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United Nations Conference on Trade and Development

# INFORMATION ECONOMY REPORT 2006

## The Development Perspective



United Nations

# Chapter 1

## ICT INDICATORS FOR DEVELOPMENT: TRENDS AND IMPACT

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### A. Introduction

In 2005, the Internet and its applications continued to penetrate societies and economies around the globe. Mobile communications continued their steep growth in developing countries, which are now far ahead of developed countries in terms of absolute number of subscribers. Mobile phones also continue to be the only ICT indicator where developing countries have surpassed developed countries. Despite this growth, penetration rates in many developing countries remain low, especially among least developed countries (LDCs). The Internet users' curve continues to flatten in most developed countries; at the same time, broadband is experiencing an unprecedented growth in rich countries, providing them with unexpected opportunities for economic growth and job creation. This flies in the face of reality in many developing countries, where SMEs depend on slow, low-quality connections unsuitable for most e-business applications.

The increasing availability of comparable data on the use of ICTs in developing countries permits a more informed discussion on the evolution of the information economy in those countries. Enterprises in developing countries are increasingly conducting e-commerce, but available data do not confirm the developed country trend that online purchases are more frequent than online sales. For example, about 28 per cent of enterprises in Qatar effect online purchases and almost 35 per cent effect online sales; this is also the case in Argentina, China and Romania. In terms of using ICT for e-business, the use of intranets and extranets remains low in comparison with developed countries.

Trade in ICT-enabled services has experienced above-average growth rates during the past five years, thus creating new export opportunities for developing countries. For example, as this chapter will show, between 1995 and 2004, computer and information services exports grew six times faster than total services exports. The share of developing countries in

this export sector increased from 4 per cent in 1995 to 20 per cent in 2003, with the highest growth since 2000.

Central to the debate on ICT for development is the availability of evidence on the impact of ICTs on productivity and growth in developing countries. While an increasing amount of research has become available, showcasing a positive impact in developed countries, limited research on developing countries indicates that those countries that have reached a certain level of ICT uptake benefit most from the new technologies.

These issues and others will be examined in this chapter of the report. It provides an overview of trends and indicators on the use of ICTs by different actors in society and the economy, as well as its impact on development, growth and trade. As in previous issues of the Information Economy Report, section B will first present basic access and use indicators, such as Internet users and mobile phone subscribers, as well as the scope and development of e-commerce and other e-business applications. In addition to presenting trends, facts and figures, it will examine how specific ICTs can impact and have impacted on enterprises in developing countries, in particular with regard to the growth of broadband availability and use.

Section C will take the reader from the individual and firm-level trends and analyses to the sectoral and industry levels. It will focus on the ICT industry sector, presenting available data on people employed by the sector, as well as its value-added contribution to the economy.

In section D, the focus will shift to ICTs and international trade. Last year's Information Economy Report examined the evolution of international trade in ICT goods. This year we will look at how ICTs have impacted on services trade, in particular in developing countries. The section will first present major trade flows and markets, most dynamic sectors and different modes of providing ICT-enabled services, including through offshoring. Then the reader's attention will

be drawn to a broader analysis of ICT-related services trade, using foreign affiliates' inward and outward flows. It will finish with a snapshot of computer and information services, one of the most rapidly growing services export sectors, and present relevant WTO commitments.

Section E will discuss approaches to measuring the impact of ICTs on productivity and growth. It will first summarize the latest research findings in this area, and then present the results from recent UNCTAD work on measuring the impact of ICTs on GDP growth in developing countries.

As usual, the chapter's scope is defined by the availability of comparable statistical data. The data presented are based on sources that include the ITU for ICT access indicators, UNCTAD for ICT use data on enterprises and on the ICT sector for developing countries, the OECD and Eurostat for enterprise data for their members, and the IMF and UNCTAD for data on international trade in services and foreign affiliate sales, respectively.

The availability of data from developing countries is increasing gradually. In the past few years, the international community has made a major effort to raise awareness among developing country policymakers so that they include ICT measurement in their national ICT policy agenda; this effort is now starting to bear fruit. The Partnership on Measuring ICT for Development, which was launched during UNCAD XI in 2004, and which comprises 11 international organizations, continues to play a critical role in this process. Box 1.1 describes recent activities in which the Partnership has engaged and its role in the WSIS follow-up process.

## B. ICT access and use by individuals, households and enterprises

This section looks at the latest available data on selected indicators of ICT access and use, which are part of the list of core indicators agreed upon under the aegis of

### Box 1.1

#### Partnership on Measuring ICT for Development: Entering phase II

ICT policymaking, research and analysis, as well as strategic e-business decision-making, benefits considerably from reliable and comparable statistical data on ICT access, use and impact. Since 2004, the members of the Partnership on Measuring ICT for Development, which include the ITU, the OECD, UNCTAD, the UNESCO Institute for Statistics, the UN ICT Task Force, the World Bank, the UN Regional Commissions (ECA, ECLAC, ESCAP and ESCWA) and Eurostat, have actively promoted the production of ICT statistics in developing countries. During the first phase of the Partnership (June 2004 – December 2005), a number of activities were carried out to create awareness among policymakers about the importance of ICT statistical indicators, to take stock globally on the status quo of data availability, and to develop a set of core ICT indicators that could be collected by all countries.

The World Summit on the Information Society (WSIS) and its two phases (Geneva 2003 and Tunis 2005) provided an ideal framework for promoting such activities and reaching out to the ICT policy community. The IER 2005 presented in detail the objectives, activities and achievements of the Partnership during its initial phase. It culminated in WSIS Tunis (November 2005), where the Partnership organized a parallel event on "Measuring the Information Society". At that event, the set of core statistical indicators for the information society agreed upon in Geneva at a global WSIS Thematic Meeting in February 2005 was launched through the publication "Core ICT Indicators". At the invitation of the Summit organizers, the outcome of the event was reported to the WSIS Plenary on 17 November 2005.

As a result of the work of the Partnership, the final WSIS outcome documents prominently feature the issue of indicators. The WSIS Tunis Agenda for the Information Society calls for periodic evaluation based on appropriate indicators and benchmarking, and using an agreed methodology, including that developed by the Partnership on Measuring ICT for Development. It furthermore invites the international community to strengthen the ICT-related statistical capacity of developing countries, which is also a key objective of the Partnership.

Now that the Partnership has entered its second phase (January 2006 – December 2007), its main focus is on enhancing capacities in developing countries to produce comparable ICT statistics. To that end, members of the Partnership engage in various technical assistance activities, such as advisory missions, development and delivery of training, and the organization of more focused workshops to exchange best practice and advance ICT measurement at the regional and national levels. The Partnership continues its work on methodology and the development of new core indicators in areas such as education and government.

*For further information, see <http://measuring-ict.unctad.org>.*

## Box 1.2

### Comparability of enterprise data from developing countries

Whenever possible, the enterprise data from national surveys presented in this chapter have been adjusted to exclude micro-enterprises and ensure that their sectoral composition roughly represents the economic weight of each sector. But the lack of standardization and comparability of most national surveys in developing countries is still a problematic issue in measuring worldwide ICT trends. Also, in many developing countries small-scale agriculture and the informal sector account for a large part of the economy and might not be reflected in the surveys. Consequently, surveys from developing countries also tend to contain less information about the overall economic importance of information technologies than surveys from developed countries. This in turn renders comparisons between developing and developed countries more difficult.

Another comparability issue occurs with respect to the indicators on the activities carried out on the Internet by enterprises. Measured as a proportion of the enterprises with Internet access, some of these indicators can be higher in developing countries than in developed countries; this might seem counter-intuitive. However, it could be because in less developed economies Internet access itself already creates a selection bias in favour of enterprises with a particular affinity for ICT and e-business use, while in more developed economies Internet access tends to be more universal. For that reason, e-commerce and e-business usage indicators are presented here both as a share of enterprises with Internet access and as a share of all enterprises surveyed.

Table 1.20 in the statistical annex shows the most recent data on ICT use in businesses received from selected developing countries, which have been used in several of the charts and tables of Chapter 1. Some of the figures reflect sample survey results only and not the whole target population. Several surveys also covered enterprises with 0-9 employees, but data on these enterprises are not included in table 1.20. The metadata on the different country surveys are contained in the notes to table 1.20.

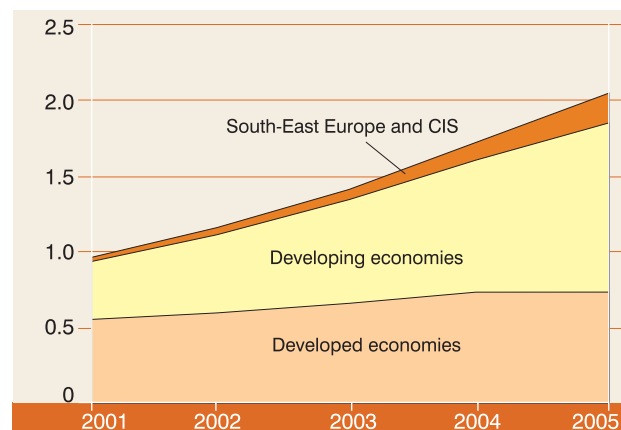
the Partnership on Measuring ICT for Development (see box 1.1). It will highlight trends in these indicators, which serve for the basic evaluation of the level of connectivity of individuals, households and enterprises in developing countries, as well as determine the use made of ICTs. This general picture of the status of ICT access and use in developed and developing countries is based on data from national statistical offices and other relevant sources, including the ITU, the OECD, Eurostat and UNCTAD. Enterprise data from developing countries should be interpreted with caution (see box 1.2).

## 1. Mobile phones

Mobile phones are the only ICT in which developing countries have surpassed developed countries in terms of users (see table 1.1). Furthermore, mobile phones have economic importance for many users in developing countries, as they are enablers of business, in particular for micro-entrepreneurs. The relevance of mobile phones to small businesses in developing countries was examined in last year's Report (UNCTAD, 2005). The economic benefits of mobile phone use are a factor of the growth in the number of mobile phone subscribers in developing countries. The evolution and the growing share of developing economies in the worldwide mobile market can be seen in chart 1.1. Tables 1.14

Chart 1.1

### Mobile phone subscribers by level of development



Source: UNCTAD calculations based on the ITU World Telecommunication Indicators Database, 2006.

and 1.15 in the statistical annex show mobile phone subscribers and penetration figures by country.

Trends from recent years continued during 2005:

- While developing Asia has the largest number of new subscribers from 2004 to 2005, African countries present the highest growth (see

**Table 1.1 – Mobile phone subscribers by region and level of development**

	2001	% change 2001–2002	2002	% change 2002–2003	2003	% change 2003–2004	2004	% change 2004–2005	2005
World	964 119 871	21.0	1 166 240 364	21.3	1 414 414 774	24.3	1 758 549 494	23.5	2 171 179 091
Developed economies	553 458 217	9.4	605 557 394	10.0	666 179 919	11.0	739 337 908	9.5	809 906 208
Asia	80 719 160	8.3	87 452 320	6.5	93 154 960	5.9	98 661 436	3.9	102 545 000
Europe	319 166 809	9.2	348 642 226	9.5	381 887 975	10.6	422 428 940	9.7	463 582 325
North America	140 152 248	10.2	154 438 848	12.8	174 190 984	14.1	198 771 532	11.6	221 828 884
Oceania	13 420 000	12.0	15 024 000	12.8	16 948 000	14.9	19 476 000	12.7	21 950 000
Developing economies	388 336 523	34.2	521 231 021	30.5	680 373 258	31.5	894 661 980	31.3	1 174 964 724
Africa	26 074 181	45.4	37 900 998	40.7	53 321 307	51.2	80 614 609	67.4	134 941 820
Asia	278 237 655	37.4	382 401 952	31.0	501 040 238	27.5	638 902 652	25.2	799 936 437
Latin America and the Caribbean	83 860 436	20.1	100 733 425	24.8	125 758 637	39.0	174 831 094	37.0	239 588 382
Oceania	164 251	18.5	194 646	30.0	253 076	23.9	313 626	58.8	498 085
South-East Europe and CIS	22 325 131	76.7	39 451 949	72.0	67 861 597	83.5	124 549 606	49.6	186 308 159

Source: UNCTAD calculations based on the ITU World Telecommunication Indicators Database, 2006.

**Table 1.2 – Mobile phone penetration by region and level of development**

	2001	% change 2001–2002	2002	% change 2002–2003	2003	% change 2003–2004	2004	% change 2004–2005	2005
World	15.6	19.5	18.7	19.8	22.4	22.9	27.5	22.0	33.6
Developed economies	58.0	8.8	63.1	9.4	69.0	10.3	76.2	8.9	83.0
Asia	60.5	8.0	65.3	6.3	69.4	5.7	73.3	3.7	76.1
Europe	67.2	8.8	73.1	9.1	79.7	10.2	87.8	9.4	96.1
North America	43.5	9.1	47.5	11.7	53.1	13.0	60.0	10.6	66.3
Oceania	58.0	10.7	64.2	11.5	71.6	13.7	81.4	11.5	90.8
Developing economies	8.0	32.3	10.5	28.7	13.6	29.7	17.6	29.5	22.8
Africa	3.0	42.3	4.2	37.7	5.8	48.0	8.6	63.9	14.1
Asia	8.1	35.7	11.0	29.4	14.2	26.0	17.9	23.7	22.1
Latin America and the Caribbean	15.5	18.4	18.3	23.1	22.5	37.1	30.9	35.2	41.8
Oceania	1.6	16.3	1.9	27.7	2.4	21.8	3.0	56.2	4.6
South-East Europe and CIS	6.7	77.2	11.9	72.5	20.6	84.0	37.9	49.9	56.8

Source: UNCTAD calculations based on the ITU World Telecommunication Indicators Database, 2006.



table 1.1) as a group, departing from a low base, followed by South-East Europe and CIS countries.<sup>1</sup>

- Among African countries, South Africa, Nigeria, Egypt and Morocco continue to be the leaders in terms of the region's number of subscribers.
- The penetration rate in developing economies continues to be well below that of developed countries (table 1.2). In some developed countries, the penetration rate is over 100 per cent, while in several dozen developing countries it is under 10 per cent. However, the gap in terms of mobile phone penetration has diminished over time between developed and developing countries.

In 2005, the worldwide number of mobile phone subscribers passed the 2 billion mark, with Asia accounting for more than 40 per cent of them. Private research estimates that by the end of 2006, the number of global mobile phone subscribers will be approximately 2.6 billion.<sup>2</sup> In developed countries the growth in the mobile phone industry will come from the increased offer and use of innovative services, from SMS and roaming to Internet access and music downloads. For example, it is expected that more than one third of Europeans will have Internet-enabled phones by 2010 (Kelley and McCarthy, 2006), although more than three quarters of Europeans that currently have mobile phones with Internet access do not use them for that purpose. There are, however, encouraging signs of potential growth, such as the fact that mobile phones accounted for 40 per cent of business-to-consumer (B2C) music downloads in 2005 worldwide, led by Europe and Asia (IFPI, 2006).<sup>3</sup>

Schemes to make mobile telephony more affordable account for much of the growth in developing countries. For example, in 2004 almost 88 per cent of mobile subscribers in Africa used pre-paid services that were tailored to low-income markets (ITU, 2006). The growth of mobile telephony in Asia is due to a highly competitive market, which has led to lower prices for calls and mobile devices (handsets). In fact, enhanced competition positively affects mobile teledensity in developing countries in general (World Bank, 2006).

Mobile connectivity sidesteps some important obstacles to other types of connectivity, but most notably to the deployment of fixed-line infrastructure, which can

be hampered by, among other things, cost and the remoteness of certain areas. In Africa, mobile phones have proved so successful that in many cases they have replaced fixed lines.

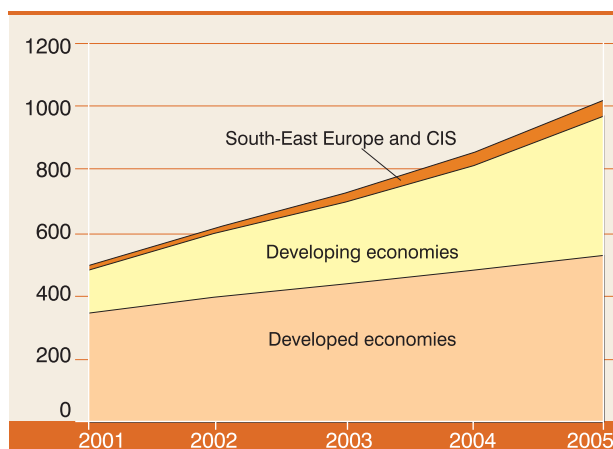
## 2. Internet

### *Individual users*

Between 2004 and 2005, the number of Internet users worldwide, as well as Internet penetration, continued to grow, as shown in tables 1.3 and 1.4.<sup>4</sup> Tables 1.16 and 1.17 in the statistical annex show the number of Internet users and Internet penetration figures by country. As is the case with mobile phones, previous trends have continued:

- Although developed economies have lost some of their share of total Internet users, they still account for more than half of Internet users worldwide (see chart 1.2), more than a third of whom are in the United States.
- The digital divide between developed and developing economies is maintained in terms of Internet penetration. The average penetration for developing economies is boosted by the case of selected countries with exceptionally high penetration, such as the Republic of Korea or small islands. Approximately one third of developing economies have a penetration rate of less than 5 per cent.
- The gender digital divide is apparent, but more and better data are needed in order to understand its magnitude, especially in developing countries (see box 1.3).
- In 2005, Asia accounted for nearly 40 per cent of all Internet users, almost a third of whom were in mainland China. In fact, China is second only to the United States in terms of the number of Internet users worldwide. Although mainland China's penetration rate is only 8.6 per cent, Macao (China) and Hong Kong (China) have penetration rates of 36.9 per cent and 50.1 per cent, respectively. Taiwan Province of China has the very high penetration rate of 58.1 per cent. But the regional leaders in terms of penetration are the Republic of Korea (69.0 per cent) and Japan (66.6 per cent). Central Asian

**Chart 1.2**  
**Internet users**  
**by level of development**



Source: UNCTAD calculations based on the ITU World Telecommunication Indicators Database, 2006.

countries have the lowest penetration rates in the region.

- In 2005, Africa had the highest growth rates in terms of numbers of Internet users, since many countries start from very low levels, but it has the lowest penetration rate after Oceania. South Africa, Egypt and Nigeria account for approximately 14 per cent of African users each. South Africa and Egypt also have above average penetration rates with respect to the region.

- In Europe, almost 59 per cent of Internet users live in four Western European countries (Germany, United Kingdom, Italy and France).<sup>5</sup> The Russian Federation accounts for more than 60 per cent of users in SEECIS.
- In Latin America and the Caribbean, Brazil and Mexico accounted for over 60 per cent of Internet users in 2005. Another 25 per cent of users were located in Argentina, Chile, Colombia, Peru and Venezuela, all in South America. However, there were very high growth rates for Caribbean island countries and Central America. In terms of penetration, Caribbean islands also show the highest rates in the region, and Brazil has the highest penetration rate among the larger countries, at 19.5 per cent. It should be noted that a survey by the Brazilian Government conducted in August and September 2005 reported that 24.4 per cent of the population had accessed the Internet in the previous three months, usually at work or at home (Brazilian Internet Steering Committee, 2006).

### *Enterprise access to the Internet*

Internet access by enterprises is nearly universal in most developed countries (see table 1.5), with penetration rates reaching almost 100 per cent among large enterprises. Certain economic sectors are more connected than others, particularly the financial sector,

## **Box 1.3**

### **Gender and Internet use**

Men are more likely to use the Internet than women in OECD countries, with the exception of Finland and the United States (OECD, 2005a). In the EU, 38 per cent of European women regularly use the Internet (at least once a week), as opposed to 49 per cent of men.<sup>1</sup>

While there are gaps of similar magnitude in Internet access between men and women in some developing countries (for example, 4 per cent in Brazil), in most of those countries the gaps are more substantial, for example in Djibouti, Guinea, India, Nepal and Turkey. It would appear that the lower the penetration of ICT in developing countries, the larger the differences in gender access, with women at a disadvantage, but there are several exceptions (Orbicom, 2005). For example, the Netherlands and Mexico both have 40 per cent of female Internet users, but overall penetration in the Netherlands is 60 per cent, as opposed to less than 5 per cent in Mexico. In such cases there are cultural and social influences on the ability of women to access ICT, frequently country-specific ones, and policies to address the gender digital divide must take these influences into consideration.

The availability of data on individual access to the Internet disaggregated by gender is very limited. It is important to increase the availability and quality of disaggregated data on individual access to ICT, including the Internet, since such data can serve to assess public and private efforts to bridge national digital divides, such as the Republic of Korea's higher education programme to promote the participation of females in the ICT workforce (World Bank, 2005). In this connection, chapter 3 of this Report highlights the need for disaggregated data by gender, region and age in order to effectively inform pro-poor ICT policies and practices.

<sup>1</sup> Individual access data is not available for France, Ireland, Malta and Norway.

**Table 1.3 Internet users by region and level of development**

	2001	% change 2001–2002	2002	% change 2002–2003	2003	% change 2003–2004	2004	% change 2004–2005	2005
World	490 773 008	25.7	618 038 617	16.3	717 381 946	19.0	854 041 719	19.5	1 020 614 866
Developed economies	342 797 199	15.5	395 818 444	7.8	426 734 196	12.5	479 924 204	10.7	531 289 219
Asia	50 700 000	20.7	61 220 000	4.8	64 140 000	5.0	67 360 000	32.4	89 173 852
Europe	125 172 191	17.6	147 263 444	14.8	169 124 796	13.1	191 273 204	7.4	205 412 718
North America	157 463 008	11.1	174 927 000	2.9	180 059 400	14.4	205 941 000	6.7	219 758 649
Oceania	9 462 000	31.1	12 408 000	8.1	13 410 000	14.5	15 350 000	10.4	16 944 000
Developing economies	139 154 246	49.3	207 776 692	28.3	266 677 707	26.6	337 645 107	30.6	441 132 301
Africa	6 478 700	66.8	10 805 156	45.4	15 711 500	47.7	23 213 421	52.5	35 389 128
Asia	102 951 221	48.8	153 198 459	29.2	197 894 654	26.4	250 121 471	26.4	316 233 484
Latin America and the Caribbean	29 581 925	47.2	43 547 477	21.2	52 783 353	21.2	63 976 215	39.3	89 135 132
Oceania	142 500	58.3	225 600	27.7	288 200	15.9	334 000	12.1	374 557
South-East Europe and CIS	8 821 563	52.4	13 443 481	78.3	23 970 043	52.2	36 472 408	32.1	48 193 346

Source: UNCTAD calculations based on the ITU World Telecommunication Indicators Database, 2006.

**Table 1.4 Internet penetration by region and level of development**  
(Internet users per 100 inhabitants)

	2001	% change 2001–2002	2002	% change 2002–2003	2003	% change 2003–2004	2004	% change 2004–2005	2005
World	7.9	24.2	9.8	14.9	11.3	17.6	13.2	18.1	15.6
Developed economies	35.9	14.8	41.2	7.2	44.2	11.8	49.4	10.1	54.4
Asia	38.0	20.4	45.7	4.5	47.8	4.8	50.1	32.1	66.1
Europe	26.3	17.2	30.9	14.4	35.3	12.7	39.8	7.0	42.5
North America	48.9	10.0	53.8	1.9	54.8	13.3	62.1	5.7	65.7
Oceania	40.9	29.7	53.0	6.9	56.6	13.2	64.1	9.2	70.1
Developing economies	2.8	47.2	4.2	26.5	5.3	24.8	6.6	28.8	8.5
Africa	0.7	63.3	1.2	42.4	1.7	44.7	2.4	49.3	3.6
Asia	3.0	46.9	4.4	27.6	5.6	24.8	6.9	24.9	8.7
Latin America and the Caribbean	5.5	45.1	7.9	19.5	9.5	19.6	11.3	37.5	15.5
Oceania	1.4	55.4	2.2	25.5	2.8	13.9	3.2	10.3	3.5
South-East Europe and CIS	2.6	52.8	4.0	78.8	7.2	52.5	11.0	32.5	14.6

Source: UNCTAD calculations based on the ITU World Telecommunication Indicators Database, 2006.



**Table 1.5 Internet penetration and website ownership, by enterprises in selected countries, 2004**

*Enterprises with 10 or more employees*

	Share of enterprises using the Internet	Share of enterprises with a website	
		% of all enterprises	% of enterprises with Internet access
Japan (2003) <sup>a</sup>	97.5	78.4	80.4
Denmark	97.4	80.9	83.1
Iceland (2003)	97.4	68.5	70.3
Finland	97.1	75.4	77.6
Belgium	96.0	67.6	70.4
Sweden	95.9	82.1	85.6
Brazil (2005)	95.1	56.2	59.1
Germany	94.1	72.4	76.9
Rep. of Korea	94.0	53.3	56.7
Canada	93.9	63.9	68.0
Austria	93.7	70.8	75.6
Argentina <sup>b</sup>	93.6	57.2	61.1
Switzerland (2002) <sup>c</sup>	92.0	64.0	69.6
Ireland	91.8	59.5	64.8
Singapore (2005)	91.0	68.3	75.0
Morocco (2005)	90.6	46.7	51.5
Australia <sup>d</sup>	90.2	49.4	54.8
Czech Republic	90.1	60.9	67.6
Netherlands	88.5	65.5	74.1
Italy	87.4	44.1	50.5
Greece	87.4	49.0	56.0
Spain (2003)	87.4	39.7	45.5
United Kingdom	86.6	66.3	76.5
Norway	85.5	61.5	71.9
Poland	85.0	43.8	51.5
Luxembourg (2003)	85.0	58.4	68.7
Hong Kong (2005)	84.8	40.5	47.8
New Zealand (2001) <sup>c</sup>	84.3	41.7	49.5
France (2003)	82.9	26.3	31.7
Hungary	77.5	34.7	44.7
Portugal	77.3	29.4	38.1
Slovakia	71.3	46.7	65.5
Costa Rica <sup>e</sup>	69.9	10.3	14.7
Macao (China) (2003)	69.1	17.8	25.8
Qatar (2005)	68.4	67.8	99.0
Russian Federation <sup>f</sup>	68.2	24.0	35.2
China (2005) <sup>g</sup>	67.6	22.3	33.0
Panama (2002) <sup>h</sup>	65.7	..	..
Thailand (2005) <sup>i</sup>	64.1	32.7	51.0
Andorra	63.0	30.8	48.9
Bulgaria	62.6	24.3	38.9
Philippines (2001) <sup>j</sup>	62.4	..	..
Cuba	60.0	17.6	29.4

Mexico (2003)	55.4	7.2	13.0
Romania	52.3	19.9	38.0
Moldova <sup>a</sup>	51.6	..	..
Kazakhstan (2005)	45.5	8.4	18.5
Belarus (2005) <sup>a</sup>	37.6	10.2	27.2
Ukraine (2003) <sup>a</sup>	28.0	..	..
Kyrgyzstan (2005) <sup>k</sup>	25.1	8.4	33.2
Cameroon (2005)	25.1	12.1	48.3
Chile (2003) <sup>a</sup>	20.3	8.6	42.6
Azerbaijan (2005)	8.3	2.8	33.7
Paraguay (2002) <sup>b,h</sup>	5.7	..	..

Notes:

<sup>a</sup> Enterprises with 100 or more employees.

<sup>b</sup> Survey of the manufacturing sector only.

<sup>c</sup> Enterprises with 5 or more employees.

<sup>d</sup> Website includes a presence on another entity's web site.

<sup>e</sup> Enterprises with 10-249 employees.

<sup>f</sup> Enterprises with 50 or more employees.

<sup>g</sup> A breakdown by number of employees is not available, so the figure could include micro-enterprises with 0-9 employees.

<sup>h</sup> Provisional figures.

<sup>i</sup> Enterprises with 16 or more employees.

<sup>j</sup> Refers to establishments with average total employment of 20 or more.

<sup>k</sup> Of enterprises with computers.

Source: OECD (2006); UNCTAD e-business database (2006).

wholesale trade and real estate, renting and business services industries.<sup>6,7</sup> In the EU, overall Internet access by enterprises with 10 or more employees is very high at 91 per cent, with Scandinavian countries showing the highest penetration rates (Finland with 98 per cent, Denmark with 97 per cent and Sweden with 96 per cent).<sup>8</sup> Slovenia also has very high penetration at 96 per cent.

Internet access by enterprises in the developing world is less uniform, reflecting a very broad range of Internet penetration rates. There is, however, a positive correlation coefficient of 0.54 between Internet penetration and ownership of websites by enterprises with Internet access.<sup>9</sup> This suggests that the level of ICT knowledge in the economy might also be an important determinant of Internet use by enterprises, since setting up a website demands more than basic computer literacy. Even more, it could matter that the characteristics of a country's economy and the structure of the enterprise sector result in differing predispositions for Internet use by enterprises. Enterprises involved in more knowledge-intensive production tend to have a greater demand for Internet access and so do larger enterprises compared with smaller firms.

Concerning the type or mode of Internet access, there are substantial differences between developed

countries, with an ever-increasing share of broadband connections, and developing countries, where dial-up is still prevalent (see chart 1.3). The changing nature of Internet modes of access is another dimension of the international digital divide. Broadband access deserves special attention for its potential to enable more sophisticated e-business, positively impacting on competitiveness and productivity at the firm level, this in turn having an impact on economic growth. The next section will take a more detailed look at this issue.

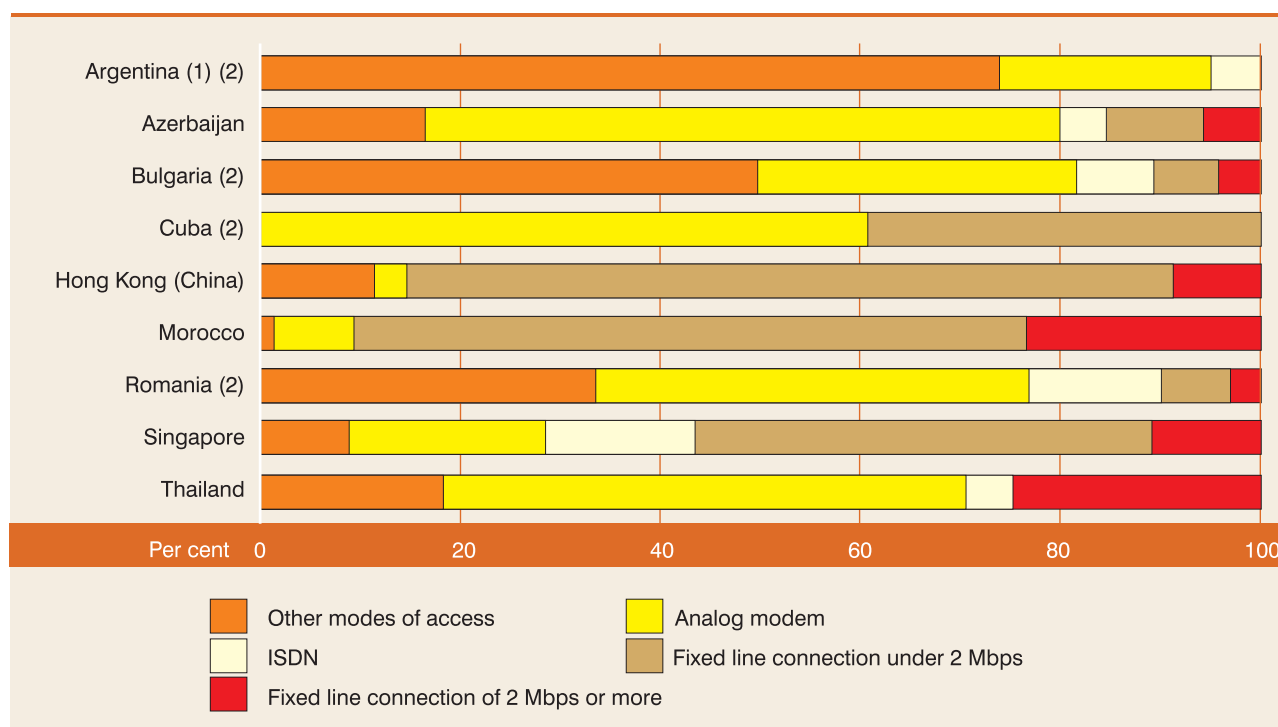
### 3. Broadband spread and its potential

Access to the Internet via broadband is important for the development of countries' information societies.<sup>10</sup> Apart from the speed, the main characteristics of advanced broadband technologies that make them so desirable for developing countries wishing to advance technologically are that they are ever-present, always on, flexible, less costly and more secure. Individuals are able to obtain more services and a richer experience from the Internet, with greater ease; enterprises are able to add value to their online interactions with customers and suppliers and make them more efficient; and Governments are able to enhance the e-government experience for their citizens. Some of the current broadband

Chart 1.3

### Modes of Internet access by enterprises in selected developing countries, 2005 or latest available year

Enterprises with 10 or more employees



#### Notes:

(1) Survey of the manufacturing sector only.

(2) Reference year 2004.

Source: UNCTAD e-business database, 2006

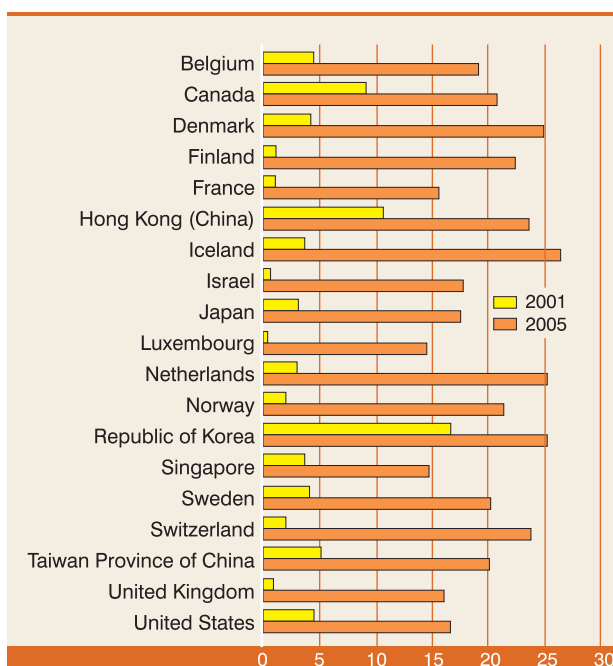
trends (tables 1.18 and 1.19 in the statistical annex show data for selected countries on broadband subscribers and penetration) are as follows:

- Broadband is increasingly available worldwide (38 per cent of all Internet subscribers in 2004) (ITU, 2006), although some countries and regions have more affordable and thus more rapidly growing broadband connections.
- In the OECD countries (most of which, but not all, are classified as developed) broadband subscribers increased by almost 15 per cent in the last half of 2005 to 158 million. In terms of broadband penetration, the leaders were Iceland and the Republic of Korea, both with more than 25 per cent penetration. At the other end of the scale, Slovakia, Mexico, Turkey and Greece have less than 3 per cent penetration each.
- The United States has the largest total number of broadband subscribers at 49 million, with a penetration of 16.3 per cent. Although broadband becomes more common and continues to rapidly gain ground over dial-up at the household level, the United States is still lagging behind most of Western Europe and some Asian countries (Lopez, 2006).
- All non-OECD developing economies for which data on broadband are available have been showing very low penetration rates, with varying growth rates. The only exceptions are in Asia. The Special Administrative Regions of China (Hong Kong and Macao), as well as Taiwan Province of China, have a relatively small subscriber base but penetration rates of 23.6 per cent, 14.8 per cent and 20.2 per cent, respectively. This is the reverse of the situation in mainland China, which had the

largest number of broadband subscribers among developing economies, but very low penetration (2.9 per cent). The Republic of Korea and Singapore continued to be outliers in 2005, with 25.5 per cent and 15.4 per cent penetration, respectively.

Growth in broadband access and penetration in recent years (see chart 1.4), particularly in developed countries, is due to competition and declining prices. In OECD countries, for example, users paid on average \$9.42 less in 2004 than in 2002 for a 514 Kbp increase in their DSL connection (OECD, 2005c). On the other hand, the monthly charge for a broadband connection in low-income countries can be more than 10 times that of high-income and middle-income countries (World Bank, 2006).<sup>11</sup> It should be noted that the United States is lagging slightly behind other developed countries owing to insufficient competition, since choice of local access to broadband is usually limited to a few providers. Developed countries have also progressed in terms of the available connection speed. While the basic broadband is defined as equal to, or greater than 256 Kbps, most countries already offer minimum speeds of 512 Kbps. In France, Japan and Sweden, premium DSL services at 10 Mbps or more are available for residential users (OECD, 2005b).

**Chart 1.4**  
**Broadband penetration in selected economies (%)**



Source: ITU World Telecommunication Indicators database, 2005.

Apart from market factors such as pricing, offers and competition, broadband expansion depends on the available infrastructure. In 2005, 62 per cent of broadband Internet subscribers in OECD countries used DSL, 31 per cent used Cable Modem and 7 per cent used other types of connection.<sup>12</sup> In the European Union, DSL represents 80 per cent of all broadband subscriptions. The development of broadband by building on pre-existing networks in the EU15 has determined the prevalence of DSL. In the new EU member countries, where there are lower levels of PC and fixed-line penetration, broadband development could build on other types of network, such as cable, and even mobile or wireless.<sup>13</sup> The latter are particularly interesting for improving access in rural areas, where they can make better economic sense.<sup>14</sup> Previous infrastructure has also led to the prevalence of cable in the United States (65 per cent of broadband connections). Other broadband technologies are less prevalent, with some country exceptions, such as Japan with a high proportion of fibre-to-the-premises (FTTP), and Persian Gulf countries with their fibre optic backbone.

In many developing countries, because of the lack of economies of scale and infrastructure, the incentive to expand broadband outside urban areas is diminished. Wireless technology and satellites can help circumvent the cost of infrastructure for remote or rural areas, or for areas without a critical mass of users. Such is the case of eChoupal in India (see box 1.4), which uses very small aperture terminals (VSAT).<sup>15</sup> VSAT satellites may offer developing countries the possibility of increasing the availability of bandwidth and reducing its cost (UNCTAD, 2005). Some countries have no choice but satellite, such as Uganda, which currently lacks connections to submarine fibre optic cable systems.<sup>16</sup>

Governments have an important role to play in improving access to broadband through infrastructure and policy. In the Republic of Korea, the Government's vision of development through the ICT sector and ICT-enabled services is dependent on broadband deployment. The European Union's i2010 strategy focuses on promoting broadband networks, which are considered crucial for e-business, economic growth and employment. It aims to reduce the digital divide between urban and rural areas in Europe (27 per cent penetration among households in densely populated areas as opposed to 15 per cent in sparsely populated areas), including through public funding grants to invest in broadband infrastructure. For example, such funding was endorsed for Latvia in 2006, with the aim of promoting economic development of its rural areas.<sup>17</sup>

Government policy can either encourage or be a disincentive to competition, and thus have an impact on availability and prices. For example, while the Government of the Republic of Korea enforces competition and encourages new entrants in the telecommunications market, the United States has allowed growing consolidation of the industry. The result is that there is a wider choice and better offers for customers in the Republic of Korea than there are for United States customers.

Prominent researchers have warned that the United States will lose its competitive edge in technology if it does not come up with a national policy to promote broadband uptake and competition.<sup>18</sup> In response, at the time of the drafting of this report, the United States Senate had started hearings to review broadband legislation (the Communications, Consumers' Choice, and Broadband Deployment Act of 2006), which could increase competition in broadband services and provide incentives to bring broadband to unserved areas of the country.

Finally, Governments can promote not only supply of, but also demand for, broadband. In Europe, although 62 per cent of rural households could subscribe to broadband (the infrastructure is available), only 8 per

cent do so (ECTA, 2006). Governments could take measures to aggregate local demand, develop relevant content and services, and enhance skills. In Spain, for example, a Government observatory has suggested that public policies to promote digital literacy, and the inclusion of ICTs in education and administration, should be a priority for encouraging the development of broadband in that country (GAPTEL, 2004).

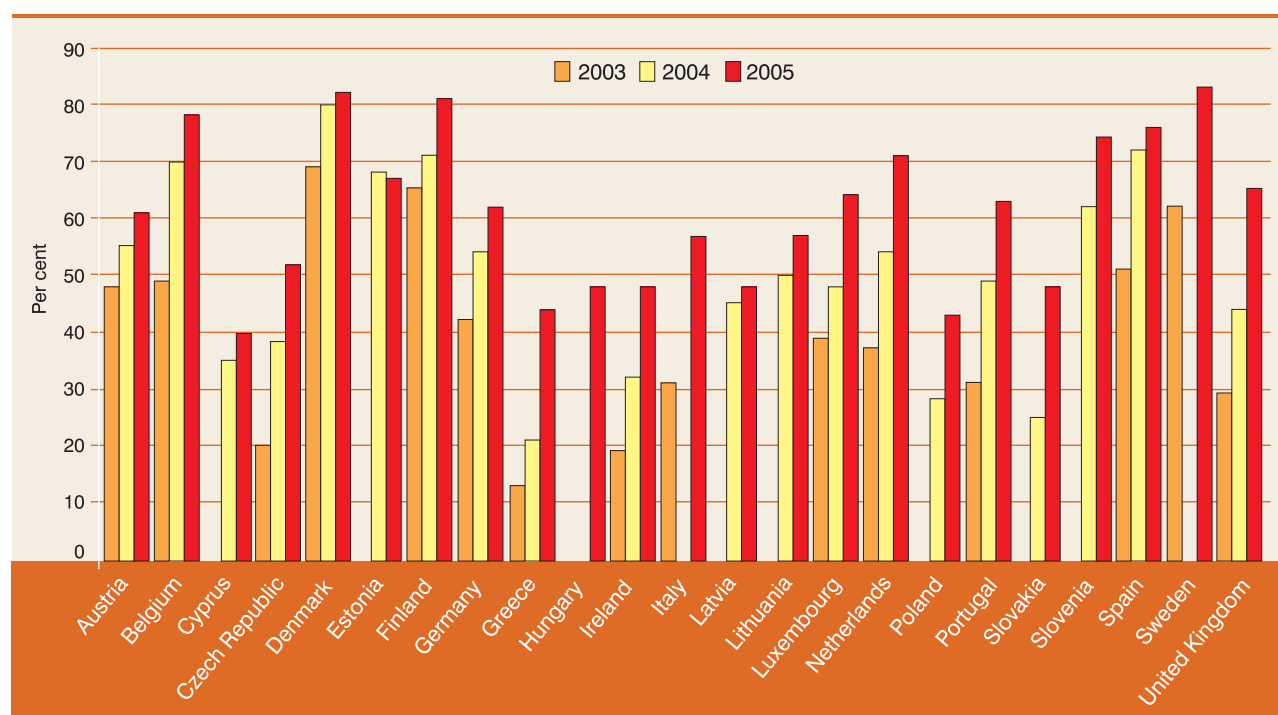
### Enterprise access to broadband

Some broadband trends among enterprises are highlighted below:

- Enterprises in OECD countries are increasingly adopting broadband platforms to connect to the Internet, and affordable broadband connectivity has been linked to the increased use of ICTs by SMEs (OECD, 2004).
- In the EU, where 63 per cent of enterprises have broadband access, there are prospects for continued growth and broadband has had a positive impact on certain economic activities, particularly business process outsourcing. Enterprise broadband connectivity grew

Chart 1.5

### Enterprise broadband penetration in selected EU countries



Notes: Missing columns reflect data not available.

Source: Eurostat, 2006.



significantly (from 53 per cent in 2004 to 63 per cent in 2005), with the highest penetration in Scandinavia (83 per cent in Sweden, 82 per cent in Denmark and 81 per cent in Finland) and the lowest penetration in Cyprus (40 per cent) (see chart 1.5).

- As both an OECD country and a developing economy, the Republic of Korea remains an exceptional case in enterprise broadband penetration. It was the leader among OECD member States and worldwide, with 92 per cent of enterprises having a broadband connection. Singapore is the other exception, as broadband Internet access among enterprises has overtaken narrowband: 55 per cent for all enterprises, with the percentage rising to 77 per cent for enterprises with 10 or more employees (IDA, 2005).
- For other developing economies, Internet modes of access other than broadband are still the norm, in particular dial-up modems, and there is still no clear picture regarding the growth rate of broadband access among enterprises.

While enterprises' access to the Internet adds value by improving their connectivity with suppliers and clients, and making them available to a wider market, including international markets, broadband increases the capacity of enterprises to deliver through the Internet. Corporate analysts estimate that broadband could contribute hundreds of billions of dollars a year to the GDP of developed countries in the next few years, and liken it to water and electricity as "the next great utility" (Whisler and Saksena, 2003). There is growing recognition that broadband can help enterprises maximize the benefits of ICTs and conduct e-business (including optimizing internal business processes).

For example, a German study estimates that if in the coming years broadband growth in Germany is maintained at an annual rate between 15 and 25 per cent, the deployment of new services and economic activities could result in the creation of 265,000 jobs and in GDP growth of up to 46 billion euros by 2010 (Fornefeld et al., 2006). Studies in the United Kingdom indicate that enterprises that use broadband are more likely to have multiple business links, and enterprises with more links tend to have higher labour productivity (Clayton and Goodridge, 2004).

A study in the United States indicates that broadband clearly has a positive economic effect (Gillett et al.,

2006).<sup>19</sup> Researchers linked broadband adoption at the community level to quicker growth in employment, and in the number of enterprises in IT-intensive sectors and overall. However, they also acknowledge that more study and better data are needed at the enterprise level in order to measure the impact of broadband on business and of ICT on national economic performance. Such data should reflect not only the availability of ICT (supply side), including broadband, but also how it is adopted and used (demand side).

However, in certain developing regions, such as Western Asia, most enterprises still need to become aware of the potential of broadband and related applications, and of the offers of application service providers (ESCWA, 2005).

### *What are the sectors that stand to benefit more from broadband?*

Broadband can enable or enhance the adoption of certain applications that have an impact on enterprise productivity. Broadband is much faster than dial-up Internet access, it is always on, and does not block telephone lines. In particular, broadband enhances existing multimedia applications, for example by broadening access to online video content, but it can be expected that new applications and business models could continue to emerge as broadband access grows. VoIP is an example of a broadband service with cost-saving potential for firms (and individuals) that is slowly gaining ground. However, in some cases, such as Singapore, it appears that there is not much difference between the types of Internet applications used by companies with broadband access as opposed to those enterprises that have slower access (IDA, 2005).

Several Governments, for example in the European Union, promote the enhanced use of broadband in the health sector, government, education, and the farm and food sectors (mainly in rural areas). The eChoupal case (see box 1.4), in India, is a good example of broadband adoption being relevant and beneficial to a non-ICT-intensive economic sector such as the agroindustry. However, it is those industries that make more use of multimedia applications or that have digital products that are the first to benefit from the enhanced experience that can be enabled by broadband. For example, the online music business has experienced recent significant growth worldwide, from \$380 million in 2004 to \$1.1 billion in 2005, with prospects for continued growth (IFPI, 2006). In the EU, 70 per cent of consumers that downloaded music from

## Box 1.4

### Broadband for enterprise efficiency in India: The eChoupal<sup>1</sup>

The role of broadband in India's offshore ICT-enabled services sector is well known. But it also holds significant promise for enterprise competitiveness in other economic sectors, including those that are anchored in rural areas, such as agriculture. Domestic efficiencies driven by ICT also have an impact on export competitiveness. The eChoupal project ([www.echoupal.com](http://www.echoupal.com)), of the Indian corporation ITC, one of India's largest exporters of agricultural products, is a success story in this sense. It successfully used ICT to increase the efficiency of its agricultural supply chain, reduce costs, eliminate intermediaries, and improve price transparency and produce quality. The eChoupal has created shareholder value for the ITC Corporation while bringing economic and other benefits to small farmers.

The eChoupal started in June 2000 by integrating a computer with an Internet connection to six choupals (a traditional community gathering in farming villages) of soybean farmers in Madhya Pradesh, in Central India. A simple portal gave farmers access to information that significantly improved their work, and which until then was unavailable (local weather forecasts, crop price lists in nearby markets, better sowing techniques). The immediate benefits in terms of productivity encouraged farmers to sell directly to the ITC Corporation, which could pay a better price for a better product. The Corporation's warehouses that collected the crop eventually also served to sell to the farmers inputs such as fertilizers, agrichemicals, and seeds, with the Corporation also offering them credit and insurance.

Training was provided to eChoupal hosts (usually literate farmers, with a respected, prominent place in the community).

The eChoupal set-up is as follows:

- PC with operating system platform and multimedia applications;
- UPS and solar-energy battery back-up;
- Printer;
- VSAT connection of up to 256 Kbps;
- Approximately \$6,000 investment in hardware, communication, software, staff, training and travel;
- Approximately \$100 of yearly maintenance.

The ITC Corporation recovers its investment within one to three years of deployment thanks to efficiency gains in the supply chain. Since the eChoupal's initial deployment, ITC's market share has grown from 8 to 12 per cent, and procurement costs have decreased by 2.5 per cent. At the same time, farmers have been able to obtain prices for their crops that are on average 2.5 per cent higher than through traditional channels, by improving their knowledge of market prices, their crop yields and decreasing waste.

The success of the soybean eChoupal encouraged the ITC Corporation to expand to other commodities. As at May 2006, the Corporation reported that the eChoupal programme had reached "more than 3.5 million farmers growing a range of crops — soybean, coffee, wheat, rice, pulses, shrimp — in over 31,000 villages through 5372 kiosks across seven states (Madhya Pradesh, Karnataka, Andhra Pradesh, Uttar Pradesh, Maharashtra, Rajasthan and Kerala)" ([www.itcportal.com](http://www.itcportal.com)). The eChoupal aims to reach 100,000 villages by the year 2010.

The use of broadband in the eChoupal programme has made possible an unprecedented level of interactivity between the ITC Corporation and its suppliers that helps build and consolidate direct commercial relationships, improves terms of business, and encourages the exchange of ideas to enhance the quality of the product.

<sup>1</sup> For further details on the eChoupal see Annamalai and Rao (2003) and chapter 8 in Austin and Bradley (2005).

online music vendors to their personal computers had broadband at home (Jennings, 2006). SMEs in ICT-enabled services will clearly depend on broadband. But in other sectors, medium-sized enterprises will be more likely to implement e-business applications dependent on broadband than small companies.

Broadband adoption in the EU appears to be more relevant for the IT services, publishing, pharmaceutical, automotive and aerospace sectors (E-Business Watch, 2005). Future broadband applications could be in marketing and sales, and for certain types of worker, broadband will facilitate working from home. In the European manufacturing industry, broadband is a key

enabler of online procurement, which helps enterprises manage their supply chain. Supply-chain integration and the streamlining of procurement processes are common objectives in those industries for which e-business solutions are attractive. Online procurement has become a part of everyday business and is one of the most frequently adopted e-business applications.

