

Patent applications to the EPO in the ICT sector 1993 to 2003

Statistics in focus

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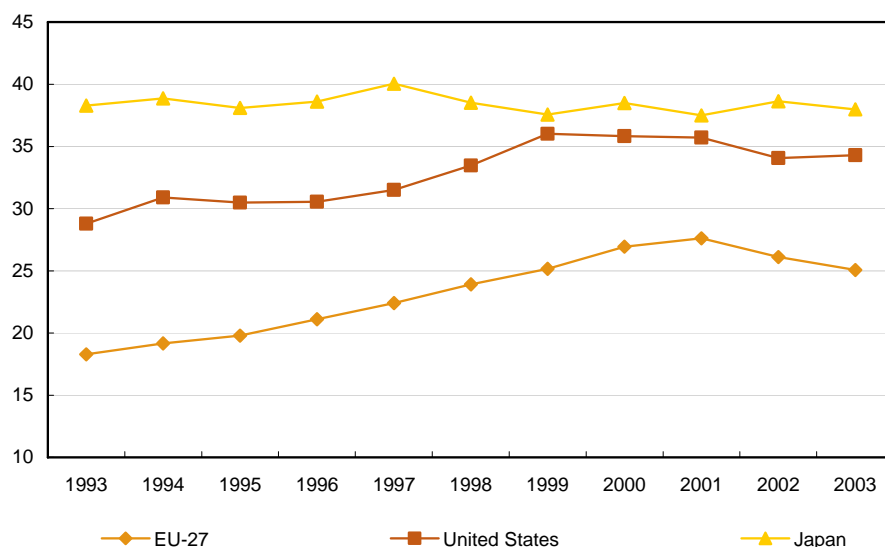
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Information and Communications Technologies (ICT) represent one of the key sectors of our present-day economy. As this sector involves technological inventions and is also known as being highly competitive, patents play a major role.

This publication presents a brief analysis of ICT patent activities at international level and then goes on to look in more detail, at what happens at national level, while taking into account the particularities of the ICT sector.

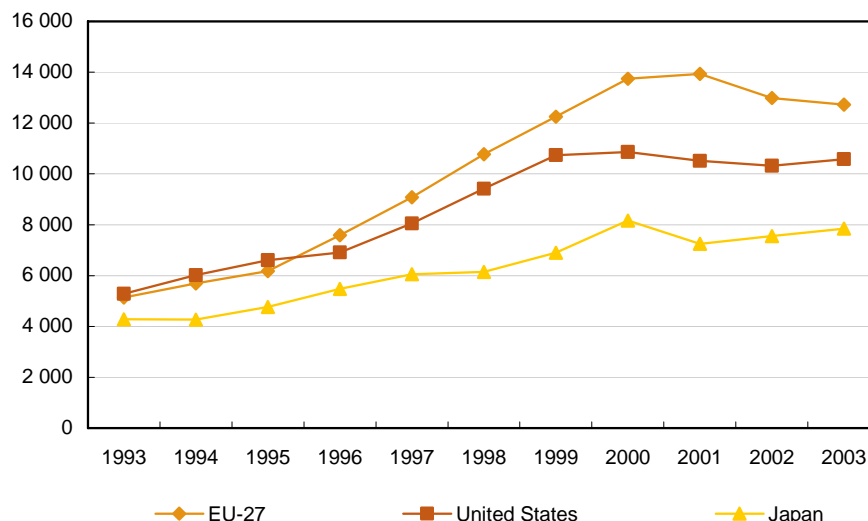
Finally, to illustrate the demand side of the ICT sector, it takes a brief look at expenditure on information technology.

Figure 1: Trend in the ICT sector's share of total patent applications to the EPO, as a percentage, 1993 to 2003, EU-27, JP and US



Source: Patent statistics

Figure 2: Trend in total number of ICT patent applications to the EPO, 1993 to 2003, EU-27, JP and US



Source: Patent statistics



The value added of the EU-27 ICT sector contributes to 5% of GDP

Table 3: The ICT sector in 2003 (number of enterprises, employment, value added) and total economy (employment, GDP), EU-27

