

Information and Communications Technologies
OECD Information Technology Outlook: 2006 Edition

Summary in English

ICTs continue to grow strongly, with very rapid growth outside the OECD area

Worldwide, the ICT sector is expected to grow at 6% in 2006, with growth more balanced across the OECD area than at the time of the 2004 Outlook when the United States led the recovery from the slump. With improved macroeconomic performance, aggregate investment is now increasing across the OECD area and ICT is a significant and growing share of this investment. Some ICT segments are very dynamic (Internet-related investment, portable and consumer applications), with the major share of venture capital continuing to flow into ICTs and merger and acquisition (M&A) activity is also high.

With the emergence of new growth economies, world ICT spending was up 5.6% a year over 2000-05. OECD spending was up 4.2% and the OECD world market share dropped from 89% in 2000 to 83% in 2006. ICT spending is increasing most rapidly in emerging non-OECD economies. China's 2005 ICT spending is estimated at USD 118 billion, following growth of 22% a year in current USD since 2000. In addition to China, nine non-OECD countries had the top spending growth rates over the 2000-05 period, including Russia (25% a year) and India (23%). Indonesia, South Africa and OECD eastern European countries were in the next group of high-growth countries.

The ICT industry contributes over 9% of total business value added and directly employs 14.5 million people in OECD countries, but it is adjusting to growth rates below those of the 1990s. As many ICT products become commodities, very rapid growth is confined to new and niche goods and services and to emerging geographical markets. Open source (the "Linux effect"), online delivery of IT services (the "Google" effect) and new digital products are also disrupting how technology is developed and delivered.

The top ICT firms have recovered strongly and revenues are now over 20% above the 2000 figures; profits are up strongly, following the sharp downturn in revenues and large losses in 2001-02. However, their employment is still flat. Equipment producers from elsewhere in Asia have emerged strongly as Japanese electronics conglomerates have slipped in the revenue rankings. Firms from China and India play increasingly important roles in ICT goods and IT services, respectively.

ICT R&D is a major driver of growth and change in the sector itself and more broadly. R&D performance is dynamic despite some signs of slowdown. ICT R&D expenditures increased by the equivalent of 0.1 percentage point of GDP over the last decade to over 0.4% according to official R&D data for 19 OECD countries. They increased particularly for electronic components and software and IT services. The top ICT firms have become more R&D-intensive, with large expenditures in electronics and components and communications.

Global restructuring of ICT production and services

Following the strong recovery in 2003-04, ICT goods trade settled back to steady growth in 2005 and is expected to grow at around the same rate as manufacturing trade in 2006. However, rapidly increasing commodity prices, coupled with ongoing price declines for ICT equipment, disguise the relatively solid performance of ICT goods trade (in volume) in 2005 and 2006. In 2004, OECD exports of ICT goods reached a new peak in current USD, driven by growth in electronic components, audio and video and other ICT-related equipment. OECD imports also achieved a new high, driven by growth in communication, audio and video equipment. However, at 13.2%, the share of ICT goods in total goods trade is only a little above that of 1996.

Worldwide FDI flows increased in 2004, recovering from the depressed levels of 2002 and 2003, and grew even more strongly in 2005 with a generally positive outlook for 2006. Mergers and acquisitions are a major component of FDI, and they have also risen sharply: the value of cross-border deals in which the ICT sector was the target was up 47% in 2005, and around 20% of all cross-border M&As have targeted the ICT sector. The first half of 2006 saw intense M&A activity, the strongest in current USD terms since the dot.com boom.

Globalisation of ICT-enabled services

Rapid technological advances in ICTs have increased the tradability of services and make it possible to provide from remote locations many ICT-enabled services that do not require face-to-face contact. Although OECD countries still account for most services activities and services trade, growth is very rapid in many non-OECD countries. India and China already account for around 6.5% of exports and almost 5% of imports of computer and information services and other business services. Some eastern European and Baltic countries are also increasing their share in ICT-enabled services supply and they are often growing most rapidly.

Countries that are building up their international services supply are also actively pursuing strategies to improve domestic capabilities and the competitiveness of their IT and software services suppliers. Firms and countries developing international services sourcing activities are aware that their future development and growth depend on the quality of services supplied, and information security and privacy, for example, are attracting greater attention. Finally, most OECD countries have seen adjustment to international sourcing as part of more general adjustment policies.

China: A new competitor and engine of growth

China has developed rapidly by hosting foreign ICT firms or third-party contract manufacturers to undertake final ICT product assembly in China, a strategy different from that of other major Asian ICT producers. It overtook the United States as the biggest exporter of ICT goods in 2004, and its ICT exports continued strongly in early 2006. Exports from China are mainly computer and related equipment which depend largely on imports of electronic components, increasingly from other Asian countries.

Export-oriented ICT investment, coupled with a rapidly developing Chinese domestic market, has resulted in high levels of inward investment. In 2005 ICT-related FDI inflows into China were worth around USD 21 billion. Value added per employee of foreign affiliates in the ICT sector has risen steadily, and technically more complex activities, such as design and testing and R&D, are increasingly shifted to China. Despite this rapid growth of its capabilities, the Chinese ICT industry must make the transition from low-cost manufacturing to higher value-added goods and services.

