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INFORMATION ECONOMY REPORT 2006

The Development Perspective



United Nations

Chapter 1

ICT INDICATORS FOR DEVELOPMENT: TRENDS AND IMPACT

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.

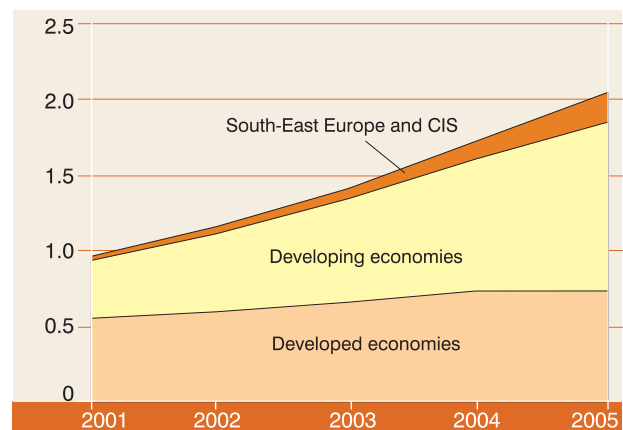
the Partnership on Measuring ICT for Development (see box 1.1). It will highlight trends in these indicators, which serve for the basic evaluation of the level of connectivity of individuals, households and enterprises in developing countries, as well as determine the use made of ICTs. This general picture 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	16 946 000	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.¹

- 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.² 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).³

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.

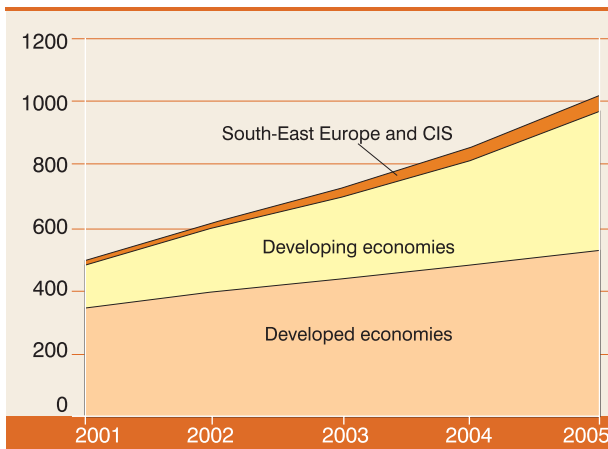
2. Internet

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 1.4.⁴ 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).⁵ 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.¹

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.

¹ 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) ^a	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 ^b	93.6	57.2	61.1
Switzerland (2002) ^c	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 ^d	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) ^e	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 ^e	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 ^f	68.2	24.0	35.2
China (2005) ^g	67.6	22.3	33.0
Panama (2002) ^h	65.7	..	..
Thailand (2005) ⁱ	64.1	32.7	51.0
Andorra	63.0	30.8	48.9
Bulgaria	62.6	24.3	38.9
Philippines (2001) ^j	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 ^a	51.6	..	..
Kazakhstan (2005)	45.5	8.4	18.5
Belarus (2005) ^a	37.6	10.2	27.2
Ukraine (2003) ^a	28.0	..	..
Kyrgyzstan (2005) ^k	25.1	8.4	33.2
Cameroon (2005)	25.1	12.1	48.3
Chile (2003) ^a	20.3	8.6	42.6
Azerbaijan (2005)	8.3	2.8	33.7
Paraguay (2002) ^{b,h}	5.7	..	..

Notes:

^a Enterprises with 100 or more employees.

^b Survey of the manufacturing sector only.

^c Enterprises with 5 or more employees.

^d Website includes a presence on another entity's web site.

^e Enterprises with 10-249 employees.

^f Enterprises with 50 or more employees.

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

^h Provisional figures.

ⁱ Enterprises with 16 or more employees.

^j Refers to establishments with average total employment of 20 or more.

^k Of enterprises with computers.

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

wholesale trade and real estate, renting and business services industries.^{6,7} 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).⁸ 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.⁹ 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.

