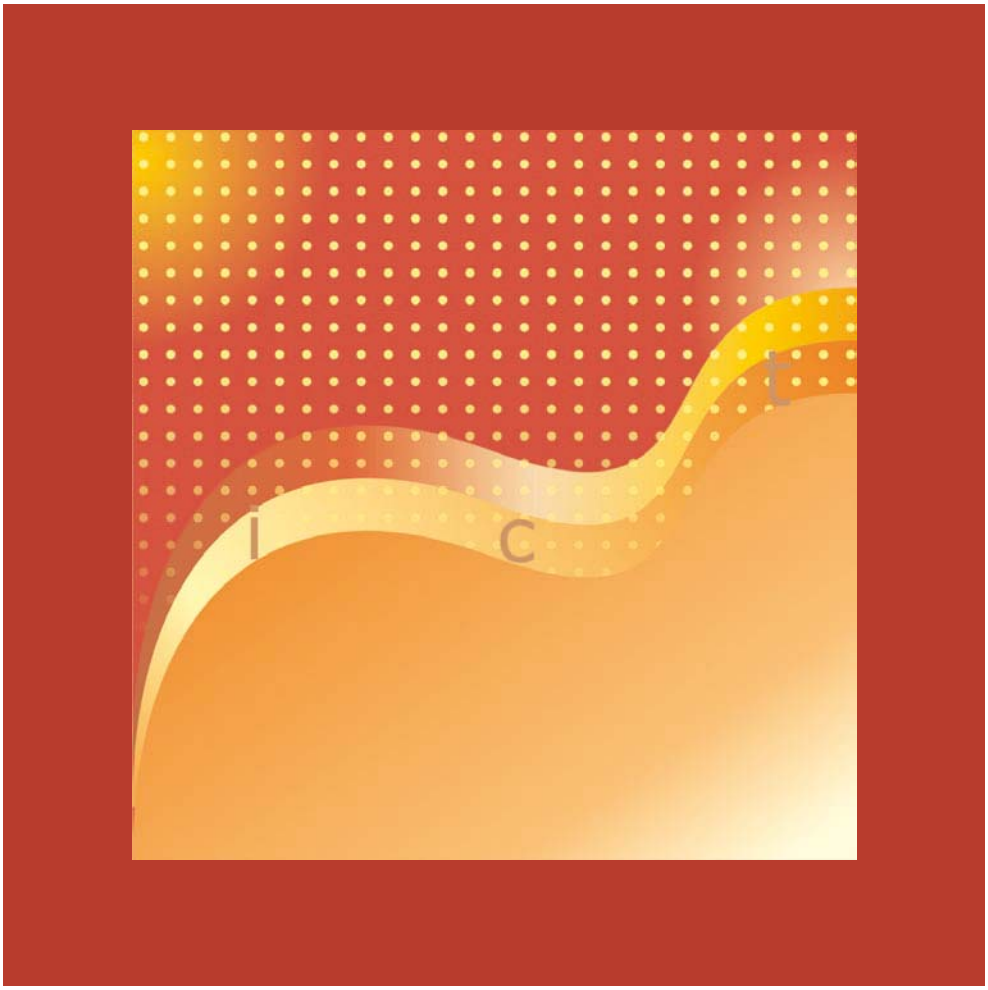
United Nations Conference on Trade and Development

INFORMATION ECONOMY REPORT 2007-2008

Science and technology for development: the new paradigm of ICT

Prepared by the UNCTAD secretariat



UNITED NATIONS
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Chapter 2

THE ICT PRODUCING SECTOR AND THE EMERGING SOUTH

A. Introduction

The role of the ICT sector in economic development and employment creation in developing countries has been widely recognized and has been discussed in previous editions of the *Information Economy Report* (UNCTAD, 2003, 2005a, 2006a). Only a few developing countries have a significant ICT goods industry. At the same time, the development of efficient and cost-effective ICT services (particularly telecommunication services) is critical for creating an enabling environment for domestic ICT uptake. Moreover, the ICT sector contributes to productivity and economic growth. As has been shown in other parts of this Report (see introductory chapter and chapter 3), the rapid technological progress in the production of ICT goods and services increases total factor productivity in the ICT-producing sector and contributes to GDP growth. ICTs used as a capital input in other sectors and services also contribute to labour productivity and total factor productivity.

As this chapter will show, the strong growth in ICT production, trade and investment since the mid-1990s has continued over the past few years, in particular in developing and transition countries, where ICT sector production and consumption have grown much faster and have higher shares than in OECD countries. The (sharp) decline in global ICT production, trade and investment following the Nasdaq crash in 2000 has been completely reversed. With the "second generation" of globalization emerging, developing countries provide an important contribution to the output of the ICT sector.[1]

ICT production and use impact on globalization in several ways. First, they are an enabler of globalization. ICTs play a critical role in the fragmentation of the global value-added chain and in shifting parts of production to different geographic at locations. This process has now been extended to also take into account the service industry and delocalization to lower-cost markets. By using ICTs, firms are able to exchange knowledge and information online from anywhere in the world, communicate just-in-time with clients and suppliers, and deliver services efficiently and promptly. Through outsourcing and offshoring, services can be provided by more cost-effective suppliers. This has contributed to a major shift in production from high- to low-cost locations, as well as a shift in investment and trade flows. At the international level, this has resulted in deeper specialization, with more productivity-driven gains on the outsourcer's side and more employment-driven gains in the host country.

Second, the ICT-producing sector itself is highly globalized. ICT components and parts, and telecom and computer equipment, are manufactured in very different locations, and there are significant shifts in production, from developed to developing countries. In 2004, the ICT sector had a lead role in international trade (13 per cent), mergers and acquisitions (20 per cent) and business value-added (9 per cent) (OECD, 2006a). In some Asian developing countries, the ICT sector contributes up to 17 per cent (Malaysia) and 21 per cent (Philippines) of business-sector value-added (UNCTAD, 2006a). The ICT sector (supply and demand) will continue to grow strongly in the next decade, given the increasing role of ICT products and use in the global economy.

FDI in the ICT sector is growing strongly, especially in ICT manufacturing (electronic and electrical equipment) and ICT services (communication services) (UNCTAD, 2005b). Developing countries are increasingly a destination for FDI flows in the ICT sector, especially for ICT services (UNCTAD, 2004). While most of those flows are targeted to Asian emerging economies, they account for larger shares of GDP in smaller developing countries. This corresponds to a general increase in FDI flows to developing countries, primarily in services: in 2005, in developing regions, more than half of all cross-border mergers and acquisitions (M&As), amounting to more than $167 billion, took place in the services sector.[2]

This chapter will review major developments in the ICT industry during the past 10 years. In particular, it will highlight the role of the ICT sector in global economic

trends and shifts, such as those related to production, employment, trade and investment, the growth of China and India and South–South economic relations, and the increasing attention that the ICT industry receives from developing country policymakers who are developing their knowledge-based economies. The chapter will argue that the ICT-producing sector has played a major role in recent global economic developments that have led to an emerging second generation of globalization, and that this trend will continue in the years ahead. It will provide evidence demonstrating the increasing importance of the ICT sector for the developing countries and South-South relations.

The Information Economy Reports 2005 and 2006 have focused on the latest developments in the trade of ICT goods and services respectively. This chapter will provide up-to-date information on some of those trends and present concrete examples of the role of the ICT sector in developing countries' efforts to develop their information economies. In that context, the UNCTAD secretariat collects from member States data on ICT sector value-added and employment. As in previous Reports, the results of the 2006 data collection will be presented in this chapter. In addition, a special project to survey the ICT industry was carried out jointly with the Government of Egypt (box 2.1). The chapter will feature some of the key findings of the survey throughout the various sections. Given the scarcity of comparable data from developing countries, the chapter relies on a number of examples to illustrate the role of the ICT sector in selected developing countries.

The ICT industry plays an important role in the growth of international sourcing. While international sourcing in ICT manufacturing has been a common feature in the past two decades, the outsourcing of ICT services took off only a few years ago and has prompted many developing countries to try to develop a competitive advantage in this field. International sourcing in the ICT industry is reflected in investment and trade flows, employment figures and national ICT strategies. Therefore, reference to offshoring and outsourcing will be made throughout this chapter. A more detailed discussion on the link between outsourcing and employment and outsourcing in the ICT services sector can be found in the IER 2006.

Lastly, the chapter will highlight the role of national and international policymaking for the development of the ICT sector in developing countries. In particular, it will consider the WTO's Information Technology Agreement (ITA), which is the key international trade agreement relevant to ICT goods trade and which entered into force 10 years ago, and will make suggestions on possible further work related to the review of the ITA.

Box 2.1

Joint UNCTAD – Government of Egypt project on the ICT sector

The Ministry of Communication and Information Technology (MCIT) of Egypt and its Information Technology Industry Development Agency (ITIDA) have formulated an ICT strategy aimed at transforming their economy into a regional hub of ICT production and service provision. The policies put in place have been successful in attracting foreign investment and outsourcing contracts in the Egyptian ICT sector. A large part of the existing ICT enterprises are concentrated in technology parks and incubators. There is strong government support for providing the necessary ICT infrastructure at accessible prices.

The ICT and E-Business Branch of UNCTAD and MCIT worked together to conduct a survey on Egypt's ICT sector with the objective of obtaining detailed firm-level information. UNCTAD assisted ITIDA in the design of a questionnaire. The main aim of the questionnaire was to identify the product portfolio of the Egyptian ICT sector, its imports and exports as well as key trading partners, the workforce, key financial indicators, participation in public support programmes and remaining obstacles to growth. The data were collected, verified and entered into a database by ITIDA, in cooperation with a local counterpart. The subsequent data analysis was carried out by both UNCTAD and MCIT.

The survey was sent to a sample of 250 ICT companies in Egypt, 151 of which responded. The results presented in this chapter are based on those companies' responses and are thus not representative of the entire ICT sector in Egypt.

The results of the survey will be used to fine-tune ICT policymaking in Egypt. In the first stage, the data will help to benchmark the performance of the ICT sector against policy targets. In the second stage, research will aim at revealing some of the factors responsible for success or failure in meeting certain policy targets.

B. ICT market, value added and employment

1. Overview of the ICT market

The production of ICTs is undergoing a shift from technology-oriented products, which dominated in the late 1990s, to commercial, often user-driven, and new applications of ICTs. There are also some structural changes, with the emergence of niche products, software and services, rather than the traditional commodities or IT equipment. The role of individuals and their demands, via use of ICTs, global communication and access to information, is growing and impacting on the ICT supply side, influencing production and firms' decisions.

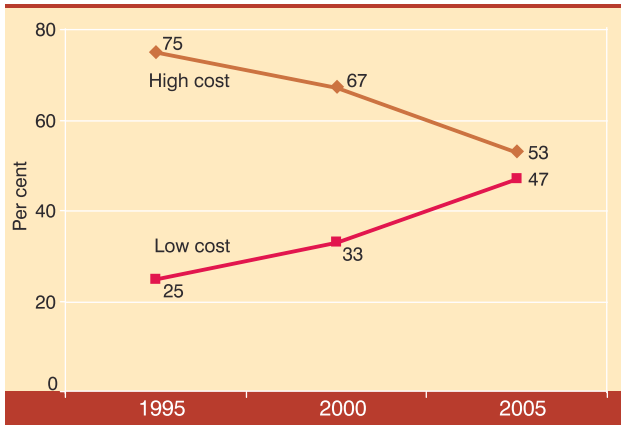
According to the World Information Technology and Services Alliance (WITSA), which is monitoring the global ICT market, global ICT spending grew at 8.9 per cent annually between 2001 and 2005, representing 6.8 per cent of global GDP. In 2006, ICT spending slowed down to 6 per cent annual growth, with a value of over $ 3 trillion (WITSA, 2006). The highest growth can be observed in software, but the largest amount spent is in the area of communications and ICT services.

Between 2000 and 2005, revenues of the top 250 ICT firms grew by an annual 4.3 per cent and reached $3 trillion in 2005. With regard to specific sectors, revenues grew by 8.3 per cent in the services and software sectors, 6.1 per cent in the telecommunications sector, 5.1 per cent in the IT equipment sector, and 3.3 per cent in the electronics and components sector. In the area of communications equipment, revenues decreased by 4.1 per cent (OECD, 2006a).

The top 50 ICT firms are primarily from Europe (Germany, the United Kingdom, France, Netherlands),

Chart 2.1

Electronics industry output by location, 1995-2005



High-cost locations: United States, Canada, Japan, Western Europe. Low-cost locations: Asia/Pacific, China, Eastern Europe, rest of the world.
Source: Reed Research, presented by Ernie Santiago, SEIPI, WTO ITA Symposium, 28 March 2007, Geneva.

North America (United States) and Asia-Pacific (Japan, Republic of Korea, Hong Kong (China), China, Singapore). In 2005, the revenues of the top 10 ICT firms ranged from $60 billion to $100 billion. However, an increasing number of the top 50 ICT firms are from developing economies, such as Samsung Electronics and LG Electronics (Republic of Korea), China Mobile (Hong Kong, China), China Telecom (China), Hon Hai Precision (Taiwan Province of China) and Flextronics (Singapore), with 2005 revenues ranging from $15 billion (Flextronics) to $48 billion (Samsung Electronics) (OECD, 2006a).

During the past decade, there has been a clear tendency to migrate the production of electronics from high-cost to low-cost locations (see chart 2.1). Asia-Pacific continues to be the fastest-growing region for electronics production (table 2.1). Asia's electronics industry grew from 48 per cent of world production in

Table 2.1

Global production of electronics, 2002-2005, $ billion

Region	2002	2003	2004	2005	CAGR 2002 – 2005 (per cent)
Europe	220.4	247.5	279.1	285.8	9.0
Americas	317.6	314.1	334.3	341.9	2.5
Japan	162.4	180.2	197.8	202.3	7.6
Asia/Pacific	343.1	386.9	448.8	492.7	12.8
Rest of the world	13.2	14.3	15.7	16.2	7.2
World	1 056.8	1 143.0	1 275.6	1 338.9	8.2

Source: Reed Research, presented by Ernie Santiago, SEIPI, WTO ITA Symposium, 28 March 2007, Geneva.

Box 2.2

Costa Rica: the Intel factor

When in 1996 Intel decided to choose Costa Rica as one of its main production sites, this was the beginning of a considerable structural change in the country's economy. In 1985, 60 per cent of Costa Rica's exports were perishable products and 3 per cent were electrical and electronic products. In 2005, the share of perishable products exports had decreased to 24 per cent, and the share of electrical and electronic products increased to 30 per cent. Exports of ICT products decreased sharply in 2000, following the global slowdown in the IT industry, but started to increase again as of 2001. Despite a 15 per cent increase since 2000, ICT goods exports have not yet reached the pre-2000 levels (chart 2.2), although at the global level, ICT goods trade fully recovered in 2005.

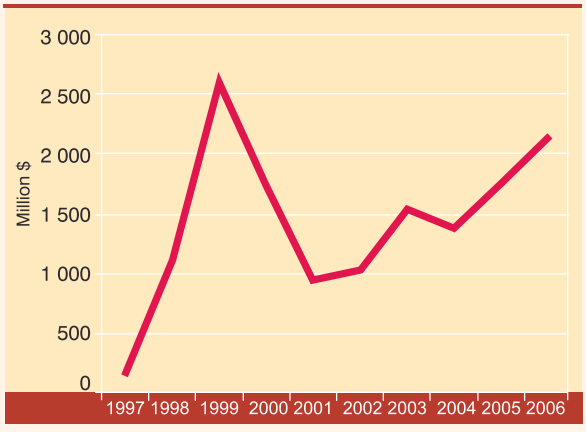
Even though FDI from other companies followed, Intel remained the largest ICT-producing firm in the country. Its impact on the country's economy has been estimated in various areas.

The contribution of Intel to GDP is estimated to be 5 per cent (2000—2005), with a further 0.8 per cent indirect impact through income spent by employees and local purchases. In 2005, the direct and indirect effects of Intel reached 25 per cent of GDP of the entire manufacturing industry (see chart 2.3). Intel accounts for 20 per cent of total exports. In addition, there are a number of qualitative benefits, such as publicizing the country as an IT location (attracting other investors), technology and knowledge transfer and the creation of linkages with academia. For example, Intel supported the curriculum and teaching teams in engineering courses at the Instituto Tecnológico de Costa Rica and the Universidad de Costa Rica, which led to a considerable increase in the numbers of students enrolled in those careers (from 577 in 1997 to 874 in 2000). Only 60 electrical engineers graduated in 1997, while by 2005 there were over 200 graduates. Because Intel absorbs only 10 per cent of those new graduates, other multinational enterprises and local firms can benefit from the increase in the number of those professionals by employing them. A study by the International Labour Organization (2007) found that Intel pays its employees an average monthly wage of $836, while employees in the manufacturing sector earn only an average monthly wage of $491 (as of December 2005).

The dominant role of Intel has, however, its downsides. The country is highly dependent on the ICT sector and was hit hard by the 2001 global slump, from which it still has not fully recovered (see above). In particular, most of its ICT exports are limited to a small number of electrical and electronic products, whereas exports of higher-value-added services are still limited, albeit growing.

Chart 2.2

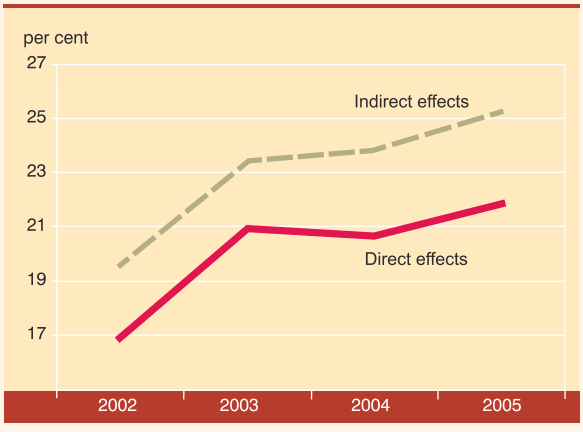
ICT goods exports in Costa Rica, 1997-2006



Source: UN COMTRADE.

Chart 2.3

Share of Intel GDP in total industrial GDP, 2002-2005



Source: presentation by Emmanuel Hess, CINDE (Costa Rican Investment Promotion Agency), WTO ITA symposium, 28 March 2007, Geneva.

2002 to 52 per cent in 2005, mainly in China and Japan. ICT production also has an important or increasing role in countries in other regions, such as Costa Rica (box 2.2), Chile, Finland, Israel and Mauritius.

In recent years, the ICT services industry has experienced strong growth, including in economies that are important suppliers of ICT goods (see box 2.3, Philippines). Those developments have been fostered

Box 2.3

Philippines: contact centres on the increase

Traditionally, the Philippine ICT industry has been dominated by manufacturing, in particular of components and devices (e.g. chips), which accounted for 74 per cent of the electronics industry in 2005, and of computer-related products (20 per cent). In 2005, the ICT industry accounted for 66 per cent of total manufacturing exports, a fact that illustrates the transformation of domestic production in only 30 years: in 1975 the Philippine economy was 49 per cent agro-based and only 3 per cent electronics-based. As in other Asian countries, the ICT sector in the Philippines is heavily dominated by foreign firms, which account for 72 per cent of firms in the sector (30 per cent are from Japan, 10 per cent from the Republic of Korea and 9 per cent from the United States).

Recently, the ICT service sector has been growing, including with regard to contact (or call) centres, business processing, animation, medical and legal transcription, engineering and software design. Contact centres are now the fastest-growing industry in the ICT services sector. In 2006, the Philippines had 146 such centres, employing 150, 000 staff and generating $2.7 billion revenue.

The industry estimates that the ICT services workforce will increase from 99,300 (in 2004) to 920,764 (in 2010), and revenues from $1.5 billion (in 2004) to $12 billion (in 2010), with the largest growth expected in customer care (contact centres) and back-office operations (business processing).

Table 2.2

The Philippines e-services industry

	Players	Employees	Seats	Revenues (million $)	Growth rate (per cent)	Performance level
Contact Centre (2007)	146	150 000	93 750	2 688	90	..
Business Processing (2006)	62	22 500	..	180	80	..
Animation (2006)	40	4 500	..	40	25	..
Medical and legal transcription (2007)	66	9 675	..	126	80	98–99 accuracy rate
Engineering design (2007)	14	4 000	..	48	30	..
Software design (2007)	300	16 000	..	272	40	..

Source: Based on the presentation by Ernie Santiago, SEIPI, WTO ITA Symposium, 28 March 2007, Geneva, and updated with information received from the Philippine Government in July 2007.
Notes: Data provided for 2005 as of first quarter 2006 and for 2006 as of first quarter 2007.

by the growth in outsourcing of ICT and ICT-enabled services, which has prompted many developing countries to develop their ICT services industry. A number of developing country ICT services producers have grown strongly, notably India, but also China, Egypt (box 2.4) and the Philippines, as well as several of the transition economies, such as Croatia, Poland and Romania.