## 4. E-commerce

More and more enterprises worldwide are conducting e-commerce, understood as placing and receiving orders online. The bulk of e-commerce worldwide

occurs between businesses (B2B), although business-to-consumer trade (B2C) is growing steadily among developed countries. In the United States, B2B accounted for 93 per cent of all e-commerce in 2004 (US Census Bureau, 2006), with B2B defined as transactions by manufacturers and merchant wholesalers. The volume of European B2B online trade has increased, with almost half of firms' purchases occurring online (European Commission, 2005b).

The diffusion of e-commerce depends on a variety of factors. Critical for the decision to purchase online are the availability of products on the Internet, which must be suitable for online commerce, and a supply price that is less than or equal to the sum of the market price of conventionally sold items, the difference in transaction costs, and the difference in risk premiums between e-commerce and conventional transactions. The technological, organizational and environmental contexts are also important for enterprises to decide whether to sell their products online (Zhu et al., 2006). Limitations include capital and human capital shortages, lack of complementary infrastructure, lack of regulatory and security frameworks, and issues of trust in online business practices. Moreover, less widespread Internet use in developing countries usually means a small relative size of the domestic market for Internet sales.

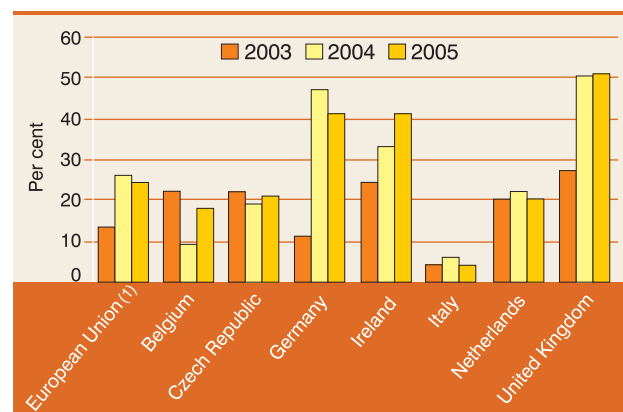
Online sales and purchases are now commonplace in all developed economies, but vary across industries and countries. In the OECD countries, in 2004, the share of

enterprises purchasing online ranged between 20 and 60 per cent averaged over the entire economy in 2004.<sup>20</sup> The share of enterprises selling their products online ranged between 10 and 20 per cent. Enterprises from the real estate sector, renting and business activities, as well as the wholesale and retail sectors, are more likely than other industries to purchase online, while online

Chart 1.7

### Enterprises in selected EU countries placing orders online

Enterprises with 10 or more employees.



Notes: (1) 2003 refers to EU15; 2004 and 2005 refer to EU25.  
Source: Eurostat (2006).

selling is generally most prevalent in manufacturing, wholesale and retail trade, and tourism. Among EU countries, an average of 12 per cent of enterprises received orders online, and 24 per cent placed orders online, although there were wide differences among countries (see charts 1.6 and 1.7).<sup>21</sup>

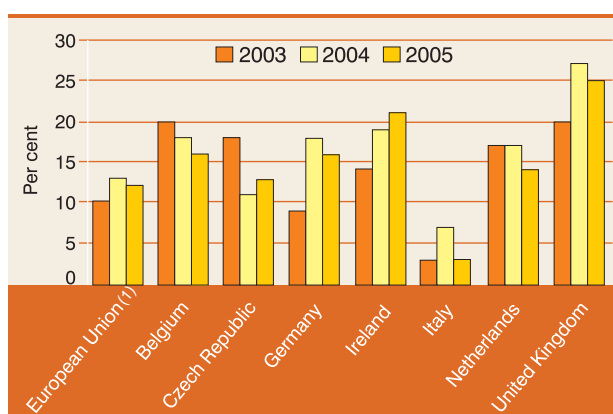
In other sectors, demand appears to be a principal constraint on increased electronic transactions, as customers prefer conventional sales channels. Furthermore, manufacturing and wholesale tend to be dominated by larger firms, for which necessary investments in e-commerce infrastructure are easier to afford.

The levels of online purchasing and selling also vary greatly among developing countries (see table 1.6). Contrary to the usual pattern throughout the developed economies, in which online purchases outnumber online sales, data from some developing and transition countries show the opposite situation. This can be partly explained by an overrepresentation of certain sectors in surveys, as is the case for the manufacturing sector in Argentina and Kazakhstan, or other business activities in the real estate sector (ISIC Rev. 3.1 category K74) in the case of Romania. As regards

Chart 1.6

### Enterprises in selected EU countries receiving orders online

Enterprises with 10 or more employees.



Notes: (1) 2003 refers to EU15; 2004 and 2005 refer to EU25.  
Source: Eurostat (2006).

**Table 1.6**  
**E-commerce in selected economies, 2005 or latest available year**

	Selling online % of all enterprises	Purchasing online % of all enterprises	Delivering online % of all enterprises
Argentina (2004) <sup>a</sup>	37.4	36.5	4.5
Brazil	27.1	28.5	..
Bulgaria (2004)	2.9	7.0	1.1
Cameroon	..	..	1.7
Chile (2003) <sup>b</sup>	1.2	1.8	..
China <sup>b</sup>	9.1	8.1	7.2
Kazakhstan	13.1	13.7	..
Kyrgyzstan <sup>c</sup>	..	..	1.6
Macao (China) (2003)	7.4	8.9	..
Morocco	5.2	9.0	9.0
Panama <sup>d</sup>	23.1	29.7	..
Qatar	34.9	28.3	..
Rep. of Korea (2004)	6.8	23.9	..
Romania (2004)	5.4	2.6	1.9
Russian Federation (2004) <sup>e</sup>	20.2	23.2	4.3
Singapore	13.5	30.8	..
Thailand <sup>f</sup>	7.2	8.7	..

Enterprises with 10 or more employees.

Notes:

<sup>a</sup> Survey of the manufacturing sector only.

<sup>b</sup> A breakdown by number of employees is not available, so the figure could include micro-enterprises with 0-9 employees.

<sup>c</sup> Of enterprises with computers.

<sup>d</sup> Provisional figures.

<sup>e</sup> Enterprises with 50 or more employees.

<sup>f</sup> Enterprises with 15 or more employees.

Source: UNCTAD e-business database, 2006

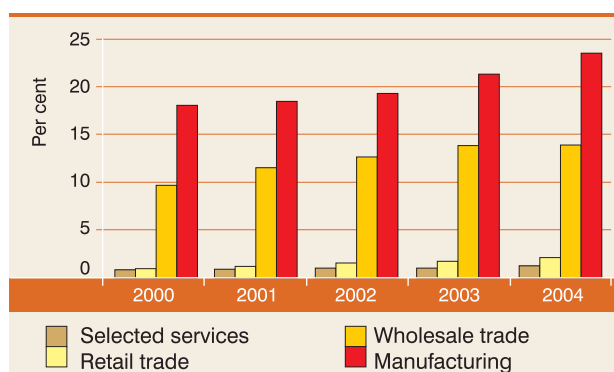
the manufacturing sector, the reason for the lower incidence of online purchases would require further research on e-commerce at the different stages of the value chain, but it could be that in some emerging markets B2B is less developed for intermediate goods than for final products.

There is much room for growth regarding the weight of e-commerce in the total turnover of economies, even in developed countries. For example, online sales represented only 2 per cent of all sales in Australia, and 1 per cent in Canada (OECD, 2005a). However, aggregated industry data show that in manufacturing industries, hotels, and the wholesale and retail trade, online sales represent a higher share of the total turnover than in other sectors. In the United States, the aggregated value of e-commerce in the manufacturing, wholesale and retail trade, and selected services sectors, accounts for nearly 10 per cent of the total revenue of those sectors; online sales play a particularly important role in manufacturing and in the wholesale and retail trade (see chart 1.8).

In the European Union, online sales account for an estimated 2.5 per cent of the gross output value of goods and services in 2005, although there are notable differences among countries. There are clear leaders, such as Ireland (10.1 per cent of all sales), Denmark (4.4 per cent in 2004), the United Kingdom (4.1 per cent) and Germany (3.1 per cent), while in several other EU economies the share of online sales was close to zero. These figures, however, are not disaggregated by economic sectors, and so it must be taken into account that many goods and services cannot be traded online very easily. The industries with the higher incidences of online sales in 2005 were the manufacturing sector (13 per cent of turnover), the wholesale and retail trade sector, the hospitality (hotels and others) sector, and the transport sector (8 per cent of turnover in each case) (see chart 1.9). Furthermore, less than one third of the EU enterprises that sold online also received online payments. Although there are virtually no data on the value of online sales from developing economies, it is not disputed that it accounts for a very small share of overall sales.

Chart 1.8

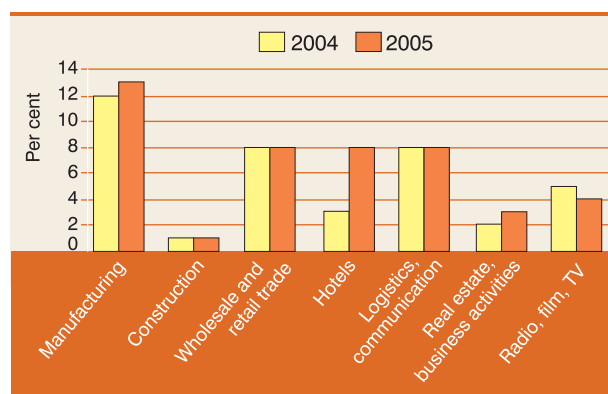
### Online sales as a proportion of total turnover in the United States, selected industries



Source: US Bureau of Census (2006).

Chart 1.9

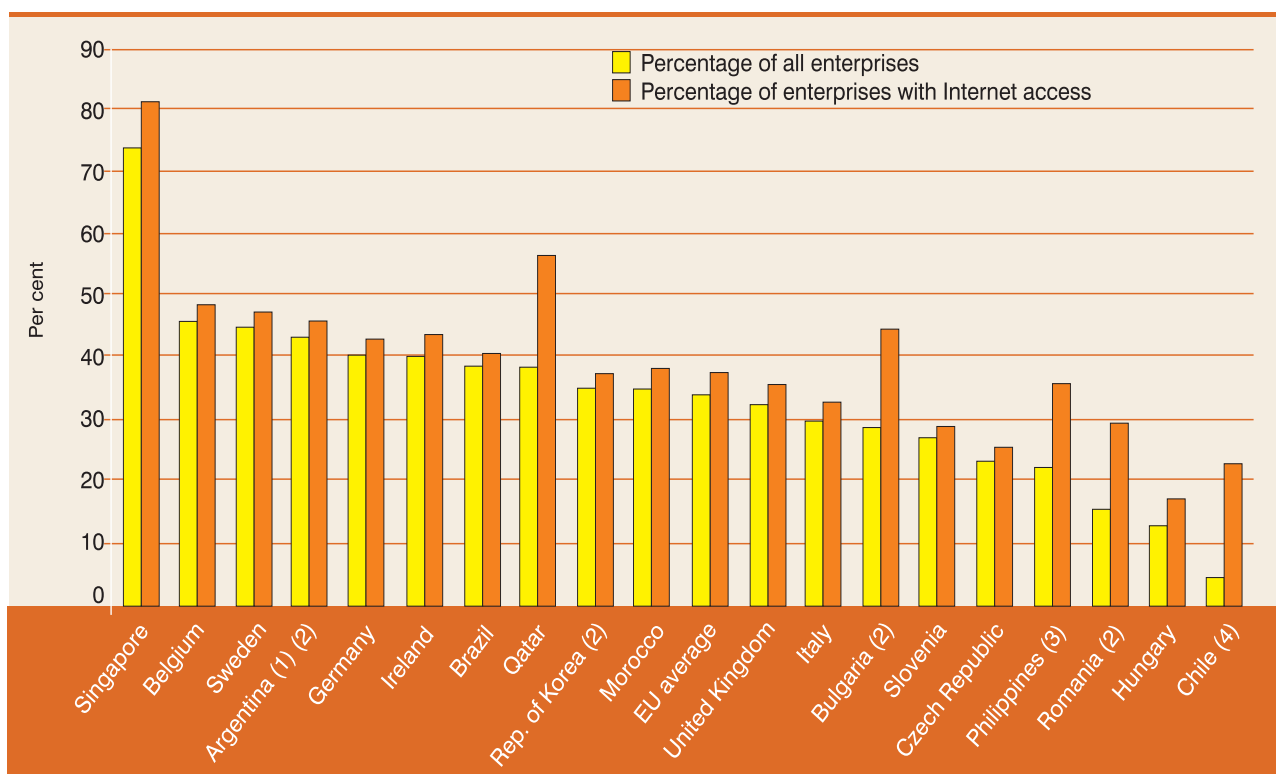
### Online sales as a proportion of total turnover in the EU



Source: Eurostat, 2006.

Chart 1.10

### Enterprises using intranet, 2005 or latest available year



Enterprises with 10 or more employees.

Notes:

(1) Survey of the manufacturing sector only.

(2) Reference year is 2004.

(3) Reference year is 2001. Refers to establishments with average total employment of 20 or more.

(4) Reference year is 2003. A breakdown by number of employees is not available, so the figure could include micro-enterprises with 0-9 employees.

Source: UNCTAD e-business database, 2006 and Eurostat (2006).



## 5. Other e-business

Other e-business refers to the use of the Internet for *internal business processes* and for interactions with government institutions (*e-government*). Also, remote work via the Internet and the use of the Internet for human resources development, which is often termed *e-learning* and refers to training that is provided through ICT structures, are of interest with respect to Internet use in enterprises.

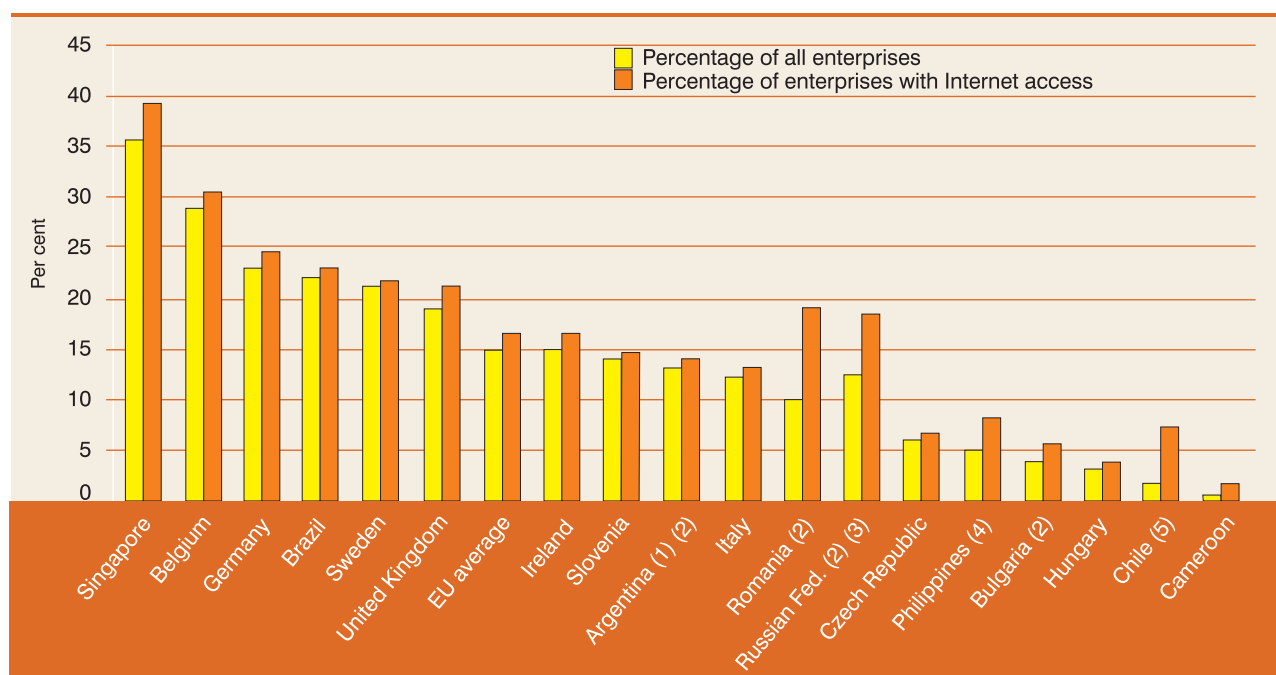
In 2003, sharing and editing documents collaboratively was the by far most important e-business activity in developed countries (30–40 per cent of enterprises), followed by online applications supporting human resource management (15–30 per cent of enterprises).<sup>22</sup> There are no available data on such e-business activities from developing countries. Therefore, the presence of an intranet is used as a proxy in order to compare

developing countries and developed countries (in this case, the EU). An intranet indicates the existence of the technical prerequisites for carrying out internal business processes online. Accordingly, 34 per cent of enterprises (excluding the financial sector) in the EU had an intranet in 2005. Across developing countries there are wide variations (see chart 1.10). At a more disaggregated level of data, in developed and developing countries alike, firm size and ICT intensity per industry sector determine varying levels of intranet use and should be taken into consideration when comparing the data.

The use of an extranet can indicate a more evolved e-business capability from an intranet, since it allows interaction with external users. The added complexity means that usually there are fewer enterprises using extranets than intranets (see chart 1.11). Trends for extranet use for either developed or developing countries are still to be established, since the available

Chart 1.11

### Enterprises using extranet, 2005 or latest available year



Enterprises with 10 or more employees.

Notes:

(1) Survey of the manufacturing sector only.

(2) Reference year is 2004.

(3) Enterprises with 50 or more employees.

(4) Reference year is 2001. Refers to establishments with average total employment of 20 or more.

(5) Reference year is 2003. A breakdown by number of employees is not available, so the figure could include micro-enterprises with 0-9 employees.

Source: UNCTAD e-business database, 2006 and Eurostat, 2006

time series is too short. In the EU, however, there was a slight growth in the proportion of enterprises with an extranet from 12 per cent in 2004 to 15 per cent 2005.

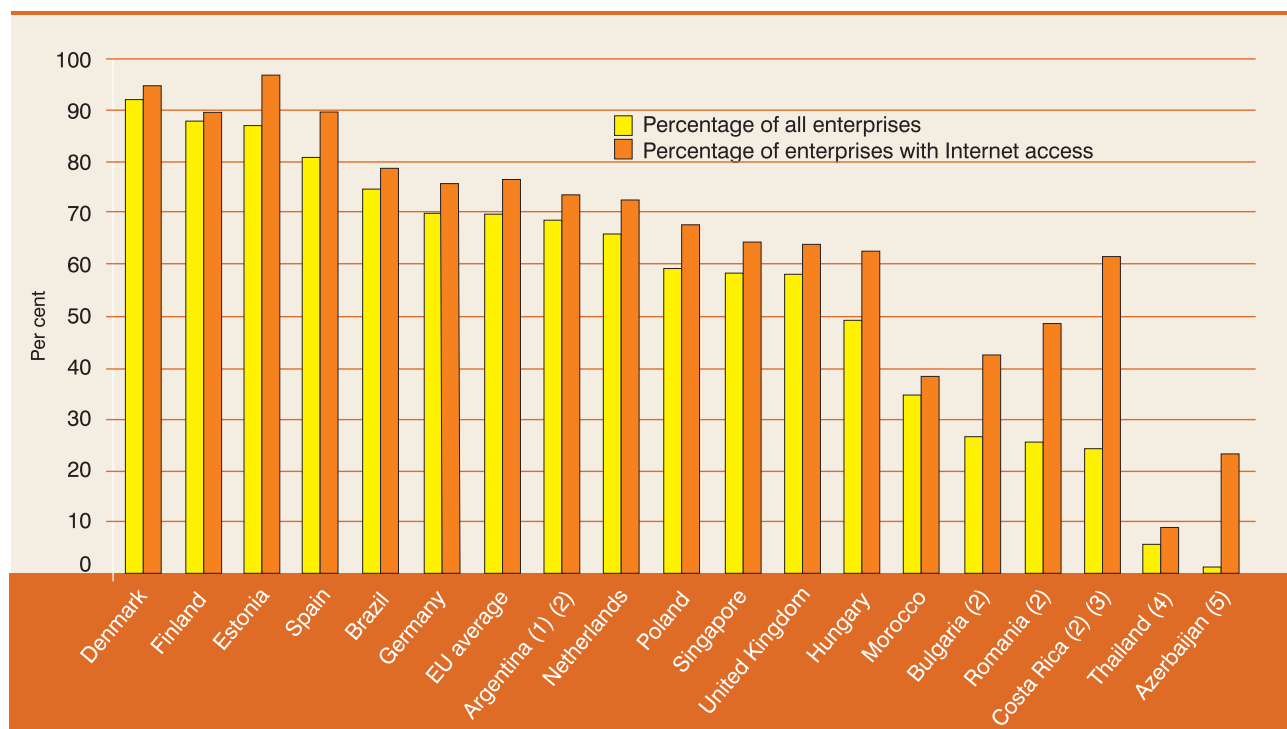
Enterprises can use the Internet for other e-business activities, such as e-banking and e-government. They can also provide customer services, although there are varying definitions of what these services cover (whether they involve a transaction or simply the availability of certain online content), and deliver digital products, but data on these activities are still very limited. Among the small set of developing economies for which information is available, some countries appear to have a demand constraint on Internet banking (when enterprises with Internet access have rates similar to those of developed countries, but the overall participation is low) or a supply constraint (when among the enterprises with

Internet access, Internet banking is not widespread) (see chart 1.12).

With respect to the use of the Internet for interaction with public authorities (e-government), the behaviour of enterprises often differs a great deal from the behaviour of households in the same country. In developed countries, where Internet access penetration among enterprises is nearly universal, neither the number of available online public services nor the Internet penetration rates in the population seem to matter significantly for enterprise use rates. Within the European Union, both the availability of online public services and Internet penetration are lower in the new member States, which nevertheless rank highest with respect to the diffusion of online transactions with government institutions among the enterprises (European Commission, 2005a, p. 23).

Chart 1.12

**Enterprises using the Internet for Internet banking or accessing other financial services, 2005 or latest available year**



Enterprises with 10 or more employees.

Notes:

(1) Survey of the manufacturing sector only.

(2) Reference year 2004.

(3) For this indicator, the breakdown by number of employees is not available, so the figure could include micro-enterprises with 0-9 employees. The survey only covers enterprises up to 249 employees.

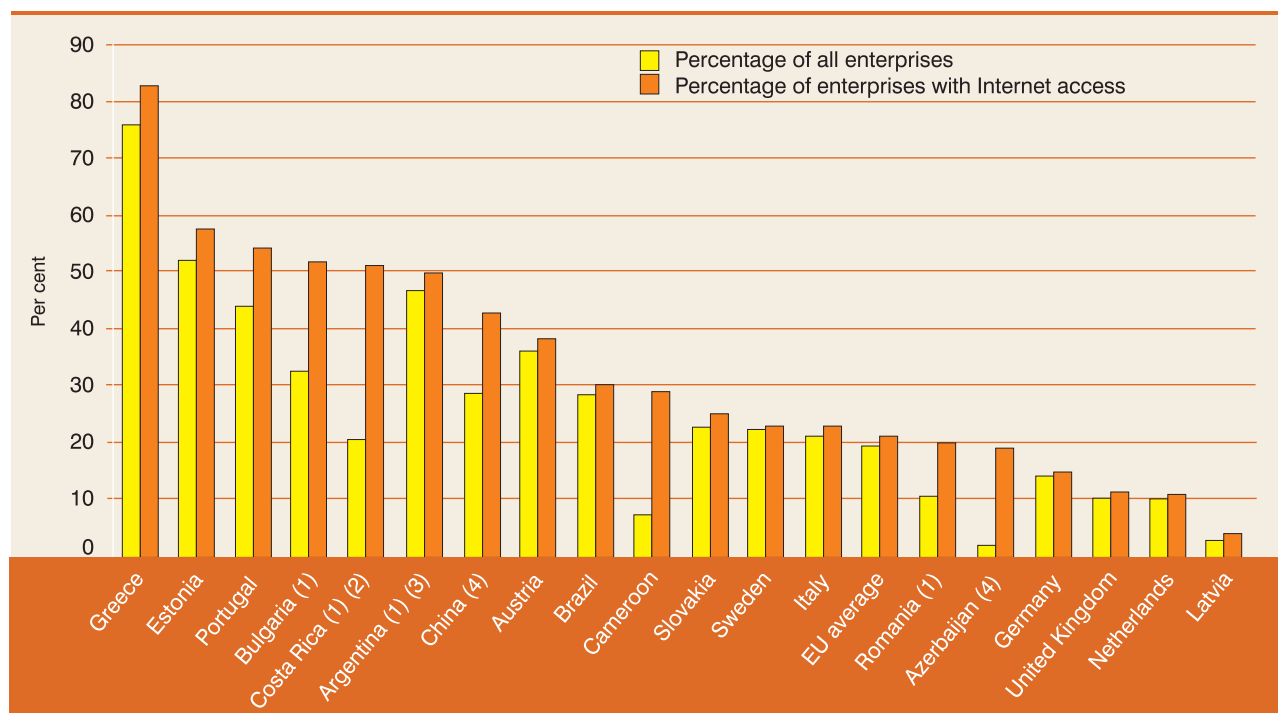
(4) Enterprises with 16 or more employees.

(5) For this indicator, the breakdown by number of employees is not available, so the figure could include micro-enterprises with 0-9 employees.

Source: UNCTAD e-business database, 2006 and Eurostat, 2006

Chart 1.13

### Enterprises using the Internet for transactions with public authorities, 2005 or latest available year



Enterprises with 10 or more employees.

Notes:

(1) Reference year is 2004.

(2) For this indicator, the breakdown by number of employees is not available, so the figure could include micro-enterprises with 0-9 employees. The survey only covers enterprises up to 249 employees.

(3) Survey of the manufacturing sector only.

(4) For this indicator, the breakdown by number of employees is not available, so the figure could include micro-enterprises with 0-9 employees.

Source: UNCTAD e-business database, 2006 and Eurostat, 2006

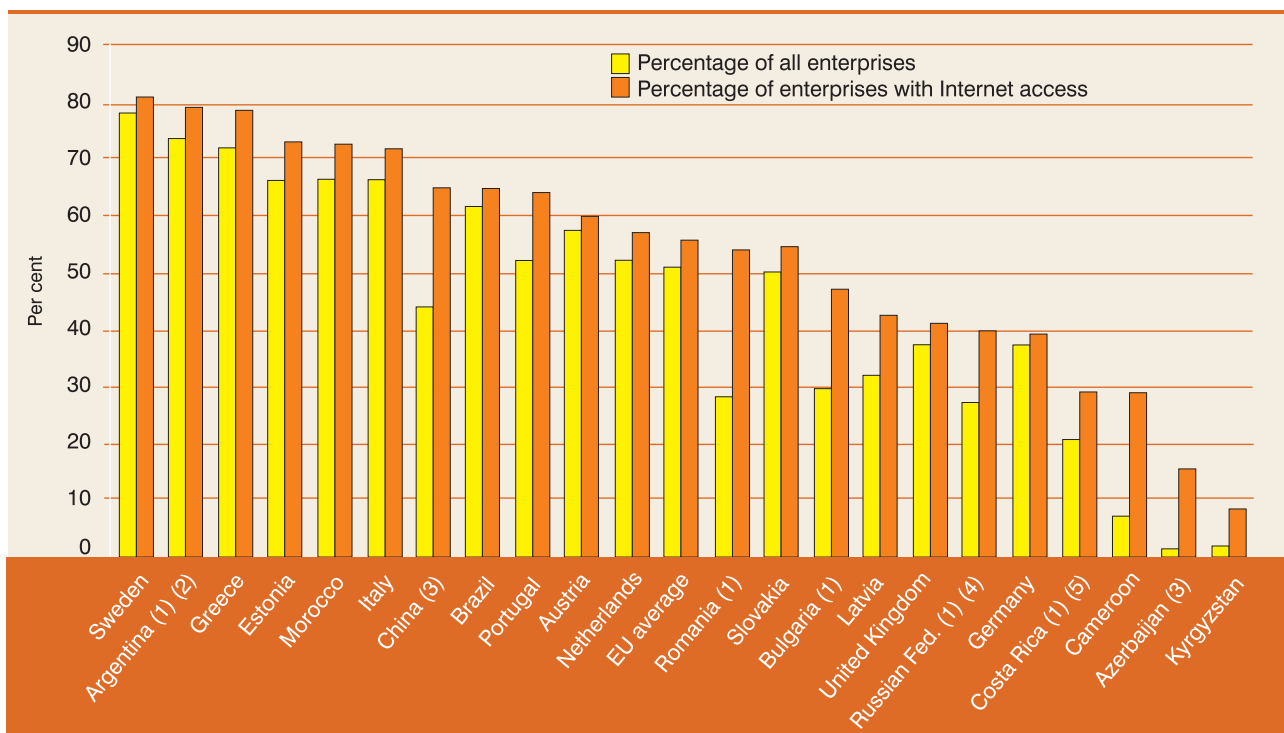
The proportion of EU enterprises with more than 10 employees in all but the financial sectors interacting with government institutions over the Internet for full electronic case handling was 19 per cent in 2005, 16 per cent in 2004 and 12 per cent in 2003 (EU-15). This reflects, on EU average, a continuing diffusion of e-government practices in the private sector. However, the diffusion of this form of e-government differs remarkably from country to country. While the diffusion of e-government practices among enterprises continues to increase in the EU average, this is not a universal trend for all individual member States. This is certainly also a result of the fact that the introduction of online transaction procedures is often economy-wide at discrete points in time, but concerns only clearly defined but possibly also varying subsets

of enterprises. Greece, for instance, experienced a significant jump from 40 to 70 per cent between 2003 and 2004, reflecting the committed promotion of e-government by the Greek authorities in its Operational Program for the Information Society (OPIS) (Boufeas, Halaris and Kokkinou, 2004). Far more widespread than online transactions with public authorities is the use of the Internet for obtaining government information.

The figures available for developing and transition countries deliver a mixed picture. In some cases, such as Azerbaijan, Bulgaria and Cameroon, the number of enterprises using the Internet to obtain government information does not exceed the number of enterprises actually completing transactions with government institutions online.

Chart 1.14

### Enterprises using the Internet to obtain information from public authorities, 2005 or latest available year



Enterprises with 10 or more employees.

Notes:

(1) Reference year is 2004.

(2) Survey of the manufacturing sector only.

(3) For this indicator, the breakdown by number of employees is not available, so the figure could include micro-enterprises with 0-9 employees.

(4) Enterprises with 50 or more employees.

(5) For this indicator, the breakdown by number of employees is not available, so the figure could include micro-enterprises with 0-9 employees. The survey only covers enterprises up to 249 employees.

Source: UNCTAD e-business database, 2006 and Eurostat, 2006

As regards other Internet uses facilitating business operations, the most popular forms of e-business are always those that will generate returns and profitability, or add value to the business, which in turn depends on the specific circumstances in a country or region. New data have been made available by Eurostat on remote work and e-learning implementation in European enterprises. In 2005, in 19 per cent of the enterprises surveyed in the EU some employees were working from a distance, using the Internet to connect with their company (16 per cent in 2004). Remote work is spearheaded by the Scandinavian countries. Also, up until 2005 on average 21 per cent of enterprises with more than 10 employees in the EU made use of e-learning techniques. For all EU member States these figures have been increasing or remaining roughly equal over the past few years.

SMEs constitute the majority of enterprises and employment in developing countries, and thus their access to and use of ICTs deserves special attention.<sup>23</sup> The Internet can provide SMEs with market and trade information, and reduce the cost of communication with customers and suppliers. SMEs can also use ICTs for e-business applications, although they have a lower capacity than large enterprises to adopt ICTs, usually owing to fewer resources for ICT investment and also because of less accessibility to e-business know-how.

Although there is not much difference in the penetration of ICTs such as the Internet between SMEs and large enterprises in developed countries, as a general rule there is a gap in their use of e-business applications. The gap between SMEs and large enterprises tends to widen the more complex the application. Although

Table 1.7  
Use of the Internet for e-business activities broken down by company size,  
2005 or latest available year

	Internet banking			E-government			Online customer services			Delivering products online		
	Micro-enterprises (0-9 employees)	SMEs (10-249 employees)	Large enterprises (250 or more employees)	Micro-enterprises (0-9 employees)	SMEs (10-249 employees)	Large enterprises (250 or more employees)	Micro-enterprises (0-9 employees)	SMEs (10-249 employees)	Large enterprises (250 or more employees)	Micro-enterprises (0-9 employees)	SMEs (10-249 employees)	Large enterprises (250 or more employees)
Argentina (2004) <sup>a</sup>	25.0	67.0	82.6	12.5	44.6	59.6	19.4	35.3	36.6	2.8	4.5	4.2
Bulgaria (2004)	..	25.6	56.8	..	31.4	65.2	..	3.5	8.4	..	1.1	2.7
Kazakhstan	..	..	..	..	..	..	10.0	17.8	31.7	..	..	..
Kyrgyzstan <sup>b</sup>	..	..	..	..	..	..	..	..	..	0.4	1.4	4.2
Morocco <sup>c</sup>	8.1	33.0	50.0	..	..	..	..	..	..	..	..	..
Romania	5.2	24.4	58.9	0.3	10.0	21.8	..	..	..	0.4	1.9	2.4
Russian Fed. (2004) <sup>d</sup>	..	..	..	..	..	..	1.0	3.0	5.4	1.2	3.4	5.6
Singapore	25.0	57.7	63.0	..	..	..	..	..	..	16.0	35.6	53.0

Notes:

<sup>a</sup> Survey of the manufacturing sector only.

<sup>b</sup> Of enterprises with computers.

<sup>c</sup> Survey does not cover enterprises with fewer than 5 employees.

<sup>d</sup> Micro-enterprises refer to 0-49 employees; SMEs refer to 50-199 employees; large enterprises refer to +199 employees

Source: UNCTAD e-business database, 2006.



the reasons for this vary depending on the economic sectors and among countries, SMEs might also find that e-business applications for internal business processes might not be suitable for their size and industry,<sup>24</sup> or are not affordable. For example, only 9 per cent of EU enterprises with 10 to 49 employees use Enterprise Resource Planning systems (ERPs), as opposed to 59 per cent of enterprises with more than 250 employees (E-Business Watch, 2005).

Information from developing countries on the use of e-business for internal business processes is very limited, but data on the use of the Internet for business applications seem to confirm the trend in developed countries in terms of the gap between SMEs and large enterprises, with some exceptions (see table 1.7). It should be noted that, unlike most developed countries, several developing countries collect data on Internet e-business in micro-enterprises (0–9 employees), which are important actors in their economies and societies.

### C. The ICT sector

This section presents trends related to two indicators on the ICT sector as identified by the core list of ICT indicators of the Partnership on Measuring ICT for Development (2005). More specifically, it shows ICT employment and value-added corresponding to the manufacturing and service industries capturing, transmitting or displaying data and information electronically. The two indicators measure the size of the ICT sector within the business sector both as a contribution to employment and as a share in production. The statistics presented in this section use data from the OECD and UNCTAD. The ICT sector is based on the OECD definition.<sup>25</sup>

Generally speaking, the data show that after the contraction in the early 2000s, developed countries experienced an increase in both value added and employment in the ICT sector in 2003. This increase in demand and supply in the developed countries' ICT sector opened up new prospects for developing country business partners.

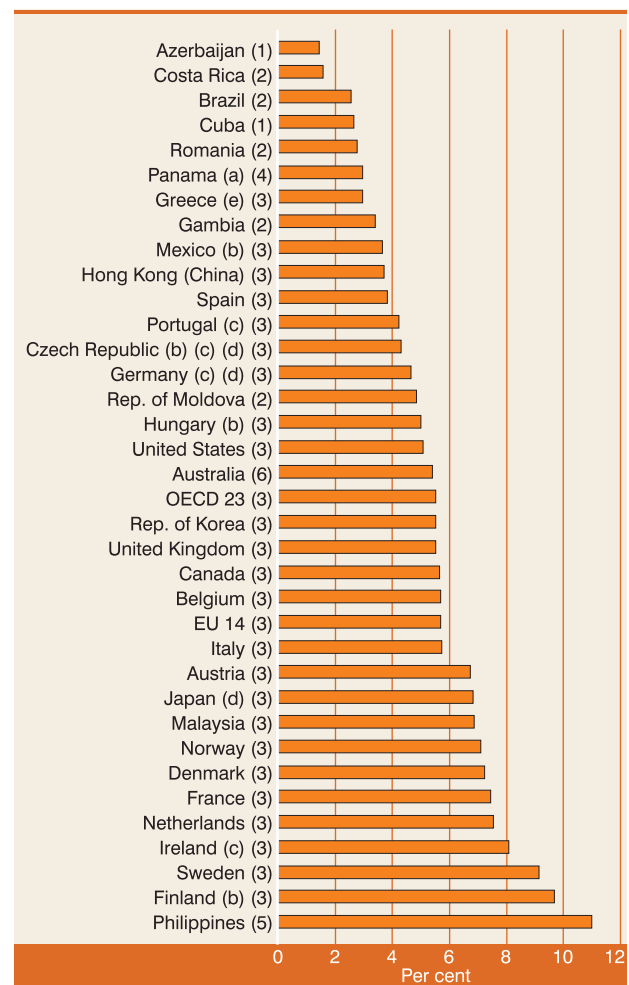
#### *Business sector workforce in the ICT sector*

In 2003, the ICT sector represented 5.5 per cent of total business employment in developed countries and was a source of employment growth (OECD,

2006). ICT sector employment grew by over 8 per cent annually between 1995 and 2003, which represented an additional 1 million people employed. The European Union accounted for 37 per cent of total employment, the United States for around one third and Japan for 15 per cent (OECD, 2004). The majority (66 per cent) of those working in the ICT sector were employed in the services sectors, a figure that corresponds to the

**Chart 1.15**

#### Share of ICT sector workforce in total business sector workforce



Notes:

(1) 2005.

(2) 2004.

(3) 2003.

(4) 2002.

(5) 2001.

(6) 2000.

(a) Preliminary data.

(b) Based on employees figures.

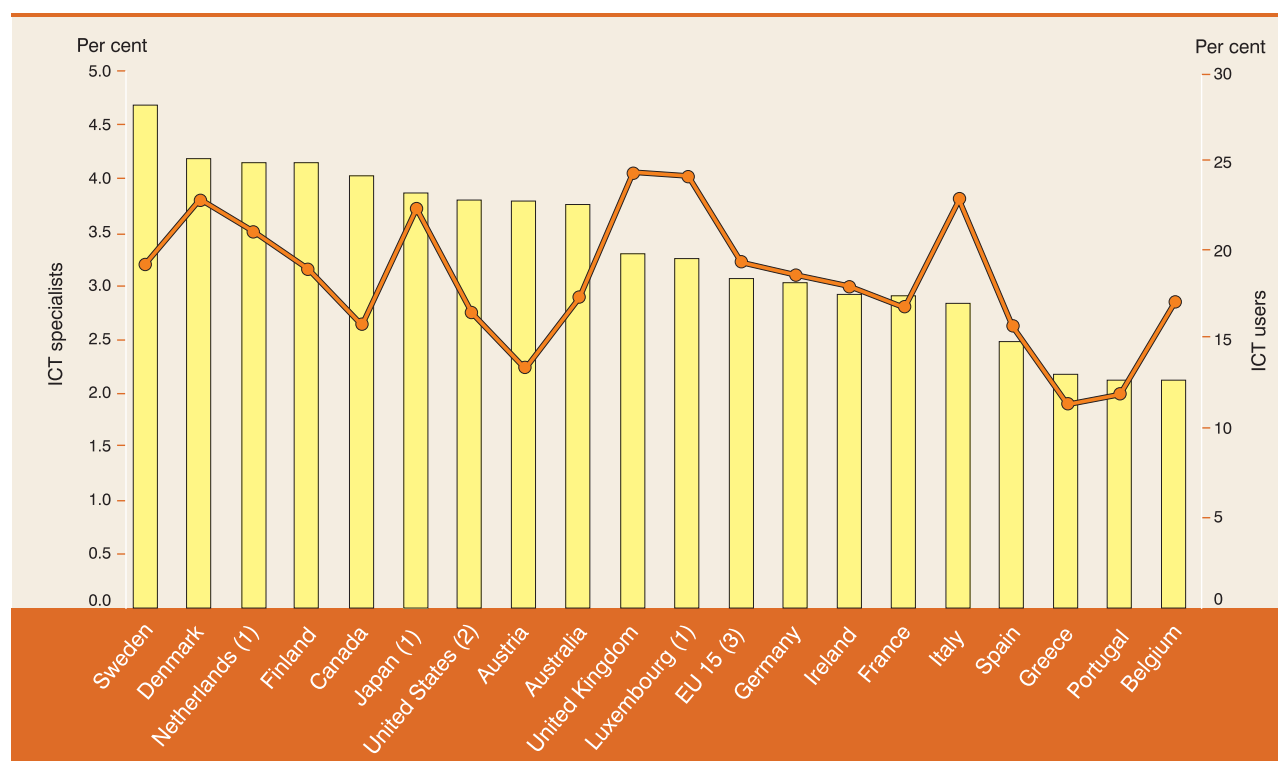
(c) Rental of ICT goods (ISIC Rev.3 7123) not available.

(d) ICT wholesale (ISIC Rev.3 5150) not available.

(e) Telecommunication services (ISIC Rev.3 642) included postal services.

Source: OECD (2006) and UNCTAD e-business database, 2006

**Chart 1.16**  
**Share of ICT-related occupations in the total economy, 2003**



Notes:

(1) 2002.

(2) OECD estimate for 2003.

(3) includes estimates.

Source: OECD (2005a).

high share of services in a typical developed economy. Moreover, services tended to be less intensive in ICT labour than manufacturing, with a 5 per cent share of ICT service employment in total business services employment compared with 7 per cent for manufacturing.

The countries with the highest 1995–2003 growth in ICT sector employment were Finland, Norway, Denmark, Sweden, Hungary and the Netherlands. The ICT intensity of business sector employment varied in 2003 between 10 per cent (Finland) and 3 per cent (Greece). Ireland and Japan had the most ICT-intensive manufacturing employment, while Sweden and Finland had the most ICT-intensive business services employment (with 10 per cent or more each).

These findings complement chapter 5 of this report, which analyses the evolution of the manufacturing workforce and the business service workforce and their contribution to global employment growth. It argues that the employment levels and the wages of

skilled workers are rising in most countries, as a result of ICT-induced technological change.

Among the developing countries for which data are available, the Republic of Korea, Malaysia and the Philippines show a very high share of ICT employment in their business sector (above the OECD average) (chart 1.15). One explanation could be that in some developing countries the size of the business sector is still small and most developments in the private market are based on new technologies.

The core indicator on ICT employment presented above measures occupation in the industries identified as belonging to the ICT sector. Alternative measures of ICT contribution to employment can take into account the occupations that use ICTs to various degrees across all industries (OECD, 2004). Chart 1.16 shows a comparison of two alternative ICT employment indicators: ICT specialists and ICT users.<sup>26</sup> When these definitions are used, the 2003 ranking of countries changes slightly. The country with the highest

proportion of ICT skills (users and specialists) in total occupations is the United Kingdom with 28 per cent. Greece and Portugal have again a lower specialization in ICT skills, with only 14 per cent. Sweden has the highest share of ICT specialists (4.7 per cent).

Interestingly, the correlation between the two alternative occupation indicators is only moderate (0.4 out of 1); this suggests that the countries with the most specialized ICT workforce are not necessarily the ones with the highest numbers of ICT users.

### Value added in the ICT sector

In developed countries, the ICT value added to the business sector picked up between 2000 and 2003, to reach over 9 per cent in 2003, closely matching the 2000 performance. Services accounted for over two thirds of the ICT sector, but were on average less ICT-intensive than manufacturing. For example, in Ireland and the United Kingdom the share of ICT in total business services value-added was the highest, with more than 11 per cent, while similar values for manufacturing reached above 20 per cent in Finland. Among ICT services, telecommunications had a particularly large share of value added in Greece, the Netherlands and Ireland (more than three quarters). The highest 1995–2003 growth rates were calculated for Finland, Hungary, the Netherlands and Norway.

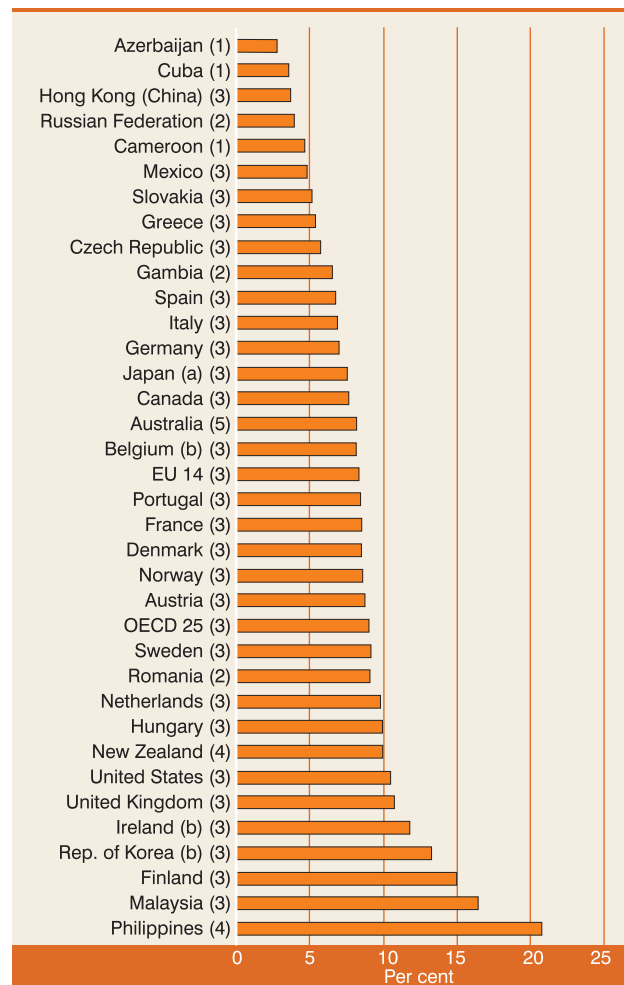
Taking into consideration available data from selected developing countries, chart 1.17 gives a more global picture of the ICT value added to the business sector. Among the developing countries, the Philippines, Malaysia and the Republic of Korea stand out with above OECD-average contributions of ICTs to the business sector. Value-added figures by sector suggest that the business sector in these countries is highly ICT-intensive.

As in the case of the findings on employment, the ICT sector is very unevenly distributed across countries. Evidence suggests that while on average, the developed countries have a higher share of ICT value-added, some developing countries report even higher values.

Although not directly comparable to the two core indicators on the ICT sector, in China the “information industry”<sup>27</sup> contributed 7.5 per cent value-added to the GDP in 2004 (OECD, 2006). The high growth rate of this indicator in 2004 (30 per cent) suggests that China developed rapidly a leading position in the production of certain ICTs. The industry has a value

Chart 1.17

### Share of ICT sector value-added in business sector value-added



#### Notes:

(1) 2005

(2) 2004

(3) 2003

(4) 2001

(5) 2000

(a) ICT wholesale (ISIC Rev.3 5150) not available.

(b) rental of ICT goods (ISIC Rev.3 7123) not available.

Source: OECD (2006) and UNCTAD e-business database, 2006

added estimated at \$118 billion, of which 60 per cent derives from the electronics and information industry and 40 percent from the communications industry. The communications industry in particular experienced high growth as shown by the post and telecommunications value added of \$40.1 billion in 2003 as compared with \$13.6 billion in 1997.

As suggested by data on a set of additional statistics, services contributed increasingly to the manufacturing value-added, with important consequences for

outsourcing. Between the early 1970s and the mid-1990s this evolution reflected the outsourcing of manufacturers' service activities previously produced in-house (OECD, 2003). Japan, the United States, Australia, France and Germany had the highest percentage of services consumption in the manufacturing sector (above 25 per cent) in the late 1990s. Business services, a champion sector in ICT-enabled outsourcing, had a particularly high intermediate consumption in the manufacturing sectors of France and Germany, while trade and transport had relatively higher shares in the manufacturing sectors of Australia and the United States.

#### D. Trade in ICT-enabled services

ICTs make services more easily tradable all over the world. They do so in two ways: by facilitating transactions with traditionally traded services and, at the same time, by making previously non-tradable services tradable. Better access to information and lower communication costs have reduced existing barriers to trade, sometimes from prohibitively high starting levels. Additionally, the new technologies have generated an array of completely new services such as application service providers, data warehousing, web-hosting and multimedia services.

The decline in trade costs in services has given rise to new international business opportunities, notably for developing countries. The "slicing-up of the value-added chain" (Krugman, 1995) has been extended to also take into account the services industry and the delocalization to lower-cost markets. More standardized services such as customer services, human resource management or software consultancy no longer have to be provided in-house. Through outsourcing and offshoring,<sup>28</sup> services can be provided from a distance by more cost-effective suppliers. At the international level, the result is a deeper specialization that is bound to benefit all parties involved, with more productivity-driven gains on the outsourcers' side, and more employment-driven gains in the host country. Developing countries that are receivers of offshoring are given the possibility to complement their development policies with a services-based strategy.

Estimates of IT and business process outsourcing and offshoring are reflected only to a small extent in developing countries' statistics of trade in ICT-enabled services. Outsourcing and offshoring of ICT-

enabled services have a substantial growth potential and some countries are not yet involved in the process. According to Chakrabarty, Ghandi and Kaka (2006), by 2005 service providers had captured only 10 per cent of the potential market to be offshored, valued at \$300 billion. The United States was the world's leading offshorer, responsible for an estimated 70 per cent of the offshored market (McKinsey Global Institute, 2003). Additionally, offshoring continued to have a relatively small proportion in the balance-of-payments statistics of trade in services. The value of offshored IT and business service activities represented only about 5 per cent of the world exports of ICT-enabled services in 2001 (OECD, 2005b).

World exports of ICT-enabled services had an accelerated growth in 2003. This was mainly due to the above-average 20 per cent growth rate of developing countries' exports, for the first time surpassing developed countries' performance after the slow down in 2000. However, developing countries only exported 16 per cent of world ICT-enabled services in 2003, with a small decline from the 18 per cent they accounted for in 2000.

Which are the main exporters and importers of ICT-enabled services? To what extent and in what way can ICTs enhance developing countries' export capacity in services? The answers to these questions encompass the full complexity of exporting and importing operations in which outsourcing and offshoring play a limited role. This section tries to answer the above questions and provides developing countries with the necessary information to be able to evaluate their export growth potential in ICT-enabled services.

The first part proceeds with a conventional analysis of trade in ICT-enabled services. It focuses on trends, values, driving sectors and leading countries, while highlighting the development perspective of ICT-enabled services trade.