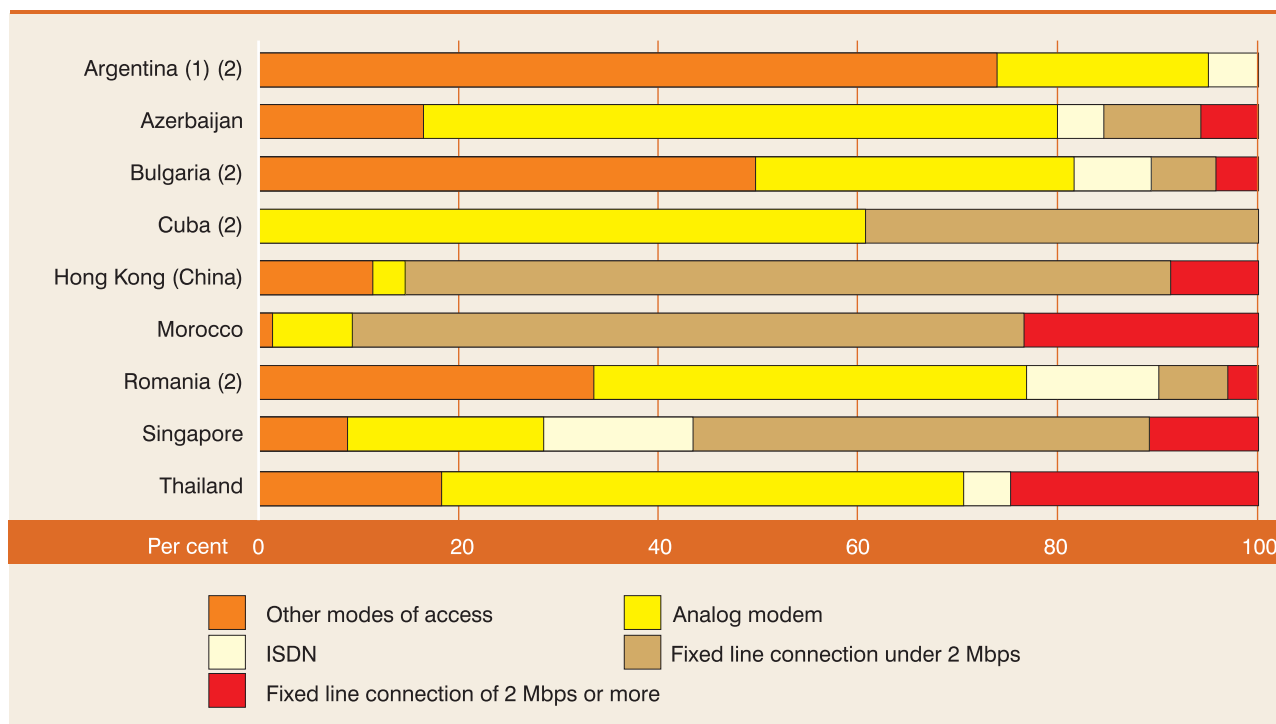
3. Broadband spread and its potential

Access to the Internet via broadband is important for the development of countries' information societies.¹⁰ 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

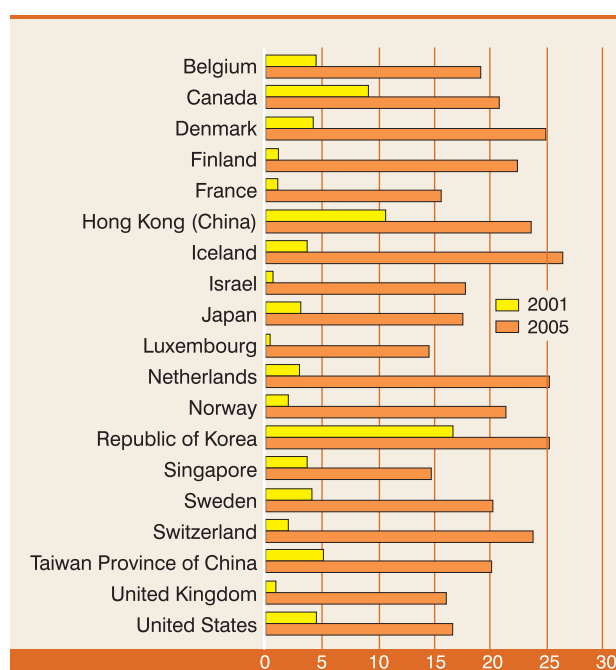
trends (tables 1.18 and 1.19 in the statistical annex show data for selected countries on broadband subscribers and penetration) are as follows:

- 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).¹¹ 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.¹² 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.¹³ The latter are particularly interesting for improving access in rural areas, where they can make better economic sense.¹⁴ 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).¹⁵ 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.¹⁶

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.¹⁷

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.¹⁸ 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).

