses. In fact, an e-procurement strategy should explicitly promote the use of the Internet and e-business systems among potential suppliers. The potential to win government contracts could act as an incentive for firms to adopt ICTs for business purposes and to go online.

E-procurement systems could also force local players to face foreign vendors that might compete on financial or strategic terms. That said, many multinational vendors have sought to establish partnerships with local companies in the more attractive markets, so that some of the implementation costs can remain in the local economy. In addition, public sector procurement could favour open source solutions, as these tend to better encourage local skills as well as costing less. Box 5.4 illustrates the use of open source principles for an e-government content management system that enhances existing processes and promotes local ingenuity. Table 5.3 outlines the implications of e-procurement for e-business.

E-procurement allows more fair and equitable access to government contracts by a wider range of companies, as tenders and other requests for supply are more likely to be seen by potential suppliers. In addition, submission of responses is less onerous and more convenient for the potential

Table 5.3

Implications of e-procurement

Implications of e-procurement for:	
Development of e-commerce and a national electronic marketplace.	The incentive for building an electronic marketplace is reciprocal with (and proportional to) increasing IT penetration and capability (Oliveira and Amorim, 2001).
Local business promotion	The selection of local suppliers can be encouraged, including SMEs.
Public resources	Internal coordination costs can be reduced and public resources freed to serve citizens in other areas.
Bureaucracy	E-procurement will help to expedite and/or overcome bureaucratic procedures.
IT readiness	E-procurement will require a scaling up of the IT readiness of government and enterprises.
Transparency	All vendors have equal bidding opportunities.
Business processes and regulations	E-procurement might require changes to business processes (e.g. regarding vendor minority participation) in order to comply with public sector purchasing laws and regulations.

vendor. In this context, increased SME participation in the supply of goods and services to government agencies should contribute to reducing the power of monopolies or favoured suppliers. The use of e-procurement systems could also reduce the bias towards urban businesses and open doors to suppliers in rural areas or non-capital cities/towns.

6.   Case studies in e-procurement

Brazil

COMPRASNET is the Brazilian Government's e-procurement system, set up by the Secretariat of Logistics and Information Technology in the Brazilian Ministry of Planning, Budget and Management.[13] The system is a Web-based online procurement system used by all Federal Government procurement units. It enables online price quoting and reverse auction commodity purchases, and it has a client/server architecture. The process is as follows:

- Federal Government organizations register their procurement needs (i.e. goods and services they need to buy).

- The system automatically informs registered suppliers by e-mail and the supplier may download the bidding documents.

- The procurement officer uses a Federal Catalogue to specify the description of the good or service required. If the item is classified as a commodity, the whole process may be carried out through the Internet, using the price quoting system (which is a two- to three-day purchase posting site for non-competitive small purchases).

- For more substantial procurement of general-purpose goods and services (such as building maintenance services or office supplies and equipment), a reverse auction procedure is used. In the reverse auction the bids (prices that the suppliers will charge for that item) are submitted on the Web. Each supplier reduces its bid price competitively with others during the auction and the one offering the lowest price at a pre-agreed end time for the auction will be the one awarded the contract.

- Auctions and prices are open for inspection by the public, and auction results are posted immediately.

COMPRASNET was introduced to automate the Government's procurement process, in order to make it uniform without centralizing the buying process of the Federal organizations. It was also intended to reduce procurement costs and give more transparency to the process. Other aims were to increase the number of government suppliers; to reduce participation costs for these suppliers; and to increase competition among suppliers, which should result in cost reductions and better quality of goods and services acquired.

Stakeholders include Federal Government agencies and organizations, as well as the suppliers of goods and services to the Federal Government (over 150,000 registered suppliers). Citizens are indirect stakeholders insofar as e-procurement is intended to provide an instrument for social control of public expenditure, through its public transparency.

During COMPRASNET's first three years the Federal Government spent about $7 million on system development and maintenance. During the first two years of online reverse auction use, the Federal Government is estimated to have saved up to $1.5 million. Besides this positive return on investment, the system enables better and more transparent procurement, as well as reducing the bureaucratic process. For example, a normal procurement process takes more than two months, while the online reverse auction may be completed in less than 15 working days. The use of online procurement has also increased the participation of small businesses in government supply. So far, the system has been judged to be largely successful, bringing an estimated average 20 per cent reduction in final price for goods and services acquired through reverse auction and price quoting. In addition, suppliers are guaranteed timely payments since COMPRASNET is linked to a financial payment system.

The enabler/success factors of COMPRASNET identified by the Brazilian Government were political will, external pressures from citizens for greater transparency and efficiency in government spending, and acceptance by suppliers of transparency. The constraints faced have been technological, causing the occasional and temporary unavail-

ability of the system, and legislative, since new legislation and rules were needed to allow for new forms of procurement. The lessons learned were: (i) the need to identify the right technology, namely a robust platform, scalability and a basis in open systems, with heavy investment in back office sustainability; (ii) the need for intense training of users on both the government and supplier sides; and (iii) the need to adopt a phased approach, since successive modules would serve as system demonstrations and develop/encourage usage and interest.

South Africa

In 1995, the government tender board in South Africa decided to outsource the advertising and processing of tenders in order to reduce the costly and time-consuming publishing and advertising of small public tenders. Previously only large companies had the time and capacity to sort through and comply with the many tender advertisements published in various government gazettes and local newspapers. Automation also enabled tenders with a lower financial value to be processed and approved more rapidly by giving junior members of management the authority to award the tender.

An outsourced system provider won the tender to provide an electronic purchasing system and to publish the purchasing requirements issued by all spheres of government, including national, provincial/state and wherever possible local/city government organizations. The aims of the e-procurement system were as follows: to automate the Government's procurement process; to achieve procurement transparency and accountability from an open system; to reduce procurement costs; to increase the number of government suppliers; and to empower SMEs by ensuring that they participated in the tender process.

The stakeholders of this e-procurement system include both buyers and suppliers. Buyers include the State and provincial tender boards, State departments (Agriculture, Education, Finance, Health, Housing, Public Works, Support Services), various State hospitals, regional councils and municipalities, the Navy and Army, the Police, prisons and the Post Office. Suppliers include all types of service providers, from consultants to tree-felling companies, and are categorized in a way similar to the tender advertisements, by Standard Industry Classification (SIC) codes.

The system collects (and provides) tender information on a national basis, so that buyers and suppliers throughout the country can interact. Smaller tenders, within the minimum value threshold, are transacted online and may be "open" or "closed". A tender is considered "open" when the buyer is able to send it to all the suppliers that have subscribed to the system (and also subscribed to the particular categories that a tender may be allocated to), while a "closed" tender is made available to a selected group of suppliers. The system also allows buyers to add a supplier who may not already be a subscriber to the system. These additional suppliers then receive by fax the information about the tender. The system keeps tender applications "unseen" until after the closing date, and is designed to capture all the information in a secure, confidential environment and to provide the results of previous tenders that have been awarded and the pricing. Larger tenders (greater value) are advertised in the system but must be dealt with in a paper-based format (documents and applications are not submitted electronically).

Suppliers have to pay a monthly charge in order to gain access to the tender requests and advertised information via a website. The information is categorized into various product groups according to the standardized SIC categories. A supplier will only receive tender opportunities that are relevant to its SIC category. The information on the e-procurement system in general and tenders is made available through the Web, e-mail or fax. Subscribers may quote online using a Web-based form, by fax or by traditional physical delivery. The lessons learned so far from the South African experience are the following:

On transactional capability:

- Regardless of the level of automation, the e-procurement system requires supervision to ensure that a critical mass of diverse suppliers can bid for tenders.

- A barrier to access to the system is created when suppliers have to pay a fee to subscribe. Because of this, buyers were allowed to add specific suppliers in order to include and target SMEs. The idea is for buyers to share the costs for suppliers to subscribe.

- If a paying subscriber may be able to receive e-mails, then so should a specified supplier. A constraint was created because specified

suppliers could only receive tender information by fax.

- Usability should be enhanced (for example, allowing inputs in different grammatical characters).

- Making use of technology does not necessarily make the tendering process more accessible. The system still requires a good tendering practice – for example, if the details or description of an online tender are not included, the supplier must still use various traditional ways to ascertain the nature of the tender; this is inefficient and can be frustrating to the supplier.

On the process of posting and responding to tenders:

- The system for receiving bids needs to be improved, namely by expanding the possibilities of delivery (for example, by providing several fax numbers or establishing longer deadlines).

- Guarantees should be given regarding the security, reliability and scalability of Web-based forms (and other technology functionalities).

- The use of postal systems and fax machines to obtain copies of tender information creates delays in the tender award process. Therefore, the submission and reception of tender proposals by electronic means should be increasingly promoted.

- Suppliers are frustrated by having to re-enter information at different points in the process.

- Regular reporting and feedback from suppliers should be monitored to ensure that the outsourced system provider is providing adequate service.

- The system requires close monitoring to ensure that suppliers use it as a tender-enabling tool rather than as a technology; that is, wherever possible, all the tender information – and at a minimum – the tender description must be included in the details.

On transparency:

- Suppliers must be informed of the outcome of a tender process.

- Tenders that are cancelled should not be reinstated for a specified period of time, so as to avoid undermining the "closed bid" principle.

- Tenders should be traceable to the people who are responsible for awarding them.

The system has been able to partially realize the benefits initially envisaged. It has reduced administration costs through automation and has increased transparency and accountability. It has been adopted by approximately 1,500 government organizations and has become a learning opportunity in those organizations. There are still delays caused by postal systems, by the need to recapture data and by the process of creating, recording and storing paper documents. Some steps involving the physical interaction of stakeholders (waiting in line, going to multiple offices) still have to be overcome.

D. Conclusion

There appears to be no doubt as to the benefits of at least a basic adoption of e-government for all countries insofar as it strengthens the relationship between government and an increasing number of citizens. E-procurement, as an application at a higher level of e-government (the transactional phase), has already brought benefits to public procurement in several countries through cost savings, streamlining and increased transparency. However, in order to elucidate the suitability of any e-procurement strategies for developing countries, developing countries may need to consider more than the efficiency benefits, carefully evaluating the level of public and private sector e-readiness and the relevance of partial or fully integrated e-procurement to their own e-government and business development strategies. The potential of e-procurement as an enabler or promoter of e-commerce in the economy might be an incentive.

On the one hand, it can be argued that there is little point in proposing e-procurement in countries where only certain suppliers will be in a position to take advantage of it, and where for a variety of reasons (size, ability to fulfil orders, management capabilities) SMEs will still be excluded from the public procurement market (offline and online). On the other hand, it can be argued that e-procurement can lead to the development of ICT and transactional capabilities in government that can

be applied to other activities such as receipt of payment of taxes and duties or disbursement of grants and social benefits, as well as in the business community competing to participate in government tenders. Transitional measures can be adopted so that local suppliers that initially may not be able to access e-procurement systems are not excluded. More research into benchmarking public e-procurement in developing countries still needs to be done.

In any case, it is necessary that Governments planning to adopt e-procurement carefully guide their plan through the phases outlined in section C, sub-heading 1, of this chapter. Developing countries should bear in mind that the adoption of e-procurement can be a scalable process that will limit the waste of limited resources and will allow users to gradually build up the relevant capabilities. To maximize initial adoption, the World Bank (2002) proposes that e-procurement plans begin by targeting agencies and suppliers that will

have immediate use for e-procurement, enlisting their support and addressing the concerns of government workers whose role might change as a result of innovation. This is applicable to any e-government project.

In order to ensure sustainability, it should be recognized that return on investment would be achieved over time in terms of cost savings and increased revenue. In the context of their e-government strategies and regardless of transactional capabilities, developing countries that have not already explored e-procurement could envisage the enhancement of G2B interaction by posting tender information and forms online, and promoting awareness within the business community and the registration of potential suppliers. A portal for transactional services can be a longer-term goal that will result from a general process reform that will entail consolidating, streamlining and enhancing the transparency of public procurement and related government processes.

ANNEX I

The following are the six main global companies that provide e-procurement platforms, selected according to market share and revenue (Forrester, 2004). The companies are listed in alphabetical order.

- **Ariba.** Ariba was founded in 1996, is regarded as one of the largest vendors in the e-procurement market and states that it has 30 per cent of the Fortune and Global 100 companies as its customers. The **Ariba Buyer** application is able to deal with complicated processes, including complex approval processes, order aggregation and supplier communication needs for purchasing indirect materials. It is also able to deal with large implementations that require linkages to back end enterprise resource planning systems. See www.ariba.com.

- **Clarus.** Clarus was founded in 1992 and through various acquisitions entered the e-procurement market. It aims its products at the mid-market. It currently has approximately 70 customers using its e-procurement product around the world. **Clarus Auctions, Clarus e-Procurement and Clarus Settlement** are products that focus on a particular component of the e-procurement process. The applications are regarded as having strong sourcing and payment settlement features. See www.claruscorp.com.

- **Commerce One.** Commerce One has more than 500 customers using its e-procurement application. It also has vendor partnerships with four large systems integrators, namely Accenture, Cap Gemini Ernst and Young, Pricewaterhouse Coopers and Compaq. **Commerce One Buy** and **Commerce One Source** do not offer advanced procurement features such as complex pricing and order aggregation but are well positioned to satisfy the demands of budget-conscious firms that want to automate the whole procurement process from sources to payments. See www.commerceone.com.

- **i2 RightWorks**. The company has approximately 55 customers using its e-procurement application and at least four partnerships with leading system integrators. The **i2 RightWorks** application is best suited to firms already using i2 technology. The product is regarded as a good fit for firms that are looking to automate their indirect procurement processes now and their direct procurement processes in the future. Further testing by Forrester has shown that the product has strong workflow and purchase order processing capabilities which are beneficial for firms that want to automate and centralize complicated purchasing processes. See www.i2.com.

- **iPlanet.** The company has financial backing from Sun Microsystems and AOL Time Warner. In 2000 iPlanet's E-Commerce Solutions, a Sun/Netscape Alliance, unveiled the industry's first complete business-to-business commerce platform. This included buying, selling, billing, market-making and trade facilitation software. The **iPlanet BuyerXpert** application is regarded as a leading application for firms that wish to automate basic purchasing processes for indirect goods for a large number of users. The application also offers self-service requisitioning and pricing capabilities and integrates with other iPlanet applications for basic sourcing capability. See wwws.sun.com/software/.

- **MRO.** The vendor has more than 5,000 customers and is actively seeking partnerships with key systems integrators such as IBM and AT Kearney. It also has an established partnership with i2, which is regarded as one of the leading e-procurement vendors. Its **MAXIMO** Buyer Solution is targeted at firms with specific industrial procurement needs. Testing by Forrester showed that the product has strong order-processing capabilities such as importing and aggregating orders from enterprise resource planning systems. See www.mro.com.

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Notes

1. See http://www.wsis.org/.

2. The chart does not include Timor Leste, which was not a UN member State in 2001.

3. An existing system, usually a computer system, that must be accommodated in building new systems.

4. See www.asycuda.org.

5. See http://www.innovazione.gov.it/ita/comunicati/2003_05_07.shtml and http://www.acquistinretepa.it/.

6. See http://www.ogc.gov.uk/. UK Office of Government Commerce, "Government announces success in search for common IT language", 3 February 2004.

7. See http://www.manchester.gov.uk/index.htm.

8. See http://www.procurementservice.net/.

9. See Pascual (2003) and http://home.eperolehan.com.my/.

10. A restricted network used internally by an organization. It uses the same concepts and technologies of the World Wide Web, such as web browsers and servers running on Internet protocol.

11. Adapted from the Australian Government Information Management Office (2000).

12. For these reasons, the European Commission will present in 2004 an action plan for the introduction of coordinated e-procurement in the EU aimed at reducing procurement costs and contributing to further integration in European public procurement markets and to the improvement of their performance.

13. Ozorio de Almeida (2002). See also http://www.comprasnet.gov.br and http://www.is.cityu.edu.hk/research/ejisdc/vol9/v9r6.pdf.

Chapter 6

Protecting Privacy Rights in an Online World

A. Personal data in the information economy

1. Introduction

Post-industrial economies, where information is a key asset, are also known as "information economies". An important asset of the information economy is personal data, primarily in the form of data about customers and potential customers. Indeed, during the dot.com boom, much of the value ascribed by stock markets to companies was based on the personal data they held, that is millions of registered users (read future customers), rather than on the products and services they had sold.

In information economies the task of protecting data is of paramount importance. While secure storage and transparent use are important for many categories of public information, managing personal data also involves important issues of privacy and the related need to strike a balance between privacy and the various needs to transmit personal data. The transmission of such data is fundamental for the conduct of e-business, but it needs a great deal of trust and confidence. With the growth of computing, the expanded use of the Internet and the extensive use of other technologies which facilitate the creation of data trails, privacy threats or at least the fear of them have substantially increased. Therefore, some form of legal protection of privacy is important for generating trust in e-commerce.

Various laws govern the processing of personal data, including those relating to intellectual property and consumer protection, and, most obviously, laws protecting privacy. Different jurisdictions adopt various approaches to the problem of data protection, and this poses problems of har-

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Box 6.1

The need for laws protecting personal data

A recent example of this is the case of India. India has been extremely successful in developing an outsourcing industry, from basic data entry processing to more sophisticated services such as customer call centres and financial services, based on a literate workforce and a developed computer and communications infrastructure.[i] Indian businesses have attracted a wide range of Western companies, from financial services to utilities, to relocate various business processes to the sub-continent. However, concerns have recently been voiced in the European Parliament about the vulnerability of personal data being transferred under such outsourcing arrangements.[ii] Some view outsourcing as a process that effectively circumvents European regulatory safeguards. As a consequence, the Indian National Association of Software and Service Companies has recently been pressuring the Indian Government to take regulatory action to help forestall any reaction from Europe.[iii]

Another example can be found in Kenyan practice. Ms. Mugure Mugo, the founder of PrecissPatrol, a Kenyan outsourcing enterprise dealing with IT services, has already received requests from European-based clients specifically wanting to know the enterprise's policy on the collection and security of collected data.[iv] She recognizes that the fact that Kenya does not have specific data protection laws may constitute a barrier to the development of the country's e-business.

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[i] See further chapter 5, "Business process outsourcing services for economic development", pp. 135-152, in UNCTAD (2003).
[ii] Bennet M (2004a).
[iii] Bennet M (2004b).
[iv] UNCTAD 2003., p. 143 et seq...

monization, especially in the case of transborder flows of data. Privacy laws governing the processing of personal data are particularly comprehensive in Europe. In European jurisdictions it is forbidden to transfer data to a jurisdiction that does not provide adequate protection. The "adequacy provision" could affect countries that do not provide such protection in their business with European countries.

Developing countries that want to participate in the information economy, and thus facilitate the free flow of information from developed to developing countries, have therefore to consider the need for laws protecting personal data.

This chapter is divided into six sections. Section A puts the question of data protection in context. Section B defines the various categories of personal data. Section C presents the privacy principles, the basis for data protection regulation. Section D deals with the regulatory approaches taken by the various jurisdictions, explaining why each jurisdiction has chosen a specific approach and the consequences of such a choice. Section E considers the question of transborder transfers of data, highlighting the interest of developing countries, and section F presents the results of a questionnaire on data protection legislation and offers some policy recommendations for developing countries.

2. Privacy of personal data as a fundamental human right

As stated in the Universal Declaration of Human Rights, privacy is a fundamental human right. Respect for privacy is viewed as a prerequisite to enable citizens to fully develop as individuals as well as to participate in society, although what is considered to constitute the concept of privacy and its boundaries may differ widely between cultures and societies. For some, the threat of interference is perceived to lie primarily in government and public administration. For others, the private sector is seen as an eqtual or even greater threat, as customer data have become an increasingly valuable asset.

Privacy as a right must coexist with and be balanced against other individual rights, such as the right of expression (Article 19 of the Universal Declaration), which is the basis for free media as well as with broader societal concerns, such as the threat to national security from terrorism.[1] The

potential tensions between security and privacy needs is illustrated by the recent dispute between the United States and the European Union about the disclosure of passenger data by European airlines to US law enforcement agencies.[2]

A right to privacy is generally enshrined in national legal systems at the constitutional level, although there is increasing recognition that a more rigorous and detailed legal framework is often required. The Justice Ministers of the member States of the Commonwealth, for example, recently adopted a Model Privacy Law to assist individual members in establishing such a framework.[3]

Legal recognition of the importance of privacy extends beyond human rights conventions and constitutional protections. Under the WTO-administered General Agreement on Trade in Services, for example, the general obligation to remove measures that discriminate against or restrict trade in service is subject to certain general exceptions, which include "the protection of the privacy of individuals in relation to the processing and dissemination of personal data".[4]

3. Technological progress and data protection

While privacy has always been a concern, with the growth of computing in the 1960s and 1970s, there was widespread anxiety that the capabilities of computers with regard to the processing of information would engender a new threat to privacy, as noted by a report commissioned by the UK Government in 1975:

> "The speed of computers, their capacity to store, combine, retrieve and transfer data, their flexibility, and the low unit cost of the work which they can do have the following practical implications for privacy:
>
> (1) they facilitate the maintenance of extensive record systems and the retention of data on those systems;
>
> (2) they can make data easily and quickly accessible from many distant points;
>
> (3) they make it possible for data to be transferred quickly from one information system to another;

<div style="border:1px solid;">

Box 6.2

Article 12 of the Universal Declaration of Human Rights

"No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks"

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(4) they make it possible for data to be combined in ways which might not otherwise be practicable"[5]

In response to these perceived threats, Governments and international organizations began to consider the need for a regulatory regime tailored specifically to address computer-derived threats to privacy. Within Europe, such regulation became known as "data protection" legislation. Data protection laws do not map neatly onto a privacy framework, but rather represent a range of differing interests. A broad distinction has to be made between "interests that relate to the quality of (personal) information and information systems", such as accessibility and reliability, and "interests pertaining to the condition of persons as data subjects[6] and to the quality of society generally", such as privacy, autonomy and democracy.[7] As a consequence of this broad range of interests, data protection laws cannot be seen as simply a subset of privacy law, but rather as a distinct but overlapping topic, also addressing data security issues.

More recently, as individuals, businesses, organizations and public authorities carry out an ever wider range of activities across the Internet, concern has again arisen about the potential threats to privacy from this online environment. This concern relates to personal data being made available on the Internet, and the monitoring of an individual's Internet-based activities.

In the first scenario, whether or not an individual uses the Internet, data collected from him/her may subsequently and increasingly be processed and made available on the Internet. A national telephone directory, for example, once placed on a server connected to the Internet becomes available to the world, thus resulting in potential exposure of a qualitatively different nature from that arising from the publication of the traditional physical directory. This qualitative shift can also be seen in respect of personal data contained in public regis-

ters, personal data that relate to our lives as citizens. For example, eligible voters in an area are traditionally listed in registers available for inspection from public offices. This information is now available on CD-ROM or the Internet. As a result, there has been a huge surge in demand for it from marketing companies, which regard "public" personal data as a valuable resource. In such situations, the Internet is basically a new medium within which personal data can be used and abused. The nature of the Internet facilitates the unfettered transmission of data around the world, with the potential to circumvent national regulations. In this respect, the concerns expressed with regard to the Internet echo those expressed in the early days of computing.

The second category of threat concerns the ability to obtain personal data arising from the online activities of data subjects when using an Internet-based service, such as e-mail,[8] the Web, Usenet or P2P applications. One aspect of this threat stems from the current insecurity of the Internet as a communications mechanism. Data subjects are generally not fully aware of the risks associated with disclosing personal information over the Internet. A second component relates to personal data arising from the monitoring of a data subject's Internet transmissions and connections, such as the websites visited and hypertext links followed. The collection of such information, particularly over time, can enable a detailed profile of an individual's preferences to be constructed.

