

Statistics in focus

SCIENCE AND TECHNOLOGY

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Author

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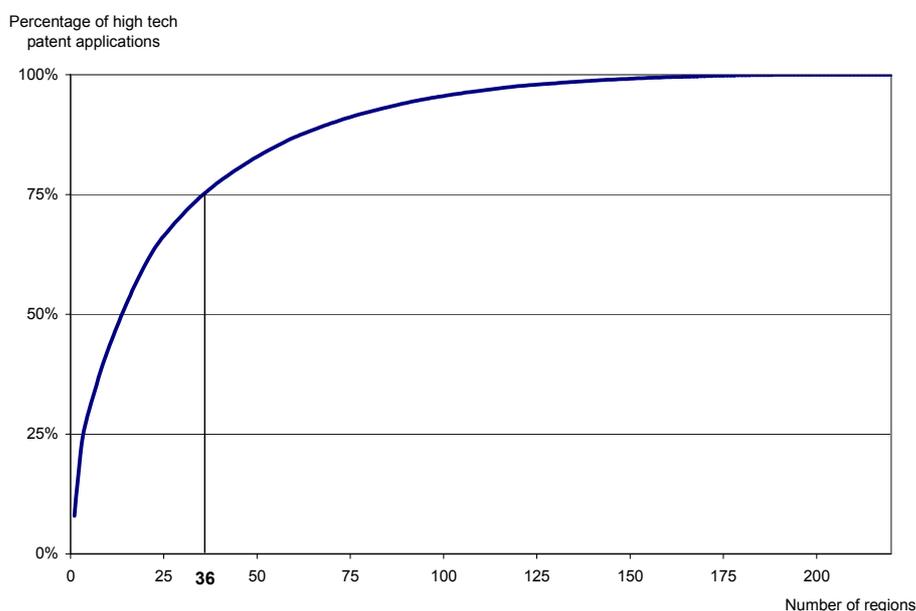


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Patent applications to the European Patent Office at regional level

High tech patenting concentrated in 36 regions

Figure 1: Concentration of high tech patenting in regions
Ratio between percentage of total high tech patent applications at NUTS 2 level
to the EPO in 2002 and number of regions