The second part takes into account the more comprehensive framework of trade in services by delivery modes (cross-border, consumption abroad, commercial presence and presence of natural persons). This approach follows the logic set out by the WTO General Agreement on Trade in Services (GATS), which allows trade policymakers to liberalize services according to the above-mentioned modes of service delivery. Within this framework, the second part looks at the effects of ICTs on delivery modes. It shows that ICTs brought about a more substantial boost in services delivered across borders and by consumption

abroad as opposed to those delivered through commercial presence. This finding is in line with ICTs' cost reduction and trade liberalization effects.

The last part concentrates on computer and information services, as the most dynamic ICT-enabled service component. A detailed presentation of the WTO GATS commitments corresponding to this sector helps to build the link between countries' positions and opportunities within the WTO negotiations on liberalization.

## 1. Trends of exports and imports: An analysis of the BOP data

### ICT-enabled services definition

To date, global definitions of ICT-enabled services still oscillate between broader and narrower frameworks. While clearly some services are more closely related to ICT use and adoption, it is not obvious where to draw the line between sectors. Building on the balance-of-payments (BOP) standard services classification, the *E-commerce and Development Report 2002* identified seven

sectors that were mostly influenced by the adoption of ICTs. Following the same approach and definition, the present analysis considers the ICT-enabled services as the highlighted BOP components in table 1.8.

Box 1.5 summarizes information on data sources, data availability and classifications.

### ICTs facilitate trade in services

Exports of ICT-enabled services grew faster than total services exports during 2000–2003 (chart 1.18). Over this period, every percentage increase in the world exports of services was accompanied by a 1.6 per cent rise in ICT-enabled services exports. As a result, in 2003 the \$836 billion value of the ICT-enabled sectors represented about 45 per cent of total services exports. This share has had a steady positive evolution over the past years, rising from approximately 37 per cent in 1995. A similar trend was found for “other services”,<sup>29</sup> with a rising share in total service exports by a closely matching 6 percentage points over the 1995–2003 period, from 44 to 50 per cent.

**Table 1.8**  
**Components of ICT-enabled services**

Balance-of-payments standard classification components of services		ICT-enabled services
Transportation		
Travel		
Other services <sup>a</sup> :	Communication services	Include postal, courier and telecommunications services
	Construction services	
	Insurance services	Include life insurance, pension funding, freight insurance, other direct insurance, reinsurance and auxiliary services
	Financial services	Include financial intermediation and auxiliary services
	Computer and information services	Include computer, news agency and other information provision services
	Royalties and licence fees	Include franchises and similar rights, plus other royalties and licence fees
	Other business services	include merchanting, <sup>b</sup> trade-related, operational leasing, legal, accounting, management consulting and public relations, advertising, market research and public opinion polling, research and development, architectural, engineering, agricultural, mining, and other on-site processing and services between related enterprises <sup>c</sup>
	Personal, cultural and recreational services	Include audiovisual and related services plus education and health services provided online or onsite.
Government services		

Notes:

<sup>a</sup> This is not a standard component but is provided by the IMF as total services minus transportation and travel.

<sup>b</sup> E.g. commodity arbitrage and wholesale trading.

<sup>c</sup> E.g. payments between subsidiaries and the parent companies to cover overhead expenses.

Source: IMF CD-ROM and UNCTAD (2002).



## Box 1.5

### Note on balance-of-payments data availability

The balance-of-payments trade in services data is gathered by the International Monetary Fund and provided usually by national central banks. The different service sectors are categorized following the standardized Extended Balance of Payments Services Classification. Many developing countries (e.g. South Africa, Thailand, Swaziland, India, Indonesia) and some developed countries (e.g. Denmark and Switzerland) do not provide complete data sets for all relevant ICT-enabled service sectors. Therefore, the analysis of ICT-enabled services, as defined here, was sometimes complemented with data on the “other services” category, for which reporting was more consistent. Within the “other services” category, ICT-enabled service exports represent about 85 to 90 per cent, the rest being allocated between “construction” and “government services” exports. 2003 was the latest year with available data for all the major exporters of ICT-enabled services.<sup>1</sup>

Comparing ICT-enabled service exports’ share in total services with the “other services” share reveals different trends only for the 1999–2000 period (chart 1.18). One interpretation is that, for this specific period of time, the growth of ICT-enabled services was rather due to an improvement in developing countries’ data reporting. For example, that year corresponded to a change in the classification base on which Indian data were reported to the IMF.<sup>2</sup> Also, other countries provided more detailed sectoral data starting with the year 2000. Therefore, this chapter focuses on the 2000–2003 evolution.

The lack of internationally comparable price data for services prevents the comparison of real trade flows. Moreover, data on trade in services are limited to global flows. Often the bilateral flows of trade in ICT-enabled services are not published. Exceptionally, for some countries bilateral trade in services data are gathered by the OECD.<sup>3</sup>

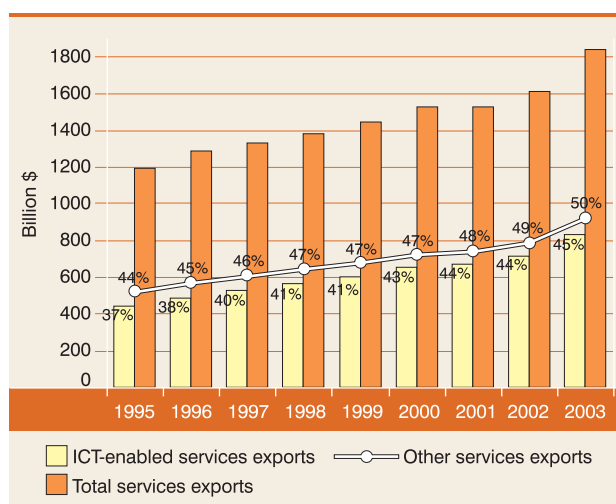
<sup>1</sup> 2004 data were missing for most developing countries of Asia.

<sup>2</sup> Computer and information services started to be reported separately from other business services.

<sup>3</sup> OECD Statistics on International Trade in Services: <http://caliban.sourceoecd.org/vl=16644819/cl=18/nw=1/rpsv/~4260/v239n1/s4/p1>.

Chart 1.18

### ICT-enabled services’ share in total worldwide services exports



Notes: Percentage figures represent the yearly share of the ICT-enabled services (below)/“other services” (above) in total services exports. “Other services” are the following: communication, construction, insurance, financial, computer and information, royalties and licence fees, other business, personal, cultural and recreational and government services.

Source: IMF BOP data.

The faster growth of the ICT-enabled cluster within services trade confirms that these services are more easily tradable. Empirical research quantifies the positive effect of ICTs on services trade. Using United States bilateral balance-of-payments trade data from 14 service sectors, Freund and Weinhold (2002) estimated that a 10 per cent increase in the number of Internet host sites<sup>30</sup> in a partner country brought about a 1.7 percentage point boost in the country’s exports to the United States. The sample covered United States imports and exports from a panel of 31 partner countries, including 17 developing ones, from 1995 to 1999. The same analysis showed that ICTs’ effects on trade are visible on both the import and the export side with a similar impact and intensity.

While it is true that improved access to and use of ICTs have the potential to boost trade in services, there are other factors that play an equally important role both in international trade and in offshoring. ICTs cannot be used only as “plug and play” technologies. The legal and regulatory environment, the level and type of education of the people, the transparency of the political system and various cultural aspects can scale up ICTs’ impact on trade. For that purpose, Governments have to ensure that the right ICT strategies are put in place, then evaluated and eventually redesigned to extend access to, and efficient use of, ICTs.<sup>31</sup>



**Table 1.9**  
**Trends in world services trade**

	2003 BOP data aggregation (billion \$)	Annual growth rates (%)				2003–2004 WTO (2005) estimates
		1999–2000	2000–2001	2001–2002	2002–2003	
Transport	397.3	7.1	-1.7	4.1	13.9	23
Travel	520.4	4.0	-2.8	4.7	10.2	18
Other services	919.1	6.5	2.4	7.2	16.2	16

Note: “Other services” are communication, construction, insurance, financial, computer and information, royalties and licence fees, other business, personal, cultural, recreational and government services.

Source: IMF BOP data, UNCTAD calculations and WTO (2005) estimates for the 2004 values.

In 2002, the expansion of services exports was driven by the “other services” category, corresponding to the ICT-enabled cluster. However, during 2003 and 2004 the “transportation” and “travel” exported values picked up as well (table 1.9). Moreover, WTO (2005) estimates suggest that the latter may have outpaced the “other services” growth rate in 2004. Real trade flows could not be compared because price data for services were not available for most countries. However, according to the same source, price increases rather than volume were the main cause of the change in exports’ sectoral growth pattern. For example, higher oil prices may have led to a greater number of “transportation” services exports.

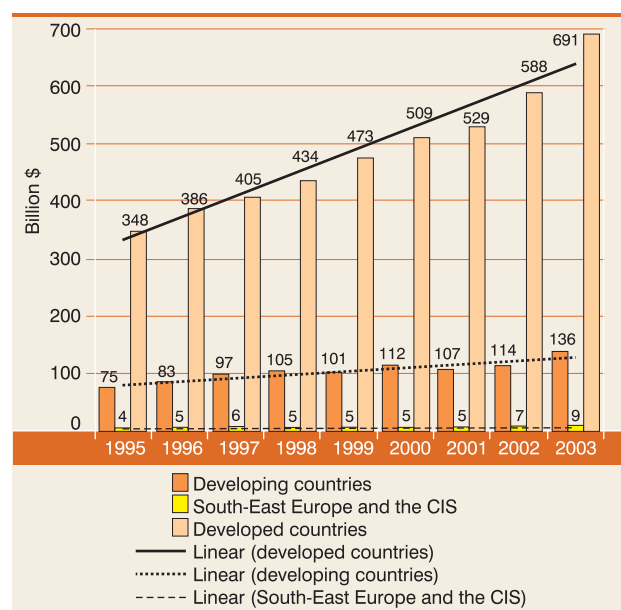
An analysis of developed countries’ exports of ICT-enabled services reveals that the European Union 15 (EU-15) as a group was the world’s largest and most dynamic exporter in 2003 (chart 1.20). The European Union still featured as a major world trader even when the high share of intra-EU-15 trade is subtracted. Moreover, during 2000–2003, the EU-15 improved its competitive position mainly outside the European markets. Estimations using Eurostat data show that the share of intra EU-15 trade in “other services” exports had declined in recent years, to reach 52 per cent in 2003. It follows that most of the growth

### Developed countries still in the lead

As shown by the linear trends in chart 1.19, both developed and developing countries have seen their ICT-enabled services exports expand over the past ten years (1994–2004).<sup>32</sup> This growth gained momentum in the aftermath of the year 2000. However, developed countries were still leading the global market of ICT-enabled services (as for total services in general) in terms of both value and growth rates. Developed countries’ contribution to world ICT-enabled service exports remained high in 2003 at around 83 per cent. During 2000–2003, developing countries lagged behind the world compound annual growth rate (CAGR) of 10 per cent, with 7 per cent annually. Among the developing economies, some had exceptionally high growth rates. Over the same period, South-East Europe and the Commonwealth of Independent States (SEECIS) achieved the highest growth rate (19 per cent annually), but their ICT-enabled exports only amounted to 1 per cent of the global value.

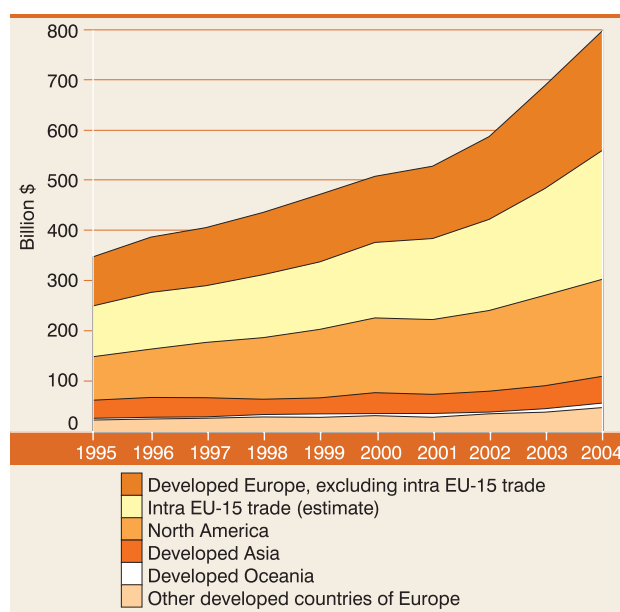
**Chart 1.19**

### ICT-enabled services exports, by broad development categories



Source: IMF BOP data.

**Chart 1.20**  
**ICT-enabled services exports of developed countries**



Note: The share of intra EU-15 trade was approximated by the Eurostat estimations corresponding to the “other services” exports.  
 Source: IMF BOP data and Eurostat.

in EU-15’s exports of ICT-enabled services went to outside markets, where the European exporters improved their position to the disadvantage of their competitors. At the same time, the EU-15 markets of ICT-enabled services were increasingly catered for by other exporters, including those from developing countries.

The EU-15’s exports of ICT-enabled services with the highest four-year (2000–2003) increases were insurance services and computer and information services, with 30 and 16 per cent annual growth rates respectively. Exports of insurance services have also driven the expansion of the ICT-enabled cluster in the developed countries of America and Asia, but with less substantial growth rates of 14 and 19 per cent respectively. Developed Oceania’s exports of ICT-enabled services evolved moderately across the seven sectors analysed, with computer and information services in the lead (10 per cent annually) and personal, cultural and recreational services suffering from a pronounced downturn (-19 per cent).

In terms of absolute exported value, the European developed countries were rather specialized in “other business services”, which made up as much as 55 per cent of their ICT-enabled services in 2003. The developed American and Asian exports were concentrated more in royalties and licence fees,

with an approximately 29 per cent market share for both regions, as against only 6 per cent in the EU-15. Developed Oceania had a more balanced market structure across the seven sectors, with relatively higher shares of the communication and computer and information services.

Table 1.21 in the statistical annex shows country exports and growth rates of ICT-enabled services from 2000 to 2003.

### *Developing countries’ export recovery in 2003*

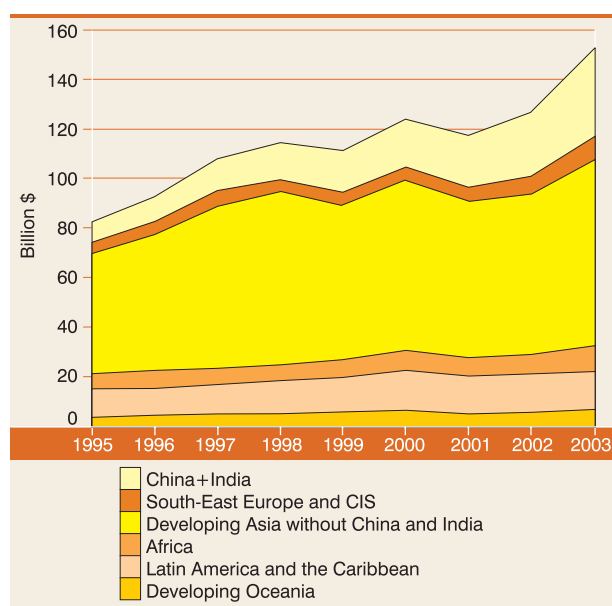
In 2003 developing countries’ exports of ICT-enabled services recorded an annual growth rate of 20 per cent, surpassing developed countries’ performance (17 per cent) for the first time since the 2000 dot-com crash. Developing countries took longer to regain high dynamics in their ICT-enabled services exports, but trade statistics suggest a strong recovery after the 2000–2003 period.

Developing and SEECIS countries’ exports of ICT-enabled services came mostly from Asia (chart 1.22), which held the lion’s share with 77 per cent. It was followed by America with around 10 per cent, Africa with 7 per cent and the SEECIS with around 6 per cent of ICT-enabled services exports in the sample of developing and transition economies.

Asian developing economies’ exports of ICT-enabled services taken together had moderate growth rates over 2000–2003 (8 per cent CAGR). However, chart 9 reflects the large imbalance in growth rates between India and China on the one hand (22 per cent CAGR) and the other developing Asian economies on the other hand (3 per cent CAGR). Past figures show that the ICT-enabled services exports of India and mainland China taken together grew faster and recovered more rapidly in the aftermath of 2000. Despite this past imbalance, in 2003 all Asian developing countries’ exports of ICT-enabled services experienced a significant increase, suggesting that more recently all were able to benefit. The exceptional 2003 growth rates are also related to the South–South trade opportunities and the positive economic developments, particularly in China and India. The Asian exported services expanded faster than the world average in the computer and information and royalties and licence fees sectors.

The SEECIS region accounted for one of the highest compound annual growth rates over the period 2000–

**Chart 1.21**  
**ICT-enabled services exports of developing countries**



Source: IMF BOP data.

2003 (19 per cent). Three sectors had particularly high growth rates: computer and information, personal, cultural and recreational, and insurance services.

Notable also was Africa's constantly increasing annual growth rate of approximately 8 per cent. After a period

of negative growth in 2000–2003, Latin America and Caribbean exports of ICT-enabled services picked up again in 2004 to regain the 2000 values. Owing to lack of data, the service exports of developing Oceania cannot be assessed.

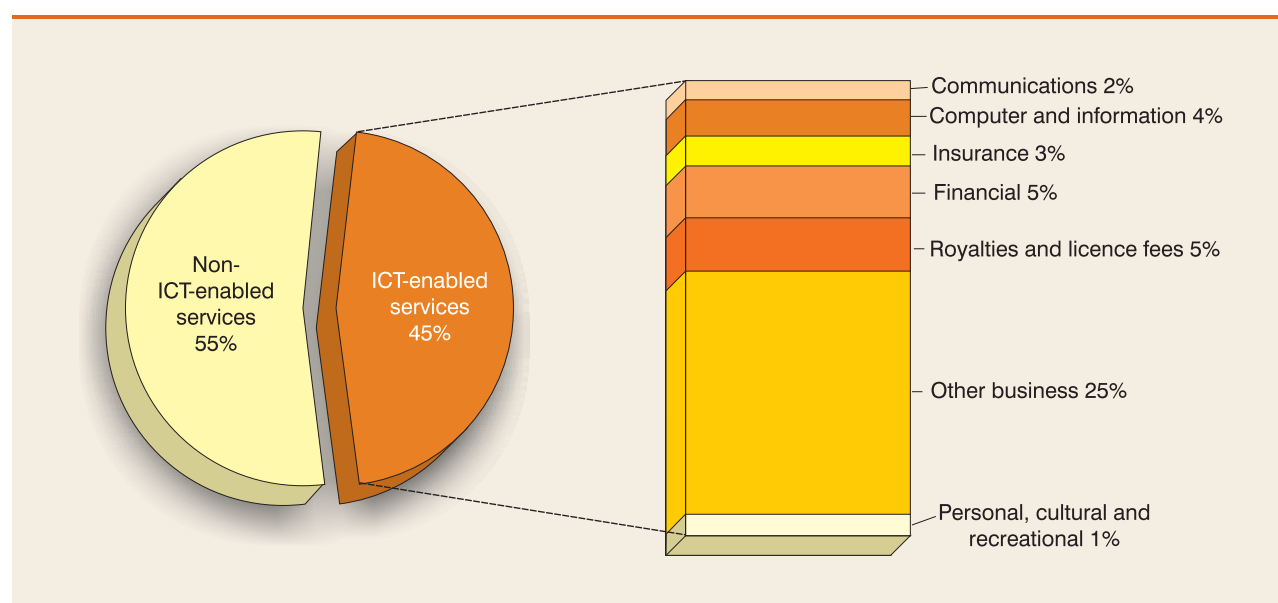
### ICT-enabled service exports by sectors

ICTs persistently reshape services industry boundaries and as a side effect, they make classification attempts look obsolete or sometimes overlapping. On the balance-of-payments classification scale, the “other business services”<sup>33</sup> represented the highest share of ICT-enabled services, with a quarter of the world exported value of all services (chart 1.22). However, this category decreased in importance as a share of total ICT-enabled services from 61 per cent in 1995 to 54 per cent in 2003.

The positive trend in the ICT-enabled cluster was also found in most of the seven sectors analysed. Three sectors were exceptionally dynamic: computer and information, insurance<sup>34</sup> and financial services.

Computer and information services recorded the highest growth rate in the sample.<sup>35</sup> Over the nine years taken into consideration (1995 to 2003), every percentage point increase in total services exports was accompanied by an almost 5 per cent rise in “computer and information” exports.

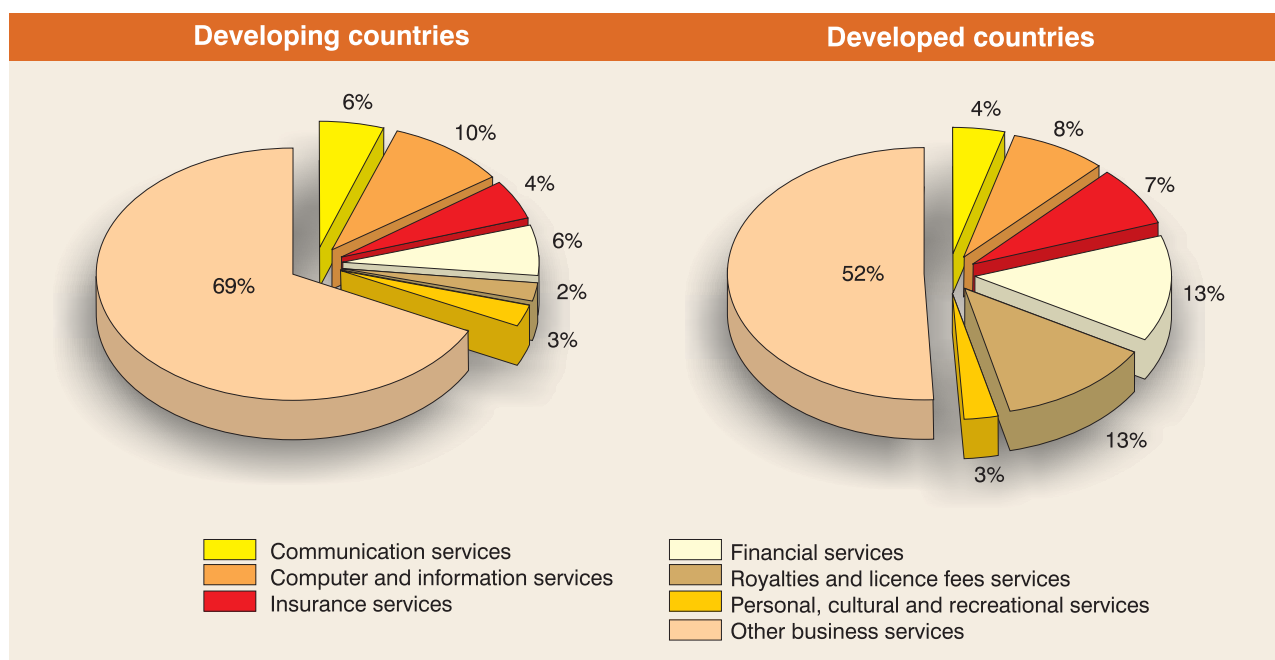
**Chart 1.22**  
**Share of ICT-enabled services sectors in the export market, 2003**



Source: IMF BOP data and UNCTAD calculations.

Chart 1.23

### Share of ICT-enabled services sectors in the export market, developed and developing countries, 2003



Source: IMF BOP data and UNCTAD calculations.

While before the year 2000, financial services recorded the second highest growth rates, in the aftermath of the dot-com crash, world exports in this sector had not recovered their 2000 value by 2003. The development of insurance services showed the reverse image of financial exports, with modest increases before 2000 and a strong recovery afterwards, culminating in the highest 2002 growth rate of all ICT-enabled services (48 per cent).

When the 2003 market structure of ICT-enabled services is compared by level of development (chart 1.23), it emerges that developing countries' export pattern is much more concentrated in "other business services", with 69 per cent of the market share in this sector as compared with only 52 per cent in developed countries. At the same time, however, communication and computer and information services had higher market shares in developing countries' exports of ICT-enabled services; this suggests a relative specialization. Developing countries exported fewer financial and insurance services and royalties and licence fees and therefore most world exports in these sectors came from developed economies. The same year, the structure of ICT-enabled services exports in South-East Europe and the Commonwealth of Independent States was similar to that in the developing countries, except for a much larger share of communication services (16 per cent of ICT-enabled services exports).

During 2000–2003, developing countries continued to specialize in computer and information services, with a 33 per cent compound annual growth rate (CAGR).<sup>36</sup> Royalties and licence fees were the other service sector where developing countries' exports attained above-average increases for the same period of time. While holding only a small 2 per cent of their export market share, credits corresponding to royalties and licence fees grew at 18 per cent CAGR in favour of developing economies' balance of payments. Arguably, this evolution could reflect the activity of developing country-based multinationals abroad. The moderate dynamics of the remaining export sectors justify developing countries' overall modest growth performance. More specifically, lower growth rates were calculated for developing countries' exports of "other business" and communication services, which together represented 75 per cent of their ICT-enabled services market.

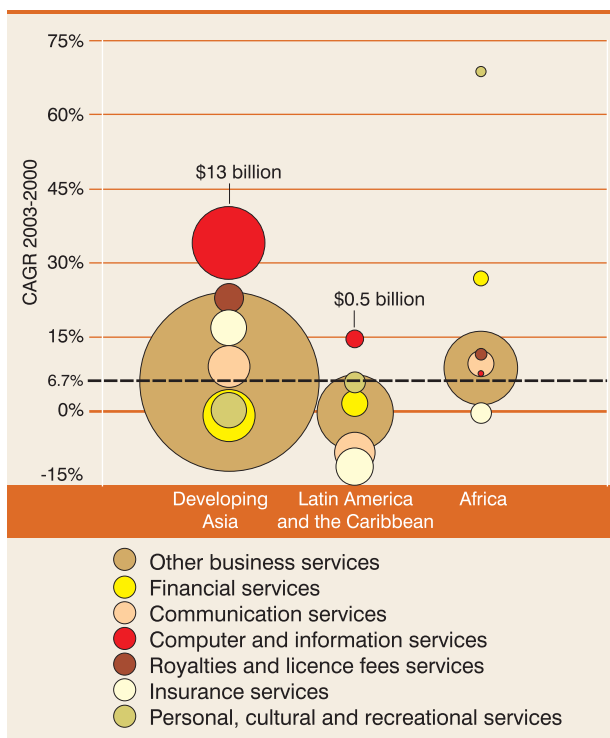
Chart 1.24 compares the evolution of developing countries' exports of ICT-enabled services located in different regions. Each sector's CAGR is benchmarked against the developing countries' average growth in the ICT-enabled cluster (6.7 per cent for 2003–2000). Larger spheres indicate higher 2003 exported values across both country groupings and sectors. As shown in the chart, developing Asia's exports of ICT-enabled services grew mainly through the computer and

information sector, which had acquired both a large export market value and a high growth rate. Unlike in other developing regions, exports of royalties, licence fees and insurance services have complemented the growth of Asian ICT-enabled services.

A different story is revealed by a similar analysis of the Latin American and Caribbean economies. There, despite a confirmed above-average performance of the computer and information sector, the other ICT-enabled services still lagged behind in terms of growth rate. However, early 2004 export figures show that Latin America and the Caribbean recovered the 2000 value in terms of ICT-enabled service exports, with a significant increase in computer and information, personal, cultural, recreational and “other business” services.

Africa stands out with a highly dynamic evolution of its personal, cultural and recreational exports, as well as its financial services exports<sup>37</sup> (chart 1.24). This happened against the background of a relatively

**Chart 1.24**  
**Developing countries' exports of ICT-enabled services, 2000–2003**



Note: The size of the spheres represents the exported value in 2003. Larger spheres stand for larger exports of a given region and of a given sector. The figure of 6.7 per cent is the benchmark given by developing countries' average 2003–2000 CAGR of all ICT-enabled services exports.

Source: IMF BOP data and UNCTAD calculations.

smaller size of the ICT-enabled service sector in Africa. The export expansion was sustained by a good growth performance of “other business services”, the sector with the largest export market share. Insurance was the main weak export sector of both American and African developing countries as shown by the deteriorating growth rate.

Table 1.22 in the statistical annex shows 2003 country exports of ICT-enabled services by sectors.

### Main exporters and importers

ICT use played a positive role in enhancing both imports and exports of services. In most countries analysed, increases in ICT-enabled exports were accompanied by similarly sized rises in ICT-enabled imports.

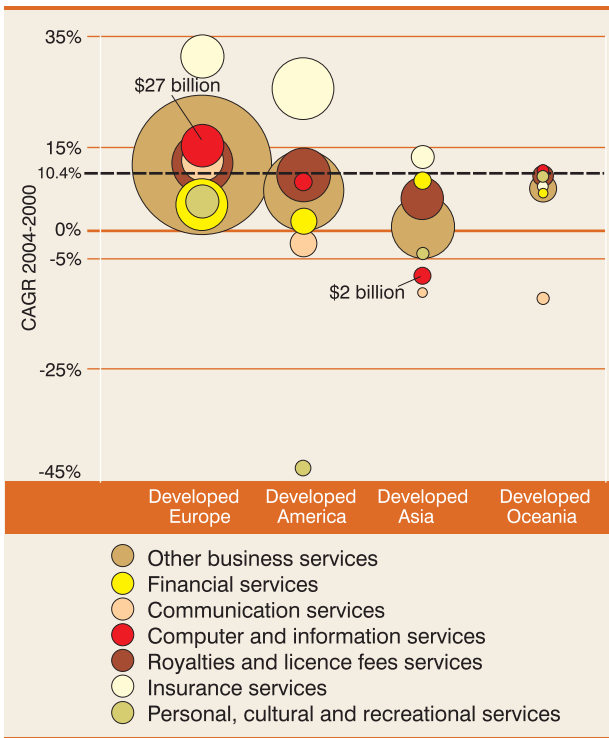
Despite this observation, the developed countries of Europe and America remained on average the world net exporters of ICT-enabled services, while most developing countries were still net importers. Communication services were the only notable exception where developing countries as a group and by geographical locations (America, Africa, Asia, Oceania and South-East Europe) were net exporters, while developed countries tended to be net importers. Overall, Asian developing countries also managed to build up a net exporter position in computer and information, financial and “other business” services. The developed countries of Europe were the only net exporters of insurance services, while developed America had an uncontested net exporter position in royalties and licence fees and personal, cultural and recreational services.

Chart 1.25 identifies developed countries' ICT-enabled service imports with the largest values and the highest growth rates.<sup>38</sup> As suggested before, developed countries' high growth rates in exports of insurance and computer and information services corresponded to similarly high rates in imports of these sectors. European countries appeared again to be more dynamic importers of ICT-enabled services than their other developed counterparts. As a distinct feature, Europe had a higher and faster growing demand for communication service imports. On the other hand, the developed countries of Asia and Oceania stood out with faster growing imports of financial services.

Comparison of the top ten importers and exporters of ICT-enabled services shows imports to be more evenly distributed across the leading countries (chart



**Chart 1.25**  
**Developed countries' imports of ICT-enabled services, 2000–2004**



Note: The size of the sphere represents the imported value in 2004. Larger spheres stand for larger imports of a given region and larger imports of a given sector. The figure of 10.4 per cent is the benchmark given by developed countries' average 2004–2000 CAGR of all ICT-enabled services imports.

Source: IMF BOP data and UNCTAD calculations.

1.26). In 2003 the United States remained the world's largest exporter of ICT-enabled services, while Japan remained the largest importer. The developed European countries entering the two rankings, both on the import and on the export side, had higher growth rates. Among them, Ireland stood out as one of the countries with the highest growth rates in ICT-enabled services trade. Hong Kong (China) was the only developing economy featuring among the top ten exporters of ICT-enabled services. No developing economy achieved a similar performance in terms of imports, despite the average developing country being in a net importer position. This suggests that most trade in ICT-enabled services was carried out between developed country partners.

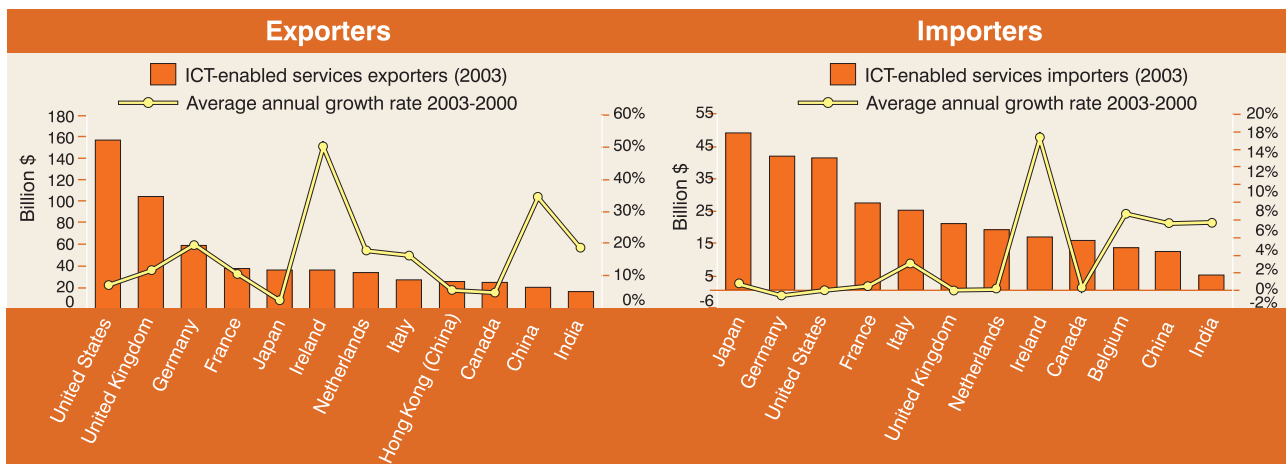
Adding China and India to the top ten rankings presented in chart 1.26 shows how close these countries have come to the world's largest exporters and importers. Their high growth rates also imply that should trade continue to evolve at the same pace, China and India will soon make their way into the top 10 rankings.

On the basis of each sector's ranking, there were eight developing economies among the top ten exporters of the different ICT-enabled service sectors:

- China for "other business" services;
- Hong Kong (China) for financial and "other business" services;
- India for computer, information and communication services;
- The Republic of Korea for royalties and licence fees;

**Chart 1.26**

**Top 10 ICT-enabled services exporters and importers, plus India and China, 2003**

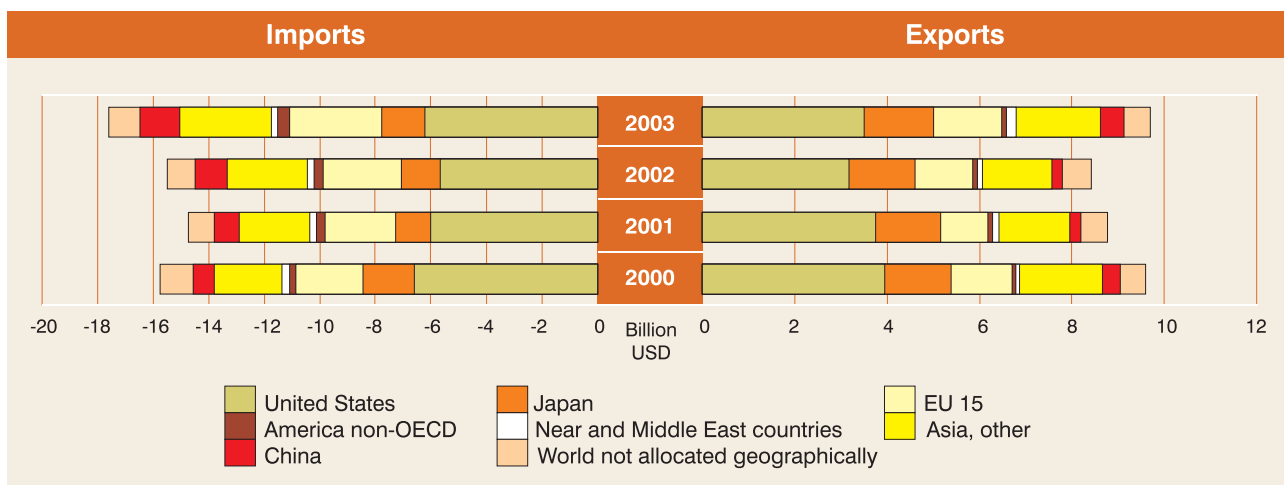


Source: IMF BOP data and UNCTAD calculations.



Chart 1.27

## Republic of Korea: Bilateral imports and exports of “other commercial services”



Source: OECD balance-of-payments data.

- Malaysia and Turkey for personal, cultural and recreational services;
- Singapore for financial and insurance services;
- Mexico for insurance services.

From a dynamic perspective, in the ICT-enabled service sectors, higher export growth rates often matched with higher import increases. While firms in some developing countries have already specialized in exporting large sector-specific values, higher imports of other ICT-enabled services benefited their consumers.

### Regional trade in ICT-enabled services

ICTs' role as trade facilitators is further enhanced when complemented with trade policy actions and favourable external factors. Regional trade agreements, as well as existing cultural awareness and affinities between geographically close countries, can compound ICTs' effect of reducing trade barriers. Unfortunately, bilateral trade in services data covering developing countries' flows are available only for very few countries.

Most trade in ICT-enabled services takes place between developed countries. For example, in 2002, the latest year for which bilateral data were available, 85 per cent of EU-15's imports of services and 64 per cent of Japan's came from OECD countries. In the same year, only 2 per cent of the European Union's imports of services and 11 per cent of Japan's came from India, China, Taiwan Province of China and Hong Kong

(China) taken together. However, the high growth rates for developing countries' exports and imports suggest the great potential of South–South trade in this field.

The Republic of Korea is one of the few developing countries for which bilateral trade data are available. Its exports and imports of “other commercial services”<sup>39</sup>, by its main trade partners, are shown in chart 1.27. The evolution of China is noteworthy on both the imports' and the exports' side, as an emerging world major buyer and supplier. The Republic of Korea's imports from China increased by an annual 22 per cent CAGR between 2000 and 2003 and attained the fastest growth rate among its import partners. China's exports market share in the Republic of Korea improved by 4 percentage points from 5 to 9 per cent. This value was still far below the calculated 52 per cent of intra-EU-15 “other business services” trade in the regional group with the highest degree of trade integration.

## 2. The broader concept of ICT-enabled trade in services

When analysing trade in ICT-enabled services, one can take into account the more broadly established concept of international trade in services. This not only comprises trade flows between resident and non-resident entities as registered in the International Monetary Fund Balance-of-Payments (IMF BOP) statistics, but also covers other modes of delivering services abroad. The approach is based on the

recommendations of the Manual of International Trade in Services Statistics (2002), co-developed by UNCTAD.<sup>40</sup> The manual sets out an internationally accepted framework for reporting statistics of international trade in services in a broad sense. It recommends that countries progressively expand and configure their trade in services statistics in line with the broader structure. This methodology allows the measurement of trade statistics along the four modes of service delivery as defined in the GATS.

Depending on “the origin of the service supplier and consumer, and the degree and type of territorial presence which they have at the moment the service is delivered” (WTO, 2001), the GATS identified four modes of delivery for international services trade: cross-border (Mode 1), consumption abroad (Mode 2), commercial presence (Mode 3) and presence of natural persons (Mode 4). The data sources for international trade in services statistics, detailed by modes of delivery, are presented in table 1.10.

Box 1.6 presents information on the data sources, data availability issues and classifications for the foreign affiliates’ trade statistics (FATS).

The composition of international trade in services is dominated by deliveries through forms of commercial presence (Mode 3) (see estimates in table 1.10). The prominence of Mode 3 can be explained by the non-tradable nature of services. Private firms expanding activity in new markets can only export small quantities across borders because they have to face high trade barriers. Services are exported on a large scale by establishing commercial presence abroad and thus avoiding part of the trade costs. Owing to aspects such as the use of an appropriate language, cultural differences and the variety of standards and regulations, only highly standardized services can be exported from a distance (Mode 1). Most services traded today are market-targeted and culturally adapted and therefore better provided through the establishment of commercial presence (Mode 3). Apart from the cost issue, only large and efficient firms can afford to set up foreign affiliates abroad, while the smaller firms have to opt for other contract arrangements to ensure service delivery in foreign markets. Most Mode 3 deliveries originate in developed countries and go hand in hand with a certain level of capital export. However, foreign investment data show that developing and SEECIS countries’ role in this field has increased substantially in recent years (UNCTAD, 2005). Moreover, ICTs

**Table 1.10. Statistical coverage by modes of supply**

WTO GATS Classification	Practical example	Sources of statistics	Estimated share in world trade in services
Mode 1 Cross-border supply	An Indian software consultant providing services electronically to a British consumer in the UK	Balance of payments: <i>transportation</i> (most of), <i>communications services</i> , <i>insurance services</i> , <i>financial services</i> , <i>royalties and licence fees</i> ; part of <i>computer and information services</i> , <i>other business services</i> , and <i>personal, cultural, and recreational services</i>	35%
Mode 2 Consumption abroad	An Indian software consultant providing services to a British consumer in India	Balance of payments: <i>travel</i> (excluding goods bought by travellers); repairs to carriers in foreign ports (goods); part of <i>transportation</i> (supporting and auxiliary services to carriers in foreign ports)	10–15%
Mode 3 Commercial presence	An Indian software consultancy resident in the UK and providing services to a local British consumer	Foreign Affiliates Trade Statistics (FATS)	50%
Mode 4 Presence of natural persons	An Indian software consultant temporarily employed by a firm located in the UK and providing services to the locals	Balance of payments: part of: <i>computer and information services</i> ; <i>other business services</i> ; <i>personal, cultural and recreational services</i> ; and <i>construction services</i> ; FATS (supplementary information); foreign employment in foreign affiliates’ balance of payments (supplementary information); labour-related flows.	1–2%

Source: Manual of International Trade Statistics (2002) for the statistical coverage; International Trade Statistics (WTO, 2005) for the estimated share in world trade and Wunsch-Vincent (2005) adapted for examples.

## Box 1.6

### Sales by foreign affiliates in the service sector: Data considerations

When the broader definition of international trade in services is applied, not all relevant flows are recorded statistically in the same way. The main distinction occurs along the line of residence. Transactions between residents and non-residents appear in the IMF Balance-of-Payments (BOP) statistics and are usually referred to as exports and imports. Sales made by foreign affiliates of transnational companies (considered resident in the host country) are recorded separately under the Foreign Affiliates Trade Statistics<sup>1</sup> (FATS). For some economies, separate supplementary data on the value of services supplied by professionals temporarily working abroad is also recorded under the FATS.

Following the Manual of International Trade Statistics' description, the IMF BOP exports and imports of ICT-enabled services correspond to Mode 1, Mode 2 and marginally Mode 4<sup>2</sup> deliveries. The sales of foreign affiliates correspond to Mode 3 deliveries<sup>3</sup> and are referred to as outward and inward flows. Most foreign affiliates' trade statistics follow the ISIC Rev.3 classification. Using the established correspondence between BOP and FATS classifications (The Manual, 2002), equivalents of the ICT-enabled service aggregate were constructed for sales through commercial presence<sup>4</sup> (Mode 3).

FATS availability is limited to some developed countries and data are only provided separately, in a decentralized manner by national institutions. Additionally, among the 24 countries that publish foreign affiliates' trade statistics,<sup>5</sup> only a few have separate data on services. In this chapter the analysis of Mode 3 ICT-enabled service trade was restricted to data from Austria, Canada, Finland, France, Germany, Japan, Portugal and the United States.

<sup>1</sup> For example, the US Bureau of Economic Analysis defines the sales of services through foreign affiliates of multinational companies as sales in international markets through the channel of direct investment.

<sup>2</sup> Services delivered electronically could fall under both Mode 1 and Mode 2 obligations, although an agreement has not been reached on this issue. For a detailed discussion see the WTO's secretariat note on «Technical Issues Concerning Financial Services Schedules», S/FIN/W/9, 29 July 1996.

<sup>3</sup> However, FATS underestimate Mode 3 deliveries for two reasons. First, the WTO and FATS definition do not match perfectly. A certain percentage of foreign ownership is required for a company to appear as a foreign affiliate in the FATS data, while no such limitation applies to the WTO Mode 3 definition. Second, FATS in the tertiary sector only cover businesses registered as services and therefore do not take into account sales of foreign affiliates registered in the primary or secondary sectors, which sell services occasionally (The Manual of International Trade Statistics, 2002).

<sup>4</sup> The broad International Standard Industrial Classification (ISIC Rev 3) categories included as ICT-enabled services were trade, post and communications, finance (including insurance), business activities, and community, social and personal services.

<sup>5</sup> Austria, Belgium, Luxembourg, Denmark, Finland, France, Germany, Ireland, Italy, Portugal, Sweden, United Kingdom, Norway, Canada, United States, Japan, China, India, Singapore, Madagascar, Slovenia, Czech Republic, Hungary and Poland (UNCTAD FDI/TNCs database ([www.unctad.org/fdistatistics](http://www.unctad.org/fdistatistics))).

can lower transaction costs and thus increase services' tradability across borders.

The persistence of Mode 3 as the primary delivery mode in international services trade relates also to the existence of relatively higher trade barriers in the other modes. For example, service deliveries through the movement of natural persons abroad are substantially limited by migration regulations. Section 3 looks into the WTO sector-specific market access commitments for computer and information services.

The value of services traded through Modes 2, 3 and 4 overtakes Mode 1 deliveries (65 per cent against 35 per cent) also because of the proximity problem. In most cases, the delivery of services relies heavily on a close interaction between consumer and provider. Mode 1, cross-border supply, is the only case where services are delivered from a distance.<sup>41</sup>

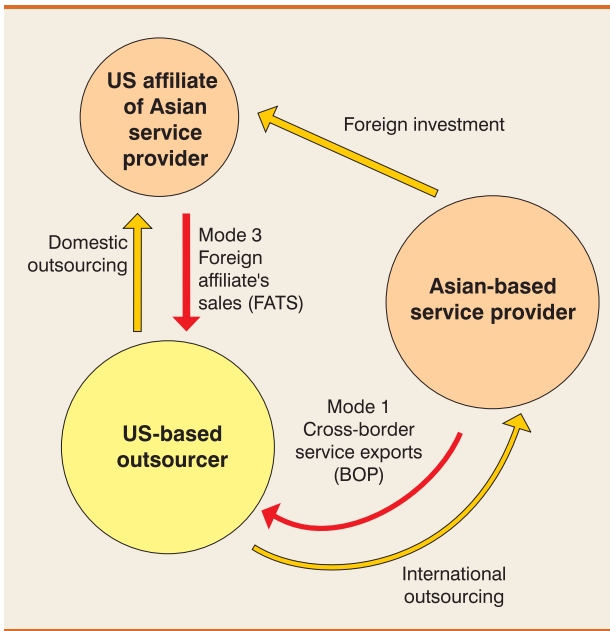
### *Why is the analysis by modes of delivery useful for developing countries?*

The modes of trading services internationally have distinct features as described before, but their final result is the same: foreign services are supplied in domestic markets. Corresponding to services delivered through forms of commercial presence (Mode 3), foreign affiliates' sales are an additional source of trade information for policymakers. Like the BOP registered exports and imports, services can thus also be supplied abroad as outward and inward sales of foreign-owned companies.

When compared, the sales of foreign affiliates and the BOP trade data provide trade policymakers with meaningful results. Three considerations are introduced below.

Chart 1.28

Domestic and international outsourcing



Source: UNCTAD.

First, through their policy actions, developing countries can choose the right balance between exports and imports on the one hand and foreign affiliates' sales on the other. Deliveries through foreign affiliates have different socio-economic consequences when compared with the export-import activities. By definition, selling services through forms of commercial presence depends on the amount of foreign investments from

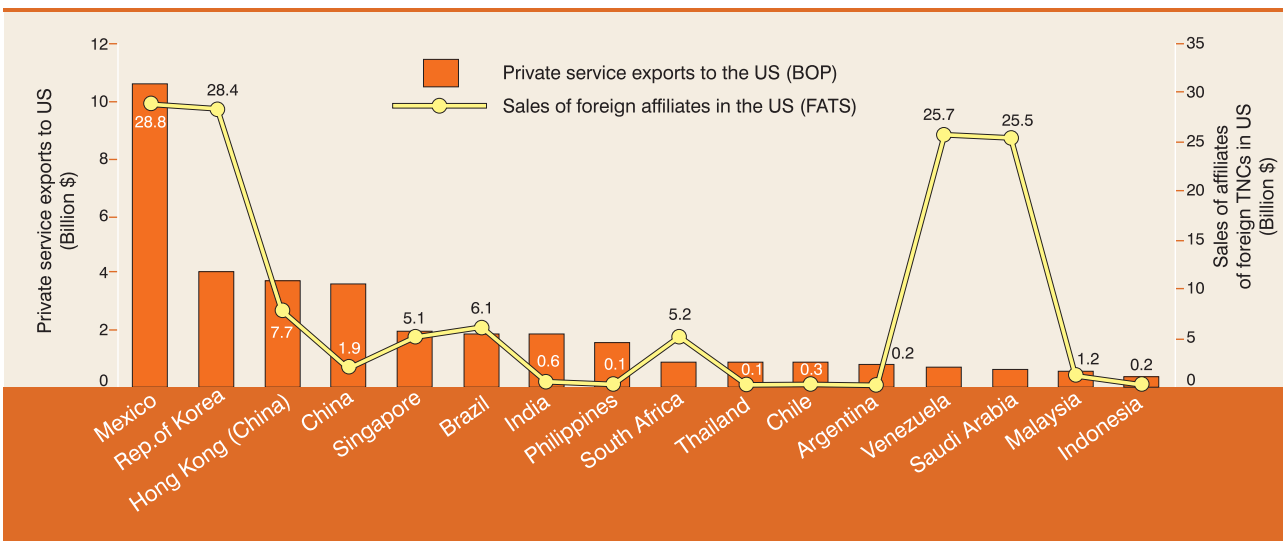
the sending to the receiving country. Subject to the particular local context, the presence of foreign-owned affiliates in the territory of a host country gives rise to new opportunities and threats. For example, better job opportunities, additional tax revenues and technology transfers could serve as a trade-off with host Governments' difficulty in regulating foreign companies and the weakened competitiveness of the domestic suppliers.

Second, the comparison of services imports and exports with foreign affiliates' inward and outward flows can provide a valuable insight, particularly in the context of outsourcing. In this way different aspects of the services internationalization story are taken into account: the foreign investment side and the exporting side. For example, a US firm deciding to outsource part of its service activities can choose as its business partner an Asian-based transnational company with commercial presence in the United States. In this example, the BOP statistics do not record the resulting service transaction, since the Asian foreign affiliate would be resident in the host country. However, the FATS typically register this type of domestic outsourcing to a foreign-owned firm. For a graphical illustration see chart 1.28.

Last, but not least, foreign investment and trade often go hand in hand, with consequences for the development of the service sector. Empirical studies have proved that the investment development path and

Chart 1.29

United States' imports and inward foreign affiliates' sales of private services



Note: Private services include all the service transactions of private entities.