In addition to the Internet, other technologies have a potential to pose privacy threats. For example, mobile phones and fixed lines may allow the identification and the location of the person who is calling. An Australian writer who has extensively written on new technologies identified as PITs (privacy-invasive technologies) calls this trend data-trail intensification (through identified phones, stored-value cards and intelligent transportation systems).[9]

With the expanded and extensive use of computing, the Internet and other technologies, the fear of privacy threats has substantially increased. According to a *Wall Street Journal*/NBC poll, 29 per cent of Americans ranked the loss of privacy as their primary concern for the 21st century.[10] According to the study entitled "The new e-government equation: Ease, engagement, privacy and protection", conducted by Hart-Teeter Research, more than 60 per cent of Americans who use the Internet are interested in using e-government, but they express concern that dealing with government over the Internet may compromise their privacy.[11] To react to these perceived fears, there is a strong need to build trust and confidence. Leaving aside the technological ways to do so, through data security mechanisms such as encryption, this chapter will focus on the legal ways to protect privacy, thus generating trust in e-business.

B.   Categories of personal data

1.   Definition

Before analysing the information privacy principles, which constitute the point of departure for data protection regulation, it is important to gain an understanding of what such principles are designed to protect -in other words, what is considered to be "personal data".

The concept of personal data is very broad and difficult to pinpoint. Personal data encompass any and all data that relate to an individual and that could be used, either directly or indirectly, to identify him or her. This includes information such as a name and birth date, which would permit direct identification of an individual, but may also include information such as a telephone number or a job title, which could be used, indirectly, to identify an individual.[12] In some jurisdictions, protection is extended to legal persons, such as companies and trade unions, as well as individual natural persons.

The types of personal data collected can be grouped into three general categories: consensual, non-consensual and sensitive data. These categories are outlined and explained below. It should be noted that while only certain data will constitute sensitive data, virtually all data can be categorized as either consensual or non-consensual data.

2.   Consensual data

Consensual data are data that are obtained directly from an individual, with the individual's knowledge as to why it is being collected, and by whom, and with the individual's consent for its use, whether express or implied. For these to be truly "consensual data" the consent itself should be specific to the purpose provided, freely given and informed. Often, individuals provide these data when performing tasks such as filling out an application form, subscribing to a service or entering into a contract. They are data that an individual allows to be collected and used for certain specified purposes. In some instances, consent is implied from the fact that the individual has provided the data in order to enter into or fulfil a contract after having been informed accordingly. Under other circumstances, the data subject's consent can be implied from the fact that the person giving such consent has not objected to any purpose or further transfer after having been informed of them and given the opportunity to object to the processing. This implied consent procedure is termed an "opt-out" procedure. Under an "opt-out" procedure, the data may be used for the purposes specified, unless the individual indicates that he/she does not agree with this. However, implied consent may not be appropriate in many circumstances, and explicit consent should be obtained. One clear circumstance is where the data are of a sensitive nature, a category of personal data that is addressed below. Here the data should be obtained via an "opt-in". Under an "opt-in" procedure, the data may be used for the reasons given only where the individual affirmatively indicates this is acceptable. This is the standard for consent to use of sensitive data in many countries, notably the European Union (EU) member States.

3.   Non-consensual data

Non-consensual data are data obtained without the knowledge or consent of the individual. These data may be consensual data reorganized according to certain criteria, such as geographical location, gender or income level, and then sold in the form of marketing lists to various companies or organizations. Non-consensual data may also be data collected as part of a transaction, such as what items were bought or what service was ordered, the price range of the items or service, the styles or options, and any other data that may be part of the transaction. Non-consensual data are often

combined with data from various sources to compile a more complete profile of the data subject.

A consumer may consent to the collection of personal data for specific purposes, and yet considerable amounts of valuable data may be collected through the transaction process. For example, data about the style of clothing bought, the colours, sizes, brands, general price range of each item, and payment method are all collected as part of the transaction. These data is collected without the express consent and perhaps without the knowledge of the consumer, and allow the online retailer to create a marketing profile of the consumer. This profile can then be used in-house, or sold to marketing agencies or manufacturers.

Trace data are unique to the online environment. Although non-consensual data, they are usually obtained directly from the individual but without the individual's knowledge. Trace data are data that are obtained by tracking an individual's use of Internet-based services. The data, depending on how they are collected, may include information on what websites were visited, which pages were viewed and how long an individual spent on a certain page of a website. The data collected will include information such as the IP address the consumer is using, the programs his/her computer is running, other sites visited, hypertext links clicked on, the computer's time zone, and possibly the e-mail address of the person using the computer.

Trace data are often collected through the use of "cookies", which are unique identifiers that web servers will place on an individual's computer. In essence, a cookie is a serial number for a computer that allows the web server to retrieve records regarding that computer from the web server's databases. Cookies will often be used by a website to recognize a certain computer or user, allowing automatic log-in, or to facilitate a faster consumer transaction by identifying the user and automatically charging a purchase to the consumer's credit card information already on file with the website, such as Amazon's "1-Click" transaction service. However, trace data may also be collected through the use of other technologies called "web bugs" and "spyware". Like cookies, these data-gathering tools operate in the background, without the user's explicit knowledge. A web bug is a graphic placed on a web page, or even in an e-mail message, that is designed to gather information on visitors to a website or on the individual(s) who read the e-mail. Web bugs are generally invisible, as they are added to web pages as part of the elements of the site and are usually only 1 pixel-by-1 pixel in size. Spyware is generally software that is automatically installed on an individual's computer system. It is usually designed to collect information without the user's knowledge and permission and, if so configured, to forward the information about software being used and the browsing and purchasing habits of the user to a specified data collection facility.

4. Sensitive data

Sensitive data are data considered by policy makers and legislators to reveal fundamental aspects of our private lives, and therefore require a higher level of protection to prevent privacy infringements. This may include requirements for data controllers[13] to obtain explicit rather than implied consent, enhance the security measures implemented and further limit the types of processing that may be carried out. Such enhanced protection is deemed necessary because discriminatory use of the data could substantially infringe an individual's privacy.

What is considered "sensitive" may obviously vary significantly between jurisdictions, reflecting different cultures. In the United Nations' "Guidelines for the Regulation of Computerized Personal Data Files", for example, Principle 5 prohibits the processing of certain types of data: "data likely to give rise to unlawful or arbitrary discrimination, including information on racial and ethnic origin, colour, sex life, political opinions, religious, philosophical and other beliefs as well as membership of an association or trade union, should not be compiled".[14]

Under European Union law, personal data used in particular contexts have also been subject to special regulatory treatment. In the telecommunications sector, for example, data relating to an individual's use of telecommunication services (e.g. number called, call duration and location data) are considered to pose increased risks to an individual's privacy and are therefore subject to additional legal protections. In the United States, financial data and data relating to a person's choice of video rental are considered sensitive enough to merit specific legislative protection.

C.   Principles of good practice

There has been significant activity at an international level towards the recognition of a set of international data protection principles. In the early 1980s, the Council of Europe and the Organisation for Economic Co-operation and Development (OECD) adopted a number of measures, and the United Nations followed in 1990 with "Guidelines for the Regulation of Computerized Personal Data Files".[15]

Since most of the data protection regulation has been developed around the same fair information practices (or privacy principles), a description of such regulation should be preceded by an analysis of those principles. They set limits to processing, that is the performance of such operations as collection, handling, use and transfer of personal data that can be done manually as well as electronically, although electronic processing is generally perceived as presenting the greater risk to privacy. The principles also address the transfer of personal data to parties in places that do not have similar protection.

The privacy principles are present in the international instruments mentioned above as well as in relevant national legislation. They have also been adopted by the private sector in self-regulatory initiatives (see further below). Thus, despite the legal meaning they may assume according to the specific instruments in which they are enshrined,[16] one may consider their uniform repetition as evidence of *diuturnitas* (the practice of States), one of the basic features of general international law, the other being *opinio iuris ac necessitatis* (acts must occur out of a sense of obligation). If the second element is also present, the principles would then be binding on all States, regardless of their inclusion in national laws.

The advantage of a principles-based approach to the regulation of data protection is the avoidance of technological redundancy. The principles should therefore be as applicable to the Internet as they were to the introduction of computer technology, in other words they should be technologically neutral. It is the mechanisms by which such principles are complied with that obviously change in response to the new threats and opportunities created by the changing technological environment. These principles of good practice are set out below.

1.   Collection

Collection of personal data should be done fairly and lawfully. Fair collection means that an individual should be informed, at the moment of collection, of the contemplated uses of that data (see also the transparency principle below). The lawfulness of data collection may be specified in different ways. Some jurisdictions, generally common-law-based, state that the collection of data is lawful provided that it is not in breach of any existing legal obligation governing the use of those data (e.g. confidential information). Other jurisdictions, generally civil law, restrict the concept of lawful collection further by stating that collection is only lawful where the data subject has given his/her consent or some other specified and limited criteria are met (e.g. the collection is necessary in order to perform a contract on behalf of the data subject). Consent is not generally considered meaningful unless it is freely given and the individual has been given adequate information about the nature of the processing activity, such as the purposes for which the information will be used, to whom it may be disclosed and any consequences that may result from withholding information or permission to use.

2.   Proportionality

The collection of personal data should be limited to data that are adequate and relevant for the specified purpose or purposes. Since computers can hold vast amounts of data easily and relatively cheaply, there may be a tendency to collect excessive information from, or about, a data subject without a specific need. In addition, such data should be retained only for the minimum period of time needed to accomplish the purpose(s) for which the data are collected.[17] Data destruction procedures may be as important for the protection of an individual's privacy interests as the process of data collection and retention. For instance, billing data should in principle be retained only for the period during which the bill may be challenged or the payment pursued.

3.   Use

There should be no disclosure, transfer or other use except those needed to achieve the purposes specified when the data were collected. Obvious exceptions to this principle may be where the

secondary use is required by law or for some other public interest, such as the investigation and detection of crime. Personal data should be used only in a manner consistent with expectations. Individuals provide data, or allow data to be collected, for a certain specific purpose. Data should be used only for that purpose, and should be further used or communicated only if this is necessary in order to accomplish the original purpose.[18]

4. Quality

Personal data that are collected and stored should be accurate and reviewed periodically to ensure that they are kept accurate and up to date. This principle is an example of where the privacy interests of the individual should overlap with those of the entity, whether public or private sector, which is processing the data.

5. Transparency

In line with the concept of "fair" collection noted above, individuals should be informed of the purpose(s) for collecting data, who will be using the data, who is in charge of protecting those data, and, if applicable, any contemplated transfers of the data and to whom.

6. Access and correction

Individuals should have the right to inquire whether their personal data are being used and the right to obtain a copy of all personal data collected and maintained that relate to them. There will be certain exemptions to the granting of such access, for example where the information would also reveal personal information provided by another party, whose privacy interests also need to be considered. Individuals should also be given the right to have inaccurate data corrected.[19]

7. Objection

Individuals should have the right to object to the processing of the personal data relating to them in certain situations, such as where serious damage or distress results, or for specified purposes, such as use for direct marketing activities.

8. Transfers/disclosure

Personal data should not be transferred to third parties unless the individual was informed that such disclosure may take place and provided that it can be ensured that the data will be given the same level of protection by the recipient as was provided by the sender. This is particularly an issue where data are transferred between jurisdictions that have different legal frameworks.

9. Security

Appropriate security measures should be implemented to protect against risks presented by the collection, use and storage of an individual's personal data, whether from accidental loss, damage or disclosure or deliberate interference. This may require the use of organizational measures, such as the appropriate screening and training of employees; technological measures, such as encryption and access controls; and physical measures, such as preventing computers from being stolen. The appropriateness of the security measures applied will depend on the nature of the data concerned (e.g. sensitive data), the purposes for which they are being used, the availability of the protection mechanisms and their cost, relative to the risks involved.

10. Accountability

Data controller compliance should be ensured through a system of enforcement, which includes the ability of a data subject to seek redress for breach of the principles in the processing of his or her personal data. The implementation of substantive rules controlling the ways in which personal information can be collected, processed and disclosed is obviously insufficient in and of itself. There is also a need for a procedural framework that ensures that such rules are complied with and that remedies are available for non-compliance.

D.   Regulatory approaches

The German State of Hesse enacted the first law directed specifically at the protection of personal data in 1970. Laws in Sweden and the United States followed soon after. Throughout the rest of the 1970s most developed nations followed suit,

enacting some form of privacy or data protection legislation themselves. However, by the late 1970s the differences in the provisions of these various national laws had created the threat of obstacles to the free flow of information between countries, potentially stifling economic growth. To create more coherent and uniform laws, intergovernmental organizations such as the OECD and the Council of Europe outlined common data protection principles to be followed by member States. The principles outlined by those two organizations are the foundation for most national legislation in place today.

1.   Approaches taken by international organizations

In 1980 the OECD concluded a study that culminated in the creation of the OECD Council Recommendation Concerning Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data[20]. The Guidelines established eight basic "privacy principles", which apply to any information relating to an identified or identifiable natural person, cover both the public and private sectors, and encompass all types of data processing.

The Guidelines require that member countries' data protection standards provide equivalent protection. If a member country does not provide equivalent protection for certain categories of data, the Guidelines provide for the implementation of legitimate restrictions on transfers of those categories of data to that member country.

The Council of Europe's Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data[21] is similar to the OECD Guidelines in that the principles also apply to both the public and the private sector. It differs from the OECD Guidelines in that it applies only to automated data processing. They also differ in their emphasis: the Convention stresses the privacy of the individual, while the OECD Guidelines emphasize the desire to ensure the free flow of information.

Although the two organizations are in general agreement as to the nature of privacy principles, the OECD Guidelines are non-binding in law, whereas the Convention is an instrument of public international law, which signatory member States are obliged to implement through the adoption of national legislation reflecting the Convention's provisions. Moreover, the means by which the provisions are given effect in national law vary from State to State.

The United Nations adopted a measure addressing the human rights aspects of the use of computer technology some ten years after the OECD and Council of Europe. In 1990, the General Assembly adopted a set of "Guidelines for the Regulation of Computerized Personal Data Files"[22]. These Guidelines are divided into two sections. The first section covers "Principles concerning the minimum guarantees that should be provided in national legislations". These principles echo those put forward by both the Council of Europe Convention and the OECD Guidelines. The second section considers the "Application of the Guidelines to personal data files kept by governmental international organizations". This requires that international organizations designate a particular supervisory authority to oversee their compliance. In addition, it includes a "humanitarian clause", which states that "a derogation from these principles may be specifically provided for when the purpose of the file is the protection of human rights and fundamental freedoms of the individual concerned or humanitarian assistance".

Such a clause is intended to cover organizations such as Amnesty International, which hold large amounts of personal data of prisoners, but would be wary of sending information out to a data subject on the basis of an access request made while the person was still imprisoned.

The UN Guidelines also provide for the principle of non-discrimination, according to which sensitive data should not be compiled at all. The power to make an exception to the principles contained in the Guidelines is severely limited and a national supervisory authority should have the power to impose sanctions for non-compliance.

2.   Current approaches to data protection law

The OECD and Council of Europe principles established the fundamental principles of fair information practices for the protection of personal data. However, the approaches taken by states to implement these principles into national legislation have developed along three different

lines. The conflict between these approaches is centred on methodology and scope, and not on basic privacy principles. The three basic approaches developed to implement data protection principles are comprehensive regulation, sectoral regulation and self-regulation/co-regulation.

Comprehensive or omnibus regulation

A comprehensive regulatory approach essentially builds on the Council of Europe model of *omnibus* or universal protection. This approach requires the creation of a general law promoting fair information practices. In addition to laying out rules establishing the parameters for collection, use and dissemination of personal data in both the public and private sectors, the law must provide individuals with the right to receive confirmation as to what data, if any, are maintained about them and the right to have those data rectified if they are incorrect or incomplete. The most important aspect of the comprehensive approach, from the individual/consumer's perspective, is the requirement that prior to the collection or use of any personal data, the individual must be notified of what data will be collected and how they will be used. Consent for that processing must usually be obtained. The goal is to give individuals greater control over their personal data. This is the approach taken by the European Union in Directive No. 95/46/EC of 24 October 1995 on the Protection of Individuals with regard to the Processing of Personal Data and on the Free Movement of Such Data, otherwise known as the Data Protection Directive.[23]

Supervision of the implementation and enforcement of the law on a national basis, as well as of compliance with it, is conducted by a national supervisory authority or regulator. This authority also acts as the guarantor of individual rights and must therefore be empowered to act independently of other government bodies. At a minimum the supervising body's powers must include the powers of investigation and intervention, particularly in cases of complaints from individuals, and the power to engage in legal proceedings. In some countries, such as Germany, the comprehensive regulatory approach requires each data controller to appoint an "in-house supervisor". The duty of this supervisor is to identify, monitor and analyse the purposes and practices of processing within the company, organization or association in which he or she operates. The supervisor is also legally responsible for ensuring that an individual's rights are protected, and he/she should therefore be endowed with sufficient authority to act autonomously from the rest of the organization, since the controller is directly accountable to the national oversight body, not to the organization for which he/she works.

Until recently South American countries generally did not have legislation regulating data protection, but now a number of countries from the region have been re-evaluating their legislative regimes as they pertain to the protection of personal data, partly because of the EU Data Protection Directive. As a result, some South American countries follow the comprehensive approach. On 11 November 2003 a judge in Buenos Aires issued the first injunction under the Argentine data protection law.[24]

Because of the nature of the comprehensive approach, the transfer of personal data to countries where the data are not provided the same level, or an adequate level, of protection is prohibited. This is to prevent circumvention of the law through the use of a third-party country, and to protect the rights of the individual in their personal data. For data to be transferred to a country with less than adequate protection, the individual must consent to the transfer or arrangements must be made, either via contract or some other method, to ensure that the data will receive the requisite protection (see further below).

Sectoral regulation

The sectoral approach does not opt for the use of all-encompassing legislation, and instead relies on localized legislation. The theory behind a sectoral approach is that over-regulation by the Government will stifle growth and innovation. The belief is that markets should be allowed to self-regulate, with the Government only stepping in to provide protection in areas where there is a high risk of harm if data are misused, such as the financial sector or in the case of data relating to health or children. A typical example of a country following this approach is the United States; other countries following this approach are Japan, Singapore and Barbados. It can be argued that the sectoral approach stands as its own model of data protection.

In the sectoral approach there is no national oversight agency. The general trend among countries following this approach has been to enact legislation in the public sector, protecting individuals from governmental abuse of personal data, while leaving the private sector relatively regulation free. The creation, implementation and enforcement of rules, and the imposition of sanctions for violation of those rules, are left to individual sectors or industries. Where data protection rules are imposed in a sector or implemented voluntarily, they will usually take into account some of the privacy principles outlined in the OECD Guidelines or the Council of Europe Convention, but these rules will apply only within the specific sectors where they are enacted or to the extent that they are voluntarily enforced. Various companies, especially in the United States and Canada, have publicly adhered to the Guidelines. Recently, Singapore adopted a Model Data Protection Code establishing minimum standards for the private sector.[25] However, the basic assumption in a sectoral approach is that where there is no governing legislation, regulation or code of conduct, there is no legal protection.

Generally, national legislation is enacted to provide greater protection in the financial, telecommunications and medical sectors. In addition, most professions, such as doctors, accountants, lawyers and bankers, are bound by strong confidentiality practices. The failure of many organizations in the United States to embrace meaningful self-regulation led the Federal Trade Commission, the agency responsible for oversight of undertakings' compliance with stated privacy policies as a fair trade practice, to assert the need for more comprehensive privacy regulation.

Self-/co-regulatory approach

The self-/co-regulatory approach can be considered a hybrid of the comprehensive and sectoral approaches. Like a comprehensive approach, a self-/co-regulatory approach centres on universal legislation at a national level that provides individuals with rights in their personal information, and protects these rights by regulating collection, use and transfers of personal data. The primary difference between the two approaches is the manner in which the data protection principles are implemented. Under a self-/co-regulatory approach, creation, implementation and enforcement of data protection regulations, including rules, codes of conduct and/or legislation, are left to individual industries and are overseen by a privacy/data protection agency. This agency ensures compliance with the rules and is responsible for handling complaints and resolving disputes. On top of this sectoral approach is national legislation that is applicable across the board, providing a minimum level of protection to all individuals in their personal data. Industries that do not implement their own codes or rules are then subject to the standards of this legislation. Examples of countries implementing a self-/co-regulatory approach are Australia, New Zealand, South Africa and the Republic of Korea.

The self-/co-regulatory approach, like the *omnibus* approach, typically establishes a national oversight agency that is endowed with considerable power and authority. This agency may be the main oversight body for all legislation dealing with privacy and/or data protection that encompasses both the public and private sectors. This is unlike the sectoral approach, where some areas of legislation are governed by one national body while others may govern other areas.

The result of a self-/co-regulatory approach is that individuals are assured that their personal data will receive a minimum level of nationally mandated protection, but the standards may differ between industries or sectors. The differing levels of protection among the various sectors and industries may work to restrict or complicate flows of data from one sector or industry to another. However, this approach may also permit the industry-specific codes or rules to reflect its realities or particularities. This helps avoid regulation that is excessive or unnecessary in an industry or that just does not fit and thus would be unduly costly or act as a barrier to commerce.

E.   Transborder transfers of data

Transborder flows of data result from an expansion of international trade, globalization and the emergence of the information economy, and is an inevitable aspect of the use of Internet-based services. However, such transfers may result in an infringement of the privacy rights of an individual, when data are moved from a protective regime to a jurisdiction without such legal protections.

The primary goal of data protection legislation is to protect the personal data of those who live within the borders of that jurisdiction, which could be compromised if data were allowed to be transferred outside the country to a jurisdiction where the protection requirements are less onerous, in effect circumventing individual rights. To avoid this, countries that have data protection laws have adopted rules regulating transborder transfers of data. The degree of regulation will obviously vary according to the regulatory approach taken. Therefore, prior to any transborder transfer of data those seeking to transfer the data must be aware of, and understand, any laws applicable to them that govern such transfers.

1. Transborder transfers of data under the comprehensive approach

The comprehensive approach is generally the most restrictive with regard to transborder transfers of data. Owing to the protective nature of the comprehensive approach, transfers are prohibited unless the country or jurisdiction to which the data are transferred offers what is considered to be "adequate" or "equivalent" protection. In that connection, certain safeguards must be in place to ensure the continued protection of personal data. Exactly who will make determinations of adequacy may vary depending on how the comprehensive system is established. In the first instance, determinations may be made by the exporting data controller, on the basis of the specific circumstances, with the national supervisory authority exercising regulatory oversight. Alternatively, the authority may issue *ex-ante* general determinations for specific jurisdictions or sectors of activity.

Determinations of adequacy are generally based on the type of data being transferred and the kind of protections that are afforded to those data: the more sensitive the data, the greater the protections required. The protections may be legal, contractual or in some other binding form, but must be sufficient to ensure the continued protection of the transferred data.

To be adequate, the protections must also be enforceable; data protection rules are only effective if they are followed in practice. It is therefore necessary to consider not just the content of rules applicable to personal data transferred to a third country, but also the procedural mechanisms in place to ensure the effectiveness of such rules. This will include considerations of economic and political stability, the viability of regulatory or judicial systems, and examination of other socio-political aspects that may result in a lack of security. Thus, the adequacy of another country's data protection rules should be determined on the basis of the content of the rules and on the basis of the means and entities used to ensure their proper application. For the time being the EU has made findings of adequacy for Argentina, Hungary, Switzerland, Canada and for those US organizations that have subscribed to the "safe harbour" arrangement.[26]

2. Transborder transfer of data under the sectoral approach

The sectoral approach is generally the most relaxed with regard to transborder transfers of data. This is due to the desire to let markets adjust themselves, with little or no governmental intervention. However, in many countries sector-specific legislation or regulations have been enacted to provide protection for certain types of personal data. The sectors traditionally regulated are the financial sector and the health sector. Thus, any transfers of data regarding financial data or health data are likely to have restrictions that must be complied with. The restrictions will generally require that notification of the transfer be provided, and possibly that consent be obtained prior to the transfer. The key aspect in a sectoral approach is not necessarily the type of data that is being protected, but the sector where the data originated. For example, financial information may be protected only if it is a regulated financial services provider that collects and uses it. The same applies to health information: it must be collected and used by a regulated healthcare institution or insurer under the sectoral legislation. Canada has adopted this solution: its legislation contains no explicit reference to international data transfers, but it requires that any transfer to any third party result in continued protection under Canadian privacy standards. This permits parties to such transfer to make protective arrangements suitable to the circumstances, thus avoiding the burdens and negative impact of overly restrictive data flows.