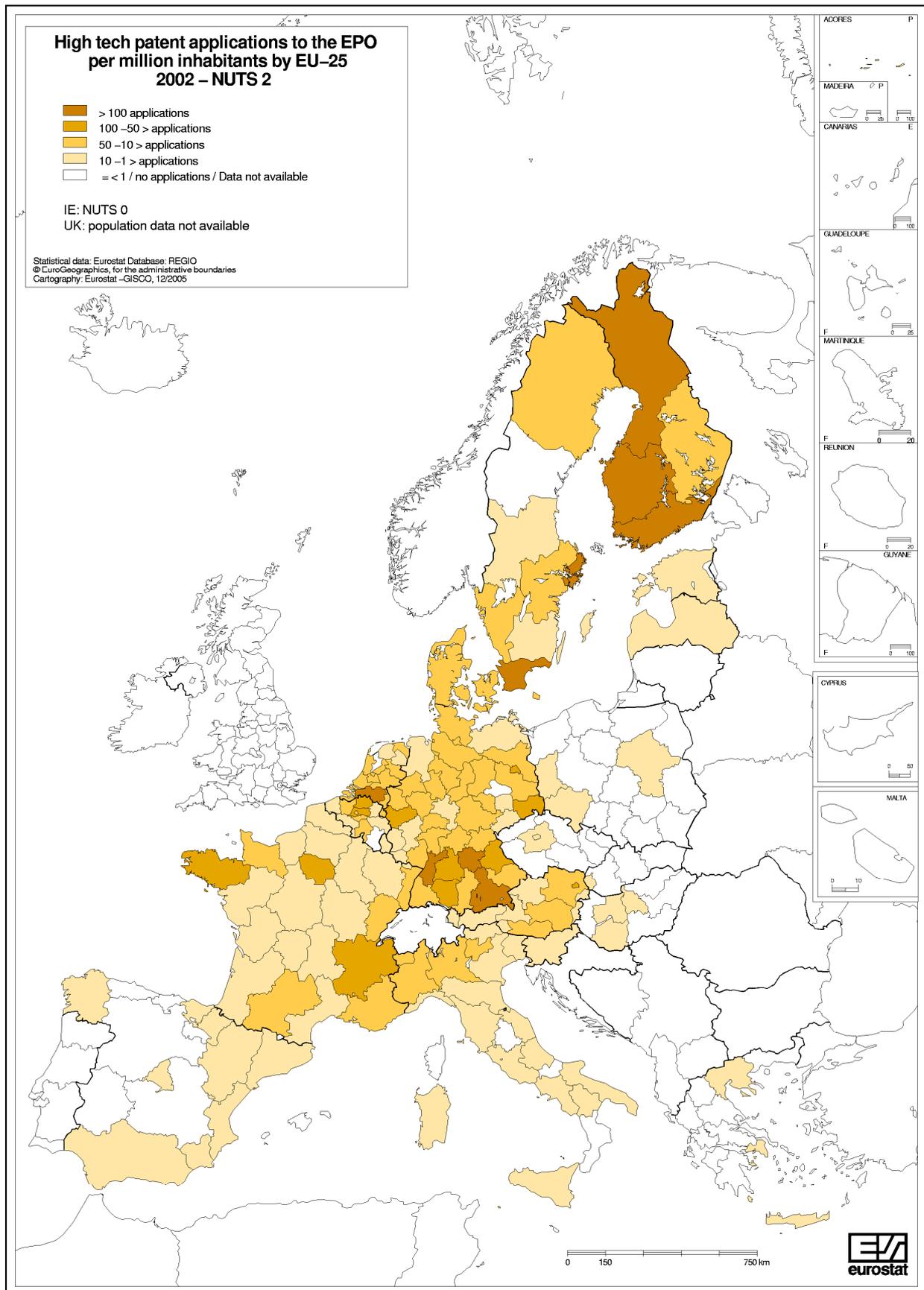


Source: Eurostat, Patent database

Main findings

- High tech patenting is highly concentrated in the EU-25 regions. 27% (2 975) of high tech patent applications are covered by four regions: Oberbayern (DE), Ile de France (FR), Noord-Brabant (NL) and Etelä-Suomi (FI).
- The concentration of high tech patenting is linked to a number of specific regions spread over EU-25 countries. Only in Finland and in Germany are there several regions concerned that are geographically close. In the Netherlands the difference between the most active high tech patenting region and the least active is very high.
- In 2002 Noord-Brabant (NL) was the leader in ICT patenting, especially for consumer electronics.
- In the biotechnology sector, the EU-25 is approaching the level of the US in the total number of patent applications. For the EU-25, biotechnology patenting is very active mainly in Ile de France (FR), Oberbayern (DE) and Denmark.

Map 1: High tech patent applications to the EPO per million inhabitants by EU-25 – NUTS 2 level in 2002



Source: Eurostat, Patent database

High regional concentration of high tech patenting

This publication focuses on three technological areas of high importance in patenting: High technology, Information and Communication Technology (ICT) and Biotechnology.

Figure 1 gives a global overview of the concentration of high tech patenting in EU-25 regions in 2002. Four out of 220 regions cover 27% (2 975) of the high tech patent applications. These regions are Oberbayern (DE), Ile de France (FR), Noord-Brabant (NL) and Etelä-Suomi (FI). Some 50% (5 515) of high tech patent applications are presented by inventors living in 14 regions. These regions are part of eight different Member States: five are German, two French, two British, one Dutch, one Finnish, one Italian, one Swedish and one Danish. This means that half of all high tech patent applications are from inventors from 6% of all regions involved in high tech patenting. Inventors from 35 regions presented 75% of all EU-25 high tech patents. Thus, a large majority of 184 regions were only responsible for the remaining 25% of high tech patent applications.

Map 1 shows the geographical situation of EU-25 regions with comparable high tech patenting activity per million inhabitants. The most dynamic regions in high tech patenting are quite scattered. Looking at the map, the Finnish regions are the most active in high tech patenting per million inhabitants. In Germany the most dynamic high tech patenting regions are in the southern part of the country whereas in France these dynamic regions are not close together at all: Ile de France, Rhône-Alpes and Bretagne.

