

Information and Communications Technologies
OECD Information Technology Outlook 2008

Summary in English



- Information technology (IT) and broadband are major drivers of economic change, restructuring businesses, affecting skills and employment, and contributing to growth and consumer benefits. This volume describes recent market dynamics and trends in industries supplying IT goods and services and offers an overview of the globalisation of the information and communication technology (ICT) sector and the rise of ICT-enabled international sourcing.
- It analyses the development and impact of the changing global distribution of services activities and the rise of China and India as significant suppliers of ICT-related goods and services. It also looks at the increasing importance of digital content in selected industries and how it is transforming value chains and business models. The potential of technological developments such as ubiquitous networks, location-based services, natural disaster warning systems, the participative web and the convergence of information technology with nanotechnology and biotechnology is also examined. This book includes StatLinks, URL's linking statistical graphs and tables to spreadsheets containing the underlying data.

The ICT industry has slowed with the world economic slowdown but growth continues in some markets and products

The outlook for the ICT sector has weakened with the turmoil in the world economy...

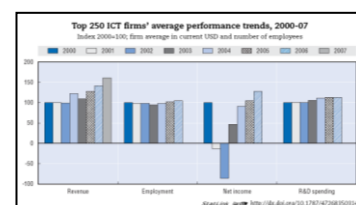
The outlook for the information and communications technology (ICT) sector is much less favourable than in recent years. With economic conditions deteriorating, recession in the OECD area and business and consumer confidence falling sharply, global projections for ICT spending have been revised sharply downwards. Macroeconomic forecasts, short-term cyclical output indicators and business and consumer activity show ICT growth in OECD countries to be slower in 2008 than in 2007 at around 4%. But growth has not yet collapsed as it did in 2001-02 with the ending of the ICT bubble, and so far it has remained somewhat stronger than OECD economies' performance as a whole.

Over the next 18 months, ICT growth is likely to be below zero for the OECD with considerable turbulence as the financial services sector restructures and the real economy experiences a deep economic downturn. However, IT services and software will generally grow, along with new Internet and communications-related products and infrastructure as they are an essential part of spending and partly recession-proof. A general upturn cannot be expected before the end of 2009 in parallel with renewed GDP growth. Growth after 2009 will potentially be at a somewhat higher level than GDP as new broadband infrastructures and products develop, although financing new ICT investments will be a continuing business and policy challenge.

... but medium-term growth is partly underpinned by new products and growth in non-OECD markets

The longer-term prospects for the ICT sector depend on whether businesses and consumers continue investing in new ICT goods and services at a relatively high rate, and whether non-OECD economies maintain growth paths that, while slowing, in part compensate for recession and uncertainties in OECD economies. Non-OECD economies make up over 20% of the global ICT market, with ICT spending in Brazil, China, India, Indonesia and Russia all growing in 2003-07 at more than 20% annually in current terms. Around 50% of ICT goods production now comes from non-OECD countries, and these countries, notably China and India, are increasingly the home of top ICT firms. But in the medium term, developing country exports and business activity will be curtailed, and commodity price rises and inflation have squeezed consumer spending in non-OECD countries. ICT employment in OECD countries will contract as business and

Top 250 ICT firms' average performance trends, 2000-07



consumer expenditures drop, and as competition from non-OECD economies and industrial restructuring accelerate.

Over the longer term the ICT industry is expanding, ICT-related employment is increasingly important and one half of venture capital goes to ICTs

Looking at developments before the current financial crisis, the ICT sector put in a strong performance since 2002, underpinning real growth and supported at global level by the dynamic performance in non-OECD countries, partly through ICT production and exports and partly through domestic market growth. Currently the ICT sector makes up over 8% of OECD business GDP, and employs over 15 million people. The top 250 ICT firms (making up around 70% of OECD ICT employment) grew by 12% in current terms in 2007 and their worldwide revenues reached USD 3.8 trillion. OECD countries specialised in ICT manufacturing such as Korea, Finland, Japan and Hungary maintained their competitiveness and ICT goods trade surpluses in recent years and will continue to do so.

ICT skills are an important contributor to growth and they are spread widely across the economy. Over 4% of total employment is in ICT specialist occupations and this share is growing rapidly, and over 20% of employment is in intensive ICT-using occupations. The industry has been underpinned by steady flows of venture capital, with US ICT venture investments in the first half of 2008 running at the same level as in 2007. Around half of the US total goes into ICTs, particularly in software and Web 2.0 applications, with increasing investment in ICT-intensive environmental and energy technologies. However, exit strategies have been constrained by the credit crunch and new venture financing faces severe challenges over the medium term.

Global restructuring continues apace

Global restructuring continues, and after expanding strongly, ICT trade slowed in 2008

Global ICT trade expanded strongly to more than USD 3.5 trillion in 2006 while the share of the OECD area in total world ICT trade decreased steadily to 56%. Weakening economic conditions slowed ICT trade in 2007 and it slowed further in the first half of 2008, due to lower growth in both US imports and Asian exports. Nevertheless, ICT exports remained resilient in the first half of 2008, with exports continuing to grow in some countries (*e.g.* China, Korea, Malaysia, Mexico, Thailand, and Eastern European countries), due to continuing, albeit slowing, demand from OECD countries and strong demand from emerging markets (especially in the Middle East, Latin America and Africa). With the sharp economic downturn in OECD countries and

increasingly elsewhere, ICT trade is bound to slow further.