3.   Transborder transfer of data under the self-/co-regulatory approach

The rules regarding transborder transfers of data under the self-/co-regulatory approach are similar to those under a comprehensive approach. The overarching national protection provided in this approach establishes a level of protection for all individuals. Transborder transfers of any data of any individual must meet the standards set out by national law. This level is generally on a par with that of the comprehensive approach: there must be an adequate level of protection. However, a self-/co-regulatory approach will often differ from a comprehensive approach in how determinations of adequacy are made. While there is oversight on a national level in a self-/co-regulatory approach, individual sectors are generally responsible for adopting standards and making determinations of adequacy. The result is that where a comprehensive approach will look at the level of sensitivity of data to determine what is necessary in order for protection to be considered adequate, a self-/co-regulatory approach may look at the sector where the data originated in order to determine adequacy. This is similar to a sectoral approach. For example, under a self-/co-regulatory approach financial data generated by a financial institution may receive greater protection than financial data gathered from a voluntary survey, even though it may be the same data.

The self-/co-regulatory approach differs from the sectoral approach in that the data collected via the survey are still guaranteed a level of protection prior to any transborder transfers. This is most likely not the case in a sectoral approach.

4.   Issues for developing countries

The three approaches to data protection outlined above are approaches traditionally taken by industrialized countries in an effort to protect personal data yet allow for the free flow of information. While data protection legislation is generally designed to be effective domestically, restrictions on transborder transfers of data can obviously have a direct effect on other countries. This is particularly true in many developing countries, where legal infrastructures often offer little protection, if any, for personal data. This may have a detrimental effect on many developing countries, as their domestic business such as data processing and call centres may be limited owing to restrictions on transfers of data from developed countries. Depending on the approach adopted by the country where data are sought to be transferred from, there are several options for developing countries.

As discussed above, under a comprehensive approach the transborder transfers of personal data are limited to countries providing adequate protection. There are several ways, however, in which an adequate level of protection may be provided: by the country enacting similar legislation, through contractual measures, or through "safe harbour" arrangements.

As explained above, the primary focus in a determination of adequacy is whether sufficient protections are available and whether those protections are enforceable. Of course, the easiest way to verify this is to ascertain whether the country seeking to receive data has adopted similar comprehensive legislation. In such instances, a determination of adequacy is generally a relatively simple matter, and once such a determination is made restrictions on transborder transfers are either abolished or significantly minimized.[27]

However, for many developing countries a comprehensive legislative approach may be too restrictive and burdensome. An alternative option may be to enact legislation, regulations or administrative rules in a specific sector, such as the telecommunications or financial sector, that are sufficient to be considered to provide adequate protection, allowing data to be transferred to data controllers within that sector.

When enacting legislation is not feasible, transborder transfers of data may still be facilitated on an individual basis through the use of contractual measures. Organizations that wish to receive data from a country with a comprehensive approach can enter into a contract, which then obligates the organization to take proper measures to ensure the protection of the data. The Council of Europe and the European Union have both adopted model contracts designed to facilitate the transfer of personal data,[28] as well as various industry organizations, such as the International Chamber of Commerce.[29]

In some instances, arrangements may be made between countries with comprehensive legislation and countries following a sectoral approach

to allow for transborder transfers of data. These are termed "safe harbour" arrangements. A safe harbour arrangement is designed to create a workable set of rules that organizations in a country with a sectoral approach can voluntarily adhere to, and that are recognized as providing adequate protection by a country with a comprehensive approach.[30] Essentially, this involves voluntary compliance with the fair information processing principles, plus an agreed enforcement regime operated, for example, by a consumer protection body (e.g. the US Federal Trade Commission). Organizations that participate in a safe harbour arrangement are then placed on a publicly available list, which allows individuals, organizations, and other countries to know which organizations may and may not receive data transfers.

The sectoral approach to data protection has traditionally been considered to be much friendlier to developing countries. This is because such an approach generally offers fewer barriers to transborder transfers of data. However, as more countries adopt a comprehensive approach to data protection, this approach may result in the data flows to developing countries being threatened. As discussed previously, even under the sectoral approach, there are often regulated sectors that may have more restrictive protective measures, typically the financial and health sectors. For transfers from these sectors to be allowed, proper measures must be taken, such as enacting similar protection or entering into contractual obligations, much like under a comprehensive approach, only more limited in scope.

With respect to transborder transfers of data to developing countries, a self-/co-regulatory approach is similar to that of a comprehensive approach: there must be adequate protection. Therefore, the three options available under a comprehensive approach -namely, enacting legislation, contractual remedies or safe harbour arrangements are available here as well. However, where a comprehensive approach has essentially two standards, for regular data and sensitive data, a co-regulatory approach may permit variations of those standards, depending on the industry or sector. An adequate level in one sector may not be adequate in another. Thus, individual undertakings in an industry that would not meet the other country's sector standards might need to put in place contractual arrangements.

F.   Survey on data protection legislation

To complement the analysis above, the UNCTAD secretariat developed a questionnaire that was circulated through a note verbale to member States. Governments were invited to complete the questionnaire and to provide UNCTAD with a copy of their national legislation on the issue of data protection.

The survey asked whether the country had adopted any regulation on privacy matters. Questions were designed to identify the approach chosen by the country while regulating data protection. Other questions looked at the various categories of data to see whether they were regulated differently (for example, computer-based records versus manual records, sensitive data versus non sensitive data). Some questions explored the manner in which privacy rights were implemented and the possibilities given to individuals to access and modify their data. Finally, a specific question inquired about the situation regarding commercial trade secrets.

1.   Results and analysis of UNCTAD survey

Responses to the questionnaire were received from the following countries: Argentina, Belarus, Bulgaria, Colombia, Croatia, Czech Republic, Denmark, Dominican Republic, Egypt, Estonia, Finland, Guatemala, Italy, Jordan, Latvia, Lebanon, Lithuania, Malta, Mexico, Monaco, Morocco, Myanmar, Pakistan, Panama, Philippines, Republic of Moldova, Romania, Russian Federation, Serbia and Montenegro, Slovenia, Suriname, Turkey, Ukraine, Uruguay and Venezuela.

Before some of the results of the survey are described, it is important to state that certain responses were vague or contradictory. Thus, the results of the survey confirm the lack of awareness regarding the various implications of data protection issues. Moreover, various countries noted that since the data protection laws were adopted recently, there is still no experience in their implementation. Also, some data protection authorities or agencies are not yet fully operational.

In all countries that answered the questionnaire, with only two exceptions, the protection of pri-

vacy is established at constitutional level. While the constitutional protection may be important, it is by no means sufficient in itself, as the implementation of the good practice principles (discussed above) is not guaranteed. Some countries stated that even though they do not have specific data protection legislation, some form of protection may be derived from other legislation. Other countries indicated that they have sectoral legislation and are in the process of drafting a more comprehensive law on data protection. The rationale stated for more comprehensive legislation is the desire to have internationally recognized standards that would facilitate international trade.

The majority of the countries that answered the questionnaire have adopted a comprehensive approach, but this result probably does not reflect the global situation as most of the countries adopting the *omnibus* approach are European or South American. In some of these countries, in addition to a general law protecting the privacy of data subjects, there are specific regulations for specific professions or services. The sectors for which in most legislation there are specific provisions are always the same: banking, lawyers, notaries, statistics, archives, health, military and police, intelligence services, taxation and scientific research. Interestingly, in some countries, besides primary *omnibus* legislation on data protection there are codes of conduct and professional practice. These codes do not in principle have binding force and therefore represent a very flexible instrument whose application could be envisaged in other fields.

The same sectors that also receive specific legislative consideration under the comprehensive approach are the only ones normally regulated according to the sectoral approach. Only two countries have adopted a sectoral approach.

Another large group of countries have chosen a self-/co-regulatory approach. Even among countries adopting a similar approach some differences are noteworthy. For instance, while in some countries it is possible to access and have corrected personal information relating to a specific sector (i.e. banking or legal), the same is not possible in other countries. Also, the remedies available to individuals to redress any infringement of data protection rules vary enormously, but this may also depend on the peculiarities of the domestic legal systems.

Finally, it should be noted that security concerns play a role in the regulation of data protection: more than one State mentioned them as an important limitation on rights to privacy.

2. Concluding remarks and policy recommendations

The right to privacy is not a new concept, and has been solidified over the years through incorporation into numerous treaties, conventions and declarations. As e-commerce has developed, so have the means to amass, exploit and retrieve greater amounts of personal information. Although this may seem a threat to our privacy, in many regards it may be viewed as beneficial. It is this paradoxical contrast between keeping personal information private, while allowing use of that information to generate business and facilitate e-government, that is at the heart of the current data protection debate. Regulation that permits individuals to control the use of their personal information may limit to some extent the information available and has a cost with regard to implementation. On the other hand, failure to provide adequate protection may allow greater use of such information, but also dissuade many consumers from utilizing Internet-based services and inhibit information flows from protective regimes to non-protective regimes.

Thus, policy makers from developing countries need to understand the implications of the different interests at stake and make an attempt to balance them.

Awareness of data protection issues should be further promoted, since, as shown by the survey, there is still some confusion about the nature, importance and implications of those issues. This could be done through efforts to educate the public on their privacy rights, to educate business about how to comply with privacy regulations and to assist companies in establishing privacy policies.

Regardless of the regulatory approach adopted to address data protection issues, every effort should be made to enact a technologically neutral regulatory framework, capable of responding to the rapidly evolving online environment.

When examining the regulatory response of developing countries to the issue of protecting personal

data, it is obviously necessary to distinguish between the policy drivers that dictate and underpin the regulatory framework and the regulatory mechanisms and tools utilized to achieve them. In terms of policy drivers, the demand for developing country Governments to address the issue of protecting personal data may primarily originate from a domestic agenda or from developments abroad.

At a domestic level, data protection will generally be focused more on concerns about the use and abuse of personal data by the public sector, rather than by the private sector. The value of an individual's data is obviously directly related to a nation's state of economic development, the sophistication of private sector activity and the purchasing power of consumers. Personal data as an asset are a particular feature of service sector economies, specifically the information economy, not agrarian or industrializing economies. Of the two broad groupings of interests represented under the concept of data protection, the interests pertaining to individuals as citizens, protected from arbitrary governmental interference or participating in the democratic process, generally drive domestic calls for data protection regulation.

The pressure for a regulatory response to protect personal data may arise from developments abroad. As noted in the introduction, developing countries may perceive a need to address issues of data protection to facilitate their participation in the global information economy, so as to ensure that an absence of protection does not constitute a barrier to the flows of data between developed and developing economies. We saw at the beginning of the chapter the example of the Indian outsourcing industry. The Indian National Association of Software and Service Companies has exerted pressure on the Indian Government to take some form of regulatory action to help forestall any reaction from Europe.[31] Moreover, after the adoption of the Data Protection Directive, the possibility of restrictions on the transfer of personal data from the EU has been an added impetus for countries such as Australia, Canada[32], Philippines[33] to put in place or at least try to work out comparable data protection schemes.

The rationale for drafting a new piece of legislation on data protection given by the Ministry of Energy, Communications and Multimedia of Malaysia reflects both domestic concerns and international developments. The legislation should promote the country as:

1. A communications and multimedia hub where the national adoption of e-based transactions is expected to be high;

2. A premier investment centre for the communications and multimedia industry;

3. A premier test-bed for applications of information and communications technologies;

4. A preferred trading partner in the communications and multimedia industry that provides international standards of personal data protection.[34]

Whether calls for data protection regulation primarily reflect domestic concerns or are a reaction to the legal situation in other countries, Governments will obviously need to consider the appropriate regulatory approach comprehensive, sectoral or self-/co-regulatory.

- The first consideration will involve the identification of the major trading partner. If the partner is, for instance, the United States, there might not be the need to adopt stringent or comprehensive regulation as in the case in which the major trading party would follow the EU approach.

- The cost of regulation will then be a critical factor. The cost associated with a comprehensive or *omnibus* approach, specifically the establishment of a dedicated regulatory authority, will generally be excessive for most developing countries, especially if borne by the private sector through licensing or notification fees. However, in terms of addressing privacy concerns vis-à-vis public sector infringements, an authority independent from government will generally be necessary in order to provide the necessary trust and assurance as regards its activities. The regulatory authority may not have an exclusively data protection remit, which mitigates the costs involved.[35]

- A sectoral regulatory response may be appropriate to address specific uses and abuses of personal data, whether driven by domestic or foreign concerns. In the telecommunications sector, many developing countries have established regulatory authorities as part of an ongoing liberaliza-

tion process within the sector.[36] Also, in the financial sector, nearly all countries maintain a distinct regulatory regime, which may address the protection of consumers of financial services, as well as the wider strategic economic aspects of the sector. These new or existing regulatory bodies may be capable of embracing data protection and privacy issues within their spectrum of duties.

- Whilst a self-regulatory or co-regulatory approach may be appealing in terms of minimizing the public costs of regulation, its success depends on a sufficiently strong and active private sector, willing and able to fund the regulatory activity. It is unlikely to be appropriate in terms of the public sector use of personal data.

- Governments of developing countries, especially those that are members of regional economic groupings, should be encouraged to establish cooperative relationships, so as to increase their capacity to deal with privacy and data protection issues.

- In addition to a regulatory approach, voluntary adherence to privacy principles should be promoted both in the private and in the public sector. This could be done through the introduction of flexible instruments such as codes of conduct or guidelines or through the promotion of trust mark initiatives.

Annex I

List of States that completed the questionnaire, and their laws on data protection

Argentina: Constitution, articles 18, 19, 33 and 43; Civil Code, art. 1071; Data Protection Law n. 25.3297/ 2000 and its Regulatory Decree n.1558/2001

Belarus: Constitution, art. 28; Law on Electronic Documents n. 357-3 of 10 January 2000; Decree of the Council of Ministers on State Programme on Informatisation n. 1819 of 27 December 2002; Presidential Decree n. 195 of 6 April 1999 amending Some Issues of Informatisation

Bulgaria: Constitution, articles 30, 32, 33, 34, in State Journal n. 56 of 13 July 1991, amended in State Journal n. 85 of 26 September 2003; Law for the Protection of Personal Data, in State Journal n. 1 of 4 January 2002; Law on Telecommunications, in State Journal n. 88 of 7 October 2003; Law for the Electronic Document and Electronic Signature, in State Journal n. 34 of 6 April 2001, amended on 29 December 2001

Colombia: Constitution, articles 15 and 20; Telecommunication Decree n. 1900 of 1990; Resolution n. 575 of 7 December 2002

Croatia: Constitution, art. 37; Law on the Protection of Personal Data

Czech Republic: Constitution, art. 3, available at http://www.psp.cz/cgi-bin/eng/docs/laws/constitution.html; Charter of Fundamental Rights and Freedoms, available at http://www.psp.cz/cgi-bin/eng/docs/laws/charter.html; Act 101 of 4 April 2000 on the Protection of Personal Data and on Amendment of Some Related Acts, available at http://www.uoou.cz/eng/101_2000.php3

Denmark: Constitution; Act on Processing of Personal Data n. 429 of 31 May 2000; Access to Public Administration Files Act n. 572 of 19 December 1985; Financial Business Act n. 453 of 10 June 2003

Dominican Republic: Constitution, art. 8; General Telecommunication Law n. 153 of 27 May 1998

Egypt: Constitution

Estonia: Constitution, available at http://www.president.ee/eng/ametitegevus/;

Personal Data Protection Act of 12 June 1996, published in State Journal I 1996, 48, 994, available at

http://www.esis.ee/ist2004/103.html

http://www.esis.ee/legislation/protection.pdf

Finland: Constitution, section 10, available at http://www.om.fi/21910.htm; Personal Data Act n. 523 of 1999; Act on the Protection of Privacy in Working Life, n. 477 of 2001; Act on the Protection of Privacy and Data Security in Telecommunications n. 565 of 1999

Guatemala: Constitution, articles 19, 22, 25 and 28

Italy: Constitution, articles 2, 14 and 15; Personal Data Protection Code, Legislative Decree n. 196 of 30 June 2003

Jordan: Constitution, articles 7, 10 and 18; Statistic Law n. 8 of 2003; Criminal Law n. 16 of 1960; Labour Law n. 8 of 1996; Telecommunication law n. 13 of 1995

Latvia: Constitution, art. 96, Personal Data Protection Law of 23 March 2000, available at http://www.dvi.gov.lv

Lebanon: No laws provided

Lithuania: Constitution, articles 22 and 25; Law on Legal Protection of Personal Data n. IX-1296 of 21 January 2003, available at

http://www3.lrs.lt/cgi-bin/preps2?Condition2=208886&Condition2

Malta: Constitution, art. 32, available at http://www.gov.mt/frame.asp?l=2&url=http://justice.gov.mt/; Data Protection Act n. XXVI of 2001

Mexico: Constitution, articles 7 and 16; Federal Law of Transparency and Access to

Public Governmental Information, published in the Official Journal on 11 June 2002, available at http://www.ifai.org.mx/transparencia/LFTAIPG.pdf;

and further regulations, available at http://www.ifai.org.mx

Monaco: Constitution, art. 22; Law on the Treatment of Nominal Information n. 1.165 of 23 December 1993 and its Regulatory Decree n. 13.327 of 12 February 1998

Morocco: Constitution, preamble and article 11; Code of Public Freedoms; Criminal Code, as amended by Law n. 07/03; Press Code

Myanmar: No laws provided

Pakistan: Constitution

Panama: Constitution, art. 29; Law n. 24 of 22 May 2002, on Credit Transactions operated by the Electronic Systems, published in the Official Journal n. 24,559 of 24 May 2002; Law n. 68 of 20 November 2003 on the Right to Privacy of Patients; Law n. 9 of 1998 on Banking

Philippines: Constitution; Bank Secrecy Law

Republic of Moldova: Constitution; Law on Access to Information, n. 982-XIV of 11 May 2000, published in the Official Journal nn. 88-90 on 28 July 2000

Romania: Constitution, art. 28; Law n. 676 of 21 November 2001 on the Processing of Personal Data and the Protection of Privacy in the Telecommunications Sector; Law n. 677 of 2001 on Persons' Protection regarding Processing of Personal Data and the Free Movement of those Data

Russian Federation: Constitution, articles 23 and 24; Federal Law on Information, Informatization and the Protection of Information n. 24 of 20 February 1995 as amended by Federal Law n. 15 of 10 January 2003; Federal Law n. 17 of 3 February 1996 on Banks and Banking; Federal Law n. 2124-1 of 27 December 1991 on Mass Media; Federal Law on Health Protection n. 5487-1 of 22 July 1993

Serbia and Montenegro: Constitution, articles 18 and 20

Slovenia: Constitution, art. 38; Personal Data Protection Act n. 8, published in the Official Journal n. 59/99, 57/2001 and 59/2001; Criminal Code, art. 154

Suriname: Constitution, art. 17; Personnel Act n. 195 of 1962 as amended by State Journal n. 77 of 2003 on Confidentiality Duties for Government Officials; Act on the Supervision of the Bank and Credit System n. 63 of 1986

Turkey: Constitution, articles 20, 21 and 22; Law on the Right to Information n. 4982 of 9 October 2003

Ukraine: Constitution, articles 31 and 32; Law on the Protection of Information in Automatized Systems

Uruguay: Constitution, articles 7, 28, 29, 72 and 332; Law on the Press n. 16099 of 3 January 1989; Law on Statistics n. 16616 of 20 October 1994; Decree on Financial Intermediation n. 15.322 of 17 September 1982; Law on Banking n. 16.696 of 30 March 1995; Decree on the Clinical History of Patients of 30 September 2003

Venezuela: Constitution, articles 28, 47, 48, 60 and 143; Law on Messages of Data and Electronic Signatures n. 1204 of 10 February 2001, published in the Official Journal n. 37 of 28 February 2001

Annex II

Websites of data protection authorities and other relevant websites

Australia: http://www.privacy.gov.au/

Austria: http://www.dsk.gv.at/

Belgium http://www.privacy.fgov.be/

Canada: http://www.privcom.gc.ca/

Cyprus: http://www.privireal.org/countries/cyprus.htm

Czech Rpublic: http://www.uoou.cz/

Denmark: http://www.datatilsynet.dk/

Finland: http://www.tietosuoja.fi/

France: http://www.cnil.fr/

Germany: http://www.bfd.bund.de/

Greece: http://www.dpa.gr/

Guernsey: http://www.dpcommission.gov.gg/

Hong Kong (China): http://www.pco.org.hk/

Hungary: http://abiweb.obh.hu/abi/

Iceland: http://www.personuvernd.is/tolvunefnd.nsf/pages/index.html

Ireland: http://www.dataprivacy.ie/

Isle of Man: http://www.gov.im/odps/

Italy: http://www.garanteprivacy.it/garante/navig/jsp/index.jsp

Japan: http://www.soumu.go.jp/english/index.html

Jersey: http://www.dataprotection.gov.je/

Latvia: http://www.dvi.gov.lv/

Liechtenstein: http://www.sds.llv.li/

Lithuania: http://www.ada.lt/

Luxembourg: http://www.cnpd.lu/

Malaysia: http://www.ktkm.gov.my/

Malta: http://www.dataprotection.gov.mt/page.asp?p=1368&l=1

Mexico: http://www.ifai.org.mx/

Netherlands: http://www.cbpweb.nl/

New Zealand: http://www.privacy.org.nz/

Norway: http://www.datatilsynet.no/

Poland: http://www.giodo.gov.pl/

Portugal: http://www.cnpd.pt/

Republic of Korea: http://www.kisa.or.kr/english/

Romania: http://www.avp.ro/

Slovakia: http://www.dataprotection.gov.sk/buxus/generate_page.php3?page_id=1

Spain: https://www.agpd.es/index.php

Sweden: http://www.datainspektionen.se/

Switzerland: http://www.edsb.ch/

Thailand: http://www.oic.thaigov.go.th/eng/engmain.asp

United Kingdom: http://www.informationcommissioner.gov.uk/

United States of America: Federal Trade Commission, not a data protection authority, http://www.ftc.gov/

Council of Europe: http://www.coe.int/T/E/Legal_affairs/Legal_co-operation/Data_protection/

European Union: http://europa.eu.int/comm/internal_market/privacy/index_en.htm

International Chamber of Commerce:

http://www.iccwbo.org/home/statements_rules/menu_rules.asp

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Notes

1. Privacy and Human Rights (2003). See http://www.privacyinternational.org/survey/phr2003/threats.htm.

2. See Article 29 Data Protection Working Party Opinion 2/2004, "on the adequate protection of personal data contained in the PNR of air passengers to be transferred to the United States' Bureau of Customs and Border Protection (US CBP)" (10019/04/EN), available at http://europa.eu.int/comm/internal_market/privacy/docs/wpdocs/2004/wp87_en.pdf.
   For an update on the situation see http://www.eurunion.org/news/press/2004/20040079.htm.

3. See www.commonwealth.org.

4. Article XIV(c)(ii).

5. UK White Paper, "Computers and Privacy" (Cmnd 6353), 1975, at 6.

6. In many laws, an individual to whom data relate is generally referred to as the "data subject". "Individual" and "data subject" are used interchangeably.

7. See Bygrave L (2002).

8. One may think of a recent form of unsolicited contact, used as marketing technique, which directly affects individuals' privacy –namely, spam.

9. Clarke R (2001).

10. "Your best defense against big brother, you", *Wall Street Journal*, 24 January 2000.

11. New e-government study finds ease, engagement, privacy and protection are top priorities, available at http://www.accenture.com/xd/xd.asp?it=enweb&xd=_dyn\dynamicpressrelease_602.xml.

12. The question of the protection of databases, which has traditionally received separate consideration by legislators, is outside the scope of this chapter.

13. In many laws, the entity processing personal data is referred to as a "data controller", "data user" or "data processor". These terms are used interchangeably.

14. General Assembly Resolution A/RES/45/95, 14 December 1990.

15. See subsection: D. 1 below.

16. I.e. binding if contained in an international treaty, and soft law with the value of a mere recommendation if contained in a General Assembly resolution.

17. For an application of the principle see the 2002 annual report prepared by the Korean Information Security Agency (KISA) on the state of personal information in the country: the mother of an elementary school student lodged a complaint because one of the websites she was using for her children's education required parents to provide excessive information on the children as part of the mandatory information, (Korea Information Security Agency, 2002, p. 45).