The telecommunications sector in particular continues to grow strongly. In the OECD countries, revenues increased each year during the past decade and exceeded $ 1 billion in 2005, contributing more than 3 per cent to GDP (OECD, 2007a). Similarly, in some developing countries, the telecommunications sector has experienced significant growth, for example in Brazil, Chile, Malaysia, Mexico and South Africa.

2. ICT sector value added

In the OECD countries, ICT sector value added as a share of total business-sector value added continues to increase overall. After the 2000 downturn, the strongest recovery can be observed in the Republic of Korea and Ireland. ICT services account for more than two thirds of ICT sector value added in the OECD countries, with growth sectors being communications services and software services (OECD, 2006a). Between 2003 and 2005, in the EU countries, Finland and the United

Box 2.4

Egypt's growing ICT sector

According to the MCIT/ITIDA–UNCTAD survey of 151 businesses in the Egyptian ICT sector, average firm revenue growth increased gradually from 16 per cent in 2004 to 26 per cent in 2006, with a greater variation in the revenue growth rate of firms. In 2006, several small and medium-sized enterprises achieved higher sales growth than in the previous two years, when most growth occurred in the largest firms. At the same time, findings suggest that revenues of foreign-owned firms also grew faster.

The increase in ICT sector sales went hand in hand with growth in ICT exports. Results from the survey indicate that while domestic sales show a more equal composition between ICT goods and services, export sales of the ICT industry concentrated mainly on services. In 2006, Egypt exported $548 million worth of communications and computer and information services (based on IMF BOP data) and $18.2 million in terms of ICT goods (based on United Nations COMTRADE). In terms of ICT services, Egypt was the second largest African exporter in 2005, for both communications and computer and information services, competing strongly with Morocco and South Africa. In 2006, the value of ICT-enabled services exports was $2.3 billion. Egypt has the potential to become a competitive international location for offshore services owing to its large skilled workforce, existing business infrastructure and geographical location. In 2005 A. T. Kearney's Offshore Location Attractiveness Index ranked Egypt among the 12 destinations most attractive to offshore businesses, before other regional competitors such as Jordan, Ghana and Tunisia, and after India, China, Malaysia and the Philippines.

Even though Egyptian ICT goods exports have a considerably lower value than ICT services exports, they expanded faster at 22 per cent (CAGR) annually from 2000 to 2006, while services increased more slowly (9 per cent CAGR). Telecommunications equipment and audio and video equipment account for more than three quarters of exports and experienced the most dynamic evolution since 2000. The main importers of Egyptian ICT goods were neighbouring countries in North Africa (Algeria and Sudan) and the Middle East (Kuwait and Jordan).

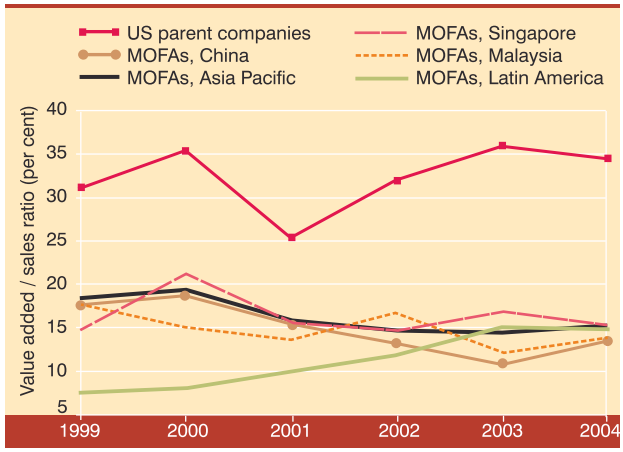
Kingdom continued to have high ICT sector value-added shares, whereas those shares have been falling in Ireland and Austria. At the same time, new member countries, such as Hungary, Slovakia, Romania and Estonia, had increasing shares of ICT sector value added.

Chart 2.5 presents available comparable data at the global level, collected by UNCTAD and based on the OECD ICT sector definition (OECD, 2007b). Among the developing countries, ICT sector value added as a share of total business-sector value added is still small, with the exception of some Asian countries. Growing shares can be observed in smaller economies such as Mauritius and Cuba. In Chile, ICT sector value added reached 3 per cent of total value added in 2004, primarily from telecommunications services (60.8 per cent), followed by IT services and trade, whereas ICT manufacturing had an insignificant share. The ICT sector represented 3.4 per cent of GDP in 2004.[3]

In India, which is one of the largest producers of ICT services, the contribution of the IT software and services sector to GDP increased from 1.2 per cent (1999) to 5.4 per cent (2006). The figures do not include the telecommunications sector, the third largest in the world and which has grown at an average rate of 40-45 per cent during the last two years (WTO, 2007). The total services contribution to GDP increased from 50 per cent (2000–2001) to 54 per cent (2005–2006), compared with a stable contribution of the manufacturing sector and a declining contribution by the agricultural sector.

Chart 2.4

Value added to sales ratio for US MNC computers and electronic products sector, 1999-2004

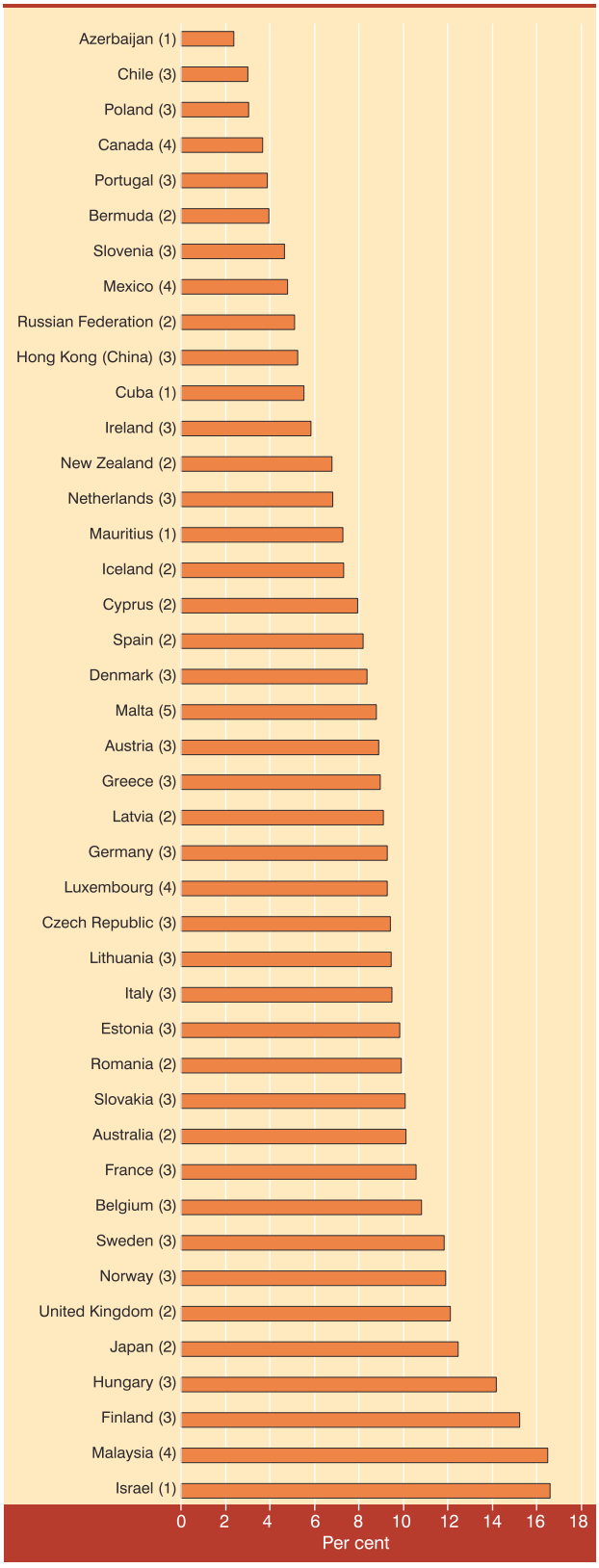


Source: Presentation by Jacob Kirkegaard, UNCTAD-OECD-ILO expert meeting, Geneva, 5 December 2006.

Note: MOFAs refers to majority-owned foreign affiliates.

Chart 2.5

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

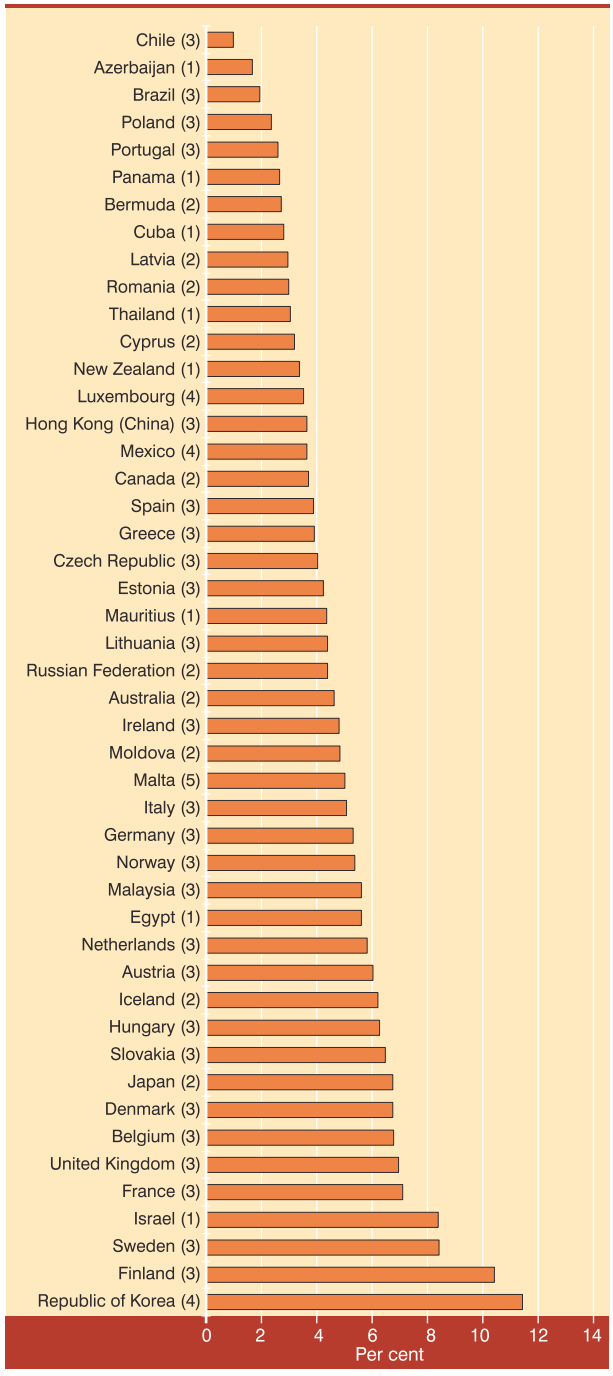


Source: UNCTAD Information Economy database (2007).

Notes: (1) reference year 2006; (2) reference year 2005; (3) reference year 2004; (4) reference year 2003; (5) reference year 2002.

Chart 2.6

Share of ICT sector workforce in total business-sector workforce



Source: UNCTAD Information Economy database (2007).

Notes: (1) reference year 2006; (2) reference year 2005; (3) reference year 2004; (4) reference year 2003; (5) reference year 2002.

According to Chinese sources, the value added of the "information industry" in China reached 7.5 per cent of GDP in 2004, an increase in value by 30 per cent from 2003. The value added of post and telecommunication services accounted for 8 per cent of services industry value added (2003). This compares with 32 per cent

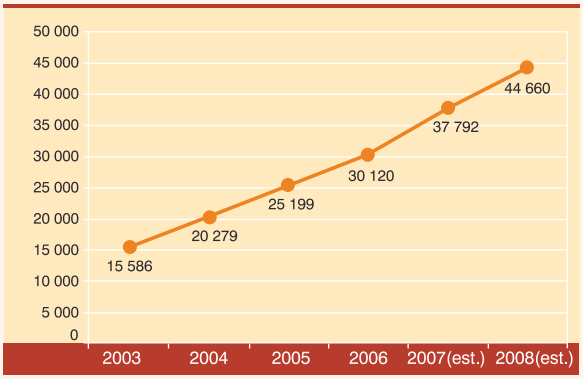
Box 2.5

Sri Lanka's ICT employment: rising demand

In Sri Lanka, ICT employment has grown steadily over the past few years and is expected to reach 44,660 by 2008 (chart 2.7)[4] In 2006, the overall IT workforce stood at 30,120 of whom 46 per cent are in the IT sector, 47 per cent in the non-IT sector and 6.6 per cent in government. The highest shares of the overall IT workforce are in software engineering and programming, technical support, and testing and quality assurance (see chart 2.8). Even though the IT workforce represents less than 1 per cent of total employment, it is an important growth sector.

Chart 2.7

IT workforce in Sri Lanka, 2003-2008

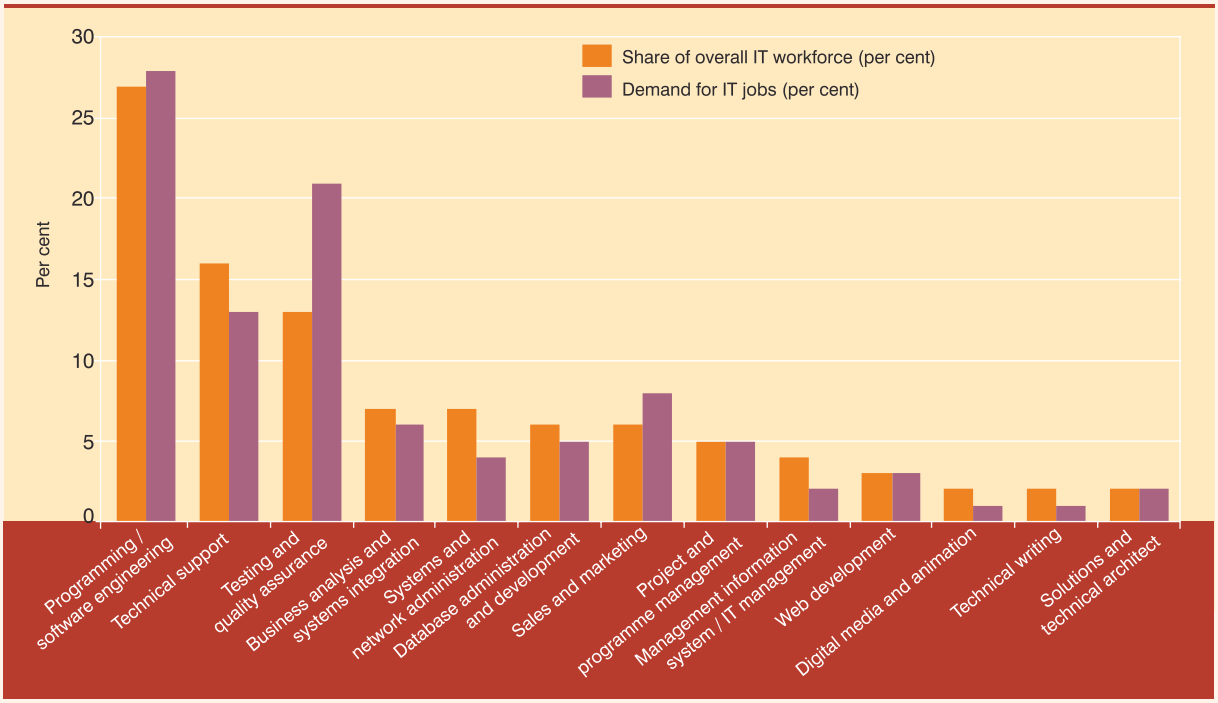


Source: SLICTA (2007).

Domestic demand for ICT professionals in Sri Lanka is greater than supply. For example, in 2007 the overall (new) demand for ICT professionals is 7,672, of which 5,755 graduates will be required to fill the job vacancies. The job categories with the greatest demand for IT workers are programming/software engineering, testing/quality assurance and technical support (chart 2.8). However, only 2,216 IT graduates will be added to the workforce, and, after adding the supply of ICT-related graduates, there will thus be a shortfall of 2,555 graduates. Furthermore, the attrition rate for IT jobs doubled between 2004 and 2006, reaching 13 per cent. This increased the shortage in the supply of ICT professionals and will reduce the likelihood that demand will be met by supply.

Chart 2.8

Job categories as share of overall IT workforce and demand for IT professionals in Sri Lanka, 2007



Source: Based on SLICTA (2007).

Box 2.5 *(continued)*

A reduction in the attrition rate and the industry's willingness to recruit IT-related degree holders and advanced diploma holders, as well non-IT graduates, may help bridge the gap. Both an increase in the number of IT graduates and an improvement in their quality are necessary. It will be a challenge to meet this goal in view of the insufficient specialization in IT courses at degree and postgraduate levels, and because courses are not tailored to particular job categories. For instance, "testing and quality assurance" is a job category that has seen rapid growth in the number of employees over the past two years, but there are no academic courses tailored to that job category. Furthermore, IT training institutions lack qualified teaching staff that could impart essential and complementary skills to graduates and improve their qualifications. A further explanation for the reduced supply of IT professionals is related to "brain drain", mainly to India, where companies find it an advantage to tap the large pool of skilled people in Sri Lanka.

About half of all IT jobs are in large organizations (with more than 300 employees). In the non-IT and government sectors, large organizations employ about three quarters of the IT workforce. By contrast, in the IT industry, almost 80 per cent of the workforce is employed by small and medium-sized enterprises (under 300 employees), a significant increase from 2004, when they employed 53 per cent of the IT workforce. A relatively small share (21 per cent) of the IT workforce is female. The Government employs most female IT professionals (36 per cent), while the non-IT sector employs 15 per cent and the IT sector 20 per cent (charts 2.9 and 2.10). No information on types of activities by gender is available.

Chart 2.9

Highly skilled graduates by sector, Sri Lanka, 2007

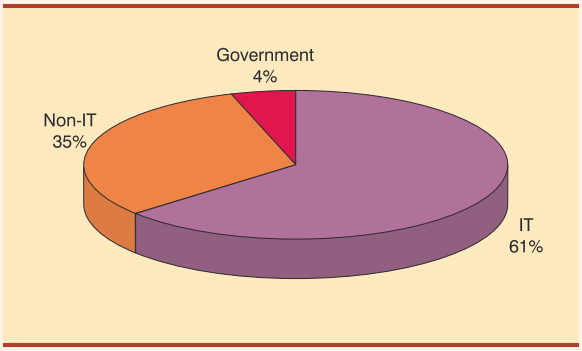
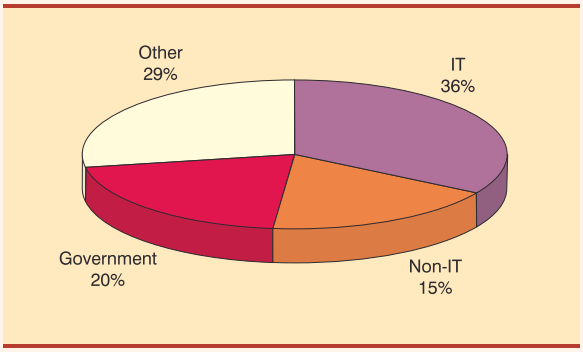


Chart 2.10

Female representation by sector, Sri Lanka, 2007



Source: SLICTA (2007).

Notes: 43 per cent of the overall workforce has a degree or a higher qualification in IT. Women represent 21 per cent of the overall IT workforce.

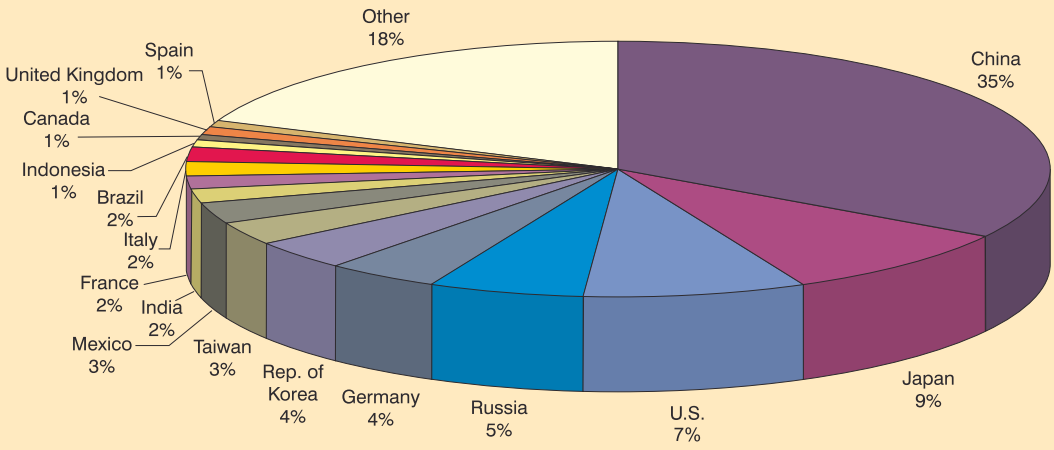
of total value added in 2004 for total services, which is still relatively low compared with OECD countries. Available data from United States foreign affiliates show that the value added to sales ratios in ICT goods production in China and other developing country producers remain below that in the United States (chart 2.4).