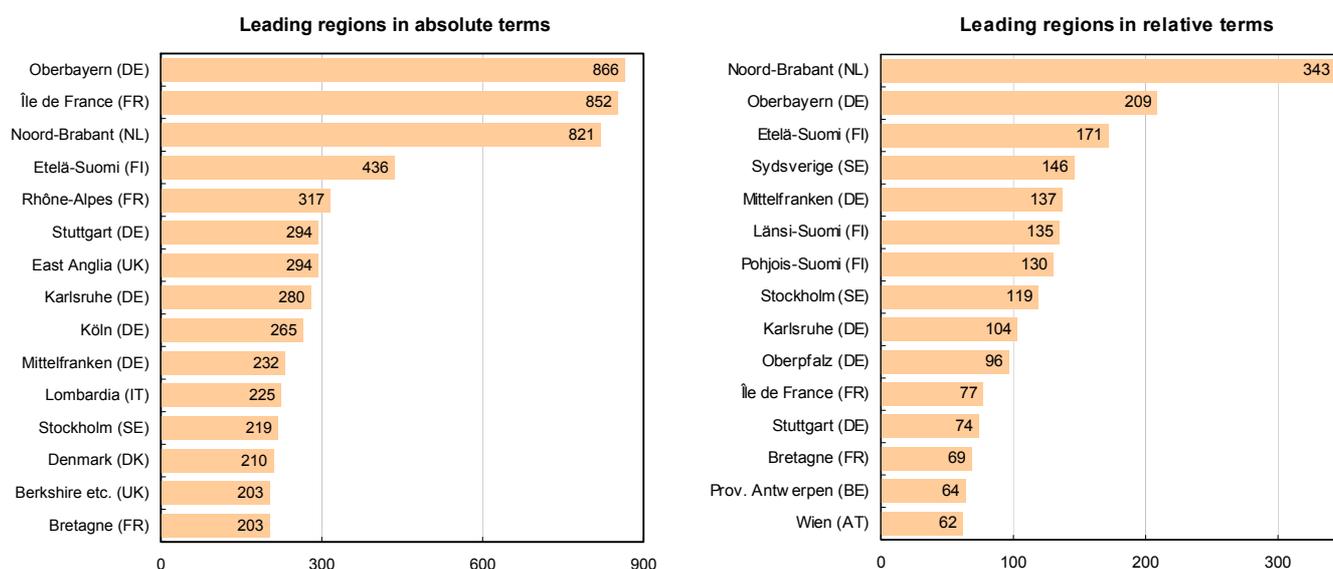
Figure 2 compares the fifteen leading EU regions in high tech patenting in absolute terms (total numbers) to the fifteen leading regions in high tech patenting in relative terms (per million inhabitants).

The top fifteen in absolute terms also illustrate the trend for high tech patenting to be concentrated in very few regions. The first three regions, Oberbayern (DE), Ile de France (FR) and Noord-Brabant (NL), each provided more than 800 patent applicants in 2002; the fourth region Etelä-Suomi (FI) more than 400. From fifth onwards (over 300) the number of patent applications fell steadily down to just over 200 for rank 15 (Bretagne – FR).

The relations are different for the leading regions in relative terms. In 2002 the first region, Noord-Brabant (NL), was well in the lead. The figures per million inhabitants among the following regions then fell steadily from 209 (Oberbayern – DE) to 62 (Wien – AT).