18. A classic example is a travel agent that communicates certain personal data of their client to make and confirm an airline or hotel reservation for that client. If data are to be used or communicated for a different purpose, the individual must be notified and such use must be lawful.

19. To give an example of a possible violation of this principle, one could imagine an organization keeping a list of undischarged bankrupts that does not seek information on persons discharging themselves from bankruptcy. See Walden (2003).

20. Available at http://www1.oecd.org/publications/e-book/9302011E.PDF.

21. Available at http://conventions.coe.int/treaty/en/Treaties/Html/108.htm.

22. General Assembly Resolution A/RES/45/95. Already in 1989 the General Assembly had adopted some draft guidelines (General Assembly Resolution A/RES/44/132, 15 December 1989), which were then submitted to

the Special Rapporteur of the Commission on Human Rights, Mr. Louis Joined, for a new version which incorporated the comments received by States and by other organizations.

23   Published in the *Official Journal,* L 281, 31.11.1995, available in 11 different languages at: http://europa.eu.int/comm/internal_market/en/dataprot/law/index.htm.

24.   See www.protecciondedatos.com.ar/resolucionspam.htm.

25.   The Singapore National Trust Council is aiming to have all TrustSg merchants full comply with the guidelines of the code by the end of 2004. See http://www.trustsg.org.sg.

26.   See subsection E. 4 below.

27.   See, for example, Commission Decision of 30/06/2003 on the adequate protection of personal data in Argentina (OJ L 168, 5.7.2003).

28.   The Council of Europe model terms are available at http://www.coe.int/T/E/Legal_affairs/Legal_co-operation/Data_protection/Documents/Publications/1ModelContract.asp#TopOfPage. The European Union model terms are available at http://europa.eu.int/comm/internal_market/privacy/modelcontracts_en.htm.

29.   "Model clauses for use in contracts involving transborder data flows", available at http://www.iccwbo.org/home/statements_rules/rules/1998/

30.   An example of a safe harbour arrangement is the agreement between the United States and the EU, which is available at http://www.export.gov/safeharbor.

31.   See the introduction to this chapter.

32.   See the online article of the Privacy Commissioner of Canada, Ms. Jennifer Stoddart, explaining the reasons for the adoption of the Personal Information Protection and Electronic Documents Act, (PIPEDA), available at http://www.privcom.gc.ca/speech/2004/vs/vs_sp-d_040331_e.asp.

33.   See the concerns expressed by the the co-chair of the security subcommitteee of the Philippine Information Technology and Electronic Commerce Council (ITECC), Mr. Dela Cruz, available at http://itmatters.com.ph/news/news_04162003c.html.

34.   Available at http://www.ktkm.gov.my/.

35.   In South Africa, for example, privacy issues are considered by the Human Rights Commission, while in Thailand the Office of the Official Information Commission has responsibility for all aspects of public sector use of, and access to, information.

36.   See, for instance, the case of Pakistan: one of the stated functions of the Licensing Enforcement Directorate in the Telecommunications Authority is to "protect consumer rights and ensure privacy of the customers". See http://www.pta.gov.pk/ledirectorate/what.htm.

Chapter 7

ASSESSING COMPETITIVENESS IN THE ICT SECTOR: THE CASE OF TUNISIA

A. Introduction

Tunisia occupies a leading position among developing countries with respect to its development of information and communication technologies (ICTs) and competitiveness. According to recently published economic indicators, Tunisia ranks 34th in the Networked Readiness Index (NRI), which covers 82 countries (World Economic Forum, 2003a). The country has the highest ranking in Africa and in the Arab world, and is ahead of several European countries. Furthermore, according to the technology achievement index (TAI), in 1999 Tunisia was the leading Arab exporter of "recent innovations in high and medium technology" (UNDP, 2001).

The Tunisian Government is making an effort to foster a supportive environment for ICTs via its national e-strategy. National ICT policies cover a broad set of development targets concerned with infrastructure, institutions, legislation and education. As host to the second phase of the World Summit on the Information Society (WSIS),[1] the Government is committed to making Tunisia a knowledge-based society.

Most dependent on the ICT environment and related policies is the ICT sector itself. In Tunisia, that sector has been one of the fastest-growing in the past few years, with an increase in turnover of 260 per cent in software and IT services between 1997 and 2001. At the same time, the firms that produce the technologies are one of the main driving forces behind the country's technological development. In recognition of this important role, one of the Government's priorities is to develop a strong and competitive ICT sector. Its national ICT policies are therefore designed to give particular support to the domestic software and IT industry. For example, its current development plan (covering the years 2002 –2006) pro-

vides for greater promotion of the knowledge-based society, and in particular the information economy, including software production and IT services (République Tunisienne, 2001a).

This chapter provides an analysis of the Tunisian ICT sector and identifies links between ICT policy measures, the national and international business environment, corporate strategies and enterprise performance. It also examines the extent to which national ICT policies enable ICT companies to enhance their competitiveness, in particular in foreign markets.

In order to evaluate how ICT policies and competitiveness relate to each other, how they have been leveraged in the country and which challenges have to be faced to take full advantage of ICT, an analysis is required that goes beyond available macro indicators and country rankings. This chapter will therefore provide an analysis at the sector and firm levels to identify the impact of ICT policies on business activities and performance, and hence the competitiveness of companies. The firm-level analysis will provide insights into the capacity of companies to gain and sustain competitive advantages within the given environment.

For this purpose, a survey was carried out with a sample of 49 software and IT service companies in Tunisia (representing about 18 per cent of the total sector), which provides the data needed for the assessment of the sector's competitiveness. The analysis will be complemented by an overall evaluation of how the national ICT environment and corporate strategies complement each other and what their impact on the sector's competitiveness is.

On the basis of the results of the survey, the chapter identifies the companies' needs for an improved policy environment. This will be useful to business leaders defining their strategies for

building competitive advantages in the software and IT industry. The chapter also provides suggestions for policy makers on how to assess and redefine their national ICT strategy so that it impacts on the competitiveness of the sector, including policies related to the ICT infrastructure, education, and public financial and non-financial business development support (BDS). This could be useful to policy makers from other developing countries aiming at fostering a competitive national ICT sector.

The following section will provide an overview of the Tunisian ICT sector and its business environment. Section C will present the Tunisian national ICT strategy and policies relevant to the creation of an enabling environment for the development of the ICT sector. Section D presents the results of the survey carried out with ICT companies. Section E draws conclusions and provides concrete suggestions related to both business and policy strategies, aimed at enhancing the competitiveness of the sector.

B. Overview of the ICT sector and its business environment

1. Definition of the ICT sector

There are various initiatives at the international level, mainly driven by the UN and the OECD, to define the ICT sector and the type of activities it comprises, and hence improve data comparability at the international level. This is a challenging task. First, given the lack of an internationally accepted classification, it is difficult to collect comparable statistical data for trade in certain products and services, such as software and IT services, but these activities are essential to the ICT sector. Second, there is inadequate implementation of international standards for statistical measurements in many countries and hence a lack of comparability of data. The definition agreed by OECD member states in 1998 will serve as a basis for the analysis in this chapter (OECD, 2002).

The OECD definition is based on the International Standard Industrial Classification ISIC Rev. 3.[2] But there are limitations to ISIC Rev. 3 regarding the coverage of software and IT services. Therefore, a firm-level analysis requires, with regard to the kind of activities considered to be

software and IT services, further classification into two main categories: first, software development and software manipulating services, such as software customization and integration, IT consulting, web development, translation and arabization (in the case of Tunisia); and second, IT-based services, such as database management, data mining, data conversion, and data extraction (World Bank, 2002).

2. Performance of Tunisia's ICT sector at a glance

The overall turnover of the ICT sector[3] increased continuously between 1997 and 1999 owing to substantial investments in ICTs, and declined in 2000 (chart 7.1). In 2001, this effect was compensated to some extent by earnings from businesses initiated during the boom years up to 1999 (Ministère des Technologies, de la Communication et du Transport, 2003).

Although the turnover of the ICT sector declined in 2000, it is important to note that, driven by the prospering world market, exports of software and IT services doubled at the same time. With an increase in turnover of 260 per cent between 1997 to 2001, software and services were a major growth area in the field of ICTs.

In 2001, a process of consolidation took place and many of the ICT companies disappeared from the market (chart 7.2), but employment for the whole sector was still increasing (chart 7.3).

Chart 7.1

Turnover of ICT companies (hardware and software)
(millions of dollars)
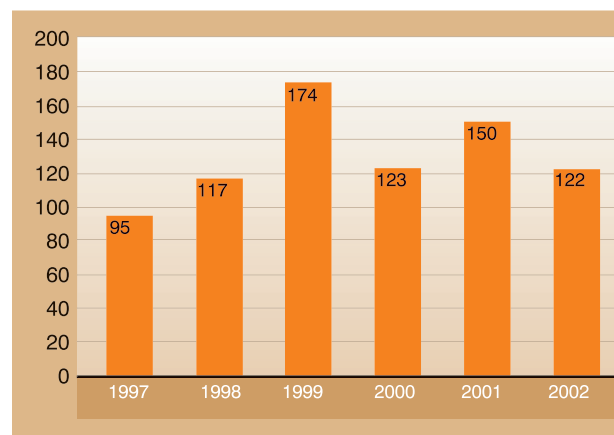
Source: Ministère des Finances (2003).

Chart 7.2
Number of private ICT companies

Source: Caisse Nationale de la Sécurité Sociale (2003).

Chart 7.3
Employment in private ICT companies

Source: Caisse Nationale de la Sécurité sociale (2003).

Strong growth in local demand helped ICT companies increase turnover again, before a decline in 2002. While firms reduced employment, the structural realignment within the sector was over and the existing companies remained. This can be explained by two factors. First, there were lay-offs due to the concentration of the market, for example through mergers and acquisitions. Second, a number of companies re-allocated employees and activities to foreign countries in order to be closer to export customers, for example in Europe.

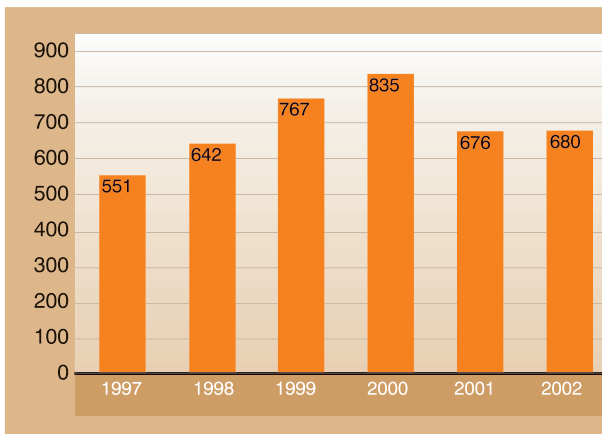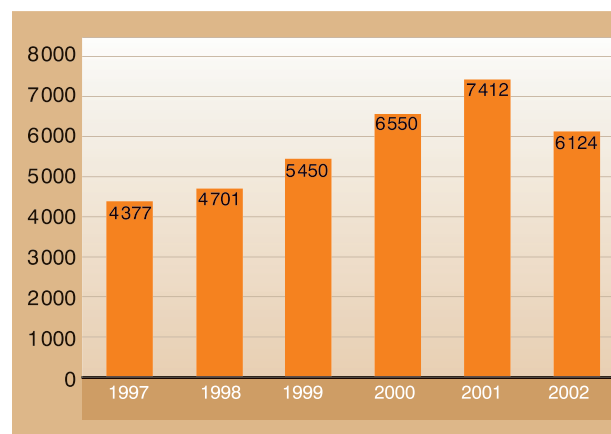In 2002, the sector comprised 680 companies with 6,124 employees (accounting for 2.1 per cent of total employment). There were 350 private enterprises specialized in the field of IT services and software development, which employed about 50 per cent of the 6,124 employees. The rest of the workforce was distributed among IT departments of major corporations, public enterprises and public administration, hardware production and national IT centres.

In the current five-year plan the Government estimates for software and IT service companies an average annual growth in turnover of 42.5 per cent, from 80 million Tunisian dinar (US$ 58.3 million) in 2002 to 655 million Tunisian dinar (US$ 477.2 million) in 2006. The average growth of other industrial sectors in Tunisia is put at 5.7 per cent. As a result, the share of software and IT services in the gross domestic product (GDP) is projected to increase significantly, from 0.27 per cent in 2002 to 1.5 per cent in 2006 (ITC, 2004). Despite the investments and growth planned by the Government, many software and IT service

companies have disappeared from the market. At the beginning of 2004, there were 274 IT software and service firms (CNS SSII, 2004).

3. National ICT business environment

Competitiveness is determined by the productivity of companies, or more precisely – in a dynamic approach – by the capacity of firms to increase productivity. Firms that are able to maintain an increase in their productivity are more likely to maintain their competitive position in the future than those that achieve a higher level of productivity but are unable to increase it further (Porter, 2003). Therefore, from a policy maker's point of view, the main concern is how to create optimal conditions for rapid and sustainable productivity growth. This section will look at these conditions by addressing two interrelated areas. First, it will look at the quality of the overall business environment. Second, it will examine the level of sophistication with which firms compete in their domestic and export markets. The link has to be made because, as companies move to more sophisticated ways of competing, they require changes in the business environment, for instance more highly skilled human resources, an improved infrastructure, or advanced research institutions (World Economic Forum, 2003a).

The following sections will look at the specific business environment for software and IT service companies in Tunisia. The discussion follows Michael Porter's methodological work on the requirements for a nation or industry to be internationally competitive (Porter 1990, see annex I).

Chart 7.4

Structure of ICT spending *(percentages)*
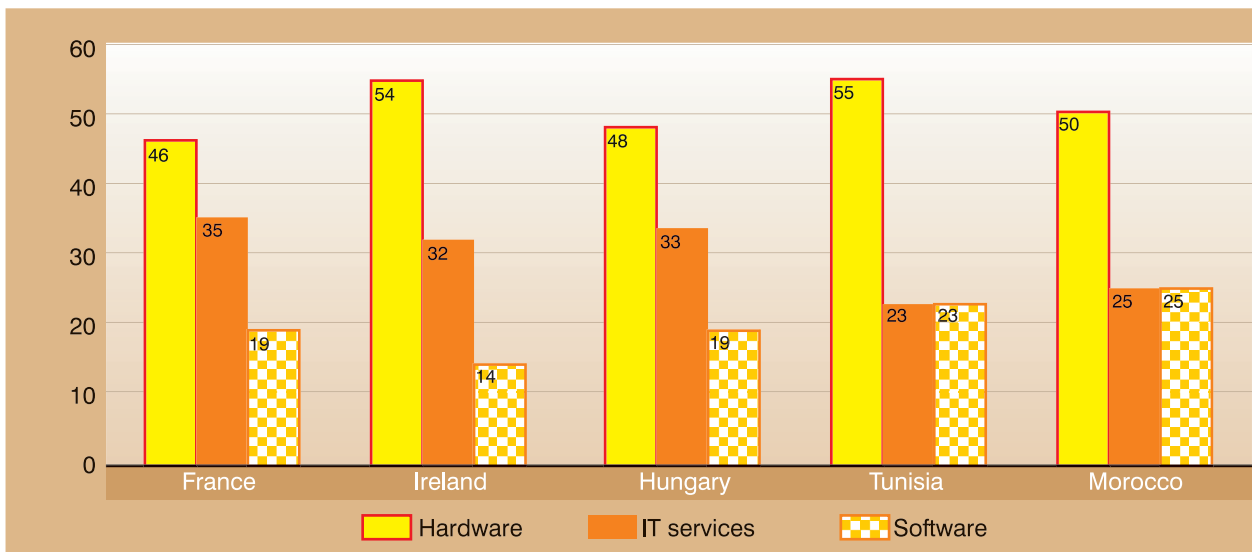
Source: ITC (2004).

In his work, Porter used a diagnostic tool known as the "competitiveness diamond", which requires that the economic conditions within which an industry competes be tested against four dimensions that have been found to be strong predictors of competitiveness and success: demand conditions, factor conditions, the presence of related and supporting industries, and the firm structure and strategy. These dimensions are closely interrelated. Governments have an influence on all aspects of the diamond via legislation, policy and delivery activities.

Demand conditions

Domestic demand for ICTs

Domestic demand is more important in terms of its character than of its size. It plays a disproportionate role in influencing the capacity of firms to improve products and services over time. Therefore, a closer look has to be taken at the structure of the domestic market in Tunisia and its impact on software and IT service companies (Porter, 1991).

The structure of spending on ICTs, as far as hardware is concerned, is very similar to that in other countries; but there is a significant difference in the international comparison regarding the ratio of services to software spending. For instance, in European countries, 15 – 20 per cent of spending

is on software and about 30 per cent on services. Whereas in Tunisia and other Maghreb countries, both are equally represented with about 25 per cent of spending (chart 7.4). This is primarily because of the disproportionately higher cost of software licences, for example for Windows or Oracle, compared with that of local IT services.

In particular, the revenues of ICT companies are significantly higher for services than for software.

Chart 7.5

Structure of revenues of the ICT sector in the domestic market
(millions of dollars)
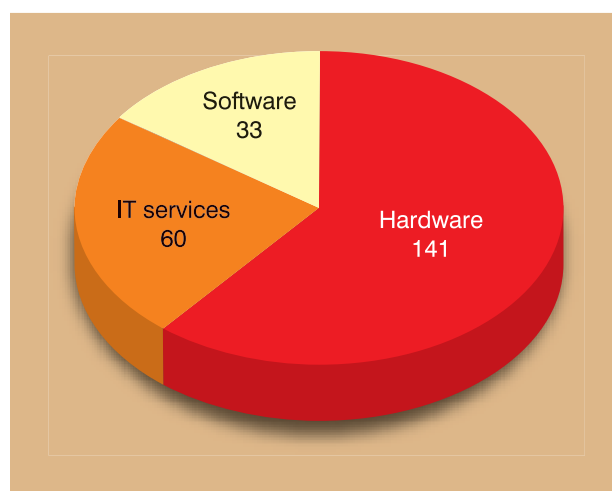
Source: International Data Corporation (IDC) – Central and Eastern Europe and the Middle East and Africa (Cema) (2003).

This means that for the same budget spent on software, IT services are more profitable (chart 7.5).

Since public investment in ICTs accounts for an important share in the overall turnover of the ICT sector, it deserves special mention in the discussion of demand conditions in Tunisia. The overall public budget for hardware, software and IT services is projected to increase from 912.2 million Tunisian dinar (US$ 664.6 million) for the period from 1997 to 2001, to 1.779 billion Tunisian dinar (US$ 1.3 billion) for the period from 2002 to 2006. Since 2002, the Government has given a higher priority to software and IT services than during the previous years (République Tunisienne, 2001a). The budget's planned increase of 18.6 per cent annually (2002 – 2006) is significantly higher for services and software than for hardware (12.3 per cent). The most extensive financial resources are reserved for hardware and equipment (which are largely imported), but this corresponds to the structure of spending in other countries.

Demand conditions in export markets

Since 1999, Tunisia has been exporting software and IT services. The biggest customers for Tunisian IT firms are located in Europe, North America, Africa and the Middle East. Important countries include France, Germany, Spain, Italy, the United Kingdom, the United States, Canada, Algeria, Morocco, the Libyan Arab Jamahiriya, Mauritania, Mali, Rwanda, Cameroon, South Africa, the United Arab Emirates and Oman (Ministère des Technologies, de la Communication et du Transport, 2003).

Chart 7.6 shows that between 1999 and 2000 the volume of exports of software and IT services doubled, in line with a fast-growing global demand. In 2001, exports suffered from – among other reasons – the weak demand growth in the global market for information technology products and services. It is interesting to note that despite the crisis in the global market after 2001, exports of software and IT services increased significantly in 2002. In Tunisia, the downturn in the overall turnover was mainly caused by weak domestic demand.

Factor conditions

Key inputs for the ICT sector are human resources, capital, ICT infrastructure, and science and research, in terms of efficiency, quality and specialization, and the extent to which they determine firms' competitiveness.

Chart 7.6

Structure of turnover of software and IT service companies
(millions of dollars)
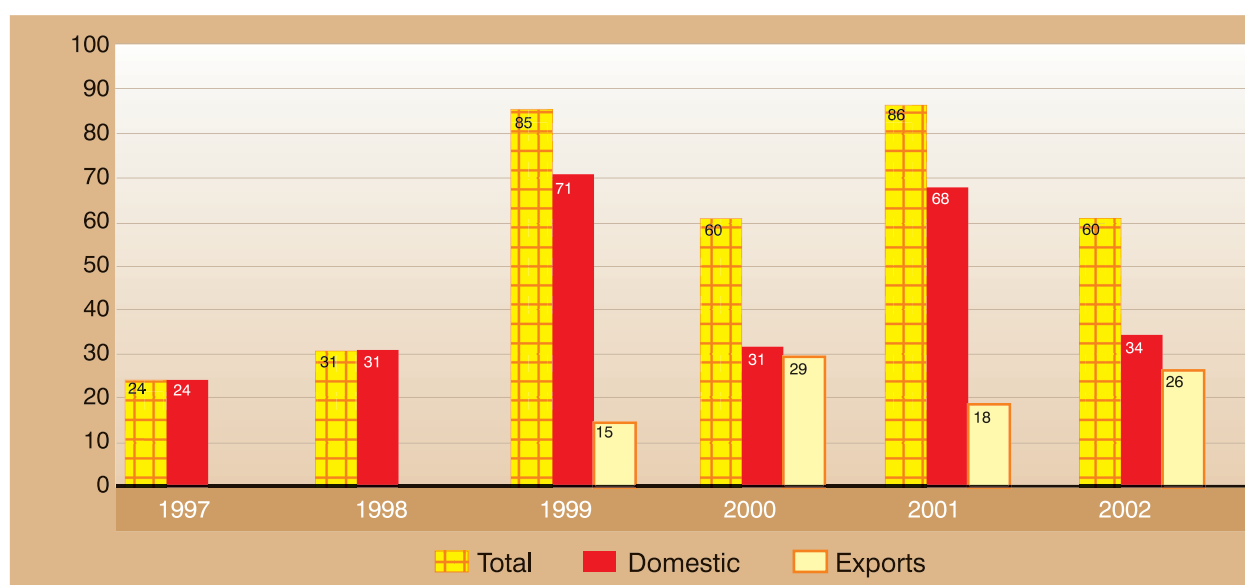
Source: Ministère des Finances (2003).

Chart 7.7

Production costs of software per man-day
(in dollars)

Country	Value
France	649
Spain	433
Turkey	419
Hungary	179
Poland	174
Morocco	129
Tunisia	114

Source: FIPA (2002).

Qualified human resources specialized in ICTs

The higher education system is a key provider of technological and managerial know-how for IT businesses. Tunisian graduates in ICT studies rank high in the international comparison as far as quality is concerned (see section C.4). In terms of quantity, the number of graduates specialized in IT will increase from 1,900 in 2002 to 5,000 in 2005 (Ministère des Technologies, de la Communication et du Transport 2003). Hence, the quantitative supply is guaranteed and does not affect negatively the ability of firms to increase productivity. A different question is whether software and IT service companies can generate sufficient demand for university graduates if the governmental estimates for 2002 – 2006 for sector growth cannot be met by the companies.

Promoting the international experience of students is another important aspect of the educational system. This way language skills other than in Arabic and French can be developed effectively. Tunisian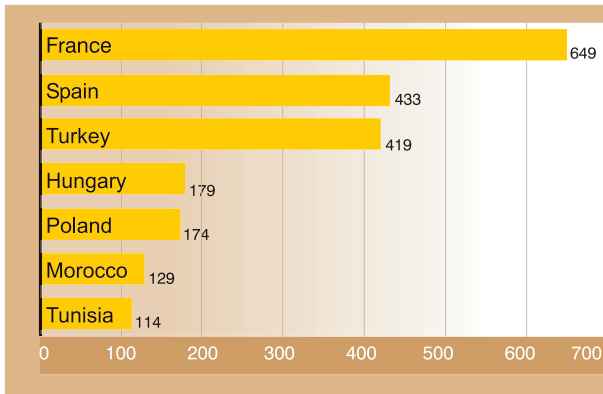 exchange students still have a strong affinity for French-speaking countries. Seventy-three per cent of all student exchanges are with France, Canada, Belgium and Switzerland (Ministère de l'Enseignement Supérieur, de la Recherche Scientifique et de la Technologie, 2003).