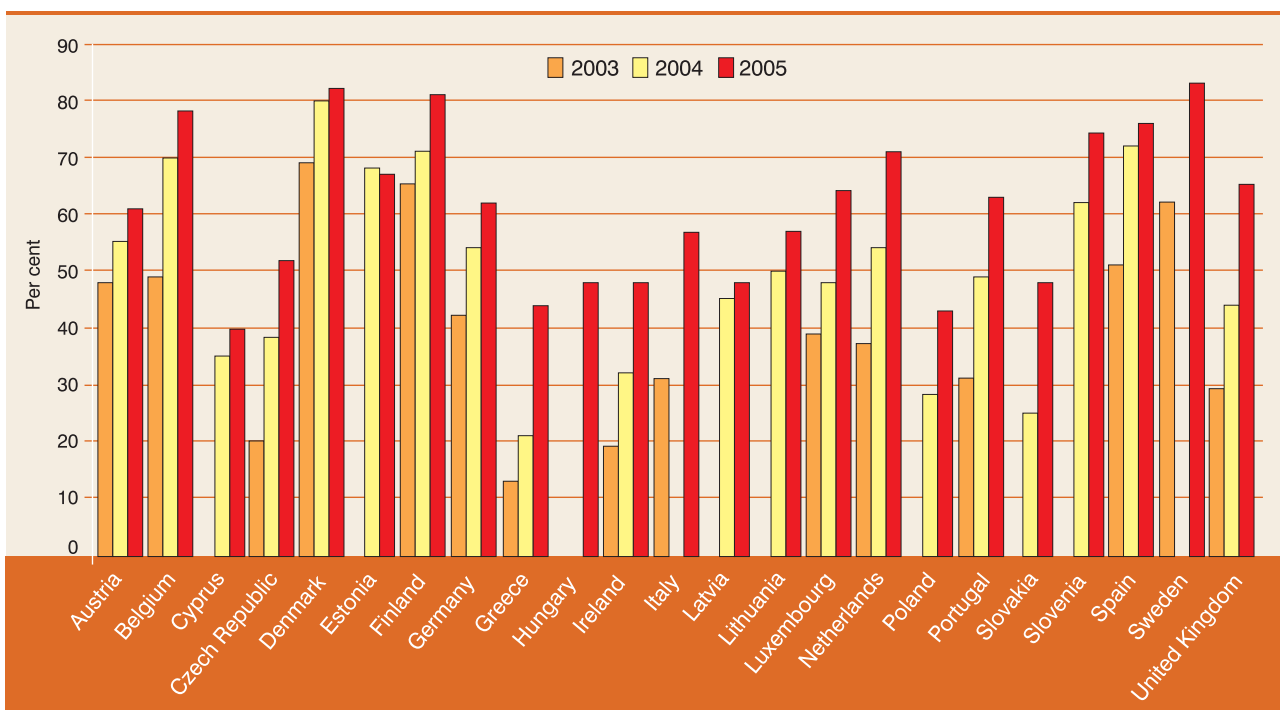
Enterprise access to broadband

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).¹⁹ 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 eChoupal¹

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), 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). 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.

¹ 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.

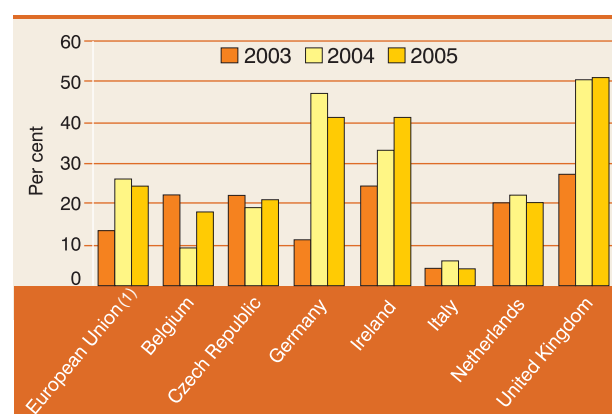
Online sales and purchases are now commonplace in all developed economies, but vary across industries and countries. In the OECD countries, in 2004, the share of

enterprises purchasing online ranged between 20 and 60 per cent averaged over the entire economy in 2004.²⁰ 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).²¹

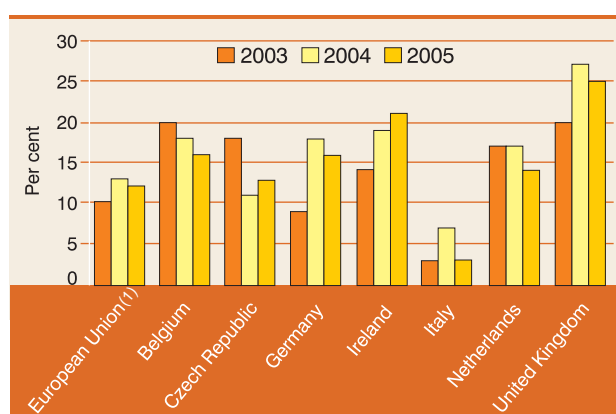
In other sectors, demand appears to be a principal constraint on increased electronic transactions, as customers prefer conventional sales channels. Furthermore, manufacturing and wholesale tend to be dominated by larger firms, for which necessary investments in e-commerce infrastructure are easier to 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) ^a	37.4	36.5	4.5
Brazil	27.1	28.5	..
Bulgaria (2004)	2.9	7.0	1.1
Cameroon	..	..	1.7
Chile (2003) ^b	1.2	1.8	..
China ^b	9.1	8.1	7.2
Kazakhstan	13.1	13.7	..
Kyrgyzstan ^c	..	..	1.6
Macao (China) (2003)	7.4	8.9	..
Morocco	5.2	9.0	9.0
Panama ^d	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) ^e	20.2	23.2	4.3
Singapore	13.5	30.8	..
Thailand ^f	7.2	8.7	..

Enterprises with 10 or more employees.

Notes:

^a Survey of the manufacturing sector only.

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

^c Of enterprises with computers.

^d Provisional figures.

^e Enterprises with 50 or more employees.

^f Enterprises with 15 or more employees.