China remains by far the leading exporter of ICT goods...

China's ICT exports rose to USD 360 billion in 2007, surpassing the combined ICT exports of the EU15 and the United States. However, China's export growth slowed to around 10% in the first half of 2008 and continues to drop. Among OECD countries, Korean exports more than doubled from 2001 to reach almost USD 100 billion in 2007, very close to those of Japan.

... and ICT-related FDI expanded to new highs before falling sharply in 2008

ICT-related foreign direct investment reached an historic high in 2007, but has fallen sharply in 2008 with a possible recovery projected after 2009. In 2007 about one-fifth of all cross-border mergers and acquisitions were ICT-related (USD 170 billion). Such deals have been increasingly targeting *and* originating in non-OECD economies, with firms in the BRICS countries particularly active. There has been a very marked slowdown in global merger and acquisition activity in 2008 along with the slowdown in foreign direct investment and this will persist due to constrained business funding.

ICT R&D and innovation as drivers of growth

The ICT sector is by far the largest R&D spender...

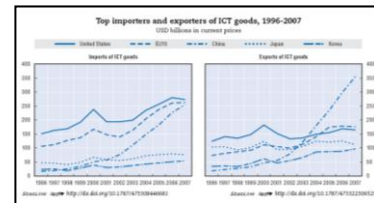
The ICT industry in OECD countries spends about two and a half times as much on R&D (USD 130 billion in 2000 prices) as the automotive sector and more than triple that of the pharmaceutical sector. R&D spending is especially strong in services and software as these areas have expanded rapidly. The United States accounts for 40% of all OECD ICT-related business R&D expenditures, the EU-15 for a little under 25%, Japan for 22% and Korea for 9%.

The ICT business sector has close to one million researchers; of these around half are in the United States. ICT research priorities are focusing on developing the basic technologies for the next generations of products and a new development has been interest in addressing major challenges including climate change and healthcare.

... the top ICT firms are R&D-intensive and the organisation of R&D is changing

R&D expenditures of major ICT firms rose to USD 151 billion in

Top importers and exporters of ICT goods, 1996-2007



2006, and growth continued in 2007. The top 100 R&D companies spend an average of nearly 7% of revenue on R&D. ICT firms from the United States and Japan still lead by a wide margin, but Korean firms have been closing the gap. ICT R&D expenditures of non-OECD ICT firms (China and India, and other emerging economies) are moderate by comparison, although rising fast.

Publicly funded research, globalised research networks and inter-firm R&D partnerships and alliances are important factors driving innovation. R&D partnerships and alliances have spread across new geographical and interdisciplinary domains. While the trend is toward globalised research networks, the centres of these networks are highly concentrated in a few regions in OECD countries. A few new locations are growing in importance, including Shanghai, Haifa and Bangalore, and to a lesser extent Chinese Taipei, Malaysia and Singapore.

Non-ICT industries are increasingly undertaking ICT-related research, and ICT patenting is expanding

In some OECD countries the share of R&D conducted by non-ICT firms has risen to 25% of total industry ICT R&D spending. This R&D is conducted in a wide range of sectors, notably in automobiles, financial services and defence, and is linked with the growing importance of embedded systems and software in ICT and non-ICT products. The number of ICT-related patents grew strongly from the mid-1990s to 2005. The United States, Europe and Japan continue to lead in the number of international patent applications, but the proportion of ICT patents in total Chinese filings tripled in a decade, and Korea's patent output is also rising.

Broadband is changing household Internet use

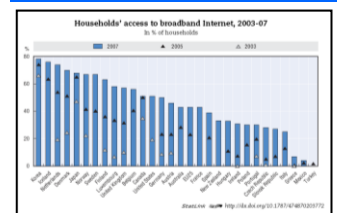
Broadband is one of the fastest diffusing technologies...

Broadband is diffusing more rapidly than narrowband Internet at home and catching up with the PC installed base. In 2007, more than two-thirds of all households had access to broadband Internet in countries such as Denmark, Finland, Iceland and the Netherlands; and in Korea, more than eight out of ten households have broadband access.

... accelerating online activities...

People with broadband access use the Internet more often and more intensively, and broadband drives online shopping, education, use of government services, playing or downloading digital content and video telephony.

Households' access to broadband Internet, 2003-07



... but a new digital use divide is surfacing based on socio-economic characteristics

The pattern of broadband use is shaped by socio-economic characteristics including education, income, age, gender, or place of access. Young, highly educated, higher-income males tend to access the internet more frequently and for different types of online activities. Having children in the house increases broadband use. But as the digital access divide decreases a digital use divide is emerging.

Digital content is developing rapidly, driven by consumer use

Digital content is transforming ICT and creative industries...