Traditionally, the education system in Tunisia focuses on continuous training of employees, including in less qualified positions. Tunisian companies either pay for the training of their own employees or have to pay a fee to the public training system. As companies have an influence on the kind of training an employee receives, this process supports the continuous input of knowledge and know-how (Ministère des Technologies, de la Communication et du Transport, 2003).

Low labour costs

A key competitive advantage in the Tunisian ICT sector is the low cost of highly qualified employees (chart 7.7). With 60 – 80 per cent of costs per man-day per unit of software produced, labour is the most important cost driver for software companies. The low level of wages supports effectively competitive prices of IT solutions and services in the international market, for example in Western and Eastern Europe and North America (FIPA, 2002).

Capital supply for software and IT service companies

Efficient capital markets and flexible financing models are essential to investments in the ICT sector. In particular, software and IT service companies with a somewhat non-tangible asset base require very specific financing conditions, compared with traditional sectors with a more tangible asset base. In this regard, there is still a lack of expertise concerning adequate risk evaluation in banks and the vast majority of venture capital firms. In general, investments and financing projects of large enterprises are preferred. This is a serious obstacle for software and IT service companies in Tunisia in view of the fact that the availability of risk capital is an important precondition for innovation and business development (World Bank, 2002), and could put them at a disadvantage in relation to competitors in countries with capital markets more experienced in the field of ICT.

There are various governmental initiatives to support ICT firms by providing public venture capital. Through the Régime d'Incitation à l'Innovation dans les Technologies de l'Information (RITI) the Government offers ICT firms the possibility of participating in projects related to research and development (R&D). A maximum of 50 per cent of the project cost may be covered by a bank loan, and at least 50 per cent is venture capital shared by the entrepreneur (minimum 2 per cent), a private venture capital company and the Fonds d'Incitation à l'Innovation dans les Technologies de l'Information (FITI). Another public-private venture capital fund is the Tunis Information Technology Fund (TITF).

Through these funds, the Government supports not only ICT companies, but in the long term also banks and venture capital firms, in gaining experience in financing projects in the field of ICT. It remains to be seen to what extent these funds are used by Tunisian enterprises and whether the capital market will change its traditional patterns regarding risk capital provision for ICT firms. This will be further explored in section D.

Foreign direct investment in ICT

The potential of the domestic market to attract foreign direct investment (FDI) plays a key role in overcoming structural obstacles, such as lack of availability of local venture capital. The presence of foreign investors in the domestic market can help Tunisian software and IT service companies develop international partnerships and take part in international networks. Collaboration with subsidiaries of multinational enterprises (MNEs) in Tunisia or MNEs investing in Tunisian companies can support the transfer of know-how. Moreover, Tunisian firms are more integrated into foreign value chains and hence, closer to foreign markets (Raffa et al., 2002).

The beneficial effects of FDI do not automatically come with the presence of foreign firms or capital. Therefore, steps to promote FDI effectively were taken by the government with the establishment of the Foreign Investment Promotion Agency (FIPA). Accordingly, administrative procedures for foreign investors were optimized and the Tunisian market is more accessible to foreign capital (Mansour, 2003). Furthermore, an advanced legal framework for the protection of intellectual property rights was developed, which is essential for efficient know-how transfers.

Chart 7.8 shows that foreign capital is not widespread among Tunisian software and IT service companies and only few subsidiaries of MNEs exist. This reflects the fact that the majority of software and IT service companies are very small and therefore less attractive to foreign capital participation. On the other hand, the availability of cost efficient Internet-based communication technologies would support intensive communication with distant foreign partners, or between subsidiaries of MNEs and home markets (World Bank, 2002). That this is an important issue for businesses in Tunisia is explained in section D.

Chart 7.8

Tunisian software and IT service companies by origin of capital
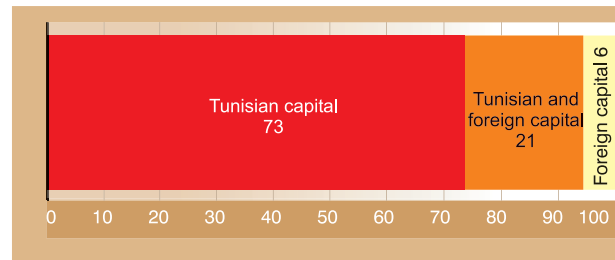
Source: Ministère des Technologies de la Communication et du Transport (2003)

Related and supporting industries

The availability and the quality of local suppliers and other supporting industries are important for the competitiveness of firms. The terms "supplier" and "industries" should not be misunderstood, however. Combined they comprise all organizations, institutions and businesses in an up-stream or down-stream relationship with software and IT service companies (Porter, 1990). "Up-stream" refers to the supply side of the value chain of firms, such as research institutions providing technological innovations. "Down-stream" refers to activities along the value chain after the actual creation of software and service solutions. Up-stream and down-stream activities regarding cluster development will be presented in section C.2. The next subsection looks at financial business support available to companies.

Public financial business support

In addition to venture capital, public funds established by the Government are focusing on the active support of business processes, having either a direct or indirect impact on ICT businesses (see section C.2, table 7.3).

Various public funds have been created to help different economic sectors to technologically upgrade their production and business processes in general. The main objective is to increase productivity, competitiveness and export performance. As investments in ICTs increased among companies as a result of these funds, software and IT service companies benefited indirectly, for example by providing resource planning systems for industrial production. In the domestic market these funds have a positive impact on the performance of ICT firms. It is hard to estimate to what

extent this enhances the productivity and competitiveness of software and IT service companies. On the one hand, the subsidies help to sell software and IT service solutions in the local market, which would be too expensive without the subsidies. Hence, it is questionable whether the products and solutions would be competitive in export markets, without the subsidies. On the other hand, software and IT service companies might acquire the necessary size, financial strength and know-how in the domestic market to successfully move into export markets.

Some funds have a direct impact on software and IT service companies. They concentrate on the promotion of exports across all economic sectors. For example, FAMEX (Fonds d'Accès aux Marchés d'Exportation) was established in collaboration between the Tunisian Government and the World Bank. Companies have to present their business plan for their export business to the advisory committee of the fund. Once approved, 50 per cent of the costs of any action undertaken to enter the market are covered by FAMEX, such as marketing efforts and business travel. The collaboration with FAMEX includes intensive management consultancy for the company, which transfers the expertise of the fund to the new export business. The Fonds de Promotion et Développement d'Exportation (FOPRODEX) is also an export promotion fund, which covers 15–50 per cent of costs for certain activities undertaken by a company, such as participation in trade fairs and certain kinds of advertising material. Both FAMEX and FOPRODEX have a positive impact on the competitiveness of Tunisian software and IT service companies. Collaboration with the funds reduces market access barriers as it permits companies to go abroad and market products with less financial effort. Companies thus learn how to market their products effectively and, in the long term, they may be able to approach the market without the support of the funds.

4. Firms' strategies and rivalry

Strategies are determined by a variety of options that an enterprise has to develop, on the basis of its strengths and advantages compared with those of its competitors, and in order to maximize profitability. The presence of domestic competitors, for example, negates basic factor advantages and forces firms to enhance existing advantages or to

develop new ones. This rivalry should be seen from two perspectives. Intense local rivalry among competitors may, on the one hand, keep profits low in the home market, but on the other hand, force companies to enhance advantages that might lead to higher profits in export markets. Therefore, the role of the public ICT sector as a competitor, and the extent to which it influences positively or negatively the business of software and IT service companies, are important (Porter, 1980).

In Tunisia, 80 per cent of software development for the public sector and public administration is carried out by the Centre National de l'Informatique (CNI). Section D.4 will illustrate in more detail that this is a significant share in an important segment of the domestic market. With the remaining 20 per cent, private businesses can scarcely participate in large national projects as these are primarily assigned to the CNI.

In the domestic and export markets, the Centre des Etudes et Recherche en Télélcommunication (CERT) is active in the field of IT services and software development. CERT mainly supplies the public administration and firms in the public sector in Tunisia. As an exporter, it has carried out IT consulting and IT management projects in various African countries and was involved in technical assistance projects in several Gulf States (UNDP and CEPEX, 2004).

Therefore, public ICT producers are the principal rivals of private software and IT service companies. A frequent argument against the dominance of CNI and CERT in these markets is that private software and IT service companies are hindered from achieving a certain critical size and financial strength, which would allow them to successfully tap export markets.

A call for liberalization to open the market for private software and IT service companies has to be seen as a trade-off against other national and sectoral development priorities of the Government. Therefore, the dominance of public ICT producers in certain market segments should not be regarded as a barrier to growth for private firms. An important question is whether all functions and responsibilities of public ICT providers should be transferred to private firms, or whether some functions should stay with public providers.

C.   Tunisia's national e-strategy

The e-strategy of a country defines the overall framework for national ICT development.[4] In Tunisia, this framework is embedded in the Government's five-year plans for national economic and social development, which give high priority to ICTs (République Tunisienne, 2001a). As a result, the country achieved the fourth best Government ICT readiness scoring after Singapore, Taiwan Province of China and Finland in the NRI, in particular a high-valued ICT competence of public officials and a high ranking for governmental procurement of advanced technology products. Furthermore, in terms of ICT usage, the Government performed better than many other countries, including France, Portugal, Spain, Hungary and India (World Economic Forum, 2003b).

This section provides an overview of Tunisia's ICT policies, programmes and projects, including infrastructure, education and science, business development support, and selected supplementary ICT initiatives driven by various non-governmental stakeholders. It will also identify future challenges that the Government is facing as regards its ICT development agenda outlined in the current Tenth Plan, covering the period 2002–2006.

1.   ICT infrastructure

During the period of the Ninth Plan (1997 – 2001), the Tunisian Government invested 1.4 bil-lion Tunisian dinar (US$ 1 billion) in ICT infrastructure, including telephone networks, Internet backbone, and other digital communication networks. The Tenth Plan (2002–2006) provides for an investment of 2.8 billion Tunisian dinar (US$ 2.1 billion) (République Tunisienne, 2001a). Despite these investments, the country still ranks internationally below-average regarding the availability and quality of telecommunication and Internet access, particularly in rural areas (World Economic Forum 2003b). Improving rural access is addressed in the Tenth Plan, which aims at a total of 13 telephone subscribers per 100 inhabitants in 2006 (in rural areas). However, it is important to note that significant progress has been achieved over the last years, as budget allocation for national telephony has been a priority. As a result, the combined number of fixed line and mobile phone subscribers per 100 inhabitants increased from 6.5 in 1997 to 15 in 2001.

Another important aspect regarding the development of the telecommunications infrastructure concerns the deregulation of the national telecommunications market. Tunisia's telephone infrastructure is characterized by relatively low costs for telephone and mobile phone subscriptions. But prices for fixed line phone calls are still comparatively high, owing to the monopoly of Tunisie Telecom.

On the other hand, the progressive liberalization of the market for mobile communication is bearing fruit. The costs for mobile phone calls are

Table 7.1

Public Internet service providers in Tunisia

Public Internet service provider	Network	Institutions connected
ATI – Agence Tunisienne d'Internet	General national / international backbone	Public institutions
Tunisie Telecom	General national backbone	Ministry of Communication, Technology and Transport and its agencies
CCK – Centre de Calcul El–Khawarizmi	RNU – Réseau National Universitaire	Universities
INBMI – Institut National de Bureautique et de Micro-informatique	EDUNET	Primary and secondary schools
SOTETEL-IT / IRSIT – Institut Régional des Sciences Informatiques et des Télécommunications	RNRT – Réseau National de la Recherche et de la Technologie	Research institutions
CIMSP – Centre informatique du Ministère de la Santé Publique	RNS – Réseau National de Santé	Hospitals
IRESA – Institut de la Recherche et de l'Enseignement Supérieur Agricole	AGRINET	Ministry of Agriculture, agricultural institutions for research and education

Table 7.2

Telecommunication indicators

	Fixed-line subscribers per 100 inhabitants	Cost of fixed-line calls [a]	Mobile phone subscribers per 100 inhabitants	Cost of mobile calls[a]	Internet hosts per 10 000 inhabitants	nternet users per 10 000 inhabitants	Personal computers per 100 inhabitants
Algeria	6.10	0.02	1.28	0.13	0.26	159.78	0.77
Egypt	11.04	0.01	6.68	0.68	0.45	282.26	1.66
Hungary	36.12	0.09	67.60	0.68	191.59	1 576.04	10.84
India	3.98	0.02	1.22	0.12	0.75	159.14	0.72
Jordan	12.66	0.04	22.89	0.49	7.72	576.97	3.75
Lebanon	19.88	0.07	22.70	0.43	21.08	1 171.30	8.05
Morocco	3.80	0.14	20.91	0.64	0.90	236.14	2.36
Poland	29.51	0.08	36.26	-	170.30	2 299.98	10.56
Romania	19.44	0.11	23.57	0.54	18.90	1,014.71	8.30
Saudi Arabia	14.39	0.03	21.72	0.76	6.73	646.12	13.67
South Africa	10.66	0.07	30.39	0.56	43.75	682.01	7.26
Syrian Arab Rep.	12.32	0.01	2.35	0.26	0.01	129.11	1.94
Tunisia	11.74	0.02	5.15	0.52	0.35	516.81	3.07
United Arab Emirates	31.35	–	69.61	0.25	139.40	3 131.63	11.99

Source: ITU (2004), UNCTAD (2003a).
[a] in dollars per three minutes call.

significantly lower than in most other Arab countries since the second mobile phone provider – Tunisiana, a subsidiary of Orascom, Telecom Tunisie – received the licence from the Tunisian Government and the monopoly of Tunisie Telecom was weakened. This has led to an increase in the number of mobile phone subscribers over the past two years. While there were 503,900 mobile phone subscribers in 2002, estimates for 2006 are as high as 3,000,000.

As far as Internet access is concerned, there are currently 12 Internet service providers (ISPs) in Tunisia. The Government established a number of public ISPs to exclusively connect certain public institutions (table 7.1) and to make the Internet accessible to sectors of particular importance for the economy, even if the average access for the rest of the country remains very low. Specific needs, such as the Internet bandwidth of different institutions, were taken into account for the network configuration. For instance, the Réseau National de Santé (RNS), which connects hospitals, is supposed to enable tele-medicine and has specific requirements concerning live stream data for online diagnostics. This is very different from the Réseau National de Recherche et de Technologie (RNRT), which connects research institutions and has a heavy demand for transfers of very large files (World Bank, 2002).

Private Internet access has improved constantly over the past years and several large private ISPs have entered the market. Today, there are five major players: Planet Tunisie, 3S Global Net, HexaByte, Tunet and Topnet. In addition, there are so-called Publinets, publicly supported Internet access points across the country. Fifty per cent of the initial investment in these access points is met by the Government and the remainder can be financed by low-interest loans. There were 305 Publinets in 2004 (ATI, 2004). These developments increase competition and hence provide greater affordability and access to the Internet.

As a result, the number of Internet users increased from 110 in 1997 (ITU, 2004) to 631,000 in 2003 (ATI, 2004). However, with 0.35 (2002), the number of Internet hosts per 10,000 inhabitants is still low by international comparison (table 7.2).

Table 7.3

Targets of business development support programmes

Programme	Target	Impact on ICT sector
RITI – Régime d'Incitation à l'Innovation dans les Technologies de l'Information	Promotion of entrepreneurship and innovation in the ICT sector	Direct
FITI – Fonds d'Incitation à l'Innovation dans les Technologies de l'Information	Promotion of investments in ICT	Direct
Mise-à-Niveau	General competitiveness, technology absorption, quality certification	Direct / Indirect
FAMEX – Fonds d'Accès aux Marchés d'Exportation	Export promotion, management consultancy, financing of market access cost	Direct / Indirect
FOPRODEX – Fonds de Promotion et Développement d'Exportation	Export promotion, financing of market access cost	Direct / Indirect
FOPRODI – Fonds de Promotion et Développement d'Industrie	Large industrial projects, efficiency, productivity	Indirect

2. Business development support

Financial and non-financial business development support (BDS) plays a central role in the Tunisian e-strategy. Through various public promotion programmes, projects and funds, the Government aims at a wide dissemination of ICTs in the Tunisian economy. Some funds are directly designed for ICT companies, so as to support entrepreneurship and innovations (table 7.3). Others encourage companies from different sectors to invest in ICTs, for example in software solutions or hardware equipment.

Technology parks

Cluster formation is an important driver for productivity and competitiveness of software and IT service companies as it aims to create closely linked, efficient relationships up-stream, down-stream and among firms at the same stage of the value chain (Porter, 1991). An important feature of ICT development policy in Tunisia is ICT cluster development, by building technology parks, so-called technopoles. This concept follows the International Business Incubation Systems (IBIS) approach by UNIDO, which aims to promote technological and industrial development (UNIDO, 2004).

The parks make it easy for local businesses with similar products and services to locate around existing industrial structures (as opposed to somewhere else). In addition, the clusters are supported by institutions such as financial and research institu-

tions and business consultancies, which help to maximize the companies' success and facilitate innovation (Porter, 1998). In Tunisia, public research institutions such as the Ecole Supérieure des Communications (Sup'Com) and the Institut Supérieur des Études Technologiques en Communications (ISET'Com), play a key role as drivers for innovation and as partners for companies (ITU, 2002b). Since 2001, ISET'Com has been establishing enterprise incubators in order to promote entrepreneurship in the ICT sector, by linking research, higher education and financial support.

One major project is the technopole Elgazala in Ariana, created in 1999. By 2003, the number of Tunisian and foreign firms located in the park had increased to 40, with about 520 engineers (www.elgazalacom.nat.tn 2004). Since 2000, Elgazala has been a member of the Association Internationale des Parcs Scientifiques (AIPS) and has established partnerships with technopoles in Bari (Italy) and Sophia Antipolis and Marseille (France). The motivation for this international collaboration among technopoles is transfer of know-how regarding the promotion of innovation and incubator development. Similar technopole projects are about to be launched, such as Sakiet Ezzit in Sfax and Hammam Maarouf in Sousse (Ambassade de France en Tunisie, 2003).
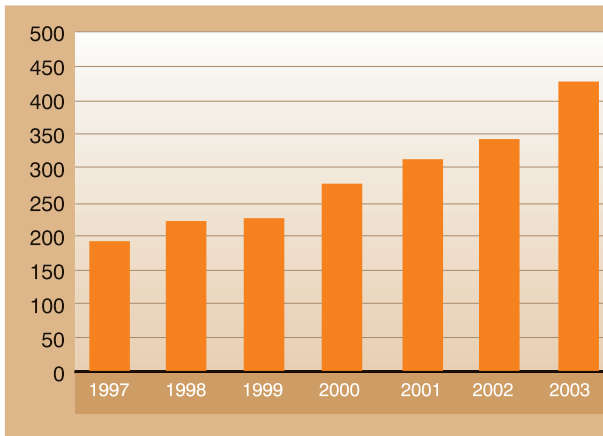
3. IT skills and education

The Tunisian Government has always set as a priority the development of human resources. There-

Chart 7.9

Public spending on higher education
(millions of dollars)

Chart 7.10

Public spending on higher education
(in percentage of GDP)
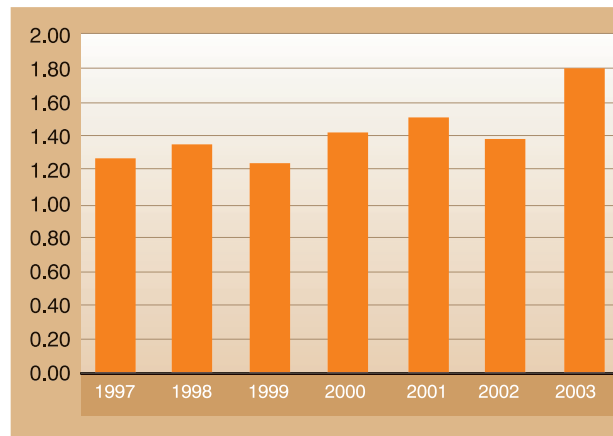
fore, education plays a major role in the national development plan and accounts for a relatively large share of public spending (charts 7.9 and 7.10). This explains the good ranking at the international level for Tunisia's public spending on education.

The higher-education system continued to place great emphasis on technical studies, so as to enable and support the development of ICTs economically and socially (chart 7.11). The quality of

Chart 7.11

Number of students in ICT-related technical studies

mathematics and science education in particular is high and Tunisia is ranked as the sixth best country in the NRI.

Despite considerable efforts made in the area of education, adult literacy is still low. Out of 82 countries covered by the NRI, Tunisia is ranked 74th, with an average adult illiteracy rate of 29 per cent (World Economic Forum, 2003a). In addition, there is relatively poor technology awareness on a broad social scale. But these issues are critical to improving the overall e-literacy in Tunisia (ITU, 2002a). The Government has therefore initiated programmes to enhance technology awareness in the country and familiarize people with the opportunities provided by new technologies, such as the Internet Caravans, Internet Week and OscarWeb (ITU, 2002b).

4.   Future ICT development challenges

A key challenge with regard to developing the Tunisian information society is the low individual usage and adoption of ICTs. Government initiatives, such as *Ordinateur Familial,*[5] were supposed to increase the number of people using computers at home and contribute to a broader dissemination of hardware. Crucial to greater penetration by the Internet is improved access (chart 7.12). Section C.2 outlined some of the improvements over the past years in the area of infrastructure, but much remains to be done.

Chart 7.12

Individual usage: A challenge for the knowledge-based society

Country	NRI Rank	NRI Score		NRI subindex	Rank	Value	Mean	[Value - mean]
Colombia	55	2.08						
Peru	56	2.06		Use of online payment systems	29	3.98	3.64	+
Philippines	57	1.98		Number of radios per 1,000 inhabitants	74	157.57	590.82	-
Russian Fed.	58	1.97		Number of television sets per 1,000 inhabitants	57	198.21	356.65	-
Paraguay	59	1.96		Number of cable television subscribers per 1,000 inhabitants	61	15.94	86.39	-
Tunisia	60	1.96		Number of mobile phones per 1,000 inhabitants	78	5.84	292.69	-
China	61	1.95		Number of Internet users per 100 inhabitants	54	12.83	38.44	-
Romania	62	1.95		Number of narrowband subscriber lines per 100 inhabitants	60	34.77	66.29	-
Morocco	63	1.93		Number of broadband subscriber lines per 100 inhabitants	44	0.00	3.62	-
Thailand	64	1.92		Household spending on ICT in dollars per month	58	19.60	27.05	-
Botswana	65	1.91						

Source: World Economic Forum (2003a).

Internet use might also be improved by increasingly offering administrative services online. Some services are already offered online, such as online registration for students at universities and tax declarations via Internet. But content and application development cannot be driven by the Government alone. Private initiatives are also necessary in order to take full advantage of the Internet and to make businesses and private persons use the Internet more actively.

The growth of the information economy is a priority for national development. On the business side, this encompasses mainly software production and IT services. These potential growth sectors are particularly interesting for two reasons. One is the role they play as regards greater integration of ICTs into the economy by supporting Tunisian manufacturing industries in upgrading their technological base (République Tunisienne, 2001b). For instance, the *Mise-à-Niveau*[6] programme is oriented in that direction

and promotes investments in ICTs. The second is the role that software and IT services can play in exports. Currently, neither Tunisian software nor IT service firms have a significant presence in international markets. The first steps have been taken to respond to that challenge. The Government, in collaboration with the World Bank, has initiated the export promotion programme Fonds d'Accès aux Marchés d'Exportation (FAMEX). Other action that could be taken in this regard will be addressed in more detail in section D.

D. Firm strategies and competition: Survey results

The previous two sections outlined the business environment in which the Tunisian ICT companies operate, as well as the national policies that impact on the business environment.

The overall business environment, including demand and factor conditions, availability of related and supporting industries and how they relate to firm strategies and rivalry, can support or limit firm activity depending on the firm's capacity to take advantage of the existing conditions.

To analyse in more detail sector competitiveness and the key elements that determine a company's success, it is necessary to move from the general context of the business environment to the level of the firm. One important aspect to consider is the relative position of firms within the overall industrial structure. It has been widely argued that these firm-external structures, which could be determined by shared market strategies, or the product and service orientation of competitors, have an important influence on firm success (Porter, 1980).