Source: UNCTAD e-business database, 2006

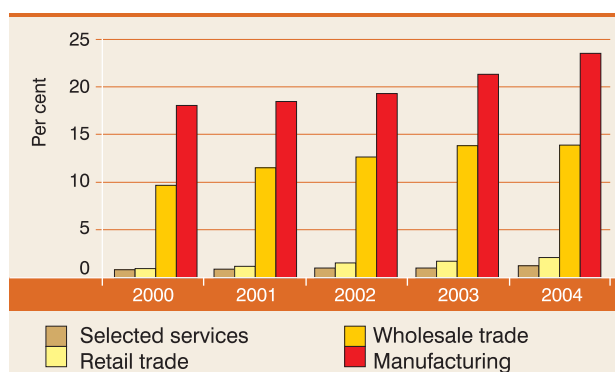
the manufacturing sector, the reason for the lower incidence of online purchases would require further research on e-commerce at the different stages of the value chain, but it could be that in some emerging markets B2B is less developed for intermediate goods than for final products.

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

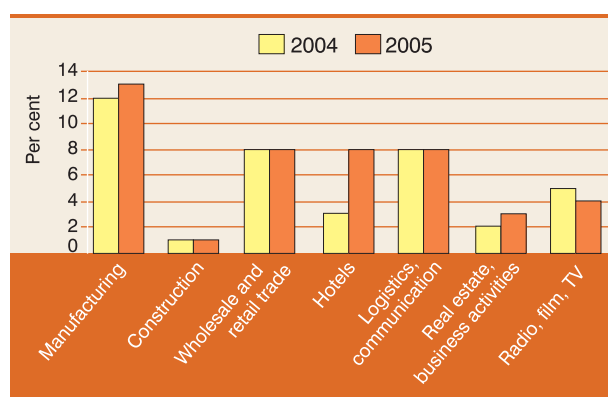
Online sales as a proportion of total turnover in the United States, selected industries



Source: US Bureau of Census (2006).

Chart 1.9

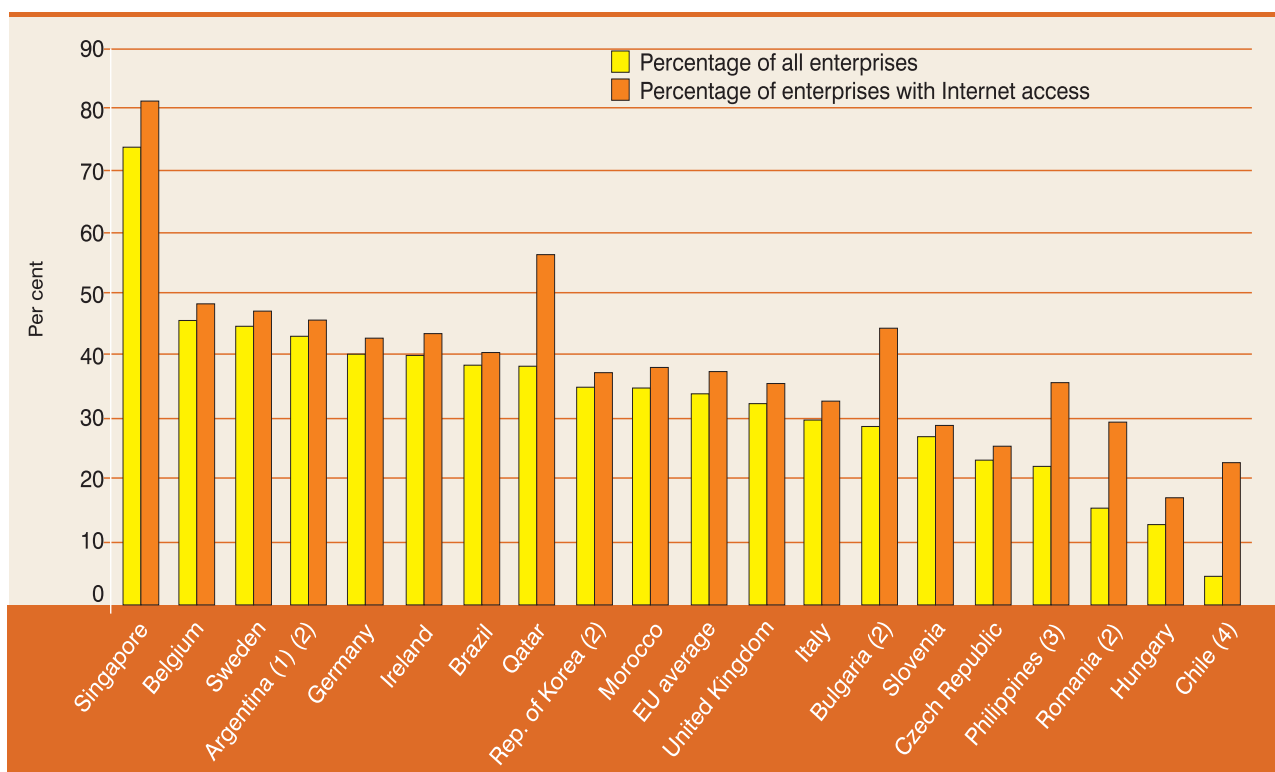
Online sales as a proportion of total turnover in the EU