3. ICT sector employment

In the OECD countries, between 1995 and 2003 ICT sector employment increased by 8 per cent overall, but growth is stable in most countries. In the United States, ICT sector employment shifted from primarily manufacturing (66.6 per cent in 1996) to primarily services (54.6 per cent in 2004), a trend which is likely to be observed in other OECD countries as well (Bednarzik, 2005). The share of the ICT sector workforce in the total business-sector workforce is highest in the Republic of Korea, accounting for more than 10 per cent in 2003 (chart 2.6). As in the case of the ICT sector value added, ICT-workforce shares are increasing in some EU countries, such as Finland and the United Kingdom, but are decreasing in others, such as Ireland, Sweden and the Netherlands. Available figures from developing countries point to small but increasing shares in countries such as Cuba and Egypt. In Chile, ICT sector activities generated 50,769 jobs in 2004, equivalent to 1 per cent of all jobs in the economy. More than 50 per cent of the persons in those jobs are considered to be highly qualified professionals and technicians. The creation of high-skilled jobs in the ICT sector has also been confirmed by a recent study carried out in Sri Lanka (box 2.5).

Chart 2.11

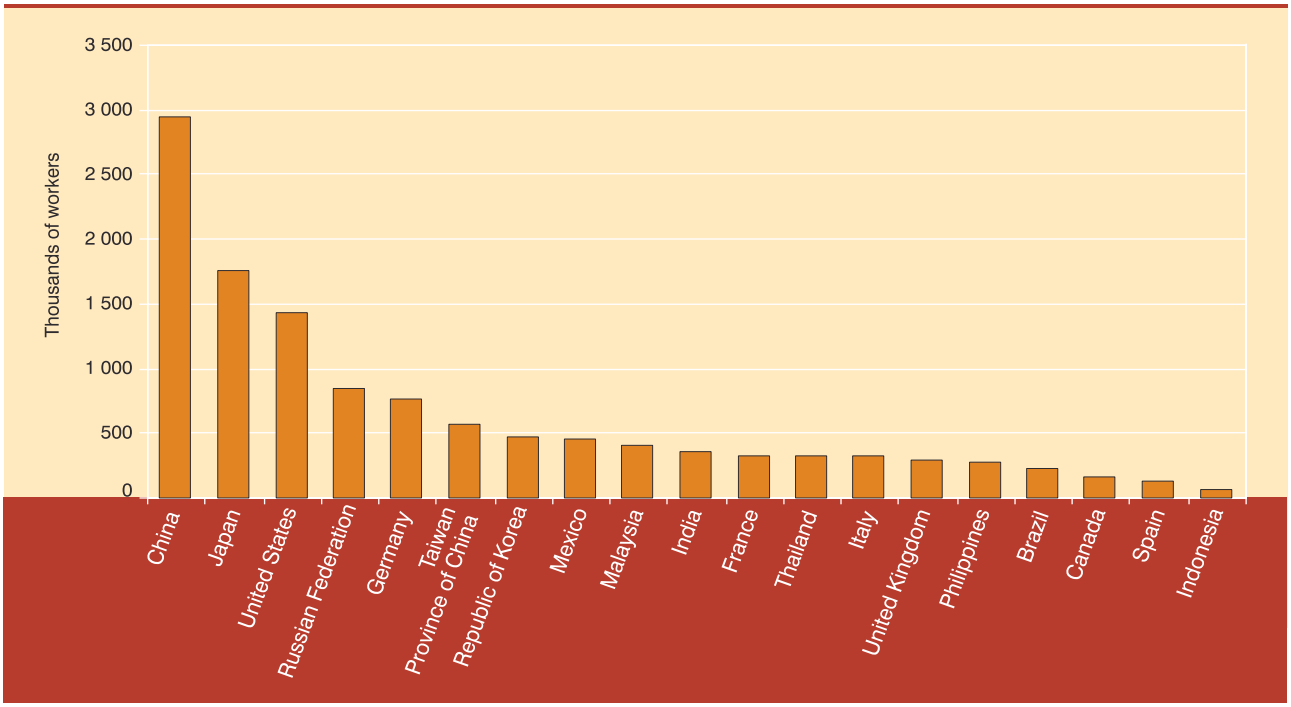
Global distribution of employment in electrical and electronic products manufacturing, 2004



Source: ILO (2007).

Chart 2.12

Employment in electrical and electronic products manufacturing, 2002



Source: ILO (2007).

In 2004, total employment in the manufacture of electrical and electronic products worldwide, which constitutes a major part of the ICT industry, was over 18 million, with a relatively high share of female employment in some developing countries (box 2.6) (ILO, 2007). Employment in this sector declined in the 1990s and until 2002, when the sector started booming, with China as the engine of growth (see section D.2.). Employment in the sector is highly concentrated, with 20 countries accounting for 87 per cent of world total employment. Among the largest employer countries are China, Japan, the United States, the Russian

Table 2.3

Employment trends in electrical and electronic products manufacturing, 1997–2004

Countries	Office, computing and accounting machinery	Electrical machinery and apparatus	Radio, TV and communication equipment	Employment trend
United States	Declining	Declining	Declining	Loss of 550,000 jobs
Japan	Declining but steady more recently	Declining	Slightly declining	Loss of 400,000 jobs
Germany	Declining	Steady	Slightly declining	Loss of 100,000 jobs
The Russian Federation	Increasing since 2002	Increasing	Declining	N/A
Thailand	Loss of 18,000 jobs	Increase of 101,000 jobs	Increase of 84,000 jobs	Increase of 167,000 jobs (1997 and 2000)
India	N/A	Increasing	Increasing since 2001	N/A
Republic of Korea	Increasing	Increasing	Increasing	N/A
Philippines	N/A	Declining	Gain of 29,000 jobs (2003 and 2004)	N/A
Mexico	Increasing since 2003	Increasing since 2003	Declining	N/A
Indonesia	N/A	N/A	Increasing	Increase of 65,000 jobs (1998 and 2001)

Source: UNCTAD, based on ILO (2007).
N/A = not available.

Box 2.6

Women in ICT manufacturing

Women account on average for almost 40 per cent of the workforce in the electrical and electronics production, with large differences between countries and industries (table 2.4) (ILO, 2007). In the manufacture of office, accounting and computing machinery, women's share of employment stands at 50 per cent in the emerging economies of Asia, such as Malaysia, the Philippines, Thailand and Viet Nam, whereas in India it is very low. In the manufacture of electrical machinery and apparatus, the average shares of women in the workforce in developing economies such as Indonesia, the Philippines, Thailand and Viet Nam are much higher than in developed economies, whereas the shares in India and Malaysia are very low. In the manufacture of radio, television and communication equipment, women's share of total employment is higher than in the other two segments, and shares in Malaysia, the Philippines, Thailand and Mexico are particularly high. High rates can also be found in Eastern Europe – in Bulgaria, the Czech Republic, Latvia, the Russian Federation, Slovakia and Ukraine. In addition, there are differences between women's and men's wages, with women earning less than men, although they work almost the same number of hours, and in all countries (except Finland) where data are available the wage discrepancy is increasing over time.

Table 2.4

Employment by gender in electrical and electronic products manufacturing

Job category	2004	2003
Office, computing and accounting machinery	40 per cent	10 per cent – 64 per cent in developing economies 25 per cent – 40 per cent in developed economies
Electrical machinery and apparatus	37 per cent	13 per cent – 60 per cent in developing economies 16 per cent – 50 per cent in developed economies
Radio, TV and communication equipment	N/A	20 per cent – 72 per cent in developing economies 17 per cent – 62 per cent in developed economies

Source: UNCTAD calculations, based on ILO (2007).
N/A = not available.

Box 2.7

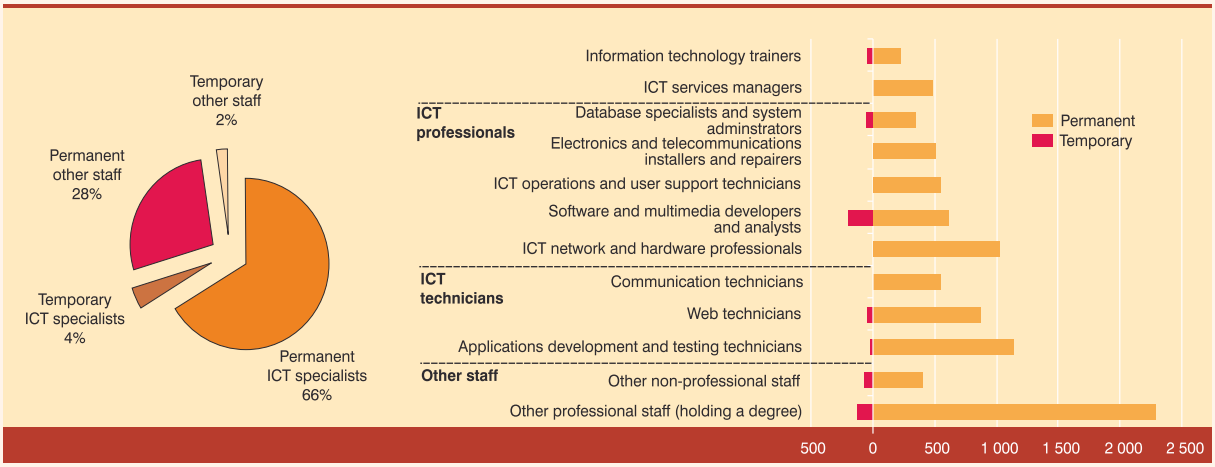
Employment in the ICT sector in Egypt

The growing global demand for ICT products and services has resulted in job creation in Africa as well. Egypt in particular has seen a notable expansion of 700 per cent in revenues from its ICT industry,[5] and a fourfold increase in the total number of ICT companies[6] during the last seven years (2000–2007). According to the World Bank (2006) the share of telecommunications revenue increased from 2.8 per cent in 2000 to 3.5 per cent in 2004, above the average performance in the Middle East and North African region. Currently, approximately 2,262 ICT companies[7] are present in the Egyptian market and they employ some 50,000 people.[8] This amount corresponds to a small share of the total active workforce of 18 million,[9] but it represents a dynamic sector with higher than average participation of women in the labour market.

A 2007 survey conducted jointly by the Ministry of Communication and Information Technology (MCIT), the Egyptian Information Technology Industry Development Agency (ITIDA) and UNCTAD interviewed 151 Egyptian ICT companies representative of the ICT sector and assessed in greater detail the structure of the workforce by gender and occupations.[10] Within the sample of companies surveyed, it was found that 70 per cent of jobs are specialized ICT occupations (against only 30 per cent other occupations) (chart 2.13). Among ICT occupations, most jobs were for applications development and testing technicians and for network and hardware professionals, while there were fewer IT trainers. Even though only 5 per cent of the staff employed were in temporary positions, the survey showed that there were relatively more temporary workers employed as software and multimedia developers and analysts compared with other occupations. This finding reveals the potential for high staff turnover for this specific type of occupation.

Chart 2.13

Permanent and tempory workforce in a sample of ICT companies in Egypt



Egypt is recognized as one of the few African countries where women's participation in ICT is more pronounced.[11] Even though the results of the MCIT/ITIDA UNCTAD survey show that female employees occupied only 23 per cent of the positions in the ICT businesses surveyed (chart 2.14), this share is greater than the 19 per cent participation of women in the total workforce estimated by ILO for 2003. In 2001, the International Telecommunication Union found that women represented 22 per cent of the staff employed in the telecom sector in Egypt.[12]

Additionally, the MCIT/ITIDA UNCTAD survey revealed that in the ICT sector there are relatively more women employed in temporary positions and in non-ICT occupations. On average, for all types of ICT occupations there is a ratio of 3 male to 1 female employee, while among the other staff members the ratio is closer to 2 to 1. Also, for every 4 male permanent staff members, there is 1 permanent female staff member, while among temporary staff members this ratio is 3 to 1. There were more women working as ICT professionals than as ICT technicians. Women are more commonly employed as ICT network and hardware professionals and as applications development and testing technicians. As seen in chart 2.13, these same jobs with a high participation of women coincide with positions most in demand among specialized ICT occupations in Egypt. This indicates that women can make an important contribution to increasing the numbers of specialized ICT personnel to match demand from the ICT-producing sector.

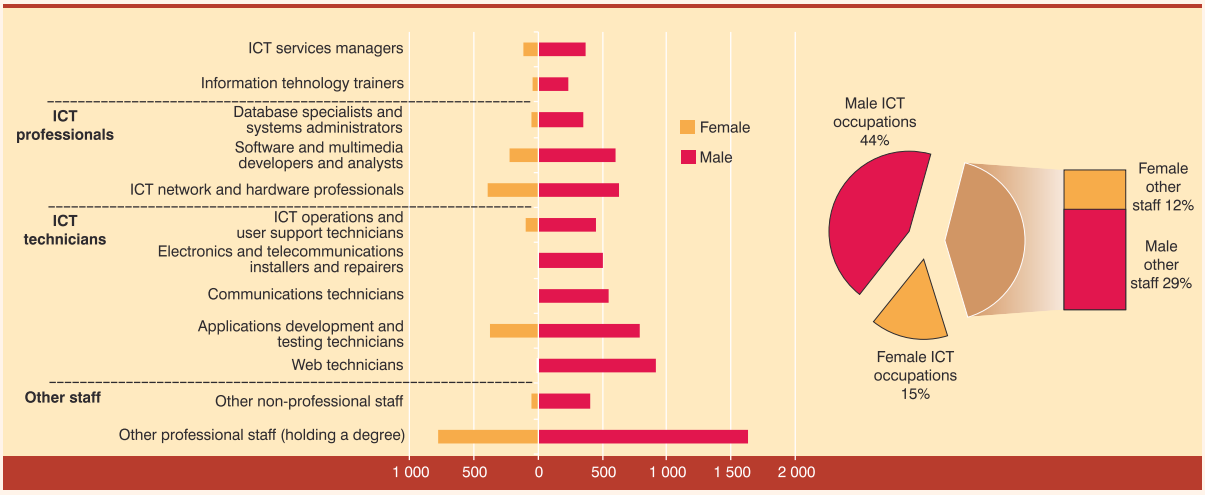
According to the MCIT/ITIDA UNCTAD study, domestically owned firms employ relatively more women in the ICT sector compared with other businesses. Foreign-owned or joint ventures employed less than a fifth of the total surveyed workforce, corresponding to a reduced share of foreign ownership in the Egyptian ICT sector. Also, a larger female participation is found in firms with a certain experience in the market, founded some 10 years ago (both absolute and relative). Younger ICT firms, founded in 2002 or before, tend to employ relatively fewer women.

Box 2.7 *(continued)*

If demand conditions remain favourable to growth in the ICT sector in Egypt, there is scope for encouraging women's participation in the ICT workforce through targeted training and by supporting a gender-balanced use of ICTs. As other studies (Standing, 1999) have shown, hiring women when there is great demand can result in superior business competitiveness.

Chart 2.14

Male and female occupations in a sample of ICT companies in Egypt

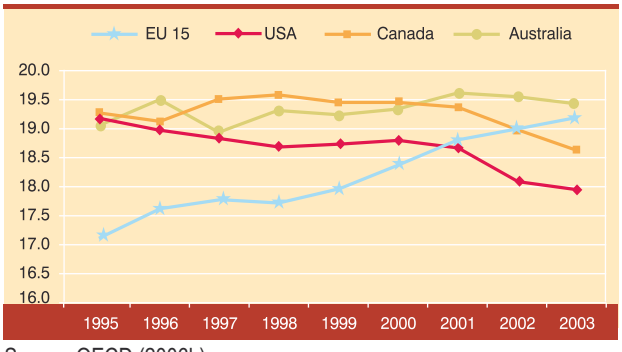


Federation, Germany, and the Republic of Korea (charts 2.11 and 2.12). The Republic of Korea, where the electronics industry has been an important part of the economy since the 1980s, there is a shift from high- to low labour-intensive production, as well as an improvement in labour productivity. This has led to a deceleration of employment in the sector, which grew annually by only 3.5 per cent (between 1997 and 2004), whereas total production grew by 9.4 per cent. The most significant growth in employment (13.7 per cent CAGR) occurred in the area of consumer products, such as television and radio transmission devices, and telephones.

The three main sub sectors are office, computing and accounting machinery, electrical machinery and apparatus, and radio, television and communication equipment. Between 1997 and 2004, most of the largest employer countries in all three sectors had flat or declining employment. In the United States 550,000 jobs (over 30 per cent) were lost from the workforce, in Japan 400,000 jobs (20 per cent) and in Germany 100,000 jobs (14 per cent). On the other hand, countries that increased their employment levels in one or several of the industry segments include China, the Russian Federation, Thailand, Indonesia and the Philippines.

Chart 2.15

Potentially offshorable occupations in total employment: EU 15, United States (estimate), Canada and Australia, 1995-2003



Source: OECD (2006b).

ICT sector employment and international sourcing

Given the strong growth of international sourcing during the past few years, the question of how many

jobs are lost/created as result of outsourcing has received much attention. Unfortunately, there are few reliable data on the impact of international sourcing in the ICT industry on employment (in both developed and developing countries). Several studies on ICT services offshoring and job losses in the United States conclude that the impact is rather limited overall and concentrated in a few industries and occupations (Bednarzik, 2005). In the European Union, job losses in information technology due to international sourcing have been estimated at 1,570 (in 2005), or 14 per cent of all job losses due to international sourcing.[13] These figures are insignificant compared with the more than 2 million jobs lost in manufacturing in the EU 15 during the period 1996–2004. However, the types of jobs in all industries that could be outsourced have been increasing in number in the EU, whereas they seem to be stable in other markets where outsourcing could originate (see chart 2.15). This is largely explained by the fact that employment in occupations potentially affected by outsourcing has been increasing in the EU countries over the past decade. The overall increase in international sourcing and its related impact on employment have caused considerable political debate in countries such as France, Germany, the United Kingdom and the United States.[14]

C. Trade and investment in ICT goods and services

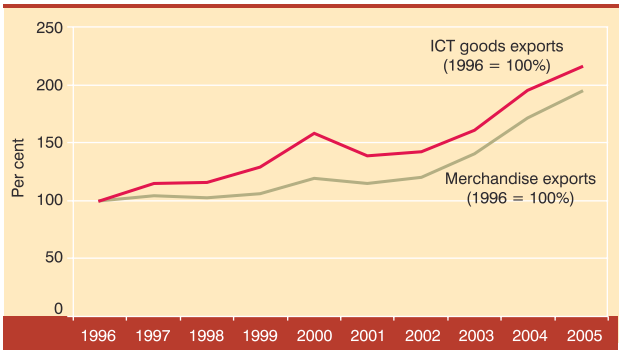
1. Overview

The past decade has witnessed strong growth in ICT-related trade and investment flows. The slowdown after the NASDAQ crash in 2000 was fully reversed by 2005, with growth rates in ICT goods trade equal to those in overall manufacturing trade and above-average growth in ICT services trade. Global ICT trade has grown faster than ICT production and more strongly compared with total exports. The global market has witnessed a general shift from developed to developing countries in the export of ICT goods and services, with the two largest developing economies, China and India, dominating the two sectors respectively. This has led to newly emerging South–South trade relationships in this dynamic sector. In 2005, the value of ICT trade among developing countries almost caught up with that among developed countries and is likely to have exceeded it as this Report goes to press.

Similarly, FDI in the ICT sector grew strongly, especially in ICT manufacturing (electronic and electrical equipment) and ICT services (communication services and software businesses) (UNCTAD, 2005b). Developing countries are increasingly becoming a destination for FDI flows, especially for ICT-related services (UNCTAD, 2004). Over the last decade, 14,566 completed cross-border M&A deals targeted the ICT sector and ICT sector companies concluded 11,634 deals. Available data on ICT sector cross-border M&As show an increase in value for target countries from $22 billion (1995) to $134 billion (2005) and in the number of deals from 386 (1995) to 1,475 (2005) (OECD, 2006a). For non-OECD countries, the value has increased from $2.9 billion (1995) to $106 billion (2005). In 2005, most cross-border M&A deals were in ICT services (610), followed by telecommunications (323) and electronics (190), which, combined, accounted for 76 per cent of all deals. The fastest growth has been in ICT services and telecommunications. In particular, South–South investment flows in the telecommunications sector are on the rise, driven by large TNCs from such countries as South Africa, Malaysia and Mexico (World Bank, 2006).