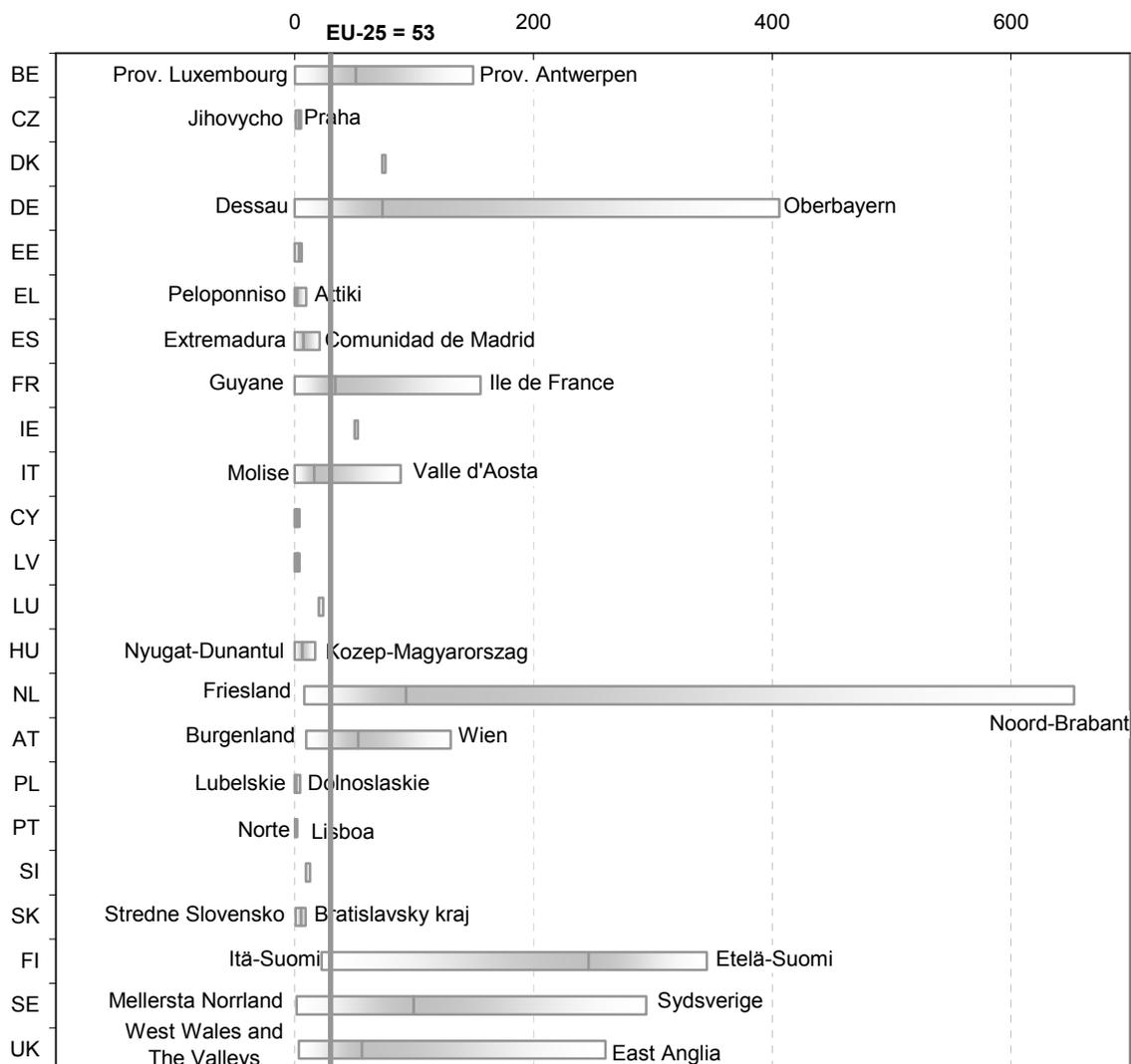
The regions of the two top fifteen listings are quite different. Although there are five German regions in both rankings, they are not exactly the same ones. There are two British regions in the top fifteen in absolute terms. In relative terms, there are no figures available for the United Kingdom per million inhabitants for 2002 because of missing population data. In relative terms, the Scandinavian regions are more represented: Finland had three regions among the first seven and Sweden two of the first eight.

Figure 2: Comparison of 15 leading regions for high tech patent applications in absolute numbers (total number) vs. relative number (per million inhabitants) in 2002



Source: Eurostat, Patent database

Figure 3: High tech patent applications to the EPO in the EU-25 per million labour force, national averages, and regions at NUTS 2 level with the highest and lowest ratios in 2002



Source: Eurostat, Patent database

Figure 3 shows for all Member States the regions with the lowest and the highest level of high tech patent applications per million labour force, together with the national average. For countries which are considered at NUTS 2 level as a region, only the national average is shown.¹

In some countries the spread between the region with the lowest number of high tech patent applications per million labour force and the region with the highest is very large. This is the case for the Netherlands and for Germany, and to a lesser extent for Finland, Sweden and the United Kingdom.

Compared with the EU-25 average, the national average is significantly higher in Finland, Sweden

and the Netherlands and, to a lesser extent, also in Germany. Denmark and Ireland are the only small countries with a national average higher than the EU-25 average. In general, small countries, new Member States and Southern European countries do not match the EU-25 average. In many cases, even the region with the highest ratio is lower than the EU-25 average, e.g. in Spain (Comunidad de Madrid).

The region with the highest level is sometimes the capital of the country. This is namely the case for Czech Republic, Greece, Spain, France, Hungary, Austria, Portugal, Slovakia and Finland.

¹ For Ireland only data at NUTS 0 level are available.