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

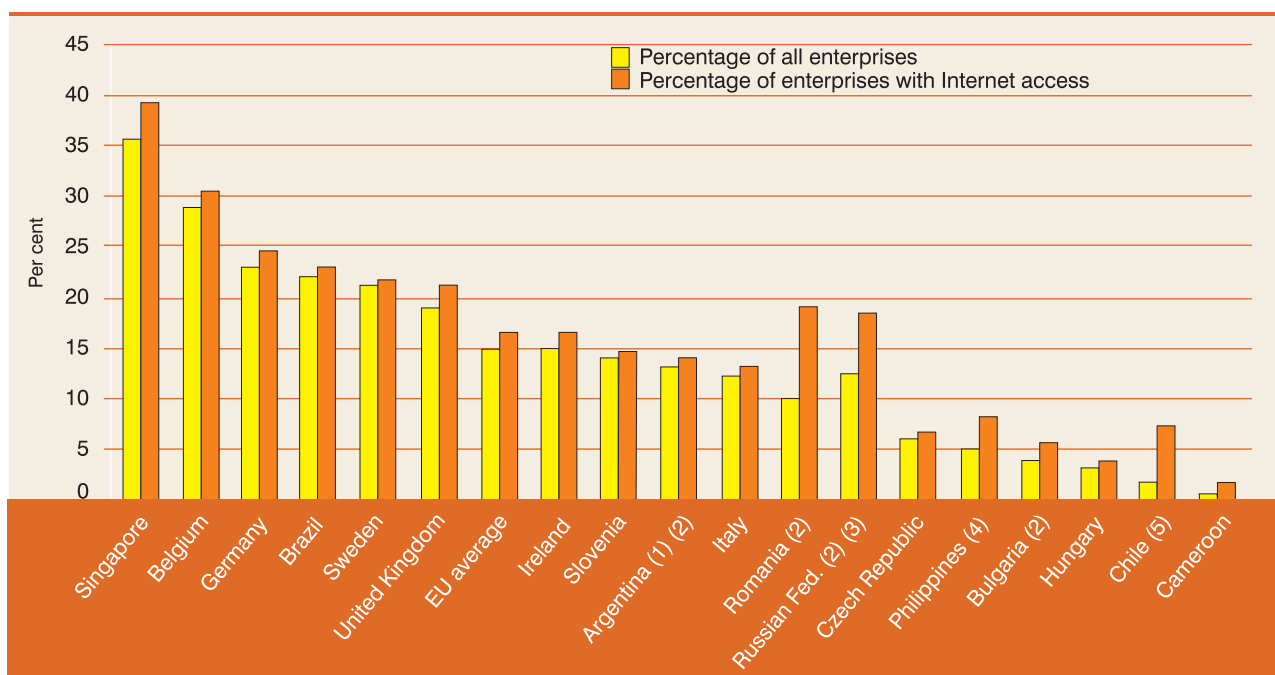
Other e-business refers to the use of the Internet for *internal business processes* and for interactions with government institutions (*e-government*). Also, remote work via the Internet and the use of the Internet for human resources development, which is often termed *e-learning* and refers to training 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).²² 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.

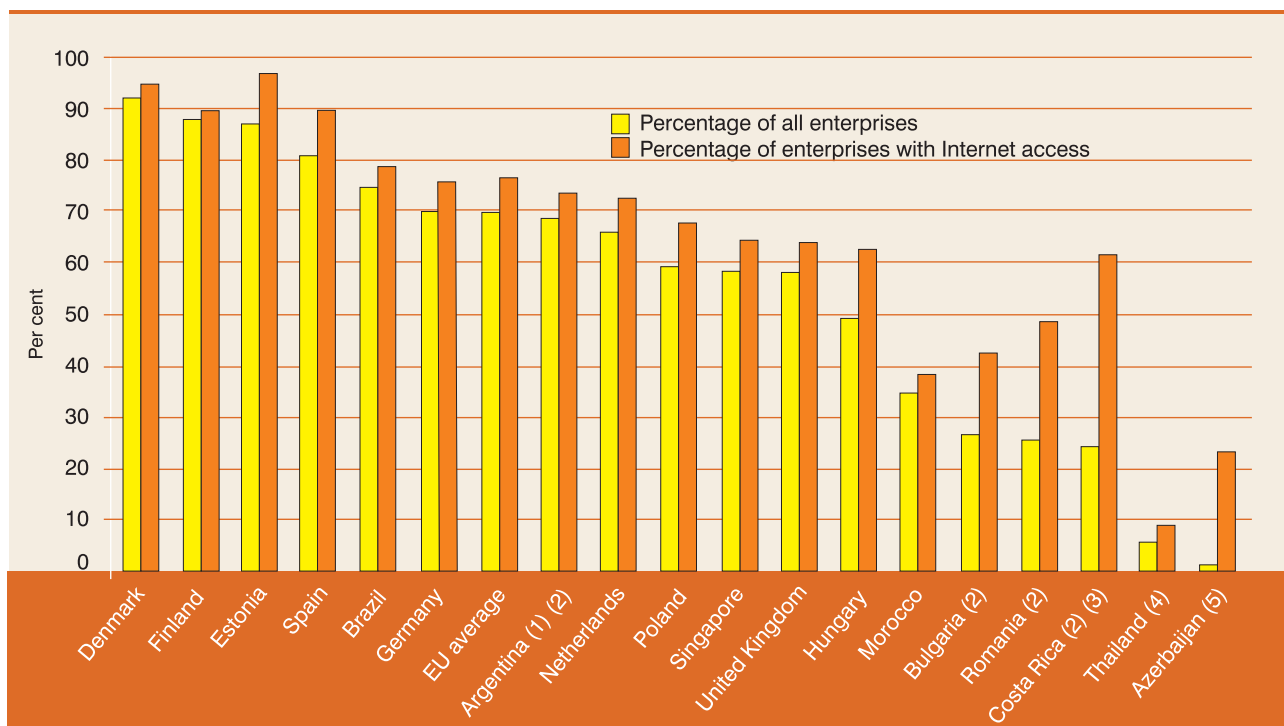
Enterprises can use the Internet for other e-business activities, such as e-banking and e-government. They can also provide customer services, although there are varying definitions of what these services cover (whether they involve a transaction or simply the availability of certain online content), 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.