Chart 2.16

Growth of world merchandise exports and ICT goods exports, 1996-2005

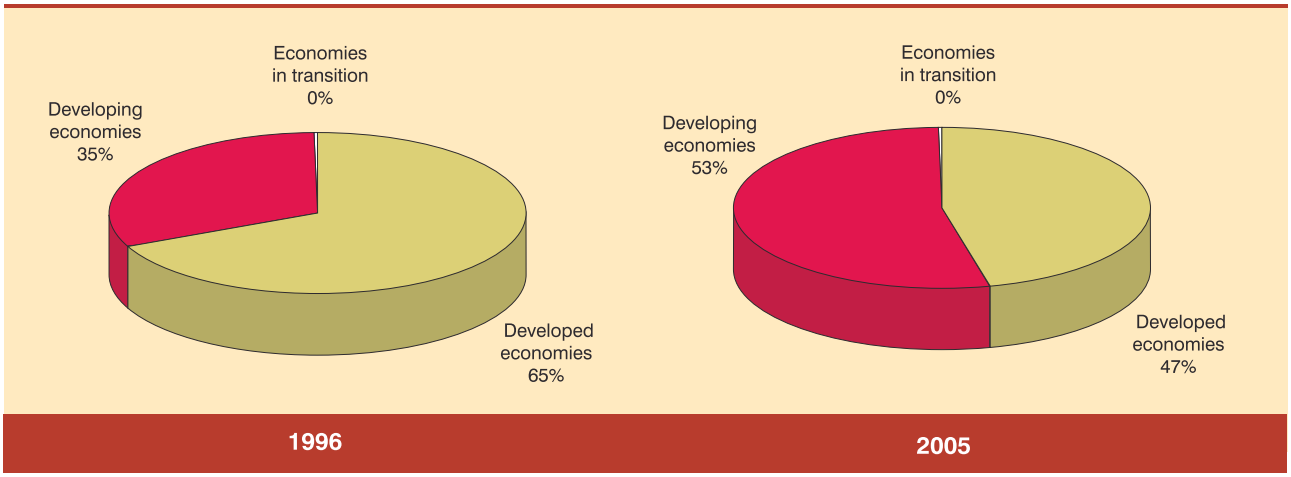


Source: UN COMTRADE.

South Asia, East Asia and South-East Asia are the main magnet for FDI inflows into developing countries, which reached $165 billion in 2005, representing 18 per cent of world inflows. Manufacturing FDI has been increasingly attracted to South, East and South-East Asia, although specific locations have changed as countries have moved up the value chain. This has included large inflows into the electronics industry (UNCTAD, 2006b).

Chart 2.17

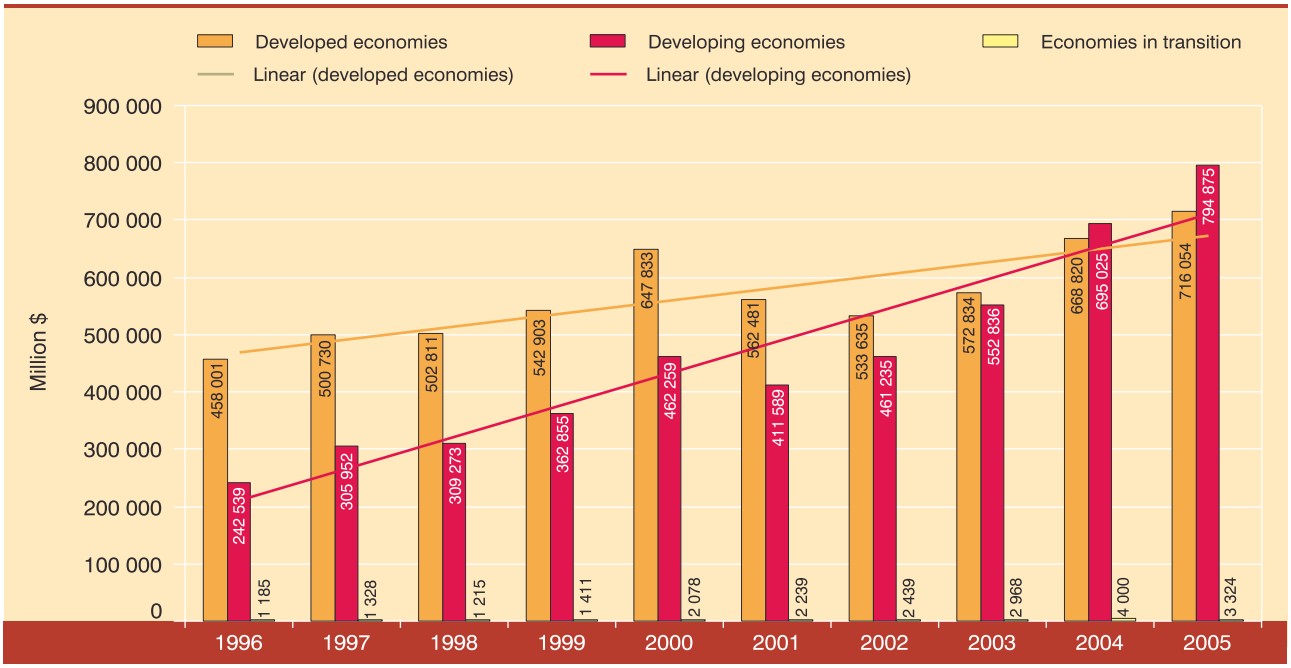
ICT goods export by level of development, 1996 and 2005



Source: UN COMTRADE.

Chart 2.18

ICT goods export by level of development, 1996-2005



Source: UN COMTRADE.

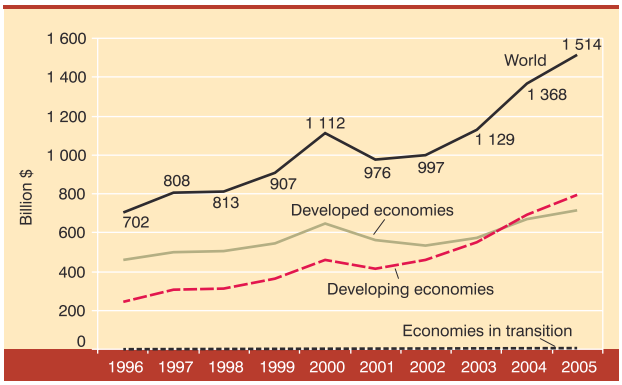
2. ICT goods

Overall, there has been strong growth of trade in ICT goods, and full recovery from the 2000 decline. The share of world exports of ICT goods in world exports of all merchandise goods increased from 13 per cent in 1996 to 15 per cent in 2005. Between 1996 and 2005, world exports of ICT goods increased at a higher CAGR than total world merchandise exports – at an annual rate of 9 per cent compared with 8 per cent. However, this is largely based on high growth in the late 1990s, whereas growth rates have been stable since 2001.

Since 1996, the value of world exports of ICT goods has more than doubled, reaching $1.5 trillion in 2005. Between 1996 and 2005 the value of merchandise exports increased by 94 per cent, while ICT goods exports increased by over 116 per cent (chart 2.16). This is despite high commodity prices in 2005 and

Chart 2.19

World exports of ICT goods, 1996-2005



Source: UN COMTRADE.

2006, which, coupled with falls in the prices of certain ICT goods, disguise the relative performance of trade in ICT goods in volume terms and the emergence of new markets.

The strong growth in ICT goods trade coincides with the lowering of tariffs on ICT products of countries that are signatories to the WTO's Information Technology Agreement (ITA). Today, 93 per cent of WTO ITA products are imported duty-free, with larger tariff cuts by developing countries than by developed countries. An assessment of ITA's 10 years of existence is provided in section E.

Exports

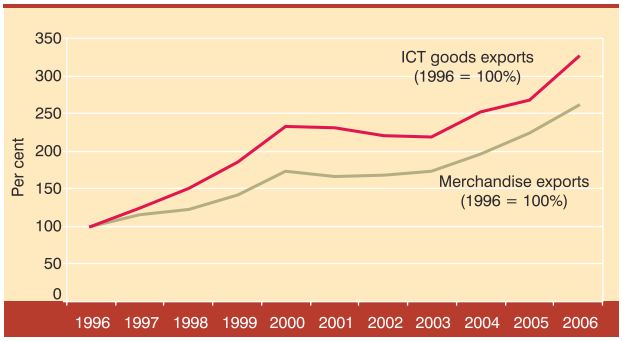
The global market in ICT goods trade has witnessed a general shift from developed economies to emerging economies in the developing world. Until 2003, the United States was the largest exporter of ICT goods; in 2004 China overtook it, and in 2006 its exports totalled $299 billion (see section D). China's exports value increased by an annual 36 per cent between 1996 and 2006, up from $19 billion in 1996, when it was the eleventh largest exporter of ICT.

Other large exporters of ICT goods include developed economies such as Germany, the United Kingdom, France, Netherlands and Japan and developing economies, such as the Republic of Korea, Singapore, Taiwan Province of China, Malaysia, Thailand, the Philippines and Mexico. While in 1996 the largest exporters of ICT goods were mainly developed countries, by 2005 developing countries had emerged as large exporters of ICT goods and such countries as France, Italy and Spain lost their place among the world's largest ICT goods exporters. Annex 1 provides country-level data on ICT exports during the past decade. Chart 2.17 shows the shift in ICT goods exporters from developed to developing countries during the same decade.

Among the emerging developing countries that have increased their share in the global ICT goods market, the cases of Mexico and Indonesia should be mentioned. In both countries, ICT goods exports increased more than overall merchandise exports (see charts 2.20 and 2.21). Since 2005, Mexico has specialized in exports of audio and video equipment, which together with telecommunications equipment increased fastest. The United States remained the main export destination for ICT goods produced in Mexico, but exports to certain South and Central American countries (such as Nicaragua, Honduras and Colombia) increased rapidly. In Indonesia, exports of electronic components picked up in the aftermath of 2000, with the main destination being Singapore.

Chart 2.20

Mexican merchandise exports and ICT goods exports (1996 = 100 per cent)



Source: UN COMTRADE.

Chart 2.21

Indonesia merchandise exports and ICT goods exports (1996 = 100 per cent)

Source: UN COMTRADE.

However, computer and related equipment remained the Indonesian ICT export category with the highest value in 2006. Countries in South-East and East Asia were the main trading partners, with an exceptionally large increase in exports of computers and related equipment from Indonesia to China.

Regional trends

- Among developing countries in Latin America, the Caribbean and other America, Mexico had a 2.9 per cent share of world exports of ICT goods in 2005 and registered a CAGR of 13 per cent between 1996 and 2006 (compared with 7 per cent for total exports). Other developing countries in that region such as Guatemala, Colombia and Honduras also had higher growth in ICT goods exports between 1997 and 2005 compared with overall exports, and above-average growth compared with all developing countries. Although they do not currently have significant shares in world exports, they grew significantly from very low initial export values in 1997. Countries such as Brazil and Costa Rica, which started with higher export values in 1997, also had higher CAGRs than the overall exports and higher than all developing countries' export.

- In Africa, developing countries' ICT export values are small. However, Mauritius, Uganda and the United Republic of Tanzania recorded substantial growth (over 50 per cent each) between 1997 and 2005, which is well above their total export growth and above the average of all developing countries' ICT goods exports CAGRs. Other countries such as Cape Verde, Egypt and Senegal registered lower growth rates but still above their overall export growth rates or above the developing countries' exports growth rate (starting from very low initial values).

- Transition economies' export values are small, as well as their shares in world exports of ICT goods. Exceptions are Romania and Croatia, which have some of the highest exports values in the region and also had high CAGRs of 50 per cent and 18 per cent respectively between 1997 and 2005, which are well above the overall export growth rates or those of the developing countries' exports.

- East Asia dominates trade in ICT goods. In Asia, a number of developing economies such as China, Hong Kong (China), the Republic of Korea, Singapore, Malaysia, Taiwan Province of China, Thailand and the Philippines are either among the top 10 exporters of ICT goods or have important export shares, comparable to those of developed countries. China, Hong Kong (China), the Republic of Korea, Indonesia, Turkey and India, which have the highest export values (in billions of dollars) in the region, also had higher CAGRs than the overall export CAGRs between 1997 and 2005.

The least developed countries (LDCs) account for only a small share of global ICT trade (less than 1 per cent, which is slightly higher than their overall share of world merchandise exports). However, their overall CAGR in ICT goods exports between 1997 and 2004 was high, at 25 per cent. This was largely influenced by strong growth in some of the LDCs' exports. For example, Uganda and the United Republic of Tanzania were the two countries that registered very high CAGRs (57 per cent and 54 per cent respectively), and exports from Bangladesh, Mozambique, Senegal and Madagascar also experienced an upward trend (table 2.5). In the case of Madagascar, Senegal and Uganda, exports of ICT goods picked up only recently (2004–2005) and are concentrated mainly in telecommunication equipment, which is also the main category of ICT goods imported into those countries. Uganda and Senegal export mainly to developed European countries, while Madagascar, besides exporting to Europe, registers high values in terms of exports to Singapore, China and Hong Kong (China). Imports of ICT goods from LDCs into the European Union enjoy duty-free market access either under the ITA agreement or under the EU's Everything But Arms initiative (since 2001). In 2006, as much as 75 per cent of LDC exports of ICT goods to developed countries went to the EU. Developing economies in Asia and Africa are the other main buyers of ICT goods from LDCs.

Imports

On the importing side, the major importers of ICT goods since 1996 include developed countries such as the United States, Germany, the United Kingdom, France, the Netherlands and Japan. Developing economies such as China, Hong Kong (China), Malaysia, Thailand, the Philippines and Mexico gradually increased their imports of ICT goods, overtaking

Table 2.5

Exports of ICT goods in selected least developed countries (thousand $)

	1997	2004	2006	CAGR (1997–2004)	CAGR (2004– 2006)
Madagascar	553	545	4 656	-0.2	192.3
Uganda	508	12 103	58 805	57.3	120.4
Senegal	1 219	6 161	24 066	26	97.6
United Republic of Tanzania	105	2 161	2 179	54	0.4
Bangladesh	139	8 650	N/A	80.4	N/A
Mozambique	N/A	7 244	1 914	N/A	48.6

Source: UN COMTRADE.
N/A = not available.

other developed economies such as Italy and Canada, which were among the 10 largest importers in 1996, or Sweden, Switzerland and Austria, which were among the 20 largest importers in 1996. In fact, in 2006, China became the second largest importer of ICT goods, with an import value of $226 billion, after the United States with an import value of $280 billion. At the same time, the import shares of the United States, Japan and Singapore have decreased.

See Annex 1 for ICT goods imports by country.

Developed countries accounted for 55 per cent of world imports of ICT goods in 2005, and developing countries accounted for 44 per cent. As shown in the section on exports, there was a general shift from developing countries being the main importers of ICT goods in the mid-1990s to developed countries being the main importers in 2005. Transition countries in South-East Europe, CIS countries and countries in Oceania import only a small share of ICT goods.

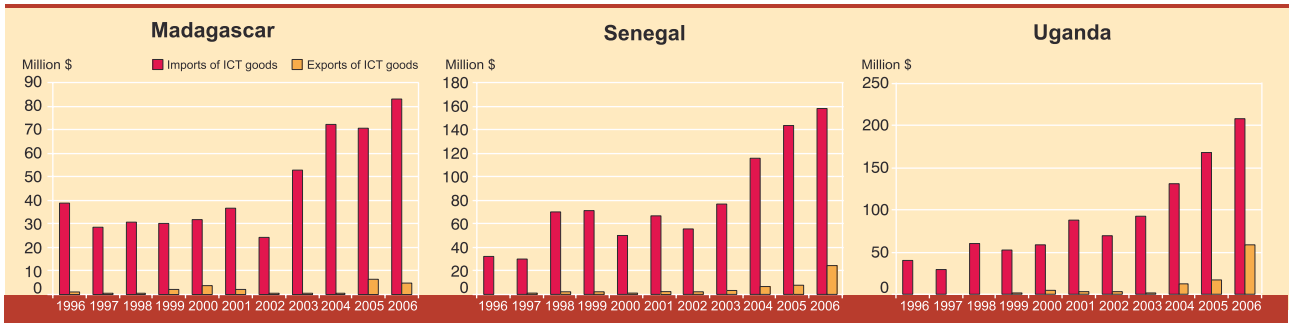
Overall imports of ICT goods have grown faster than imports of other goods. The share of world imports of ICT goods in world imports of all merchandise goods increased from 13 per cent in 1996 to 15 per cent in 2005. Between 1996 and 2005, world imports of ICT goods increased at a higher CAGR than total world merchandise imports – at an annual 9 per cent CAGR compared with 8 per cent.

Regional trends

- Among developing countries in Latin America, the Caribbean and other America, Mexico (which is among the top 20 importers) had a 2.8 per cent share of imports of ICT goods in 2005 and registered a CAGR of 12 per cent between 1996 and 2006 (compared with a 7 per cent annual growth of total imports). Other countries such as Ecuador and Costa Rica, which have some of the highest import values in the region, registered higher annual growth between 1997 and 2005 (17 per cent and 25 per cent respectively) than total annual import growth (10 per cent).

Chart 2.22

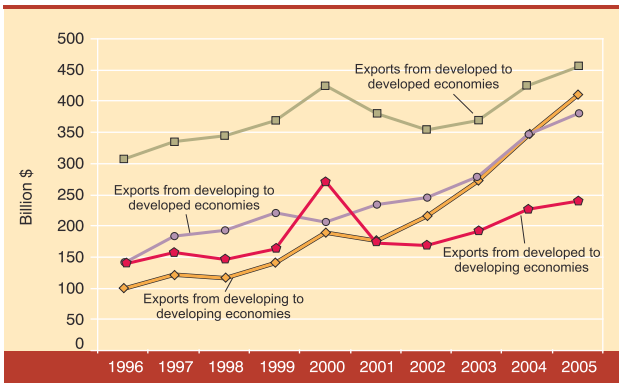
Selected LDC exports and imports of ICT goods



Source: UN COMTRADE.

Chart 2.23

Direction of ICT goods trade originating in developed and developing economies, 1996-2005



Source: UN COMTRADE.

- Developing countries in Africa have very small import values and do not command significant shares of world imports of ICT goods. Nevertheless, some countries' imports, for example those of Mauritius, Uganda and Senegal, grew at CAGRs of over 20 per cent between 1997 and 2005, which is well above the overall CAGRs for imports (albeit starting from low levels).

- A number of developing economies in Asia such as China, Hong Kong (China), Singapore, Malaysia, the Republic of Korea, the Philippines, Thailand and India have significant shares of world imports. The share of China's imports of ICT goods in its imports of all merchandise goods increased from 12 per cent in 1996 to 31 per cent in 2006. Between 1996 and 2006, China's imports of ICT goods increased at a higher CAGR than its total merchandise imports–at an annual 32 per cent CAGR compared with 20 per cent.

- Countries in South-East Europe and the CIS do not have significant shares of world imports of ICT goods. However, Romania and Croatia experienced high CAGRs between 1997 and 2005 (19 per cent and 11 per cent respectively), which were above the overall 10 per cent CAGR for imports.

Direction of trade: the emerging South-South trade

In the LDCs, imports of ICT goods by far outnumber exports. All of the LDCs are in fact net importers of ICT goods. In addition, the share of LDCs' ICT goods imports in total ICT goods imports is small (1.1 per cent in 2005). Their overall CAGR for ICT goods imports between 1997 and 2004 was 17 per cent. In some LDCs (Madagascar, Uganda and Senegal) import growth rates are below average, while exports are increasing at above-average rates (chart 2.22). This points to the growth of the domestic ICT sector, which increasingly serves the domestic market with ICT goods.

Table 2.6

Direction of ICT goods trade and growth, 2000–2005

Exports from	2005 value of ICT goods exports (million $)	CAGR (per cent) 2000 –2005	CAGR (per cent) 2000 –2003	CAGR (per cent) 2003 –2005	Share (per cent) of world exports of ICT goods in 2005
Developed to developed economies	455.118	1.3	-2.9	11.1	30.1
Developed to developing economies	239.541	-2.5	-6.8	11.8	15.8
Developed to transition economies	20.300	70.7	52.3	33.0	1.3
Developing to developed economies	379.856	13.0	6.2	16.7	25.1
Developing to developing economies	410.554	16.8	7.5	23.0	27.1
Developing to transition economies	4.291	70.6	52.4	32.6	0.3
Transition to developed economies	1.710	-22.5	-23.2	2.5	0.1
Transition to developing economies	889	0.8	-1.6	6.3	0.1
Transition to transition economies	716	13.6	7.8	14.2	0.0

Source: UN COMTRADE.

In 2004, exports from developing to developing countries (i.e. South–South) exceeded those from developing to developed countries (chart 2.23). The $410 billion value of South–South trade in ICT goods had almost equalled the $450 billion value of North–North trade, and is likely to have exceeded it in 2006, given the strong growth of South–South ICT trade and the relatively weaker growth of North–North trade (table 2.6). This confirms the increasing importance of trade among developing countries, and the overall shift of ICT production and trade from developed to developing countries. It also demonstrates the growth of the ICT market in developing countries, where the potential for ICT uptake is considerable and hence the demand for ICT goods high. Unlike in the past, when ICT trade largely took place between developed countries, ICT goods trade is becoming trade among developing countries.