	ICT sector				Total economy		
	Number of enterprises	Employment		Value added at factor cost		Employment	GDP
		Number of persons employed in thousands	As a % of total economy	In million EUR	As a % of GDP	in thousands	In million EUR
EU-27	614 301 p	5 398 p	2.6 p	409 474 p	4.9 p	204 991	8 410 918
BE	13 693	121	3.0	12 272	4.8	4 070	256 727
BG	4 508	60	2.1	890	8.1	2 835	10 976
CZ	29 207 u	128 u	2.7 u	3 766 u	7.7 u	4 701	49 212
DK	8 496	74 c	2.7 c	5 332	3.3	2 707	162 662
DE	53 525	945	2.6	86 140	4.0	35 925	2 152 753
EE	1 191	11 c	1.8 c	343	7.1	594	4 826
IE	3 930 c	53 c	2.9 c	5 411 c	5.7 c	1 811	94 679
EL	:	:	:	:	:	4 275	121 721
ES	34 191	353	2.0	27 581	4.5	17 296	612 635
FR	65 355	792	3.3	62 109	4.3	24 358	1 434 672
IT	102 991	634	2.9	46 972	4.9	22 054	967 008
CY	288 c	5 c	1.5 c	401 c	4.3 c	329	9 230
LV	1 317	15	1.5	469 c	7.7 c	1 007	6 088
LT	1 463 c	24 c	1.7 c	474 c	6.0 c	1 433	7 843
LU	1 257	7 c	3.7 c	991 c	4.3 c	187	23 198
HU	25 010	135	3.4	4 222	9.0	3 922	47 012
MT	:	:	:	:	:	148	3 492
NL	25 385	186 c	2.3 c	12 460 c	3.1 c	8 121	399 969
AT	14 317	109	2.9	9 039	4.1	3 793	217 963
PL	35 436	133 c	1.0 c	2 274 c	1.5 c	13 617	147 616
PT	3 593	54	1.1	4 576	4.2	5 118	108 494
RO	10 826 c	108	1.2	1 693	5.7	9 155	29 751
SI	2 808	19 c	2.1 c	519 c	2.5 c	897	21 149
SK	1 844	39	1.8	988	4.9	2 162	20 042
FI	6 584	111	4.7	11 897	8.9	2 365	133 898
SE	32 904	178 c	4.1 c	11 872 c	5.0 c	4 314	235 470
UK	134 182	1 102	4.0	96 781	8.8	27 797	1 097 382

Source: SBS, LFS and National accounts statistics

Note: EU-27 values based on data available for Member States (see also methodological notes)

Figure 1 shows the trend in the ICT sector's share of total patent applications to the EPO for the three main economies between 1993 and 2003; Figure 2 tracks the movement in the number of ICT patent applications to the EPO for the same period and the same countries. In 2003, the share of ICT patents in the EU-27 grew to 25% of all patent applications to the EPO. In the United States and Japan, however, the shares were significantly higher, at 34% and 38% respectively. In terms of the number of ICT patent applications to the EPO, the EU-27 was in the lead, followed by the United States and Japan. For all three economies the number of ICT patent applications increased steadily, except during the last two years of the period under review. This slowdown may be explained – at least in part - by

the length of the patenting procedures and by the fact that patent applications are filed according to priority date.

Table 3 describes the ICT sector using economic indicators such as number of enterprises, employment, and value added at factor cost. The absolute values reveal the differences in the economic size of each Member State and also in their national ICT sector. The ratios relating to total economy or to GDP highlight structural differences. Whereas in Poland, for example, the ICT sector in 2003 was responsible for 1% of the total employment, in Finland the proportion of employed persons working in the ICT sector was close to 5%. Value added as a percentage of GDP ranged from 1.5% in Poland to 9% in Hungary.

One in four EU patent applications is filed in the ICT sector

Table 4: Patent applications to the EPO in the ICT sector (total, ICT, ICT groups, per million inhabitants, as a percentage of total), EU-27 and selected countries, 2003