Firm success based on competitive advantages also depends on the potential of firms to nurture competitive advantages (Grant, 1991; Wernerfelt, 1984). Therefore, a competitiveness analysis needs to look at firm-internal positions concerning strategic resources, which could be competitive advantages (Barney, 1991; Prahalad and Hamel, 1990). For example, if reputation and close business relationships are crucial to firm success, particular competencies in these areas can be of strategic importance.

In March – April 2004, UNCTAD carried out a survey of Tunisian businesses in the ICT sector, focusing on software and IT services. Its main objective was to gather information about the companies' strategies and performances that could explain their ability to gain sustained competitive advantages. The following sections present the research results, which are based on the information obtained from the survey. They provide a detailed analysis of Tunisian software and IT service companies, including their current strategic orientation with respect to internationalization, target markets, products and services, and future trends and business outlooks, as well as their link with national ICT policies.

1.   Survey methodology

The study had three components:

(a) Field analysis: interviews were held with ICT experts from various Tunisian institutions, such as venture capital firms, public administration and business associations. Subsequently, a structured questionnaire was developed and distributed to all 274 Tunisian enterprises active in the field of software production and IT services. The survey response rate was 18 per cent (or 49 companies). In order to collect additional qualitative data, a sample of software and IT service companies were contacted for on-site meetings and interviews, and 21 Tunisian ICT experts were interviewed.

(b) Data analysis: on the basis of the data collected, the information obtained was analysed from a competitiveness point of view. Factors influencing the productivity of software and IT service companies and the resulting impact on competitive advantages and disadvantages were evaluated.

(c) Case studies: five software and IT service companies with outstanding characteristics as regards their strategy development were selected for a more detailed analysis based on personal interviews. The aim of the company case studies is to show which strategies have helped the companies gain competitive advantages and achieve improved performance. In this sense, the cases serve as best practice examples for Tunisian success stories in the field of software production and IT services. The case studies are presented in annex II.

2.   Sample characteristics

According to the Chambre Nationale Syndicale des Sociétés de Services et d'Ingénierie Informatique (CNS SSII) there are currently 274 software and IT service companies in Tunisia. Eighty-four per cent of the firms employ fewer than 10 people. Within the sample, 53 per cent of the companies employ fewer than 10 people. The sample is therefore slightly biased towards larger firms.

Twenty-two per cent of the companies surveyed have an annual turnover lower than 50,000 Tunisian dinar (US$ 36,430), 27 per cent between 50,000 and 200,000 Tunisian dinar (US$ 36,430 and 145,720), and 24 per cent above 200,000 Tunisian dinar (US$ 145,720), but under one million Tunisian dinar (US$ 728,600). The remaining 27 per cent have an annual turnover of more than 1 million Tunisian dinar (US$ 728,600), including 6 per cent with a turnover of more than 2 million Tunisian dinar (US$ 1.5 million).

Chart 7.13

Export markets of software and IT service companies
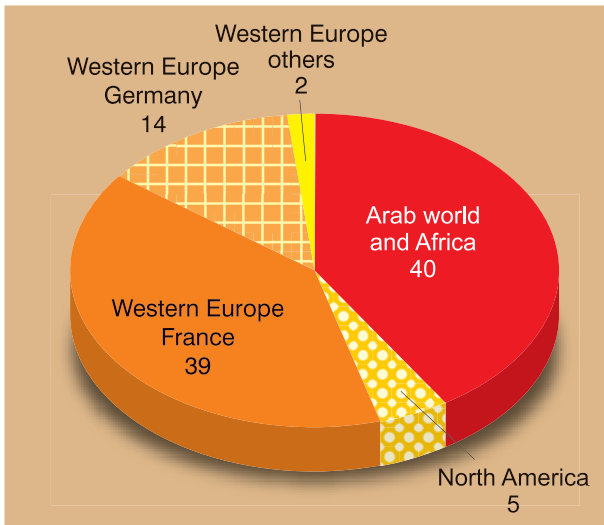
Note: Percentages relate to the export turnover generated by all software and IT service companies.

3.   Internationalization

The results of the survey reveal that most of the businesses focus on the domestic market. Twenty-three per cent of the overall turnover generated by the companies relate to exports, and 77 per cent to the domestic market. Nevertheless, the interna-

tionalization of business plays an important role for the firms.

At the time of the survey, 29 per cent of software and IT service companies in Tunisia did not export at all. They were only active in the domestic market. According to business leaders' plans, this share will decrease to 6 per cent, as firms are increasingly trying to extend their business in export markets. Seventy-one per cent of the companies in the survey are exporters, including 6 per cent pure exporters exclusively serving foreign markets. Firms that do not sell any products or services domestically are, for example, off-shore outsourcing specialists. In the future, 94 per cent of all software and IT service companies will partly or exclusively serve foreign markets.

Chart 7.13 shows the main target markets. Customers in Africa and the Arab world are mainly located in North African countries, such as Morocco, Algeria and Egypt. The Gulf States contribute little (0.18 per cent) to regional export businesses. The highest share of export turnover is generated in Western Europe. Within the European market, companies in France contribute the major part, followed by Germany. Software and IT service companies are not present in the Italian market, despite the fact that Italy is the second

Chart 7.14

Structure of turnover of software and IT service companies per region by degree of export orientation

(percentages)
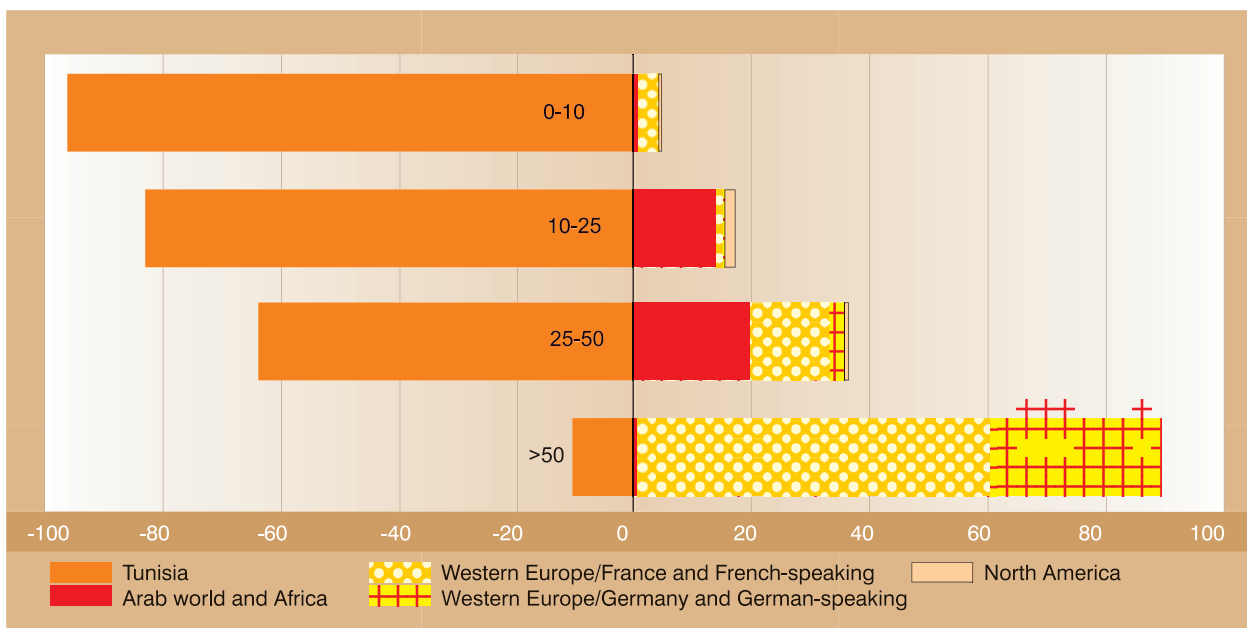
Note: Percentages relate to the export and domestic turnover generated by all software and IT service companies.

Table 7.4

**Distribution of turnover among software and IT service companies
by degree of export orientation**

Degree of export orientation	>50%	25–50%	10–25%	0–10%	0% (purely domestic)	
Overall turnover	11%	14%	47%	13%	15%	100%
Domestic turnover	1%	12%	51%	16%	20%	100%
Export turnover	40%	22%	35%	3%	–	100%
Share of companies	11%	9%	20%	29%	31%	100%
Relative company size*	1.00	1.56	2.35	0.45	0.48	
Concentration domestic turnover**	0.09	1.33	2.55	0.55	0.65	
Concentration export turnover***	3.64	2.44	1.75	0.10	–	

*   Relative company size measured in share of overall turnover per share of companies.
** Concentration of domestic turnover measured in share of domestic turnover per share of companies.
*** Concentration of export turnover measured in share of export turnover per share of companies.

most important trading partner for Tunisia's economy, after France and before Germany. Other Western European markets, such as Switzerland (1.38 per cent), Belgium (1.01 per cent), the United Kingdom (0.33 per cent) and the Netherlands (0.12 per cent) play a role for very few software and IT service companies. Exports to North America are mainly those to the United States, and to some extent also to Canada (0.04 per cent).

It is interesting to note that the higher the share of exports in the corporate turnover of a company, the stronger the market orientation towards Western Europe. Small exporters sell more in the regional market, mainly in Morocco, Algeria and Egypt. Chart 7.14 shows how different export markets contribute to the corporate turnover according to the degree of export orientation of the companies.

Hybrid exporters with a 10–25 per cent share of exports in their business have the major share in the domestic market (table 7.4). The ratio of overall turnover to share of companies belonging to this group indicates that these firms are large enterprises. The high share of 40 per cent of export turnover is generated by companies that do more than 50 per cent of their business abroad. It is interesting to see that these firms are of average size compared with the hybrid exporters and purely domestic firms, as the ratio of overall turnover to share of companies shows.

Linking turnover to export markets, it can be said that middle-size strong exporters take the lead regarding turnover generated abroad. They export mainly to Western Europe, with France and Germany being the most important target markets. On the other hand, there are large hybrid exporters with exports of 10–25 per cent. Hence, they greatly depend on the domestic market. Their main foreign target markets are in North Africa, not in Western Europe or North America.

In order to capture possible future dynamics in the internationalization of software and IT service companies, business leaders were asked to specify their target countries and regions for potential new customers (several answers were possible). There is no significant difference in attractiveness between the regional market, comprising Africa and the Arab world, and the Western European market (table 7.5). One question relates to the future role of North America and the low priority given by business leaders to this market. The responses in the survey indicate that no major changes should be expected here.

As far as country markets are concerned, two interesting developments might occur. The first is that export activities may be extended to Italy, although this has not yet been envisaged by any company despite the fact that Italy is the second most important export market for Tunisia as a whole. The second is that the English-speaking market might play a more significant role in the

Table 7.5

Future markers for software and IT service companies
(percentage of companies)

Rank	Country / region	%
1	Tunisia	69
2	Arab World and Africa	69
3	Western Europe/France	67
4	Western Europe/Germany	29
5	Western Europe/Italy	18
6	North America/USA	16
7	Western Europe/United Kingdom	14
8	Western Europe/French-speaking	6
9	North America/Canada	2
10	Western Europe/Switzerland	2

future. To what extent, however, is linked first of all to the obvious lack of attractiveness of the main English-speaking market, North America, for the majority of firms.

4. Competitors

As earlier research indicated, competitors for Tunisian IT exporters mainly originate from Eastern Europe and Morocco (ITC, 2004). A closer look at the firm level allows a more precise identification of the main competitors. For this purpose, target markets/countries were matched with competitors' countries of origin. The results show that for Tunisian software and IT service companies targeting the domestic market, the most important competitors are located in Tunisia. This is not surprising because of the rivalry from the public ICT sector (see earlier discussion in section B.4). Also important are companies located in Western Europe and, not surprisingly, companies from North Africa and Arab countries entering the local market.

The survey results indicate that there are different competitive advantages on which a company has to capitalize in order to enter and succeed in different markets. With regard to competition, the following emerged from the survey:

- Exporters that are also active in Tunisia view Asian companies as the most difficult competitors in their export markets. Also important (but significantly less important)

competitors are Tunisian and other North African companies.

- In the regional market (North Africa and Arab countries), the strongest competition comes from Asia and Eastern Europe.

- In the Western European market, the main competitors are other North African and Arab firms.

- In the North American market, competitors from Asia are the most challenging, compared with North African and other Arab, including Tunisian, firms.

5. Products and markets

Choice of products

From a list of 18 products or solutions, companies were asked to select the portfolio they currently cover and to indicate which solutions they are planning to offer in the future. The results show that the range will increase significantly over the next few years and companies will have more similar product and service portfolios. Today, 47 per cent of the companies offer one specific solution, web design. In the future, 47–57 per cent of the companies are planning to offer the five most common solutions. Currently, Tunisian software and IT service companies are specialized in 4.08 areas (on average). The greater diversification will result in 5.78 areas in the product portfolios (chart 7.15).

Many firms will extend their product and service range to include more complex solutions, such as enterprise resource planning (ERP) systems. Other services, such as web hosting, are gradually losing their importance in the portfolios of companies. The most common products and services will be e-commerce and e-business solutions, web design, customer relationship management (CRM) systems, e-learning solutions and training, and ERP systems.

Chart 7.15 provides a broad image of solutions which will play an increasing role for the companies in the future. The relative measures used categorize the solutions that are (more or less) present in current and future product and service portfolios, and identify areas of significant market dynamics to be expected. The thresholds chosen for both dimensions are based on the mean of

Chart 7.15

Present and future products and services of software and IT service companies
(percentages)

	High present share of companies offering a specific solution (> = 25)	
Small increase from present to future in companies offering a specific solution (<50)	E-commerce / e-business solutions (58) Web design (54) E-learning solutions (49) ERP systems (47) Accounting systems (37) Inventory management systems (31) Web hosting (29)	CRM solutions (54)
	Knowledge management solutions (33) + Telecommunication solutions (27) + CAD systems (15) Webmarketing (5) + = emerging trends	SCM systems (33) + Decision support systems (27) + Security solutions (23) + Geographical information systems (19) GPS solutions (11)
	Low present share of companies offering a specific solution (<25)	**Strong increase from present to future in companies offering a specific solution (> = 50)**

Strongest increase in m-commerce/mobile solutions	
Present share of companies offering the solution	14
Future share of companies offering the solution	35
Increase present to future	143

% Future share of companies offering a specific solution.
+ Indicator for leaping from a low present share to a high future share of companies offering a specific solution.

respective minimum and maximum values for all solutions. Both serve an illustration purpose and should not be regarded as indicators for evaluating the strategic meaning of certain solutions for the companies.

Less dynamic areas are more traditional solutions, such as those related to e-commerce and e-business. The number of companies engaged in these areas is relatively high, but they do not attract many new competitors. On the other hand, there are areas with quite a large number of competitors offering similar products and services, which still attract a relatively large number of new competitors, for example CRM solutions.

The main emerging trends regarding the future portfolio orientation of the companies are supply chain management (SCM) systems, decision sup-

port systems (DSS) and security solutions. Growing more slowly in importance, but already playing a significant role in product and service portfolios of companies, are knowledge management and telecommunication solutions. The most dynamic future trend is in mobile solutions. These products, which currently have a low presence in the market, have caught the attention of a large number of firms. In the light of the recent liberalization of the mobile communications market in Tunisia, it is not surprising that more and more companies perceive this as a promising market.

Business trend: Outsourcing

Various forms of outsourcing have developed together with the expansion of ICTs and new business models (UNCTAD, 2003b). Following the global trend, outsourcing also plays a role for

Table 7.6

Companies with outsourcing business by share in turnover
(percentages)

No outsourcing	0–25% turnover	25–50% turnover	50–75% turnover	75–100% turnover	Pure outsourcing
20%	53%	16%	4%	2%	4%

Tunisian software and IT service firms. They take over IT functions within their customers' business, such as software and database development, customer service, website management, IT training, data reporting, web content management and digital security services. Numerous software producers and IT service companies have entered the market.

As table 7.6 shows, only a few pure outsourcing specialists are in the Tunisian market. Most firms generate up to 25 per cent of their turnover in this field. A significant number (20 per cent) of companies do not conduct any outsourcing business at all.

The survey shows that 86 per cent of export companies are active in the field either off-shore (in export markets) or locally in Tunisia. The majority of off-shore outsourcing firms have entered the regional market, whereas North America and Europe have not yet caught the attention of many firms. Among the companies that concentrate exclusively on the domestic market, 64 per cent offer outsourcing services.

Looking at the added value of services offered, outsourcing companies focusing on the domestic market clearly concentrate on complex services with high added value, such as IT consultancy, systems analysis and systems design. Export-oriented companies offer both complex and more simple services, but low-value-added services, such as systems maintenance and customization of software, predominate.

This underlines again (see section D.3) the different sources of competitive advantages in different markets. For example, in Western Europe and North America, Tunisian software and IT service firms concentrate on low-value services for outsourcing. This indicates that companies compete with other regional and Asian competitors on the basis of cost rather than high service differentiation and hence more complex high-value service offerings. Furthermore, this might indicate that

not all off-shore outsourcing companies can take full advantage of their local proximity to Europe, their highly skilled engineering work force or language skills, all of which should permit more companies to offer high-value services. There are several reasons for this.
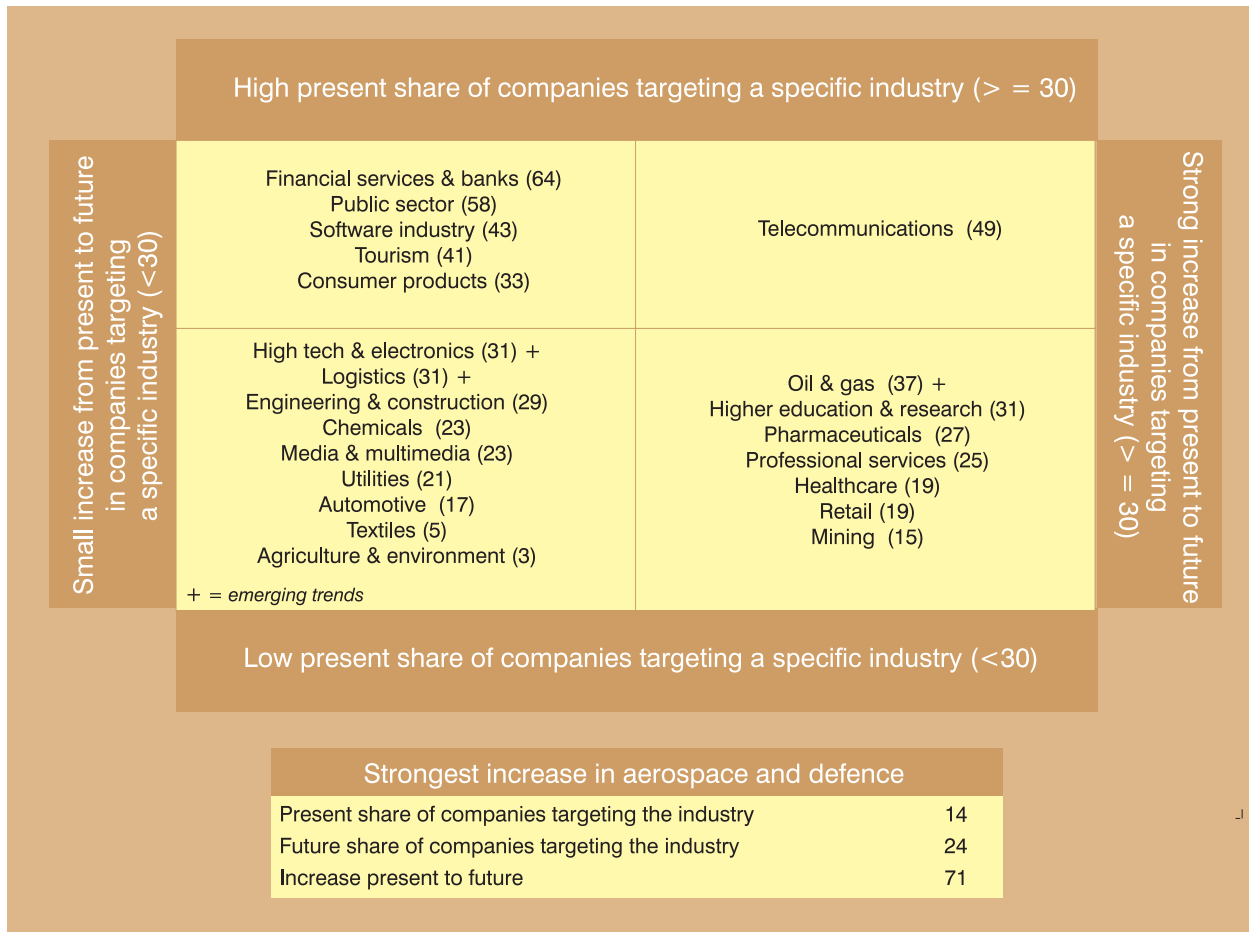
First, close customer relationships play a key role for successful outsourcing at the top of the value hierarchy of services. This requires relationship-building skills and intensive communication. An essential question in this context is whether the existing ICT infrastructure supports cost-effective communication with distant outsourcing customers, such as voice-over IP (VoIP) and broadband Internet. Another important issue is the availability of management skills, which are crucial to successful relationship management (UNCTAD, 2003b) (see section D.7).

Second, at the regional and domestic levels, high-value-added services, requiring greater technological knowledge and relationship-building, are better represented. Here, Tunisian IT outsourcing firms compete not only on cost (i.e. simpler services), but also on differentiation (i.e. more complex services). This is underlined by the fact that, in addition to regional and Asian competitors, business leaders mentioned increased competition from Western and Eastern Europe in the field of outsourcing locally (in Tunisia) and at the regional level (in Arab and African countries). European IT outsourcing firms are forced to compete less on costs, and more on differentiated services (UNCTAD, 2003b).

Choice of markets and industries

From a list of 22 industries, companies were asked to select present and future target industries. Results show that, apart from products and services, the average number of target industries will increase significantly over the next years. Currently, 51–53 per cent of the companies target two specific industries (financial services and public administration). Estimates show that this figure

Chart 7.16

Present and future target industries of software and IT service companies
(percentages)

High present share of companies targeting a specific industry (> = 30)

Small increase from present to future in companies targeting a specific industry (<30)			Strong increase from present to future in companies targeting a specific industry (> = 30)
	Financial services & banks (64) Public sector (58) Software industry (43) Tourism (41) Consumer products (33)	Telecommunications (49)	
	High tech & electronics (31) + Logistics (31) + Engineering & construction (29) Chemicals (23) Media & multimedia (23) Utilities (21) Automotive (17) Textiles (5) Agriculture & environment (3) + = *emerging trends*	Oil & gas (37) + Higher education & research (31) Pharmaceuticals (27) Professional services (25) Healthcare (19) Retail (19) Mining (15)	

Low present share of companies targeting a specific industry (<30)

Strongest increase in aerospace and defence	
Present share of companies targeting the industry	14
Future share of companies targeting the industry	24
Increase present to future	71

% Future share of companies targeting a specific industry.
+ Indicator for leaping from a low present share to a high future share of companies targeting a specific industry.

may change to 41–63 per cent, targeting five industries of most interest to the companies. The number of target industries will increase from 5.45 to 6.80 per company.

Chart 7.16 provides an overview of types of customers and industries that will increasingly play a role for software and IT service companies. Small increases are expected in traditional customer industries, such as financial services and banks. The number of companies engaged in these fields is relatively high, but these markets do not attract significantly new competitors. On the other hand, some industries, already targeted by quite a high number of competitors, will attract a relatively high number of new competitors. This is the case for the telecommunications sector.

With regard to the future orientation of software and IT service companies, one of the main emerging markets could be the oil and gas industry. More gradually developing, but also important as customer industries, are high tech and electronics, and logistics. More and more firms are targeting the aerospace and defence sector, which might soon play a more important role for software and IT service companies.