Remarkable is also the flow of ICT goods to transition economies. Exports from developed and developing economies directed to transition economies grew significantly between 2000 and 2005, although they accounted for only a small share in total world exports. As transition economies are quickly catching up in the development of their information economies, there is a great demand for ICT products.

In the developed world, most countries import from other developed countries. However, imports from the developing world increased at a CAGR of 13 per cent between 2000 and 2005, compared with a CAGR of 1.3 per cent only for imports from developed economies. It is likely that this trend will continue and therefore developing economies will soon become the main source of imports of ICT goods for developed economies.

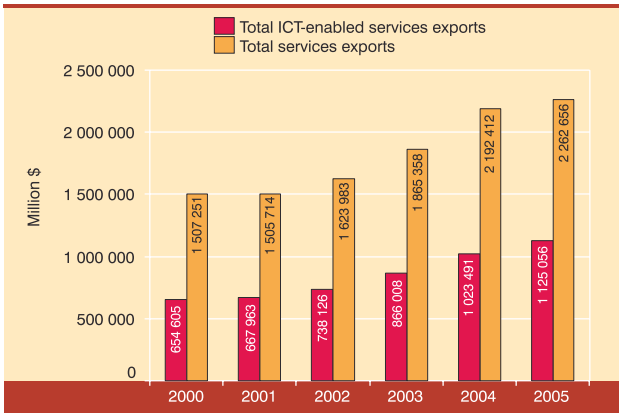
3. ICT services

Unlike trade in ICT goods, trade in ICT services is more difficult to capture. An OECD definition of ICT services based on the Central Product Classification (CPC) Ver. 2 (2007) was agreed in 2006 (OECD, 2007b). However, the CPC classification is not used to capture trade in services statistics, which are mainly estimated using the IMF's BOP classification. The latter is rather broad and does not identify ICT services. Therefore, UNCTAD has been using the concept of ICT-enabled services to analyse trade and investment flows. ICT-enabled services go beyond the economic activities described in the ICT sector classification and include such BOP services categories as communication services, insurance services, financial services, computer and information services, royalties and licence fees, other business services, and personal, cultural and recreational services (UNCTAD, 2002).

Key trends concerning trade and investment in ICT-enabled services were featured in detail in the IER 2006. Since then, ICTs have continued to facilitate trade in services and increase the tradability of services. Exports of ICT-enabled services grew faster than total services exports during 2000–2005, at 11 per cent compared with 8 per cent. In 2005, the $1.1 trillion value of ICT-enabled services represented about 50

Chart 2.24

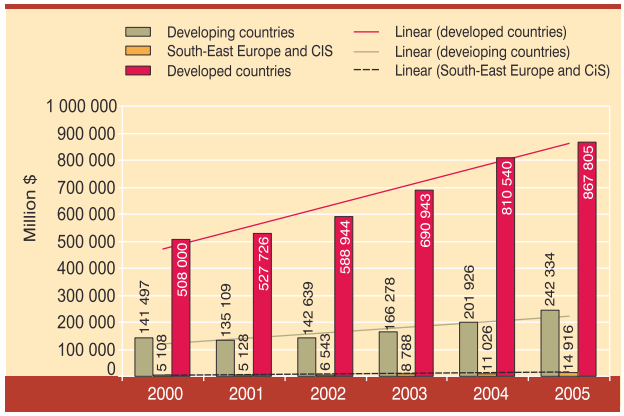
ICT-enabled services share in total worldwide services exports



Source: UN COMTRADE.

Chart 2.25

ICT-enabled services exports, by broad development categories, 2000-2005



Source: IMF BOP, UNCTAD Globstat and United Nations Statistics Division.

Box 2.8

Telecommunications sector – main target of FDI in ICT services

In the past two decades the telecommunications sector in all regions of the world has witnessed liberalization and modernization, which have increasingly attracted FDI. FDI came in the first wave in the early to mid-1990s and was characterized by privatization of State-owned telecommunications companies, and then in a second wave after the revolution in mobile communications technology in the mid-1990s, characterized by the introduction of cost-effective digital cellular services. Telecommunications FDI flows to developing countries were substantial during the mid- and late 1990s, but then decreased after 2000 following the bursting of the telecommunications bubble in developed countries, the compromised balance sheet of leading global operators and pessimism about emerging markets after the East Asian, the Russian Federation and Argentine economic crises (World Bank, 2006).

Evidence regarding large-scale foreign entry in the telecom services in 85 developing countries in the period 1985–1999 points to an improved and more competitive supply of services as a result of better firm performance (Fink et al., 2002). Research has shown that FDI has led to improved telecom services and contributed to higher economic growth (Norton, 1992; Roeller and Waverman, 1996). As the telephone system improves, the business-related costs fall, and firm output increases in individual sectors of the economy. Thus, telecommunications infrastructure investment and the derived services provide significant benefits because of productivity gains.

From a study carried out by the World Bank, it emerges that 122 out of 154 developing countries financed telecommunications infrastructure projects with foreign investment between 1990 and 2003 (World Bank, 2006). The foreign investment commitments amounted to $194 billion, which corresponds to 11.5 per cent of total FDI inflows to developing countries during that period. The same study shows that between 1990 and 2003 the 10 largest foreign direct investors in telecommunications were multinational corporations from Europe and the United States and they accounted for 57 per cent of the total FDI in telecommunications in developing countries. In 2002, the top-30 list of the largest telecommunications multinational corporations included four companies from developing countries: Datatec (South Africa), America Movil (Mexico), MTN Group (South Africa) and Telekom Malaysia.

Teléfonos de México (Telmex), the largest telecommunications operator in Mexico, expanded regionally in Latin America, including in Argentina, Brazil, Chile, Colombia, Mexico, Peru and Puerto Rico, as well as in the United States. In 2004, it acquired AT&T Latin America (with operations in Argentina, Brazil, Chile, Colombia and Peru) and paid $113.5 million for an 80 per cent stake in Techtel, Argentina's data and voice provider. In 2005, Telmex acquired MCI's equity stake in Brazilian long-distance operator Embratel. In addition, América Móvil, a Telmex spin off company that operates Mexico's largest mobile phone company – Telcel – has expanded aggressively in Latin America in recent years, and has subsidiaries in Argentina, Brazil, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Paraguay, Peru and Uruguay, as well as in the United States.

Table 2.7

Intraregional South-South telecommunications FDI, 1990–2003 (percentage of total South–South FDI)

	Destination region					
Region of investor	East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa
North to South	72	93	90	52	75	51
South to South	28	7	10	48	25	49
East Asia and Pacific	100				24	50
Europe and Central Asia		100				
Latin America and the Caribbean			100			
Middle East and North Africa				100	36	5
South Asia					40	
Sub-Saharan Africa						45

Source: World Bank (2006).
Note: Based on the largest 75 investors in telecommunications, accounting for 95 per cent of total telecommunications-related FDI in developing countries between 1990 and 2003.

Box 2.8 (continued)

Maturing domestic markets and increased competition, geographical proximity and the withdrawal of some developed-country investors led to a surge in South–South FDI. From 2001 to 2003, South–South FDI accounted for over 36 per cent of total inflows and close to 20 per cent of the total number of telecommunications projects, compared with only 23 per cent and 11 per cent respectively in 1990–1999. This is primarily attributable to the high cost of acquiring reliable information about foreign markets for relatively small companies. They tend to invest in neighbouring countries where they are more knowledgeable about local conditions than multinationals because they have been developing trade, cultural or family links. They thus understand the complexities of investing in those markets and are more tolerant of political risk.

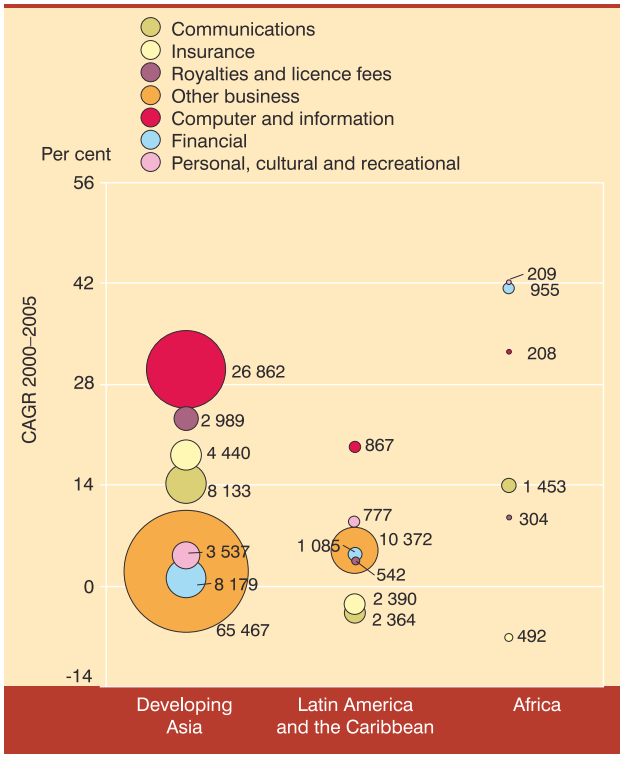
The surge in South–South FDI has been significant also because multinational companies either gradually phased themselves out, to be replaced by regional players, or considered markets too small or marginal to invest in directly and as a consequence invested through their subsidiaries. Investments by Vodacom of South Africa (partly owned by Vodafone of the United Kingdom) and Sonatel of Senegal (a subsidiary of France Télécom) are relevant examples.

per cent of total services exports, compared with only 37 per cent in 1995 (see chart 2.24). This has created new export opportunities for developing countries.

Until 2004 the top 10 exporters of ICT-enabled services were all from developed countries, but in 2005 India joined the top 10, as the first developing economy (replacing Hong Kong (China) and overtaking Italy and Luxembourg), with exports worth $41 billion and a market share of 3.8 per cent. Its annual growth rate between 2000 and 2005 of 37 per cent was higher than the growth rate of overall world ICT-enabled services exports. China is catching up quickly and is among the top 20 exporters and not far behind the top 10 in terms of export value ($26 billion in 2005). It has a share of 2.4 per cent of the world market and had annual growth of 22 per cent between 2000 and 2005, which is well above the growth rate of overall world ICT-enabled services exports. Both developed and developing countries have seen their ICT-enabled services exports increase since 2000 (chart 2.25). Computer and information services exports grew six times faster than total services exports between 1995 and 2004, and the share of developing countries in this export sector increased from 4 per cent in 1995 to 28 per cent in 2005 (although it was largely dominated by India).

Chart 2.26

Developing countries' exports of ICT-enabled services, 2000-2005



Source: IMF BOP, UNCTAD Globstat and United Nations Statistics Division.

In developing Asia and Latin American and the Caribbean, computer and information services exports grew at an annual rate of 30 per cent and 19 per cent respectively between 2000 and 2005, faster than all the other ICT-enabled services exports in those regions and faster also than the overall world ICT-enabled services exports. In Africa, personal, cultural and recreational services, financial services and computer and information services grew annually at higher levels than other ICT-enabled services exports and at higher levels than the overall world ICT-enabled services exports (chart 2.26).

Investment flows and outsourcing

International sourcing[15] of business activities/processes has become an integral element in the discussion on trade and investment in ICT-enabled services, and the related shifts from developed to developing countries.

Available data sometimes distinguish between outsourcing in the ICT industry and outsourcing in other industries (BPO), but there is no internationally agreed definition. Therefore, the data presented below have to be interpreted carefully.

According to the Everest Research Institute, the worldwide outsourcing market size in 2005 was $362 billion, of which IT outsourcing accounted for $233 billion (64 per cent) and BPO accounted for $129 billion (36 per cent). [16]

Rising labour costs in the most popular locations, competitive pressures and improving host-country environments, have led to a broadening of the geographical scope of locations for FDI in services and to offshoring of service activities such as IT services, business processes and call centres. Most offshored services are concentrated in India, China, Malaysia or the Czech Republic, but Canada and the United States also rank highly because of their favourable business environment and skilled labour force. A more detailed discussion of China and India as popular international sourcing destinations will be found in section D.

According to the OECD (2006a), there were 632 export-oriented FDI projects in IT services worldwide during 2002–2003, 513 call-centre projects and 139 projects related to shared services centres. The number of IT services projects in developing countries more than doubled. Developing Asia accounted for 265 (42 per cent) of the IT services projects, with India accounting for 118 (19 per cent) of the worldwide total. A total of 33 per cent of the call-centre projects and 47 per cent of the shared services centre projects were directed to Asia. The telecommunication sector in developing countries has been a preferred recipient of FDI during the past decade (see box 2.8). For example, in South Africa, FDI in telecommunications and information technology has overtaken that in mining and extraction (UNCTAD, 2004).

D. The role of the ICT sector in the growth of China and India

1. Overview

The two largest developing economies, China and India, have been growing strongly during the past decade. Both countries accounted for an increasing world GDP share and growth between 1995 and 2003; the figures are as follows: China 11 per cent (average GDP share) and 22 per cent (growth share); India 6 per cent (average GDP share) and 11 per cent (growth share) (Jorgenson and Vu, 2005).

This has impacted on global economic developments ranging from important shifts in trade and FDI flows from developed countries to China and India, to shifts in production and employment from West to East, the growth of outsourcing in services, and an increase in South–South trade and investment, and the related emerging new geography of trade.[17]

ICTs have played a critical role in the expansion of the two economies. Both economies have benefited from the strong growth of their ICT sectors. As shown in the previous section, China overtook the United States as the world's number one producer and exporter of ICT goods in 2004. India is the world's largest exporter of ICT and ICT-enabled services and the main market for business process outsourcing (BPO).

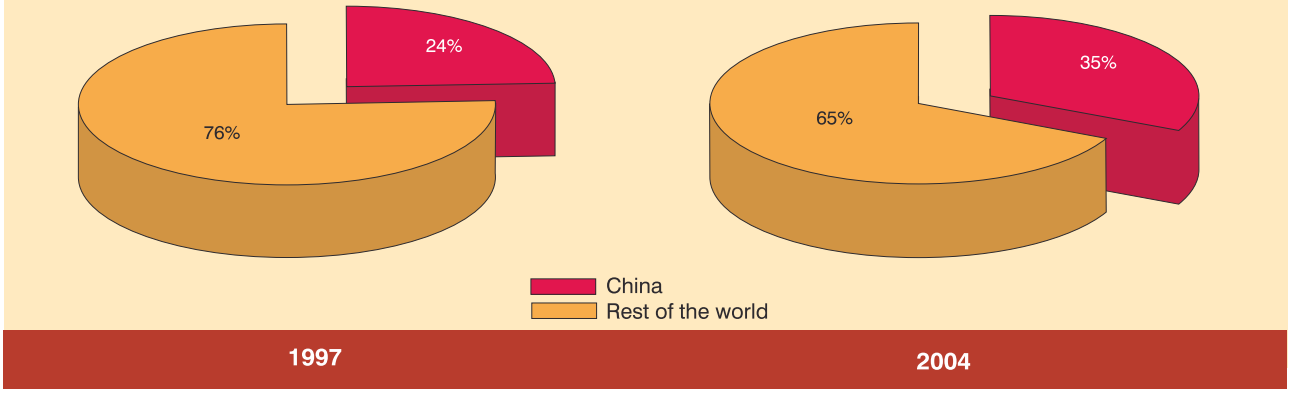
Economic growth in China and India is driven by foreign investment and international sourcing. For example, the two countries have been described as the most attractive business locations for foreign investors (UNCTAD, 2005b), often because of the growth of the ICT industry, growth in China being in ICT manufacturing, and in India in ICT and related services. In the next few years, not only will China and India continue to be major recipients of FDI and international sourcing, but also international sourcing by those countries to other locations, for example in developing countries, may increase. Both countries are in the process of shifting from labour-intensive to knowledge-intensive goods and services. It is possible that China and India will generate a large pool of knowledge in the future, and also develop new technologies, which could be available to developed countries and hence could further contribute to global shifts in production, trade and employment.

2. China's ICT manufacturing

China's ICT sector is primarily driven by the production of ICT goods. ICT production in China grew dramatically between 2000 and 2005 (OECD, 2006a). According to Chinese sources, the value added of the "information industry" reached 7.5 per cent of GDP in 2004, a 30 per cent an increase in value from 2003. Value added of post and telecommunication services accounted for 8 per cent of services industry value added (2003). This compares with total services accounting for 32 per cent of total value added in 2004,

Chart 2.27

China's share of employment in world total employment in the electrical and electronic industry, 1997 and 2004



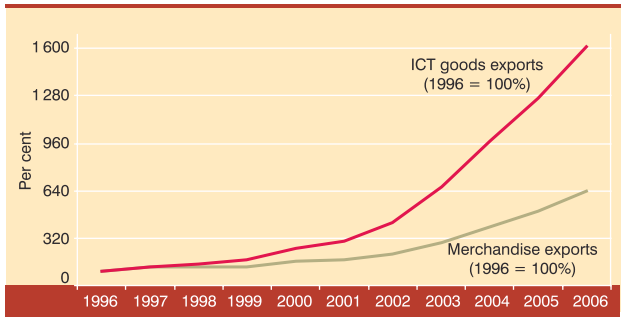
Source: ILO (2007).

which is still relatively low compared with the figures for OECD countries. The ICT sector is the largest trade sector, accounting for 34.4 per cent of total trade in 2006. [18] Employment in the electrical and electronics industry, a major part of the Chinese ICT sector, has increased sharply: in 1997 China accounted for 24 per cent of global employment in that sector, whereas that figure was 35 per cent in 2004 (ILO, 2007) (chart 2.27).

China imports mainly high-value-added electronic components and exports computer and related equipment, telecom equipment (the area of highest growth), and audio/video equipment. There is a tendency to increasingly export final products. Export

Chart 2.28

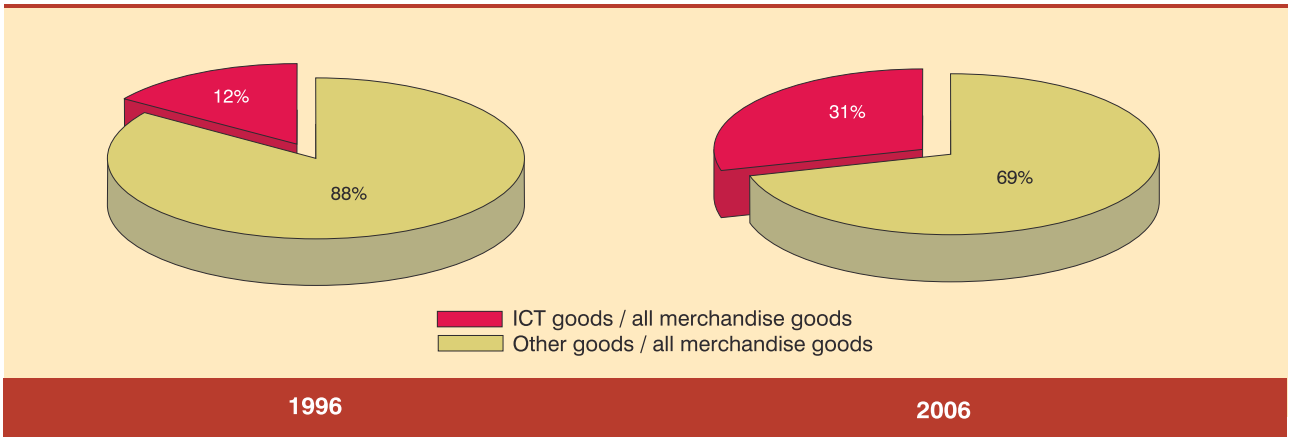
China: merchandise exports and ICT goods exports (1996 = 100 per cent)



Source: UN COMTRADE.

Chart 2.29

China: share of ICT goods exports in all merchandise exports, 1996 and 2006



Source: UN COMTRADE.

destinations have somewhat shifted to developing Asia, but are still mainly the United States, Hong Kong (China), the EU and Japan.

In 1996, ICT goods exports accounted for 12 per cent of total merchandise exports, a figure that increased to 31 per cent in 2005. Between 1996 and 2006, exports of ICT goods increased at a higher rate than total merchandise exports – at an annual 32 per cent compared with 20 per cent for total merchandise exports (charts 2.28 and 2.29). ICT goods exports have thus been a driving force in Chinese exports over the past decade. In 2004, China overtook the United States as the world's largest exporter of ICT goods, which had a value of $299 billion in 2006.

On the import side, total merchandise imports growth slowed down between 2004 and 2005, but ICT goods imports continued to grow strongly. The share of ICT goods imports in total merchandise goods imports increased from 12 per cent in 1996 to 31 per cent in 2006. Remarkably, in only a year (between 2005 and 2006), the share of ICT goods imports in total merchandise imports increased from 26 per cent to 31 per cent. This is primarily due to a sharp increase in the imports of ICT and chips, and wired telecom equipment. Like exports, imports of ICT goods increased at a higher rate than total merchandise imports between 1996 and 2006 – at an annual 32 per cent CAGR compared with 20 per cent.