Source: US Bureau of Economic Analysis data.

the trade development path are closely interconnected (Dunning et al., 2001). Increased exports in a particular sector often go together with a higher participation of that sector in both inward and outward foreign direct investment. This link is reinforced in the services industry, where suppliers and consumers often need to meet face to face.

Chart 1.29 shows to what extent deliveries through the Mode 3 channel were relevant for a group of selected developing economies. The calculations used data on the total private services imports and inward foreign affiliates' sales in the United States for the year 2001 (the latest data available). As illustrated by the chart, private services delivered through affiliates of developing-country-based trans-nationals exceeded the value imported across borders from the same developing countries. Detailed sectoral data were not available for most developing countries selected in the chart and therefore a similar analysis corresponding to the ICT-enabled service cluster could not be conducted. Also, the breakdown of existing FATS by sending country only captured observations with regard to some developing country partners. However, it is calculated that in 2001 approximately 88 per cent of the US total inward foreign affiliates' sales of services were ICT-enabled. At the same time, the ICT-enabled services represented about 18 per cent of total US private services imports.

The question addressed in the following section is how ICTs influence the composition by delivery modes of international trade in services and what are the implications for the developing countries.

### *The internationalization of the service industry*

A large share of the globally produced services is not traded in the conventional way, but rather sold abroad through commercial presence. BOP statistics show a

relatively constant evolution of the share of services in total world exports, which has stayed at approximately 20 per cent during the past ten years. UNCTAD estimates<sup>42</sup> that total BOP trade in services expanded with a 10 per cent growth rate in 2005, but slightly lagged behind the trade in goods growth rate (table 1.11). While it could be considered that commodity price increases boosted the value of trade in goods, for trade in services only nominal trade flows could be compared since internationally comparable services price data are not available.

The relatively low share of services in total exports has been contrasted against the much higher share of services in national GDP composition. Services represented 72 per cent of developed countries' GDP, 52 per cent of developing countries' output and 57 per cent of Central and Eastern European countries' GDP according to UNCTAD (2003) estimates. Using BOP data as the basis for trade in services evaluation suggests that services evolve into an international business only on a small scale.

Foreign direct investment (FDI) statistics, however, tell a different story. While departing from fairly low figures in 1990, services' share in the composition of foreign investments has increased spectacularly during the last decade. According to UNCTAD (2004), the world has witnessed a shift of foreign investment composition towards services for both developed and developing country investors. Services accounted for about 60 per cent of total global FDI inward stock in 2002, rising from less than half in 1990. An increasing value of FDI came from the developed and transition economies, together with an increase in South–South FDI flows. There are thus signs that the service industry did become more international mainly through foreign investments.

The substantial increase in service-related foreign investments was also reflected in foreign affiliates' sales (Mode 3). Foreign investments in services generated

**Table 1.11**  
**Trends in world trade**

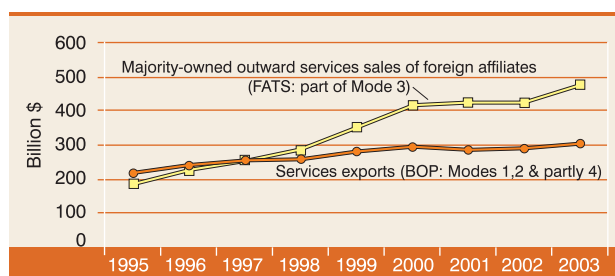
World exports	UNCTAD estimates for 2005 (billion \$)	Annual growth rates (%)					
		1999–2000	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005
Goods	10 278.3	12.8	-4	4.7	15.9	20.5	13.8
Services	2 439.9	5.6	0.4	6.3	14.6	18.3	10.1

Source: IMF BOP data and UNCTAD calculations.



Chart 1.30

### United States' outward services transactions



Note: The FATS sales referred to here are not limited to majority-owned foreign affiliates' sales.

Source: US Bureau of Economic Analysis; IMF BOP data.

higher and more dynamic sales of foreign affiliates than the traded value registered in the BOP. In the United States, the ratio of majority-owned foreign affiliates' sales to BOP trade followed a steadily increasing trend from 0.8 in 1987 to 1.6 in 2003 for outward transactions and from 0.8 to 1.7 for inward transactions (chart 1.30). The same trend and a higher share of FATS services sales vis-à-vis BOP service exports were found in the developed countries with growing exports.<sup>43</sup> Canada, Finland, France, Germany and Portugal had both higher and faster growing majority-owned foreign affiliates' outward sales of services than the BOP exports (1995/1997 to 2002). Austria had more service exports than outward sales, but the trend of the ratio was similar to that of the other countries. These countries' exports (BOP) of

ICT-enabled services represented more than 55 per cent of the global figure in 2004.

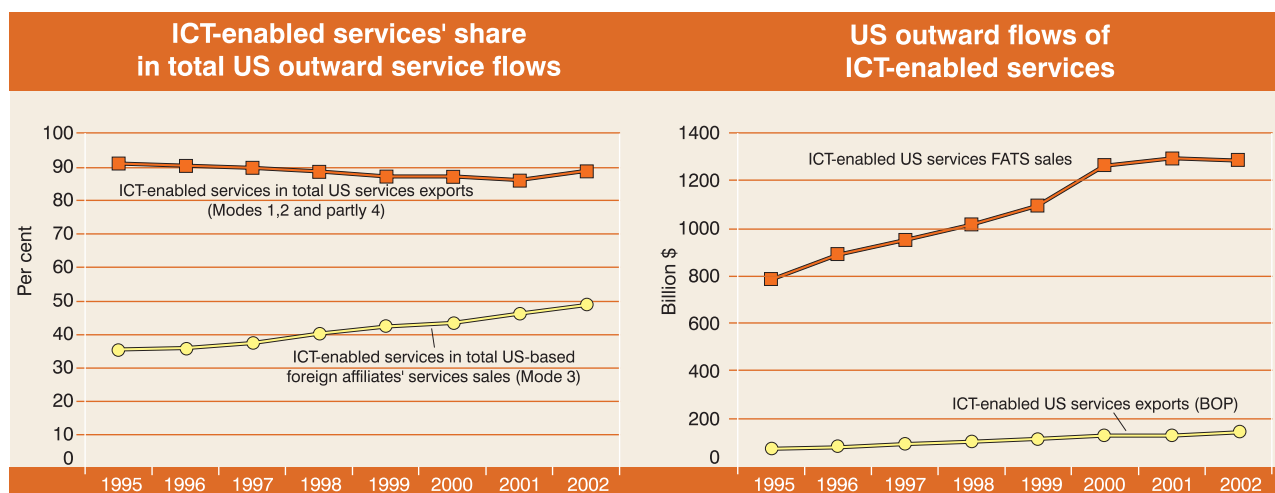
ICTs can boost services trade in all the delivery modes because they lower transaction costs. For example, the value of foreign affiliates' sales has also been boosted by the recent surge of mergers and acquisitions (United States Department of Commerce, 2003). However, since the value delivered through commercial presence also necessitates capital investment and thus an additional financial effort, ICTs' effect on Mode 3 trade should be more moderate. Therefore, ICTs can bring about a change in the structure of international service deliveries. More specifically, improved access to and use of ICTs should favour Modes 1 and 2 over Mode 3 deliveries. This change would benefit the developing countries with reduced commercial presence abroad.

To check whether ICT-enabled services were increasingly delivered across borders and through consumption abroad (through Modes 1 and 2), the analysis relied on individual country data. Chart 1.31 presents the data analysis and results for the United States. There were similar findings for the majority-owned foreign affiliates' sales in Canada (1999 to 2002), France (1999 to 2001), Germany (1995 to 2003) and Portugal (1997 to 2003). These countries exported 49 per cent of world ICT-enabled services in 2003 and recorded positive growth rates in the aggregate sector.

The share of ICT-enabled services in total services exports increased in the United States by 15 percentage points over a seven-year period (1995–2002). As highlighted in the first part of this section, the same

Chart 1.31

### Share of ICT-enabled services in total US outward service flows



Source: US Bureau of Economic Analysis data.



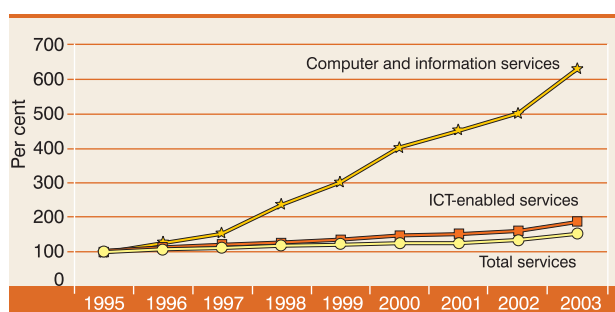
trend was found at the global level, where the share of ICT-enabled services exports also improved. On the other hand, US ICT-enabled Mode 3 sales grew at a slower pace than the total outward sales of US-based foreign affiliates. Chart 1.31 illustrates the two slowly converging shares of ICT-enabled services within total US exports and, respectively, total US foreign affiliates' sales. The opposite happened in absolute terms, where the ICT-enabled services delivered through commercial presence remained considerably larger and expanded faster than the exports of ICT-enabled services. Results suggest that, given the global context of surging Mode 3 deliveries and the relatively slower evolution of BOP trade flows, the trends of the ICT-enabled sectors had a compensating effect that favoured Mode 1 and 2 exports.

Exceptions were Japan and Finland (1995 to 2002), where exports of ICT-enabled services experienced fluctuating and declining growth rates respectively. For Japan the shares of ICT-enabled services in exports and outward sales had a parallel evolution, while for Finland the two calculated shares diverged.

It appears therefore that the countries which specialized in ICT-enabled service exports over the period analysed have also seen an increase in the corresponding sales of home-based multinationals. ICT-enabled service sales through commercial presence grew faster than exports for most countries analysed. The same applied for trade in services in general. However, if the general trend of trade in services is accounted for separately, ICT-enabled services were increasingly delivered cross-border and through consumption abroad (Modes 1 and 2) rather than through commercial presence (Mode 3). This result applied particularly to countries with an increasing trend towards ICT-enabled service exports.

**Chart 1.32**

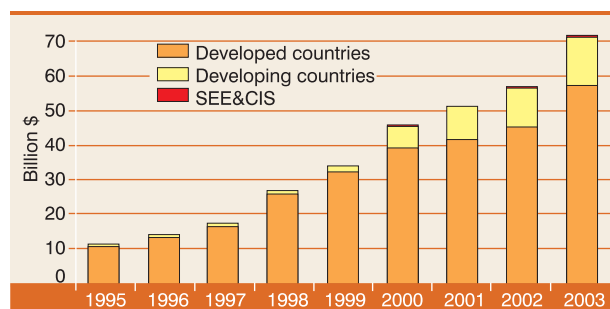
### Growth of computer and information services exports



Source: IMF BOP data and UNCTAD calculations.

**Chart 1.33**

### Exports of computer and information services, by level of development



Source: IMF BOP data and UNCTAD calculations.

The lack of data prevented a similar analysis of the developing countries' exports and outward sales. However, as confirmed by empirical studies (Dunning et al., 2001), developing countries with growing ICT-enabled service exports should also be able to improve their competitive position in the sector's outward sales of foreign affiliates. Moreover, the developing countries with less commercial presence abroad could increasingly specialize in ICT-enabled service exports.

## 3. Sector focus: Computer and information services

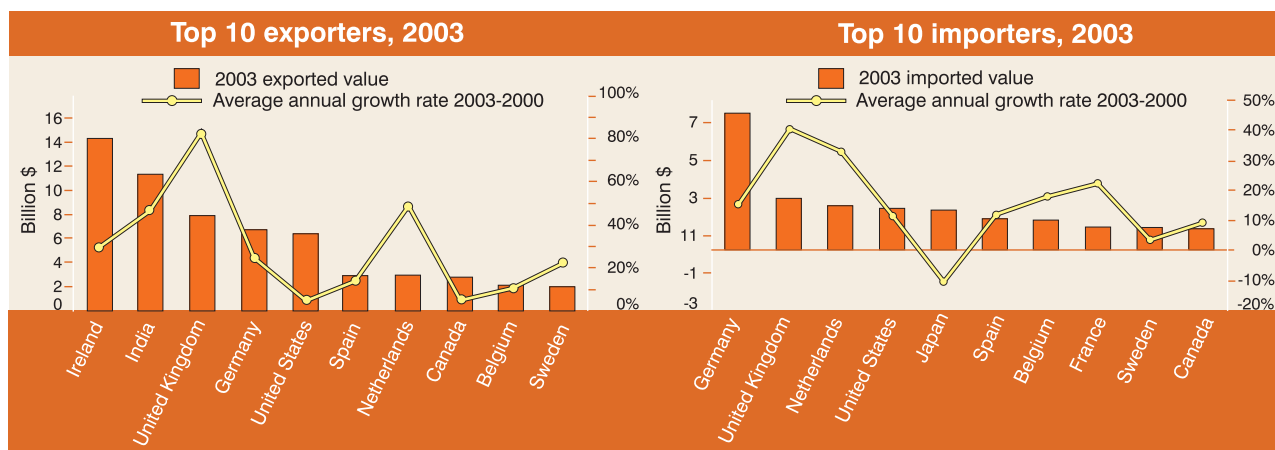
### Exports and imports

Compared with the 1995 value, in 2003 global computer and information service exports multiplied six times and grew six times faster than total ICT-enabled services (chart 1.32). The spectacular expansion of export statistics in this service sector has been greatly helped by developing countries' growth rates. In 2003, developing countries' exports of computer and information services were thirty times greater than their 1995 value. Developing countries' share in computer and information exports increased from 4 per cent in 1995 to 20 per cent in 2003, reaching the highest growth of all ICT-enabled service sectors since 2000 (chart 1.33).

Most of developing countries' exports of computer and information services originated in Asia. Export growth rates were positive for developing countries from America and Africa as well, even if the Asian developing countries again had the most substantial increases.

Chart 1.34

## Top 10 exporters and importers of computer and information services, 2003

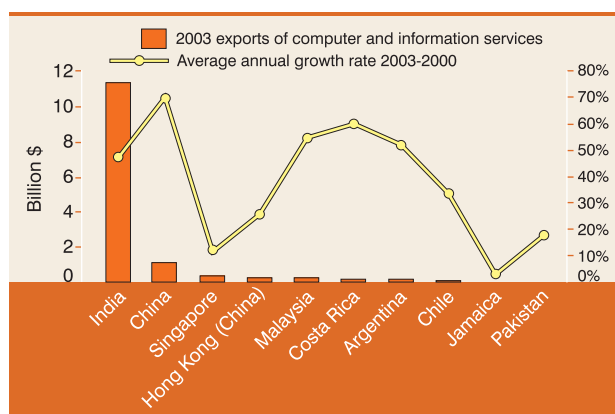


Source: IMF BOP data and UNCTAD calculations

In absolute value, the largest exporters and importers of computer and information services were still mainly the developed countries (chart 1.34). The only notable exception was India, which exported in 2003 the second highest value of computer and information services, worth \$ 11.4 billion. With an annual average growth rate of 47 per cent, over a period of only three years (2000–2003) India surpassed the United States. Unlike in the case of the other large exporters' performance, Indian imports significantly lagged behind the exports' growth rate over the same period, by 45 percentage points, reaching in 2003 total imports worth only \$659 million. A similar case was Ireland, the world's largest exporter in this sector, with \$14.2 billion exports as opposed to only \$371 million imports in 2003.

Chart 1.35

## Top 10 developing economy exporters of computer and information services



Source: IMF BOP data and UNCTAD calculations.

The developed European countries were among the largest and most dynamic exporters of computer and information services. The performance of Germany, the United Kingdom and the Netherlands in terms of both exports and imports of computer and information services was particularly significant.

In Asia and America, developed countries' imports in the sector had a below-average development and even a negative growth rate in Japan. Trade data show that Europe, developed Oceania and developing Asia were the largest and most dynamic markets for the computer and information services trade. In 2003, China imported \$1 billion worth of computer and information services, which almost doubled its 2000 figure. At the same time, China was also the second largest developing exporter in this service sector, with \$1.1 billion.

The top ten list of developing country exporters of computer and information services shows the uncontested leadership of India (chart 1.35). Even when scaling exports to the size of the economy, trade specialization indices (revealed comparative advantage) show that India has a much stronger comparative advantage position in this service sector.<sup>44</sup> Other developing countries specializing in computer and information services had similarly high export growth rates, a fact that suggests an improvement in their competitive position in the global market.

Table 1.26 in the Statistical Annex shows the exports of computer and information services by country from 2000 to 2003.

### WTO liberalization commitments

The dynamic evolution of computer and information services and their particular relevance to developing countries' exporters justify an analysis of the corresponding WTO commitments in the sector. In 2003, 99.6 per cent of world exports of computer and information services originated from WTO members. Moreover, in this sector developing and transition countries participated substantially in determining the current level of market access commitments. Out of 90 WTO members with specific commitments for computer and related services, 52 per cent were developing economies and 10 per cent were from South-East Europe and the Commonwealth of Independent States. These figures can be contrasted with a majority of more than three quarters of developing and transition economies among WTO members.<sup>45</sup>

Services are classified differently in the IMF Extended Balance of Payments and the WTO schedules of commitments.<sup>46</sup> The Manual of Trade in Services Statistics (2002) established a correspondence between the two classification systems. The BOP computer and information sector corresponds largely to the WTO computer and related services.<sup>47</sup> Annex III gives a detailed description of the type of services included in the WTO computer and related sector, based on the provisional United Nations Central Product Classification.

Services have been subject to multilateral trade negotiations since 2000. Despite continuous negotiations on services in the WTO, at the time of completing this report (July 2006) the outcome of the negotiations remained unresolved. During 1998–2006, seventeen new members joined the WTO and all made specific commitments with regard to computer and related services. Therefore, the information presented in this chapter corresponds to both the WTO members' market access commitments as submitted in the 1995 lists and the acceding countries' additional commitments.

Among the sectors negotiated in the WTO, the computer and related services sector is one of the most liberalized, largely owing to the low-trade barrier environment in this sector at the time of the Uruguay Round. However, as is generally the case for service sectors, the level of liberalization varies greatly by modes of delivery. For example, while most developed countries committed to full market access for computer and related services delivered through

Modes 1 to 3 (cross-border, consumption abroad and commercial presence), significantly less was achieved for the movement of natural persons (Mode 4).

WTO GATS market access commitments represent the upper bound to the level of protectionism that policymakers can exercise in a domestic market. More liberal conditions may apply for trade in computer and related services either for regional trade partners or on a more general basis. For this reason, the WTO level of commitments in services is a deficient proxy for the actual level of trade liberalization achieved within a member economy.

Charts 1.36 and 1.37 show the global level of commitments for market access liberalization in the computer and related service cluster, by comparing Mode 1 and Mode 3. With a few exceptions (Georgia, Indonesia, Pakistan and China) WTO members have agreed to bind all the five subsectors of computer and related services with the same commitments.<sup>48</sup> Annex IV shows WTO members' market access commitments under Modes 1 and 3 for computer and related services.

Sectoral commitments were categorized between three options: full, partial or no market access. Alternatively, WTO members could also choose not to include the computer and related sector in their lists of specific commitments. Such a choice resulted also in the absence of any binding commitment of market access for foreign service providers.<sup>49</sup>

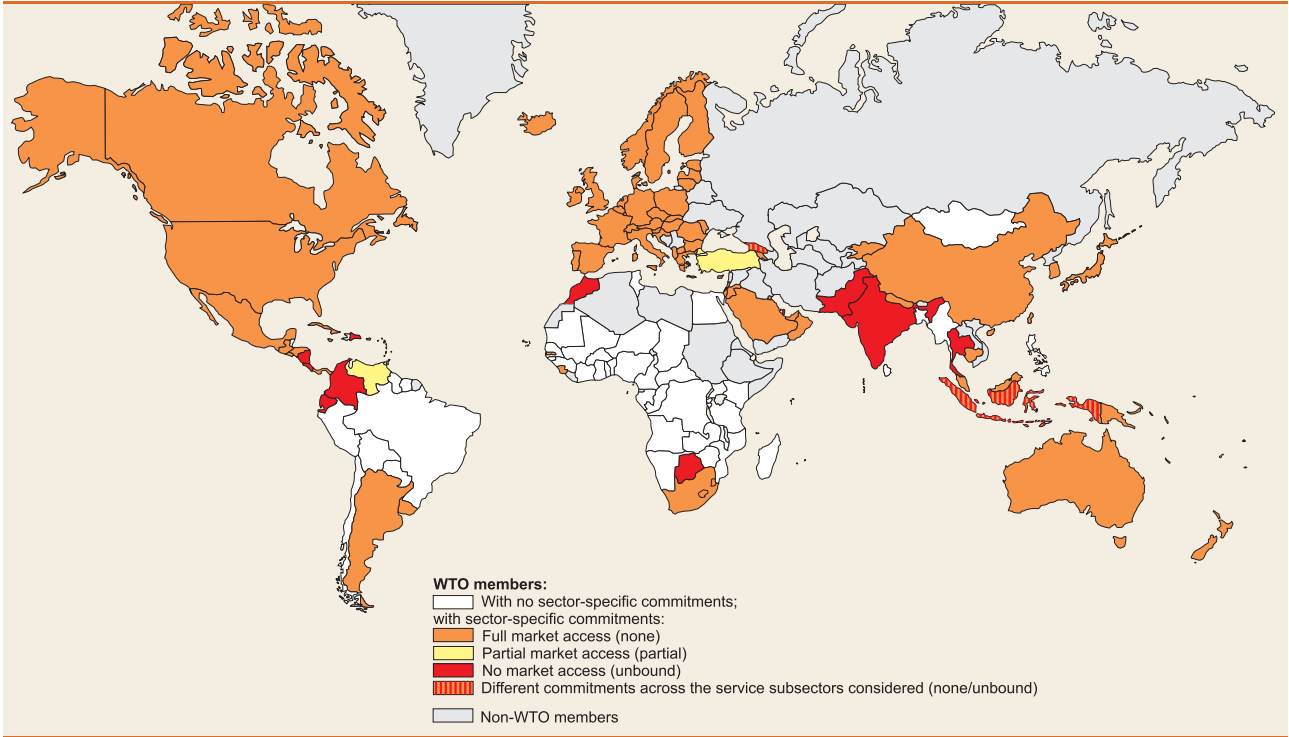
The geographical representation of countries shows a very large participation by the European countries in the negotiations on this sector. Almost all the European economies are members of the WTO, and committed to open their markets for computer and related services. In contrast, only 20 per cent of the African WTO members included this sector in their list of commitments. The countries of Oceania have limited participation in the WTO, while Asia and America made up half of the existing commitments in the sector. On average, half of the developing WTO members included computer and related services in their lists. Brazil, Chile, Egypt, Thailand, Morocco and Macao (China) are among the WTO members with no commitments in the sector.

Computer and related services benefit from full free access to all developed WTO members' markets when delivered cross-border, through consumption abroad or through commercial presence. It follows that 83 per cent of the world exports of computer and information

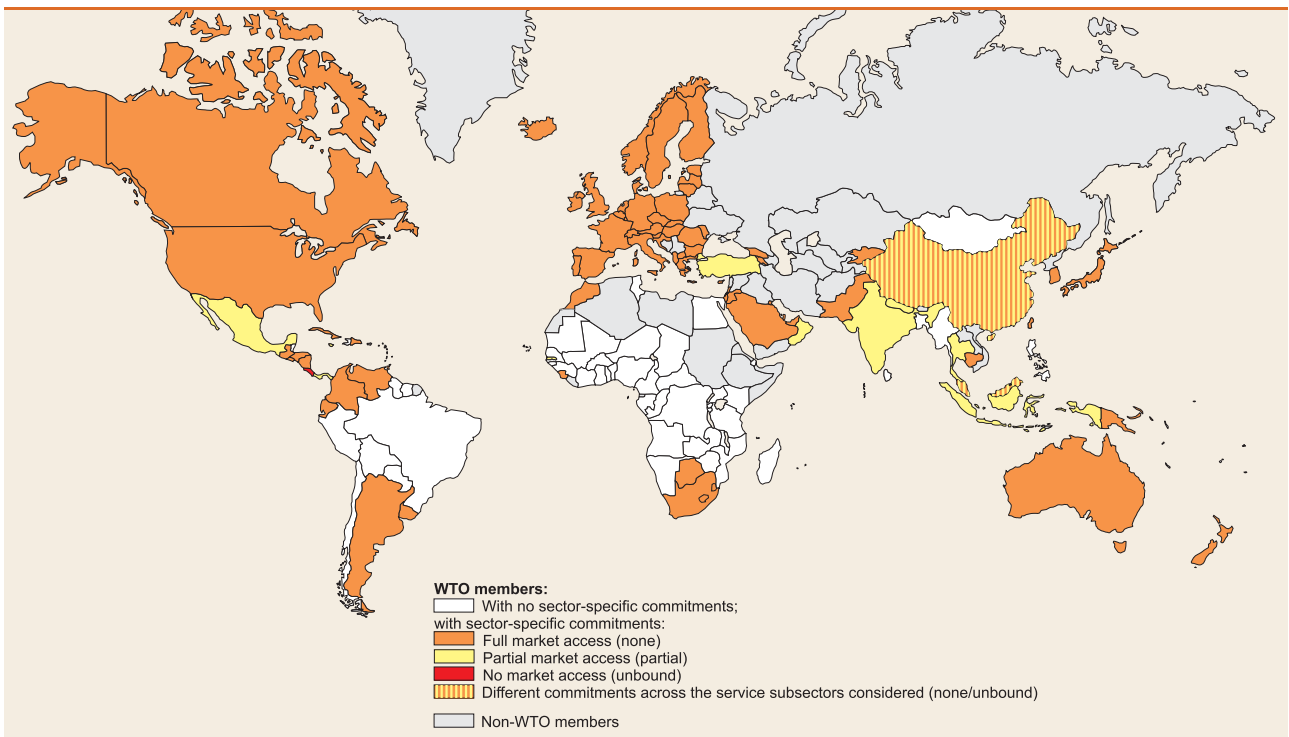
Charts 1.36 and 1.37

WTO market access commitments for computer and related services

(Mode 1)



(Mode 3)





services in 2003 came from WTO members with full cross-border market access commitments. The WTO members permitting full access through commercial presence in their markets also exported 82 per cent of the global value of this service sector.

Developing WTO members made less liberal market access commitments. Only two thirds of them committed to open markets for computer and related services delivered cross-border (Mode 1). One third allowed only partial market access through forms of commercial presence. Half of the developing countries chose a combination of Mode 1 and Mode 3 full commitments. Costa Rica, India, Indonesia, Thailand and Turkey were the only WTO members with partial or no market access commitments on computer and information services for across-border consumption abroad deliveries.

Service provision through the movement of natural persons is still qualified by specific domestic requirements in most countries (in 93 per cent of all commitments). The same applies to South-East European countries and the Commonwealth of Independent States. The lack of free trade commitments under Mode 4 seriously hinders the provision of services through the movement of natural persons.

A continued services liberalization process will have to tackle at least three aspects of the computer and related sector.

First, not all countries have included this sector among their market access commitments and, additionally, some subsectors were omitted. WTO members are continuing negotiations on services, which could eventually lead to a comprehensive sectoral coverage of the entire computer and related service cluster subject to the same type of regulations.<sup>50</sup> However, developing countries have to consider world prices, and weigh carefully their need for access to computer and related services, against making commitments that may inhibit the development of their own productive capacities in this sector.

Secondly, more liberalization could be required with regard to the movement of natural persons (Mode 4). In the computer and related services sector full market access has already been achieved in respect of developed countries for Modes 1, 2 and 3. From a developing country point of view, more service liberalization under Mode 4 needs to be examined. India has been the main advocate of this position with both multilateral and sector-specific proposals.<sup>51</sup>

Developing countries' better endowment in ICT human skills rather than ICT capital could justify their relative specialization in Mode 4 trade rather than Mode 3. Moreover, empirical evidence shows that in the case of India in particular, a substantial presence of IT specialists in the United States led to a significant increase in overall trade flows between India and the United States (Herander and Saavedra, 2005). At present, most developed country commitments with regard to Mode 4 refer only to specialists employed by foreign affiliates. Therefore, they can only be exploited marginally by those developing countries with less commercial presence abroad.

Thirdly, developing countries could also seek to pursue mutual liberalization with other developing countries under all modes of delivery in the context of South–South trade negotiations, whose potential has been highlighted previously in this chapter.

Last, but not least, developing countries with commercial presence abroad should build up comprehensive development strategies to take into account Mode 3 deliveries. As suggested by data findings for some of the large exporters of ICT-enabled services, the sales of foreign affiliates seem to play an essential role in the internationalization of the services industry.

## E. Measuring ICT impact

Calls for measuring ICT impact on development have been an essential and persistent feature in the discussion on ICT measurement and the collection of statistical indicators. After all, how important is it to know how many enterprises have access to the Internet, when we do not know how their use of Internet-based technologies has changed the way they operate or interact with the global economy, or whether this has led to job losses or the creation of new jobs?

Therefore, an increasing amount of research is emerging on quantitatively measuring<sup>52</sup> the impact of ICTs on social and economic development, including firm productivity and national GDP growth. This kind of empirical research has been made possible by the increasing availability of comparable statistical indicators on ICT access and use. So far, most of the work has been based on developed countries' data. But with the gradual increase in the availability of comparable data from a number of developing countries, similar analysis will be possible in the near future.

This section will first briefly discuss different approaches to measuring the economic impact of ICTs using both aggregate and micro-level data, drawing primarily on developed countries' studies. Then it will present the latest research results from UNCTAD's work on measuring the impact of ICTs on GDP growth in developing countries. While it will not answer all questions related to the impact of ICT on development, it provides a starting point for this growing field of research, which will be extended in future editions of the Information Economy Report.

## 1. Measuring ICT impact using aggregate data

Measuring the economic impact of ICTs on growth and productivity has been the subject of intense investigation during the last decade. The interest was mainly stirred by the unusually long period of expansion experienced in the United States (1992–2000). One approach was to focus on the ICT sector and measure its productivity gains within the GDP of the country, using aggregate-level data (Jorgenson, Ho and Stiroh, 2005). The hypothesis here is that the greater the size of the sector producing ICT goods and services, the larger the positive impact of ICT on growth. This positive effect would be mainly justified by the rapid technological progress and very strong demand characterizing the ICT sector in most OECD countries. Estimation results show that the largest contributions of ICT manufacturing were achieved in Finland, Ireland and the Republic of Korea, by adding almost 1 percentage point to aggregate multi-factor productivity growth in the 1995–2001 period (OECD, 2003). The analysis shows the leaders of the new technological wave to be on average in the forefront of economic expansion.

This type of analysis identifies a strong causal relationship, but it has the disadvantage of only focussing on ICT-producing countries. Also, it ignores to a large extent the differences in the use of ICTs as inputs to other industries. In addition, it does not provide suggestions on how less technologically advanced countries should proceed to catch up with the information economy leaders. For example, according to the comparative advantage notion of conventional trade theory, an efficient allocation of resources would prevent at least some countries from specializing in ICT production. If this were the case, a focus on producing more ICT goods and services

could even hinder developing countries from growing and catching up.

Another common approach to measuring ICT and growth focuses on ICT inputs and the role of the ICT-using sector. It estimates the impact of ICT-related capital investments on overall capital deepening and the corresponding increases in labour productivity (Waverman, Meschi and Fuss, 2005). It is expected that the higher the ICT-related capital investment, the greater the gains in per capita GDP. The theoretical background of this type of models is based on the Solow growth model (Solow, 1957), which compares the impact on growth of ICT-related capital investment as opposed to non-ICT capital investments. National studies based on this approach have estimated the impact of ICT investments on per capita GDP growth at a magnitude of between 0.2 per cent for France and Japan and 1.4 per cent for the Republic of Korea.

The main challenge of this analysis is related to the differences between countries' national accounts statistical data with regard to ICT and non-ICT capital investments. Also, the analysis cannot be reproduced in a global context as the data are not available for developing countries. Moreover, the approach has been criticized for underestimating the ICT contribution to growth by ignoring the potential network effects and the knowledge spillover supposedly generated by ICT technologies. Finally, aggregate-level data provide few insights into the underlying causes that affect firm performance.

## 2. Measuring ICT impact using micro-data

With the increasing availability of data at the firm level, more and more studies are emerging that aim to capture the extent to which the efficient use of ICTs by firms contributes to multi-factor productivity growth and firm performance more generally (OECD, 2005d). Put differently, ICT assets can be used more or less efficiently depending on the regulatory environment, the structure of the industry sector and the degree of competition in the market. In a sample of 13 OECD countries, firm-level data showed that the use of ICTs can help firms increase their market share, expand their product range, better adapt their products to demand, reduce inventories and help them integrate activities throughout the value chain (OECD, 2003). Some of the key findings emerging from these firm-level studies are that:<sup>53</sup>



- Among ICTs, networking technologies have the highest positive impact on firm performance;
- ICT impacts emerge over time; and
- Effective ICT use is closely linked to innovation, skills and organizational change.

These positive changes are reflected in higher productivity gains for the firms adopting more complex ICT strategies. The advantage of using micro-data is that the analysis can be linked to other firm-specific characteristics or data such as skills.

Preliminary research results from a micro-data-based Canadian study suggest that firms both progress and regress from one e-business stage to another over time and that larger firms are more likely to move up the e-business ladder than SMEs (Statistics Canada, 2006). A recent Finnish study on ICT impact in firms found that a computer increases average workers' productivity by 24 per cent and that computer portability and LAN connections add additional important effects (32 per cent and 14 per cent respectively) (Maliranta and Rouvinen, 2004). The impact was found to be much greater in younger companies than in older ones.

Researchers from the United Kingdom have extensively used micro-data to measure the impact of ICTs on firm productivity (Bloom, Sadun and van Reenen, 2006; Clayton, 2006; Crespi, Crisculo and Haskel, 2006; Farooqui and Sadun, 2006). They revealed positive and significant productivity effects across all economic

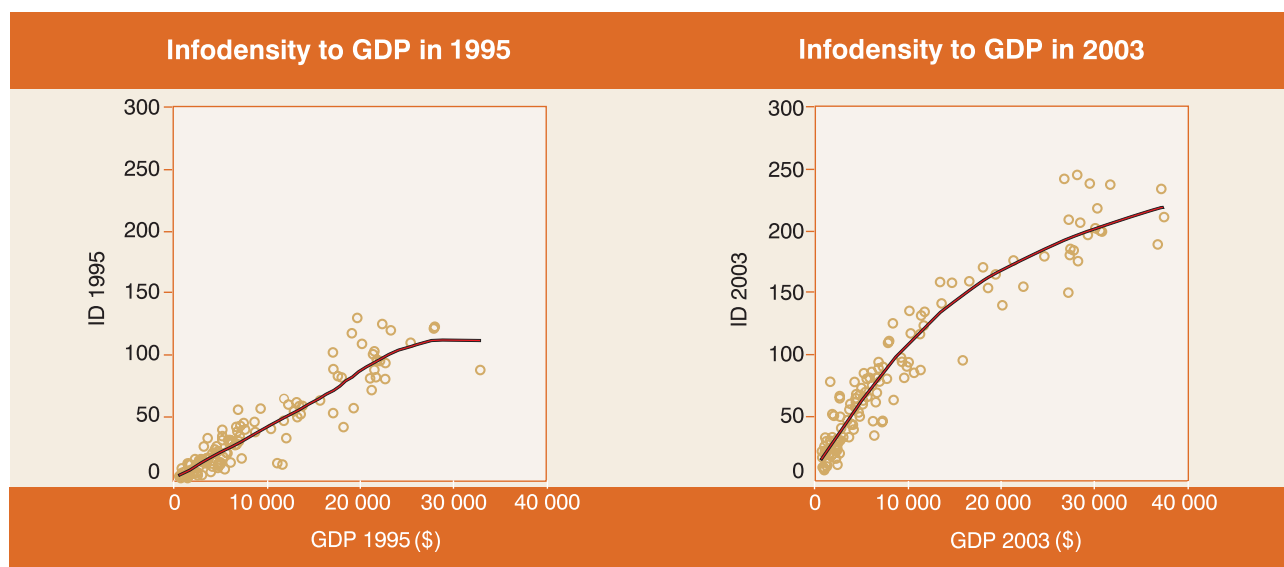
sectors, with strong links to other variables such as organizational structure, skills, age and size, as well as broadband availability. The impact of broadband on productivity has been the subject of a number of recent studies which revealed positive and significant links (see section B of this chapter).

### 3. Impact of ICTs on GDP growth in developing countries<sup>54</sup>

Most of the above-mentioned research on measuring ICT impact has focused on developed countries, primarily for reasons of statistical data availability.<sup>55</sup> To extend the work on ICT impact measurement to developing countries, UNCTAD carried out in 2005 empirical research on the macroeconomic impact of ICTs with a special focus on developing countries and using the Orbicom infodensity model as a basis (Orbicom, 2005). The analysis is based on the Infodensity composite index developed by the Orbicom Digital Divide Initiative, which defines Infodensity as “representing the ICT productive function of an economy”, composed of ICT-enhancing capital and labour (Orbicom, 2003). The choice of this index over other available indexes<sup>56</sup> was motivated primarily by the fact that it includes — apart from ICT capital — a proxy for measuring ICT skills, which are considered critical to a country's ability to absorb and effectively use ICTs. A short description of the infodensity methodology is provided in annex II.

Chart 1.38

#### GDP per capita and infodensity in 1995 and 2003



### Box 1.7

#### An empirical model for estimating ICT impact on GDP growth

UNCTAD's analysis was built on the derivations of the neoclassical growth model (Solow, 1957) extended to include government policy variables. The empirical model uses the framework of Barro (1997) for the analysis of growth across countries. Accordingly, differences in the relative growth rates across countries are explained by the targeted level of output, as determined by policymakers' choices. Technological innovation is driving sustained long-run growth in this model as an external factor. Barro and Sala-i-Martin (1995) provide a more complex endogenous growth setting in which, even if only leading-edge countries discover new ideas and the other countries simply imitate,<sup>1</sup> in the long run all output growth rates converge towards the levels chosen by policymakers. Their setting confirms that government action to improve ICT use can help developing countries to grow faster even when they do not lead innovation in ICT.

Following this analysis, the empirical model developed is shown in the following equation:

$$\log(GDP_{percapita})_{t,i} = a_0 + a_1 PopulationGrowth_{t,i} + a_2 \left(\frac{GCF}{GDP}\right)_{t,i} + a_3 OPENNESS_{t,i} + a_4 Inflation_{t,i} + a_{5,t}$$

The per capita GDP growth rate is represented here as a function of five variables: the annual population growth rate, the gross capital formation weighted by the GDP (as a proxy for investment), a classical index of openness (as a proxy for trade), an annual inflation index calculated from the GDP deflator, and the Infodensity index (ID).

The  $a_{5,t}$  coefficient measures how sensitive GDP is to changes in Infodensity. In other words, if  $a_{5,t}$  is equal to 0.3, a 1 per cent increase in the Infodensity index of a country would, on average, bring about a 0.3 per cent increase in per capita GDP.

<sup>1</sup> Technological innovation is endogenous.

The goal of the UNCTAD analysis was to estimate whether a relative measure of ICT uptake can justify differences in output growth on a more global scale. Given the scarcity of data on ICT investment for developing countries, a general growth accounting framework was chosen. Rather than capturing the impact of ICT-related capital investments, the analysis inquires into whether a greater stock of ICT capital and labour helps boost economic growth. The channels

through which this is expected to take place are mainly network and spillover effects.

The model uses available statistical data from 153 countries to proxy the diffusion and uptake of ICTs. The panel data consist of a mix of developed and developing countries, with a substantial prevalence of developing countries, covering the period from 1995 to 2003.

**Table 1.12**  
Impact of ICT on GDP growth (global estimates)

Sample year	Number of countries in the sample	GDP elasticity to ID (%)	GDP per capita mean (\$ PPP)	ID mean (*100)	Marginal effect of ID on GDP (\$)
1996	147	0.125	7 654	41.21	23
1997	147	0.132	8 039	48.67	22
1998	147	0.142	8 284	55.90	21
1999	146	0.199	8 537	64.57	26
2000	146	0.236	9 060	73.08	29
2001	146	0.262	9 386	80.00	31
2002	143	0.310	9 565	87.10	34
2003	135	0.327	9 572	97.35	32

Notes: Pooled SUR estimation with an AR(3) process, convergence achieved after 17 iterations  
Unbalanced panel with 901 observations, 132 countries and 9 years.

$a_0 = 6.97$

R-squared 0.729682

What follows illustrates, first, the linkage between the levels of GDP per capita in purchasing power parity (PPP) terms and ICT levels. Then, on the basis of a growth accounting model that includes data on investment, trade, population growth and inflation, it presents a summary account of the results of measuring the impact of ICTs on economic growth, in particular in developing countries.

### Correlation between ICTs and GDP

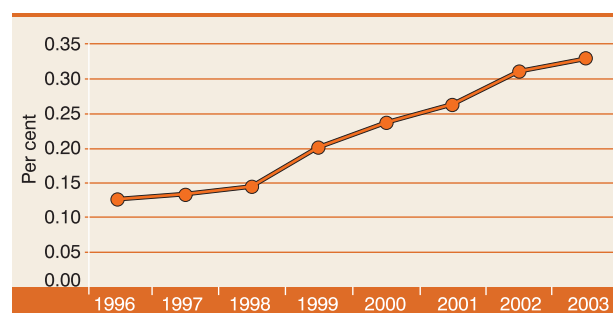
ICT uptake is found to be highly correlated with per capita GDP at purchasing power parity (PPP) (chart 1.38). The correlation coefficients tend to decline slightly over time – from around 0.95 (1995) to 0.9 (2003). At the same time, the ICT–GDP relationship appears to have grown more robust, with the 2003 values more evenly distributed along the regression line. This confirms the strong linkage between the level of ICT advancement of a country and per capita GDP.

The graphs also show that the fitted lines are steeper for 2003 data than for 1995 data. This suggests that, on average, GDP levels are more responsive to changes in ICT uptake today than nine years ago.

### Impact of ICT on GDP growth

A strong correlation between two variables is not sufficient to prove a causal relationship. ICT uptake and GDP per capita may simply go hand in hand; it does not necessarily mean that an increase in the ICT level will bring about stronger GDP growth. Therefore,

**Chart 1.39**  
**GDP elasticity to infodensity**



a panel data estimate was run to measure the impact of ICTs on per capita GDP within a more comprehensive growth model framework, taking into consideration data on investment, trade, population growth and inflation (box 1.7).

Results illustrate the impact of ICTs on economic growth (table 1.12). Here, the model explains approximately 73 per cent of the variation in GDP per capita growth rates across time and countries. Moreover, ICTs have a positive effect on income growth.<sup>57</sup> In addition, the estimated elasticity coefficients put into perspective the relationship between the variables growth rates rather than their levels. Merely having a good ICT level but very slow ICT growth rates can be reflected in slower GDP growth rates. The estimation of the elasticity coefficient is therefore more suitable for capturing the relationship between the ICT and GDP growth rates.

Over time, the elasticity coefficients experience an upward trend, as anticipated in the previous graphical

**Table 1.13**

### Impact of ICT on GDP growth, by country groups (estimated coefficients)

Year	Group A (%)	Group B (%)	Group C (%)	Group D (%)	Group E (%)
1995	0.140	0.251	0.070	0.089	0.099
1996	0.145	0.250	0.080	0.091	0.101
1997	0.150	0.256	0.092	0.095	0.107
1998	0.155	0.257	0.094	0.097	0.103
1999	0.167	0.252	0.102	0.102	0.103
2000	0.176	0.266	0.111	0.108	0.100
2001	0.182	0.272	0.116	0.116	0.106
2002	0.182	0.271	0.120	0.123	0.105
2003	n.a	n.a	n.a	0.130	0.112
R-squared	0.230	0.310	0.190	0.090	0.080

analysis in chart 1.38. They increase from 0.1 in 1996 to 0.3 in 2003 (chart 1.39). In other words, a 1 per cent increase in the Infodensity index of a country resulted on average in a 0.1 per cent increase in per capita GDP in 1996 and in a 0.3 per cent increase in 2003. As suggested earlier, the elasticity coefficients proxy the degree to which the ICT-related inputs have been incorporated into the production processes of a given country.

### Impact by country groups

Finally, the model was run separately for five different country groups with different levels of ICT uptake. This is based on the assumption that economic growth has not been equally sensitive to changes in the ICT indicators across different levels of ICT performance. Therefore, countries have been sorted according to their 2003 Infodensity performance and categorized into five groups (A to E), in a decreasing order (see annex II, table 1.24, for country classification).

Compared with the overall estimation results, group estimates are less significant statistically (table 1.13). Accordingly, the model fits best the countries in Group B, where it explains approximately 30 per cent of the variation in the income growth rate. Despite efficiency limitations, elasticity coefficients exhibit a similar upward trend found in the global analysis. Results also suggest that Group B countries benefit most from increases in ICT growth rates over the nine years, having the highest coefficients (ranging from 0.25 to 0.27). Moreover, it seems that over time, Groups C, D and E could catch up, given the upward trend of the corresponding coefficients. Also, in contrast with Groups A and B, Groups C, D and E have relatively low coefficients (chart 1.40). The slightly lower results of Group A countries compared with Group B countries suggest that in countries with high ICT endowment the

effect is somewhat levelling off, although it continues to increase over time.

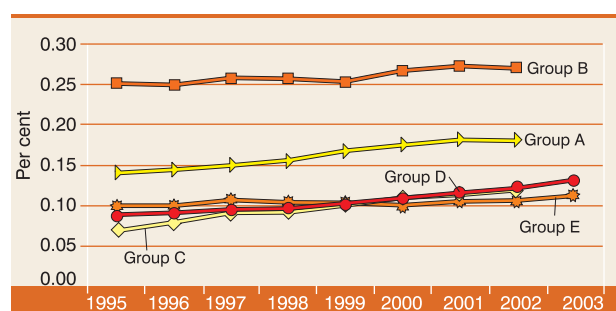
The more moderate results for the least-ICT-endowed countries are a potential indicator of an insufficient or inefficient incorporation of ICTs into the production processes of those countries. Market rigidities (such as difficult access to credit, lower degree of technological advances diffusion, lower rates of enrolment in higher education resulting in limited high-skilled labour endowments, etc.) could limit a more efficient incorporation of ICTs into the production process in countries of Groups C to E and thus might prevent them from taking full advantage of their ICT-related investments. Another explanation could be stronger spillover and network effects. Countries with a higher ICT stock could theoretically benefit from a higher level of interaction of their domestic ICT networks, thus creating added value at very low cost and achieving higher productivity gains.

To conclude, the results of the empirical analysis showed that ICT adoption can make an important positive contribution to gains in per capita income — even in poorer countries. ICTs as measured by the Infodensity index can contribute to the GDP per capita (PPP) growth rate with an increase of 0.1 to 0.3 percentage points. However, the best results are retrieved from group estimations for the intermediate level of ICT uptake. In other words, countries with similar shares of world GDP and ICT uptake seem to be benefiting most from the opportunities provided by ICTs. Since human capital is a central component of the Infodensity index, the results strongly reflect the level of skills and education available in the countries, as a key determinant for the impact of ICTs on development.

## F. Conclusions and recommendations

Chart 1.40

### Country group elasticities



This chapter has provided an overview of the latest trends in ICT access and use globally, and specifically in the developing world. It has included a description of the evolution of core ICT indicators such as Internet and mobile phone use, as well as the role of broadband in promoting the information economy. The chapter has also analysed the role of ICTs in developing countries' services trade, and presented research results that aimed to measure the economic impact of ICTs. On the basis of this comprehensive discussion of global ICT developments, the following will — in

a summary fashion — draw some key conclusions and provide suggestions for policymakers in developing countries.

### *The diffusion of ICT in developing countries still needs government intervention*

ICT diffusion in developing countries should address connectivity in both urban and rural areas, where private providers might be discouraged to go because of costs associated with geographical hurdles or the absence of a critical mass of customers. Mobile phones and other wireless technologies present a viable alternative solution to connectivity problems in developing countries. To reduce the economic isolation of rural and remote areas, wireless communications should be encouraged actively by Governments where telecommunications incumbents could take the lead.

### *Broadband is crucial for developing an information economy*

Broadband Internet access makes it possible to conduct more sophisticated e-business, and is essential for conducting such business at the international level. This will become increasingly evident in developing countries, as the rapid growth in broadband penetration in OECD countries shed further light on the technology gap. The use of broadband for e-business has a positive impact on competitiveness and productivity at the firm level, which in turn has an impact on macroeconomic growth.

### *Demand is as important as supply to broadband deployment*

National ICT policies must address both the supply and the demand sides of broadband deployment, with special attention to SMEs. Broadband deployment should match demand, but demand can be encouraged through the development of content and skills, as well as by ensuring an enabling environment through an adequate regulatory framework and security.

### *The ICT sector could be an important source of employment and growth*

Following the contraction in the year 2000, ICT-sector value-added and employment grew in developed

countries in 2003. This increase in demand and supply in the developed countries' ICT sector opens up new prospects for developing country business partners. Industrial and trade policies in ICT-producing developing countries should therefore support the creation of business opportunities in ICT-related industries.

### *ICTs continue to facilitate trade in services*

ICT-enabled service exports continued to grow faster than total service exports, thus confirming ICTs' role in facilitating services trade. Developing countries contributed with less than one fifth to the global exported value of ICT-enabled services and took longer to recover in the aftermath of 2000. However, in 2003, developing countries' exports picked up again and exceeded the average growth rate. Asian exporters in general and mainland China and India in particular performed better in terms of both absolute value and dynamics.

### *South–South trade potential: Evidence from Asia*

Developed countries remained the main exporters and importers of ICT-enabled services, although they traded to an increasing extent with transition/SEECIS and developing partners. Given the lack of bilateral data, the potential of South–South trade in ICT-enabled services could not be thoroughly assessed. The Republic of Korea's exports and imports of services suggest a growing contribution of regional trade in the developing countries' balance of payments.

### *ICTs boost countries' exports more than multinationals' sales*

In the ICT-enabled sectors, trade carried out through the foreign affiliates of multinational companies exceeds by a large extent the conventional export and import flows. Furthermore, developing and transition economies have increased their commercial presence abroad. An analysis in relative terms shows that in most cases ICTs boost service exports more than sales through foreign affiliates. However, large exports of ICT-enabled services are also likely to sell more through their foreign affiliates. Developing countries' exports would benefit from improved access to foreign markets under all WTO modes of delivery.



### *Computer and information services trade needs further liberalization*

Computer and information exports are the most rapidly growing ICT-enabled service sector, particularly in the developing economies. This may be explained by, inter alia, the correspondingly low regulatory environment in the WTO. Continued trade liberalization in this sector would need to take into account developing countries' concerns about the movement of natural persons (Mode 4). Additionally, developing countries should seek improved market access commitments under the other modes of delivery to boost the potential for South–South trade in services.