	All patents	ICT patents						As a % of all patents	Per million inhabitants
	Total number	Total number	of which in %						
			Consumer electronics	Computer, office machinery	Telecommunications	Other ICT			
EU-27	50 785	12 731	11.8	29.2	30.5	28.6	25.1	26	
BE	1 273	254	6.0	30.4	31.6	32.0	20.0	25	
BG	21	8	:	13.0	64.9	22.1	36.2	1	
CZ	112	11	:	46.3	39.3	14.4	9.5	1	
DK	979	192	22.1	21.8	30.8	25.3	19.6	36	
DE	21 469	4 578	8.3	27.3	27.1	37.4	21.3	55	
EE	11	5	:	18.5	37.0	44.4	50.3	4	
IE	214	74	4.2	39.8	19.1	36.8	34.7	19	
EL	85	24	8.4	30.4	45.2	16.0	28.1	2	
ES	920	134	5.5	33.6	41.2	19.6	14.6	3	
FR	7 759	2 184	13.1	27.8	34.4	24.8	28.1	35	
IT	4 269	621	6.9	32.0	30.2	30.9	14.5	11	
CY	6	1	40.3	:	59.7	:	10.0	1	
LV	8	1	:	:	100.0	:	6.1	0	
LT	13	10	:	100.0	:	:	74.7	3	
LU	87	10	:	32.2	43.6	24.2	11.8	23	
HU	125	23	13.0	8.7	76.1	2.2	18.4	2	
MT	4	2	:	:	:	100.0	46.2	5	
NL	3 386	1 445	30.1	35.4	14.5	20.0	42.7	89	
AT	1 302	248	16.3	30.0	25.9	27.8	19.1	31	
PL	110	20	14.7	34.2	9.8	41.3	18.5	1	
PT	61	10	4.9	29.1	36.9	29.1	16.8	1	
RO	15	4	19.1	31.9	17.1	31.9	25.7	0	
SI	76	13	7.6	15.2	30.3	47.0	17.3	7	
SK	29	6	:	23.7	35.6	40.7	21.8	1	
FI	1 245	644	7.4	23.1	61.2	8.3	51.7	124	
SE	1 939	557	7.1	21.0	51.4	20.6	28.7	62	
UK	5 264	1 652	9.0	34.4	29.5	27.1	31.4	28	
NO	336	83	38.4	20.3	20.8	20.6	24.8	18	
EEA30	51 176	12 827	11.9	29.1	30.4	28.5	25.1	26	
CH	2 675	506	10.8	24.9	20.1	44.2	18.9	69	
CN	813	379	9.7	21.6	59.4	9.3	46.6	0	
IL	963	344	11.6	35.1	35.8	17.5	35.7	51	
JP	20 665	7 848	20.3	33.4	18.1	28.2	38.0	61	
US	30 830	10 577	8.9	37.9	27.0	26.2	34.3	36	

Source: Patent statistics

The total number of ICT patent applications more or less reflects the economic size of the country. In 2003, Germany led with 4 578 ICT patent applications, followed by France with 2 184 and the United Kingdom with 1 652.

Looking at the number of ICT patent applications per million inhabitants, the picture is very different and sheds more light on actual performance in ICT patenting. Here, Finland ranked first with 124 ICT patent applications per million inhabitants, the Netherlands second with 89, and Sweden third with 62.

In this context, it should be pointed out that over 50% of the Finnish patent applications filed are in the ICT sector, which is twice the EU average. The breakdown by ICT group reveals that more than 60% of the Finnish ICT patent applications related to telecommunications, which is also twice the European average.

ICT patent applications show higher growth rates

Table 5: Annual average growth in patent applications to the EPO (total, ICT, ICT groups), EU-27 and selected countries from 1993 to 2003