Forty-eight per cent of the turnover of the companies surveyed is generated in the public sector. The share in the corporate turnover of firms is declining by the degree of export orientation, down to 7 per cent of turnover among exporters, with more than 50 per cent of business activities abroad.
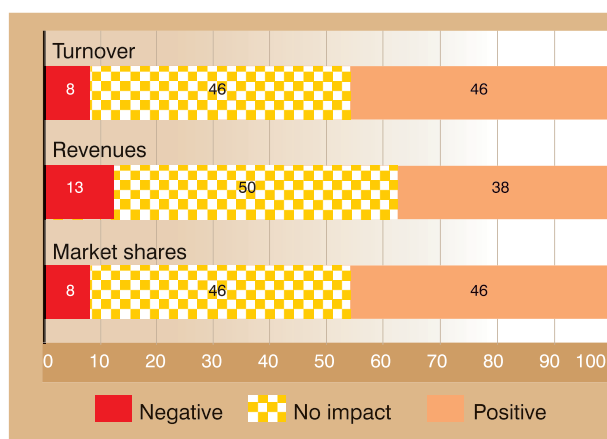
Technology trend: Free and open source software

Much has been said about the significance of free and open source software (FOSS) for economic development. For example, it can help Governments and businesses to minimize their reliance on single suppliers of proprietary software. Moreover, FOSS development can play a central role in upgrading a country's human resource capacity and technological skill base (UNCTAD, 2003b).

FOSS is also an attractive business for Tunisian software companies. Currently, 10 per cent of the turnover of software companies is generated by FOSS-based solutions, compared with 90 per cent by the use of proprietary software. The minor role in terms of share of turnover should not be misunderstood as very often software solutions integrate both FOSS and proprietary software. In Tunisia, 45 per cent of software firms are such integrators. Fifty-two per cent are concentrating entirely on the development of solutions based on proprietary software, and 3 per cent could be identified as FOSS specialists, not using any proprietary software at all. An interesting finding of the survey is that there are significantly different FOSS requirements in export and domestic markets. While 67 per cent of exporters implement FOSS in their solutions, only 29 per cent of companies focused on the domestic market do so. Domestic customers possibly require fewer FOSS characteristics in software solutions than those located in the export market.

As far as the companies' experience with FOSS is concerned, 46 per cent of the companies engaged in FOSS development indicated that they had experienced positive impacts on their turnover and market share as a result of the implementation of FOSS in their solutions. The same number of firms did not experience any changes in these two areas. Eight per cent experienced decreasing numbers in terms of turnover and market share. Regarding revenues, the distribution is slightly different. Thirty-eight per cent were able to increase revenues, 50 per cent did not change, and 13 per cent said they faced a decline in revenue due to FOSS development (chart 7.17).

6. Capital and finance

Driven by weak capital supply from the banking sector and an insufficient number of financing models for the IT sector, the presence of private venture capital is not very common among the firms (chart 7.18).

As already discussed, public BDS plays an important role for Tunisian software and IT service companies in order to compensate for the lack of private funds. The most important public funds are listed in table 7.7. FAMEX and FOPRODEX are BDS programmes tailored for exports. Therefore, it is not surprising that the share of companies using the funds increases with their degree of export orientation. Since the objective of the export promotion funds is to increase firms' activities abroad, their value for companies that already have a strong export focus is rather low. Similarly, *Mise-à-Niveau* is not particularly designed for export or for IT firms, but it is attractive to many

Chart 7.17

Impact of FOSS on business performance of FOSS developing firms
(percentages)

Chart 7.18

Private venture capital in software and IT service companies
(percentages)
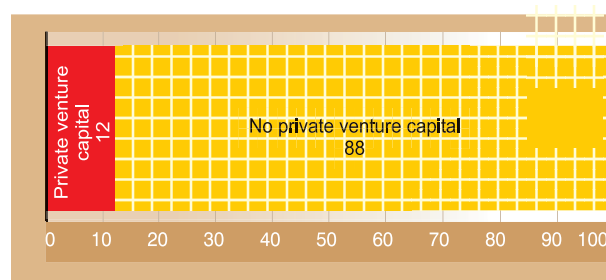
Note: Percentage of companies using venture capital or not.

Table 7.7

Most important business development support programmes of companies using BDS

(percentages)

Rank	Business development support programme	All companies	100% domestic	Exports 0–10%	Exports 10–25%	Exports 25–50%	Exports >50%
1	FAMEX	41	7	46	56	100	40
2	Mis–à–Niveau	24	14	23	22	50	20
3	FOPRODEX	8	0	15	11	25	0
4	Others	2	0	31	0	25	0
	No use of BDS programmes	43	79	23	33	0	60

companies as it helps to implement international quality standards such as ISO 9001.

Exporters with a turnover of 25–50 per cent based on foreign business are the most advanced users of BDS funds across all programmes. They have the most diversified portfolio of sources of public finance. This might indicate a preference on the part of the funds for these companies. In fact, not only customers and banks are judging software and IT service companies on the basis of size and

financial strength. For instance, the funds require a minimum commitment from the entrepreneur and external private sources of capital to a joint project. These requirements can hardly be fulfilled by small businesses.

Chart 7.19 shows how software and IT service companies use BDS. Exporters with the highest share of export turnover set different priorities. They invest in quality certification and marketing, including market research, and market positioning analysis.
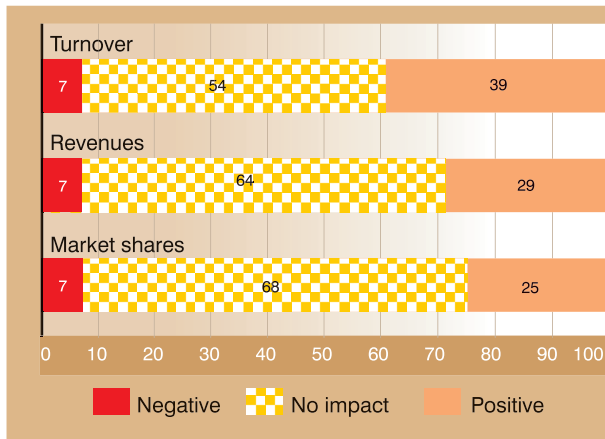
Chart 7.19

BDS goals of software and IT service companies
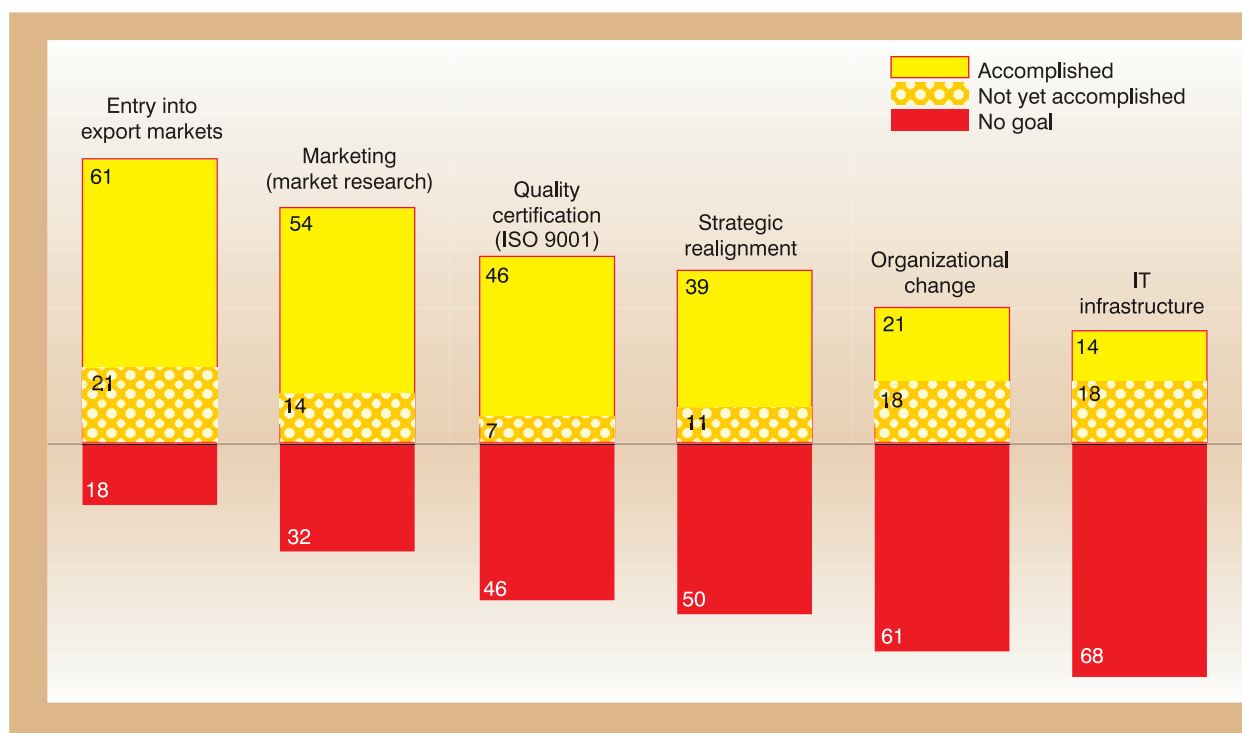
(percentages)

Note: Goals are measured in percentage of companies having accomplished, not yet accomplished or not having specified this as a goal.

Chart 7.20

Impact of business development support on domestic performance in companies using BDS
(percentages)

	Negative	No impact	Positive
Turnover	7	54	39
Revenues	7	64	29
Market shares	7	68	25

Chart 7.21

Impact of business development support on export performance in companies using BDS
(percentages)

	No impact	Positive
Turnover	57	43
Revenues	68	32
Market shares	68	32

Investments in IT infrastructure are more important for companies with a low or average export orientation. Advancing export businesses might require an advanced infrastructure as well. The survey results show that strong exporters might have already developed the necessary IT infrastructure as they do not have this priority any longer. Strategic realignment also plays a role for the hybrid exporter (with 25–50 per cent of overall export business), and a clear strategy formulation is a prerequisite for successful export businesses, as section D.7 will show.
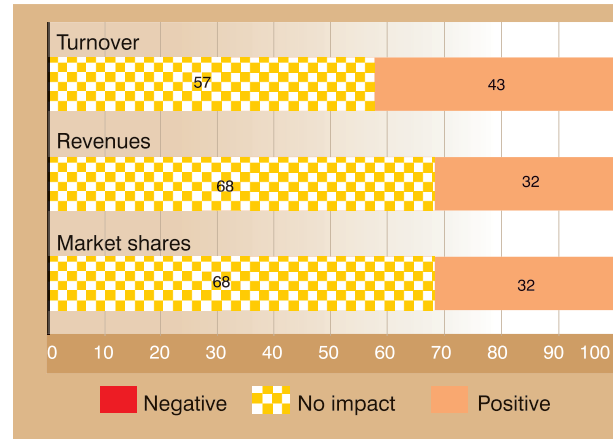
To summarize, a significant share of the companies (32 per cent) which collaborated with the funds stated that they could increase their revenues and market shares in export markets (chart 7.21). Forty-three per cent experienced a growth in their export turnover. As outlined above, export promotion is only one of several BDS targets. Therefore, it is not surprising that for the majority of companies nothing changed regarding their export business. A strategic impact of the funds could be that for 33 per cent of the firms with an export orientation of 10–25 per cent, the domestic business decreased in terms of turnover, market share and revenue. This could be due to a strategic realignment of business towards foreign markets.

7. Sophistication of firm strategies

Important to a company's strategy setting is consideration of available resources, dynamics in markets and the potential of the company, within the given business environment. In other words, the strategy defines which resources create competitive advantages, and how to leverage the advantages most effectively with respect to the company's strengths, weaknesses, threats and opportunities in each market.

Successful organizational strategy implementation requires consideration of a number of important aspects, such as linkages to the operational business, firm-wide awareness of targets, clearly defined roles of single business units, organizational incentives to follow the targets, and control of effectiveness. Chart 7.22 shows the extent to which Tunisian software and IT service companies have developed and implemented their corporate strategies (although the time frame is rather short – less than five years).

The results show that there is a link between the degree of export orientation and the degree of strategy implementation. With an increasing focus on exports, companies tend to cover the whole range of options to support their strategic planning better within their organization, for example measurement of effectiveness and precise action plans. Therefore, it is valid to say that exporting could require companies to implement stronger and more comprehensive strategies in their organizations. A reason for that could be the need for a more precise definition of competitive advantages and a strategic choice on how to leverage the advantage in a specific market, or the choice of the most attractive market for the specific advantages that a company has vis-à-vis its competitors.

Chart 7.22

Strategy implementation in software and IT service companies
(percentages)
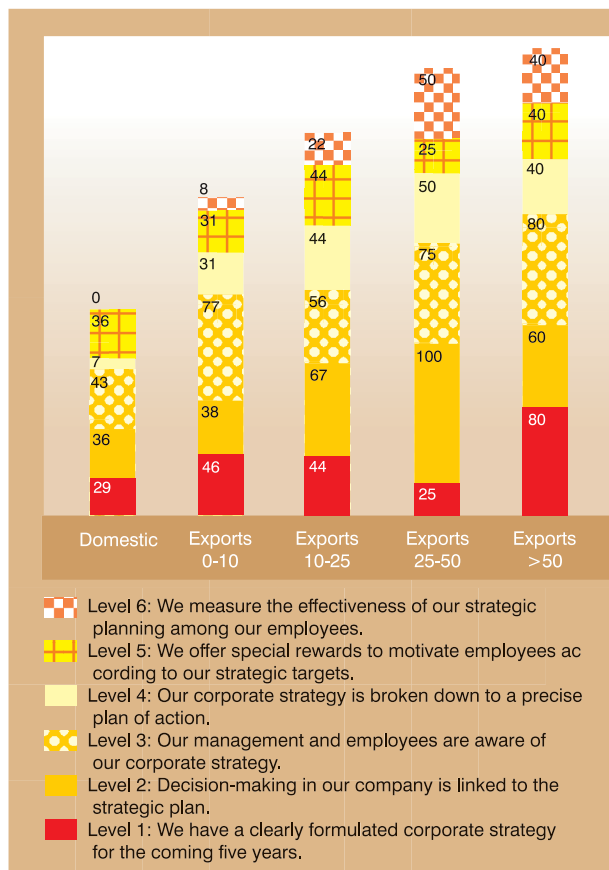
Note: The affirmative answers are presented by the number of companies in percentages.

Chart 7.23 lists the strategic priorities of Tunisian software and IT service companies. The top priority is product marketing, ranging from market research and market positioning analysis to marketing campaigns. The awareness of companies about these activities underlines the increasing importance of strategic planning and more dedicated customer orientation. A clear understanding of customer needs and requirements is a prerequisite for a successful strategy formulation and implementation.

The survey identified possible challenges for firms to develop and maintain customer relationships over time (chart 7.24). Most critical is the availability of resources for the preparation, development and implementation of customer projects. Large customer projects require serious commitments from both customers and suppliers, regarding financial means and human resources. As solution providers cannot be paid real-time, customers have to consider not only technical capabilities

but also financial strength in their choice of providers. As discussed in section B.3, adequate financing models for large projects, which could help software and IT service companies in this regard, are rare in Tunisia.

The question remains to what extent companies will be able to face these challenges. Among the companies surveyed, the most favoured option for resolving problems of financial strength and firm size is inter-firm cooperation. As table 7.8 shows, 80 per cent of all companies consider this to be their strategy for market growth. While cooperation among firms can help in taking advantage of complementary resources and a stronger image for customers, successful collaboration also requires good management skills to coordinate two or more organizations successfully. The alternative organic growth may be hard to achieve given the limited opportunities to participate in large projects. Owing to weak financial and capital markets in Tunisia, mergers and acquisitions (M&A) are the least favoured option. They would require more intensive collaboration with experienced financial institutions to support the process of merging different companies and organizations.
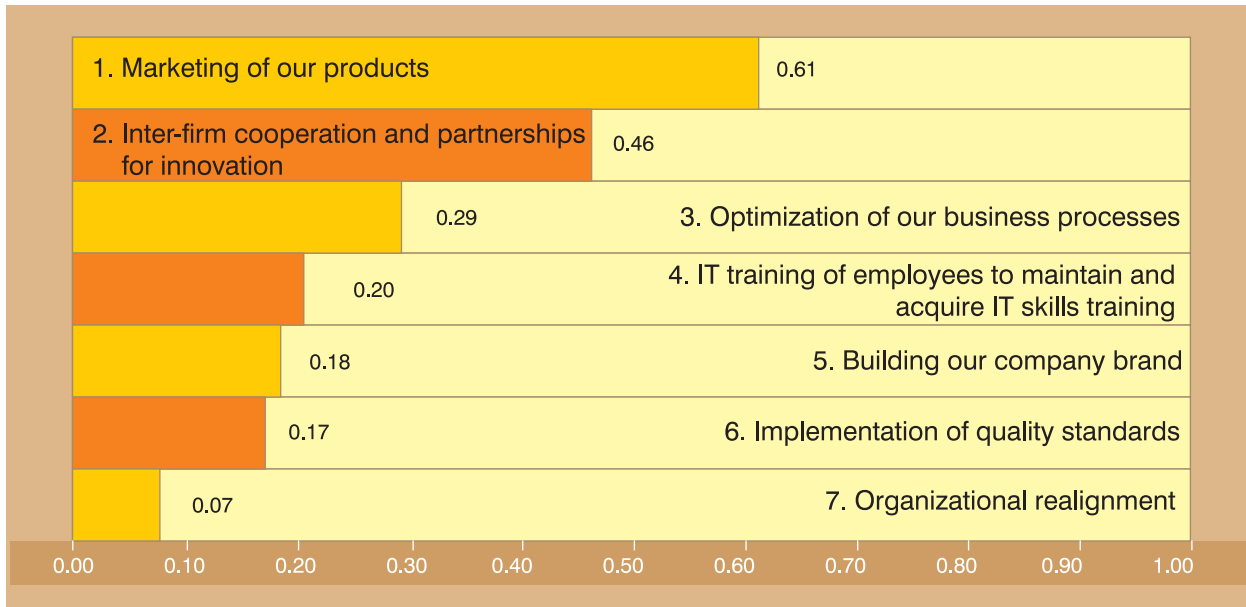
Table 7.9 shows the level of e-business solutions implemented (or planned) by software and IT service companies in Tunisia. It is interesting to note that awareness of customer needs and marketing issues seems increasingly to influence the decisions of companies concerning e-business solutions. Traditional IT solutions, such as accounting systems, and telecommunication and knowledge management solutions, have an impact on organizational efficiency within the firm.

In the future, CRM systems as well as e-business solutions will gain most in importance. These tools can help software and IT service companies

Table 7.8

Growth strategies of software and IT service companies
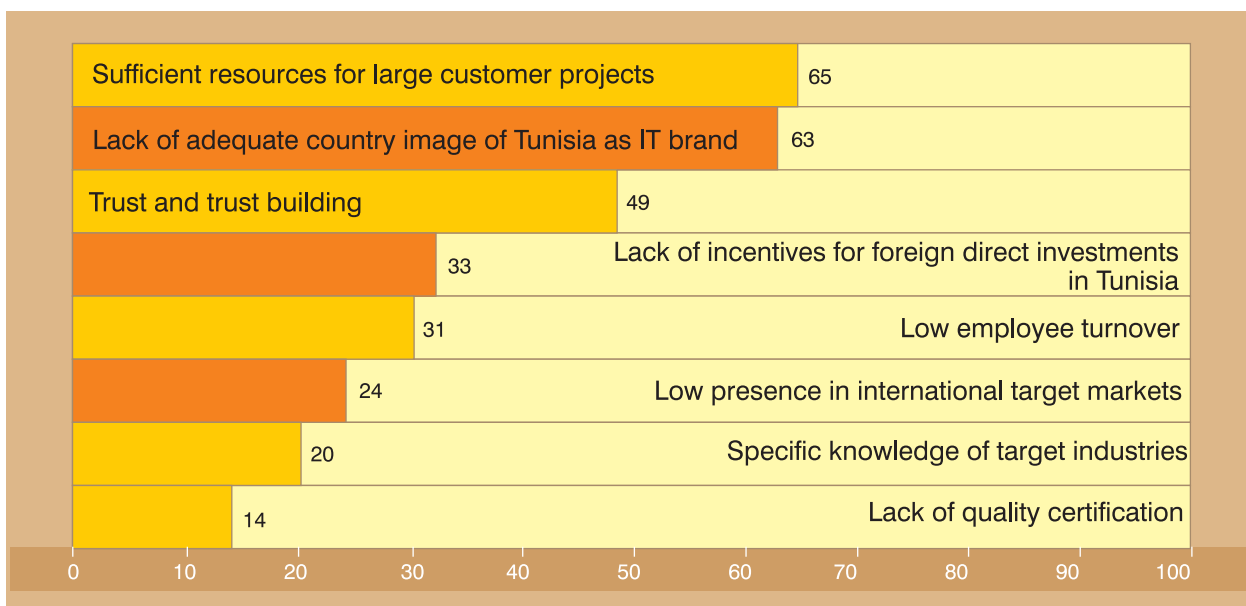*(percentage of companies)*

Rank	Strategy	%
1	Cooperation	80
2	Organic growth	18
3	Mergers & acquisitions	12

Chart 7.23

**Strategic priorities for software and IT service companies
over the next five years**

1. Marketing of our products	0.61
2. Inter-firm cooperation and partnerships for innovation	0.46
0.29	3. Optimization of our business processes
0.20	4. IT training of employees to maintain and acquire IT skills training
0.18	5. Building our company brand
0.17	6. Implementation of quality standards
0.07	7. Organizational realignment

0.00   0.10   0.20   0.30   0.40   0.50   0.60   0.70   0.80   0.90   1.00

Note: Number of companies normed to 1; weighted by priority 1, 2, 3.

Chart 7.24

**Main challenges for software and IT service companies
to develop new customer relationships**
(percentage of companies)

Sufficient resources for large customer projects	65
Lack of adequate country image of Tunisia as IT brand	63
Trust and trust building	49
33	Lack of incentives for foreign direct investments in Tunisia
31	Low employee turnover
24	Low presence in international target markets
20	Specific knowledge of target industries
14	Lack of quality certification

0   10   20   30   40   50   60   70   80   90   100

Table 7.9

E-business trends in software and IT service companies

Rank	System / solution	Present e-readiness in % of companies	Future e-readiness in % of companies	Change in ranking
1	**Accounting systems**	59	65	=
2	**Telecommunication solutions**	39	41	=
3	**Knowledge management solutions**	31	33	=
4	**Security solutions**	31	39	=
5	**CRM systems (customer relationship management)**	29	51	+
6	**E-learning solutions for internal training**	16	24	=
7	**DSS (decision support systems)**	14	24	=
8	**E-business and e-commerce solutions for domestic business**	8	22	=
9	**E-business and e-commerce solutions for exports**	4	18	=

Note: Percentage of all companies.

to optimize their downstream business activities and improve the handling of transactions and processes between firms and customers.

E. Conclusions: Implications for firm strategies and national ICT policies

The aim of the analysis was to look from a competitiveness point of view at Tunisian software and IT service companies in their specific business environment. For that purpose, links were identified between the national ICT strategy and corporate strategies of firms in order to evaluate the extent to which both approaches complement each other.

The conclusions therefore address both national and firm strategies and their role in maintaining and enhancing the competitiveness of the sector. The survey revealed that the successful implementation of firm strategies plays a crucial role in maintaining companies' competitive advantages. These could differ considerably according to the target market. For example, a company that is highly competitive in the European market may

not be competitive in the domestic market (and vice versa). But companies with no clear strategy or weak implementation are clearly low performers (no matter in which market). To give an example, the more firms focus on the regional market the more they need to develop advantages based on firm-specific resources and their proximate business environment. Basic factor advantages, such as low labour cost, do not apply in the regional market, whereas cultural proximity is important. By contrast, in Western European markets, basic factor advantages apply and technological requirements are higher, whereas cultural proximity is less important. The company cases in annex II illustrate the diversity and innovative approaches of different strategies followed by companies focusing on different target markets. Successful firms formulate and consistently implement their business strategies. This is a prerequisite for actively developing and sustaining competitive advantages.

As far as the enabling business environment is concerned, and the success of government policies in promoting the sector, the survey revealed that more needs to be done to address the particular needs of ICT-sector firms. This includes policies related to enhancing the ICT infrastructure (in

particular as regards access, pricing and local content), and providing finance, skills and education (not only in IT related fields, but also in project management and business development). If software and IT services are a priority for the future development of the country, it is important for the Government to consider that other countries may do more to promote ICT-sector firms within their national ICT strategy. At the same time, business leaders have to be aware of the changing business environment in the country, and adapt their corporate strategies accordingly. Drawing on the results of the study, the following provides specific suggestions to business leaders and policy makers working towards enhancing the competitiveness of the sector.