A significant share of FDI in China is driven by ICT-related investments. For example, in 2005, China received 3,000 "instances" of FDI inflows for a contractual value of $21 billion in telecom equipment, computers and other electronic equipment, which accounted for almost 30 per cent of all FDI inflows (OECD, 2006a). Most of the investment goes towards labour-intensive, low-value-added assembly and production of, for example, television sets, computers (e.g. laptops) and telephone handsets.

Leading firms from the United States, such as Dell, Hewlett Packard, Motorola and Nokia, as well as from Taiwan Province of China, have made ICT-related FDI. In 2004, the 3,384 ICT manufacturing firms from abroad accounted for 21 per cent of total assets in this sector, 30 per cent of total revenue, 20 per cent of profits and 16 per cent of employees. Most of the FDI inflows are directed towards manufacturing and less towards services. ICT and ICT-enabled services (mainly leasing and business services, followed by computer services and scientific research services) have accounted for a relatively small share of total Chinese FDI – 6 per cent of inward FDI in 2004 (OECD, 2007a).[19] Foreign affiliates from Europe, the United States, and Taiwan Province of China have also opened R&D units in the computer, communications and electronics industry.[20]

China will continue to grow in ICT supply; its ICT industry is still low-cost manufacturing often relying on imports of intermediate inputs, but it will gradually shift to ICT-enabled services and move up the value chain. The Chinese Government is encouraging the development of capacity in ICT services, which have so far had a small share in the economy, especially compared with India. China's offshoring is more focused on industry-specific R&D activities and, unlike India, less on language-based back-office services or call centres.

China has the necessary infrastructure and IT workforce to attract investments in the ICT services area. A recent study by the International Data Corporation (IDC) claims that Shanghai and Beijing could overtake Indian top outsourcing destinations by 2011.[21] But research carried out by the OECD (2007a) concludes that China is unlikely to compete with India in ICT-enabled services unless it improves language, cultural and corporate culture skills. It also needs to strengthen its intellectual property legislative system and its regulatory system in order to create a level playing field in the supply of services, especially computer and information services. For the time being, China has the advantage of receiving BPO contracts from Japan since Japanese is spoken widely in one of its regions (North-East China's Liaoning Province – the north-east cities of Shenyang and Dalian); hence it has become the major offshoring destination for Japan. Large Indian companies are already investing in China as a springboard for entering markets in Japan and the Republic of Korea.

3. India's ICT and ICT-related services

As in the case of China, the ICT industry has been an important driver of India's economic growth in recent years and will continue to be so. Already, the ICT industry[22] contributed 5.4 per cent of GDP in 2006, up from 4.8 per cent in 2005 (agriculture contributed 18 per cent to GDP). The value of software exports alone exceeded that of foreign investment (in the same year) in a country which is also a major destination for FDI. The ICT sector is also an important source of employment in India: the number of professionals increased from 284,000 professionals in 1999 to 1.3

million in 2005, and it is estimated that it will reach 1.6 million in 2007 (table 2.8). While those figures are small compared with, for example, agriculture (which employs 60 per cent of the working population, including the non-organized sector), it is an important job growth market for the country.

The ICT sector has also played an important role in India's trade performance over the past decade. Both total merchandise and services exports increased significantly. Manufacturing exports increased from $30 billion in 1995 to $120 billion in 2006, while services exports (based on the IMF BOP classification) increased from $6.7 billion in 1995 to $48 billion in 2005. In particular, the share of services in total exports increased from 18 per cent in 1995 to 37 per cent in 2006, and this has been primarily ICT-driven. For example, the ICT-enabled services share in total services exports increased from 33.8 per cent in 1995 to 86 per cent in 2005; computer and information services alone accounted for 56 per cent of India's ICT-enabled services exports in 2005.

Table 2.8

Indian employment in the software and services sector

Sector	FY 2004	FY 2005	FY 2006	FY 2007E
IT services	215 000	297 000	398 000	562 000
ITES-BPO	216 000	316 000	415 000	545 000
Engineering services and R&D and software products	81 000	93 000	115 000	144 000
Domestic market (including user organizations)	318 000	352 000	365 000	378 000
TOTAL*	830 000	1 058 000	1 293 000	1 630 000

Source: NASSCOM, Indian IT industry – Fact Sheet, February 2007 (www.nasscom.in).
Notes: *Figures do not include employees in the hardware sector.

Table 2.9

The Indian IT industry

$ billion	FY 2004	FY 2005	FY 2006	FY 2007E
IT services	**10.4**	**13.5**	**17.8**	**23.7**
-Exports	7.3	10.0	13.3	18.1
-Domestic	3.1	3.5	4.5	5.6
ITES-BPO	**3.4**	**5.2**	**7.2**	**9.5**
-Exports	3.1	4.6	6.3	8.3
-Domestic	0.3	0.6	0.9	1.2
Engineering services and R&D, software products	**2.9**	**3.9**	**5.3**	**6.5**
-Exports	2.5	3.1	4.0	4.9
-Domestic	0.4	0.8	1.3	1.6
Total software and services revenues	**16.7**	**22.6**	**30.3**	**39.7**
Of which, exports are	12.9	17.7	23.6	31.3
Hardware	5.0	5.9	7.0	8.2
Total IT industry (including hardware)	**21.6**	**28.4**	**37.4**	**47.8**

Source: NASSCOM, Indian IT industry – Fact Sheet, February 2007 (www.nasscom.in).

Notes: Total may not match because of rounding off.
*NASSCOM estimates have been reclassified to provide greater granularity.
Historical values for a few segments have changed because of availability of updated information.

According to NASSCOM, ICT-related services exports grew by 34.6 per cent (CAGR) annually between 2000 and 2006, from $4 billion to $23.6 billion (table 2.9). It is estimated that the export value could reach $60 billion in 2010. NASSCOM's definition of ICT-related services includes BPO, IT software and services, and engineering services and products, and is not based on the IMF BOP classification. The main export markets are the United States and the United Kingdom, but revenues from other European markets are growing.

In addition, India has become the main global hub for BPO and international sourcing of services. According to the NASSCOM – McKinsey 2005 study, India accounts for 65 per cent of the global market in ICT offshoring and 46 per cent of global BPO.[23] The latter figure is expected to increase to 50 per cent by 2010; this could mean that by 2010 India's IT-related services exports will account for 5 per cent of Indian GDP (compared with all exports accounting for 19 per cent of GDP) and 25 per cent of total exports of goods and services. NASSCOM estimates that one United States dollar now offshored to India will increase its value to $1.45, including the delivery of value to India ($0.33), savings for the United States ($0.67) and the creation of new value through the re-employment of US labour ($0.45).[24]

The global market for international sourcing in ICT and other services is forecast to increase further, with a huge growth potential for the Indian ICT services industry (see chart 2.30).

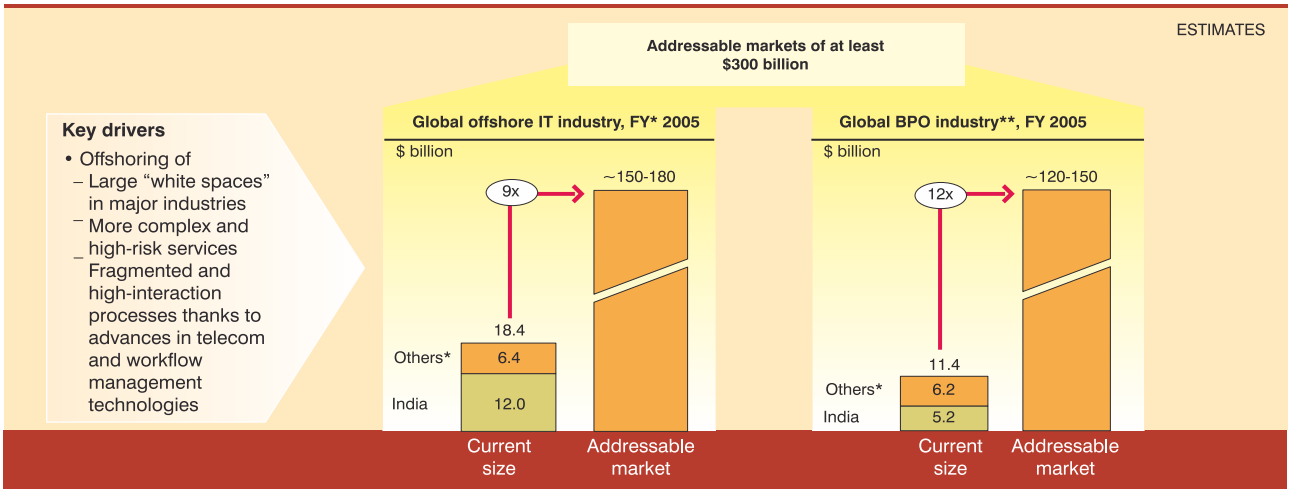
A research report by the Everest Research Institute found that India's labour arbitrage with the United States is likely to be sustained for another two decades.[25] Currently, more than 50 per cent of the Fortune 500 companies source to India, mostly because of the success of the BPO model. The BPO segment will grow, but at a rate of 30 per cent. This sector accounted for 4 per cent of India's GDP and 29 per cent of exports in 2004–2005 and is projected to grow to 7 per cent of GDP and 35 per cent of exports by 2008–2009. India's software and services export sales are well on track to meet a target of $60 billion for 2010.[26]

While Indian companies clearly dominate the ICT services industry, business processing in other sectors is largely in the hands of foreign companies (chart 2.31), although, with more domestic firms gaining ground (Rowthorne, 2006).

India has been one of the main destinations for FDI: TNC investments announced in 2006, and to be made over next few years, total $10 billion. The Indian Government aims to attract $150 billion in FDI in the next decade by setting up special economic zones, science parks, and free-trade and warehousing zones (UNCTAD, 2005b).

Chart 2.30

Potential market for ICT-related international sourcing

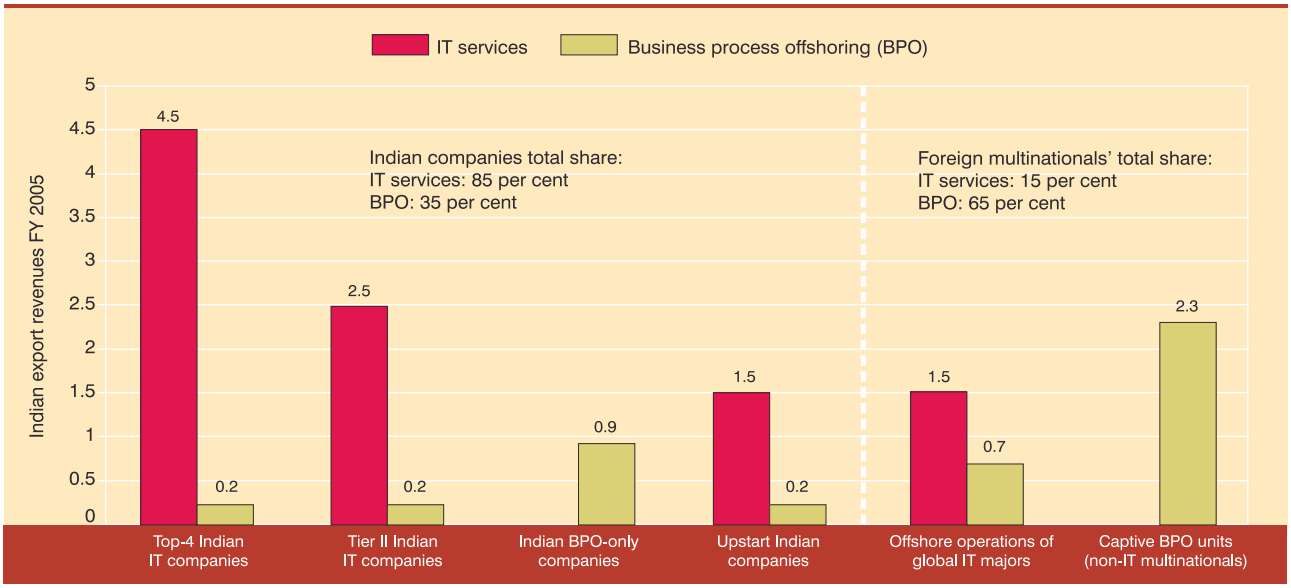


* Financial year, April 1 to March 31
** Includes addressable markets in currently offshoring industries
*** Includes Philippines, China, Russia, Eastern Europe, Ireland, Mexico

Source: NASSCOM, presentation at UNCTAD-OECD-ILO expert meeting "In support of the implementation and follow-up of WSIS: using ICTs to achieve growth and development", Geneva, 4-5 December 2006.

Chart 2.31

India-based IT services providers, export revenue by corporate characteristic (2005), in billion $



Source: NASSCOM Facts and Figures, at http://www.nasscom.in/Nasscom/templates/NormalPage.aspx?id=28487.

Approximately one third of Indian exports of ICT services and two thirds of ICT-enabled services are estimated to be generated by foreign-owned companies.[27] Export-oriented affiliates that locate in India's software technology parks to serve foreign markets, joint ventures that have expanded in the Indian market by buying local companies, and units of Indian ICT companies that are established, managed and expanded by a foreign company and then later taken over by the Indian companies are examples of ways in which TNCs have gained a foothold in the country. Joint ventures such as Mahindra British Telecom Ltd, India's eighth largest ITS company, NEC-HCL Infosystems, Deloitte Consulting-Mastek, and Microsoft-TCS-Uniware, and acquisitions by IBM of Dakesh eServices, India's third largest ITES company, or by Oracle of i-flex, India's leading software company, are examples of how successful India is in attracting foreign multinationals (OECD, 2006a).

Between 2002 and 2003, there were 632 export-oriented FDI projects in IT services worldwide, with Asia accounting for 265 (42 per cent) of IT services projects and India alone accounting for 118 (19 per cent) of the world total.[28] In 2005, total inflows into India stood at a record level of $5.6 billion. Cross-border M&As in India increased in 2004 in the telecommunications, BPO and pharmaceutical industries. FDI inflows have been encouraged by an improving economic situation and a more open FDI climate. For example, the Government allows 100 per cent FDI under the automatic route in software and related services, as well as in electronics and ICT hardware manufacturing (WTO, 2007). In telecommunications, the FDI limit was increased from 49 per cent to 74 per cent in 2005, and this resulted in the telecom sector being one of the largest recipients of FDI, after the electronics and electrical equipment sector.

A key factor in India's performance in the ICT services sector has been its relatively strong ICT-skilled labour force. These strong ICT skills will also help increase productivity in other manufacturing sectors and develop new high-value-added products. It is expected that India will develop more sophisticated manufacturing products in the years to come and develop knowledge-intensive activities (Rowthorne, 2006). The Government is making an effort to support the production of quality manpower through a number of initiatives and reforms to improve the overall tertiary-level education system.

A more recent development is what is called nearshoring: more and more Indian companies establish subsidiaries in other Asian developing countries (e.g. in the field of software development) in order to be closer to their clients. This also helps to overcome restrictions on the movement of persons, which are often important for the ICT industry since staff have to move between home and client locations.

Promoting and supporting the domestic ICT sector have been important elements in the Government's national ICT plan, and it has put in place a number of initiatives in this regard. For example, the number of Software Technology Parks of India has increased to 47, spread all over the country. As India is a member of the WTO ITA, tariffs on all ICT goods were eliminated in 2005; and infrastructure facilities for the ICT sector, in particular to promote the BPO industry, are planned for all major cities in the country (WTO, 2007). The telecom sector has experienced a continuous opening up to competition (in particular, the mobile service), which has contributed significantly to a reduction in communication tariffs.

E. International and national environment and policymaking

1. Government policies on the ICT sector

Government policies can favourably affect ICT sector growth. Therefore, the development of the domestic ICT industry, including ICT production, trade and investment, has been included in many national ICT policies in developing countries. The nature of such policies differs substantially among countries, but a few common features can be identified.

The telecommunication sector is crucial for any ICT-related strategy and thus telecommunications-related policies are included in virtually all national ICT master plans. Attracting new investments in telecommunication, building ICT-relevant infrastructure and developing a wider range of services are usually the basic elements of such policies.

The ICT manufacturing industry is well developed in a number of countries, mainly in South-East Asia, but also in smaller economies such as Costa Rica, Mauritius and Romania. Following their successful example, a number of developing countries have implemented proactive measures to attract domestic and foreign investment in the ICT industry through the establishment of technology parks, the development of new infrastructure projects, the provision of special incentives and the creation of public–private partnerships.

The ICT services industry is a more recent growth sector. The availability of domestic ICT services is essential for supporting ICT uptake by businesses in other sectors. Moreover, ICT services create new growth and employment opportunities, such as those related to contact centres and internationally sourced contracts. As this chapter has shown, some countries that were traditional ICT manufacturers (Republic of Korea, Philippines and China) are now shifting their focus to developing ICT services, aiming to create higher-skilled jobs and develop higher-value-added products. Other countries that are starting to develop their ICT industry are also often focusing on ICT services, taking advantage of local language skills, geographical location and a well-educated workforce. As in the case of the ICT manufacturing industries, policymakers in those countries are including the development of ICT services in their national ICT strategies and plans (see boxes 2.9 and 2.10).

Government policy can be instrumental in the development of the ICT sector. In particular, in the area of telecommunications infrastructure and services, it can contribute to creating a more competitive market, which will lower prices and improve the quality of services. Furthermore, governments can play a critical role by ensuring a substantial commitment to technical education and the creation of a high-skilled workforce for the IT industry, and by providing a stable regulatory and enabling environment to attract BPO contracts and promote call centres.

Often, government policies are best designed and implemented in close dialogue with other stakeholders, particularly the businesses concerned. For example, close cooperation between public and private sectors has been crucial to successes in the ICT industry in such countries as the Republic of Korea and India. As mentioned in the previous section, the Indian Government has made an effort to involve private industry associations in its policy formulation related to the development of the domestic ICT sector. Following the success of India, the Government of Egypt is working with the local private sector to develop a competitive ICT industry (box 2.11). It is also developing a close relationship with India's NASSCOM to exchange know-how and learn from best practice. Egypt envisages becoming a hub in the Middle East for Indian ICT companies.

2. Multilateral trade agreements relevant to the ICT sector: the ITA ten years later

International trade in ICT goods and services is subject to multilateral trade agreements, which include the ITA,

Box 2.9

Ghana BPO sector found to have great potential - focus of government policy

Ghana is one of the sub-Saharan African countries that decided to prioritize the development of ICT as a key strategy in its national development plan and its efforts to achieve middle- income status. Thus, the Ghana ICT Policy for Accelerated Development has been integrated as a driver and enabler within the national Growth and Poverty Reduction Strategy II. In addition to the building of infrastructure and skills, and the establishment of a legal framework, the development of the ICT sector (particularly services) is a central component of the national ICT plan. The objective of the "e-Ghana project" is to increase employment and income generated by the sector, to increase its competitiveness and human capacity, and to promote investment in it.

The Government has sought the support of a private company (Hewitt Associates) to develop the country's ICT services, including BPO. It wants to build on its comparative advantage related to language skills, geographical location and related time zone, and low-cost labour force. It is also developing a technology park in a free trade zone in Tema, the port city of Ghana. Initial research by Hewitt estimates that the Ghana BPO sector has the potential to create 37,000 direct jobs and 150,000 indirect jobs within five years, and revenues of $750 million. In 2005, another private company (A.T. Kearney) ranked Ghana as the number one BPO destination in sub-Saharan Africa, ahead of South Africa. To realize its potential, the country still needs to improve the quality and cost of communication services and strengthen the regulatory environment related to the ICT services sector.

Sources: Paper presented by Mike Aaron, Minister of ICT, Ghana, at UNCTAD-OECD-ILO expert meeting, December 2006; ICT Provides Additional Growth for Ghana, World Bank News, 8 March 2007, available at http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/0,,contentMDK:21249466~menuPK:2643833~pagePK:64020865~piPK:149114~theSitePK:282823,00.html

Box 2.10

Morocco: offshoring as a growth strategy

Morocco, like other African and Arab countries, is a new supplier in the global ICT sector market. As part of its ICT development strategy, the Government decided to promote the ICT industry and put in place a number of projects, including "Casashore", a domestic IT park, which was established in 2005.

While the ICT industry is still small, it has been growing strongly: in 2001-2004 at 6.5 per cent (annually), in 2004-2006 at 10 per cent (annually) and in 2006-2007 at 11 per cent. ICT sector revenue increased from 2.6 billion euros (2004) to 3.5 billion euros (2006), and the sector's contribution to GDP increased from 5 per cent in 2004 to 6.5 per cent in 2006. The industry is heavily concentrated in the two urban centres, with 85 per cent of activities located in Casablanca and Rabat, which employ 0.5 per cent of the actively employed population.

In 2006, 80 per cent of companies were in the area of telecom (operators, distributors, network installation). But offshoring activities have been growing, mainly with French companies, and they now constitute one of the most dynamic sectors in the economy with high growth potential. Therefore, the Government decided to make offshoring a central strategy in its "emergency" programme (a programme aimed at prioritizing the support of certain economic sectors); it estimates that, by 2013, offshoring could generate 91,000 jobs (currently 25,000) and contribute $1.7 billion to GDP.