Digital content is a key factor behind the rapid growth of OECD broadband subscribers to 251 million in 2008, up from 68 million in 2003, and the growing number of users has spurred the creation of new content. Mobile broadband is also beginning to boost content creation and demand. Finally, management and distribution technologies are increasing the supply of broadband content, including from users.

An increasing share of content industry revenues is derived from products delivered via the Internet, but with marked differences across sectors. Advertising is the biggest online market, with revenues of over USD 30 billion in 2007 and annual growth of 30%. Online revenues are around one-sixth of the total for computer and video games and music, and they are growing fastest for films, albeit from low levels. The development of user-created content has been rapid, with for example 40% of Korean Internet users being members of online communities. Video and social networking sites are leading the development, and virtual worlds have become a major centre of activity.

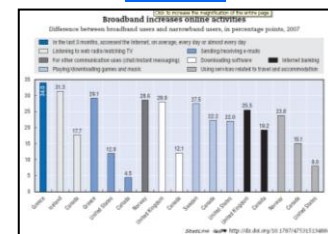
There are significant impacts on value chains and business models beyond the ICT sector...

Cross-industry collaboration and new business partnerships are emerging, for example, for content aggregation and distribution. Some online business models mirror offline models (e.g. pay-per-item) and some are new (e.g. sale of virtual items). Digital content has also been increasingly used to organise users around non-media industries such as banking, and non-entertainment applications are emerging in government services and health.

... although barriers hamper uptake

Industry's goal of digital content "anywhere, anytime and on any

Broadband increases online activities



Market size and growth of digital content sectors, 2007



device” is still remote. Challenges include access speeds, service quality and pricing. Online content catalogues are still limited and interoperability, geographic access limitations and the availability of unauthorised digital content hamper uptake. Widespread use of advanced mobile broadband content services has not yet emerged.

The potential and actual impacts of broadband

Broadband networks are an integral part of the economy...

Broadband is an enabler of structural change, the creation of new digital services, and it boosts firm efficiency, improves competition and underpins globalisation. Broadband spurs ICT innovation and ICT-enabled innovation, for example in developing collaborative R&D, making cloud computing possible and enabling new ways of organising research.

... but measuring broadband impacts is an ongoing challenge

Despite the rapid take-up of broadband, its diffusion is relatively recent and its impacts are difficult to disentangle from those of established ICTs. Nevertheless, firms use fast connections to make existing processes more efficient and productive, develop new e-business value chains and business models, and transform business activities. There is evidence that broadband increases the number of businesses and employment particularly in knowledge-intensive sectors.

Broadband and associated applications are contributing to the transformation of economic activity as did other general purpose technologies such as electricity and the internal combustion engine. Broadband impacts may be greater as the price of ICTs has fallen more dramatically. However necessary, complementary investments in skills and organisational innovations may take time to materialise to enable broadband’s contribution to growth and job creation. It is generally accepted that considerably higher levels of investment in intangibles, human and organisational capital are needed to complement ICT and broadband investments.

Rising to the challenges? ICT policies in demanding times

ICT policies are widening their focus...

OECD governments are continuing to integrate ICT policies into national strategies for enhancing economic growth, employment, welfare and achieving wider socio-economic objectives. There is a greater need for a coordinated, horizontal government approach since

ICTs are increasingly addressing policy challenges in areas as diverse as education, healthcare, climate change, and energy efficiency. Around one-third of OECD countries are attempting to centralise formulation and co-ordination of ICT-related policies to improve policy coherence. Efforts to improve coordination and reduce duplication are likely to intensify with the economic decline, greater strains on government budgets, and pressures on long-term investments.

... and priorities are shifting...

In 2008, the top 10 ICT policy priorities of OECD governments are a mixture of traditional targets (*e.g.* government online, ICT R&D) and newer areas (*e.g.* digital content and public sector information). Some governments are introducing policies to meet challenges beyond technology uptake. These include R&D programmes and fostering innovation; government online policies to target public sector efficiency; and broadband policies to bridge geographic and social divides. Policies to enhance trust online are gaining in importance; and while policies to improve technology diffusion to business are still a priority, policies focused on the general ICT business environment decreased.

Top ten ICT policy priorities, 2008

- 1 Government on line, government as model users
- 2 Broadband
- 3 ICT R&D programmes
- 4 Promoting IT education
- 5 Technology diffusion to business
- 6 Technology diffusion to individuals and households
- 7 Industry-based and on-the-job training
- 8 General digital content development
- 9 Public sector information and content
- 10 ICT innovation support

.... while better policy assessment and coordination are needed

Assessment and evaluation are more widespread, but further efforts are needed to more effectively measure and subsequently improve the efficiency of ICT policies and their coordination.

ICT policies have evolved to meet new priorities while continuing to focus on core activities. These policies will be tested in terms of

their contributions to long-run competitiveness, growth and employment. Non-OECD economies are also developing comprehensive ICT policies which both complement and challenge the development of policies in OECD countries. To safeguard the future, it is crucial in light of the economic downturn which began in 2008 to maintain long-term priorities and investments in research, innovation and human resources.

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