### *ICT impact on firms is best when complemented with other changes*

Research on the impact of ICTs at the firm level revealed a positive impact on firm performance and increased market share if it is complemented by organizational changes, the upgrading of skills and innovation. The age and size of the companies, as well as the quality and speed of the Internet connection, also play a role. Other critical factors are the regulatory environment in which the firm operates, the structure of the industry sector and the degree of competition in the market. Hence, to optimize impact, firm-level ICT strategies need to be introduced in conjunction with other changes in the management of the firms.

### *ICT impact on growth is highest once a critical threshold of ICT uptake is reached*

ICT access and use can contribute to productivity growth in both developed and developing countries. UNCTAD research on measuring the impact of ICTs on GDP in developing countries revealed a positive contribution even in poorer countries. But countries

that already have a certain level of ICT uptake seem to benefit most from the new technologies. Therefore, Governments need to create an enabling environment through their national ICT plans and policies, so as to promote ICT diffusion among economic and social actors (see chapter 2).

### *Measuring ICT impact should focus on micro-level data*

Research on measuring the impact of ICT on development is still in its infancy. However, with the increasing availability of reliable and comparable statistical data, further work will be possible. In particular, there is a need to carry out micro-data analysis to identify the extent to which ICTs change the performance of SMEs in developing countries. Another important advantage of using micro-data is that the analysis can be linked to other firm-specific characteristics or data such as skills. National statistical offices, the producers of such data, are in the best position to carry out this analysis, as an input to national ICT policymaking.

### *More and better data are crucial for assessing the information economy*

Finally, research on ICT trends and impact on development will benefit significantly from improved data. Measuring the information society should therefore be an integral component of national ICT plans and policies. This requires close cooperation between policymakers and statistical offices, and among stakeholders in the national statistical system. Since the development of comparable data is a long-term process, even countries with relatively less advanced information societies should start the process early in order to have some initial data in the medium term that will allow them to assess the impact of ICT on their social and economic development.

## Annex I

### STATISTICAL ANNEX

**Table 1.14**  
**Mobile phone subscribers:**  
**Economies by level of development and by region**

	2001	% change 2001– 2002	2002	% change 2002– 2003	2003	% change 2003– 2004	2004	% change 2004– 2005	2005
DEVELOPED ECONOMIES									
ASIA									
Israel	5 900 000	7.4	6 334 000	2.6	6 500 000	10.6	7 187 500	8.5	7 800 000
Japan	74 819 160	8.4	81 118 320	6.8	86 654 960	5.6	91 473 936	3.6	94 745 000
EUROPE									
Andorra	29 429	11.4	32 790	58.3	51 893	..	..	..	64 560
Austria	6 541 000	3.0	6 736 000	5.3	7 094 502	12.6	7 989 955	2.1	8 160 000
Belgium	7 697 000	5.3	8 101 777	6.2	8 605 834	6.1	9 131 705	3.6	9 460 000
Cyprus	314 355	32.9	417 933	32.0	551 752	16.1	640 515	12.2	718 842
Czech Republic	6 947 151	23.9	8 610 177	12.8	9 708 683	10.9	10 771 270	9.3	11 775 878
Denmark (incl. Faroe Islands)	3 984 652	13.1	4 508 461	6.6	4 805 917	7.5	5 165 546	6.7	5 511 878
Estonia	651 200	35.3	881 000	19.2	1 050 241	19.6	1 255 731	15.1	1 445 300
Finland	4 175 587	8.2	4 516 772	5.1	4 747 126	5.1	4 988 000	4.9	5 231 000
France	36 997 400	4.3	38 585 300	8.0	41 683 100	6.9	44 551 800	7.9	48 058 400
Germany	56 126 000	5.3	59 128 000	9.6	64 800 000	10.1	71 316 000	11.1	79 200 000
Gibraltar	9 797	24.2	12 167	30.7	15 900	15.7	18 392	..	..
Greece	7 963 742	17.0	9 314 260	11.0	10 337 000	6.8	11 044 232	-9.1	10 042 633
Greenland	16 747	19.0	19 924	..	..	..	..	..	..
Guernsey	31 539	16.0	36 580	13.5	41 530	5.5	43 824	..	..
Hungary	4 967 430	38.6	6 886 111	15.4	7 944 586	9.9	8 727 188	6.8	9 320 000
Iceland	248 131	5.0	260 438	7.4	279 670	4.2	291 372	4.3	304 001
Ireland	2 970 000	1.0	3 000 000	16.7	3 500 000	8.0	3 780 000	11.4	4 210 000
Italy	51 246 000	5.8	54 200 000	4.7	56 770 000	10.5	62 750 000	14.0	71 535 000
Jersey	61 417	..	..	..	81 200	..	..	..	..
Latvia	656 835	39.6	917 196	33.0	1 219 550	26.0	1 536 712	21.8	1 871 602
Liechtenstein	11 000	3.7	11 402	119.3	25 000	2.0	25 500	..	..
Lithuania	1 017 999	61.6	1 645 568	31.9	2 169 866	57.7	3 421 538	27.2	4 353 447
Luxembourg	409 064	15.6	473 000	14.0	539 000	..	..	..	..
Malta	239 416	15.6	276 859	4.7	289 992	..	..	..	323 980
Netherlands	12 200 000	0.8	12 300 000	9.7	13 491 000	9.9	14 821 000	6.8	15 834 000
Norway	3 766 431	3.8	3 911 136	6.4	4 163 381	..	..	..	4 754 453
Poland	10 004 661	38.9	13 898 471	25.2	17 401 222	32.7	23 096 064	26.7	29 260 000

Table 1.14 (Continued)

	2001	% change 2001- 2002	2002	% change 2002- 2003	2003	% change 2003- 2004	2004	% change 2004- 2005	2005
Portugal	7 977 537	6.9	8 528 900	17.6	10 030 000	2.7	10 300 000	11.1	11 447 670
San Marino	15 854	5.7	16 759	0.8	16 900	..	..	..	..
Slovakia	2 147 331	36.1	2 923 383	25.8	3 678 774	16.2	4 275 164	6.2	4 540 374
Slovenia	1 470 085	13.4	1 667 234	4.3	1 739 146	..	..	..	1 759 232
Spain	29 655 728	13.1	33 530 996	11.0	37 219 840	3.8	38 622 584	7.0	41 327 911
Sweden	7 177 000	10.8	7 949 000	10.7	8 801 000	5.7	9 302 000	-9.3	8 436 500
Switzerland	5 275 791	8.7	5 736 303	7.9	6 189 000	1.4	6 275 000	9.1	6 847 000
United Kingdom	46 283 000	7.3	49 677 000	6.7	52 984 000	15.3	61 100 000	..	..
<b>NORTH AMERICA</b>									
Canada	10 649 000	11.5	11 872 000	11.4	13 228 000	13.3	14 984 396	10.8	16 600 000
United States (incl. Puerto Rico and Guam)	129 535 848	10.1	142 566 848	11.3	158 721 984	15.8	183 787 136	9.7	201 650 000
<b>OCEANIA</b>									
Australia	11 132 000	13.0	12 575 000	14.1	14 347 000	14.7	16 449 000	12.0	18 420 000
New Zealand	2 288 000	7.0	2 449 000	6.1	2 599 000	16.5	3 027 000	16.6	3 530 000
<b>DEVELOPING ECONOMIES</b>									
<b>AFRICA</b>									
Algeria	100 000	300.0	400 000	260.3	1 441 400	224.9	4 682 690	191.7	13 661 000
Angola	86 500	50.3	130 000	156.0	332 800	182.5	940 000	16.4	1 094 115
Benin	125 000	75.0	218 770	8.0	236 175	..	..	..	75 063
Botswana	316 000	37.7	435 000	20.2	522 840	7.8	563 782	46.0	823 070
Burkina Faso	76 000	48.7	113 000	100.9	227 000	75.3	398 000	43.8	572 200
Burundi	30 687	69.5	52 000	23.1	64 000	..	..	..	153 000
Cameroon	417 295	68.1	701 507	53.5	1 077 000	42.7	1 536 594	47.0	2 259 000
Cape Verde	31 507	36.3	42 949	24.2	53 342	23.3	65 780	24.2	81 721
Central African Rep.	11 000	14.5	12 600	217.5	40 000	50.0	60 000	..	..
Chad	22 000	55.5	34 200	90.1	65 000	89.2	123 000	70.7	210 000
Comoros	..	..	..	..	2 000	..	..	..	16 065
Congo	150 000	47.9	221 800	48.8	330 000	16.3	383 653	27.7	490 000
Côte d'Ivoire	728 545	41.0	1 027 058	24.7	1 280 696	19.6	1 531 846	43.0	2 190 000
Democratic Republic of the Congo	150 000	273.3	560 000	78.6	1 000 000	..	..	..	2 746 000
Djibouti	3 000	400.0	15 000	53.3	23 000	..	..	..	..
Egypt	2 793 800	60.9	4 494 700	29.0	5 797 530	31.8	7 643 060	78.3	13 629 602
Equatorial Guinea	15 000	113.3	32 000	29.7	41 500	33.7	55 500	74.6	96 900
Eritrea	..	..	..	..	..	..	20 000	102.2	40 438
Ethiopia	27 500	83.2	50 369	94.2	97 827	82.0	178 000	..	..
Gabon	150 000	86.2	279 289	7.4	300 000	63.1	489 367	32.8	649 807

Table 1.14 (Continued)

	2001	% change 2001- 2002	2002	% change 2002- 2003	2003	% change 2003- 2004	2004	% change 2004- 2005	2005
Gambia	55 085	81.5	100 000	..	..	..	175 000	41.4	247 478
Ghana	243 797	58.6	386 775	105.7	795 529	113.1	1 695 000	4.1	1 765 000
Guinea	55 670	63.1	90 772	22.8	111 500	..	..	..	189 000
Guinea-Bissau	..	..	..	..	1 275	..	..	..	67 000
Kenya	600 000	97.9	1 187 122	34.0	1 590 785	60.1	2 546 157	81.1	4 611 970
Lesotho	57 000	69.9	96 843	4.8	101 474	56.7	159 000	54.1	245 052
Liberia	2 000	..	..	..	47 250	..	..	..	160 000
Libyan Arab Jamahiriya	50 000	40.0	70 000	81.4	127 000	..	..	..	..
Madagascar	147 500	10.5	163 010	74.0	283 666	17.7	333 888	51.1	504 660
Malawi	55 730	54.4	86 047	57.0	135 114	64.4	222 135	93.3	429 305
Mali	45 340	16.1	52 639	365.3	244 930	63.3	400 000	117.4	869 576
Mauritania	110 463	123.8	247 238	41.9	350 954	48.9	522 400	42.7	745 615
Mauritius	272 416	27.8	348 137	-6.3	326 033	56.4	510 000	39.9	713 300
Mayotte	..	..	21 700	65.9	36 000	5.6	38 000	..	..
Morocco	4 771 739	29.9	6 198 670	18.7	7 359 870	26.9	9 336 878	32.7	12 392 805
Mozambique	152 652	66.9	254 759	71.0	435 757	62.5	708 000	72.3	1 220 000
Namibia	106 600	40.7	150 000	49.1	223 671	27.9	286 095	73.0	495 000
Niger	2 126	683.1	16 648	360.0	76 580	93.6	148 276	102.3	299 899
Nigeria	400 000	302.0	1 607 931	95.9	3 149 473	190.4	9 147 209	103.3	18 600 000
Reunion	421 100	16.3	489 800	15.4	565 000	..	..	..	..
Rwanda	65 000	26.8	82 391	58.7	130 720	6.1	138 728	109.0	290 000
Sao Tome and Principe	..	..	1 980	143.4	4 819	..	..	..	12 000
Senegal	301 811	51.0	455 645	26.4	575 917	78.5	1 028 061	68.3	1 730 106
Seychelles	36 683	21.9	44 731	10.1	49 229	0.0	49 230	15.8	57 003
Sierra Leone	26 895	149.1	67 000	69.0	113 214	..	..	..	..
Somalia	85 000	17.6	100 000	100.0	200 000	150.0	500 000	0.0	500 000
South Africa	10 787 000	27.0	13 702 000	23.0	16 860 000	15.7	19 500 000	59.0	31 000 000
Sudan	103 846	83.7	190 778	176.4	527 233	98.9	1 048 558	89.4	1 986 000
Swaziland	55 000	23.6	68 000	25.0	85 000	32.9	113 000	77.0	200 000
Syrian Arab Republic	200 000	100.0	400 000	196.3	1 185 000	97.9	2 345 000	25.8	2 950 000
Togo	95 000	78.9	170 000	29.4	220 000	..	..	..	443 635
Tunisia	389 208	47.6	574 334	233.9	1 917 530	85.8	3 562 970	59.4	5 680 726
Uganda	283 520	38.7	393 310	97.3	776 169	50.1	1 165 035	30.9	1 525 125
United Republic of Tanzania	426 964	78.0	760 000	36.9	1 040 640	57.6	1 640 000	..	..
Zambia	121 200	14.8	139 092	73.3	241 000	24.5	300 000	145.0	735 000
Zimbabwe	314 002	7.9	338 779	7.3	363 365	9.4	397 500	75.8	699 000

Table 1.14 (Continued)

	2001	% change 2001- 2002	2002	% change 2002- 2003	2003	% change 2003- 2004	2004	% change 2004- 2005	2005
ASIA									
Afghanistan	..	..	25 000	700.0	200 000	200.0	600 000	100.0	1 200 000
Bahrain	299 587	29.8	388 990	13.9	443 109	46.6	649 764	15.2	748 703
Bangladesh	520 000	106.7	1 075 000	27.0	1 365 000	217.0	4 327 516	108.0	9 000 000
Bhutan	..	..	..	..	7 998	122.6	17 800	112.6	37 842
Brunei Darussalam	137 000	..	..	..	..	..	..	..	..
Cambodia	223 458	70.1	380 000	31.2	498 388	..	..	..	1 062 000
China	144 820 000	42.2	206 004 992	31.0	269 952 992	24.0	334 824 000	17.5	393 428 000
Dem. People's Rep. of Korea	..	..	..	..	..	..	..	..	..
Hong Kong (China)	5 776 360	10.7	6 395 725	14.9	7 349 202	10.9	8 148 685	6.0	8 635 532
India	6 431 520	97.3	12 687 637	106.1	26 154 404	80.8	47 300 000	60.7	76 000 000
Indonesia	6 520 947	79.4	11 700 000	60.7	18 800 000	59.6	30 000 000	56.4	46 909 972
Iran (Islamic Rep. of)	2 087 353	4.8	2 186 958	54.4	3 376 526	27.3	4 300 000	68.0	7 222 538
Iraq	..	..	20 000	300.0	80 000	617.5	574 000	..	..
Jordan	865 627	40.9	1 219 597	8.7	1 325 313	20.3	1 594 513	..	..
Kuwait	877 920	39.8	1 227 000	15.7	1 420 000	40.8	2 000 000	19.0	2 379 811
Lao PDR	29 545	86.7	55 160	103.5	112 275	81.9	204 191	212.6	638 202
Lebanon	766 754	1.1	775 104	5.8	820 000	8.3	888 000	11.5	990 000
Macao (China)	194 475	42.0	276 138	31.8	364 031	18.8	432 450	23.2	532 758
Malaysia	7 385 240	25.3	9 253 387	20.2	11 124 112	31.4	14 611 902	33.8	19 545 000
Maldives	18 894	121.8	41 899	58.6	66 466	70.4	113 246	35.5	153 393
Mongolia	195 000	10.8	216 000	47.7	319 000	..	..	..	557 207
Myanmar	22 671	111.6	47 982	38.6	66 517	38.3	92 007	99.4	183 434
Nepal	17 286	26.6	21 881	130.2	50 367	255.6	179 126	38.9	248 820
Oman	324 540	43.2	464 896	27.7	593 450	35.6	805 000	65.6	1 333 225
Pakistan	742 606	128.7	1 698 536	41.6	2 404 400	108.9	5 022 908	154.3	12 771 203
Palestine	300 000	6.7	320 000	50.0	480 000	103.0	974 345	12.3	1 094 640
Philippines	12 159 163	26.5	15 383 001	46.3	22 509 560	46.3	32 935 876	-0.4	32 810 000
Qatar	177 929	49.9	266 703	41.2	376 535	30.2	490 333	46.2	716 763
Rep. of Korea	29 045 596	11.4	32 342 492	3.9	33 591 760	8.9	36 586 052	4.8	38 342 323
Saudi Arabia	2 528 640	98.0	5 007 965	44.5	7 238 224	26.8	9 175 764	44.9	13 300 000
Singapore	2 991 600	11.8	3 344 800	4.0	3 477 100	11.0	3 860 600	13.6	4 384 600
Sri Lanka	667 662	39.5	931 580	49.6	1 393 403	58.7	2 211 158	52.0	3 361 775
Taiwan Province of China	21 786 384	12.0	24 390 520	5.8	25 799 840	-11.8	22 760 144	-2.6	22 170 702
Thailand	7 550 000	113.5	16 117 000	54.3	24 864 020	10.1	27 379 000	..	..
Turkey	19 572 896	19.2	23 323 118	19.6	27 887 536	24.5	34 707 548	25.6	43 608 965
United Arab Emirates	1 909 303	27.2	2 428 071	22.4	2 972 331	23.9	3 683 117	23.1	4 534 480
Viet Nam	1 251 195	52.0	1 902 388	44.1	2 742 000	80.9	4 960 000	81.5	9 000 000



Table 1.14 (Continued)

	2001	% change 2001- 2002	2002	% change 2002- 2003	2003	% change 2003- 2004	2004	% change 2004- 2005	2005
Yemen	152 000	170.4	411 083	70.3	700 000	53.1	1 072 000	86.6	2 000 000
LATIN AMERICA AND THE CARIBBEAN									
Antigua and Barbuda	25 000	52.8	38 205	..	..	..	54 000	..	..
Argentina	6 741 791	-2.6	6 566 740	19.4	7 842 233	72.3	13 512 383	63.6	22 100 000
Aruba	53 000	..	..	..	..	..	..	..	..
Bahamas	60 555	101.1	121 759	-4.5	116 267	60.0	186 007	..	..
Barbados	53 111	83.0	97 193	44.0	140 000	43.0	200 138	3.0	206 190
Belize	39 155	32.1	51 729	16.8	60 403	61.8	97 755	-4.8	93 089
Bermuda	13 333	125.0	30 000	33.3	40 000	22.5	49 000	..	..
Bolivia	779 917	31.2	1 023 333	25.0	1 278 844	40.8	1 800 789	34.5	2 421 402
Brazil	28 745 768	21.3	34 880 964	32.9	46 373 264	41.5	65 605 000	31.4	86 210 000
Cayman Islands	17 000	..	..	..	..	..	..	..	..
Chile	5 271 565	22.3	6 445 698	16.7	7 520 280	27.2	9 566 581	10.5	10 569 572
Colombia	3 265 261	40.8	4 596 594	34.6	6 186 206	68.1	10 400 578	109.6	21 800 000
Costa Rica	326 944	53.7	502 478	54.9	778 299	18.6	923 084	19.3	1 101 035
Cuba	8 579	108.1	17 851	98.1	35 356	114.4	75 797	77.4	134 480
Dominica	7 710	57.9	12 173	73.3	21 099	98.3	41 838	..	..
Dominican Rep.	1 270 082	33.9	1 700 609	24.8	2 122 543	19.4	2 534 063	43.0	3 623 289
Ecuador	859 152	81.7	1 560 861	53.6	2 398 161	89.5	4 544 174	37.5	6 246 332
El Salvador	857 782	3.6	888 818	29.4	1 149 790	59.4	1 832 579	31.6	2 411 753
French Guiana	75 320	15.9	87 300	..	..	..	98 000	..	..
Grenada	6 414	17.8	7 553	459.9	42 293	2.4	43 313	..	..
Guadeloupe	292 520	10.6	323 500	..	..	..	350 000	..	..
Guatemala	1 146 441	37.6	1 577 085	29.0	2 034 776	55.7	3 168 256	..	..
Guyana	75 320	15.9	87 300	35.9	118 658	21.3	143 945	73.7	250 000
Haiti	91 500	53.0	140 000	128.6	320 000	25.0	400 000	..	..
Honduras	237 629	37.4	326 508	16.2	379 362	86.4	707 201	81.2	1 281 462
Jamaica	635 000	87.0	1 187 295	34.8	1 600 000	37.5	2 200 000	22.7	2 700 000
Martinique	286 120	11.8	319 900	..	..	..	349 000	..	..
Mexico	21 757 560	19.2	25 928 266	16.1	30 097 700	27.8	38 451 136	23.4	47 462 108
Netherlands Antilles	..	..	..	..	200 000	0.0	200 000	..	..
Nicaragua	164 509	44.2	237 248	96.7	466 706	58.3	738 624	51.5	1 119 379
Panama	475 141	10.7	525 845	58.6	834 031	2.6	855 852	58.0	1 351 924
Paraguay	1 150 000	45.0	1 667 018	6.2	1 770 345	-0.1	1 767 824	6.7	1 887 000
Peru	1 793 284	28.6	2 306 944	27.0	2 930 343	39.7	4 092 558	36.4	5 583 356
Saint Kitts and Nevis	2 100	138.1	5 000	..	..	..	10 000	..	..
Saint Lucia	2 700	430.1	14 313	..	..	..	93 000	..	..

Table 1.14 (Continued)

	2001	% change 2001- 2002	2002	% change 2002- 2003	2003	% change 2003- 2004	2004	% change 2004- 2005	2005
Saint Vincent and the Grenadines	7 492	33.2	9 982	530.2	62 911	-9.5	56 950	24.0	70 620
Suriname	87 000	24.6	108 363	55.5	168 522	26.3	212 819	9.4	232 785
Trinidad and Tobago	256 106	41.3	361 911	34.3	485 871	33.3	647 870	23.5	800 000
Uruguay	519 991	-1.2	513 528	-3.1	497 530	20.6	600 000	..	..
Venezuela	6 472 584	-0.1	6 463 561	8.5	7 015 735	20.0	8 420 980	48.4	12 495 721
Virgin Islands (U.S.)	41 000	..	..	..	..	..	..	..	..
<b>OCEANIA</b>									
American Samoa	..	..	..	..	..	..	..	..	..
French Polynesia	67 300	33.7	90 000	..	..	..	..	..	87 000
Kiribati	395	25.3	495	6.3	526	..	..	..	..
Marshall Islands	489	12.9	552	8.3	598	..	..	..	..
Micronesia (Fed. States of)	..	..	100	5 769.0	5 869	117.8	12 782	..	..
Nauru	1 500	..	..	..	..	..	..	..	..
New Caledonia	67 917	17.8	80 000	21.4	97 113	19.9	116 443	15.3	134 265
Northern Marianas Islands	..	..	..	..	..	..	..	..	..
Palau	..	..	..	..	..	..	..	..	..
Papua New Guinea	10 700	40.2	15 000	..	..	..	..	..	26 000
Samoa	2 500	8.0	2 700	288.9	10 500	..	..	..	24 000
Solomon Islands	967	3.3	999	48.9	1 488	..	..	..	6 000
Tonga	236	1321.2	3 354	..	..	..	..	..	..
Tuvalu	..	..	..	..	..	..	..	..	..
Vanuatu	350	1300.0	4 900	59.2	7 800	34.7	10 504	20.8	12 692
<b>TRANSITION ECONOMIES</b>									
<b>SOUTH-EAST EUROPE AND CIS</b>									
Albania	392 650	116.7	851 000	29.3	1 100 000	..	..	..	..
Azerbaijan	730 000	8.8	794 000	33.1	1 057 000	68.7	1 782 900	25.8	2 242 000
Belarus	138 329	234.4	462 630	141.7	1 118 000	..	..	..	4 097 997
Bosnia and Herzegovina	444 711	68.4	748 780	40.2	1 050 000	..	..	..	1 594 367
Bulgaria	1 550 000	67.6	2 597 548	34.8	3 500 869	35.1	4 729 731	32.0	6 244 693
Croatia	1 755 000	33.3	2 340 000	9.1	2 553 000	..	..	..	2 983 900
Georgia	301 327	67.1	503 619	41.2	711 224	18.2	840 600	73.6	1 459 180
Kazakhstan	582 000	76.5	1 027 000	29.6	1 330 730	107.3	2 758 940	79.6	4 955 200
Kyrgyzstan	27 000	96.6	53 084	160.5	138 279	117.0	300 000	80.6	541 652
Rep. of Moldova	225 000	50.3	338 225	40.7	475 942	65.4	787 000	38.5	1 089 800
Romania	3 845 116	32.9	5 110 591	37.8	7 039 898	45.1	10 215 388	30.7	13 354 138
Russian Federation	7 750 499	127.2	17 608 756	107.3	36 500 000	103.9	74 420 000	61.2	120 000 000
Serbia and Montenegro	1 997 809	37.7	2 750 397	32.1	3 634 613	30.1	4 729 629	10.6	5 229 000

**Table 1.14 (Continued)**

	2001	% change 2001- 2002	2002	% change 2002- 2003	2003	% change 2003- 2004	2004	% change 2004- 2005	2005
Tajikistan	1 630	709.8	13 200	260.7	47 617	..	..	..	240 000
TFYR Macedonia	223 275	63.6	365 346	112.4	776 000	..	..	..	1 250 000
Turkmenistan	8 173	0.0	8 173	12.4	9 187	..	..	..	..
Ukraine	2 224 600	66.0	3 692 700	76.0	6 498 423	111.4	13 735 000	25.3	17 214 280
Uzbekistan	128 012	46.0	186 900	71.7	320 815	69.6	544 100	32.3	720 000

Source: UNCTAD calculations based on the ITU World telecommunication Indicators Database, 2006.

## Annex I

### Statistical Annex

#### Table 1.15

### Mobile phone penetration: Economies by level of development and by region

Mobile phone subscribers per 100 inhabitants

	2001	% change 2001–2002	2002	% change 2002–2003	2003	% change 2003–2004	2004	% change 2004–2005	2005
DEVELOPED ECONOMIES									
ASIA									
Israel	90.7	5.3	95.5	0.6	96.1	9.0	104.7	7.9	113.0
Japan	58.8	8.3	63.7	6.7	67.9	5.4	71.6	3.3	74.0
EUROPE									
Andorra	36.9	8.5	40.0	54.1	61.6	..	..	..	..
Austria	81.1	2.5	83.1	4.8	87.2	11.7	97.4	2.5	99.8
Belgium	74.7	4.8	78.2	6.1	83.0	6.5	88.3	..	..
Cyprus	45.6	28.2	58.4	31.4	76.8	3.3	79.4	8.5	86.1
Czech Republic	67.9	24.9	84.9	13.6	96.5	9.2	105.3	9.4	115.2
Denmark	74.0	12.7	83.3	6.0	88.3	8.8	96.1	4.8	100.7
Estonia	45.5	42.8	65.0	19.6	77.7	23.5	96.0	13.3	108.8
Faroe Islands	54.3	18.4	64.4	18.9	76.5	..	..	..	..
Finland	80.4	7.9	86.7	4.9	91.0	5.1	95.6	4.2	99.7
France	62.3	3.8	64.7	7.6	69.6	5.9	73.7	7.8	79.4
Germany	68.1	5.2	71.6	9.6	78.5	10.1	86.4	10.8	95.8
Gibraltar	35.6	21.9	43.5	28.4	55.8	..	..	..	..
Greece	75.2	12.5	84.5	6.7	90.2	11.5	100.6	-10.2	90.3
Greenland	29.9	17.7	35.2	..	..	..	..	..	..
Guernsey	56.1	16.4	65.3	13.9	74.4	..	..	..	..
Hungary	48.8	39.1	67.9	15.7	78.5	13.0	88.8	4.0	92.3
Iceland	86.5	4.6	90.4	7.0	96.8	2.8	99.4	4.0	103.4
Ireland	77.4	-1.4	76.3	15.3	88.0	7.5	94.5	7.4	101.5
Italy	88.3	8.7	96.0	2.2	98.1	10.3	108.2	13.8	123.1
Jersey	70.4	..	..	..	92.3	..	..	..	..
Latvia	27.9	41.0	39.4	33.5	52.6	27.8	67.2	20.7	81.1
Liechtenstein	32.8	2.6	33.7	116.5	72.9	..	..	..	..
Lithuania	29.2	62.2	47.4	32.7	62.8	58.1	99.3	28.0	127.1
Luxembourg	93.1	14.0	106.1	12.6	119.4	..	..	..	..
Malta	61.1	14.5	69.9	3.7	72.5	..	..	..	80.8
Netherlands	75.8	.3	75.9	9.1	82.8	10.3	91.3	6.4	97.1
Norway	83.3	3.2	85.9	5.8	90.9	..	..	..	102.9

Table 1.15 (Continued)

	2001	% change 2001–2002	2002	% change 2002–2003	2003	% change 2003–2004	2004	% change 2004–2005	2005
Poland	25.9	39.0	36.0	25.3	45.1	32.9	59.9	26.8	75.9
Portugal	77.2	6.2	82.0	17.6	96.4	6.1	102.3	6.7	109.1
San Marino	58.7	5.7	62.1	0.8	62.6	..	..	..	..
Slovakia	39.9	22.5	48.9	17.9	57.7	37.1	79.1	6.3	84.1
Slovenia	73.7	13.4	83.5	4.3	87.1	..	..	..	89.4
Spain	73.4	11.2	81.6	6.9	87.2	7.7	93.9	3.1	96.8
Sweden	80.5	10.3	88.9	10.3	98.0	5.3	103.2	-9.6	93.3
Switzerland	72.8	8.2	78.8	7.4	84.6	0.1	84.6	8.4	91.8
United Kingdom	77.0	9.1	84.1	8.4	91.2	12.8	102.8	..	..
NORTH AMERICA									
Canada	34.2	10.3	37.7	10.4	41.7	13.3	47.2	9.0	51.4
United States	45.0	8.6	48.9	11.7	54.6	11.7	61.0	10.9	67.6
OCEANIA									
Australia	57.3	11.7	64.0	12.7	72.2	14.5	82.6	10.6	91.4
New Zealand	59.0	5.4	62.2	4.3	64.8	19.6	77.5	13.0	87.6
DEVELOPING ECONOMIES									
AFRICA									
Algeria	0.3	294.2	1.3	255.1	4.5	219.0	14.5	187.2	41.6
Angola	0.6	45.9	0.9	148.5	2.3	188.1	6.7	2.8	6.9
Benin	1.9	69.4	3.2	4.5	3.4	..	..	..	1.0
Botswana	18.8	34.5	25.3	17.5	29.7	5.7	31.4	48.5	46.6
Burkina Faso	0.7	45.1	0.9	96.0	1.9	60.5	3.0	45.6	4.3
Burundi	0.4	66.4	0.7	20.8	0.9	..	..	..	2.0
Cameroon	2.7	63.7	4.4	49.5	6.6	42.3	9.4	46.8	13.8
Cape Verde	7.1	33.9	9.5	22.0	11.6	19.9	13.9	15.7	16.1
Central African Rep.	0.3	9.5	0.3	203.4	1.0	58.7	1.5	..	..
Chad	0.3	51.4	0.4	85.1	0.8	72.8	1.4	55.1	2.2
Comoros	..	..	..	..	0.3	..	..	..	2.0
Congo	4.8	39.4	6.7	40.3	9.4	6.6	10.0	21.9	12.3
Côte d'Ivoire	4.5	39.8	6.2	23.6	7.7	17.7	9.1	33.1	12.1
Democratic Republic of the Congo	0.3	272.5	1.1	78.2	1.9	..	..	..	0.9
Djibouti	0.5	390.9	2.3	50.6	3.4	..	..	..	..
Egypt	4.3	54.3	6.7	26.5	8.4	29.3	10.9	68.6	18.4
Equatorial Guinea	3.2	98.5	6.3	20.6	7.6	43.2	10.9	76.0	19.3
Eritrea	..	..	..	..	..	..	0.5	97.3	0.9
Ethiopia	0.0	77.8	0.1	88.6	0.1	74.3	0.2	..	..



Table 1.15 (Continued)

	2001	% change 2001–2002	2002	% change 2002–2003	2003	% change 2003–2004	2004	% change 2004–2005	2005
Gabon	11.9	80.8	21.5	4.4	22.4	61.3	36.2	29.7	47.0
Gambia	4.3	76.6	7.5	..	..	..	12.0	36.3	16.3
Ghana	1.2	54.5	1.9	100.3	3.7	112.1	7.9	0.7	8.0
Guinea	0.7	61.2	1.2	21.5	1.4	..	..	..	2.4
Guinea-Bissau	..	..	..	..	0.1	..	..	..	5.0
Kenya	1.9	96.6	3.8	33.1	5.0	56.5	7.9	71.4	13.5
Lesotho	2.6	69.4	4.5	4.4	4.7	89.2	8.8	54.6	13.7
Liberia	0.1	..	..	..	1.4	..	..	..	4.9
Libyan Arab Jamahiriya	0.9	40.6	1.3	82.2	2.3	..	..	..	..
Madagascar	1.0	7.6	1.0	69.4	1.7	7.4	1.9	45.4	2.7
Malawi	0.5	53.6	0.8	56.3	1.3	39.8	1.8	85.1	3.3
Mali	0.4	13.6	0.5	355.3	2.3	59.8	3.6	112.7	7.7
Mauritania	4.2	118.1	9.2	38.4	12.8	37.5	17.5	38.6	24.3
Mauritius	22.7	26.7	28.8	-7.2	26.7	54.9	41.4	38.5	57.3
Mayotte	..	..	13.5	59.2	21.6	5.6	22.8	..	..
Morocco	16.4	27.8	20.9	16.8	24.4	27.8	31.2	26.1	39.4
Mozambique	0.9	63.0	1.4	67.0	2.4	58.6	3.7	65.1	6.2
Namibia	5.8	37.1	8.0	45.3	11.6	22.4	14.2	71.3	24.4
Niger	0.0	648.4	0.1	339.6	0.6	91.7	1.2	79.9	2.1
Nigeria	0.3	291.4	1.3	90.7	2.6	181.7	7.2	96.5	14.1
Reunion	57.6	14.4	65.9	13.4	74.7	..	..	..	..
Rwanda	0.8	23.3	1.0	54.4	1.6	5.1	1.6	96.2	3.2
Sao Tome and Principe	..	..	1.3	141.8	3.2	..	..	..	7.6
Senegal	3.1	46.9	4.5	23.0	5.6	78.9	9.9	49.2	14.8
Seychelles	45.2	18.3	53.4	11.3	59.5	2.2	60.8	..	..
Sierra Leone	0.5	148.1	1.4	68.3	2.3	..	..	..	..
Somalia	0.9	17.2	1.0	64.3	1.7	150.0	4.2	0.0	4.2
South Africa	24.2	24.5	30.1	20.6	36.4	18.6	43.1	51.5	65.4
Sudan	0.3	78.7	0.6	172.8	1.6	91.8	3.0	80.4	5.5
Swaziland	5.4	22.2	6.6	23.6	8.1	28.2	10.4	85.6	19.4
Syrian Arab Republic	1.2	95.2	2.3	189.2	6.8	90.6	12.9	20.4	15.5
Togo	2.0	74.4	3.5	26.1	4.4	..	..	..	7.2
Tunisia	4.0	45.9	5.9	230.5	19.4	84.7	35.9	57.1	56.3
Uganda	1.2	33.9	1.6	90.4	3.0	43.9	4.4	21.3	5.3
United Republic of Tanzania	1.3	73.6	2.2	33.6	2.9	47.7	4.4	..	..
Zambia	1.1	11.6	1.3	68.4	2.2	27.6	2.7	129.4	6.3
Zimbabwe	2.7	6.7	2.9	6.1	3.1	-0.5	3.1	91.1	5.9

Table 1.15 (Continued)

	2001	% change 2001–2002	2002	% change 2002–2003	2003	% change 2003–2004	2004	% change 2004–2005	2005
ASIA									
Afghanistan	..	..	0.1	829.2	1.0	141.4	2.4	99.4	4.8
Bahrain	46.0	25.7	57.9	10.3	63.8	37.7	87.9	17.1	103.0
Bangladesh	0.4	103.7	0.8	25.1	1.0	186.2	2.9	119.5	6.3
Bhutan	..	..	..	..	1.1	-29.7	0.8	..	..
Brunei Darussalam	40.1	..	..	..	..	..	..	..	..
Cambodia	1.7	65.8	2.8	27.9	3.5	..	..	..	7.5
China	11.0	45.4	16.0	30.3	20.9	22.0	25.5	17.3	29.9
Dem. People's Rep. of Korea	..	..	..	..	..	..	..	..	..
Hong Kong (China)	85.9	9.7	94.2	14.5	107.9	6.1	114.5	7.1	122.6
India	0.6	94.5	1.2	103.2	2.5	76.8	4.4	57.5	6.9
Indonesia	3.1	76.9	5.5	58.5	8.7	54.2	13.5	56.2	21.1
Iran (Islamic Rep. of)	3.2	3.5	3.3	52.2	5.1	21.0	6.2	68.6	10.4
Iraq	..	..	0.1	289.2	0.3	591.5	2.2	..	..
Jordan	16.7	37.2	22.9	5.6	24.2	17.4	28.4	..	..
Korea (Rep. of)	61.4	10.7	67.9	3.4	70.2	8.4	76.1	4.3	79.4
Kuwait	38.6	34.5	51.9	10.1	57.2	34.8	77.1	14.9	88.6
Lao P.D.R.	0.5	81.9	1.0	98.4	2.0	78.5	3.5	205.3	10.8
Lebanon	22.9	-0.8	22.7	3.2	23.4	6.8	25.0	10.6	27.7
Macau (China)	44.5	40.4	62.5	29.8	81.2	14.1	92.6	25.1	115.8
Malaysia	30.9	22.1	37.7	17.1	44.2	32.9	58.7	28.0	75.2
Maldives	6.9	117.3	14.9	55.4	23.2	49.0	34.5	..	..
Mongolia	8.1	9.5	8.9	46.0	13.0	..	..	..	21.1
Myanmar	0.0	107.5	0.1	35.9	0.1	36.3	0.2	..	..
Nepal	0.1	24.0	0.1	125.6	0.2	227.4	0.7	31.7	0.9
Oman	13.1	39.9	18.3	24.6	22.8	20.1	27.4	89.4	51.9
Pakistan	0.5	123.2	1.2	38.1	1.6	105.6	3.3	151.0	8.3
Palestine	9.1	1.8	9.3	43.2	13.3	99.3	26.4	11.8	29.6
Philippines	15.5	24.5	19.4	43.5	27.8	43.5	39.8	-0.9	39.5
Qatar	27.9	42.5	39.7	34.2	53.3	48.6	79.2	16.3	92.2
Saudi Arabia	11.8	93.0	22.8	40.8	32.1	14.7	36.8	47.0	54.1
Singapore	72.4	10.9	80.3	3.1	82.9	8.0	89.5	13.3	101.4
Sri Lanka	3.6	37.9	4.9	47.2	7.2	58.5	11.5	41.2	16.2
Taiwan Province of China	97.2	11.4	108.3	5.4	114.1	-12.4	100.0	-2.6	97.4
Thailand	12.3	111.3	26.0	54.2	40.1	10.0	44.2	..	..
Turkey	28.6	17.3	33.5	17.7	39.4	21.7	48.0	24.1	59.6
United Arab Emirates	54.7	18.2	64.7	13.7	73.6	15.1	84.7	19.1	100.9

Table 1.15 (Continued)

	2001	% change 2001–2002	2002	% change 2002–2003	2003	% change 2003–2004	2004	% change 2004–2005	2005
Viet Nam	1.5	51.8	2.3	43.9	3.4	78.5	6.0	77.7	10.7
Yemen	0.8	161.7	2.1	64.8	3.5	48.8	5.2	84.4	9.5
LATIN AMERICA AND THE CARIBBEAN									
Antigua and Barbuda	32.3	51.7	49.0	..	..	..	70.1	..	..
Argentina	18.1	-3.5	17.5	18.3	20.7	67.9	34.8	64.7	57.3
Aruba	50.0	..	..	..	..	..	..	..	..
Bahamas	19.7	97.8	39.0	-6.0	36.7	60.0	58.7	..	..
Barbados	19.8	82.5	36.1	43.7	51.9	42.3	73.9	3.8	76.7
Belize	15.2	23.3	18.8	9.0	20.5	83.0	37.5	-7.9	34.5
Bermuda	20.6	123.6	46.2	32.5	61.2	29.2	79.0	..	..
Bolivia	9.4	30.2	12.3	24.0	15.2	32.0	20.1	31.4	26.4
Brazil	16.7	19.9	20.1	31.0	26.3	38.1	36.3	27.4	46.2
Cayman Islands	38.0	..	..	..	..	..	..	..	..
Chile	34.2	25.1	42.8	15.3	49.4	25.7	62.1	9.2	67.8
Colombia	7.6	39.2	10.6	33.1	14.1	63.9	23.2	106.5	47.8
Costa Rica	8.2	52.2	12.5	49.3	18.7	16.4	21.7	17.1	25.4
Cuba	0.1	107.4	0.2	97.4	0.3	114.1	0.7	78.4	1.2
Dominica	9.9	57.5	15.6	72.9	27.0	118.4	58.9	..	..
Dominican Rep.	15.7	26.6	19.9	23.2	24.5	17.8	28.8	41.1	40.7
Ecuador	6.7	80.0	12.0	52.5	18.3	88.2	34.4	37.1	47.2
El Salvador	13.4	2.7	13.8	25.8	17.3	60.0	27.7	26.5	35.0
French Guiana	44.6	11.9	49.9	..	..	..	53.6	..	..
Grenada	6.4	11.1	7.1	428.1	37.6	11.8	42.1	..	..
Guadeloupe	67.9	9.5	74.3	..	..	..	79.0	..	..
Guatemala	9.8	34.0	13.1	25.7	16.5	51.5	25.0	..	..
Guyana	8.7	14.7	9.9	34.5	13.4	40.5	18.8	77.4	33.3
Haiti	1.1	52.5	1.7	127.8	3.8	23.4	4.7	..	..
Honduras	3.6	34.1	4.9	14.5	5.6	81.0	10.1	76.1	17.8
Jamaica	24.3	86.0	45.2	33.9	60.6	35.7	82.2	23.9	101.8
Martinique	74.0	11.0	82.1	..	..	..	88.4	..	..
Mexico	21.9	17.4	25.8	14.4	29.5	24.3	36.6	21.0	44.3
Netherlands Antilles	..	..	..	..	89.9	.2	90.1	..	..
Nicaragua	3.2	44.2	4.6	86.8	8.5	55.0	13.2	..	..
Panama	16.4	6.7	17.5	53.0	26.8	0.8	27.0	55.2	41.9
Paraguay	20.4	41.3	28.8	3.5	29.9	-1.6	29.4	4.3	30.6
Peru	6.9	25.5	8.6	23.9	10.7	38.9	14.8	34.5	20.0
Saint Kitts and Nevis	4.6	135.0	10.7	..	..	..	20.0	..	..

Table 1.15 (Continued)

	2001	% change 2001–2002	2002	% change 2002–2003	2003	% change 2003–2004	2004	% change 2004–2005	2005
Saint Lucia	1.7	422.7	8.9	..	..	..	62.0	..	..
Saint Vincent and the Grenadines	6.5	31.0	8.5	519.7	52.9	-11.0	47.1	26.1	59.3
Suriname	18.5	23.0	22.8	53.9	35.0	38.4	48.5	6.9	51.8
Trinidad and Tobago	19.7	41.2	27.8	34.1	37.3	32.9	49.6	23.6	61.3
Uruguay	16.2	-1.5	15.9	-3.4	15.4	20.2	18.5	..	..
Venezuela	26.2	-2.1	25.6	6.5	27.3	17.8	32.2	45.2	46.7
Virgin Islands (U.S.)	37.5	..	..	..	..	..	..	..	..
OCEANIA									
Fiji	9.9	10.2	11.0	21.3	13.3	..	..	..	..
French Polynesia	27.9	31.3	36.7	..	..	..	..	..	34.0
Kiribati	0.5	23.3	0.6	4.5	0.6	..	..	..	..
Marshall Islands	0.9	11.2	1.0	6.7	1.1	..	..	..	..
Micronesia (Fed. States of)	..	..	0.1	5752.7	5.4	111.7	11.5	..	..
Nauru	13.0	..	..	..	..	..	..	..	..
New Caledonia	31.0	15.3	35.7	18.7	42.4	18.4	50.2	12.9	56.7
Northern Marianas Islands	..	..	..	..	..	..	..	..	..
Palau	..	..	..	..	..	..	..	..	..
Papua New Guinea	0.2	35.9	0.3	..	..	..	..	..	0.4
Samoa	1.4	6.9	1.5	285.0	5.8	..	..	..	13.0
Solomon Islands	0.2	.5	0.2	38.8	0.3	..	..	..	1.3
Tonga	0.2	1 316.9	3.4	..	..	..	..	..	..
Tuvalu	..	..	..	..	..	..	..	..	..
Vanuatu	0.2	1 263.3	2.4	55.0	3.8	28.9	4.8	20.3	5.8
TRANSITION ECONOMIES									
SOUTH-EAST EUROPE AND CIS									
Albania	12.7	117.2	27.6	29.6	35.8	..	..	..	..
Armenia	0.7	179.8	1.9	60.3	3.0	121.4	6.7	26.4	8.4
Azerbaijan	9.1	6.8	9.8	31.1	12.8	65.1	21.1	26.3	26.7
Belarus	1.4	235.8	4.7	142.6	11.3	..	..	..	42.0
Bosnia and Herzegovina	11.7	67.6	19.6	39.6	27.4	..	..	..	40.8
Bulgaria	19.6	68.5	33.1	35.6	44.9	34.6	60.4	33.8	80.8
Croatia	40.1	33.3	53.5	9.1	58.4	..	..	..	65.6
Georgia	6.1	68.5	10.2	42.4	14.5	14.0	16.6	96.9	32.6
Kazakhstan	3.6	77.9	6.4	30.6	8.4	113.2	17.9	86.6	33.4
Kyrgyzstan	0.5	94.0	1.1	159.2	2.7	109.8	5.8	78.7	10.3
Rep. of Moldova	6.2	50.8	9.3	41.2	13.2	39.9	18.5	40.4	25.9
Romania	17.2	36.6	23.5	38.5	32.5	41.2	45.9	34.2	61.5

**Table 1.15 (Continued)**

	2001	% change 2001–2002	2002	% change 2002–2003	2003	% change 2003–2004	2004	% change 2004–2005	2005
Russian Federation	5.3	127.5	12.0	107.5	24.9	107.0	51.6	62.0	83.6
Serbia and Montenegro	18.7	37.2	25.7	31.7	33.8	33.1	45.0	42.3	64.0
Tajikistan	0.0	689.2	0.2	251.5	0.7	..	..	..	3.7
TFYR Macedonia	10.9	62.0	17.7	110.3	37.2	..	..	..	61.5
Turkmenistan	0.2	-0.3	0.2	12.0	0.2	..	..	..	..
Ukraine	4.6	67.6	7.7	78.1	13.6	109.0	28.5	29.8	37.0
Uzbekistan	0.5	44.2	0.7	69.5	1.3	64.1	2.1	31.8	2.7

Source: UNCTAD calculations based on the ITU World Telecommunication Indicators Database, 2006.