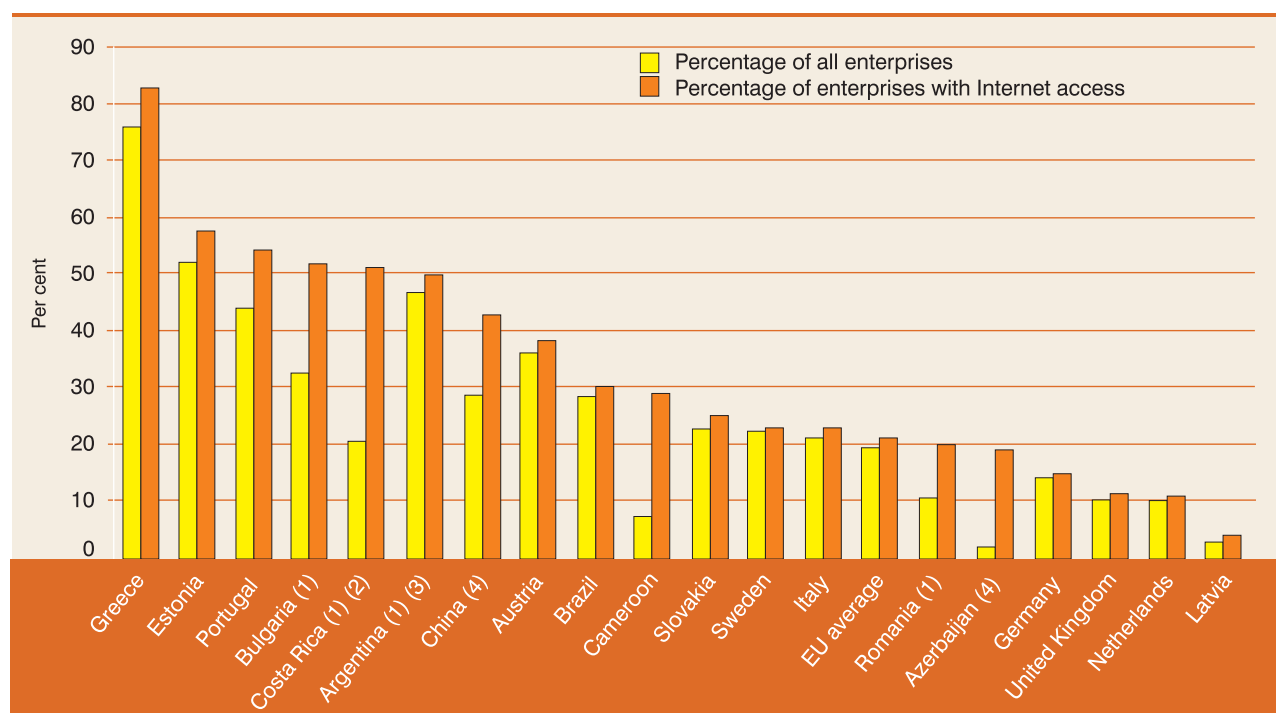
(4) Enterprises with 16 or more employees.