	Annual average growth rates (AAGR) 1993 - 2003					
	All patents	Total ICT	Consumer electronics	Computer, office machinery	Telecommunications	Other ICT
EU-27	6.8	10.6	11.2	12.2	13.5	6.9
BE	5.3	8.6	-2.8	5.6	14.7	11.4
BG	9.4	25.5	:	:	:	6.1
CZ	20.7	22.0	:	:	:	-1.7
DK	9.6	22.4	32.6	34.0	51.5	8.5
DE	6.9	10.6	10.1	12.6	13.7	7.8
EE	16.7	:	:	:	:	:
IE	13.3	26.3	:	21.0	26.2	33.7
EL	20.1	36.0	:	:	:	11.0
ES	10.8	13.9	8.7	15.2	15.2	11.2
FR	5.5	9.0	9.6	9.7	11.7	5.2
IT	7.3	7.0	-0.3	7.1	16.0	3.8
CY	22.5	:	:	:	:	:
LV	36.5	:	:	:	:	:
LT	33.2	:	:	:	:	:
LU	10.9	29.6	:	:	:	10.7
HU	10.7	16.5	13.0	-1.7	:	-16.4
MT	6.3	:	:	:	:	:
NL	9.6	15.0	16.5	19.2	10.2	11.6
AT	7.8	16.2	19.7	19.7	35.5	7.1
PL	22.5	23.8	:	:	:	12.2
PT	13.7	17.0	:	13.0	16.0	22.0
RO	13.0	:	:	:	:	:
SI	15.3	13.7	:	12.9	26.0	8.4
SK	20.9	:	:	:	:	:
FI	8.6	14.0	12.2	23.6	14.6	2.5
SE	6.2	12.4	25.8	14.7	13.3	7.0
UK	4.7	7.7	7.5	8.7	11.8	3.8
NO	7.6	8.8	8.8	30.9	24.0	-1.7
EEA30	6.8	10.6	11.2	12.2	13.6	6.8
CH	5.3	8.9	13.2	14.2	8.8	6.1
CN	43.7	77.0	:	60.4	90.9	64.4
IL	13.7	14.2	14.4	12.2	23.6	7.7
JP	7.1	7.0	4.7	6.2	10.5	7.7
US	5.9	8.0	4.3	8.3	14.9	4.4

Source: Patent statistics

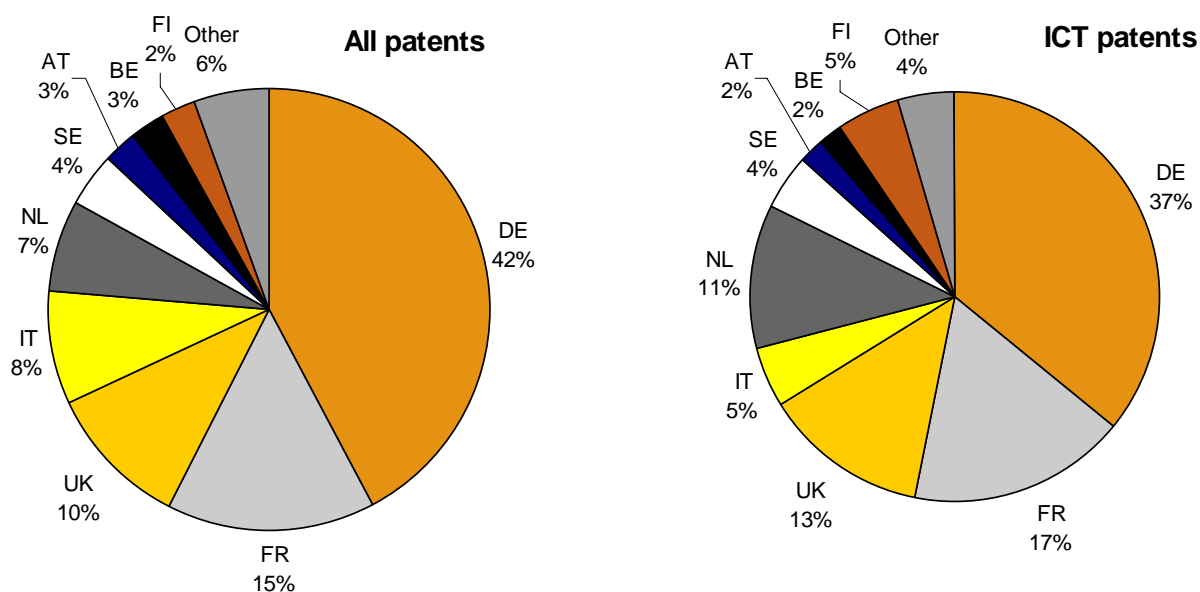
Another interesting way to analyse patent activities is to look at growth rates, which provide some indication of the trend over a given reference period. Between 1993 and 2003, the number of ICT patent applications generally grew faster than the total number of patent applications. The only exceptions to this trend were Italy, Slovenia and Japan, with a slightly lower AAGR for the ICT sector (see Table 5).

In 1993 the number of patent applications in small economies was often so low that not every ICT group had patent applications, and in some countries there were no ICT patent applications at all. This explains the absence of growth rate figures for countries such as the three Baltic States, Cyprus, Malta, Romania and Slovakia.

'Telecommunications' recorded the highest growth rate in ICT at EU-27 level. The increase at national level was highest in Denmark (52%) and Austria (36%), with China achieving an exceptional 91%.