## Annex I Statistical Annex

### Table 1.16

#### Internet users: Economies by level of development and by region

	2001	% change 2001– 2002	2002	% change 2002– 2003	2003	% change 2003– 2004	2004	% change 2004– 2005	2005
DEVELOPED ECONOMIES									
ASIA									
Israel	1 800 000	11.1	2 000 000	25.0	2 500 000	28.0	3 200 000	..	..
Japan	48 900 000	21.1	59 220 000	4.1	61 640 000	4.1	64 160 000	32.9	85 290 000
EUROPE									
Andorra	..	..	..	..	10 049	9.5	11 000	99.3	21 922
Austria	3 150 000	6.0	3 340 000	11.7	3 730 000	4.6	3 900 000	2.6	4 000 000
Belgium	3 200 000	6.3	3 400 000	17.6	4 000 000	5.0	4 200 000	14.3	4 800 000
Cyprus	150 000	40.0	210 000	19.0	250 000	19.2	298 000	9.4	326 000
Czech Republic	1 500 000	73.3	2 600 180	-7.9	2 395 000	7.6	2 576 000	7.1	2 758 000
Denmark (incl. Faroe Islands)	2 320 000	4.1	2 415 500	3.9	2 509 000	9.9	2 757 000	4.7	2 887 000
Estonia	429 656	3.3	444 000	35.1	600 000	11.7	670 000	3.0	690 000
Finland	2 235 320	13.1	2 529 000	1.2	2 560 000	4.7	2 680 000	4.5	2 800 000
France	15 653 000	15.4	18 057 000	20.5	21 765 000	9.0	23 732 000	10.2	26 154 000
Germany	26 000 000	7.7	28 000 000	17.9	33 000 000	6.7	35 200 000	6.5	37 500 000
Gibraltar	6 179	..	..	..	..	..	6 295	..	..
Greece	915 347	62.3	1 485 281	15.7	1 718 435	13.8	1 955 000	2.4	2 001 000
Greenland	20 000	25.0	25 000	24.0	31 000	22.6	38 000	..	..
Guernsey	25 000	20.0	30 000	10.0	33 000	9.1	36 000	8.3	39 000
Hungary	1 480 000	8.1	1 600 000	50.0	2 400 000	12.5	2 700 000	11.1	3 000 000
Iceland	172 000	8.5	186 600	4.5	195 000	15.7	225 610	14.4	258 000
Ireland	895 000	23.1	1 102 000	14.3	1 260 000	-4.9	1 198 000	-4.3	1 146 700
Italy	15 600 000	26.9	19 800 000	15.6	22 880 000	18.8	27 170 000	3.1	28 000 000
Jersey	..	..	..	..	20 000	35.0	27 000	..	..
Latvia	170 000	82.4	310 000	..	..	..	810 000	27.2	1 030 000
Liechtenstein	15 000	33.3	20 000	0.0	20 000	10.0	22 000	..	..
Lithuania	250 000	100.0	500 000	39.1	695 700	39.1	968 000	26.2	1 221 749
Luxembourg	160 000	3.1	165 000	3.0	170 000	59.3	270 810	16.3	315 000
Malta	70 000	14.9	80 410	19.4	96 022	16.3	111 634	14.0	127 247
Netherlands	7 900 000	3.8	8 200 000	3.7	8 500 000	17.6	10 000 000	20.6	12 060 000
Norway	1 319 400	6.0	1 398 600	13.2	1 583 300	13.2	1 792 000	89.7	3 400 000
Poland	3 800 000	133.7	8 880 000	1.0	8 970 000	0.3	9 000 000	11.1	10 000 000
Portugal	1 860 400	21.9	2 267 200	17.9	2 674 000	10.4	2 951 000	-0.4	2 939 000
San Marino	13 850	3.5	14 340	1.0	14 481	3.6	15 000	..	..
Slovakia	674 039	28.0	862 833	59.5	1 375 809	65.4	2 276 055	9.8	2 500 000

Table 1.16 (Continued)

	2001	% change 2001– 2002	2002	% change 2002– 2003	2003	% change 2003– 2004	2004	% change 2004– 2005	2005
Slovenia	600 000	25.0	750 000	6.7	800 000	18.8	950 000	14.7	1 090 000
Spain	7 388 000	6.3	7 856 000	24.6	9 789 000	46.4	14 332 800	5.5	15 119 000
Sweden	4 600 000	11.4	5 125 000	10.3	5 655 000	20.2	6 800 000	1.3	6 890 000
Switzerland	2 800 000	7.1	3 000 000	13.3	3 400 000	2.9	3 500 000	5.7	3 700 000
United Kingdom	19 800 000	26.3	25 000 000	4.1	26 025 000	8.0	28 094 000	1.5	28 515 000
<b>NORTH AMERICA</b>									
Canada <sup>a</sup>	14 000 000	8.6	15 200 000	15.8	17 600 000	13.6	20 000 000	0.0	20 000 000
United States (incl. Puerto Rico and Guam)	143 463 008	11.3	159 727 000	1.7	162 459 400	14.4	185 931 000	..	..
<b>OCEANIA</b>									
Australia	7 700 000	36.4	10 500 000	7.6	11 300 000	15.0	13 000 000	9.2	14 190 000
New Zealand	1 762 000	8.3	1 908 000	10.6	2 110 000	11.4	2 350 000	17.2	2 754 000
<b>DEVELOPING ECONOMIES</b>									
<b>AFRICA</b>									
Algeria	200 000	150.0	500 000	30.0	650 000	130.8	1 500 000	28.0	1 920 000
Angola	20 000	105.0	41 000	104.9	84 000	104.8	172 000	2.3	176 000
Benin	25 000	100.0	50 000	40.0	70 000	42.9	100 000	325.0	425 000
Botswana	50 000	20.0	60 000	0.0	60 000	0.0	60 000	0.0	60 000
Burkina Faso	19 000	31.6	25 000	92.0	48 000	10.8	53 200	21.4	64 600
Burundi	7 000	14.3	8 000	75.0	14 000	78.6	25 000	60.0	40 000
Cameroon	45 000	33.3	60 000	66.7	100 000	70.0	170 000	47.1	250 000
Cape Verde	12 000	33.3	16 000	25.0	20 000	25.0	25 000	0.0	25 000
Central African Rep.	3 000	66.7	5 000	20.0	6 000	50.0	9 000	22.2	11 000
Chad	4 000	275.0	15 000	100.0	30 000	16.7	35 000	14.3	40 000
Comoros	2 500	28.0	3 200	56.3	5 000	60.0	8 000	150.0	20 000
Congo	1 000	400.0	5 000	200.0	15 000	140.0	36 000	38.9	50 000
Côte d'Ivoire	70 000	28.6	90 000	55.6	140 000	14.3	160 000	25.0	200 000
Democratic Republic of the Congo	6 000	733.3	50 000	..	..	..	112 500	25.0	140 625
Djibouti	3 300	36.4	4 500	44.4	6 500	38.5	9 000	11.1	10 000
Egypt	600 000	216.7	1 900 000	57.9	3 000 000	30.0	3 900 000	28.2	5 000 000
Equatorial Guinea	900	100.0	1 800	66.7	3 000	66.7	5 000	40.0	7 000
Eritrea	6 000	50.0	9 000	5.6	9 500	426.3	50 000	40.0	70 000
Ethiopia	25 000	100.0	50 000	50.0	75 000	50.7	113 000	45.1	164 000
Gabon	17 000	47.1	25 000	40.0	35 000	14.3	40 000	67.5	67 000
Gambia	18 000	38.9	25 000	40.0	35 000	40.0	49 000	..	..
Ghana	40 000	325.0	170 000	47.1	250 000	47.2	368 000	9.1	401 310
Guinea-Bissau	4 000	250.0	14 000	35.7	19 000	36.8	26 000	19.2	31 000
Kenya	200 000	100.0	400 000	150.0	1 000 000	5.5	1 054 920	5.3	1 111 000

Table 1.16 (Continued)

	2001	% change 2001– 2002	2002	% change 2002– 2003	2003	% change 2003– 2004	2004	% change 2004– 2005	2005
Lesotho	5 000	320.0	21 000	42.9	30 000	43.3	43 000	..	..
Liberia	1 000	..	..	..	..	..	..	..	..
Libyan Arab Jamahiriya	20 000	525.0	125 000	28.0	160 000	28.1	205 000	..	..
Madagascar	35 000	57.1	55 000	28.2	70 500	27.7	90 000	11.1	100 000
Malawi	20 000	35.0	27 000	33.3	36 000	28.2	46 140	13.8	52 500
Mali	20 000	25.0	25 000	40.0	35 000	42.9	50 000	20.0	60 000
Mauritania	7 000	42.9	10 000	20.0	12 000	16.7	14 000	42.9	20 000
Mauritius	106 000	17.9	125 000	20.0	150 000	20.0	180 000	..	..
Mayotte	..	..	..	..	..	..	..	..	..
Morocco	400 000	75.0	700 000	42.9	1 000 000	250.0	3 500 000	31.4	4 600 000
Mozambique	30 000	66.7	50 000	66.0	83 000	66.3	138 000	..	..
Namibia	45 000	11.1	50 000	30.0	65 000	15.4	75 000	..	..
Niger	12 000	25.0	15 000	26.7	19 000	26.3	24 000	20.8	29 000
Nigeria	115 000	265.2	420 000	78.6	750 000	136.0	1 769 661	182.5	5 000 000
Reunion	120 000	25.0	150 000	20.0	180 000	11.1	200 000	10.0	220 000
Rwanda	20 000	25.0	25 000	24.0	31 000	22.6	38 000	31.6	50 000
Sao Tome and Principe	9 000	22.2	11 000	36.4	15 000	33.3	20 000	..	..
Senegal	100 000	5.0	105 000	114.3	225 000	114.2	482 000	12.0	540 000
Seychelles	9 000	30.4	11 736	2.2	12 000	66.7	20 000	5.0	21 000
Sierra Leone	7 000	14.3	8 000	12.5	9 000	11.1	10 000	..	..
Somalia	85 000	1.2	86 000	4.7	90 000	..	..	..	90 000
South Africa	2 890 000	7.3	3 100 000	7.3	3 325 000	7.2	3 566 000	43.0	5 100 000
Sudan	150 000	100.0	300 000	212.3	937 000	21.7	1 140 000	145.6	2 800 000
Swaziland	14 000	42.9	20 000	35.0	27 000	33.3	36 000	..	..
Syrian Arab Republic	60 000	508.3	365 000	67.1	610 000	31.1	800 000	37.5	1 100 000
Togo	150 000	33.3	200 000	5.0	210 000	5.2	221 000	..	300 000
Tunisia	410 000	23.3	505 500	24.6	630 000	32.5	835 000	14.2	953 770
Uganda	60 000	66.7	100 000	25.0	125 000	60.0	200 000	150.0	500 000
United Republic of Tanzania	60 000	33.3	80 000	212.5	250 000	33.2	333 000	..	..
Zambia	25 000	109.7	52 420	109.8	110 000	110.0	231 000	..	..
Zimbabwe	100 000	400.0	500 000	60.0	800 000	2.5	820 000	22.0	1 000 000
<b>ASIA</b>									
Afghanistan	..	..	1 000	1900.0	20 000	25.0	25 000	20.0	30 000
Bahrain	100 000	22.8	122 794	22.2	150 000	1.8	152 721	1.5	155 000
Bangladesh	186 000	9.7	204 000	19.1	243 000	23.5	300 000	23.3	370 000
Bhutan	5 000	100.0	10 000	50.0	15 000	33.3	20 000	25.0	25 000
Brunei Darussalam	35 000	..	..	..	48 000	16.7	56 000	16.1	65 000
Cambodia	10 000	200.0	30 000	16.7	35 000	17.1	41 000	..	..
China	33 700 000	75.4	59 100 000	34.5	79 500 000	18.2	94 000 000	18.1	111 000 000

Table 1.16 (Continued)

	2001	% change 2001– 2002	2002	% change 2002– 2003	2003	% change 2003– 2004	2004	% change 2004– 2005	2005
Dem. People's Rep. of Korea	..	..	..	..	..	..	..	..	..
Hong Kong (China)	2 601 300	12.2	2 918 800	10.1	3 212 800	8.3	3 479 700	1.3	3 526 200
India	7 000 000	136.9	16 580 000	11.5	18 481 044	89.4	35 000 000	71.4	60 000 000
Indonesia	4 200 000	7.1	4 500 000	79.6	8 080 000	38.9	11 226 143	42.5	16 000 000
Iran (Islamic Rep. of)	1 005 000	215.2	3 168 000	51.5	4 800 000	14.6	5 500 000	27.3	7 000 000
Iraq	12 500	100.0	25 000	20.0	30 000	20.0	36 000	..	..
Jordan	234 000	31.4	307 469	44.4	444 000	41.8	629 524	..	..
Kuwait	200 000	25.0	250 000	126.8	567 000	5.8	600 000	16.7	700 000
Lao PDR	10 000	50.0	15 000	26.7	19 000	10.0	20 900	23.9	25 900
Lebanon	260 000	53.8	400 000	25.0	500 000	20.0	600 000	16.7	700 000
Macao (China)	101 000	13.9	115 000	4.3	120 000	25.0	150 000	13.3	170 000
Malaysia	6 346 650	23.6	7 842 000	10.2	8 643 000	14.3	9 879 000	11.5	11 016 000
Maldives	10 000	50.0	15 000	13.3	17 000	11.8	19 000	..	..
Mongolia	40 000	25.0	50 000	185.6	142 800	40.1	200 000	34.2	268 300
Myanmar	10 000	150.0	25 000	12.0	28 002	127.4	63 688	22.5	78 010
Nepal	60 000	33.3	80 000	25.0	100 000	20.0	120 000	-6.3	112 500
Oman	120 000	50.0	180 000	16.7	210 000	16.7	245 000	16.3	285 000
Pakistan	500 000	100.0	1 000 000	700.0	8 000 000	25.0	10 000 000	5.0	10 500 000
Palestine	60 000	75.0	105 000	38.1	145 000	10.3	160 000	51.9	243 000
Philippines	2 000 000	75.0	3 500 000	14.3	4 000 000	10.0	4 400 000	..	..
Qatar	40 000	75.0	70 000	101.1	140 760	17.2	165 000	32.7	219 000
Rep. of Korea	24 380 000	7.8	26 270 000	11.2	29 220 000	8.1	31 580 000	4.5	33 010 000
Saudi Arabia	1 016 208	39.6	1 418 880	5.7	1 500 000	5.7	1 586 000	..	..
Singapore	1 700 000	23.5	2 100 000	1.7	2 135 034	13.4	2 421 782	..	..
Sri Lanka	150 000	33.3	200 000	25.0	250 000	12.0	280 000	..	..
Taiwan Province of China	7 820 000	37.1	10 720 000	9.5	11 740 000	4.0	12 210 000	8.2	13 210 000
Thailand	3 536 019	35.7	4 800 000	25.6	6 030 000	15.6	6 971 500	1.6	7 084 200
Turkey	3 500 000	22.9	4 300 000	39.5	6 000 000	70.3	10 220 000	56.6	16 000 000
United Arab Emirates	976 000	20.4	1 175 516	-5.6	1 110 207	11.6	1 238 464	12.8	1 397 207
Viet Nam	1 009 544	48.6	1 500 000	106.5	3 098 007	104.8	6 345 049	68.8	10 710 980
Yemen	17 000	488.2	100 000	20.0	120 000	50.0	180 000	..	..
<b>LATIN AMERICA AND THE CARIBBEAN</b>									
Antigua and Barbuda	7 000	42.9	10 000	40.0	14 000	42.9	20 000	45.0	29 000
Argentina	3 650 000	12.3	4 100 000	10.5	4 530 000	35.8	6 153 603	11.5	6 863 466
Aruba	24 000	..	..	..	..	..	..	..	..
Bahamas	16 923	254.5	60 000	40.0	84 000	10.7	93 000	10.8	103 000
Barbados	15 000	100.0	30 000	233.3	100 000	50.0	150 000	6.7	160 000

Table 1.16 (Continued)

	2001	% change 2001– 2002	2002	% change 2002– 2003	2003	% change 2003– 2004	2004	% change 2004– 2005	2005
Belize	18 000	38.9	25 000	20.0	30 000	16.7	35 000	8.6	38 000
Bermuda	30 000	..	..	..	36 000	8.3	39 000	7.7	42 000
Bolivia	180 000	50.0	270 000	14.8	310 000	29.0	400 000	20.0	480 000
Brazil	8 000 000	78.8	14 300 000	25.9	18 000 000	22.2	22 000 000	65.3	36 356 000
Cayman Islands	..	..	..	..	..	..	..	..	..
Chile	3 102 200	15.2	3 575 000	11.9	4 000 000	7.5	4 300 000	..	..
Colombia	1 154 000	73.3	2 000 113	36.6	2 732 201	41.5	3 865 860	22.6	4 738 544
Costa Rica	384 000	112.4	815 745	10.3	900 000	11.1	1 000 000	10.0	1 100 000
Cuba	120 000	33.3	160 000	-38.8	98 000	53.1	150 000	26.7	190 000
Dominica	9 000	38.9	12 500	36.0	17 000	20.6	20 500	26.8	26 000
Dominican Rep.	397 333	25.8	500 000	30.0	650 000	23.1	800 000	87.5	1 500 000
Ecuador	333 000	61.5	537 881	5.9	569 727	9.6	624 579	-1.4	615 954
El Salvador	150 000	100.0	300 000	83.3	550 000	6.8	587 475	8.4	637 050
French Guiana	20 000	25.0	25 000	24.0	31 000	22.6	38 000	10.5	42 000
Grenada	5 200	188.5	15 000	26.7	19 000	..	8 000	..	..
Guadeloupe	40 000	25.0	50 000	26.0	63 000	25.4	79 000	7.6	85 000
Guatemala	200 000	100.0	400 000	37.5	550 000	38.2	760 000	31.6	1 000 000
Guyana	100 000	25.0	125 000	12.0	140 000	3.6	145 000	10.3	160 000
Haiti	30 000	166.7	80 000	87.5	150 000	233.3	500 000	20.0	600 000
Honduras	90 000	87.3	168 560	10.1	185 510	21.3	225 000	15.6	260 000
Jamaica	100 000	500.0	600 000	33.3	800 000	33.4	1 067 000	..	..
Martinique	40 000	50.0	60 000	33.3	80 000	37.5	110 000	18.2	130 000
Mexico	7 410 124	45.3	10 764 715	13.5	12 218 830	14.9	14 036 475	32.7	18 622 509
Netherlands Antilles	..	..	..	..	..	..	..	..	..
Nicaragua	75 000	20.0	90 000	11.1	100 000	25.0	125 000	12.0	140 000
Panama	121 425	19.4	144 963	19.4	173 085	13.6	196 548	4.9	206 178
Paraguay	60 000	66.7	100 000	20.0	120 000	66.7	200 000	0.0	200 000
Peru	2 000 000	20.0	2 400 000	18.8	2 850 000	13.0	3 220 000	42.9	4 600 000
Saint Kitts and Nevis	3 600	177.8	10 000	..	..	..	..	..	..
Saint Lucia	13 000	..	..	..	34 000	61.8	55 000	..	..
St. Vincent and the Grenadines	5 500	9.1	6 000	16.7	7 000	14.3	8 000	25.0	10 000
Suriname	14 520	37.7	20 000	15.0	23 000	30.4	30 000	6.7	32 000
Trinidad and Tobago	120 000	15.0	138 000	10.9	153 000	4.6	160 000	..	..
Uruguay	370 000	2.7	380 000	39.5	530 000	7.0	567 175	17.8	668 000
Venezuela	1 153 000	7.9	1 244 000	55.5	1 935 000	14.1	2 207 000	50.1	3 313 000
Virgin Islands (US)	20 000	50.0	30 000	..	..	..	..	..	..
OCEANIA									
American Samoa	..	..	..	..	..	..	..	..	..

Table 1.16 (Continued)

	2001	% change 2001– 2002	2002	% change 2002– 2003	2003	% change 2003– 2004	2004	% change 2004– 2005	2005
Fiji	15 000	233.3	50 000	10.0	55 000	10.9	61 000	6.6	65 000
French Polynesia	15 000	33.3	20 000	75.0	35 000	28.6	45 000	22.2	55 000
Kiribati	2 000	0.0	2 000	0.0	2 000	0.0	2 000	0.0	2 000
Marshall Islands	0 900	38.9	1 250	12.0	1 400	42.9	2 000	10.0	2 200
Micronesia (Fed. States of)	5 000	20.0	6 000	66.7	10 000	20.0	12 000	16.7	14 000
Nauru	300	..	..	..	..	..	..	..	..
New Caledonia	40 000	25.0	50 000	20.0	60 000	16.7	70 000	8.6	76 000
Northern Mariana Islands	..	..	..	..	..	..	..	..	..
Palau	..	..	4 000	..	..	..	..	..	..
Papua New Guinea	50 000	50.0	75 000	50.7	113 000	6.2	120 000	12.5	135 000
Samoa	3 000	33.3	4 000	25.0	5 000	10.0	5 500	9.1	6 000
Solomon Islands	2 000	10.0	2 200	13.6	2 500	20.0	3 000	33.3	4 000
Tonga	2 800	3.6	2 900	3.4	3 000	0.0	3 000	0.0	3 000
Tuvalu	1 000	25.0	1 250	44.0	1 800	66.7	3 000	..	..
Vanuatu	5 500	27.3	7 000	7.1	7 500	0.0	7 500	6.7	8 000
TRANSITION ECONOMIES									
SOUTH-EAST EUROPE AND CIS									
Albania	10 000	20.0	12 000	150.0	30 000	150.0	75 000	150.7	188 000
Armenia	50 000	20.0	60 000	133.3	140 000	7.1	150 000	7.3	161 000
Azerbaijan	25 000	1100.0	300 000	16.7	350 000	16.6	408 000	66.4	678 800
Belarus	430 263	87.9	808 481	72.2	1 391 903	76.8	2 461 093	37.9	3 394 421
Bosnia and Herzegovina	45 000	122.2	100 000	50.0	150 000	50.0	225 000	258.4	806 421
Bulgaria	605 000	4.1	630 000	..	..	..	1 234 000	29.0	1 591 705
Croatia	518 000	52.3	789 000	28.5	1 014 000	30.9	1 327 700	9.3	1 451 100
Georgia	46 500	58.1	73 500	59.2	117 020	50.1	175 600	..	..
Kazakhstan	150 000	66.7	250 000	20.0	300 000	33.3	400 000	..	..
Kyrgyzstan	150 600	0.9	152 000	31.6	200 000	31.5	263 000	6.5	280 000
Rep. of Moldova	60 000	150.0	150 000	92.0	288 000	41.0	406 000	..	..
Romania	1 000 000	120.0	2 200 000	81.8	4 000 000	12.5	4 500 000	..	..
Russian Federation	4 300 000	39.5	6 000 000	100.0	12 000 000	54.2	18 500 000	17.8	21 800 000
Serbia and Montenegro	600 000	6.7	640 000	32.3	847 000	79.1	1 517 015	..	..
Tajikistan	3 200	9.4	3 500	17.7	4 120	21.4	5 000	..	..
TFYR Macedonia	70 000	42.9	100 000	26.0	126 000	26.2	159 000	0.6	159 889
Turkmenistan	8 000	..	..	..	20 000	80.0	36 000	..	..
Ukraine	600 000	50.0	900 000	177.8	2 500 000	50.0	3 750 000	21.6	4 560 000
Uzbekistan	150 000	83.3	275 000	78.9	492 000	78.9	880 000	..	..

Notes: \* The value for Internet users in Canada in 2005 is assumed.

Source: UNCTAD calculations based on the ITU World Telecommunication Indicators Database, 2006.



## Annex I

### Statistical Annex

#### Table 1.17

### Internet penetration: Economies by level of development and by region

Internet users per 100 inhabitants

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
DEVELOPED ECONOMIES									
ASIA									
Israel	29.0	8.8	31.5	22.5	38.6	25.6	48.5	..	..
Japan	38.4	20.9	46.4	3.9	48.3	3.9	50.2	32.8	66.6
EUROPE									
Andorra	..	..	..	..	15.1	9.0	16.4	98.6	32.6
Austria	38.8	5.8	41.1	11.4	45.8	4.3	47.7	2.3	48.8
Belgium	31.0	6.0	32.8	17.4	38.5	4.8	40.4	14.1	46.1
Cyprus	18.8	38.3	26.0	17.6	30.6	17.8	36.1	8.2	39.0
Czech Republic	14.6	73.5	25.4	19.3	30.3	-16.8	25.2	7.2	27.0
Denmark (incl. Faroe Islands)	42.9	3.7	44.5	3.5	46.1	9.5	50.5	4.4	52.7
Estonia	31.7	4.0	32.9	35.9	44.7	12.2	50.2	3.4	51.9
Finland	43.1	12.8	48.6	0.9	49.0	4.4	51.2	4.2	53.3
France	26.3	14.9	30.2	20.0	36.3	8.6	39.4	9.8	43.2
Germany	31.5	7.6	33.9	17.7	40.0	6.6	42.6	6.5	45.4
Gibraltar	22.3	..	..	..	..	..	22.6	..	..
Greece	8.3	61.8	13.4	15.4	15.5	13.5	17.6	2.2	18.0
Greenland	35.5	24.7	44.3	23.7	54.8	22.2	66.9	..	..
Guernsey	38.9	19.5	46.4	9.6	50.9	8.7	55.4	8.0	59.8
Hungary	14.5	8.4	15.7	50.4	23.6	12.8	26.7	11.4	29.7
Iceland	60.6	7.5	65.1	3.5	67.4	14.7	77.3	13.3	87.6
Ireland	23.2	20.9	28.0	12.2	31.4	-6.6	29.4	-5.9	27.6
Italy	27.0	26.7	34.2	15.4	39.5	18.6	46.8	2.9	48.2
Jersey	..	..	..	..	22.8	34.8	30.8	..	..
Latvia	7.2	83.5	13.2	..	..	..	34.9	27.8	44.6
Liechtenstein	45.2	32.0	59.6	-1.0	59.0	9.0	64.3	..	..
Lithuania	7.2	100.8	14.4	39.6	20.1	39.6	28.1	26.7	35.6
Luxembourg	36.3	1.8	36.9	1.7	37.5	57.3	59.0	14.8	67.8
Malta	17.8	14.3	20.3	18.8	24.1	15.7	27.9	13.5	31.7
Netherlands	31.6	1.6	32.1	1.5	32.6	15.3	37.6	18.2	44.4
Norway	29.1	5.4	30.7	12.6	34.6	12.6	39.0	88.8	73.6
Poland	9.8	133.8	23.0	1.1	23.2	0.4	23.3	11.2	26.0

Table 1.17 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Portugal	18.1	21.2	21.9	17.3	25.7	9.8	28.3	-0.9	28.0
San Marino	50.9	2.6	52.3	0.1	52.4	2.7	53.8	..	..
Slovakia	12.5	28.0	16.0	59.5	25.5	65.5	42.1	9.9	46.3
Slovenia	30.5	25.0	38.1	6.7	40.7	18.7	48.3	14.8	55.4
Spain	18.0	5.1	18.9	23.0	23.2	44.7	33.6	4.5	35.1
Sweden	51.7	11.0	57.4	9.9	63.0	19.7	75.5	0.9	76.2
Switzerland	38.9	6.9	41.6	13.1	47.1	2.7	48.3	5.5	51.0
United Kingdom	33.6	25.8	42.3	3.7	43.9	7.6	47.2	1.2	47.8
<b>NORTH AMERICA</b>									
Canada <sup>a</sup>	45.2	7.5	48.5	14.6	55.6	12.5	62.6	0.0	62.6
United States (incl. Puerto Rico and Guam)	49.3	10.3	54.4	0.7	54.8	13.4	62.1	..	..
<b>OCEANIA</b>									
Australia	39.9	34.8	53.8	6.4	57.3	13.8	65.2	8.0	70.4
New Zealand	45.7	7.1	48.9	9.3	53.5	10.2	58.9	16.1	68.4
<b>DEVELOPING ECONOMIES</b>									
<b>AFRICA</b>									
Algeria	0.6	146.3	1.6	28.0	2.0	127.3	4.6	26.1	5.8
Angola	0.1	99.3	0.3	99.0	0.6	98.9	1.1	-0.6	1.1
Benin	0.3	93.7	0.7	35.5	0.9	38.3	1.2	311.8	5.0
Botswana	2.8	19.6	3.4	-0.0	3.4	0.1	3.4	0.2	3.4
Burkina Faso	0.2	27.4	0.2	85.9	0.4	7.3	0.4	17.7	0.5
Burundi	0.1	11.2	0.1	69.6	0.2	72.6	0.3	54.4	0.5
Cameroon	0.3	30.8	0.4	63.6	0.6	66.9	1.1	44.5	1.5
Cape Verde	2.6	30.2	3.4	22.1	4.1	22.1	5.0	-2.3	4.9
Central African Rep.	0.1	64.4	0.1	18.5	0.2	48.1	0.2	20.7	0.3
Chad	0.0	261.8	0.2	93.0	0.3	12.8	0.4	10.8	0.4
Comoros	0.3	24.6	0.4	52.2	0.7	55.9	1.0	143.5	2.5
Congo	0.0	384.9	0.1	191.1	0.4	133.0	0.9	34.9	1.3
Côte d'Ivoire	0.4	26.5	0.5	53.2	0.8	12.6	0.9	23.1	1.1
Democratic Republic of the Congo	0.0	711.2	0.1	..	..	..	0.2	21.3	0.2
Djibouti	0.5	33.3	0.6	41.6	0.8	35.9	1.2	9.2	1.3
Egypt	0.9	210.6	2.7	54.9	4.2	27.5	5.4	25.8	6.8
Equatorial Guinea	0.2	95.4	0.4	62.9	0.6	62.9	1.0	36.9	1.4
Eritrea	0.2	43.5	0.2	0.9	0.2	404.2	1.2	34.6	1.6
Ethiopia	0.0	95.1	0.1	46.4	0.1	47.1	0.1	41.7	0.2

Table 1.17 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Gabon	1.3	44.5	1.9	37.8	2.6	12.5	2.9	64.9	4.8
Gambia	1.3	34.8	1.8	36.1	2.4	36.2	3.3	..	..
Ghana	0.2	315.8	0.8	43.9	1.2	44.1	1.7	6.8	1.8
Guinea	0.2	128.3	0.4	11.8	0.4	12.5	0.5	6.4	0.5
Guinea-Bissau	0.3	239.6	1.0	31.6	1.3	32.8	1.7	15.7	2.0
Kenya	0.6	95.8	1.2	144.7	3.1	3.2	3.2	2.9	3.2
Lesotho	0.3	319.1	1.2	42.8	1.7	43.5	2.4	..	..
Liberia	0.0	..	..	..	..	..	..	..	..
Libyan Arab Jamahiriya	0.4	512.8	2.3	25.5	2.8	25.6	3.6	..	..
Madagascar	0.2	52.8	0.3	24.7	0.4	24.2	0.5	8.2	0.5
Malawi	0.2	31.9	0.2	30.4	0.3	25.4	0.4	11.3	0.4
Mali	0.2	21.3	0.2	35.8	0.3	38.6	0.4	16.5	0.4
Mauritania	0.3	38.6	0.4	16.4	0.4	13.2	0.5	38.7	0.7
Mauritius	8.9	16.8	10.3	18.8	12.3	18.9	14.6	..	..
Mayotte	..	..	..	..	..	..	..	..	..
Morocco	1.3	72.1	2.2	40.5	3.2	244.4	10.9	29.4	14.1
Mozambique	0.1	64.2	0.2	63.6	0.3	63.8	0.4	..	..
Namibia	0.1	9.8	0.1	28.5	0.1	14.1	0.1	..	..
Niger	0.1	20.8	0.1	22.4	0.1	22.1	0.2	16.9	0.2
Nigeria	0.1	257.0	0.3	74.6	0.6	130.8	1.4	176.5	3.8
Reunion	16.3	22.9	20.0	18.1	23.6	9.4	25.9	8.4	28.0
Rwanda	0.2	21.6	0.3	22.0	0.4	20.9	0.4	29.3	0.6
Sao Tome and Principe	6.3	19.5	7.5	33.2	10.0	30.3	13.1	..	..
Senegal	0.9	2.5	1.0	109.2	2.0	109.2	4.2	9.4	4.6
Seychelles	11.6	29.3	15.0	1.3	15.2	65.1	25.0	4.0	26.0
Sierra Leone	0.1	9.4	0.2	7.5	0.2	6.6	0.2	..	..
Somalia	1.2	-2.0	1.2	1.3	1.2	..	..	..	1.1
South Africa	6.3	6.3	6.7	6.4	7.1	6.6	7.6	42.3	10.8
Sudan	0.4	96.2	0.9	206.6	2.7	19.4	3.2	140.8	7.7
Swaziland	1.4	42.3	1.9	34.8	2.6	33.4	3.5	..	..
Syrian Arab Republic	0.3	493.2	2.1	63.0	3.4	27.9	4.3	34.2	5.8
Togo	2.7	29.7	3.5	2.3	3.6	2.6	3.7	32.3	4.9
Tunisia	4.2	21.9	5.2	23.3	6.4	31.1	8.4	13.0	9.4
Uganda	0.2	61.2	0.4	20.8	0.5	54.5	0.7	141.4	1.7
United Republic of Tanzania	0.2	30.7	0.2	206.5	0.7	30.7	0.9	..	..
Zambia	0.2	106.0	0.5	106.3	1.0	106.6	2.0	..	..
Zimbabwe	0.8	396.6	3.9	59.0	6.2	1.9	6.3	21.3	7.7

Table 1.17 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Afghanistan	..	..	0.0	1803.1	0.1	19.1	0.1	14.8	0.1
Bahrain	14.6	20.8	17.6	20.4	21.3	0.4	21.3	-0.0	21.3
Bangladesh	0.1	7.6	0.2	16.9	0.2	21.2	0.2	21.1	0.3
Bhutan	0.3	95.7	0.5	46.8	0.7	30.5	0.9	22.3	1.2
Brunei Darussalam	10.3	..	..	..	13.4	14.1	15.3	13.5	17.4
Cambodia	0.1	194.1	0.2	14.4	0.3	14.9	0.3	..	..
China	2.7	74.2	4.7	33.7	6.2	17.5	7.3	17.4	8.6
Dem. People's Rep. of Korea	..	..	..	..	..	..	..	..	..
Hong Kong (China)	38.7	10.9	42.9	8.8	46.7	7.1	50.0	0.2	50.1
India	0.7	133.1	1.6	9.8	1.7	86.5	3.2	68.9	5.4
Indonesia	2.0	5.8	2.1	77.3	3.7	37.2	5.1	40.8	7.2
Iran (Islamic Rep. of)	1.5	212.5	4.7	50.2	7.0	13.5	8.0	26.0	10.1
Iraq	0.0	94.4	0.1	16.7	0.1	16.8	0.1	..	..
Jordan	4.6	27.7	5.8	40.4	8.2	38.0	11.3	..	..
Kuwait	8.5	20.0	10.3	119.0	22.5	2.5	23.0	13.2	26.1
Lao PDR	0.2	46.5	0.3	23.8	0.3	7.5	0.4	21.2	0.4
Lebanon	7.6	52.3	11.5	23.7	14.3	18.8	16.9	15.5	19.6
Macao (China)	22.6	13.0	25.5	3.6	26.4	24.2	32.8	12.6	36.9
Malaysia	27.0	21.1	32.7	8.1	35.4	12.2	39.7	9.5	43.5
Maldives	3.4	46.2	4.9	10.5	5.4	9.0	5.9	..	..
Mongolia	1.5	23.2	1.9	183.7	5.3	38.1	7.3	31.9	9.6
Myanmar	0.1	144.9	0.1	9.8	0.1	123.1	0.3	20.2	0.4
Nepal	0.2	30.3	0.3	22.2	0.4	17.3	0.4	-8.3	0.4
Oman	4.9	48.7	7.2	15.8	8.4	15.6	9.7	14.8	11.1
Pakistan	0.3	95.9	0.7	684.3	5.3	22.6	6.5	2.9	6.6
Palestine	1.8	69.4	3.1	33.8	4.2	6.9	4.5	47.1	6.6
Philippines	2.6	71.7	4.4	12.2	5.0	8.0	5.4	..	..
Qatar	6.2	63.8	10.2	88.2	19.2	10.6	21.2	26.9	26.9
Rep. of Korea	51.8	7.2	55.6	10.8	61.6	7.7	66.3	4.2	69.0
Saudi Arabia	4.6	35.8	6.2	2.9	6.4	3.0	6.6	..	..
Singapore	41.5	21.6	50.4	0.3	50.6	12.0	56.7	..	..
Sri Lanka	0.7	32.1	1.0	23.9	1.2	11.0	1.4	..	..
Taiwan Province of China	35.0	36.3	47.7	9.0	52.0	3.6	53.9	7.8	58.1
Thailand	5.7	34.5	7.7	24.5	9.5	14.6	10.9	0.8	11.0
Turkey	5.1	21.1	6.1	37.6	8.4	68.1	14.2	54.5	21.9
United Arab Emirates	28.0	11.8	31.3	-91.3	2.7	957.4	28.9	7.5	31.1

Table 1.17 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Viet Nam	1.3	46.5	1.9	103.7	3.8	102.0	7.6	66.6	12.7
Yemen	0.1	470.1	0.5	16.3	0.6	45.4	0.9	..	..
LATIN AMERICA AND THE CARIBBEAN									
Antigua and Barbuda	9.0	41.0	12.7	38.3	17.6	41.2	24.8	43.3	35.6
Argentina	9.8	11.2	10.9	9.4	11.9	34.5	16.0	10.5	17.7
Aruba	25.6	..	..	..	..	..	..	..	..
Bahamas	5.5	249.6	19.3	38.1	26.7	9.2	29.2	9.3	31.9
Barbados	5.6	99.5	11.2	232.5	37.3	49.6	55.8	6.4	59.4
Belize	7.3	35.9	9.9	17.5	11.6	14.3	13.2	6.4	14.1
Bermuda	47.5	..	..	..	56.5	7.9	61.0	7.3	65.4
Bolivia	2.1	47.0	3.1	12.6	3.5	26.5	4.4	17.7	5.2
Brazil	4.5	76.2	8.0	24.1	9.9	20.6	12.0	63.0	19.5
Cayman Islands	..	..	..	..	..	..	..	..	..
Chile	19.9	13.9	22.7	10.7	25.1	6.3	26.7	..	..
Colombia	2.7	70.5	4.6	34.5	6.2	39.3	8.6	20.7	10.4
Costa Rica	9.6	108.2	19.9	8.2	21.5	9.1	23.5	8.1	25.4
Cuba	1.1	33.0	1.4	-38.9	.9	52.7	1.3	26.4	1.7
Dominica	11.5	38.6	16.0	35.8	21.7	20.3	26.1	26.2	32.9
Dominican Rep.	4.7	24.0	5.9	28.1	7.5	21.3	9.1	84.8	16.9
Ecuador	2.7	59.2	4.2	4.4	4.4	8.1	4.8	-2.8	4.7
El Salvador	2.3	96.3	4.6	80.0	8.3	4.9	8.7	6.6	9.3
French Guiana	11.8	21.7	14.4	20.9	17.4	19.6	20.8	7.9	22.5
Grenada	5.1	188.3	14.7	26.5	18.6	-58.0	7.8	..	..
Guadeloupe	9.2	23.9	11.4	24.9	14.3	24.4	17.8	6.8	19.0
Guatemala	1.7	95.3	3.4	34.2	4.6	34.9	6.2	28.4	7.9
Guyana	13.4	24.7	16.7	11.8	18.7	3.4	19.3	10.2	21.3
Haiti	0.4	162.9	1.0	84.8	1.8	228.6	5.9	18.3	7.0
Honduras	1.4	83.0	2.5	7.6	2.7	18.6	3.2	13.0	3.6
Jamaica	3.8	496.8	22.9	32.7	30.5	32.8	40.4	..	..
Martinique	10.3	49.2	15.4	32.6	20.4	36.8	27.9	17.7	32.8
Mexico	7.3	43.3	10.5	12.0	11.7	13.4	13.3	31.0	17.4
Netherlands Antilles	..	..	..	..	..	..	..	..	..
Nicaragua	1.5	17.6	1.7	8.9	1.9	22.5	2.3	9.7	2.6
Panama	4.0	17.2	4.7	17.2	5.5	11.5	6.2	3.1	6.4
Paraguay	1.1	62.7	1.7	17.2	2.0	62.8	3.3	-2.3	3.2
Peru	7.6	18.2	9.0	17.0	10.5	11.3	11.7	40.8	16.4
Saint Kitts and Nevis	8.8	175.0	24.3	..	..	..	..	..	..

Table 1.17 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Saint Lucia	8.4	..	..	..	21.5	60.5	34.5	..	..
Saint Vincent and the Grenadines	4.7	8.5	5.1	16.0	5.9	13.7	6.8	24.3	8.4
Suriname	3.3	36.7	4.5	14.2	5.2	29.6	6.7	6.0	7.1
Trinidad and Tobago	9.3	14.6	10.7	10.5	11.8	4.3	12.3	..	..
Uruguay	11.0	2.0	11.2	38.5	15.5	6.3	16.5	17.0	19.3
Venezuela	4.6	5.9	4.9	52.7	7.5	12.0	8.4	47.5	12.4
Virgin Islands (US)	18.0	49.7	26.9	..	..	..	..	..	..
OCEANIA									
American Samoa	..	..	..	..	..	..	..	..	..
Fiji	1.8	230.2	6.1	9.0	6.6	10.0	7.3	5.7	7.7
French Polynesia	6.2	31.1	8.2	72.1	14.1	26.5	17.8	20.4	21.4
Kiribati	2.2	-2.1	2.1	-2.0	2.1	-2.0	2.1	-2.0	2.0
Marshall Islands	1.7	34.3	2.3	7.8	2.4	37.4	3.3	6.0	3.6
Micronesia (Fed. States of)	4.7	19.3	5.6	65.4	9.2	19.1	10.9	15.8	12.7
Nauru	0.0	..	..	..	..	..	..	..	..
New Caledonia	18.4	22.6	22.6	17.7	26.6	14.5	30.4	5.4	32.1
Northern Mariana Islands	..	..	..	..	..	..	..	..	..
Palau	..	..	20.3	..	..	..	..	..	..
Papua New Guinea	0.9	46.8	1.4	37.1	1.9	12.0	2.1	10.3	2.3
Samoa	1.7	32.1	2.2	24.0	2.7	9.2	3.0	8.4	3.2
Solomon Islands	0.5	7.1	0.5	10.7	0.6	16.9	0.6	30.0	0.8
Tonga	2.8	3.1	2.9	3.0	3.0	-0.4	2.9	-0.3	2.9
Tuvalu	9.8	24.3	12.1	43.3	17.4	65.9	28.9	..	..
Vanuatu	2.8	24.7	3.5	5.0	3.7	-1.9	3.6	4.6	3.8
TRANSITION ECONOMIES									
SOUTH-EAST EUROPE AND CIS									
Albania	0.3	19.6	0.4	148.7	1.0	148.6	2.4	149.2	6.0
Armenia	1.6	20.6	2.0	134.3	4.6	7.5	5.0	7.7	5.3
Azerbaijan	0.3	1092.4	3.6	15.9	4.2	15.8	4.9	65.3	8.1
Belarus	4.3	88.9	8.1	73.1	14.1	77.8	25.1	38.7	34.8
Bosnia and Herzegovina	1.2	121.1	2.6	50.1	3.8	50.3	5.8	258.6	20.6
Bulgaria	7.6	4.8	8.0	..	..	..	15.9	29.9	20.6
Croatia	11.5	52.1	17.5	28.0	22.4	30.4	29.2	9.0	31.9
Georgia	1.0	59.8	1.6	60.9	2.6	51.6	3.9	..	..
Kazakhstan	1.0	67.3	1.7	20.2	2.0	33.5	2.7	..	..
Kyrgyzstan	3.0	-0.3	3.0	30.0	3.9	30.0	5.1	5.2	5.3
Rep. of Moldova	1.4	150.9	3.5	92.6	6.8	41.4	9.6	..	..



**Table 1.17 (Continued)**

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Romania	4.5	120.8	10.0	82.5	18.3	12.9	20.7	..	..
Russian Federation	2.9	40.2	4.1	101.0	8.3	54.9	12.9	18.4	15.2
Serbia and Montenegro	5.7	6.8	6.1	32.4	8.1	79.2	14.4	..	..
Tajikistan	0.1	8.2	0.1	16.5	0.1	20.0	0.1	..	..
TFYR Macedonia	3.5	42.5	4.9	25.7	6.2	25.9	7.8	0.4	7.9
Turkmenistan	0.2	..	..	..	0.4	77.4	0.8	..	..
Ukraine	1.2	51.7	1.9	180.9	5.3	51.7	8.0	22.9	9.8
Uzbekistan	0.6	80.7	1.1	76.3	1.9	76.3	3.4	..	..

Notes: a The value for Internet penetration in Canada in 2005 is assumed.

Source: UNCTAD calculations based on the ITU World Telecommunication Indicators Database, 2006.

**Annex I**  
**Statistical Annex**

**Table 1.18**

**Broadband subscribers: Economies by level of development and by region**

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
DEVELOPED ECONOMIES									
ASIA									
Israel	38 000	468.9	216 163	192.9	633 100	54.8	980 000	25.5	1 229 626
Japan	3 835 000	145.0	9 397 426	58.7	14 917 165	31.1	19 557 146	14.4	22 365 148
EUROPE									
Andorra	..	..	1 148	213.7	3 601	74.5	6 282	64.6	10 341
Austria	320 600	68.3	539 500	11.4	601 000	36.4	820 000	43.4	1 176 000
Belgium	458 759	77.7	815 418	52.4	1 242 928	30.1	1 617 185	24.0	2 004 859
Cyprus	2 500	135.2	5 879	70.7	10 033	33.2	13 368	99.6	26 684
Czech Republic	6 200	146.8	15 300	126.7	34 690	580.3	235 996	89.7	447 682
Denmark (incl. Faroe Islands)	223 276	102.1	451 297	59.2	718 299	42.1	1 020 893	32.9	1 356 283
Estonia	17 261	164.8	45 700	97.6	90 300	23.7	111 699	60.4	179 200
Finland	52 000	426.0	273 500	79.6	491 100	62.9	800 000	46.8	1 174 200
France	601 500	179.8	1 682 992	112.1	3 569 381	83.9	6 562 541	44.2	9 465 600
Germany	2 100 000	52.6	3 205 000	40.4	4 500 000	53.3	6 900 000	55.1	10 700 000
Gibraltar	..	..	225	..	..	..	..	..	..
Greece	..	..	..	..	10 476	391.2	51 455	211.2	160 113
Greenland	..	..	..	..	..	..	..	..	..
Guernsey	..	..	..	..	..	..	..	..	..
Hungary	20 000	457.3	111 458	137.1	264 311	55.6	411 171	58.5	651 689
Iceland	10 424	132.8	24 270	66.5	40 419	36.4	55 112	41.6	78 017
Ireland	..	..	10 600	294.3	41 800	263.9	152 100	78.0	270 700
Italy	390 000	117.9	850 000	164.7	2 250 000	97.8	4 450 000	52.4	6 780 000
Jersey	..	..	..	..	..	..	..	..	..
Latvia	3 235	209.1	10 000	95.3	19 533	151.6	49 147	430.6	260 770
Liechtenstein	..	..	..	..	..	..	..	..	..
Lithuania	2 427	724.1	20 000	234.0	66 790	93.2	129 051	81.4	234 081
Luxembourg	1 215	368.9	5 697	169.5	15 351	137.8	36 500	92.1	70 100
Malta	9 157	93.1	17 679	28.6	22 736	65.6	37 642	18.7	44 672
Netherlands	466 200	129.3	1 068 966	86.0	1 988 000	61.3	3 206 000	27.9	4 100 000
Norway	88 541	131.9	205 307	94.2	398 758	68.4	671 666	47.6	991 352
Poland	12 000	914.0	121 684	60.9	195 752	314.7	811 796	53.2	1 243 949
Portugal	96 324	172.8	262 789	91.5	503 128	70.6	858 419	41.2	1 212 034

Table 1.18 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
San Marino	..	..	..	..	600	..	..	..	..
Slovakia	..	..	..	..	7 708	538.1	49 188	181.7	138 569
Slovenia	5 500	931.5	56 735	2.2	57 992	98.4	115 069	47.7	169 950
Spain	430 055	190.1	1 247 496	76.5	2 202 000	56.3	3 441 630	45.1	4 994 274
Sweden	356 500	100.9	716 085	10.7	793 000	56.0	1 237 000	56.1	1 931 000
Switzerland	140 000	225.2	455 220	72.2	783 874	55.3	1 217 000	41.8	1 725 446
United Kingdom	501 000	263.5	1 821 000	110.0	3 824 500	86.4	7 130 500	33.8	9 539 900
NORTH AMERICA									
Canada	2 836 000	23.9	3 515 000	28.4	4 513 000	20.0	5 416 000	23.8	6 706 699
United States (incl. Puerto Rico and Guam)	12 794 562	55.6	19 904 281	41.8	28 230 149	34.2	37 890 646	30.4	49 391 060
OCEANIA									
Australia	122 800	110.2	258 100	100.2	516 800	98.4	1 025 500	105.1	2 102 800
New Zealand	17 267	151.9	43 500	90.8	83 000	131.0	191 695	72.7	331 000
DEVELOPING ECONOMIES									
AFRICA									
Algeria	..	..	..	..	..	..	36 000	441.7	195 000
Angola	..	..	..	..	..	..	..	..	..
Benin	..	..	21	0.0	21	285.7	81	142.0	196
Botswana	..	..	..	..	..	..	..	..	..
Burkina Faso	..	..	50	190.0	145	6.2	154	68.8	260
Burundi	..	..	..	..	..	..	..	..	..
Cameroon	..	..	..	..	..	..	..	..	..
Cape Verde	..	..	..	..	..	..	283	231.1	937
Central African Rep.	..	..	..	..	..	..	..	..	..
Chad	..	..	..	..	..	..	..	..	..
Comoros	..	..	..	..	..	..	1	300.0	4
Congo	..	..	..	..	..	..	..	..	..
Côte d'Ivoire	..	..	..	..	1 000	-17.4	826	..	..
Democratic Republic of the Congo	..	..	..	..	..	..	1 450	3.4	1 500
Djibouti	..	..	..	..	..	..	..	..	42
Egypt	..	..	937	417.6	4 850	879.5	47 504	139.0	113 526
Equatorial Guinea	..	..	..	..	..	..	..	..	..
Eritrea	..	..	..	..	..	..	..	..	..
Ethiopia	..	..	..	..	57	..	..	..	..
Gabon	..	..	..	..	170	282.4	650	133.1	1 515
Gambia	..	..	..	..	..	..	..	..	71

Table 1.18 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Ghana	..	..	..	..	..	..	..	..	1 904
Guinea	..	..	..	..	..	..	..	..	..
Guinea-Bissau	..	..	..	..	..	..	..	..	..
Kenya	..	..	..	..	..	..	..	..	..
Lesotho	..	..	..	..	..	..	..	..	45
Liberia	..	..	..	..	..	..	..	..	..
Libyan Arab Jamahiriya	..	..	..	..	..	..	..	..	..
Madagascar	..	..	..	..	..	..	..	..	..
Malawi	..	..	..	..	69	100.0	138	192.8	404
Mali	..	..	..	..	..	..	..	..	..
Mauritania	..	..	..	..	..	..	..	..	164
Mauritius	..	..	285	315.8	1 185	128.5	2 708	..	..
Mayotte	..	..	..	..	..	..	..	..	..
Morocco	..	..	2 000	35.6	2 712	2284.2	64 660	285.3	249 138
Mozambique	..	..	..	..	..	..	..	..	..
Namibia	..	..	..	..	..	..	..	..	..
Niger	..	..	..	..	..	..	77	175.3	212
Nigeria	..	..	..	..	..	..	..	..	500
Reunion	..	..	..	..	..	..	56 536	..	..
Rwanda	..	..	..	..	..	..	..	..	..
Sao Tome and Principe	..	..	..	..	..	..	..	..	..
Senegal	..	..	1 200	75.0	2 100	264.9	7 663	140.1	18 396
Seychelles	..	..	..	..	..	..	349	64.8	575
Sierra Leone	..	..	..	..	..	..	..	..	..
Somalia	..	..	..	..	..	..	..	..	..
South Africa	..	..	2 669	661.1	20 313	195.4	60 000	175.5	165 290
Sudan	..	..	..	..	..	..	1 400	28.6	1 800
Swaziland	..	..	..	..	..	..	..	..	..
Syrian Arab Republic	..	..	..	..	..	..	600	..	..
Togo	..	..	..	..	..	..	..	..	..
Tunisia	..	..	..	..	..	..	2 839	480.9	16 491
Uganda	..	..	..	..	2 590	..	..	..	..
United Republic of Tanzania	..	..	..	..	..	..	..	..	..
Zambia	31	54.8	48	89.6	91	174.7	250	0.0	250
Zimbabwe	..	..	..	..	4 618	94.2	8 967	13.6	10 185
ASIA									
Afghanistan	..	..	..	..	..	..	200	10.0	220

Table 1.18 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Bahrain	1 176	323.5	4 980	95.5	9 737	..	..	..	..
Bangladesh	..	..	..	..	..	..	..	..	..
Bhutan	..	..	..	..	..	..	..	..	..
Brunei Darussalam	..	..	..	..	..	..	..	..	..
Cambodia	..	..	50	738.0	419	..	..	..	..
China	339 510	1480.8	5 367 000	107.7	11 147 000	123.2	24 875 000	50.8	37 504 000
Dem. People's Rep. of Korea	..	..	..	..	..	..	..	..	..
Hong Kong (China)	716 435	45.0	1 038 995	22.0	1 267 966	19.9	1 519 837	9.2	1 659 098
India	50 000	64.8	82 409	70.3	140 362	67.4	235 000	453.2	1 300 000
Indonesia	15 000	155.3	38 300	..	..	..	..	..	..
Iran (Islamic Rep. of)	661	2346.4	16 171	9.5	17 700	..	..	..	..
Iraq	..	..	..	..	..	..	..	..	..
Jordan	409	676.8	3 177	57.3	4 996	108.6	10 424	..	..
Kuwait	5 000	110.0	10 500	23.8	13 000	53.8	20 000	..	..
Lao PDR	..	..	..	..	..	..	550	-69.1	170
Lebanon	..	..	35 000	100.0	70 000	14.3	80 000	62.5	130 000
Macao (China)	9 786	73.2	16 954	63.6	27 744	63.0	45 218	50.4	68 030
Malaysia	4 000	382.6	19 302	472.0	110 406	128.9	252 701	94.2	490 630
Maldives	..	..	190	164.7	503	42.5	717	191.6	2 091
Mongolia	49	83.7	90	455.6	500	80.0	900	100.0	1 800
Myanmar	..	..	..	..	..	..	..	..	119
Nepal	..	..	..	..	..	..	..	..	..
Oman	..	..	97	40.2	136	391.2	668	1154.2	8 378
Pakistan	..	..	..	..	..	..	..	..	44 600
Palestine	..	..	..	..	..	..	..	..	7 665
Philippines	10 000	110.0	21 000	161.9	55 000	..	..	..	..
Qatar	..	..	228	1211.8	2 991	256.1	10 652	136.3	25 168
Rep. of Korea	7 806 000	33.3	10 405 486	7.4	11 178 499	6.6	11 921 440	2.3	12 190 711
Saudi Arabia	1 000	128.7	2 287	267.3	8 400	134.5	19 700	..	..
Singapore	151 000	78.8	270 000	56.2	421 700	21.5	512 400	29.9	665 500
Sri Lanka	327	81.0	592	477.2	3 417	..	..	..	14 072
Taiwan Province of China	1 133 000	85.3	2 100 000	44.9	3 043 273	23.3	3 751 214	22.7	4 602 223
Thailand	1 613	829.9	15 000	200.0	45 000	..	..	..	..
Turkey	10 915	94.3	21 205	840.0	199 324	189.9	577 931	175.1	1 589 768
United Arab Emirates	7 754	108.6	16 177	84.4	29 831	86.2	55 541	131.3	128 493
Viet Nam	..	..	1 076	753.2	9 180	474.2	52 709	298.5	210 024
Yemen	..	..	..	..	..	..	..	..	..