Source: Fédération Marocaine des Technologies de l'Information, des Télécommunications et de l'Offshoring, 2007.

the General Agreement on Trade in Services (GATS) and the agreements related to telecommunications. A detailed analysis of each of the agreements and its implications for ICT sector trade would go beyond the scope of this chapter. The IER 2006 analysed the trade in ICT services and related GATS commitments. This section will review the latest developments regarding the ITA, which entered into force ten years ago, and which covers more than 90 per cent of the global trade in ICT goods.

Box 2.11

Developing the Egyptian ICT industry: need for training and finance

Egypt's geographical location makes it an ideal place for developing regional links with Europe, the Mediterranean, Africa and the Arab region. Since Egypt has a large population under the age of 25 and strong foreign-language skills, the Government has decided to make the development of the Egyptian ICT industry, and in particular ICT services, a priority in its national development plan.

The Ministry of Communication and Information Technology (MCIT), created in 1999, drew up its first National Plan to develop and expand the telecommunications infrastructure, establishing hundreds of information technology clubs to expand the pool of IT-skilled labour, and creating national information systems and databases. The plan was followed by the Egyptian Information Society Initiative in 2003, designed to help bridge the digital divide and facilitate Egypt's becoming an information society. In 2004, the Information Technology Industry Development Agency (ITIDA) was established to support the Egyptian ICT industry and exports.

In May 2007, the MCIT announced Egypt's 2010 ICT strategy, which consolidates and builds on the progress made by the Government in partnership with the private sector and civil society. The strategy has three main pillars: restructuring Egypt's ICT sector, maximizing the benefits of ICT for development, and nurturing innovation and supporting industry development. In line with the third pillar, ITIDA adopted the IT Industry National Development Strategy - targeting export growth, whose aim is achieve specific goals by 2010, such as increasing IT exports to reach more than 1 billion Egyptian pounds and creating 50,000 to 60,000 jobs in the IT sector.

In the joint MCIT/ITIDA–UNCTAD survey of 151 ICT companies[29] in 2007, respondents mentioned "difficulties in attracting new customers" and "lack of access to financial markets" as the main factors inhibiting their business development. This was followed by "high costs of office rent" and "slow Internet connections". A large majority of the respondents were domestically owned SMEs. Only 13 per cent of them had broadband, while the others had low-speed Internet connections. In comparison, an A.T. Kearney study (2005) focusing on services offshore business in Egypt showed that from a financial perspective, including office-renting costs, Egypt is an attractive location for foreign companies. When taking into account the spending on specialized personnel, infrastructure costs and tax regulations, A.T. Kearney ranked Egypt among the top five most financially attractive offshoring locations, before countries such as Indonesia, India, Thailand and China.

In this context, the Government of Egypt took a number of steps to foster the growth of small and medium-sized ICT enterprises through ITIDA, which assists such enterprises through programmes aimed at:

- Facilitating access to international markets through trade missions to international exhibitions;
- Facilitating the opportunities for winning tenders for joint projects with ITIDA;
- Offering training and quality certifications;
- Providing financial support to reduce business costs.

In addition, ITIDA helps NGOs working to support small and medium-sized ICT enterprises by providing office space in the Smart Village in order to facilitate contact with both the MCIT and ITIDA and enable them to provide the best services to SMEs in the ICT sector.

The survey also revealed the need to reinforce ICT education and training, as well as general business skills, including in management. Government policy can be helpful in a number of those areas, in particular in the area of education and training, and improving communications infrastructure. While significant progress has already been made in deregulating the telecommunications sector, especially with regard to mobile telephony, further improvements are to be expected in voice telephony and broadband connectivity. As part of its national ICT master plan, the Government has put in place a number of policies and initiatives to create a supportive environment for the ICT industry to improve its competitiveness, the results of which should become visible in the next couple of years.

In December 1996, the Ministerial Declaration on Trade in Information Technology Products was adopted by 29 countries at the first WTO Ministerial Conference, held in Singapore. The Declaration was adopted in preparation for the ITA, which entered into force in April 1997, with an additional 11 members. This made a total of 40 members, which accounted for 90 per cent of trade in IT products at that time. Under the ITA, duty-free imports are traded on a most-favoured-nation (MFN) basis; in other words, all WTO members benefit from the concessions made by members of the agreement. The ITA is a sectoral initiative and has therefore not been part of the overall negotiations (e.g. the Doha Round). Since tariffs in developing countries were higher, the tariff cuts for members from the developing world were larger than those for developed countries. For example, India had not only a very high applied rate but also an even higher bound rate, and therefore significantly reduced tariffs upon entering the agreement. Developing countries were granted a longer period of time in which to implement the ITA (at the latest by 2005) and new members still have time to implement the commitments.

Ten years later, in 2007, there were 70 members of the ITA membership, accounting for 97 per cent of IT trade; and developing country members are now in the majority (see annex 2 for a list of current members).

During the past ten years, world exports of ITA products have more than doubled, reaching in 2005 a value of $1.45 billion, which represents an annual average growth of 8.5 per cent. ITA trade accounts for 19 per cent of world exports, compared with agricultural products (8.4 per cent) and automotive products (7.2 per cent). Research on the ITA's impact on trade indicates that participation in the agreement increases bilateral trade, particularly if both countries are WTO members (Bora and Liu, 2006; Mann and Liu, 2007).

Product coverage and classification: keeping pace with innovation

The ICT market is typically characterized by rapid product development and technological change, as well as by a high level of innovation, with the result that new products enter the market on a continuous basis and more frequently than in many other manufacturing industries. Repeated calls for an expansion of the ITA's product coverage are therefore justified. For example, the distinction between intermediate and final goods is increasingly artificial and needs to be reconsidered. Moreover, in some countries, such as the Republic of Korea, the export growth of non-ITA products is now higher than that of ITA products, because of the exports of products such as colour TVs, CDs, DVDs and monitors, which are not included in the ITA. ICT goods that have changed their functionality and thus need to be reconsidered include set top boxes, flat panel computer monitors, laser multifunctional printers and some "parts" of ITA products.[30]

Attempts to revise the ITA product coverage have failed so far. Discussions in the WTO Committee of Participants on the Expansion of Trade in Information Technology Products did not result in any agreement on the number of consumer electronics included in the package, which for some member countries is too large, and for others too small. Some members are hesitant about revising the product coverage because they fear that existing products may be traded for new ones and thus eliminated from the ITA list. The impact of possible product erosion on trade flows and tariff levels needs to be further researched, from a development perspective.

Product classification is also being discussed. The ITA product list is largely based on the Harmonized System (HS) 1996 (ITA Attachment A), but includes in Attachment B a description of 13 specific items with no corresponding HS codes. The original intention was that descriptions could override HS codes and thus ensure the coverage of converging technologies.

This classification divergence between ITA products and the HS applied in Customs can lead to discrepancies in classifications among member states. Most countries have made ratifications in their WTO schedules by including ITA commitments at the national tariff line level, which is more detailed than the HS. As a result, some countries include certain products under the ones covered by the ITA - and hence apply duty-free treatment - while others do not. This is especially the case with products included in ITA Attachment B.

The HS nomenclature is currently being amended from the current version, HS02, to HS07. While only few modifications occurred when it changed from HS96 to HS02, the move to HS07 implies major changes for ITA products, with 158 out of 241 subheadings affected. As a result, the WTO schedules (bound and applied duties) and ITA product lists will need to be updated.

It should also be noted that the ITA product coverage is not identical to the OECD ICT goods classification. This makes it difficult to compare international trade flows of ICT goods, which are usually based on the OECD classification. Further research is needed in order to examine the types of ICT goods not included in the ITA (and vice versa), and identify the related trade and tariff implications, in particular for developing countries. In addition, products that are critical to enhancing productivity and contributing to growth should be identified.

Geographical coverage: free riders?

Although the current 70 ITA members represent 97 per cent of trade in ITA products (in 2007), two regions – South America and Africa – remain virtually absent from the ITA. These are important exporters in South America, for example Brazil, Chile, Mexico and Venezuela. Mexico, for instance, is among the top 20 exporters of ITA products. At the same time, because of the MFN nature of the ITA, all countries enjoy full duty-free market access. Therefore, some members, in particular the EU, have stated that they will not accept any further discussion on product expansion

unless some advanced developing countries become members.

In the case of some of the African countries joining the ITA, one possibility could be to introduce special and differential treatment with extended implementation periods on certain products. Also, countries focusing on the development of their ICT sector may consider the positive impact that becoming an ITA signatory has on attracting foreign investment, which was the case of Costa Rica. Further research needs to investigate the pattern of trade in ITA products by non-ITA members compared with members.

F. Conclusions and policy recommendations

The ICT sector is a dynamic and fast-changing market, with an important growth potential in developing countries. As an ICT supplier, it plays an important role in the development of a competitive information economy in developing countries. As a key technology producer, it contributes to total factor productivity and GDP growth. This chapter has provided a comprehensive overview of latest trends in the sector, including ICT production, employment, value added, trade and investment, from a development perspective. The information presented is summarized below, and relevant conclusions and suggestions for policy and research are provided.

Production, trade and investment

- ICT production, trade and investment will continue to increase, with continued shifts from developed to developing countries. The ICT sector thus plays a major role in the second generation of globalization and the emerging South and South–South trade. The impressive growth of some large developing countries, including China, India and Mexico, is having a significant impact on ICT sector performance in other countries in the South.

- South–South trade in ICT goods has grown substantially over the past five years. In terms of value, it overtook South–North trade in 2004, and is expected to have overtaken North–North trade in 2007. This corresponds not only to the overall trend of an emerging South and South–South trade, but also to the rapid catching up of many developing countries in terms of ICT uptake and the development of their information economies.

- The developing world ICT market is concentrated in a few Asian economies, but a number of small economies (including some LDCs) have succeeded in building competitive advantage and increasing their export shares in ICT goods and services. China and India are the world's largest players in the export of ICT goods and services, respectively.

- Computer and information services exports continue to grow exponentially and the developing countries' shares rose from 4 per cent in 1995 to 28 per cent in 2005.

Services and international sourcing

- In 2005, India joined the top 10 group of ICT-enabled services exporters (replacing Hong Kong, China). The ICT services industry will continue to increase its contribution to domestic value-added, employment and export earnings, and to attracting foreign investment.

- The international sourcing of ICT production and ICT-enabled services will continue, with a huge potential for developing countries, while the impact on employment in developed countries is insignificant overall, although more noticeable in certain sectors. In the developing world, an increasing demand for ICT-skilled labour will have to be addressed.

- The expanding ICT industry and international sourcing offer a huge potential for developing countries. At the same time, competition will increase and countries wishing to attract FDI and BPO contracts will need to invest in their domestic labour skills, telecommunication infrastructure and improving the investment climate.

National and international policy responses

- The dynamic nature of the ICT industry has led a number of developing countries to include the promotion of the ICT sector (in particular, ICT-related services) in their national ICT plans and overall development strategies. This may be sustainable in the long term in the context

of increased global competition only if global demand remains strong and sustained.

- At the international level, the WTO ITA has contributed to facilitating trade in ICT goods, 93 per cent of which are now imported duty-free. Some member countries indicated the need for a revision of the ITA to harmonize the product coverage based on international classifications and to take into consideration the fast-changing nature of the ICT market. Such revision should fully take into consideration the implications for developing countries. A careful analysis at the tariff-line level is needed in order to assess the implications for developing economies not yet signatories to the Agreement.

Annex 2.1

Trade in ICT goods

Table 2.10

Exports of ICT goods by level of development and by region, 1996– 2005 ($ million)

	1996	2000	2005	CAGR 1996–2005 (per cent)	CAGR 2000–2005 (per cent)
World	**701 724**	**1 112 170**	**1 514 254**	**8.9**	**6.4**
Developed economies	**458 001**	**647 833**	**716 054**	**5.1**	**2.0**
Asia	106 797	131 470	125 876	1.8	-0.9
Europe	211 115	309 122	415 890	7.8	6.1
North America	137 677	204 888	171 532	2.5	-3.5
Oceania	2 412	2 353	2 757	1.5	3.2
Developing economies	**242 539**	**462 259**	**794 875**	**14.1**	**11.5**
Africa	513	1 391	2 311	18.2	10.7
Asia	224 315	417 964	742 332	14.2	12.2
Latin America and the Caribbean	17 701	42 900	50 224	12.3	3.2
Oceania	10	5	8	-3.0	10.4
Transition economies	**1 185**	**2 078**	**3 324**	**12.1**	**9.9**

Source: UN COMTRADE.

Table 2.11

Exports of ICT goods, 1996– 2005: economies ranked by 2005 export values ($ million)

Economy	1996	2000	2005	CAGR 1996–2005 (per cent)	CAGR 2000–2005 (per cent)
China	18 584	46 996	235 167	32.6	38.0
United States	123 802	182 262	154 917	2.5	-3.2
Japan	103 213	123 548	121 474	1.8	-0.3
Hong Kong (China)	37 643	55 313	118 237	13.6	16.4
Singapore	67 742	77 345	106 576	5.2	6.6
Germany	42 812	57 452	99 127	9.8	11.5
Republic of Korea	34 316	61 525	87 163	10.9	7.2
Taiwan, Province of China	..	64 409	66 506	..	0.6
Netherlands	24 899	41 218	64 748	11.2	9.5
Malaysia	36 987	55 582	64 472	6.4	3.0
United Kingdom	43 116	55 865	59 755	3.7	1.4
Mexico	16 422	38 267	43 870	11.5	2.8
France	25 892	35 689	33 187	2.8	-1.4
Thailand	14 208	20 318	26 169	7.0	5.2
Ireland	13 265	26 349	24 931	7.3	-1.1
Philippines	10 294	26 422	24 418	10.1	-1.6
Canada	13 875	22 626	16 615	2.0	-6.0
Hungary	663	7 776	16 537	43.0	16.3
Sweden	11 407	16 883	15 818	3.7	-1.3
Italy	13 047	12 842	15 162	1.7	3.4
Belgium	..	..	14 620	..	..
Finland	5 935	11 555	14 557	10.5	4.7
Czech Republic	894	2 128	9 778	30.4	35.7
Spain	4 969	6 137	8 280	5.8	6.2
Austria	3 270	4 883	8 134	10.7	10.7
Indonesia	3 287	7 844	7 911	10.2	0.2
Denmark	3 154	4 177	7 102	9.4	11.2
Switzerland	4 143	4 712	5 554	3.3	3.3
Israel	3 584	7 921	4 402	2.3	-11.1
Poland	648	1 424	4 123	22.8	23.7
Brazil	1 010	2 513	4 038	16.6	10.0
Turkey	496	1 103	3 395	23.8	25.2
Slovakia	154	464	3 200	40.0	47.2
Portugal	1 371	1 893	3 184	9.8	11.0
Australia	2 180	2 068	2 262	0.4	1.8
Norway	1 301	1 430	1 858	4.0	5.4
Costa Rica	9	1 740	1 758	78.7	0.2
India	659	714	1 424	8.9	14.8
Estonia	161	996	1 403	27.2	7.1
Luxembourg	..	..	1 390	..	..
Russian Federation	794	799	1 157	4.3	7.7
Malta	908	1 565	1 121	2.4	-6.4
South Africa	333	521	798	10.2	8.9
Romania	37	552	770	39.9	6.9

Table 2.11 (continued)

Economy	1996	2000	2005	CAGR 1996–2005 (per cent)	CAGR 2000–2005 (per cent)
Morocco	4	552	705	77.5	5.0
Lithuania	192	199	661	14.7	27.2
Slovenia	368	397	588	5.4	8.2
Croatia	129	161	548	17.4	27.8
Greece	182	481	525	12.5	1.8
New Zealand	232	286	494	8.8	11.6
Tunisia	144	199	385	11.5	14.1
Cyprus	41	16	381	28.3	88.1
Saudi Arabia	28	114	369	33.2	26.4
Ukraine	144	283	302	8.6	1.3
Mauritius	7	11	295	52.5	91.5
Bulgaria	47	50	232	19.4	35.7
Argentina	123	181	205	5.9	2.6
Belarus	..	138	199	..	7.6
Jordan	..	47	172	..	29.4
Latvia	49	31	139	12.4	34.9
Oman	42	70	121	12.5	11.3
Sri Lanka	..	..	102	..	..
Pakistan	..	..	81	..	..
Colombia	12	20	74	22.4	29.9
Chile	25	34	52	8.7	8.7
Côte d'Ivoire	3	3	47	36.4	74.8
Peru	7	25	42	22.1	11.4
Serbia and Montenegro	9	9	36	17.0	30.9
Kazakhstan	..	55	34	..	-8.9
Venezuela (Bolivarian Republic of)	11	22	34	13.5	9.4
Barbados	..	25	32	..	5.0
Iceland	2	12	25	36.0	17.0
Trinidad and Tobago	12	3	25	9.0	51.4
Ecuador	2	2	24	29.5	71.7
Iran (Islamic Republic of)	..	6	23	..	29.6
Honduras	7	0	21	12.4	166.0
Namibia	..	13	18	..	7.4
Uganda	0	5	17	72.8	30.1
Guatemala	2	2	16	28.0	50.2
Egypt	0	6	14	47.1	21.2
Bosnia and Herzegovina	..	..	13	..	..
Qatar	..	12	11	..	-1.2
Moldova	12	8	11	-1.8	6.9
Bahrain	..	3	10	..	31.5
TFYR, Macedonia	2	4	8	20.2	15.4
Antigua and Barbuda	..	9	8	..	-3.8
Senegal	0	2	7	34.9	34.4
Madagascar	1	4	6	22.6	10.4
Uruguay	2	4	6	14.9	8.8

Table 2.11 (continued)

Economy	1996	2000	2005	CAGR 1996–2005 (per cent)	CAGR 2000–2005 (per cent)
Albania	0	2	5	33.5	23.0
Armenia	..	6	5	..	-5.6
Saint Lucia	3	4	4	2.8	-0.8
Bolivia	1	11	4	13.6	-17.5
New Caledonia	..	2	3	..	17.1
Paraguay	1	2	3	11.4	11.8
Fiji	..	0	3	..	65.6
Cape Verde	..	1	3	..	21.4
Jamaica	5	4	3	-6.6	-5.7
United Republic of Tanzania	..	3	3	..	1.2
Timor-Leste	..	..	2	..	..
Yemen	..	..	2	..	..
Cameroon	1	0	2	17.4	55.2
Azerbaijan	3	5	2	-5.2	-15.8
Gabon	6	2	2	-11.5	0.1
Mozambique	..	1	2	..	19.8
Ghana	0	3	2	16.6	-8.6
Kyrgyzstan	5	4	2	-11.7	-15.6
Nicaragua	43	1	1	-32.1	8.1
Malawi	1	1	1	2.0	12.0
Georgia	1	1	1	7.9	5.8
Syrian Arab Republic	..	..	1	..	..
Niger	1	1	1	-0.6	13.9
French Polynesia	10	3	1	-21.5	-15.3
Zambia	2	1	1	-5.1	7.0
Saint Kitts and Nevis	1	0	1	5.7	18.6
Guyana	..	0	1	..	35.3
Panama	0	..	1	51.1	..
Saint Vincent and the Grenadines	0	0	1	4.5	14.9
Mayotte	..	0	0	..	51.6
Togo	2	0	0	-19.6	36.5
Maldives	..	..	0	..	..
Seychelles	2	..	0	-19.7	..
Burundi	..	0	0	..	165.9
Dominica	0	0	0	0.9	-17.8
Benin	..	0	0	..	30.0
Belize	0	0	0	-13.8	-18.8
Mongolia	0	1	0	-17.0	-29.8
Montserrat	..	0	0	..	-30.7
Gambia	0	0	0	-3.3	-4.2
Central African Republic	0	0	0	-14.4	-7.8
Macao (China)	28	110	..	..	..
Lesotho	..	25	..	..	..
Botswana	..	20	..	..	..
Grenada	0	14	..	..	..

