

"The 2010 Report on R&D in ICT in the European Union" includes data up to 2007, and, this being the third report of a series published annually, it now covers the period of ICT sector growth that took place between two important financial events: the 'dot.com' crisis and the current financial and economic crisis.

This multiannual analysis confirms the consistency of the data over time and offers a privileged view of the major ICT R&D trends across those years (2002 – 2007).

The following main observations can be made:

- Worldwide, the ICT industry maintains its position as the leading R&D investing sector, due to its dynamism, its innovative capacity and the fact that it supplies general purpose technology to the rest of the economy.
- Europe has been, and is still, lagging behind its main competitors in terms of ICT R&D investment and ICT R&D patenting.
- This lag is largely due to the size of European ICT companies. For example, as compared with US ICT companies, they are smaller and did not grow as fast in the last decades. This is a particular weakness in the most promising segments, for example in the Computer Services and Software ICT sub-sector, where European Internet companies have failed so far to achieve a truly global scale.
- Europe is an important location for foreign ICT R&D investment, but international cooperation in R&D is evolving from a dominant EU-US relation to global networking where the US-Asia relation is taking a growing share. Here also, it seems that US companies are able to grasp opportunities more rapidly than European ones.

Importance for policy makers

The detailed and comprehensive analyses contained in "The 2010 Report on R&D in ICT in the European Union" are particularly relevant for policy makers since:

- The ICT industry and ICT-enabled innovation in non-ICT industries and services make an increasingly important contribution to the economic growth of advanced economies. The ICT sector was highlighted in the EU Lisbon Objectives, and has retained its prominence in the recently proposed Europe 2020 Strategy.
- The ICT sector is a significant contributor to the ambition of achieving the target of investing 3% of GDP in R&D in the EU – a target which is reiterated in the proposed Europe 2020 Strategy.

About the Report:

This report provides an analysis of R&D investments in the EU Information and Communication Technology (ICT) sector. The research and analysis was carried out by the Information Society Unit at the Institute for Prospective Technological Studies (IPTS), one of the seven research institutes of the European Commission's Joint Research Centre (JRC). This work was carried out in the context of the project "Prospective insights on R&D in ICT" (PREDICT), a research project co-financed by JRC-IPTS and the Information Society & Media Directorate General of the European Commission.

Data sources:

This report combines in a unique way three complementary perspectives: national statistics (covering both private and public R&D expenditures), company data, and technology-based indicators. It relies on the latest available official statistics delivered by Member States, Eurostat and the OECD:

- For R&D data: ANBERD 2009 (OECD), R&D Statistics (ESTAT), EU industrial R&D Investment Scoreboard (JRC-IPTS)
- For supporting data: Structural Business Statistics (SBS), National Accounts, Trade, Price and GDP data (Eurostat), EUKLEMS database (Groningen University), PATSTAT (European Patent Office), Amadeus database (Bureau Van Dijk) as well as several other external or in-house resources.

For most of the data, 2007 figures were the latest available in December 2009 when the report was prepared; for patent data, latest year available was 2006.

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Highlights from

The 2010 Report on R&D in ICT in the European Union

*An analysis of Research & Development (R&D)
investments in the EU Information and Communication
Technology (ICT) sector*



To get your copy of the Report:

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Most important findings

The **ICT sector includes** five NACE* classes, also called sub-sectors:

□ **Three ICT manufacturing sub-sectors** (IT equipment; IT Components, Telecom and Multimedia Equipment; and Measurement Instruments)

□ **Two ICT services sub-sectors** (Telecom Services, and Computer Services and Software). Where indicated, the Telecom Services sub-sector also includes Postal Services

* NACE – Nomenclature générale des Activités économiques dans les Communautés Européennes

The importance of ICT services, and in particular of the Computer Services and Software sub-sector

In 2007, total ICT sector employment exceeded for the first time its previous peak level of 2001. It therefore took six years for total ICT sector employment to recover from the effects of the dot.com crisis, with an important redistribution of jobs from ICT manufacturing to ICT services sub-sectors.

From 1999 to 2007, employment increased by 27% in ICT services sub-sectors while it decreased by 10% in ICT manufacturing sub-sectors. **This brought the share of ICT services employment to 68% of the total ICT sector.** In 2007, the Computer Services and Software sub-sector alone accounted for half the total ICT employment in Europe.

A similar structural shift occurred for ICT value added with a steady increase of the share of the ICT services sub-sectors' value added. **ICT Services accounted for more than 75% of total ICT value added in 2007**, with the Computer Services and Software sub-sector alone producing 42% of the ICT sector value added.

The Computer Services and Software sub-sector is also the only EU ICT sub-sector with a strong and sustained increase in both business expenditure in R&D (BERD) and employment of researchers: from 2002 to 2007, its BERD increased by 40% (see orange line in Figure 1, left) and employment of researchers by 56%. In 2007, the Computer Services and Software sub-sector became for the first time the leading ICT sub-sector in terms of employment of researchers (see orange line in Figure 1, right).

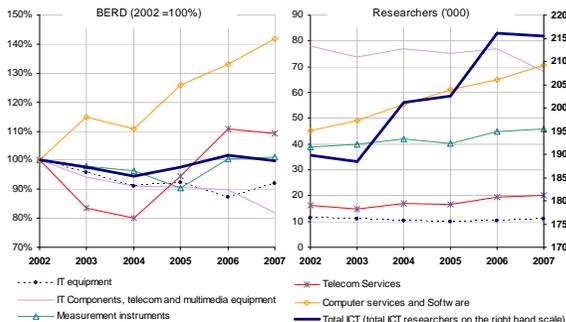


Figure 1: BERD growth (%) and number of researchers (thousands) by ICT sub-sector and for the ICT sector, 2002-2007

International comparisons

The **US, Japan, Taiwan and Korea are investing significantly more in ICT R&D than the EU (when comparing ICT R&D over GDP ratios).** Although the EU and the US have roughly equivalent GDPs, the US levels of both ICT business R&D expenditure (ICT BERD) and public ICT R&D funding (ICT GBAORD) are double those of the EU.