Table 1.18 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
LATIN AMERICA AND THE CARIBBEAN									
Antigua and Barbuda	..	..	..	..	..	..	..	..	..
Argentina	85 000	35.3	115 000	104.0	234 625	112.0	497 513	69.0	841 000
Aruba	..	..	..	..	..	..	..	..	..
Bahamas	..	..	7 540	45.1	10 941	17.0	12 803	..	..
Barbados	..	..	..	..	27 319	..	..	..	31 942
Belize	..	..	..	..	940	200.7	2 827	51.4	4 280
Bermuda	..	..	..	..	..	..	..	..	..
Bolivia	..	..	3 330	72.4	5 740	52.0	8 723	23.7	10 788
Brazil	331 000	120.8	731 000	64.0	1 199 000	88.2	2 256 000	46.5	3 304 000
Cayman Islands	..	..	..	..	..	..	..	..	..
Chile	66 722	182.4	188 454	86.9	352 234	36.0	478 883	47.9	708 358
Colombia	13 830	152.3	34 888	84.7	64 436	97.3	127 113	150.7	318 683
Costa Rica	..	..	363	3998.6	14 878	87.7	27 931	..	..
Cuba	..	..	..	..	..	..	..	..	..
Dominica	175	1178.9	2 238	18.5	2 651	22.7	3 253	..	..
Dominican Rep.	..	..	..	..	..	..	37 257	76.8	65 856
Ecuador	..	..	..	..	..	..	11 620	130.5	26 786
El Salvador	..	..	..	..	..	..	29 321	44.3	42 314
French Guiana	..	..	..	..	..	..	..	..	..
Grenada	..	..	563	..	..	..	609	..	..
Guadeloupe	..	..	..	..	..	..	..	..	..
Guatemala	..	..	..	..	..	..	..	..	27 106
Guyana	..	..	..	..	..	..	..	..	2 000
Haiti	..	..	..	..	..	..	..	..	..
Honduras	..	..	..	..	..	..	..	..	..
Jamaica	..	..	9 000	..	..	..	..	..	..
Martinique	..	..	..	..	6 000	..	..	..	..
Mexico	50 000	363.0	231 486	85.1	428 378	142.2	1 037 455	122.1	2 304 520
Netherlands Antilles	..	..	..	..	..	..	..	..	..
Nicaragua	1 604	44.6	2 319	89.9	4 403	13.6	5 001	110.6	10 534
Panama	4 040	202.8	12 235	22.9	15 039	11.4	16 746	4.9	17 567
Paraguay	300	66.7	500	0.0	500	..	..	..	5 600
Peru	7 237	375.3	34 400	172.4	93 695	47.6	138 277	152.8	349 582
Saint Kitts and Nevis	..	..	500	..	..	..	..	..	..
Saint Lucia	..	..	..	..	..	..	..	..	..
Saint Vincent and the Grenadines	81	1240.7	1 086	5.5	1 146	15.2	1 320	176.3	3 647



Table 1.18 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Suriname	..	..	94	129.8	216	94.4	420	138.3	1 001
Trinidad and Tobago	..	..	95	830.5	884	378.8	4 233	155.2	10 803
Uruguay	1 371	..	..	..	..	..	27 000	126.6	61 186
Venezuela	36 636	113.3	78 151	..	116 997	..	210 303	69.7	356 898
Virgin Islands (US)	..	..	..	..	..	..	..	..	..
OCEANIA									
American Samoa	..	..	..	..	..	..	..	..	..
Fiji	..	..	..	..	..	..	..	..	..
French Polynesia	..	..	..	..	946	359.9	4 351	152.8	11 000
Kiribati	..	..	..	..	..	..	..	..	..
Marshall Islands	..	..	..	..	..	..	..	..	..
Micronesia (Fed. States of)	..	..	..	..	..	..	..	..	..
Nauru	..	..	..	..	..	..	..	..	..
New Caledonia	132	430.3	700	138.3	1 668	208.5	5 146	86.6	9 600
Northern Mariana Islands	..	..	..	..	..	..	..	..	..
Palau	..	..	..	..	..	..	..	..	..
Papua New Guinea	..	..	..	..	..	..	..	..	..
Samoa	..	..	..	..	..	..	..	..	..
Solomon Islands	..	..	108	89.8	205	-2.4	200	125.0	450
Tonga	..	..	11	..	..	..	..	..	..
Tuvalu	..	..	..	..	..	..	..	..	..
Vanuatu	..	..	..	..	15	53.3	23	..	..
TRANSITION ECONOMIES									
SOUTH-EAST EUROPE AND CIS									
Albania	..	..	..	..	..	..	..	..	..
Armenia	..	..	8	25.0	10	9 900.0	1 000	..	..
Azerbaijan	..	..	..	..	..	..	900	142.7	2 184
Belarus	..	..	20	515.0	123	509.8	750	108.5	1 564
Bosnia and Herzegovina	..	..	213	..	..	..	6 637	106.4	13 702
Bulgaria	..	..	..	..	..	..	1 291	..	..
Croatia	..	..	12 000	..	..	..	26 800	235.1	89 800
Georgia	..	..	920	53.3	1 410	..	..	..	..
Kazakhstan	..	..	..	..	..	..	1 997	..	..
Kyrgyzstan	..	..	36	..	139	..	1 907	28.9	2 459
Rep. of Moldova	..	..	418	42.8	597	306.9	2 429	328.0	10 395
Romania	6 000	163.3	15 800	1141.2	196 106	95.2	382 783	96.2	751 060
Russian Federation	..	..	11 000	..	..	..	675 000	135.4	1 589 000

**Table 1.18 (Continued)**

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Serbia and Montenegro	..	..	..	..	..	..	..	..	..
Tajikistan	..	..	..	..	..	..	..	..	..
TFYR Macedonia	..	..	..	..	..	..	..	..	12 436
Turkmenistan	..	..	..	..	..	..	..	..	..
Ukraine	..	..	..	..	..	..	..	..	..
Uzbekistan	..	..	..	..	2 757	..	..	..	..

Source: UNCTAD calculations based on the ITU World Telecommunication Indicators Database, 2006.

## Annex I

### Statistical Annex

#### Table 1.19

### Broadband penetration: Economies by level of development and by region

Broadband subscribers per 100 inhabitants

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
DEVELOPED ECONOMIES									
ASIA									
Israel	0.6	457.2	3.4	187.1	9.8	51.8	14.8	23.2	18.3
Japan	3.0	144.6	7.4	58.5	11.7	30.9	15.3	14.2	17.5
EUROPE									
Andorra	..	..	1.7	212.3	5.4	73.7	9.4	64.1	15.4
Austria	3.6	40.6	5.0	47.4	7.4	36.1	10.0	43.1	14.4
Belgium	4.5	89.2	8.4	42.2	12.0	29.9	15.6	23.7	19.2
Cyprus	0.3	132.2	0.7	68.6	1.2	31.7	1.6	97.4	3.2
Czech Republic	0.1	147.0	0.1	126.9	0.3	580.9	2.3	89.9	4.4
Denmark (incl. Faroe Islands)	4.1	101.4	8.3	58.6	13.2	41.7	18.7	32.4	24.8
Estonia	1.3	166.4	3.4	98.6	6.7	24.3	8.4	61.1	13.5
Finland	1.0	424.5	5.3	79.0	9.4	62.4	15.3	46.4	22.4
France	1.0	178.7	2.8	111.2	5.9	83.1	10.9	43.7	15.6
Germany	2.5	52.5	3.9	40.3	5.4	53.2	8.3	55.0	12.9
Gibraltar	..	..	0.8	..	..	..	..	..	..
Greece	..	..	..	..	0.1	390.1	0.5	210.6	1.4
Greenland	..	..	..	..	..	..	..	..	..
Guernsey	..	..	..	..	..	..	..	..	..
Hungary	0.2	458.7	1.1	137.7	2.6	56.0	4.1	58.9	6.5
Iceland	3.7	130.6	8.5	65.0	14.0	35.1	18.9	40.3	26.5
Ireland	..	..	0.3	287.1	1.0	257.4	3.7	75.0	6.5
Italy	0.7	117.6	1.5	164.3	3.9	97.5	7.7	52.2	11.7
Jersey	..	..	..	..	..	..	..	..	..
Latvia	0.1	211.0	0.4	96.4	0.8	152.9	2.1	433.2	11.3
Liechtenstein	..	..	..	..	..	..	..	..	..
Lithuania	0.1	727.5	0.6	235.1	1.9	93.9	3.7	82.0	6.8
Luxembourg	0.3	362.6	1.3	165.9	3.4	134.7	8.0	89.6	15.1
Malta	2.3	92.1	4.5	28.0	5.7	64.8	9.4	18.1	11.1
Netherlands	1.9	124.4	4.2	82.1	7.6	58.0	12.1	25.3	15.1
Norway	2.0	130.6	4.5	93.2	8.7	67.6	14.6	46.9	21.5
Poland	0.0	914.6	0.3	61.0	0.5	315.0	2.1	53.4	3.2

Table 1.19 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Portugal	0.9	171.4	2.5	90.4	4.8	69.7	8.2	40.5	11.5
San Marino	..	..	..	..	2.2	..	..	..	..
Slovakia	..	..	..	..	0.1	538.2	0.9	181.7	2.6
Slovenia	0.3	931.4	2.9	2.2	2.9	98.4	5.8	47.7	8.6
Spain	1.0	186.6	3.0	74.3	5.2	54.5	8.1	43.7	11.6
Sweden	4.0	100.1	8.0	10.3	8.8	55.3	13.7	55.5	21.4
Switzerland	1.9	224.3	6.3	71.8	10.8	55.0	16.8	41.5	23.8
United Kingdom	0.9	262.2	3.1	109.3	6.5	85.8	12.0	33.4	16.0
NORTH AMERICA									
Canada	9.2	22.7	11.2	27.1	14.3	18.8	16.9	22.6	20.8
United States (incl. Puerto Rico and Guam)	4.4	54.1	6.8	40.5	9.5	33.0	12.7	29.1	16.3
OCEANIA									
Australia	0.6	104.3	1.3	105.3	2.6	96.3	5.1	102.9	10.4
New Zealand	0.4	149.1	1.1	88.6	2.1	128.4	4.8	71.0	8.2
DEVELOPING ECONOMIES									
AFRICA									
Algeria	..	..	..	..	..	..	0.1	433.5	0.6
Angola	..	..	..	..	..	..	..	..	..
Benin	..	..	..	..	0.0	1 207.4	0.0	134.5	0.0
Botswana	..	..	..	..	..	..	..	..	..
Burkina Faso	..	..	0.0	180.8	0.0	2.9	0.0	63.6	0.0
Burundi	..	..	..	..	..	..	..	..	..
Cameroon	..	..	..	..	..	..	..	..	..
Cape Verde	..	..	..	..	..	..	0.1	223.5	0.2
Central African Rep.	..	..	..	..	..	..	..	..	..
Chad	..	..	..	..	..	..	..	..	..
Comoros	..	..	..	..	..	..	0.0	289.7	0.0
Congo	..	..	..	..	..	..	..	..	..
Côte d'Ivoire	..	..	..	..	..	..	0.0	..	..
Democratic Republic of the Congo	..	..	..	..	..	..	0.0	0.4	0.0
Djibouti	..	..	..	..	..	..	..	..	0.0
Egypt	..	..	0.0	407.8	0.0	860.9	0.1	134.5	0.2
Equatorial Guinea	..	..	..	..	..	..	..	..	..
Eritrea	..	..	..	..	..	..	..	..	..
Ethiopia	..	..	..	..	..	..	..	..	..
Gabon	..	..	..	..	0.0	1 179.9	0.0	129.5	0.1

Table 1.19 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Gambia	..	..	..	..	..	..	..	..	0.0
Ghana	..	..	..	..	..	..	..	..	0.0
Guinea	..	..	..	..	..	..	..	..	..
Guinea-Bissau	..	..	..	..	..	..	..	..	..
Kenya	..	..	..	..	..	..	..	..	..
Lesotho	..	..	..	..	..	..	..	..	0.0
Liberia	..	..	..	..	..	..	..	..	..
Libyan Arab Jamahiriya	..	..	..	..	..	..	..	..	..
Madagascar	..	..	..	..	..	..	..	..	..
Malawi	..	..	..	..	0.0	95.7	0.0	186.5	0.0
Mali	..	..	..	..	..	..	..	..	..
Mauritania	..	..	..	..	..	..	..	..	0.0
Mauritius	..	..	0.0	311.8	0.1	126.4	0.2	..	..
Mayotte	..	..	..	..	..	..	..	..	..
Morocco	..	..	..	..	0.0	2245.7	0.2	279.2	0.8
Mozambique	..	..	..	..	..	..	..	..	..
Namibia	..	..	..	..	..	..	..	..	..
Niger	..	..	..	..	..	..	0.0	166.3	0.0
Nigeria	..	..	..	..	..	..	..	..	0.0
Reunion	..	..	..	..	..	..	7.3	..	..
Rwanda	..	..	..	..	..	..	..	..	..
Sao Tome and Principe	..	..	..	..	..	..	..	..	..
Senegal	..	..	0.0	70.9	0.0	256.3	0.1	134.5	0.2
Seychelles	..	..	..	..	..	..	0.4	63.2	0.7
Sierra Leone	..	..	..	..	..	..	..	..	..
Somalia	..	..	..	..	..	..	..	..	..
South Africa	..	..	0.0	655.3	0.0	193.6	0.1	174.2	0.3
Sudan	..	..	..	..	..	..	0.0	26.1	0.0
Swaziland	..	..	..	..	..	..	..	..	..
Syrian Arab Republic	..	..	..	..	..	..	0.0	..	..
Togo	..	..	..	..	..	..	..	..	..
Tunisia	..	..	0.0	885.3	0.0	8.4	0.0	474.7	0.2
Uganda	..	..	..	..	..	..	..	..	..
United Republic of Tanzania	..	..	..	..	..	..	..	..	..
Zambia	..	..	..	..	0.0	170.2	0.0	-1.6	0.0
Zimbabwe	..	..	..	..	0.0	159.5	0.1	12.9	0.1
ASIA									
Afghanistan	..	..	..	..	..	..	0.0	5.3	0.0

Table 1.19 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Bahrain	0.2	316.8	0.7	92.8	1.4	..	..	..	..
Bangladesh	..	..	..	..	..	..	..	..	..
Bhutan	..	..	..	..	..	..	..	..	..
Brunei Darussalam	..	..	..	..	..	..	..	..	..
Cambodia	..	..	0.0	721.7	0.0	..	..	..	..
China	0.0	1470.2	0.4	106.4	0.9	121.8	1.9	49.9	2.9
Dem. People's Rep. of Korea	..	..	..	..	..	..	..	..	..
Hong Kong (China)	10.7	43.3	15.3	20.6	18.4	18.5	21.8	8.0	23.6
India	0.0	62.2	0.0	67.7	0.0	64.9	0.0	445.0	0.1
Indonesia	0.0	152.1	0.0	..	..	..	..	..	..
Iran (Islamic Rep. of)	0.0	2325.1	0.0	8.5	0.0	..	..	..	..
Iraq	..	..	..	..	..	..	..	..	..
Jordan	0.0	654.9	0.1	52.9	0.1	103.1	0.2	..	..
Kuwait	16.6	32.7	22.0	7.0	23.6	-96.7	0.8	..	..
Lao PDR	..	..	..	..	0.5	..	0.0	-69.8	0.0
Lebanon	..	..	..	..	..	..	2.3	60.8	3.6
Macao (China)	..	..	1.0	98.0	2.0	395.1	9.9	49.5	14.8
Malaysia	2.2	71.9	3.8	62.5	6.1	-83.4	1.0	90.7	1.9
Maldives	..	..	0.1	461.1	0.5	-50.6	0.2	184.5	0.6
Mongolia	..	..	0.1	158.2	0.2	-79.6	0.0	96.7	0.1
Myanmar	..	..	..	..	..	..	..	..	0.0
Nepal	..	..	..	..	..	..	..	..	..
Oman	..	..	..	..	..	..	0.0	1138.0	0.3
Pakistan	..	..	..	..	..	..	..	..	0.0
Palestine	..	..	..	..	..	..	..	..	0.2
Philippines	..	..	..	..	..	..	..	..	..
Qatar	..	..	0.0	0 157.1	0.1	1898.4	1.4	125.8	3.1
Rep. of Korea	..	..	0.0	1127.8	0.4	6034.0	25.0	1.9	25.5
Saudi Arabia	0.0	122.5	0.0	257.5	0.0	128.4	0.1	..	..
Singapore	3.7	76.0	6.5	54.1	10.0	20.0	12.0	28.3	15.4
Sri Lanka	0.0	79.4	0.0	472.1	0.0	..	..	..	0.1
Taiwan Province of China	5.1	84.3	9.3	44.3	13.5	22.8	16.6	22.2	20.2
Thailand	0.0	821.5	0.0	197.3	0.1	..	..	..	..
Turkey	0.0	91.5	0.0	827.1	0.3	186.1	0.8	171.4	2.2
United Arab Emirates	0.2	93.7	0.4	71.8	0.7	75.2	1.3	120.5	2.9
Viet Nam	..	..	..	..	0.0	466.4	0.1	293.2	0.2
Yemen	..	..	..	..	..	..	..	..	..



Table 1.19 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
LATIN AMERICA AND THE CARIBBEAN									
Antigua and Barbuda	..	..	..	..	..	..	..	..	..
Argentina	0.2	34.0	0.3	102.1	0.6	110.0	1.3	67.4	2.2
Aruba	..	..	..	..	..	..	..	..	..
Bahamas	..	..	2.4	43.1	3.5	15.4	4.0	..	..
Barbados	..	..	..	..	10.2	..	..	..	11.8
Belize	..	..	..	..	0.4	194.5	1.1	48.4	1.6
Bermuda	..	..	..	..	..	..	..	..	..
Bolivia	..	..	..	..	..	..	0.1	21.3	0.1
Brazil	0.2	117.7	0.4	61.7	0.7	85.6	1.2	44.5	1.8
Cayman Islands	..	..	..	..	..	..	..	..	..
Chile	0.4	179.2	1.2	84.9	2.2	34.5	3.0	46.4	4.3
Colombia	0.0	148.2	0.1	81.8	0.1	94.2	0.3	146.9	0.7
Costa Rica	..	..	0.0	3920.7	0.4	84.3	0.7	..	..
Cuba	..	..	..	..	..	..	..	..	..
Dominica	0.2	1176.6	2.9	18.3	3.4	22.4	4.1	..	..
Dominican Rep.	..	..	..	..	..	..	0.4	74.2	0.7
Ecuador	..	..	..	..	0.1	65.6	0.1	127.2	0.2
El Salvador	..	..	..	..	0.3	47.0	0.4	41.8	0.6
French Guiana	..	..	..	..	..	..	..	..	..
Grenada	..	..	0.6	..	..	..	0.6	..	..
Guadeloupe	..	..	..	..	..	..	..	..	..
Guatemala	..	..	..	..	..	..	..	..	..
Guyana	..	..	..	..	..	..	..	..	..
Haiti	..	..	..	..	..	..	..	..	..
Honduras	..	..	..	..	..	..	..	..	..
Jamaica	..	..	..	..	..	..	..	..	..
Martinique	..	..	..	..	1.5	..	..	..	..
Mexico	0.0	356.6	0.2	82.6	0.4	139.1	1.0	119.4	2.2
Netherlands Antilles	..	..	..	..	..	..	..	..	..
Nicaragua	0.0	41.7	0.0	86.1	0.1	11.3	0.1	106.4	0.2
Panama	0.1	197.3	0.4	20.7	0.5	9.4	0.5	3.1	0.5
Paraguay	0.0	62.7	0.0	-2.3	0.0	..	..	..	0.1
Peru	0.0	368.2	0.1	168.4	0.3	45.4	0.5	149.1	1.2
Saint Kitts and Nevis	..	..	1.2	..	..	..	..	..	..
Saint Lucia	..	..	..	..	..	..	..	..	..
Saint Vincent and the Grenadines	0.1	1 233.7	0.9	5.0	1.0	14.6	1.1	174.8	3.1

Table 1.19 (Continued)

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Suriname	..	..	0.0	128.3	0.0	93.2	0.1	136.9	0.2
Trinidad and Tobago	..	..	0.0	827.6	0.1	377.4	0.3	154.4	0.8
Uruguay	..	..	..	..	..	..	0.8	125.1	1.8
Venezuela	0.1	109.4	0.3	..	..	..	0.8	66.7	1.3
Virgin Islands (US)	..	..	..	..	..	..	..	..	..
OCEANIA									
American Samoa	..	..	..	..	..	..	..	..	..
Fiji	..	..	..	..	..	..	..	..	..
French Polynesia	..	..	..	..	0.4	375.7	1.7	149.0	4.3
Kiribati	..	..	..	..	..	..	..	..	..
Marshall Islands	..	..	..	..	..	..	..	..	..
Micronesia (Fed. States of)	..	..	..	..	..	..	..	..	..
Nauru	..	..	..	..	..	..	..	..	..
New Caledonia	0.1	426.8	0.4	135.8	0.9	205.0	2.8	84.7	5.3
Northern Mariana Islands	..	..	..	..	..	..	..	..	..
Palau	..	..	..	..	..	..	..	..	..
Papua New Guinea	..	..	..	..	..	..	..	..	..
Samoa	..	..	..	..	..	..	..	..	..
Solomon Islands	..	..	0.0	84.9	0.0	-4.9	0.0	119.4	0.1
Tonga	..	..	0.0	..	..	..	..	..	..
Tuvalu	..	..	..	..	..	..	..	..	..
Vanuatu	..	..	..	..	0.0	50.4	0.0	..	..
TRANSITION ECONOMIES									
SOUTH-EAST EUROPE AND CIS									
Albania	..	..	..	..	..	..	..	..	..
Armenia	..	..	0.0	67.4	0.0	9936.7	0.0	..	..
Azerbaijan	..	..	..	..	..	..	0.0	141.0	0.0
Belarus	..	..	0.0	518.4	0.0	513.2	0.0	109.7	0.0
Bosnia and Herzegovina	..	..	..	..	..	..	0.2	106.6	0.4
Bulgaria	..	..	..	..	..	..	0.0	..	..
Croatia	..	..	0.3	..	..	..	0.6	234.2	2.0
Georgia	..	..	0.0	54.9	0.0	..	..	..	..
Kazakhstan	..	..	..	..	..	..	0.0	..	..
Kyrgyzstan	..	..	..	..	..	..	0.0	27.5	0.0
Rep. of Moldova	..	..	0.0	148.6	0.0	308.2	0.1	329.2	0.2
Romania	0.0	1 673.3	0.1	828.3	0.9	95.9	1.8	96.9	3.5
Russian Federation	..	..	..	..	..	..	0.5	136.6	1.1

**Table 1.19 (Continued)**

	2001	% change 2001-2002	2002	% change 2002-2003	2003	% change 2003-2004	2004	% change 2004-2005	2005
Serbia and Montenegro	..	..	..	..	..	..	..	..	..
Tajikistan	..	..	..	..	..	..	..	..	..
TFYR Macedonia	..	..	..	..	..	..	..	..	0.6
Turkmenistan	..	..	..	..	..	..	..	..	..
Ukraine	..	..	..	..	..	..	..	..	..
Uzbekistan	..	..	..	..	..	..	..	..	..

Source: UNCTAD calculations based on the ITU World Telecommunication Indicators Database, 2006.

**Table 1.20 – Core indicators on use of ICT by businesses and on the ICT sector, selected economies, 2005 or latest available year**

Enterprises with 10 or more employees

Reference Year	Proportion of:						Proportion of enterprises:						Proportion of enterprises accessing the internet by:				
	Enterprises using computers	Employees using computers	Enterprises using Internet	Employees using Internet	With a website	With an intranet	Receiving orders over the Internet	Placing orders over the Internet	Analogue modem	ISDN	Fixed line connection under 2 Mbps	Fixed line connection of 2 Mbps or more	Other modes of access				
	B1	B2	B3	B4	B5	B6	B7	B8	B9.a	B9.b	B9.c	B9.d	B9.e				
Andorra	2005	72.9	62.0	63.0	44.5	30.8	..	26.2	25.0	18.3	..	..	44.7				
Argentina	2004	97.1	38.0	93.6	21.5	57.2	43.0	37.4	36.5	20.2	4.8	..	70.2				
Azerbaijan	2005	45.2	9.5	8.3	1.8	2.8	5.8	..	..	5.3	0.4	0.8	1.4				
Belarus	2005	83.6	..	37.6	..	10.2	..	..	..	..	..	..	..				
Brazil	2005	98.8	38.3	95.1	28.4	56.2	38.5	27.1	28.5	42.9	10.4	12.8	69.9				
Bulgaria	2004	85.0	14.3	62.6	9.1	24.3	28.2	2.9	7.0	24.8	6.0	5.3	39.1				
Cameroon	2005	67.8	..	25.1	..	12.1	12.3	..	..	19.0	..	19.8	..				
Chile	2003	24.7	..	20.3	..	8.6	4.6	1.2	1.8	5.9	2.1	8.6	15.5				
China	2005	..	..	67.6	..	22.3	..	9.1	8.1	6.2	4.3	..	..				
Costa Rica	2004	80.7	..	69.9	..	10.3	..	..	..	..	..	..	..				
Cuba	2005	99.1	60.1	60.3	6.8	17.5	34.5	0.8	2.7	36.5	0.0	23.5	0.2				
Hong Kong (China)	2005	90.2	55.0	84.8	43.0	40.5	26.2	3.3	18.5	3.2	..	77.7	9.1				
India	2003	61.3	..	..	..	..	..	..	..	..	..	..	..				
Kazakhstan	2005	73.6	..	45.5	..	8.4	..	13.1	13.7	..	..	..	..				
Kyrgyzstan	2005	..	..	25.1	..	8.4	..	..	..	..	..	..	..				
Macao (China)	2003	75.6	..	69.1	..	17.8	..	7.4	8.9	14.3	..	7.6	78.1				
Mexico	2003	73.1	..	55.4	..	7.2	..	..	..	..	..	..	..				
Moldova	2003	..	..	..	..	9.3	..	..	..	..	..	..	..				
Morocco	2005	..	..	90.6	14.2	46.7	34.4	5.2	9.0	7.5	..	63.2	22.2				
Panama	2002	81.0	24.6	65.7	..	..	..	23.1	29.7	..	..	..	..				
Paraguay	2002	..	..	5.7	..	..	..	..	..	..	..	..	..				
Philippines	2001	87.9	..	62.4	..	..	22.0	..	..	..	..	..	..				
Qatar	2005	84.4	..	68.4	..	67.8	38.2	34.9	28.3	..	..	..	..				
Rep. of Korea	2004	95.6	..	94.0	..	38.9	35.2	6.8	23.9	..	..	92.2	1.9				
Romania	2004	80.0	16.7	52.3	9.2	19.9	15.4	5.4	2.6	24.2	6.2	4.0	2.2				
Russian Federation	2004	96.6	27.7	68.2	10.9	24.0	..	20.2	23.2	..	..	27.3	..				
Singapore	2005	92.8	..	91.0	..	68.3	74.1	13.5	30.8	24.6	22.5	66.4	17.4				
Thailand	2005	86.8	..	64.1	..	32.7	..	7.2	8.7	40.4	3.4	..	18.7				

Source: UNCTAD e-business database, 2006

Table 1.20 (Continued)

Proportion of enterprises with:		Proportion of enterprises using the Internet for:									
Local Area Network (LAN)	An extranet	Sending and receiving e-mail	Information about goods or services	Information from public authorities	Other information searches or research	Internet banking or financial services	Transacting with public authorities	Providing customer services	Delivering products online	Other types of activity	
B10	B11	B12.a	B12.b.i	B12.b.ii	B12.b.iii	B12.c	B12.d	B12.e	B12.f	B12.g	
Andorra	25.7	..	..	..	44.7	38.9	15.7	..	..	..	
Argentina	71.1	13.0	90.2	71.5	73.9	69.1	46.7	35.5	4.5	7.6	
Azerbaijan	11.5	9.2	..	..	1.3	2.5	1.6	..	..	5.3	
Belarus	41.1	..	..	..	..	..	..	..	..	..	
Brazil	82.8	21.9	65.4	..	61.6	75.1	28.5	46.4	..	41.5	
Bulgaria	44.9	3.6	..	..	29.5	26.5	32.4	3.7	1.1	..	
Cameroon	15.0	0.4	12.3	1.7	7.3	..	7.3	1.7	1.7	..	
Chile	4.6	1.5	18.4	..	..	..	..	..	..	..	
China	46.0	..	56.4	41.9	44.0	..	28.9	26.5	7.2	..	
Costa Rica	..	..	68.5	..	..	..	..	..	..	..	
Cuba	..	59.1	..	..	..	..	..	1.8	0.5	..	
Hong Kong (China)	61.1	7.6	82.8	81.5	60.1	27.4	..	17.6	34.8	41.0	
India	..	..	..	..	..	..	..	..	..	..	
Kazakhstan	27.8	..	40.8	28.6	..	..	..	20.4	..	42.0	
Kyrgyzstan	15.8	..	20.3	..	2.1	..	..	..	1.6	..	
Macao (China)	..	..	41.8	32.7	..	..	7.4	..	..	2.0	
Mexico	38.0	..	..	..	..	..	..	..	..	..	
Moldova	68.0	..	..	..	..	..	..	..	..	..	
Morocco	..	..	87.3	83.5	66.0	34.9	24.5	44.3	9.0	46.2	
Panama	57.6	..	..	..	..	..	..	..	..	..	
Paraguay	..	..	15.1	..	..	..	..	..	..	..	
Philippines	54.9	5.1	..	..	..	..	..	..	..	..	
Qatar	..	..	..	..	..	..	..	..	..	..	
Rep. of Korea	64.6	..	..	..	..	..	..	..	..	..	
Romania	31.0	10.0	..	..	28.3	25.4	10.4	..	1.9	..	
Russian Federation	70.6	12.5	64.7	44.3	27.2	..	..	3.9	4.3	..	
Singapore	74.1	35.8	84.4	84.9	..	58.3	..	..	37.7	..	
Thailand	..	..	51.6	..	..	5.5	..	..	..	..	

Source: UNCTAD e-business database, 2006

## Notes:

- Andorra: Enterprises with 0-9 employees accounted for 82 per cent of the sample. Survey does not cover enterprises larger than 250 employees. Table 1.20 only reflects enterprises with 10-249 employees. There is no breakdown by ISIC.
- Argentina: Enterprises with 0-9 employees accounted for 4.4 per cent of the sample. Table 1.20 only reflects enterprises with 10 or more employees. Survey of ISIC D only. Innovation Survey 2004.
- Azerbaijan: Enterprises with 0-9 employees accounted for 64.8 per cent of the sample. Table 1.20 only reflects enterprises with 10 or more employees. Census of ISIC C, D, E, F, G, H, I, J, K, L, M, N, O by NACE Rev 2 or ISIC Rev 1. Excludes category A, B (NACE) and G staff under 5 workers.
- Belarus: There is no breakdown by number of employees or ISIC. Sampling frame was composed of "organizations of all branches of economy, excluding public organizations, public safety and defense organizations, and "small business" enterprises"
- Brazil: For indicator B9.e, other modes of access include "DSL, Wide Band and mobile narrow band". Survey of ISIC D, F, G, H, I, K, O.
- Bulgaria: Survey of ISIC D, E, F, G, H, I60, I64, K70, K72, O.
- Cameroon: Enterprises with 0-9 employees accounted for 39 per cent of the sample. Table 1.20 only reflects enterprises with 10 or more employees. Survey of ISIC A, E, F, G50, G51, I60, I63, I64, J, K72, K74, L, M, N, O.
- Chile: There is no breakdown by number of employees, so sample could include enterprises with 0-9 employees. Structural surveys of ISIC C13, D, E401, G50-52, K70-72, K74, O90-93, and H55.
- China: There is no breakdown by number of employees, so sample could include enterprises with 0-9 employees. Survey of ISIC C, D, E, F, G, H, I, J, K70.
- Costa Rica: Enterprises with 0-9 employees accounted for 39 per cent of the sample. Survey does not cover enterprises larger than 250 employees. Table 1.20 only reflects enterprises with 10-249 employees. There is no breakdown by ISIC.
- Cuba: Enterprises with 0-9 employees accounted for less than 1 per cent of the sample. Table 1.20 only reflects enterprises with 10 or more employees. Survey excludes ISIC P.
- Hong Kong (China): Enterprises with 0-9 employees accounted for 87.7 per cent of sampling frame. Table 1.20 only reflects enterprises with 10 or more employees. Survey excludes ISIC A, B, C.
- India: Enterprises with 0-9 employees accounted for 13.9 per cent of the sample. Table 1.20 only reflects enterprises with 10 or more employees.
- Kazakhstan: Enterprises with 0-9 employees accounted for 34.3 per cent of the sample. Table 1.20 only reflects enterprises with 10 or more employees. Survey of ISIC A, C, D, E, F, K72, K73, M.
- Kyrgyzstan: Of enterprises with computers. Enterprises with 0-9 employees accounted for 21.8 per cent of the sample. Table 1.20 only reflects enterprises with 10 or more employees. Survey excludes ISIC P.
- Macao (China): Enterprises with 0-9 employees accounted for 88.2 per cent of the sample. Table 1.20 only reflects enterprises with 10 or more employees. Survey of ISIC C, D, E, F, G 50-52, H, I60-64, K74, O.
- Mexico: Source is OECD database: "data refer to enterprises with 50 or more employees and include: Manufacturing, Services and Construction."
- Moldova: There is no breakdown by number of employees, so sample could include enterprises with 0-9 employees. Statistical census of legal persons, which detain informational assets and informational system.
- Morocco: Enterprises with 0-9 employees accounted for 14.9 per cent of the sample. Table 1.20 only reflects enterprises with 10 or more employees. Survey excludes ISIC L, M, N.
- Panama: Enterprises with 0-9 employees accounted for 87.4 per cent of sampling frame. Table 1.20 only reflects enterprises with 10 or more employees. Survey excludes ISIC L,P.
- Paraguay: Enterprises with 0-9 employees accounted for 83.1 per cent of sampling frame. Table 1.20 only reflects enterprises with 10 or more employees. Survey of ISIC D only.
- Philippines: Refers to enterprises with 20 or more employees. Survey excludes ISIC P.
- Qatar: Enterprises with 0-9 employees accounted for 48.2 per cent of sampling frame. Table 1.20 only reflects enterprises with 10 or more employees. Survey excludes ISIC A, B, K73, L, P.
- Rep. of Korea: Indicator B9.d includes xDSL, dedicated line and cable modem. Indicator B9.e includes dial-up modem, satellite etc. Survey excludes ISIC P and Q.
- Romania: Enterprises with 0-9 employees accounted for 81.3 per cent of sampling frame. Table 1.20 only reflects enterprises with 10 or more employees. Survey of C, D, E, F, G50-52, H, I60-64, K70-74, O.
- Russian Federation: Enterprises with 0-49 employees accounted for 54 per cent of sample. Table 1.20 only reflects enterprises with 50 or more employees. Survey excludes P.
- Singapore: Enterprises with 0-49 employees accounted for 68.3 per cent of sample. Survey of ISIC D, G, H, I, J, M, N.
- Thailand: Enterprises with 0-9 employees accounted for 96.3 per cent of sampling frame. Table 1.20 only reflects enterprises with 10 or more employees. Survey of D, F, G50-52, H, I60, I63, K70-74.

**Annex I**  
**Statistical annex**

**Table 1.21**

**Exports of ICT-enabled services by country, 2000–2003 (million \$)**

	2000	% change 2000–2001	2001	% change 2001–2002	2002	% change 2002–2003	2003
Afghanistan	..	..	..	..	..	..	..
Albania	22	49.5	33	39.9	46	116.1	100
Algeria	..	..	..	..	..	..	..
Angola	251	-24.7	189	-19	153	-10.6	137
Anguilla	5	8	6	-1.2	6	..	..
Antigua and Barbuda	52	-9	47	-20.9	38	..	..
Argentina	631	48.2	935	-2.5	911	25.8	1 147
Armenia	29	49.4	43	-0.9	42	8	46
Aruba	96	5.5	101	10	111	19.1	132
Australia	5 385	-24.3	4 077	13.9	4 642	18.4	5 497
Austria	16 123	5.8	17 055	1.2	17 264	15.5	19 946
Azerbaijan	47	-4.7	45	12.6	50	161.7	132
Bahamas	141	-4.8	134	1.3	136	-15	115
Bahrain	79	-18.7	64	28.6	83	-35.3	54
Bangladesh	141	-12.5	124	26.5	156	70.3	266
Barbados	305	1.7	310	3.7	321	5.5	339
Belarus	270	-11.8	238	33.5	318	-7.6	294
Belgium	..	..	..	..	19 331	19.8	23 157
Belize	19	3	19	7	21	11.8	23
Benin	31	-8.8	29	..	..	..	..
Bolivia	89	-11.5	78	0.3	79	9.7	86
Bosnia and Herzegovina	112	7	120	15	138	19.9	166
Botswana	31	16.7	36	57.2	57	..	..
Brazil	5 514	0.6	5 548	-5.5	5 244	0.3	5 260
Bulgaria	373	11.5	415	-6.8	387	15.2	446
Burkina Faso	5	49.8	8	..	..	..	..
Burundi	0	145.1	1	71.1	2	-53	1
Cambodia	47	5.7	50	8	54	-14.1	46
Cameroon	..	..	..	..	..	..	..
Canada	20 736	-2.6	20 197	4.1	21 026	13.3	23 820
Cape Verde	15	7.2	16	2.3	16	22.3	20
Central African Republic	..	..	..	..	..	..	..
Chad	..	..	..	..	..	..	..



Table 1.21 (Continued)

	2000	% change 2000–2001	2001	% change 2001–2002	2002	% change 2002–2003	2003
Chile	988	-0.9	978	23.9	1 212	12.6	1 364
China	9 642	0	9 644	24.7	12 030	64.4	19 773
Colombia	366	-7.5	339	-13.6	293	15.7	338
Comoros	..	..	..	..	..	..	..
Congo	84	-10.6	75	26.4	95	-40.4	57
Costa Rica	351	30.2	457	-4.4	437	4.3	455
Côte d'Ivoire	271	28.7	348	-2.1	341	7.5	366
Croatia	543	33.8	726	17.3	851	20.4	1 025
Cyprus	1 090	15.1	1 254	3.1	1 293	12.3	1 452
Czech Republic	2 221	1.8	2 261	-2.4	2 206	-12.9	1 922
Denmark	9 260	6.3	9 843	10.6	10 887	13.7	12 378
Djibouti	..	..	..	..	..	..	..
Dominica	32	-33.5	21	25.7	27	..	..
Dominican Republic	211	-25.1	158	1.1	160	2.1	163
Ecuador	101	19.2	121	7.5	130	6.7	139
Egypt	2 604	-18	2 136	12.1	2 394	14.1	2 733
El Salvador	194	-10.1	174	-1.5	171	6.8	183
Equatorial Guinea	..	..	..	..	..	..	..
Eritrea	10	..	..	..	..	..	..
Estonia	228	14.6	261	2.7	268	71.5	460
Ethiopia	104	-0.1	104	22.6	128	37.3	176
Faeroe Islands	10	-12.2	9	73.3	15	-51.2	8
Fiji	..	..	..	..	..	..	..
Finland	2 663	-7.8	2 454	18.3	2 902	21.6	3 528
France	27 933	9.3	30 517	1.8	31 057	19	36 968
Gabon	..	..	..	..	..	..	..
Gambia	..	..	..	..	..	..	..
Georgia	7	72.2	12	255.4	44	31.5	58
Germany	36 849	12	41 279	17.7	48 567	21.4	58 938
Ghana	57	6.5	61	9	66	11.6	74
Greece	1 805	2.5	1 851	3.2	1 911	25.8	2 404
Grenada	48	-22.2	37	-17.3	31	..	..
Guatemala	137	107	284	12.2	319	-27.5	231
Guinea	5	439.6	28	-79.3	6	18.1	7
Guinea-Bissau	..	..	1	370.1	4	-39.8	2
Guyana	89	19.9	107	11.1	119	21.4	145

Table 1.21 (Continued)

	2000	% change 2000–2001	2001	% change 2001–2002	2002	% change 2002–2003	2003
Haiti	30	-40	18	11.1	20	15	23
Honduras	122	0.5	122	-4	117	4.9	123
Hong Kong (China)	19 652	6.9	21 003	4	21 846	10.3	24 087
Hungary	1 486	42.2	2 113	29.2	2 730	22.1	3 334
Iceland	190	32	250	-1.5	247	17.7	290
India	10 090	13.8	11 486	16	13 318	19.1	15 859
Indonesia	86	-1.2	85	107.1	176	42.2	250
Iran, Islamic Rep. of	185	..	..	..	..	..	..
Ireland	14 331	32.4	18 977	24.5	23 629	34.8	31 853
Israel	7 869	-9.4	7 129	-3.7	6 863	12.4	7 713
Italy	17 867	19.4	21 331	1.5	21 658	23.2	26 691
Jamaica	327	-12.9	285	6.6	304	-10.7	271
Japan	33 483	-5.1	31 769	5.5	33 526	7.5	36 033
Jordan	577	-25.2	431	-8.5	395	-13	344
Kazakhstan	88	-4.6	83	48.6	124	86.4	231
Kenya	33	64.4	54	-38	34	13.5	38
Kiribati	..	..	..	..	..	..	..
Kuwait	91	0.0	91	36.9	125	4.7	131
Kyrgyzstan	22	9.7	24	75	42	-9.1	38
Lao People's Dem. Rep.	..	..	..	..	..	..	..
Latvia	239	10.2	263	10.2	290	20.8	350
Lesotho	12	-5.9	11	-3.4	11	35.6	15
Liberia	..	..	..	..	..	..	..
Libyan Arab Jamahiriya	28	35.7	38	39.5	53	24.5	66
Lithuania	155	38.2	214	23.5	265	1.6	269
Luxembourg	17 039	-2.9	16 542	-2.3	16 156	23.7	19 987
Macao (China)	..	..	..	..	168	25	210
Madagascar	121	-29.8	85	-18	70	-47	37
Malawi	..	..	..	..	..	..	..
Malaysia	5 684	-22.9	4 381	-0.6	4 354	4	4 528
Maldives	4	-6.3	4	30	5	32.8	7
Mali	17	18.3	20	20.6	25	27.2	31
Malta	177	4.6	185	13.5	210	3.8	218
Mauritania	..	..	..	..	..	..	..
Mauritius	292	22.2	356	-29	253	-5.7	239
Mexico	3 903	-26.5	2 867	-13.7	2 473	-19	2 003

Table 1.21 (Continued)

	2000	% change 2000–2001	2001	% change 2001–2002	2002	% change 2002–2003	2003
Mongolia	8	331.6	34	-71.2	10	..	..
Montserrat	5	-22.9	4	-5.9	4	..	..
Morocco	330	65.1	544	23.5	672	48	995
Mozambique	154	-16.8	128	10.4	141	-28.9	100
Myanmar	221	-6	207	-12	183	-23.9	139
Namibia	16	-30.7	11	-15.3	10	24	12
Nepal	191	-41.5	112	-53	53	27.5	67
Netherlands	21 796	3.6	22 578	17.8	26 603	12.3	29 879
Netherlands Antilles	636	-1.7	625	-5.8	589	10.7	652
New Zealand	868	-5.5	820	10.8	909	12.4	1 021
Nicaragua	28	-3.5	27	-6.3	26	12.1	29
Niger	..	..	..	..	..	..	..
Nigeria	..	..	..	..	..	..	..
Norway	5 556	-9.0	5 058	10.8	5 606	16.2	6 517
Oman	36	-38.3	22	6.3	24	-16.1	20
Pakistan	363	9.1	396	53.3	607	-15.3	514
Panama	351	-0.3	350	48.3	519	1.6	527
Papua New Guinea	224	15.7	259	..	..	..	..
Paraguay	431	-14.4	369	8.4	400	2.8	411
Peru	340	3.8	353	-5.1	335	-2.6	326
Philippines	813	-18.1	666	-5.4	630	22.4	771
Poland	1 977	0.4	1 985	-4.5	1 896	25.3	2 375
Portugal	2 045	-1.7	2 011	18.3	2 378	20.4	2 862
Republic of Korea	9 196	-8.0	8 457	-3.6	8 155	13.0	9 213
Republic of Moldova	32	15.5	37	27.2	47	5.7	49
Romania	699	8.6	759	26.7	962	28.9	1 240
Russian Federation	2 410	..	..	..	3 096	42.7	4 418
Rwanda	3	21.4	4	3.4	4	..	..
Saint Kitts and Nevis	25	-18.8	20	-8	18	..	..
Saint Lucia	29	-3.0	28	-6.9	26	..	..
Saint Vincent and the Grenadines	38	3.7	40	5.7	42	..	..
Samoa	..	..	..	..	..	..	..
Sao Tome and Principe	3	-13.7	2	4.3	3	..	..
Saudi Arabia	4 779	4.8	5 008	3.4	5 177	10.4	5 713
Senegal	133	-2.3	130	17	153	..	..
Seychelles	10	58.0	16	-6.3	15	..	..

Table 1.21 (Continued)

	2000	% change 2000–2001	2001	% change 2001–2002	2002	% change 2002–2003	2003
Sierra Leone	11	26.0	13	-97.1	0	696.4	3
Singapore	12 053	5.6	12 730	3.9	13 232	10.6	14 639
Slovakia	723	..	..	..	836	8.5	907
Slovenia	363	6.0	385	38.4	533	11.3	593
Solomon Islands	..	..	..	..	..	..	..
Somalia	..	..	..	..	..	..	..
South Africa	1 029	-22.2	801	-21.2	631	39.8	882
Spain	13 843	14.1	15 798	13.7	17 969	22.8	22 067
Sri Lanka	268	160.2	696	-51.8	335	8.0	362
Sudan	3	37.5	4	27.7	6	-28.8	4
Suriname	32	-29.5	23	-62.3	9	151.7	22
Swaziland	156	-51.3	76	0.0	76	..	..
Sweden	10 913	6.6	11 637	15.2	13 406	35.1	18 118
Switzerland	15 415	-8	14 181	25.5	17 803	13.1	20 128
Syrian Arab Republic	153	5.2	161	-21.1	127	63.8	208
Taiwan Province of China	11 912	-1.4	11 745	11.3	13 068	19	15 546
Tajikistan	..	..	..	..	12	27.7	15
TFYR Macedonia	116	-34.3	76	22.2	93	30.4	122
Thailand	2 822	-11.3	2 504	55.5	3 894	6.5	4 147
Togo	27	-4.5	26	28.8	33	-0.5	33
Tonga	..	..	7	-11.6	6	..	..
Trinidad and Tobago	123	26.2	155	-0.9	154	..	..
Tunisia	352	4.7	369	2.5	378	8.5	411
Turkey	8 553	-49.9	4 284	-39.3	2 599	10	2 859
Turkmenistan	..	..	..	..	..	..	..
Uganda	8	70.9	14	9.8	15	275.6	57
Ukraine	448	-25	336	13.7	382	34.3	513
United Kingdom	77 247	3.6	79 998	13.7	90 932	15.1	104 636
United Republic of Tanzania	142	-3.5	137	-19.3	110	..	..
United States	127 615	2	130 126	8.2	140 769	8.9	153 316
Uruguay	161	9.2	176	-36.9	111	5.4	117
Vanuatu	33	18.9	39	-64.8	14	27.1	17
Venezuela	260	-7.3	241	-27.4	175	-12.6	153
Viet Nam	..	..	..	..	..	..	..
Yemen	80	-15.6	68	5.2	71	-24.6	54
Zambia	5	..	..	..	..	..	..
Zimbabwe	..	..	..	..	..	..	..