Table 2.11 (continued)

Economy	1996	2000	2005	CAGR 1996–2005 (per cent)	CAGR 2000–2005 (per cent)
Lebanon	..	11	..	..	..
Kuwait	..	9	..	..	..
El Salvador	0	8	..	..	..
Algeria	2	8	..	..	..
Bangladesh	0	7	..	..	..
Swaziland	..	3	..	..	..
Zimbabwe	..	3	..	..	..
Bahamas	..	3	..	..	..
Cuba	..	3	..	..	..
Burkina Faso	2	2	..	..	..
Andorra	1	2	..	..	..
Kenya	..	1	..	..	..
Sudan	0	1	..	..	..
Mali	0	1	..	..	..
Nepal	..	1	..	..	..
Suriname	0	1	..	..	..
Cambodia	..	1	..	..	..
Turkmenistan	..	0	..	..	..
Anguilla	..	0	..	..	..
Turks and Caicos Islands	..	0	..	..	..
Guinea	0	0	..	..	..
Greenland	0	0	..	..	..
Papua New Guinea	..	0	..	..	..
Nigeria	1	0	..	..	..
Comoros	0	0	..	..	..
Cook Islands	..	0	..	..	..
Dominican Republic	1	..	..	..	..
Faroe Islands	0	..	..	..	..
Rwanda	0	..	..	..	..
Aruba	..	..	..	..	..
Bermuda	..	..	..	..	..
Bhutan	..	..	..	..	..
Brunei Darussalam	..	..	..	..	..
Eritrea	..	..	..	..	..
Ethiopia	..	..	..	..	..
Haiti	..	..	..	..	..
Kiribati	..	..	..	..	..
Mauritania	..	..	..	..	..
Samoa	..	..	..	..	..
Sao Tome and Principe	..	..	..	..	..
Sierra Leone	..	..	..	..	..
Tuvalu	..	..	..	..	..
Wallis and Futuna Islands	..	..	..	..	..

Source: UN COMTRADE.

Table 2.12

Imports of ICT goods by level of development and by region, 1996–2005 ($ million)

	1996	2000	2005	CAGR 1996–2005 (per cent)	CAGR 2000–2005 (per cent)
World	**718 213**	**1 128 748**	**1 574 158**	**9.1**	**6.9**
Developed economies	**480 808**	**716 614**	**863 035**	**6.7**	**3.8**
Asia	51 492	72 745	81 634	5.3	2.3
Europe	244 288	356 555	473 638	7.6	5.8
North America	174 028	273 933	289 576	5.8	1.1
Oceania	10 999	13 381	18 187	5.7	6.3
Developing economies	**232 073**	**406 137**	**691 373**	**12.9**	**11.2**
Africa	6 275	8 494	13 197	8.6	9.2
Asia	194 344	338 885	603 901	13.4	12.2
Latin America and the Caribbean	31 397	58 588	73 997	10.0	4.8
Oceania	57	170	279	19.2	10.5
Transition economies	**5 332**	**5 996**	**19 750**	**15.7**	**26.9**

Source: UN COMTRADE.

Table 2.13

Imports of ICT goods, 1996– 2005: economies ranked by 2005 import values ($ million)

Economy	1996	2000	2005	CAGR 1996–2005 (per cent)	CAGR 2000–2005 (per cent)
United States	150 475	237 943	256 770	9.1	6.9
China	16 850	50 597	183 025	6.7	3.8
Hong Kong (China)	44 831	64 403	119 967	12.9	11.2
Germany	48 736	65 268	99 100	15.7	26.9
Singapore	50 429	59 769	80 415	5.8	1.1
Japan	47 858	66 871	76 454	5.3	2.3
United Kingdom	47 144	67 727	68 735	7.6	5.8
Netherlands	23 938	42 118	60 430	5.7	6.3
Republic of Korea	23 482	39 086	47 037	8.6	9.2
Malaysia	27 024	37 249	46 105	10.0	4.8
France	28 458	39 571	45 835	13.4	12.2
Taiwan, Province of China	..	44 851	45 068	19.2	10.5
Mexico	14 968	36 332	43 354	6.1	1.5
Canada	23 526	35 970	32 806	30.3	29.3
Italy	18 452	23 515	30 183	11.6	13.2
Philippines	9 911	12 621	23 333	8.2	8.7
Thailand	13 160	15 660	23 213	5.3	6.1
Spain	10 565	14 238	22 571	5.3	2.7
Belgium	..	..	17 719	4.3	0.3
Ireland	9 297	17 232	17 319	10.8	7.5
Australia	9 380	11 626	15 499	8.0	3.8
Sweden	9 094	12 254	13 690	6.1	4.4
Hungary	1 483	7 612	13 535	5.4	3.0
India	1 368	3 300	12 516	..	0.1
Austria	5 454	7 058	10 745	12.5	3.6
Brazil	7 318	9 133	10 634	3.8	-1.8
Switzerland	7 267	9 225	10 587	5.6	5.1
Denmark	4 651	5 909	9 831	10.0	13.1
Czech Republic	2 761	3 900	9 723	6.5	8.2
Poland	2 989	5 107	9 070	8.8	9.7
Finland	4 214	6 293	9 063	..	..
Russian Federation	2 979	1 883	8 859	7.2	0.1
Turkey	2 567	6 035	8 240	5.7	5.9
South Africa	3 514	3 648	6 741	4.7	2.2
Portugal	2 616	3 588	5 564	27.8	12.2
Norway	3 206	3 642	5 381	27.9	30.6

Table 2.13 (continued)

Economy	1996	2000	2005	CAGR 1996–2005 (per cent)	CAGR 2000–2005 (per cent)
Israel	3 635	5 874	5 180	7.8	8.8
Saudi Arabia	1 399	1 556	4 492	4.2	3.1
Argentina	2 491	3 869	3 726	4.3	2.8
Slovakia	472	1 002	3 292	8.7	10.7
Greece	1 593	2 465	3 281	15.0	20.0
Romania	688	1 563	3 230	13.1	12.2
Colombia	1 503	1 208	3 014	8.9	7.6
Venezuela (Bolivarian Republic of)	698	1 369	2 843	12.9	36.3
New Zealand	1 620	1 755	2 688	13.8	6.4
Iran (Islamic Republic of)	..	747	2 639	7.5	13.1
Chile	1 415	1 834	2 459	8.7	9.2
Indonesia	2 851	1 001	2 426	5.9	8.1
Pakistan	..	..	2 324	4.0	-2.5
Costa Rica	225	1 112	2 288	13.8	23.6
Ukraine	418	416	1 739	4.6	-0.7
Morocco	324	1 311	1 676	24.1	26.9
Luxembourg	..	..	1 633	8.4	5.9
Croatia	494	483	1 469	18.7	15.6
Estonia	355	1 028	1 469	8.0	20.1
Ecuador	195	220	1 153	16.9	15.7
Bulgaria	203	336	1 137	5.8	8.9
Peru	857	748	1 132	..	28.7
Slovenia	537	694	1 106	6.3	6.0
Lithuania	287	306	1 077	-1.8	19.4
Malta	888	1 525	1 045	..	..
Egypt	504	656	965	29.4	15.5
Kazakhstan	..	348	900	17.2	33.1
Tunisia	411	468	803	20.0	5.0
Jordan	..	237	782	..	..
Qatar	..	167	724	12.9	24.9
Cyprus	207	278	715	17.1	7.4
Serbia and Montenegro	274	165	659	21.9	39.3
Guatemala	137	450	657	21.1	27.6
Paraguay	415	244	646	3.1	8.6
Belarus	..	249	555	8.4	9.8
Latvia	150	245	551	15.8	28.6
Ghana	135	113	526	1.8	-7.3
Oman	231	188	459	7.5	8.0

Table 2.13 (continued)

Economy	1996	2000	2005	CAGR 1996–2005 (per cent)	CAGR 2000–2005 (per cent)
Mauritius	94	127	416	..	20.9
Sudan	24	108	413	7.7	11.4
Sri Lanka	..	..	411	..	27.0
Panama	177	277	389	..	34.1
Iceland	177	262	352	14.7	20.8
Bosnia and Herzegovina	..	..	325	10.2	31.9
Syrian Arab Republic	..	..	291	19.0	7.9
Honduras	98	13	277	5.0	21.5
Uruguay	253	257	268	..	17.4
Trinidad and Tobago	97	135	264	15.6	17.6
Jamaica	142	182	259	16.3	36.1
Côte d>Ivoire	91	105	250	7.9	19.5
Azerbaijan	52	124	242	17.9	26.8
United Republic of Tanzania	58	96	207	37.5	30.7
Nicaragua	58	70	179	..	..
Bahrain	..	134	169	9.1	7.0
Uganda	39	58	169	7.9	6.1
TFYR, Macedonia	88	91	153	..	..
Senegal	32	50	144	..	..
Georgia	24	52	142	12.2	85.3
Namibia	..	119	142	0.6	0.8
Barbados	..	101	137	11.7	14.3
Zambia	37	71	130	6.9	7.3
Mozambique	..	68	124	11.9	19.0
Albania	35	47	122	18.5	14.3
Bolivia	138	140	118	15.2	16.7
French Polynesia	56	78	105	13.3	20.8
Yemen	..	..	104	..	4.8
Moldova	29	43	98	17.5	23.8
Cameroon	35	45	95	6.4	10.9
New Caledonia	..	69	93	18.1	23.7
Maldives	16	24	89	21.9	22.5
Gabon	63	75	82	..	3.5
Fiji	..	..	80	..	6.3
Armenia	..	59	72	15.1	12.8
Madagascar	39	32	71	..	12.6
Mongolia	18	42	69	14.7	20.9
Malawi	..	25	52	-1.7	-3.3

Table 2.13 (continued)

Economy	1996	2000	2005	CAGR 1996–2005 (per cent)	CAGR 2000–2005 (per cent)
Suriname	19	35	49	7.2	6.0
Kyrgyzstan	47	25	46	..	..
Faroe Islands	22	28	36	14.3	17.8
Niger	7	8	30	11.8	16.0
Benin	..	18	30	..	6.1
Belize	9	20	29	20.8	30.6
Saint Lucia	15	25	26	2.8	1.7
Togo	13	11	24	..	..
Antigua and Barbuda	..	34	22	..	4.3
Mauritania	..	13	22	6.9	17.4
Saint Kitts and Nevis	11	19	20	15.7	10.5
Burundi	5	17	19	..	16.0
Cape Verde	..	17	19	11.0	7.0
Guyana	..	21	18	-0.2	12.9
Mayotte	..	6	17	5.6	5.2
Saint Vincent and the Grenadines	..	9	17	18.1	31.3
Dominica	7	11	15	..	10.7
Seychelles	23	..	14	14.2	7.7
Gambia	7	6	13	6.0	0.4
Central African Republic	7	1	5	7.2	17.9
Timor-Leste	..	..	4	..	-8.3
Montserrat	..	2	2	..	10.7
Kiribati	1	..	1	7.1	1.0
Algeria	480	545	..	15.5	2.0
Kuwait	..	448	..	..	2.2
El Salvador	141	355	..	..	-2.9
Lebanon	..	279	..	..	23.0
Cuba	..	258	..	..	12.3
Bangladesh	100	245	..	7.9	5.9
Nigeria	259	196	..	-5.3	..
Macao (China)	107	162	..	7.1	16.4
Kenya	..	154	..	-3.7	27.9
Botswana	..	125	..	..	..
Turkmenistan	..	112	..	..	-3.6
Andorra	73	89	..	0.9	..
Bahamas	..	78	..	..	..
Ethiopia	..	75	..	..	..
Nepal	..	50	..	..	..

Table 2.13 (continued)

Economy	1996	2000	2005	CAGR 1996–2005 (per cent)	CAGR 2000–2005 (per cent)
Burkina Faso	25	41	..	..	..
Cambodia	..	34	..	..	..
Swaziland	..	31	..	..	..
Mali	18	28	..	..	..
Papua New Guinea	..	22	..	..	..
Greenland	27	19	..	..	..
Lesotho	..	17	..	..	..
Grenada	9	16	..	..	..
Guinea	18	10	..	..	..
Turks and Caicos Islands	..	7	..	..	..
Anguilla	..	4	..	..	..
Comoros	4	1	..	..	..
Sao Tome and Principe	..	0	..	..	..
Rwanda	9	..	..	..	..
Aruba	..	..	..	..	..
Bermuda	..	..	..	..	..
Bhutan	..	..	..	..	..
Brunei Darussalam	..	..	..	..	..
Cook Islands	..	..	..	..	..
Dominican Republic	..	..	..	..	..
Eritrea	..	..	..	..	..
Haiti	..	..	..	..	..
Samoa	..	..	..	..	..
Sierra Leone	..	..	..	..	..
Tuvalu	..	..	..	..	..
Wallis and Futuna Islands	..	..	..	..	..
Zimbabwe	..	..	..	..	..

Source: UN COMTRADE.

Table 2.14

Top 50 exporters of ICT-enabled services, 1996– 2005: ranked by 2005 export values ($ million)

Rank	Economy	1996	2000	2005	CAGR 1996– 2005 (per cent)	CAGR 2000– 2005 (per cent)
1	United States	84 793	127 234	184 691	9.0	7.7
2	United Kingdom	49 896	77 418	132 848	11.5	11.4
3	Germany	34 934	36 849	73 836	8.7	14.9
4	Japan	34 757	33 483	52 469	4.7	9.4
5	Ireland	1 962	14 331	46 574	42.2	26.6
6	Netherlands	17 884	21 796	42 683	10.1	14.4
7	France[2]	30 282	27 933	42 032	3.7	8.5
8	India[3]	2 359	8 490	41 659	37.6	37.5
9	Italy	20 853	17 867	35 639	6.1	14.8
10	Luxembourg	..	..	34 183	..	..
11	Hong Kong (China)	..	21 346	32 776	..	9.0
12	Canada	14 094	20 736	28 857	8.3	6.8
13	Switzerland[4]	12 645	16 296	28 739	9.6	12.0
14	Belgium	..	..	28 098	..	..
15	Spain	9 221	13 291	28 016	13.1	16.1
16	Singapore	12 466	12 308	26 994	9.0	17.0
17	China	7 297	9 642	26 594	15.5	22.5
18	Sweden	5 118	10 913	26 023	19.8	19.0
19	Austria	15 848	16 123	25 411	5.4	9.5
20	Republic of Korea	9 003	9 196	14 307	5.3	9.2
21	Norway[5]	3 511	5 556	10 548	13.0	13.7
22	Israel	2 977	7 869	9 933	14.3	4.8
23	Brazil	2 307	5 514	7 845	14.6	7.3
24	Russian Federation	2 456	2 410	7 549	13.3	25.7
25	Australia	3 873	5 385	6 471	5.9	3.7
26	Hungary	1 839	1 486	6 026	14.1	32.3
27	Saudi Arabia	2 769	4 779	5 916	8.8	4.4
28	Malaysia	7 667	5 684	5 690	-3.3	0.0
29	Finland[6]	3 302	2 596	5 518	5.9	16.3
30	Thailand	4 972	2 822	5 510	1.1	14.3
31	Lebanon	..	..	4 870	..	..
32	Indonesia	278	86	4 729	37.0	122.9
33	Poland	2 256	1 977	3 614	5.4	12.8
34	Nigeria	621	1 512	3 415	20.9	17.7
35	Portugal	1 371	2 045	3 380	10.5	10.6
36	Greece	5 163	1 805	2 902	-6.2	10.0

Table 2.14 (continued)

Rank	Economy	1996	2000	2005	CAGR 1996– 2005 (per cent)	CAGR 2000– 2005 (per cent)
37	Czech Republic	2 192	2 221	2 677	2.2	3.8
38	Mexico	2 348	3 903	2 541	0.9	-8.2
39	Turkey	3 554	7 643	2 491	-3.9	20.1
40	Egypt	3 174	2 604	2 350	-3.3	-2.0
41	Romania	399	699	2 290	21.4	26.8
42	Cyprus	714	1 090	2 128	12.9	14.3
43	Argentina	541	719	1 842	14.6	20.7
44	South Africa	1 229	1 029	1 786	4.2	11.7
45	Morocco	342	330	1 659	19.2	38.2
46	Chile	913	988	1 628	6.6	10.5
47	Croatia	394	543	1 414	15.3	21.1
48	Kuwait	94	91	1 412	35.2	72.9
49	Philippines	11 007	660	1 225	-21.6	13.2
50	Ukraine	494	448	1 192	10.3	21.6

Source: IMF BOP.

Notes:
1. Including Puerto Rico,
2. Including Monaco, Guadeloupe, Martinique, French Guiana and Réunion,
3. Including Sikkim,
4. Including Liechtenstein,
5. Including Svalbard and Jan Mayen Islands, excluding Bouvet Island,
6. Including Åland Islands.

Annex 2.2

ITA members as of September 2007

Albania

Australia

Bahrain

Bulgaria

Canada

China

Costa Rica

Croatia

Dominican Republic

Egypt

El Salvador

European Communities

Georgia

Guatemala

Honduras

Hong Kong (China)

Iceland

India

Indonesia

Israel

Japan

Jordan

Kyrgyzstan

Macao (China)

Malaysia

Mauritius

Moldova

Morocco

New Zealand

Nicaragua

Norway

Oman

Panama

Philippines

Republic of Korea

Romania

Saudi Arabia

Singapore

Switzerland (incl. Liechtenstein)

Taiwan, Province of China

Thailand

Turkey

United States

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Notes

1. The «second generation» of globalization refers to a new phase of globalization in which the developing countries play a significant role. It stands in comparison with the wave of globalization during the 1990s, when developing countries were mainly providers of raw materials. It is based on the expansion of some large emerging markets, in particular China and India, and their import demands, which have created significant economic opportunities for other developing countries. In particular, South–South trade has increased significantly during the past few years (UNCTAD, 2007).

2. UNCTAD (2006b, p. 39).

3. See Chile Satellite Account 2006, available at http://www.economia.cl/aws00/servlet/aawsconver?2,,500798.

4. SLICTA (2007). The data mainly cover ICT-related occupations in both the ICT sector and other industries.

5. Ministry of Communications and Information Technology Egypt, http://www.mcit.gov.eg consulted 13 September 2007.

6. American Chamber of Commerce in Egypt (2007).

7. American Chamber of Commerce in Egypt (2007).

8. Ministry of Communication and Information Technology Egypt, http://www.mcit.gov.eg consulted 13 September 2007.

9. Figure refers to 2003, www.laborsta.ilo.org, consulted in September 2007.

10. The UNCTAD MCIT/ITIDA 2007 survey used as a basis the classification of occupations in ICT proposed by ILO (2006).

11. ILO–ITU–ECA study on the impact of ICTs on employment and poverty alleviation in Africa, presentation in 2007, http://www.uneca.org/CODI/codi5/content/AOM_Joint_ITU_ILO_ECA_Study-Opoku-Mensah-EN.ppt.

12. See http://www.itu.int/ITU-D/ict/statistics/at_glance/f_staff.html.

13. Presentation by Peter Borg Nielsen, Statistics Denmark, at the OECD WPIIS-WPIE Workshop, London, May 2007, based on European Restructuring Monitor information.

14. A discussion on the political debate of international sourcing goes beyond the scope of this Report. For further reading, see, for example, Alan S. Blinder, Fear of offshoring, Princeton University, CEPS Working Paper No. 119, December 2005. There are hundreds of press articles on this subject, see, for example, Bush, adviser assailed for stance on offshoring jobs, *Washington Post*, 11 February , 2004, http://www.washingtonpost.com/ac2/wp-dyn/A30194-2004Feb10?language=printer, Outsourcing made in Germany, *Deutsche Welle*, 22.07.2004, http://www.dw-world.de/dw/article/0,,1273178,00.html; India says outsourcing jobs good for U.S., UPI, 31 December 2004, http://www.upi.com/International_Intelligence/Analysis/2004/12/31/india_says_outsourcing_job_good_for_us/4941/; Indian company creates 600 UK jobs, *The Register*, 8 September 2005, http://www.the register.co.uk/2005/09/08/india_jobs_to_uk/.

15. Definition of international sourcing: the total or partial movement of business functions (core or support business functions) currently performed in-house or currently domestically sourced by the resident

enterprise to either non-affiliated (external suppliers) or affiliated enterprises located abroad. Exemptions: movement of business functions (core or support business functions) abroad without reducing activity and/or jobs in the enterprise concerned; temporary subcontracting abroad (one-year limit could be used) (Statistics Denmark, 2007).

16. See http://www.everestresearchinstitute.com/.

17. UNCTAD (2004) and UNCTAD XI São Paulo documents.

18. Presentation by Zhongzou Li, UNCTAD-OECD-ILO expert meeting "In support of the implementation and follow-up of WSIS: using ICTs to achieve growth and development", Geneva, 4-5 December 2006.

19. OECD, 29 March, 2007.

20. OECD (2006a, p. 151).

21. IDC press release, 3 July, 2007, available at http://www.idc.com/getdoc.jsp?containerId=prSG20768607.

22. The definition used by the country is not the same as the OECD ICT sector definition; for example, India does not include telecommunication services, but includes business process outsourcing services (such as those in accounting, medical services and financial services).

23. See also WTO (2007, p.21).

24. NASSCOM presentation, UNCTAD-OECD-ILO expert meeting, December 2006.

25. *The Hindu Business Line*, 27 February, 2006, in "demographic complementarities and outsourcing: implications and challenges for India", Mukul G. Asher and Amarendu Nandy, Research and information system for developing countries, July 2006.

26. *Financial Times*, February 10, 2006.

27. Business Standard (2005).

28. OECD (2006a, p. 78).

29. It is worth mentioning that the majority of these companies are small and medium-sized enterprises.

30. Product coverage issues have been discussed at, for example, a WTO workshop on 18 January, 2007. For presentations see http://www.wto.org/English/tratop_e/inftec_e/inftec_e.htm.