Noord-Brabant led by far in 2002 for ICT patent applications to the EPO

Table 1: Top 15 leading regions for ICT (Information & Communication Technologies) patent applications to the EPO per million labour force and total number, in 2002

	Per million labor force		Total number
Noord-Brabant (NL)	1 122	Noord-Brabant (NL)	1 428
Oberbayern (DE)	537	Ile de France (FR)	1 172
Mittelfranken (DE)	392	Oberbayern (DE)	1 146
Etelä-Suomi (FI)	370	Stuttgart (DE)	644
Sydsverige (SE)	358	Etelä-Suomi (FI)	500
Pohjois-Suomi (FI)	346	Rhône-Alpes (FR)	427
East Anglia (UK)	327	Köln (DE)	408
Stuttgart (DE)	326	Karlsruhe (DE)	397
Länsi-Suomi (FI)	325	East Anglia (UK)	374
Karlsruhe (DE)	302	Mittelfranken (DE)	327
Stockholm (SE)	295	Stockholm (SE)	298
Oberpfalz (DE)	286	Lombardia (IT)	297
Freiburg (DE)	238	Berkshire, Buckinghamshire & Oxfordshire (UK)	283
Berkshire, Buckinghamshire & Oxfordshire (UK)	236	Bretagne (FR)	255
Hampshire and Isle of Wight (UK)	222	Freiburg (DE)	252

Source: Eurostat, Patent database

Table 1 compares the fifteen leading regions in ICT patenting per million labour force and in total absolute number. In 2002 Noord-Brabant (NL) was the leading region in ICT high tech patenting, both per million labour force and in the total number of applications.

Per million labour force, the ratio for the first region is more than twice the second region (Oberbayern – DE). From the third region onwards (Mittelfranken – DE) the figures fall steadily from 392 to 222.

Within the top fifteen regions in total number, the first three (Noord-Brabant – NL, Ile de France – FR and Oberbayern – DE) are relatively close, with well over 1 000.

The technical area of ICT can be split into four sub-groups: Telecommunications, Consumer electronics, Computers and office machinery, and other ICT. Table 2 compares the breakdown per sub-group of the leading regions, Noord-Brabant (NL), Ile de France (FR) and Oberbayern (DE), with the EU-25.

The breakdown per sub-group is very different in each of the selected regions. Whereas for the EU-25, Consumer electronics play the smallest role in ICT patenting, with 11%, it is the biggest sub-group in

Noord-Brabant, with 39%. Computers and office machinery are of similar importance in EU-25 ICT patenting and in Noord-Brabant, whereas Telecommunications and other ICT cover only 15% each in Noord-Brabant; in the EU-25 30% and 31% respectively of ICT patenting concern these sub-groups.

For Ile de France and Oberbayern, patenting concerning Telecommunications is the most important ICT sub-group, with 39% and 37% respectively. At 6%, Consumer electronics plays a minor patenting role in the region of Oberbayern.

Table 2: ICT sub-groups in the three leading ICT patenting regions compared to the EU-25 average, total number and percentage of total, 2002

	Consumer electronics		Computer, office machinery		Telecommunication		Other ICT	
EU-25	1 762	11%	4 479	28%	4 775	30%	4 706	30%
Noord-Brabant (NL)	554	39%	457	32%	208	15%	210	15%
Ile de France (FR)	159	14%	314	27%	452	39%	248	21%
Oberbayern (DE)	67	6%	328	29%	421	37%	330	29%

Source: Eurostat, Patent database

Biotechnology patenting: EU-25 approaches US level in 2002 - two leading regions in Europe

Table 3: Biotechnology patenting compared at international level (1990-2002), total number

	EU-25	Germany	France	United Kingdom	United States	Japan
1990	744	198	117	155	1 181	302
1992	872	211	144	199	1 384	284
1994	1 102	256	191	253	1 788	351
1996	1 366	371	187	307	2 516	488
1998	2 114	558	326	498	3 455	552
1999	2 438	707	344	541	3 781	696
2000	2 725	962	389	479	4 701	841
2001	2 823	1 007	407	523	3 899	898
2002	2 739	1 031	341	484	3 039	1 069

Source: Eurostat, Patent database

Table 3 compares the total absolute numbers in biotechnology patenting for EU-25, Germany, France, the United Kingdom, the United States and Japan in 2002.

Since 1990 the EU-25 has registered fewer biotechnology patent applications than the United States but the numbers have increased steadily each year and in 2002 the difference between them became smaller for the first time. US biotechnology patenting grew until 2000, since when the number of biotechnology patent applications has decreased.

Together with Japan, Germany, which accounted for 38% of all biotechnology patent applications in the EU-25 in 2002, are the only countries shown in Table 3 where biotechnology patenting has increased steadily and continues to grow. Whereas the United States reached a peak in 2000 of 4 701 biotechnology patent applications, France (407) and the EU-25 (2 823) recorded their highest values in 2001 and the United Kingdom (541) in 1999.