**Table 1.21 (Continued)**

ICT-enabled service exports by region (million USD)	2000	% change 2000–2001	2001	% change 2001–2002	2002	% change 2002–2003	2003
Developed economies	508 803	3.9	528 650	11.3	588 157	17.5	690 968
Asia	41 351	-6.4	38 694	2.4	39 628	10.4	43 746
Europe	312 342	7	334 056	13.7	379 697	21.3	460 473
North America	148 857	1.4	151 003	8.1	163 282	10.4	180 231
Oceania	6 253	-21.7	4 897	13.3	5 551	17.4	6 518
Developing economies	112 177	-4.2	107 426	5.8	113 625	20	136 389
Africa	7 923	-8	7 292	10.5	8 058	27.3	10 260
Asia	87 782	-3.9	84 332	7.2	90 385	22.8	111 014
Latin America and the Caribbean	16 215	-4.4	15 498	-2.2	15 162	-0.4	15 097
Oceania	256	18.7	304	-93.5	20	-11.9	17
South-East Europe and CIS	5 217	-0.2	5 205	27.6	6 639	33.9	8 891
World	626 209	2.4	641 296	10.5	708 444	18	836 249

Source: UNCTAD calculations based on IMF BOP data

## Annex I

### Statistical Annex

#### Table 1.22

#### Exports of ICT-enabled services by sector and country, 2003 (million \$)

	Communication	Computer and information	Insurance	Financial	Royalties and licence fees	Other business	Personal, cultural and recreational	Total ICT-enabled services
Afghanistan	..	..	..	..	..	..	..	..
Albania	48	1	3	21	5	18	5	100
Algeria	..	..	..	..	..	..	..	..
Angola	..	..	0	..	..	135	1	137
Anguilla	..	..	..	..	..	..	..	..
Antigua and Barbuda	..	..	..	..	..	..	..	..
Argentina	148	153	..	1	48	689	107	1 147
Armenia	17	11	7	2	..	7	2	46
Aruba	12	0	0	3	..	117	..	132
Australia	611	720	441	645	401	2 302	376	5 497
Austria	669	188	1 739	995	155	15 936	265	19 946
Azerbaijan	22	..	5	..	..	102	2	132
Bahamas	..	..	..	..	..	115	..	115
Bahrain	..	..	..	..	..	54	..	54
Bangladesh	71	5	4	28	0	153	4	266
Barbados	32	18	90	74	1	124	1	339
Belarus	70	17	1	2	1	200	2	294
Belgium	1 861	2 118	743	2 529	878	14 664	362	23 157
Belize	6	98 145	98 145	98 145	98 145	17	98 145	23
Benin	..	..	..	..	..	..	..	..
Bolivia	27	0	38	12	2	7	1	86
Bosnia and Herzegovina	87	..	2	9	..	68	..	166
Botswana	..	..	..	..	..	..	..	..
Brazil	449	29	124	363	108	4 133	54	5 260
Bulgaria	45	15	18	18	5	308	37	446
Burkina Faso	..	..	..	..	..	..	..	..
Burundi	..	..	0	..	..	1	..	1
Cambodia	39	..	..	..	..	7	1	46
Cameroon	..	..	..	..	..	..	..	..
Canada	1 776	2 788	3 414	1 038	2 854	10 336	1 614	23 820
Cape Verde	15	0	1	0	0	4	0	20
Central African Republic	..	..	..	..	..	..	..	..

Table 1.22 (Continued)

	Communication	Computer and information	Insurance	Financial	Royalties and licence fees	Other business	Personal, cultural and recreational	Total ICT-enabled services
Chad	..	..	..	..	..	..	..	..
Chile	133	81	145	28	45	864	68	1 364
China	638	1 102	313	152	107	17 427	33	19 773
Colombia	136	16	..	36	6	113	31	338
Comoros	..	..	..	..	..	..	..	..
Congo	3	..	1	..	..	53	..	57
Costa Rica	23	167	..	5	0	261	0	455
Côte d'Ivoire	71	2	38	47	..	208	0	366
Croatia	213	62	20	48	35	615	33	1 025
Cyprus	51	92	34	190	15	1 059	10	1 452
Czech Republic	104	77	1	174	50	1 406	111	1 922
Denmark	..	..	..	..	..	12 378	..	12 378
Djibouti	..	..	..	..	..	..	..	..
Dominica	..	..	..	..	..	..	..	..
Dominican Republic	104	18	..	..	..	41	..	163
Ecuador	103	..	2	..	..	..	34	139
Egypt	309	23	37	80	121	2 092	72	2 733
El Salvador	123	0	31	3	0	25	..	183
Equatorial Guinea	..	..	..	..	..	..	..	..
Eritrea	..	..	..	..	..	..	..	..
Estonia	39	31	15	16	5	352	2	460
Ethiopia	21	0	1	5	..	148	1	176
Faeroe Islands	2	0	3	0	0	1	1	8
Fiji	..	..	..	..	..	..	..	..
Finland	226	565	50	36	502	2 118	32	3 528
France	2 500	1 256	2 074	1 071	4 066	24 133	1 868	36 968
Gabon	..	..	..	..	..	..	..	..
Gambia	..	..	..	..	..	..	..	..
Georgia	24	..	10	10	6	7	0	58
Germany	2 665	6 680	6 763	4 253	4 453	33 120	1 004	58 938
Ghana	..	..	7	..	..	67	..	74
Greece	322	136	199	85	18	1 310	334	2 404
Grenada	..	..	..	..	..	..	..	..
Guatemala	9	2	59	5	..	156	1	231
Guinea	0	..	0	..	0	6	..	7
Guinea-Bissau	0	..	0	1	..	2	..	2



Table 1.22 (Continued)

	Communication	Computer and information	Insurance	Financial	Royalties and licence fees	Other business	Personal, cultural and recreational	Total ICT-enabled services
Guyana	26	4	9	63	32	10	..	145
Haiti	23	..	..	..	..	..	..	23
Honduras	83	..	18	..	..	22	..	123
Hong Kong (China)	756	245	394	2 833	341	19 382	137	24 087
Hungary	208	244	33	191	313	1 519	825	3 334
Iceland	8	43	7	1	..	227	4	290
India	1 066	11 366	409	392	25	2 601	..	15 859
Indonesia	248	..	3	..	..	..	..	250
Iran, Islamic Rep. of	..	..	..	..	..	..	..	..
Ireland	1 159	14 372	5 245	3 727	206	6 743	400	31 853
Israel	171	3 657	16	..	425	3 445	..	7 713
Italy	1 894	501	1 157	893	525	21 000	720	26 691
Jamaica	143	36	7	26	12	26	20	271
Japan	662	1 076	373	3 471	12 271	18 042	140	36 033
Jordan	..	..	..	..	..	344	..	344
Kazakhstan	61	1	2	14	0	154	0	231
Kenya	15	0	11	..	12	..	0	38
Kiribati	..	..	..	..	..	..	..	..
Kuwait	..	..	84	..	..	47	..	131
Kyrgyzstan	9	1	1	1	2	19	5	38
Lao People's Dem. Rep.	..	..	..	..	..	..	..	..
Latvia	36	33	10	93	4	171	3	350
Lesotho	..	..	0	..	15	0	..	15
Liberia	..	..	..	..	..	..	..	..
Libyan Arab Jamahiriya	11	..	55	..	..	..	..	66
Lithuania	60	29	0	7	1	155	18	269
Luxembourg	811	1 137	1 248	14 245	119	2 262	165	19 987
Macao (China)	45	..	19	23	..	122	..	210
Madagascar	6	1	1	2	1	25	0	37
Malawi	..	..	..	..	..	..	..	..
Malaysia	201	216	223	109	20	1 924	1 835	4 528
Maldives	..	..	0	..	6	1	..	7
Mali	12	..	1	2	..	16	0	31
Malta	25	4	18	..	0	172	..	218
Mauritania	..	..	..	..	..	..	..	..
Mauritius	21	9	9	13	..	182	5	239

Table 1.22 (Continued)

	Communication	Computer and information	Insurance	Financial	Royalties and licence fees	Other business	Personal, cultural and recreational	Total ICT-enabled services
Mexico	423	..	1 163	..	84	41	293	2 003
Mongolia	..	..	..	..	..	..	..	..
Montserrat	..	..	..	..	..	..	..	..
Morocco	250	..	76	..	26	643	..	995
Mozambique	7	0	1	4	15	73	0	100
Myanmar	..	..	..	..	..	139	0	139
Namibia	9	0	0	0	..	3	..	12
Nepal	17	..	1	..	..	49	..	67
Netherlands	1 530	2 054	626	1 032	1 885	22 045	708	29 879
Netherlands Antilles	9	1	..	3	1	637	1	652
New Zealand	180	98	41	20	118	494	69	1 021
Nicaragua	26	..	2	..	..	..	..	29
Niger	..	..	..	..	..	..	..	..
Nigeria	..	..	..	..	..	..	..	..
Norway	300	373	359	552	195	4 529	210	6 517
Oman	15	..	5	..	..	..	..	20
Pakistan	190	34	22	12	8	247	1	514
Panama	46	..	19	295	..	167	..	527
Papua New Guinea	..	..	..	..	..	..	..	..
Paraguay	13	0	20	6	193	178	..	411
Peru	79	..	88	..	2	157	..	326
Philippines	433	28	12	38	4	247	9	771
Poland	243	134	219	161	28	1 532	58	2 375
Portugal	361	109	94	160	36	1 967	135	2 862
Republic of Korea	343	30	71	696	1 325	6 672	76	9 213
Republic of Moldova	24	1	2	2	1	18	1	49
Romania	238	108	48	51	3	674	118	1 240
Russian Federation	443	175	148	176	174	3 177	125	4 418
Rwanda	..	..	..	..	..	..	..	..
Saint Kitts and Nevis	..	..	..	..	..	..	..	..
Saint Lucia	..	..	..	..	..	..	..	..
Saint Vincent and the Grenadines	..	..	..	..	..	..	..	..
Samoa	..	..	..	..	..	..	..	..
Sao Tome and Principe	..	..	..	..	..	..	..	..
Saudi Arabia	..	..	..	..	..	5 713	..	5 713
Senegal	..	..	..	..	..	..	..	..

Table 1.22 (Continued)

	Communication	Computer and information	Insurance	Financial	Royalties and licence fees	Other business	Personal, cultural and recreational	Total ICT-enabled services
Seychelles	..	..	..	..	..	..	..	..
Sierra Leone	3	..	0	0	0	0	..	3
Singapore	..	319	874	1 803	197	11 426	20	14 639
Slovakia	76	84	18	58	50	552	69	907
Slovenia	70	88	8	19	11	375	21	593
Solomon Islands	..	..	..	..	..	..	..	..
Somalia	..	..	..	..	..	..	..	..
South Africa	56	..	323	..	49	453	..	882
Spain	1 032	2 916	1 346	1 900	539	13 511	824	22 067
Sri Lanka	53	80	48	..	..	182	..	362
Sudan	3	..	..	1	..	0	0	4
Suriname	..	..	0	..	..	22	..	22
Swaziland	..	..	..	..	..	..	..	..
Sweden	815	1 993	732	886	2 336	11 148	208	18 118
Switzerland	955	..	3 542	8 387	..	7 241	4	20 128
Syrian Arab Republic	40	50	1	22	..	95	..	208
Taiwan Province of China	338	110	451	863	215	13 529	40	15 546
Tajikistan	10	0	..	2	1	2	..	15
TFYR Macedonia	41	5	2	3	2	65	4	122
Thailand	148	..	134	..	7	3 858	..	4 147
Togo	9	1	0	0	..	23	..	33
Tonga	..	..	..	..	..	..	..	..
Trinidad and Tobago	..	..	..	..	..	..	..	..
Tunisia	9	19	20	55	18	283	5	411
Turkey	224	..	211	291	..	1 352	781	2 859
Turkmenistan	..	..	..	..	..	..	..	..
Uganda	17	4	3	15	4	14	..	57
Ukraine	83	17	14	20	14	361	4	513
United Kingdom	3 396	7 893	10 966	22 065	10 245	47 322	2 750	104 636
United Republic of Tanzania	..	..	..	..	..	..	..	..
United States	5 719	5 431	4 877	17 637	48 227	64 074	7 351	153 316
Uruguay	23	14	6	58	..	16	..	117
Vanuatu	3	..	..	9	..	6	..	17
Venezuela	48	6	2	..	..	92	5	153
Viet Nam	..	..	..	..	..	..	..	..
Yemen	43	..	..	..	..	10	..	54

**Table 1.22 (Continued)**

	Communication	Computer and information	Insurance	Financial	Royalties and licence fees	Other business	Personal, cultural and recreational	Total ICT-enabled services
Zambia	..	..	..	..	..	..	..	..
Zimbabwe	..	..	..	..	..	..	..	..

World exports of ICT-enabled services in 2003 (million USD)	829 625
Communications services	39 976
Computer and information services	71 524
Insurance services	52 382
Financial services	95 391
Royalties and licence fees services	94 231
Other business services	451 484
Personal, cultural and recreational services	24 637
Non-ICT-enabled services	1 007 236

Source: IMF BOP data

## Annex I

Table 1.23

## Exports of computer and information services by country, 2000–2003 (\$)

	2000	% change 2000–2001	2001	% change 2001–2002	2002	% change 2002–2003	2003
Albania	2 200 000	..	..	..	550 000	114.8	1 181 600
Argentina	147 106 000	28.4	188 912 000	-39.1	115 056 000	32.6	152 616 000
Armenia	1 970 000	324.0	8 352 000	17.9	9 850 000	11.8	11 009 300
Aruba	391 061	-28.6	279 330	..	..	..	335 196
Australia	469 625 000	-9.0	427 572 000	39.6	596 853 000	20.6	719 911 000
Austria	134 854 000	-2.9	130 956 000	6.8	139 922 000	34.4	188 034 000
Bangladesh	3 243 270	-22.8	2 503 150	25.6	3 143 810	62.5	5 108 450
Barbados	17 350 000	0.6	17 450 000	0.9	17 600 000	2.6	18 050 000
Belarus	4 500 000	48.9	6 700 000	83.6	12 300 000	41.5	17 400 000
Belgium	..	..	..	..	1 773 720 000	18.7	2 105 310 000
Bolivia	400 000	0.0	400 000	0.0	400 000	0.0	400 000
Botswana	21 365	1725.4	389 991	347.5	1 745 110	-20.2	1 391 920
Brazil	33 971 000	-20.6	26 966 000	35.1	36 418 000	-20.2	29 071 000
Bulgaria	5 088 800	143.9	12 412 000	-40.5	7 389 800	100.3	14 800 000
Burkina Faso	1 405	1259.8	19 099	..	..	..	..
Canada	2 428 410 000	-4.0	2 330 850 000	-2.1	2 282 810 000	22.1	2 787 780 000
Cape Verde	79 567	20.6	95 995	-70.2	28 594	52.2	43 514
Chile	33 400 000	28.3	42 837 900	46.8	62 900 000	29.4	81 400 000
China	355 947 000	29.5	461 000 000	38.4	638 167 000	72.7	1102 180 000
Colombia	3 833 030	96.2	7 521 900	-21.1	5 938 420	177.6	16 484 200
Costa Rica	59 653 100	109.0	124 650 000	23.1	153 436 000	8.7	166 761 000
Côte d'Ivoire	182 590	-2.9	177 344	1760.7	3 299 910	-51.1	1 613 900
Croatia	33 490 500	30.7	43 765 300	4.4	45 688 600	36.1	62 160 500
Cyprus	57 839 800	50.0	86 763 500	19.9	104 013 000	-17.5	85 760 100
Czech Republic	94 679 100	29.6	122 716 000	17.5	144 224 000	-46.9	76 600 900
Dominican Republic	..	..	..	..	17 800 000	-1.1	17 600 000
Egypt	23 000 000	-3.5	22 200 000	22.5	27 200 000	-16.5	22 700 000
El Salvador	3 900 000	-94.9	200 000	-50.0	100 000	300.0	400 000
Eritrea	31 132	..	..	..	..	..	..
Estonia	21 175 300	9.8	23 256 200	4.4	24 268 600	28.1	31 099 600
Ethiopia	404 999	405.6	2 047 760	-69.7	620 917	-49.5	313 538
Faeroe Islands	180 000	5.6	190 000	36.8	260 000	-11.5	230 000
Finland	203 128 000	49.8	304 370 000	66.2	505 824 000	11.7	565 056 000
France	803 433 000	39.7	1 122 610 000	5.8	1 188 220 000	5.7	1 256 130 000
Gabon	1 706 520	-50.8	840 338	-26.4	618 375	233.1	2 059 530
Germany	3 798 150 000	26.5	4 804 960 000	15.1	5 531 210 000	21.0	6 693 720 000
Greece	88 800 000	-7.7	82 000 000	-2.4	80 026 000	69.1	135 291 000
Guatemala	3 700 000	30.0	4 811 670	49.8	7 210 240	-74.3	1 856 500

Table 1.23 (Continued)

	2000	% change 2000–2001	2001	% change 2001–2002	2002	% change 2002–2003	2003
Guinea	..	..	134 000	-70.1	40 000	..	..
Guyana	500 000	260.0	1 800 000	138.9	4 300 000	-4.7	4 100 000
Hong Kong (China)	59 681 000	158.0	153 999 000	34.8	207 593 000	18.2	245 436 000
Hungary	120 948 000	45.1	175 514 000	13.8	199 648 000	22.1	243 765 000
Iceland	29 480 800	-7.8	27 188 700	44.1	39 190 000	12.9	44 240 400
India	4 727 390 000	56.7	7 407 380 000	20.0	8 889 330 000	27.9	11 365 700 000
Ireland	7 489 690 000	19.2	8 925 660 000	17.0	10 447 100 000	36.3	14 237 800 000
Israel	4 246 100 000	-18.3	3 470 800 000	-9.4	3 143 300 000	16.3	3 656 500 000
Italy	447 586 000	-21.7	350 635 000	10.7	388 017 000	29.1	501 080 000
Jamaica	40 400 000	-9.4	36 600 000	-6.7	34 140 000	5.4	36 000 000
Japan	1 569 320 000	-10.0	1 413 120 000	-19.3	1 140 170 000	-5.7	1 075 520 000
Kazakhstan	1 087 410	-56.4	474 100	-64.0	170 880	223.3	0 552 416
Kenya	370 421	-9.8	334 151	103.8	681 150	-99.7	0 1 712
Kyrgyzstan	473 757	0.7	477 239	36.3	650 651	128.1	1 484 380
Latvia	20 216 200	8.3	21 892 900	13.3	24 812 000	31.9	32 725 500
Lebanon	..	..	..	..	12 593	-75.7	0 3 064
Lithuania	15 495 000	56.0	24 175 000	-22.2	18 806 100	52.3	28 638 500
Luxembourg	172 179 000	0.1	172 410 000	79.2	309 015 000	291.1	1 208 560 000
Madagascar	..	..	..	..	..	..	715 742
Malaysia	81 578 900	116.1	176 316 000	3.0	181 579 000	19.0	216 000 000
Mali	..	..	..	..	117 649	..	..
Malta	3 442 750	-7.4	3 187 000	10.0	3 504 620	44.8	5 076 430
Mauritius	2 817 420	116.4	6 097 940	2.0	6 217 450	47.4	9 162 000
Mongolia	..	..	..	..	925 590	94.5	1 800 000
Mozambique	..	..	..	..	0 986	692.4	7 813
Namibia	512 279	..	..	..	..	..	26 856
Netherlands	1 166 300 000	-25.9	863 731 000	64.7	1 422 490 000	102.8	2 884 340 000
Netherlands Antilles	2 011 170	-23.6	1 535 750	-37.4	960 894	40.1	1 346 370
New Zealand	79 782 800	-1.9	78 268 300	23.6	96 725 600	1.7	98 329 200
Niger	14 045	385.6	68 209	34.6	91 824	113.6	196 146
Norway	660 314 000	-10.8	589 015 000	-48.9	300 880 000	24.1	373 277 000
Pakistan	22 000 000	-13.6	19 000 000	10.5	21 000 000	61.9	34 000 000
Paraguay	400 000	-25.0	300 000	33.3	400 000	-50.0	200 000
Philippines	76 000 000	-71.1	22 000 000	-4.5	21 000 000	33.3	28 000 000
Poland	61 000 000	37.7	84 000 000	17.9	99 000 000	35.4	134 000 000
Portugal	74 891 600	-19.1	60 555 200	27.7	77 346 000	41.2	109 175 000
Republic of Korea	10 600 000	51.9	16 100 000	21.1	19 500 000	52.3	29 700 000
Rep. of Moldova	570 000	-29.8	400 000	117.5	870 000	36.8	1 190 000
Romania	44 000 000	13.6	50 000 000	56.0	78 000 000	38.5	108 000 000
Russian Federation	59 170 000	116.3	127 990 000	7.3	137 300 000	27.4	174 970 000
Saint Lucia	5 000 000	-30.0	3 500 000	-30.5	2 433 330	..	..

Table 1.23 (Continued)

	2000	% change 2000–2001	2001	% change 2001–2002	2002	% change 2002–2003	2003
Senegal	16 855	1454.0	261 923	-90.1	25 825	193.1	75 705
Singapore	247 204 000	26.1	311 612 000	13.3	353 061 000	-5.4	334 144 000
Slovakia	51 916 300	..	..	..	71 009 300	17.9	83 746 800
Slovenia	53 920 000	18.9	64 090 000	24.5	79 772 000	10.8	88 378 500
Spain	2 043 160 000	6.6	2 177 810 000	14.3	2 490 110 000	17.0	2 913 370 000
Sri Lanka	..	..	65 960 000	-24.2	50 000 100	30.0	64 999 900
Sudan	..	..	..	..	460 000	..	..
Swaziland	1 873 250	-19.4	1 510 020	-24.6	1 138 440	5.4	1 200 300
Sweden	1 190 920 000	20.3	1 432 980 000	2.7	1 471 560 000	35.5	1 993 310 000
Syrian Arab Republic	..	..	..	..	..	..	50 000 000
Tajikistan	..	..	..	..	7 300	-84.9	1 100
TFYR Macedonia	1 036 400	52.7	1 582 800	23.2	1 950 450	134.0	4 564 740
Togo	..	..	95 493	-74.5	24 391	2044.5	523 055
Tunisia	19 698 200	5.9	20 852 000	-12.3	18 287 500	6.1	19 403 000
Uganda	..	..	..	..	648 359	554.7	4 244 640
Ukraine	6 000 000	16.7	7 000 000	42.9	10 000 000	70.0	17 000 000
United Kingdom	4 321 480 000	8.4	4 682 790 000	23.2	5 770 140 000	36.8	7 892 540 000
United Republic of Tanzania	500 001	8.7	543 667	30.0	707 037	-71.0	204 854
United States	5 622 000 000	-3.5	5 423 100 000	-0.6	5 393 100 000	18.7	6 404 100 000
Uruguay	10 000 000	44.0	14 400 000	-5.6	13 600 000	-14.7	11 600 000
Venezuela	7 000 000	0.0	7 000 000	0.0	7 000 000	-14.3	6 000 000

World	45 489 523 096	11.7	50 822 941 869	11.3	56 588 732 394	29.3	73 152 884 872
Developed economies	39 326 046 650	5.3	41 393 085 800	9.6	45 357 046 220	29.3	58 653 394 930
Asia	5 815 420 000	-16.0	4 883 920 000	-12.3	4 283 470 000	10.5	4 732 020 000
Europe	24 910 808 850	13.4	28 249 375 500	15.8	32 704 087 620	34.3	43 911 254 730
North America	8 050 410 000	-3.7	7 753 950 000	-1.0	7 675 910 000	19.7	9 191 880 000
Oceania	549 407 800	-7.9	505 840 300	37.1	693 578 600	18.0	818 240 200
Developing economies	6 003 889 579	52.7	9 170 702 630	19.2	10 926 958 493	28.9	14 085 175 906
Africa	51 230 048	8.7	55 667 930	11.3	61 953 517	3.1	63 884 226
Asia	5 583 644 170	54.7	8 635 870 150	20.3	10 385 312 093	29.8	13 477 071 414
Latin America and the Caribbean	369 015 361	29.8	479 164 550	0.1	479 692 884	13.5	544 220 266
Oceania	0	0.0	0	0.0	0	0.0	0
South-East Europe and CIS	159 586 867	62.4	259 153 439	17.6	304 727 681	36.0	414 314 036

Source: UNCTAD calculations based on IMF BOP data.



## Annex II

### THE ORBICOM CONCEPTUAL FRAMEWORK

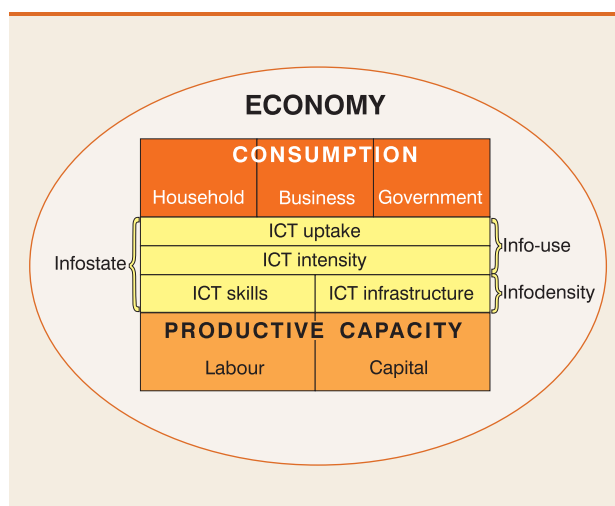
The research presented in section E of this chapter is based on the conceptual framework and methodology developed by the Orbicom Digital Divide project. Crucial to the project is the development of a composite index (ICT Opportunity Index) based on a number of ICT-related indicators that define the “infostate” of a country (Orbicom, 2005).

The Orbicom conceptual framework distinguishes between ICT productive and consumptive functions, denominated “infodensity” and “info-use” respectively.

ICT productive functions are understood to be indicative of productive capacity (both quantitative and qualitative) and include ICT capital and labour stocks; this is defined in the model as “infodensity”. ICT capital includes network infrastructure, such as that related to main telephone lines, cable connectivity and the Internet, as well as ICT machinery and equipment (a total of eight indicators). ICT labour stocks are measured by the level of skills in the labour force, and in relation to basic literacy and school enrolment at different levels (a total of four indicators). They are not limited to ICT skills, but include overall levels of skills and education, which are considered indispensable for the functioning of knowledge-based societies.

Chart 1.41

#### Orbicom conceptual framework of Infostates



Source: Orbicom (2003)

ICT capital and labour stocks are assumed to expand over time and have no upward boundary. Furthermore, ICTs are assumed to affect factor growth, technological change and productivity gains. The notion of ICT networks deserves particular mention since networks create externalities — that is, their benefits increase with the number of users.

The ICT consumptive functions are understood as the “consumptive capacity” of people or the use of ICTs, comprising ICT uptake (such as telephones, PCs or Internet users per 100 inhabitants) and ICT intensity (such as broadband users and international phone traffic per capita). The consumptive part of the framework is called “info-use” (see chart 1.41 for a presentation of the framework).

As shown in chart 1.41, the “infostate” index is simply an aggregate of “info-use” and “infodensity”. The model then defines the digital divide as the difference between countries’ infostates.

The conceptual model was translated into an empirical, operational model, using statistical indicators, and creating a reference year (2001) and hypothetical country as benchmarks to quantify the evolution of the digital divide.

The analysis carried out by UNCTAD refers to “infodensity” only. Infodensity is assumed to be more relevant to measuring the impact of ICTs on economic growth (GDP per capita), which relies primarily on the expansion of productive capacity in a country, and less on the expansion of consumption.

In the Orbicom model, infodensity is expressed in relative terms; each country is allocated an infodensity index, which is calculated as follows:

$$\text{Infodensity} = \sqrt[k]{\prod_{i=1}^k I_{n,t}^{i,j(c)}}, \text{ with } k=2.$$

The model is based on a number of statistical indicators and hence relies on existing data; the latest database includes time series covering the period 1995–2003. While data for up to 193 countries exist, 153 countries are included in the infodensity time series, representing 96 per cent of the global population in 2003.

**Table 1.24**  
**Country grouping by Infodensity levels**

Group A	Infodensity 2003	Group B	Infodensity 2003	Group C	Infodensity 2003	Group D	Infodensity 2003	Group E	Infodensity 2003
Denmark	246	Slovenia	166	Bulgaria	112	Samoa	82	Kenya	34
Sweden	242	Czech Republic	160	Brazil	111	Ukraine	82	Djibouti	32
Netherlands	238	Estonia	160	Mexico	99	Belarus	76	Lesotho	32
Finland	238	Hungary	159	Russian Federation	95	Kazakhstan	70	Tajikistan	32
Norway	234	Spain	156	Turkey	95	Paraguay	69	Côte d'Ivoire	32
Switzerland	219	Portugal	155	Trinidad & Tobago	94	Georgia	67	Lao People's Dem. Rep.	31
United States	212	Italy	151	Romania	92	Bolivia	67	Sudan	28
United Kingdom	210	Malta	150	Malaysia	91	Fiji	67	Zambia	27
Belgium	208	Slovakia	142	Dominican Rep.	90	Philippines	66	Cameroon	27
Austria	203	Greece	141	Mauritius	89	Botswana	64	Pakistan	26
Canada	201	Latvia	136	Serbia & Montenegro	87	Namibia	63	Mauritania	26
Iceland	200	Poland	135	South Africa	87	Guyana	63	Senegal	26
Australia	197	Cyprus	133	Lebanon	86	Ecuador	61	Ghana	25
Luxembourg	194	Lithuania	133	Kuwait	85	Guatemala	59	Benin	25
Ireland	190	Qatar	132	Belize	84	Armenia	56	Congo	24
Germany	186	Uruguay	126	Panama	83	Oman	55	Uganda	24
Hong Kong (China)	185	Argentina	124	Costa Rica	82	Albania	54	Rwanda	24
France	181	Brunei Darussalam	121	Thailand	82	Kyrgyzstan	53	Cambodia	23
Singapore	180	Chile	119	Colombia	80	Mongolia	52	United Republic of Tanzania	23
Israel	178	Croatia	117	Rep. of Moldova	79	Swaziland	51	Yemen	23
New Zealand	177	United Arab Emirates	108	Jamaica	79	Nicaragua	51	Mozambique	23
Japan	177	Macao (China)	105	Venezuela	74	Indonesia	48	Madagascar	21
Rep. of Korea	171	Bahamas	103	Peru	71	Iran	47	Papua New Guinea	21
		Bahrain	98	Jordan	69	Gabon	47	Nigeria	21
		Barbados	96	Saudi Arabia	67	Tunisia	47	Bangladesh	21
				El Salvador	64	Sri Lanka	45	Haiti	20
				China	62	Egypt	44	Nepal	20
						Honduras	42	Malawi	18
						Morocco	41	Guinea	17
						Zimbabwe	39	Mali	15
						Libyan Arab Jamahiriya	39	Myanmar	15
						Algeria	36	Burkina Faso	14
						Cuba	35	Angola	12
						Syrian Arab Republic	35	Liberia	11
						Gambia	35	Central African Rep.	11
						India	34	Chad	11
						Viet Nam	31	Dem. Rep. of the Congo	10
						Togo	29	Ethiopia	10
								Eritrea	10
								Niger	8

Source: UNCTAD and Orbicom (2005)

## Annex III

**Table 1.25**  
**Breakdown of the computer and related service sector**

WTO classification	Provisional UN CPC Description
B. Computer and related services (under the superior aggregation Business services)	Division 84. Computer and related services (under Section 8. Business services)
1.B.a. Consultancy services related to the installation of computer hardware (CPC 841)	841. <i>Consultancy services related to the installation of computer hardware</i> : Assistance services to clients in the installation of computer hardware (i.e. physical equipment) and computer networks.
1.B.b. Software implementation services (CPC 842)	842. <i>Software implementation services</i> : All services involving consultancy services on software, and development and implementation of software. The term "software" may be defined as the sets of instructions required to make computers work and communicate. A number of different programs may be developed for specific applications (application software), and the customer may have a choice of using ready-made programs off the shelf (packaged software), developing specific programs for particular requirements (customized software) or using a combination of the two. 84210. <i>Systems and software consulting services</i> : Services of a general nature prior to the development of data processing systems and applications (management services, project planning services, etc.) 84220. <i>Systems analysis services</i> : Include analysis of the clients' needs, defining functional specification, and setting up the team. Also involved are project management, technical coordination and integration and definition of the systems architecture. 84230. <i>Systems design services</i> : Include technical solutions, with respect to methodology, quality-assurance, choice of equipment software packages or new technologies, etc. 84240. <i>Programming services</i> : Include the implementation phase, i.e. writing and debugging programs, conducting tests, and editing documentation. 84250. <i>Systems maintenance services</i> : Include consulting and technical assistance services of software products in use, rewriting or changing existing programs or systems, and maintaining up-to-date software documentation and manuals. Also included are specialist works, e.g. conversions.
1.B.c. Data processing services (CPC 843)	843. <i>Data processing services</i> : 84310. <i>Input preparation services</i> : Data recording services such as key punching, optical scanning or other methods for data entry. 84320. <i>Data-processing and tabulation services</i> : Services such as data processing and tabulation services, computer calculating services, and rental services of computer time. 84330. <i>Time-sharing services</i> : This seems to be the same type of services as 84320. Computer time only is bought; if it is bought from the customer's premises, telecommunications services are also bought. Data processing or tabulation services may also be bought from a service bureau. In both cases the services might be time sharing processed. Thus, there is no clear distinction between 84320 and 84330. 84390. <i>Other data processing services</i> : Services which manage the full operations of a customer's facilities under contract: computer-room environmental quality control services; management services of in-place computer equipment combinations; and management services of computer work flows and distributions.
1.B.d. Data base services (CPC 844)	84400. <i>Data base services</i> : All services provided from primarily structured databases through a communication network. Exclusions: Data and message transmission services (e.g. network operation services, value-added network services) are classified in class 7523 (Data and message transmission services). Documentation services consisting in information retrieval from databases are classified in subclass 96311 (Library services).
1.B.e. Other (CPC 845+849)	84500. <i>Maintenance and repair services of office machinery and equipment including computers</i> : Repair and maintenance services of office machinery, computers and related equipment. 849. <i>Other computer services</i> : 84910. <i>Data preparation services</i> : Data preparation services for clients not involving data processing services. 84990. <i>Other computer services n.e.c.</i> : Other computer related services, not elsewhere classified, e.g. training services for staff of clients, and other professional computer services.

Sources: Document S/C/W/45, Background Note by the WTO Secretariat (July 1998) – page 3, figure 1; *Detailed structure and explanatory notes of Provisional CPC code 84*, <http://unstats.un.org/unsd/cr/registry/regcs.asp?Cl=9&Lg=1&Co=84>

## Annex IV

**Table 1.26**  
Mode 1 and Mode 3 market access commitments for computer  
and related services (WTO, GATS)

WTO members	Mode 1 Limitations on market access
Albania	None
Angola	Not included in the list
Antigua and Barbuda	None
Argentina	None
Armenia	None
Australia	None
Austria	None
Bahrain	Not included in the list
Bangladesh	Not included in the list
Barbados	None
Belgium	None
Belize	Not included in the list
Benin	Not included in the list
Bolivia	Not included in the list
Botswana	Unbound
Brazil	Not included in the list
Brunei Darussalam	None
Bulgaria	None
Burkina Faso	Not included in the list
Burundi	Not included in the list
Cambodia	None
Cameroon	Not included in the list
Canada	None
Central African Republic	Not included in the list
Chad	Not included in the list
Chile	Not included in the list
China	None
Chinese Taipei	None
Colombia	Unbound
Congo	Not included in the list
Costa Rica	Unbound
Côte d'Ivoire	Not included in the list

**Table 1.26 (Continued)**

WTO members	Mode 1 Limitations on market access
Croatia	None
Cuba	None
Cyprus	None
Czech Republic	None
Dem. Rep. of the Congo	Not included in the list
Denmark	None
Djibouti	Not included in the list
Dominica	Not included in the list
Dominican Republic	Unbound
Ecuador	Unbound
Egypt	Not included in the list
El Salvador	None
Estonia	None
Fiji	Not included in the list
Finland	None
France	None
Gabon	Not included in the list
Gambia	None
Georgia	None - computer and related services except CPC 8499
Georgia	Unbound - CPC 8499
Germany	None
Ghana	Not included in the list
Greece	None
Grenada	Not included in the list
Guatemala	None
Guinea	Not included in the list
Guinea-Bissau	Not included in the list
Guyana	Not included in the list
Haiti	Not included in the list
Honduras	None
Hong Kong (China)	Partial
Hungary	None
Iceland	None
India	Unbound
Indonesia	None - CPC 84330
Indonesia	Unbound - computer and related services CPC 841 AND 842
Ireland	None

**Table 1.26 (Continued)**

WTO members	Mode 1 Limitations on market access
Israel	None
Italy	None
Jamaica	None
Japan	None
Jordan	None
Kenya	Not included in the list
Kuwait	Unbound
Kyrgyzstan	None
Latvia	None
Lesotho	None
Liechtenstein	None
Lithuania	None
Luxembourg	None
Macao (China)	Not included in the list
Madagascar	Not included in the list
Malawi	Not included in the list
Malaysia	None
Maldives	None
Mali	Not included in the list
Malta	None
Mauritania	Not included in the list
Mauritius	Not included in the list
Mexico	None
Mongolia	Not included in the list
Morocco	Unbound
Mozambique	Not included in the list
Myanmar	Not included in the list
Namibia	Not included in the list
Nepal	None
Netherlands	None
Netherlands Antilles	Not included in the list
New Zealand	None
Nicaragua	Unbound
Niger	Not included in the list
Nigeria	Not included in the list
Norway	None
Oman	None

**Table 1.26 (Continued)**

WTO members	Mode 1 Limitations on market access
Pakistan	Unbound
Panama	None
Papua New Guinea	None
Paraguay	Not included in the list
Peru	Not included in the list
Philippines	Not included in the list
Poland	None
Portugal	None
Qatar	Unbound
Republic of Korea	None
Rep. Of Moldova	None
Romania	None
Rwanda	Not included in the list
Saint Kitts and Nevis	Not included in the list
Saint Lucia	Not included in the list
Saint Vincent and the Grenadines	Not included in the list
Saudi Arabia	None
Senegal	Not included in the list
Sierra Leone	None
Singapore	None
Slovakia	None
Slovenia	None
Solomon Islands	Not included in the list
South Africa	None
Spain	None
Sri Lanka	Not included in the list
Suriname	Not included in the list
Swaziland	None
Sweden	None
Switzerland	None
TFYR Macedonia	None
Thailand	Unbound
Togo	Not included in the list
Trinidad and Tobago	None
Tunisia	Not included in the list
Turkey	Partial
Uganda	Not included in the list



**Table 1.26 (Continued)**

WTO members	Mode 1 Limitations on market access
United Arab Emirates	None
United Kingdom	None
United Republic of Tanzania	Not included in the list
United States	None
Uruguay	None
Venezuela	Partial

## Mode 3 market access commitments for computer and related services (WTO, GATS)

Country	Mode 3 Limitations on market access
Albania	None
Angola	Not included in the list
Antigua and Barbuda	Partial
Argentina	None
Armenia	None
Australia	None
Austria	None
Bahrain	Not included in the list
Bangladesh	Not included in the list
Barbados	None
Belgium	None
Belize	Not included in the list
Benin	Not included in the list
Bolivia	Not included in the list
Botswana	None
Brazil	Not included in the list
Brunei Darussalam	Partial
Bulgaria	None
Burkina Faso	Not included in the list
Burundi	Not included in the list
Cambodia	None
Cameroon	Not included in the list
Canada	None
Central African Republic	Not included in the list
Chad	Not included in the list
Chile	Not included in the list
China	None - computer and related services CPC 841 and CPC 8431 to 8433

**Table 1.26 (Continued)**

Country	Mode 3 Limitations on market access
China	Partial - CPC 8421 to 8425
Chinese Taipei	None
Colombia	None
Congo	Not included in the list
Costa Rica	Unbound
Côte d'Ivoire	Not included in the list
Croatia	None
Cuba	None
Cyprus	None
Czech Republic	None
Dem. Rep. of the Congo	Not included in the list
Denmark	None
Djibouti	Not included in the list
Dominica	Not included in the list
Dominican Republic	None
Ecuador	None
Egypt	Not included in the list
El Salvador	None
Estonia	None
Fiji	Not included in the list
Finland	None
France	None
Gabon	Not included in the list
Gambia	Partial
Georgia	None
Germany	None
Ghana	Not included in the list
Greece	None
Grenada	Not included in the list
Guatemala	None
Guinea	Not included in the list
Guinea-Bissau	Not included in the list
Guyana	Not included in the list
Haiti	Not included in the list
Honduras	None
Hong Kong (China)	None
Hungary	None

**Table 1.26 (Continued)**

Country	Mode 3 Limitations on market access
Iceland	None
India	Partial
Indonesia	Partial
Ireland	None
Israel	None
Italy	None
Jamaica	Partial
Japan	None
Jordan	None
Kenya	Not included in the list
Kuwait	None
Kyrgyzstan	None
Latvia	None
Lesotho	None
Liechtenstein	None
Lithuania	None
Luxembourg	None
Macao (China)	Not included in the list
Madagascar	Not included in the list
Malawi	Not included in the list
Malaysia	Partial - computer and related services CPC 841, CPC 842, except software development, plus
Malaysia	None - CPC 842 <sup>1</sup>
Maldives	None
Mali	Not included in the list
Malta	None
Mauritania	Not included in the list
Mauritius	Not included in the list
Mexico	Partial
Mongolia	Not included in the list
Morocco	None
Mozambique	Not included in the list
Myanmar	Not included in the list
Namibia	Not included in the list
Nepal	Partial
Netherlands	None
Netherlands Antilles	Not included in the list
New Zealand	None

**Table 1.26 (Continued)**

Country	Mode 3 Limitations on market access
Nicaragua	None
Niger	Not included in the list
Nigeria	Not included in the list
Norway	None
Oman	Partial
Pakistan	None
Panama	Partial
Papua New Guinea	None
Paraguay	Not included in the list
Peru	Not included in the list
Philippines	Not included in the list
Poland	None
Portugal	None
Qatar	None
Republic of Korea	None
Rep. Of Moldova	None
Romania	None
Rwanda	Not included in the list
Saint Kitts and Nevis	Not included in the list
Saint Lucia	Not included in the list
Saint Vincent and the Grenadines	Not included in the list
Saudi Arabia	None
Senegal	Not included in the list
Sierra Leone	None
Singapore	None
Slovakia	None
Slovenia	None
Solomon Islands	Not included in the list
South Africa	None
Spain	None
Sri Lanka	Not included in the list
Suriname	Not included in the list
Swaziland	None
Sweden	None
Switzerland	None
TFYR Macedonia	None
Thailand	Partial

**Table 1.26 (Continued)**

Country	Mode 3 Limitations on market access
Togo	Not included in the list
Trinidad and Tobago	None
Tunisia	Not included in the list
Turkey	Partial
Uganda	Not included in the list
United Arab Emirates	None
United Kingdom	None
United Republic of Tanzania	Not included in the list
United States	None
Uruguay	None
Venezuela	None
Zambia	Not included in the list
Zimbabwe	Not included in the list

Note:

<sup>1</sup> Specifically, computer software development services covering development of new software for general application, including ready-made software packaged for general application.

Source: UNCTAD based on WTO Services Database (<http://tsdb.wto.org/wto/WTOHomepublic.htm>)

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## Notes

1. Although developing Oceania apparently presents the highest growth rate from 2004–2005, it should be noted that data for most countries are missing for 2004; countries also depart from a lower base than Africa.
2. See [http://www.pyramidresearch.com/pa\\_jan12\\_pred.htm](http://www.pyramidresearch.com/pa_jan12_pred.htm).
3. This does not include peer-to-peer music file sharing.
4. Data on Internet users worldwide take into account all kinds of users in all types of locations, and in countries with no Internet use surveys, figures are estimated on the basis of the number of Internet subscribers, with a multiplier for each country.
5. These countries also account for 35.3 per cent of the population in the whole of Europe (including South-East Europe and CIS countries), 54.1 per cent of the population in developed Europe and 55.5 per cent of the population in the EU25.
6. In 2004, the financial sector had 97 per cent penetration or more for the six countries reporting on this industry. Of the 21 OECD countries able to report on wholesale trade and the real estate, renting and business services sectors, 14 had Internet penetration rates of over 90 per cent for both (including Belgium, Denmark, Finland and Sweden). The retail sector had slightly lower penetration except in Finland, Denmark, Sweden, Canada and Switzerland (all had more than 90 per cent).
7. Germany conducted a different survey for the financial services sector because of its structural differences with other industries. Thus it is not always included in average values stated for all enterprises. (Information Technology in Enterprises and Households 2005, Federal Statistical Office of Germany).
8. Enterprise data for 2005 are not available for France, Malta and Portugal.
9. This is a Spearman rank correlation, which measures the strength of the associations between two variables. A coefficient between 0.5 and 1 shows a strong positive correlation.
10. Broadband access is defined as being equal to, or greater than, 256 Kbps, as the sum of the capacity in both directions (Partnership on Measuring ICT for Development, 2005).
11. The digital divide is apparent in the differences in the international Internet bandwidth available to developed and developing economies and its cost. For example, in 2004 Denmark had more than twice the bandwidth of the whole Latin American and Caribbean region. For a discussion on international Internet backbone connectivity and related issues for developing countries, see chapter 2 of the *Information Economy Report 2005*.
12. See OECD Broadband Statistics, December 2005, at [http://www.oecd.org/document/39/0,2340,en\\_2649\\_34223\\_36459431\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/39/0,2340,en_2649_34223_36459431_1_1_1_1,00.html).
13. See the “Bridging the Broadband Gap”, COM(2006) 129 final, Commission of the European Communities, Communication from the Commission to the Council, the European Parliament, European Economic and Social Committee and the Committee of the Regions. Brussels, 20 March 2006.
14. The *Digital Divide Forum Report: Broadband access and public support in under-served areas* of the Commission of the European Communities does an excellent analysis of the urban–rural broadband divide in Europe and proposes policy actions to bridge this divide. [http://europa.eu.int/information\\_society/eeurope/i2010/docs/implementation/ddf\\_report\\_final.pdf](http://europa.eu.int/information_society/eeurope/i2010/docs/implementation/ddf_report_final.pdf).

15. VSAT can be used for Internet access in places that cannot get ADSL or cable Internet access for geographical or other reasons that affect last-mile connectivity, for example remote or rural areas. Satellite bandwidth is scalable from speeds below 1 Mbit/s up to 45 Mbit/s.
16. Uganda and other East African countries are developing the Eastern Africa Submarine Cable System (EASSy) project with the aim of improving international connectivity. For more information see <http://eassy.org>.
17. European Commission Press Release IP/06/755, “State aid: Commission endorses public funding to bridge broadband communications gap in Latvia”, Brussels, 8 June 2006.
18. See Ferguson (2004) and the exchange of letters in Foreign Affairs of Adam Segal (November/December 2004), Thomas Bleha (May/June 2005), and Philip J. Weiser and Thomas Bleha (September/October 2005).
19. In the absence of economic output data at the community level, the study measured broadband impact through other economic variables: employment, salaries, rent, and industry structure or mix.
20. The exceptions are Italy, Hungary and Greece, with less than 20 per cent.
21. Some EU countries show a slight decline from 2004 to 2005, which may be due to the statistical margin of error as well as changes in survey methodology.
22. Detailed data for 2003 on e-business activities in enterprises for a selection of OECD countries are available in IER 2005.
23. See chapter 2 of the *E-Commerce and Development Report 2004* on e-business and SMEs.
24. This was found to be the case with online purchases and sales.
25. See <http://www.oecd.org/dataoecd/34/37/2771153.pdf> for the detailed definition of the ICT sector.
26. As defined in OECD (2004), ICT specialists have the ability to develop, operate and maintain ICT systems, while ICT users are competent users of generic or more advanced tools, without having ICTs as their main job.
27. The definition differs from the OECD ICT sector definition; it includes information equipment manufacturing and information services.
28. Outsourcing is defined as the contracting out of non-core operations from the internal production of a company to a third party specializing in that operation. Operations can be transferred within the same country (domestic outsourcing) or abroad (international outsourcing). Offshoring is defined as the location or transfer of activities abroad. It can be done internally by moving services from a parent company to its foreign affiliates (sometimes referred to as “captive offshoring”, involving FDI, to differentiate it from offshoring to third parties). It is different from the concept of outsourcing, which always involves a third party, but not necessarily a transfer abroad. Offshoring and outsourcing overlap only when the activities in question are outsourced internationally to third-party services providers (UNCTAD, 2004). For more information on business process outsourcing see chapter 5 of UNCTAD’s *E-commerce and Development Report 2003*.
29. See box 1 for more information.
30. The authors used data on the number of top-level domain names.

31. For more information on ICT policies see chapters 2 and 3 of this publication.
32. Detailed country tables are provided in the statistical annex (annex I).
33. See table 1.8 for a list of the services included.
34. For more information see chapter 8 of UNCTAD's *E-commerce and Development Report 2002*.
35. See section 3 for more detailed information.
36. For more on computer and information service exports see part 3 of this section.
37. Particularly high 2000–2003 growth rates for financial service exports were calculated for Cape Verde, Mali, Madagascar, Côte d'Ivoire and Tunisia.
38. 2004 values were available only for the developed countries. The growth rates shown in chart 1.25 are therefore CAGR calculations on a five-year basis, 2000–2004.
39. "Other commercial services" include ICT-enabled services, together with construction services.
40. Together with the European Commission, the International Monetary Fund, the Organisation for Economic Co-operation and Development, and the World Trade Organization.
41. Electronic deliveries are also transmitted from a distance, although not all through Mode 1.
42. UNCTAD estimates of world trade in services, February 2006 version.
43. Japan was an exception, with a very high share of foreign affiliates' outward sales vis-à-vis BOP exports (8.5 in 2002), but with a fluctuating evolution of both FATS and BOP outflows of services during 1995–2002.
44. With 6.2 as compared with 1.1 for the country ranking next, namely Costa Rica.
45. Data on WTO members' market access commitments draws on the WTO services schedules available at [http://www.wto.org/english/tratop\\_e/serv\\_e/serv\\_commitments\\_e.htm](http://www.wto.org/english/tratop_e/serv_e/serv_commitments_e.htm).
46. The GNS/W/120 list based on the CPC, Version 1.0.
47. News agency and other information provision services included in the BOP item are not covered by the same GATS commitments. Also, computer facilities management and data processing services provided on line are covered separately by WTO commitments on telecommunication services (The Manual, 2002).
48. Exceptions are indicated with stripes in the chart.
49. Similar to no market access.
50. See, for example, the submission of the European Commission proposing that WTO members make commitments at the two-digit level of the CPC, GATS Council, Special Session. Communication from the EC and their Member States, GATS 2000: Computer and Related Services (CPC 84) - Addendum, S/CSS/W/34/Add.1 (15 July 2002).
51. Communication from India, Proposed Liberalization of Movement of Professionals under GATS, S/CSS/W/12 (24 November 2000) and Negotiating Proposal on Computers and Related Services, S/CSS/W/141/Corr.1 (11 April 2002).

52. The chapter will focus on the quantitative measurement of ICT impact, based on official statistical data sources only. It will not delve into research using qualitative approaches, such as surveys measuring the *perceived* impact of ICTs on businesses or individuals (e.g. through direct questions such as “In your view, ...” or “Do you think/expect that ...”). Chapter 2 of the ECDR 2003 provides a detailed overview of the literature on ICT and economic performance.
53. Based on a presentation by OECD at the WPIIS Expert Group on ICT Impact, Paris, 4 May 2006.
54. The research results presented here are discussed in detail in Orbicom (2005).
55. Recent work on the impact of ICTs on economic growth in Latin America has been carried out by Prof. Nauro F. Campos of Brunel University West London. See <http://www.itu.int/osg/spu/dtis/documents/presentations/campos.ppt>.
56. Other composite ICT indexes include the World Economic Forum (WEF) Network Readiness Index, the ITU Digital Access Index and Digital Opportunity Index, the UNCTAD Index of ICT Diffusion and the Economic Intelligence Unit (EIU) e-readiness ranking.
57. As shown by the positive and statistically significant  $\alpha_{5,t}$  coefficients.