On the demand side, China is the sixth largest ICT market and about two and a half times that of India, but in 2005 its market was still only about one-tenth that of the United States. At the end of 2005, China had 64.3 million broadband and 111 million Internet users. More than half and sometimes up to three-quarters of Chinese firms surveyed use the Internet and e-commerce has grown rapidly. Nonetheless, only about 4% of the Chinese population are broadband users, only 8% are Internet users and e-commerce is comparatively less developed than in OECD countries, and there remains a striking urban-rural digital divide.

Digital content creation, distribution and access

Digital content is now an important driver of the ICT industry. Technological innovation and new consumer demand are leading to new or more direct forms of creative supply, new distribution methods and potentially improved access. Research results, for example, are becoming more directly accessible, and digital content is pervading many sectors, with applications that may prove more significant than those for entertainment.

Content industries are migrating to commercial digital content applications, with varying degrees of success. The games, music, scientific publishing and mobile content industries have very specific and different characteristics, but digital content is the major driver of growth for all. New types of content have developed (*e.g.* online games) or are displacing traditional entertainment (*e.g.* television). New business models are being tested, including subscription (games) and pay-per-use (music). Advertising is becoming less important in some areas (mobile TV) and more important in others (search). As numbers of simultaneous peer-to-peer users rise, trials of commercial applications for this large user base are under way.

Consumer demographics, income and new uses will structure the growth and shape of the industry. For users, there is more, and more diverse, content available on line than off line, and innovative new products provide customised services with greater interactivity. Increasing numbers of users are also becoming digital content creators, although it is unclear whether this will be a lasting phenomenon or an ephemeral fashion. Governments

can develop general enabling factors for the creation and use of digital content, maintain a supportive business environment and governments are also major producers and users of digital content.

ICT skills for employment and competitiveness

ICT skills increasingly are a workplace requirement. Up to 5% of total employment is in ICT specialist occupations and around 20% in ICT-using occupations. ICT specialist job definitions are evolving, requiring some combination of ICT specialist skills with other skills, *e.g.* business or marketing. ICT skills are supplied in different ways for different populations. Basic skills needs are increasingly filled “naturally” through diffusion of ICTs and the use of ICTs in schools and at the workplace. Efforts are being made to improve the access of older workers to ICT skills through training programmes. Because ICT specialist skills needs are likely to change rapidly as technology changes, the formal education system may offer less flexibility for adapting curricula than private-sector schemes, usually set up as multi-stakeholder partnerships.

Many teleworking services can now be provided anywhere. Analysis suggests that up to 20% of employment is potentially affected by ICT-enabled offshoring. This does not mean that these jobs will necessarily be offshored but that around 20% of all employed workers carry out the kinds of tasks and functions that could potentially be carried out from any geographic location. ICT-enabled globalisation of services of course also means that countries gain jobs in these functional areas.

Looking to the future: Emerging technology applications

Many new ICT applications have significant potential and may well have major economic and social impacts as well as having a fundamental role in the interlinking and convergence of different technologies. Among these emerging technologies are ubiquitous networks, which make it possible to follow persons and objects and provide real-time tracking, storing and processing of information. Applications such as radio frequency identification (RFID) and other sensor technologies are increasingly affordable, investment is rising and applications are moving into commercial use. Location-based services use a variety of position-determining technologies to follow the location of objects and users. The two most common applications are navigation and asset tracking.

Natural disaster prevention and warning technologies (*e.g.* tsunami early warning systems) are becoming more important for reducing the impacts of disasters that result in large economic losses (totalling USD 170 billion in 2005). Participative web (Web 2.0) is the active participation of Internet users in creating content, customising the Internet and developing applications for a broad variety of fields. Blogs are one of the most popular forms, with around 50 million in mid-2006. In Asia, the number is disproportional compared with the general use of the Internet.

Convergence of nanotechnology, biotechnology and information technology is likely to provide major opportunities and challenges. Convergence in applications such as health care and robotics is leading OECD countries increasingly to assess the potential

impact. Neurotechnology, for example, is the application of electronics and engineering to the human nervous system.

Rising to new challenges: ICT policies in a time of strong growth and expanding opportunities

To maximise policy effectiveness and improve delivery of more targeted policies and programmes, countries are increasingly co-ordinating policy vertically, through the layers of government, and horizontally, across ministries and agencies. As OECD countries have achieved higher levels of ICT access, basic skills and content, the focus has shifted to deepening these achievements through broadband, more advanced skills and sophisticated content. They are also emphasising ICT R&D and innovation, diffusion to business, greater competition in ICT markets and more attention to IPRs.

Assessment and evaluation remain important weaknesses in most countries. Despite the emphasis on broadband rollout, for example, few countries report evaluation of broadband policies. Techniques for evaluating the effectiveness of IT policy need to be shared and improved, to compare assessments and policy impacts across countries.

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