In terms of R&D invested in ICT sub-sectors for the period 2004 to 2007, analysis of *ICT Scoreboard*** companies shows that **R&D investments by EU companies have been growing** – in some case strongly – in all ICT sub-sectors. However, at the same time, the *ICT Scoreboard* also shows that US companies clearly outperform EU companies in several ICT sub-sectors that are key to the competitiveness of the EU industry, notably Computer Services and Software. A further example of EU weaknesses in growing markets is that in the Internet industry, where companies like Google or Yahoo are dominant, no EU company had invested sufficiently in R&D in 2007 in order to make it to the *ICT Scoreboard* listing.

This is largely because of the size of European ICT companies. As compared with US ICT companies they are generally smaller and did not grow as fast in the last decades.

** The *ICT Scoreboard* includes the 453 ICT companies with the largest R&D budgets globally. It is extracted from the EU industrial R&D Investment Scoreboard, available at http://iri.jrc.ec.europa.eu/research/scoreboard_2008.htm

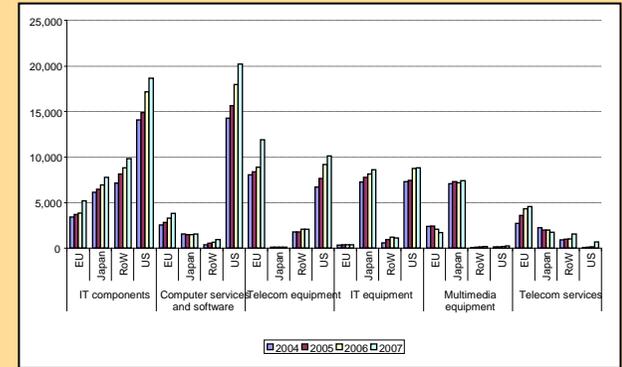


Figure 2: R&D investments in the ICT sub-sectors by EU, Japanese, US and Rest of the World (RoW) ICT Scoreboard companies, 2004-2007 (€ million)

Internationalisation of ICT R&D

ICT R&D is an international endeavour that is increasingly widely distributed. Analyses of a combination of indicators (global distribution of corporate R&D sites of major ICT companies and international patents in ICT technologies) show that the **EU remains an important location for ICT R&D** – for both EU and non-EU companies – but it is also noted that **Asia is gaining importance** in this respect.

International patent analysis also indicates that **US companies have taken a 'first mover' advantage in developing ICT R&D collaborations with Asia.** For example the share of the ICT inventions developed in Asia owned by US patent applicants grew from almost zero in the early 1990's to 1.5% in 2006, while the share owned by EU patent applicants merely started growing in the mid 1990's and reached only 0.5% in 2006 (estimated by analysing priority patents applications filed in 2006 to all European national patent offices, the European Patent Office and the United States Patent and Trademark Office).

The importance of the ICT sector

ICTs are highly pervasive technologies and the ICT sector underpins growth in all sectors of the economy. In the EU, the USA, and Japan, **the ICT sector is by far the largest R&D-investing sector of the economy.** In 2007, while the ICT sector represented 4.8% of GDP (€540 billion) and 3% of total employment in the EU (6.1 million employees), it accounted for **25% of overall business expenditure in R&D (BERD) and employed 33% of all business sector researchers.**

The time-series (2002 to 2007) show that EU ICT BERD remained stable (see blue line in Figure 1, left) with an ICT BERD intensity between 6 and 6.5% of ICT sector value added. Whilst this is far above the EU 3% target, it is well below US ICT BERD intensity (11.2% in 2007). It does however demonstrate the importance of the sector in understanding R&D expenditures, dynamics and performance in the EU. Further, additional evidence of the importance of the sector is provided by the fact that 20% of all EU patents are in ICT technologies.

Not only does the ICT sector lead other economic sectors in terms of BERD, it also provides them with productivity-enhancing technology. Hence it contributes directly and indirectly to increasing labour productivity and overall EU competitiveness.

ICT R&D distribution across EU Member States

- ✦ **Finland and Sweden** invest the largest amount in ICT BERD in relation to their GDP (above the US level).
- ✦ **Finland, Germany, the Netherlands and Sweden** are the only Member States with ratios of ICT patent applications in relation to GDP either above or close to the US ratio.
- ✦ **Finland and the Netherlands** have the highest specialisation in ICT patenting.

✦ The EU's three largest economies (**Germany, France and the UK**) and to some extent the next two (**Italy and Spain**) set the average EU trend.

✦ In 2007, **Germany, France, the UK, Italy and Spain** accounted for more than 70% of total ICT sector value added and 2/3 of its employment.

✦ **These five countries** together contribute more than 2/3 of EU ICT BERD, and they generate more than 75% of all ICT patents (**Germany** generates almost 45% of these).

✦ In spite of strong ICT BERD increase the **new EU Member States** still have very low ICT BERD in relation to their GDP. Although several new Member States, such as **Hungary, the Czech Republic and Poland** recorded spectacular increases in ICT manufacturing employment, analysis shows that these countries are still hosting rather low value added activities.