Figure 6 takes a closer look to the breakdown of patent applications by main country for all patents and for ICT patents. Patent activities are very concentrated in the European Union. The patent applications of four Member States (Germany, France, United Kingdom and Italy) make up three quarters of all patent applications of the 27 Member States. Germany accounts for the biggest share by far, with 42% of all patent applications. For ICT patents, however, Germany's share is some 5 percentage points lower.

Figure 6: Distribution of patent applications to the EPO in EU-27, main countries, ICT sector vs. all patents, in 2003



Source: Patent statistics

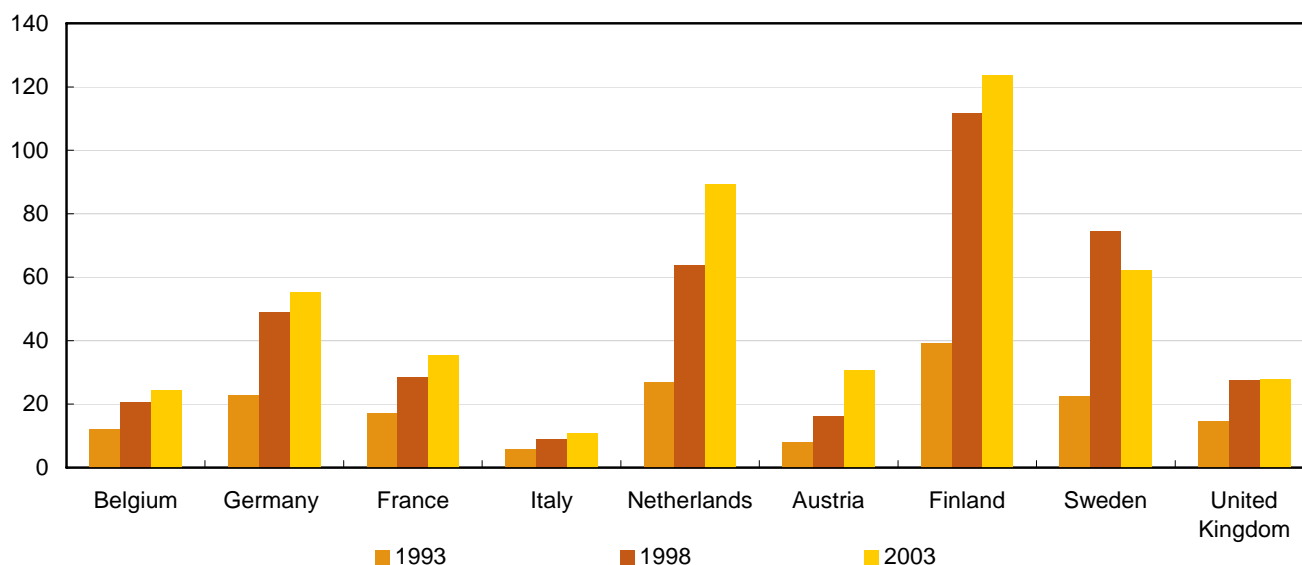
The Netherlands (+4%), Finland (+3%), the United Kingdom (+3%) and France (+2%) have higher shares of patent applications in the ICT sector as a percentage of all patents.

Patent activity in the ICT sector was also highly concentrated. More than one third of ICT patent applications were filed by German residents. In 2003

inventors in the nine main countries were responsible for 96% of all ICT patent applications in EU-27.

Figure 7 shows the ratio of ICT patent applications to the EPO per million inhabitants for the same nine EU-Member States for the years 1993, 1998 and 2003. With the exception of Sweden in 2003, the trend in nearly all countries was upwards.