(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

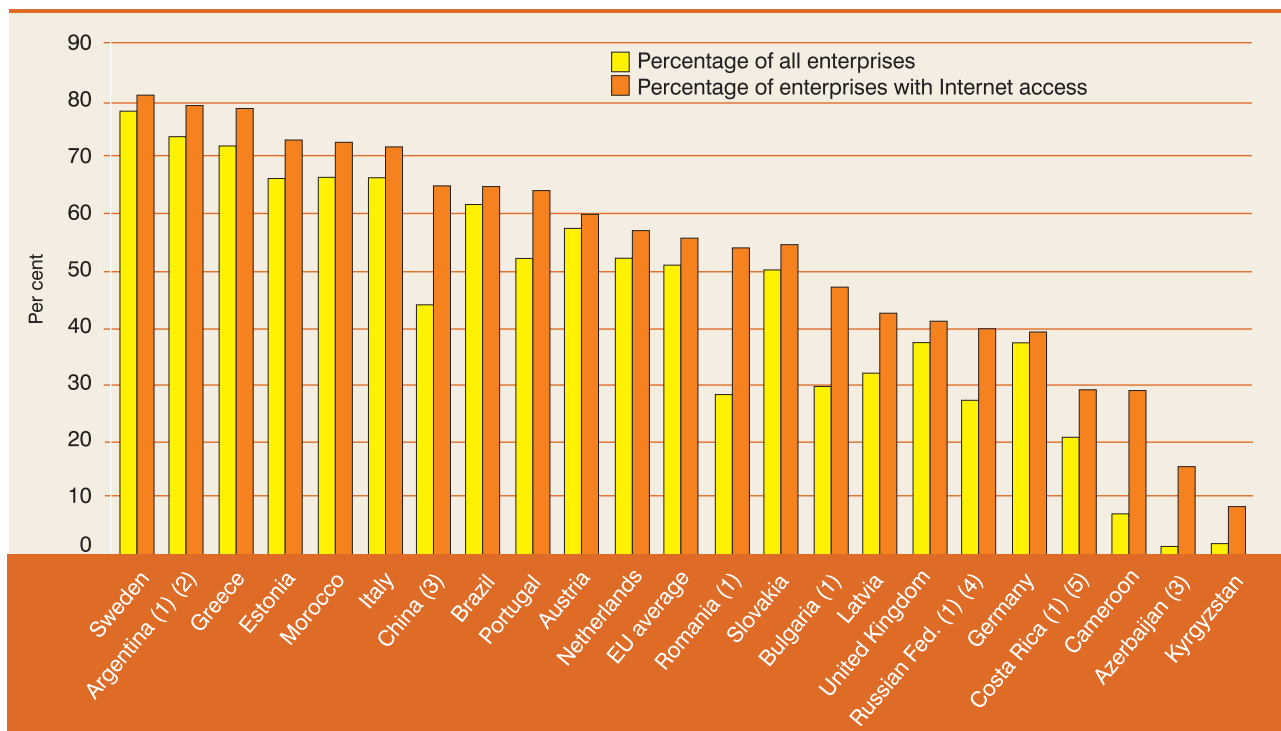
The proportion of EU enterprises with more than 10 employees in all but the financial sectors interacting with government institutions over the Internet for full electronic case handling was 19 per cent in 2005, 16 per cent in 2004 and 12 per cent in 2003 (EU-15). This reflects, on EU average, a continuing 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.²³ 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) ^a	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 ^b	..	..	..	..	..	..	..	..	..	0.4	1.4	4.2
Morocco ^c	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) ^d	..	..	..	..	..	..	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:

^a Survey of the manufacturing sector only.

^b Of enterprises with computers.

^c Survey does not cover enterprises with fewer than 5 employees.

^d 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,²⁴ 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.²⁵

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.

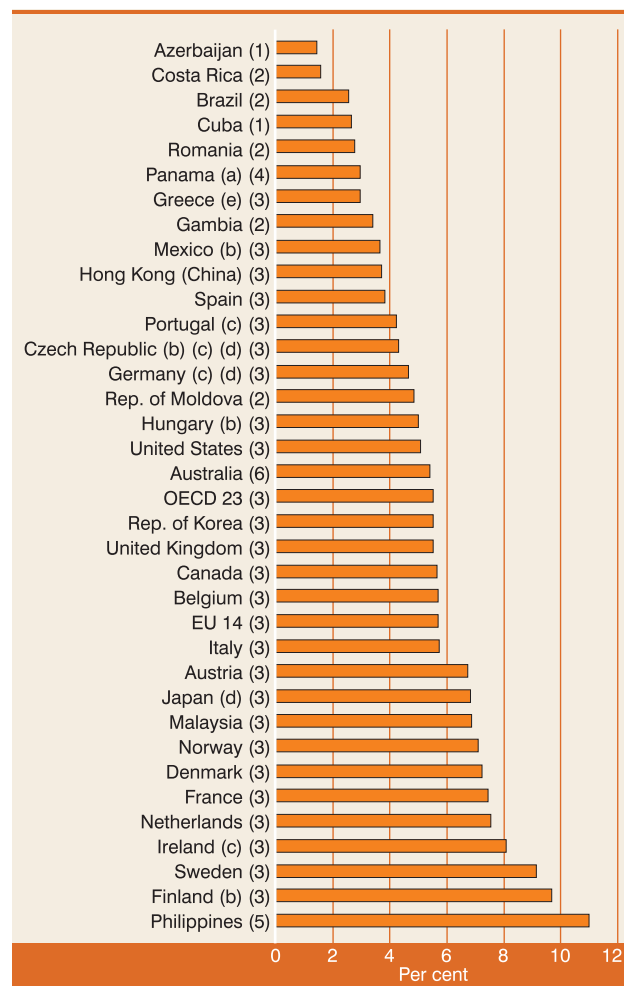
Business sector workforce in the ICT sector

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.