1. ICT companies: From opportunity to strategy

The results from the survey and the interviews showed that companies will have to prepare to take an important step, namely the leap from opportunity to strategy. This is in particular the case for firms planning to expand their export businesses and heading for Western Europe or the regional market. Concerning the strategy content, the following strategic challenges should be pointed out.

Products and markets

The increasingly widespread range of solutions and services offered by the firms could present a problem with regard to a clear and competitive positioning in their markets. A stronger specialization would help to increase the productivity of companies and may be crucial for gaining competitiveness.

Since companies are entering the regional market or markets in developing countries, competitive advantages based on basic factor endowments such as low level of wages do not apply. Businesses should focus more on the value added of products and services. Knowledge-based competition is a promising field for Tunisian firms as the educational system provides the necessary quality and quantity of technicians and university graduates in ICT studies to create high-value-added software and service solutions. Firms focusing on the European or North American market can still take full advantage of basic factor conditions in Tunisia and benefit from low wages. At the same time, the

high-quality engineering workforce is an advantage compared with many other countries.

Firm-level innovation and organizational implications

Greater emphasis on cooperation and partnerships among Tunisian firms or with foreign companies in target markets would support innovation since joint efforts and complementary skills of partners reduce investment risks related to innovation. But partnerships present a very specific management challenge and would require a stronger engagement in the development of management skills for the coordination of partnerships, inter-firm processes and decision-making procedures (Mansour, 2003). Given their (small) size and limited financial resources, companies are aware of the potential of (and need for) stronger inter-firm cooperation, for example in the field of technological innovation or external communication in markets. Nevertheless, only a few firms have developed inter-firm cooperation to enhance their resource base (Chaabouni and Mezghani, 2001).

Further concentration of business through M&A could help Tunisian firms gain the critical size for participation in large projects. But the feasibility of M&A depends on the markets for capital and finance. It remains to be seen to what extent these will develop as regards ICT business orientation and overcoming obstacles, such as the lack of tailored finance models and private venture capital for software and IT service companies.
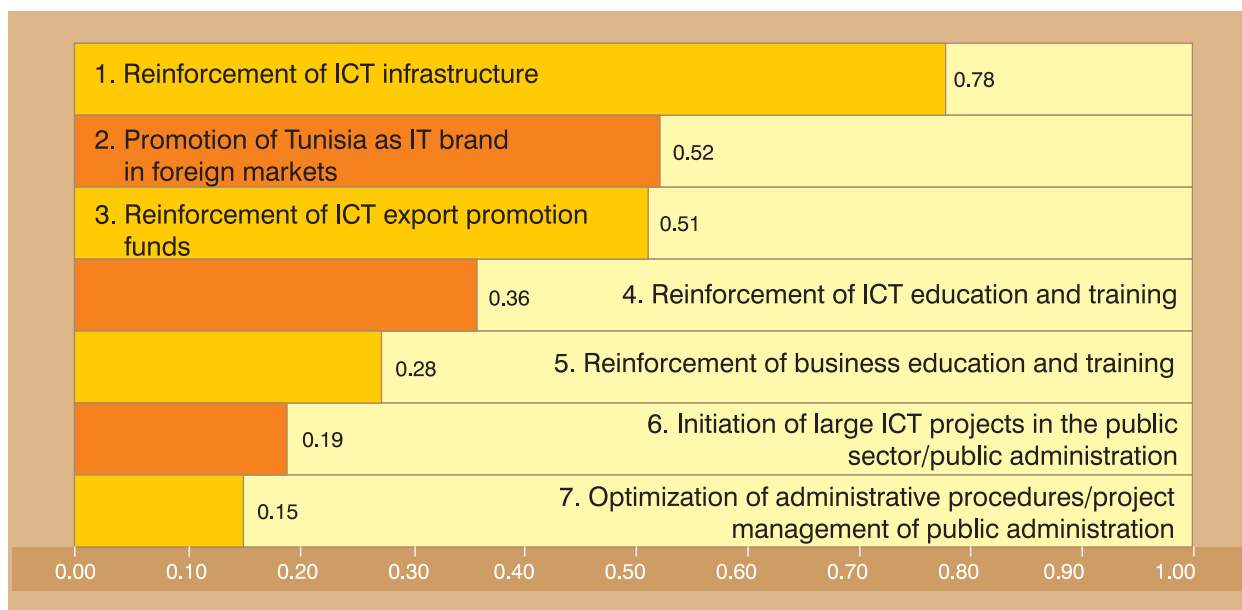
2. ICT policy priorities

Tunisia's e-strategy has created an environment that fosters technological progress at the level of the economy and society. The current achievements concerning the regulatory framework, infrastructure, business and development support, and education show some positive results. From the international point of view, Tunisia is taking a leading position as an ICT player among the developing countries.

However, the business environment needs to be such that it supports effectively the competitiveness of firms or a sector. According to the survey results, the Tunisian ICT sector has not yet fully benefited from national ICT policies, and the effective implementation of the national development plan regarding a supportive business envi-

Chart 7.25

Priorities for the Government for the next five years according to ICT business leaders

1. Reinforcement of ICT infrastructure	0.78
2. Promotion of Tunisia as IT brand in foreign markets	0.52
3. Reinforcement of ICT export promotion funds	0.51
0.36	4. Reinforcement of ICT education and training
0.28	5. Reinforcement of business education and training
0.19	6. Initiation of large ICT projects in the public sector/public administration
0.15	7. Optimization of administrative procedures/project management of public administration

0.00   0.10   0.20   0.30   0.40   0.50   0.60   0.70   0.80   0.90   1.00

Note: Number of companies normed to 1; weighted by priority 1, 2, 3.

ronment for software and IT service companies is questionable. The priorities set by the Government do not entirely correspond to the needs of companies. The views of the business leaders captured in the study point to the most critical areas for government action (chart 7.25). As a result, a realignment of the national e-strategy is necessary with regard to those elements that limit the companies' strategic options and competitiveness. The following suggests several ICT policies that could play a key role in this context and makes recommendations for future steps that might be taken.

Infrastructure

Cost-efficient advanced communication technologies. The improvement of the telecommunications infrastructure is crucial to the companies' need for communicating with target export markets (UNDP and CEPEX, 2004). The results presented in chart 7.26 show that technologies such as broadband, satellite connections and VoIP play an important role for businesses and require improved access. This applies particularly to outsourcing, which requires close continuous customer relationships and hence relies heavily on communication. In this context, low-cost telecom-

munication becomes a key factor as an enabler for services at competitive prices (UNCTAD, 2003b). According to the business leaders, the Government should give this matter the highest priority in the national e-strategy (chart 7.25).

Business development support

Stronger promotion of Tunisia as an IT brand in foreign markets. Branding is crucial, and currently the image of Tunisia in foreign markets is determined more by tourism than by technology. The Government will have to focus more on the promotion of "IT Made in Tunisia" in order to support the country's software and IT service exports (ITC, 2004). This could be done, for example, through a stronger presence at international trade fairs. Business leaders consider this to be the second highest priority for the Government's e-strategy.

Reinforcement of export promotion funds for ICTs. A further adaptation of BDS to the particular needs of ICT firms is necessary. The recent initiatives by the Government are the first signs of stronger support for ICT firms. The one-sided promotion of entrepreneurship and innovation primarily increases the domestic dynamics within

Chart 7.26

Availability of communication technologies
(percentage of companies)
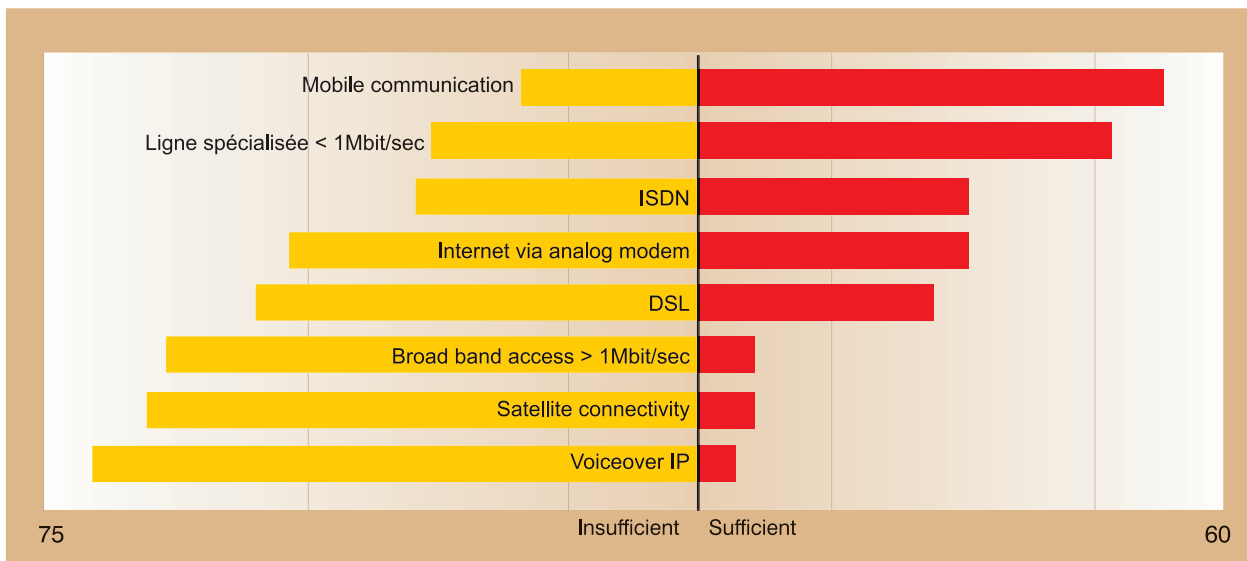
the ICT sector. To enhance growth potentials in export markets, the Government has to consider whether the existing BDS structures are adequate to support effectively firms' export strategies. Access to export markets is still a challenge for many companies. Therefore, existing BDS programmes should be reviewed and optimized to allow ICT firms to participate effectively in funds such as FOPRODEX and FAMEX. The survey results clearly indicate that this subject should have the third highest priority within the national e-strategy.

Strategy consulting for SMEs. Apart from financial BDS, small firms suffer from a limited capacity to develop business strategies necessary for succeeding in (export) markets. Therefore, the current BDS system should be complemented by offering consulting services to SMEs in the area of strategy development and transfer of management know-how.[7]

Reduction of public ICT development. The Government established a number of institutions to boost ICT development in Tunisia and to support research and development at a time when no private companies were in a position to do so. Given the developing information economy in Tunisia, the role of the public sector in this field has to be reconsidered. One approach could be the gradual reduction of the role of the Centre National de

l'Informatique (UNDP and CEPEX, 2004). This would also respond to the call of private businesses for large national investment projects. The reallocated financial resources would help firms to acquire the size, financial strength and experience necessary for becoming successful exporters. A gradual reduction of public ICT production should be in areas that support most effectively the competitiveness of private software and IT service companies, for example through greater participation in projects with the public sector and the public administration (ITC, 2004). Successfully stepping into export markets also requires a certain experience with customer projects in the public sector. Therefore, such projects should be assigned to private businesses.

Awareness creation for software and IT services. The Government could help the software and IT services companies in the domestic market by raising awareness about the potential of ICTs to improve productivity and hence competitiveness, and thus encourage other sectors to increase their adoption of ICT. This would also support the process of privatization and deregulation in the light of the ongoing opening of the economy to the global market (World Bank, 2002).

Gaining international experience. Ways should be found to effectively promote partnerships among private businesses at the international level, given

that this is an important challenge for Tunisian IT exporters. One way could be to attract FDI, which would allow Tunisian firms to join international networks by collaborating locally with foreign firms and thus integrate into customer value chains abroad. Moreover, the public sector could help local IT firms gain experience in international projects by also considering international companies in tenders for large ICT investment projects. Local firms would thus get the chance to collaborate with international partners (ITC, 2004). Action in this regard has been initiated at the national and regional level, in order to increase the participation of foreign enterprises in the domestic market.[8]

Facilitating partnerships. Public export promotion institutions should increasingly engage in the establishment of partnerships between Tunisian IT firms and foreign companies. This might be achieved through offices located abroad, which could enhance presence in the target markets. Another measure would be the creation of databases shared by Chambers of Commerce and companies looking for partners abroad, and vice versa (UNDP and CEPEX, 2004).

Open source promotion. The potential of open source for IT companies to gain competitiveness as identified in section D.4 calls for a greater promotion of FOSS to support private businesses.

This could be done by projects in future growth areas of software and IT services. Relevant areas for public engagement could be e-government, e-learning and digital security.

Education

Cross-functional skills. The survey results emphasize that the success of ICT companies does not depend solely on a highly skilled engineering workforce. With the increasing complexity of high-value-added IT services it becomes more and more important for companies to be able to resort to excellent management knowledge. A greater promotion of studies that serve as a cross-functional interface between technology and business might be a solution.

Learning target markets and languages. As the numbers for international student exchanges show, Tunisian graduates who have studied abroad have a strong orientation towards French-speaking countries. Not only language skills but also valuable knowledge about key ICT target markets could be generated if Tunisian students gained international experience in other countries. In that way, the market potential of software and service solutions could be leveraged more efficiently since access to new markets abroad would be facilitated by internationally experienced graduates, for instance in Italy, Germany or the United Kingdom (ITC, 2004).

ANNEX I

Competitiveness "à la une"

Competitiveness is a widely discussed, but nonetheless often misunderstood term. According to Porter (2003), it is measured by the productivity of firms, or more precisely, by their capacity to increase productivity.

An essential question is how to explain why certain firms perform better than others. Management theory has made various attempts to identify and examine the origins of competitive advantages that cause performance differences, and the strategies that lead to them (Barney, 1991; Porter, 1991; Jacobson, 1992).

Porter (2003) states that the ability of firms to develop and enhance competitive advantages depends primarily on two interrelated aspects – the quality of the national or immediate business environment, and the sophistication with which firms compete in the domestic and international markets. The origin of competitive advantage is thus to be found not only within the firm, but also in the proximate business environment. The latter is crucial for providing essential input factors, skills and knowledge that firms can draw on, influencing goals that determine investments, and putting pressure on firms to innovate and accumulate resources.

According to this approach, four attributes, collectively termed the "diamond", determine the business environment in a country and its impact on firms with regard to developing and enhancing competitive advantages. These are factor conditions, demand conditions, the presence of related and supporting industries, and the context of firm strategies and rivalry.

Industrial organization (IO) economics aims to explain competition among firms in industrial structures from an external view of the firm. The traditional structure-conduct-performance or Bain/Mason paradigm of IO offers a systematic model for assessing competition within an industry. According to this approach, the success of a firm and of an industry is the result of a certain industry structure, which determines the behaviour and strategic choice of firms, and their profitability (Porter, 1981).

Porter also notes that the structural evolution of industries can be significantly influenced by rivalry among competitors, uncertainty of events and the strategic choices that firms make. In this sense, industry structure and business strategy are complementary and connected by feedback loops, rather than a strategy being an automatic consequence of the particular structural context.

In order to better reflect this interdependence, Porter (1991) extended the structure-conduct-performance paradigm and developed what he called the "industry structure analysis". This framework aims to explain sustainable performance differences on the basis of a firm's relative position within an industrial structure, which is influenced five forces: the threat of new entrants into an industry, the bargaining power of buyers and suppliers, the threat of substitute products or services, and the rivalry among existing competitors (Bresser, 1998).

ANNEX II

Company case studies

The following case studies illustrate in more detail how Tunisian ICT firms have positioned themselves within their business environment. The cases shed light on the operations of the companies and their corporate strategies and show that there are numerous possibilities for strategic planning within the same business environment. Technological expertise is important for all of them, but in terms of financing, markets envisaged, and partnership models they all differ.

	Telnet *Telecom Networks Engineering*		
	Immeuble Ennour, Centre Urbain Nord, 1082 Tunis Mahrajène		
Contact	Internet: www.telnet.com.tn E-mail: info@telnet.com.tn	Phone: +216 71 706 922 Fax: +216 71 706 939	
	Year of establishment: 1994 Employees: 100 Quality certification: ISO 9001		
Specialization	The company targets the telecommunication sector, the automotive industry and the information technology industry. The business has a clear focus on the private sector, which accounts for 90 per cent of its turnover. The range of products and services concentrates on information systems and software development, electronic systems design and client-server systems. Twenty-six per cent of the turnover is generated by offshore outsourcing contracts with Western European enterprises.		
Strategy	Eighty-five per cent of the business is based on exports to Western Europe, mainly France. In 2002, Telnet opened a sales and consulting office in Paris in order to be more present and visible to their existing and potential customers. The company is aiming at an extension of exports to other Western European countries. Extensive market research was therefore carried out before the export strategy was adopted. The audit aligned the strategy to the requirements identified for the future target markets. Crucial to the strategic realignment was the financial support of public BDS funds.		
Competition	Telnet capitalizes on a decade of experience with Western European customers. The proximity to Europe has always been an important factor for its success. Therefore, this advantage was chosen as a strategy and is implemented via sales offices in target markets. Technological competencies and low costs are the key advantages envisaged by Telnet.		

	WebOne *E-Business Solutions*	
	21 Rue Abd El Hamid Ibn Badis, 1002 Tunis	
Contact	Internet: www.webone.com.tn E-mail: info@webone.tunisie.com	Phone: + 216 71 784 726 Fax: + 216 71 894 326
	Year of establishment: 1999 Employees: 21 Quality certification: none	

Specialization	The company targets the automotive and electronics industry, the financial services and professional services sector, and the media industry. WebOne has customers only in the private sector. The range of products and services concentrates on J2EE-based e-commerce, m-commerce and e-business solutions, CRM, ERP and content management systems. WebOne is an offshore outsourcing specialist whose entire turnover is generated by software development for the German partner company Think Tank Corporate Consulting. The partner specializes exclusively in consulting and customer relationship management in the German and Swiss markets. Software development and implementation are carried out solely by WebOne.
Strategy	The whole of the business is based on exports to Germany and other German-speaking countries in Western Europe. In 2001, WebOne decided to acquire Think Tank, which was sold by the former owner, an international consulting group. It kept the existing customer relationships and is acquiring new customers in the German-speaking part of Europe. The company is aiming at an extension of the partnership model to other Western European markets, and at software development and offshore outsourcing in connection with an experienced partner (or a subsidiary) in a target market with expertise in IT consulting and acquisition of customers. Public BDS is used by the company to explore foreign markets for potential partners.
Competition	WebOne can capitalize on a clear focus on the target market with a permanent presence and visibility for customers through its subsidiary Think Tank. The specialization in customer relationship management and software development for highly competitive prices combines three advantages: costs, local proximity and cultural proximity. WebOne is thus facing up to the strong competition in the market, which also challenges the capabilities of firms to continuously develop the basis of success, namely technological leadership.

	HexaByte Group *Connecting the dots ...*		
	11 Rue du Niger, 1002 Tunis		
Contact	Internet: www.hexabyte.tn	Phone:+ 216 71 288 682	
	E-mail: info@hexabyte.tn	Fax: + 216 71 287 754	
	Year of establishment: 2001	Employees: 22	Quality certification: none
Specialization	The HexaByte Group consists of four cross-linked companies which cover different businesses. The group addresses the telecommunication and software industry, and the information technology sector. Fifteen per cent of turnover is generated in the public sector, and 85 per cent in the private sector. The group offers solutions in the field of telecommunication, Internet services, digital security, e-commerce, m-commerce, e-business and web marketing. Offshore outsourcing contributes five per cent to the overall turnover. The core business is the private Internet service provider HexaByte. Promotions.com.tn is the web marketing specialist in the group, e-Serve offers mobile solutions for GSM networks and Punica.com is about to be launched as the first Tunisian tourism web portal. The core competencies are clearly separated and highly specialized for each of the four firms.		

Strategy	HexaByte's businesses concentrate on the Tunisian market (95 per cent of turnover). The remaining five per cent derives from activities in Western Europe, mainly in the United Kingdom and France. With its subsidiaries, the group pursues consistent niche market exploration and development. Businesses are developed around opportunities arising out of existing business activities. The group is aiming at the extension of its activities by leveraging spin-off opportunities for highly specialized independent businesses. In this connection, it sees itself as a business incubator ("We take the market where nobody has been before...").
Competition	HexaByte competes in each of its businesses separately in different markets. The common target is to be the first mover in each field of business. Therefore, the company brand plays a key role in success. Each subsidiary of the HexaByte Group can capitalize on reputation and brand values.

Oxia *Your partner of choice*	
11 Rue Claude Bernard, 1002 Tunis Belvédère	
Contact	Internet: www.oxiasoft.com Phone: +216 71 288 682 E-mail: infoxia@oxiasoft.com Fax: +216 71 287 754
	Year of establishment: 2000 Employees: 59 Quality certification: ISO 9001
Specialization	The company targets the chemical and pharmaceutical industry, the financial services sector, consumer goods, the engineering and construction sector, and the software industry. Eleven per cent of turnover is generated in the public sector, and 89 per cent in the private sector. The group specializes in ERP, CRM, SCM systems, and telecommunication solutions. Offshore outsourcing contributes 16 per cent to the overall turnover.
Strategy	The target markets are Tunisia with 50 per cent of turnover, 34 per cent for Western Europe (mainly France) and 16 per cent for North Africa. Oxia emphasizes human resource development. In 2002, the company bought out a complete team of developers and consultants in Tunisia from a former project with a European customer. Oxia thus kept the experience and know-how of the successful collaboration for future projects. An additional office for software development was established in Algeria, which was supposed to further complete the human resources of Oxia. The extension of businesses is aiming at more exports to the regional market, Africa and Middle East, and Western Europe. Public BDS plays an important role in the process of exploring and learning about new target markets, and in evaluating business opportunities. Private venture capital was the enabling factor for Oxia's M&A activities and helped in the establishment of the subsidiary abroad with know-how in finance and organizational issues.
Competition	Oxia is taking advantage of the combination of highly specialized human resources regarding technological knowledge and experience in different target markets. It explores and chooses markets, which makes it possible to leverage the maximum potential of the organizational capabilities of the company, such as combined complementary skills. The experience in the utilization of private venture capital is a key factor in Oxia's success, as M&A have always been the necessary tool for the integration of organizational complements.

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Notes

1. The second phase of the WSIS will take place in Tunis from 16 to 18 November 2005. The first phase took place in Geneva from 10 to 12 December 2003.

2. It defines the ICT sector as a combination of manufacturing and services industries that capture, transmit and display data and information electronically. For manufacturing industries, the products of a candidate industry must be intended to fulfil the function of information processing and communication, including transmission and display, and must use electronic processing to detect, measure and/or record physical phenomena or control a physical process. For services industries, the products of a candidate industry must be intended to enable the function of information processing and communication by electronic means (OECD, 2003).

3. Excluding the telecommunication sector.

4. A comprehensive discussion of national ICT strategies, in particular policies to foster the adoption of ICT by the business sector in developing countries, is provided in UNCTAD (2003b).

5. Tunisian households benefit from bank loans at reduced interest rates and reduced prices to purchase computers. A total of 22,600 personal computers were sold with the help of the Ordinateur Familial programme up until 2001. Three per cent of households were equipped with personal computers in 2001. Estimates for the dissemination of personal computers among households in 2006 rise to 10.5 per cent.

6. The participation in the Mise-à-Niveau programme requires firms to provide a comprehensive analysis of their whole business and strategy. The strategy has to be approved by the advisory committee of the programme. After approval, 10–20 per cent of material investments, such as hardware, and 70 per cent of immaterial investments, such as software and IT consulting, are covered by the funding of the programme.

7. Empretec is UNCTAD's integrated capacity-building programme; it helps to foster entrepreneurial capabilities and the growth of internationally competitive SMEs. The programme identifies promising entrepreneurs, provides them with training aimed at strengthening their entrepreneurial behaviour and business skills, assists them in accessing business services and financing for their business ventures, helps to establish cooperation with domestic and foreign companies, and puts in place long-term support systems to facilitate growth and internationalization. For further information see www.empretec.net.

8. www.tunisurf.com, www.appeldoffres.mincom.tn, www.tunisieappelsdoffres.com