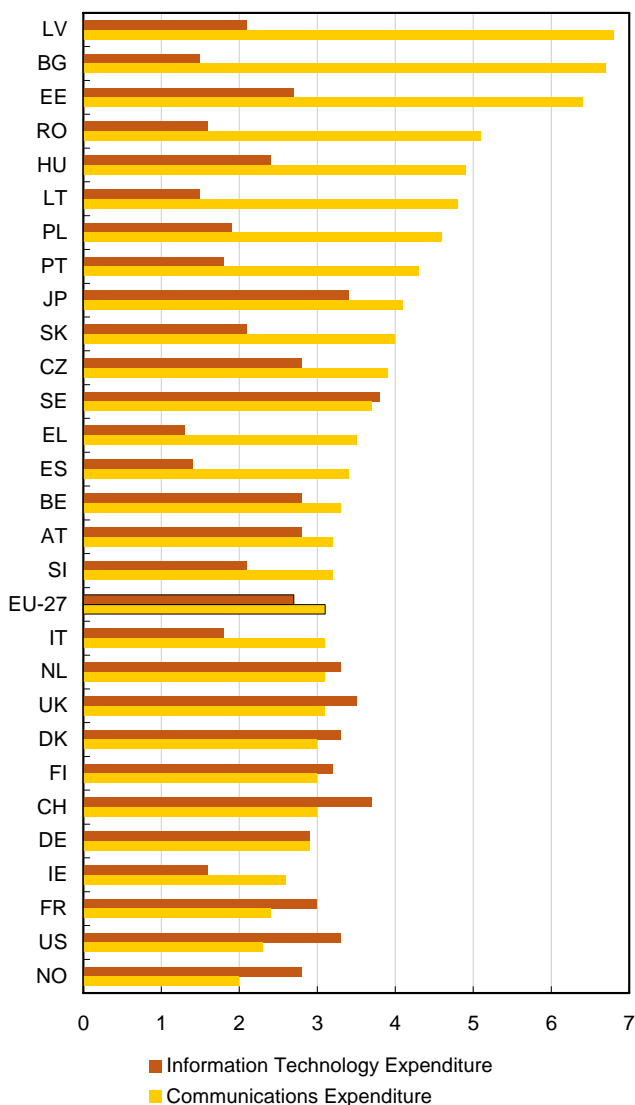
Figure 7: Evolution of ICT patent applications to the EPO per million inhabitants, EU-27 main countries, 1993, 1998 and 2003



Source: Patent statistics

Information technology expenditure

Figure 8: Information technology and Communications expenditure as a percentage of GDP in 2004; selected EU Member States, Norway, Switzerland, US and Japan



Source: Information society statistics

Whereas patent activities in the ICT sector give some idea of the supply side of the sector, Figure 8 shows two indicators that to some extent reflect the demand side. These indicators are “*Information technology expenditure*” and “*Communication expenditure*”, both expressed as a percentage of GDP.

For *Communication expenditure*, many of the EU-15 Member States, Switzerland, the United States and Norway were below the EU-27 average of 3.1%. Smaller countries, mostly the new Member States (from the 2004 and 2007 enlargements) and Japan made up the group that was above the EU average.

The leader in *Communication expenditure* was Latvia with 6.8% of GDP, followed by Bulgaria and Estonia with 6.7% and 6.4% respectively. These high percentages can be explained by the rather low GDP, but also by the need for these countries to complete the process of equipping themselves in communication technologies.

At the other end of the scale are Norway (2.0%), the United States (2.3%) and France (2.4%).

The results for the other indicator, *Information technology expenditure*, are quite different. For this indicator most of the EU-15 countries, Switzerland, the United States and Norway were above the EU-27 average, whereas many of the new Member States and smaller economies are to be found below the European average.

Sweden - with 3.8% - recorded the highest value, followed by Switzerland with 3.7% and the United Kingdom with 3.5%. The countries with the lowest values were Greece (1.3%), Spain (1.4%) and Lithuania (1.5%).

In a majority of the countries shown in Figure 8 the percentages of GDP for *Communications expenditure* were higher than those of *Information Technology Expenditure*. Whereas the first indicator varied across countries between 2.0% and 6.8% of GDP the second one fluctuated only between 1.3% and 3.8% of GDP.

Continued growth in the EU ICT sector

The EU ICT sector is in a strong phase of the business cycle, according to a new study by the Commission's Directorate-General for Enterprise and Industry. The EU's ICT manufacturing growth rates in 2006 were the highest for six years and growth continued in the first six months of 2007. Production and exports were the main drivers of the growth in the EU ICT manufacturing industry, which was especially strong in Germany. However, new orders in the EU ICT manufacturing industry fell during the first half of 2007, which indicates that there might be a risk of a slowdown in manufacturing growth in the second half of 2007 and at the beginning of 2008.