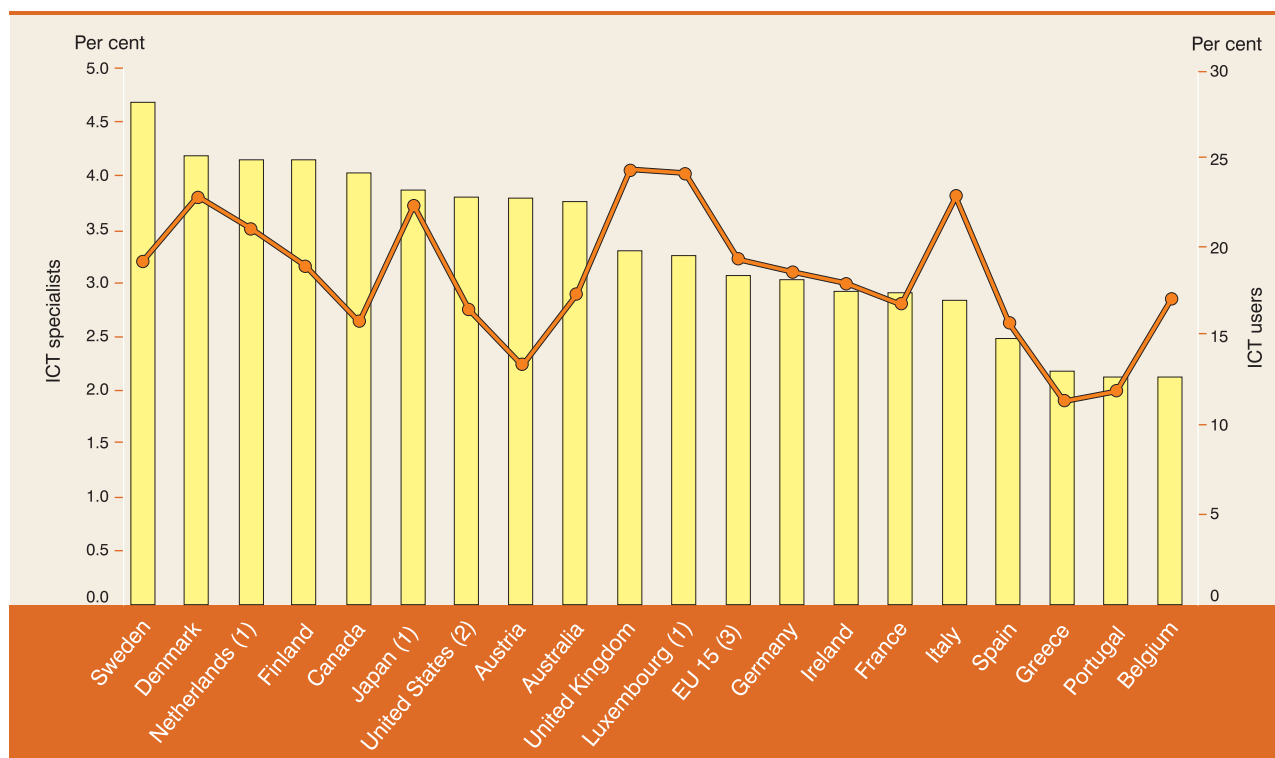
(c) Rental of ICT goods (ISIC Rev.3 7123) not available.

(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.²⁶ 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.

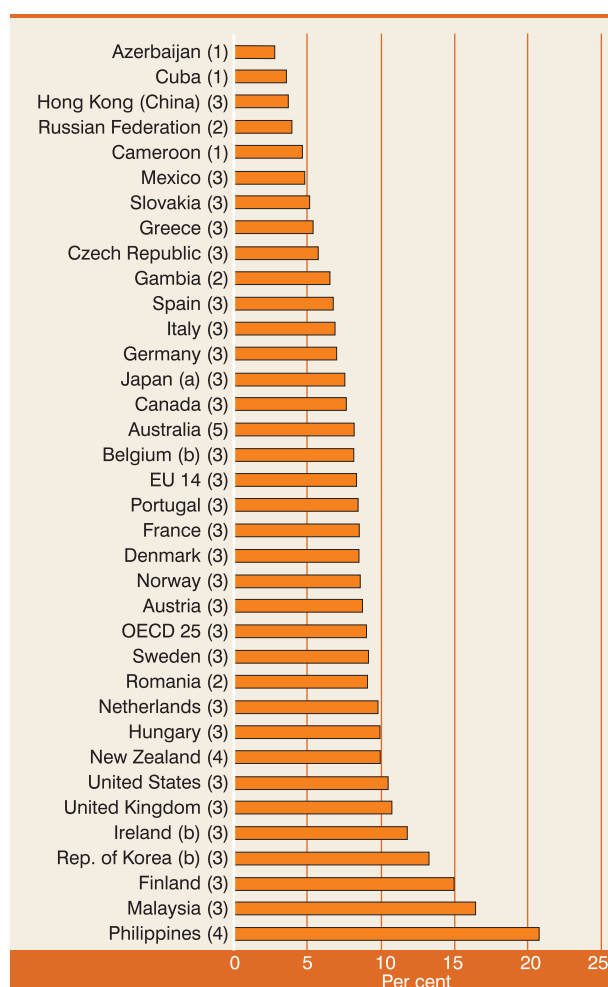
Taking into consideration available data from selected developing countries, chart 1.17 gives a more global picture of the ICT value added to the business sector. Among the developing countries, the Philippines, Malaysia and the Republic of Korea stand out with above OECD-average contributions of ICTs 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”²⁷ 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 per cent 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,²⁸ 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