EU ICT services also show signs of being **close to the peak in the business cycle**. Growth in the turnover of EU ICT services was 4.4 percent in 2006, accelerating to 6 percent in the first six months of 2007. The lion's share of the growth was due to computer services, which grew at least twice as rapidly as telecommunications services. The French and UK ICT services industries showed the highest growth rates, with 8 percent in the first half of 2007.

The full report is available at: http://ec.europa.eu/enterprise/ict/policy/ict/index_en.htm (Source: DG Enterprises and Industry)

➤ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

Patents statistics

Following changes in the production of patent statistics at Eurostat in 2007, data shown on the Eurostat webpage are no longer fully comparable with data previously disseminated.

From 2007 onwards Eurostat's production of EPO and USPTO data has been based almost exclusively on the **EPO Worldwide Statistical Patent Database**. The worldwide statistical patent database, also known as "PATSTAT", was developed by the EPO in 2005, using their collection and knowledge of patent data.

EPO data

The new methodology for EPO data used for the calculation of indicators is very similar to the methodology of the OECD. For patent applications to the EPO all direct applications (EPO-direct) are taken into account, but among the PCT applications (applications following the procedure laid down by the *Patent Cooperation Treaty* – PCT) made to the EPO only those that have entered into the regional phase are counted. As PCT patent applications in the international phase designating the EPO will no longer be included in the calculation of patent applications to the EPO, the data shown are lower. Nevertheless, patent data produced by Eurostat and the OECD can still not be exactly the same. Differences may be explained by the fact that the data sources used and the date of extraction of the data could differ.

Reference year (or date)

All patent statistics from Eurostat are shown by priority date, i.e. the first date of filing of the patent application anywhere in the world. This date is the earliest and it is chosen in order to be the closest to the date of the invention as patent procedures always take several years.

Counting patents with multiple inventors from different countries

Eurostat has chosen fractional counting as the counting method. This means that when a patent was invented by several inventors from different countries, the respective contributions of each country are taken into account. This is done in order to eliminate multiple counting of such patents. For example, a patent co-invented by 1 French, 1 American and 2 German residents will be counted as $\frac{1}{4}$ of a patent for France, $\frac{1}{4}$ for the US and $\frac{1}{2}$ a patent for Germany.

For all further details, please see the Eurostat metadata on patent statistics posted on the webpage.

The 2002 OECD ICT sector definition based on NACE Rev. 1.1

ICT Manufacturing

DL30.0	Manufacture of office, accounting and computing machinery
DL31.30	Manufacture of insulated wire and cable
DL32.10	Manufacture of electronic valves and tubes and other electronic components
DL32.20	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy
DL32.30	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and

	associated goods
DL33.20	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment
DL33.30	Manufacture of industrial process control equipment

ICT Services

G51.84	Wholesale of computers, computer peripheral equipment and software
G51.86	Wholesale of electronic and telecommunications parts and equipment
I64.20	Telecommunications
K71.33	Renting of office machinery and equipment including computers
K72	Computer and related activities

The indicators shown for the ICT sector are always the sum of the NACE classes for which data are available. As for several countries and NACE classes data are missing/confidential the data shown should be considered as indications.

Definitions

Number of enterprises

A count of the number of enterprises active during at least a part of the reference period

Number of persons employed

Total number of persons who work in the observation unit (inclusive of working proprietors, partners working regularly in the unit and unpaid family workers), as well as persons who work outside the unit who belong to it and are paid by it (e.g. sales representatives, delivery personnel, repair and maintenance teams).

Value added at factor cost

This is the gross income from operating activities after adjusting for operating subsidies and indirect taxes. Value adjustments (such as depreciation) are not subtracted.

Information technology expenditure

The indicator gives the annual data on expenditure for ICT hardware, equipment, software and other services as a percentage of GDP. A breakdown is given by expenditure for telecommunications (telecommunication equipment and services) and IT expenditure (hardware, software and other services).

Symbols/abbreviations

:	not available
P	provisional
AAGR	Average annual growth rate

Country codes for non-EU countries:

NO	Norway	IL	Israel
CH	Switzerland	JP	Japan
CN	China	US	United States

Data presented in this Statistics in Focus reflect availability in Eurostat's reference database as at 26 November 2007.

Further information:

Data: [EUROSTAT Website/Home page/Science and technology/Data](#)

Science and technology

 **Patent statistics**

 **Patent applications to the EPO by priority year**

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