Table 4 shows the top 10 leading regions in biotechnology patenting per million inhabitants and in total absolute number. Per million inhabitants, the

Belgian region of Brabant Wallon was in the lead in 2002 whereas in total absolute number Ile de France (FR) ranked first.

The countries of origin in the two ranking lists are different. In both, half of the regions are German. But in the top ten per million inhabitants, two regions are Swedish, one region is Belgian, one Dutch and one is Danish. In the top ten in total number three regions are in the United Kingdom, one in France and one is also in Denmark. It should be noted that no data per million inhabitants are available for the United Kingdom.

Table 4: Top 10 leading regions for biotechnology patent applications to the EPO per million inhabitants and total number in 2002

per million inhabitants		total number	
Prov. Brabant Wallon (BE)	54	Île de France (FR)	145
Oberbayern (DE)	34	Oberbayern (DE)	139
Karlsruhe (DE)	33	Denmark (DK)	139
Berlin (DE)	32	Berlin (DE)	108
Utrecht (NL)	28	Köln (DE)	97
Braunschweig (DE)	28	Berkshire, Buckinghamshire & Oxfordshire (UK)	93
Stockholm (SE)	27	Düsseldorf (DE)	93
Denmark (DK)	26	Karlsruhe (DE)	88
Hamburg (DE)	24	Inner London (UK)	86
Sydsverige (SE)	23	East Anglia (UK)	73

Source: Eurostat, Patent database

The differences in ranking between first and tenth are relatively gradual, thus indicating that there is not a high concentration of biotechnology patenting.

Table 5 shows the leading regions in biotechnology patenting in Member States that have more than 10 biotechnology patent applications and puts them in relation to the total number of biotechnology patent applications at EU-25 level.

The total absolute numbers vary between one and 145 patent applications.

To sum up, the leading regions of each Member State do not even account for 30% of all EU-25 patent applications in biotechnology. This confirms that regional concentration is much lower for biotechnology patenting than, for example, for high tech patenting.

Table 5: Regions with the highest number of patent applications in biotechnology in selected Member States and as a percentage of all EU-25 biotechnology patent applications in 2002

	Total absolute number of region with highest level of patent applications in biotechnology	% of EU-25
BE Prov. Oost-Vlaanderen	24	0.89
DK Denmark	139	5.07
DE Oberbayern	139	5.08
ES Comunidad de Madrid	25	0.91
FR Ile de France	145	5.29
IE Ireland	13	0.47
IT Lombardia	44	1.59
NL Zuid-Holland	49	1.80
AT Wien	28	1.03
FI Etelä-Suomi	21	0.77
SE Stockholm	50	1.84
UK Berkshire, Buckinghamshire & Oxfordshire	93	3.40

Source: Eurostat, Patent database

► ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

1. Patent statistics produced by Eurostat

The production of patent statistics at Eurostat was reorganised in 2005. This means that the data shown in this Statistics in Focus publication and also on the Eurostat webpage are no longer entirely comparable with the data published previously.

In 2005, only one single raw database (mainly compiled on the basis of input from the European Patent Office - EPO, the US Patent & Trademark Office - USPTO and the Japanese Patent Office - JPO) was used for producing an extended set of tables and indicators on the Eurostat webpage. This will also be done in the years to come. Data based on the OECD data source are no longer disseminated by Eurostat.

The data and indicators posted on the webpage are structured as follows:

- Patent applications to the EPO by priority year

- Patents at national level
- Patents at regional level
- Foreign ownership

- Patents granted by the USPTO by priority year

- Patents at national level
- Foreign ownership

- Triadic patent families by earliest priority year

The new data production is described as follows:

Eurostat continues to produce the patent statistics (source: Eurostat/EPO) it started some years ago. However, these statistics are now produced using the priority year of the application, and not the year of filing as previously. The data values are, however, similar. The data on EPO applications with OECD data source are no longer disseminated by Eurostat. These data are in general less extensive than the data released by Eurostat. This is due to the fact that all PCT applications filed to the EPO (= applications made in accordance with the procedure under the Patent Cooperation Treaty) are taken into consideration by Eurostat whereas the OECD datasets do so only in part. Eurostat has implemented the changes described above as only one single data source is now used (as described above) and as the data produced provide a better reflection of the innovation and R & D performance of an economy.

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

Counting patents with multiple inventors

Where a patent has been invented by several inventors from different countries, the respective contributions from 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 1/4 of a patent for France, 1/4 for the USA and 1/2 for Germany.

EPO patent applications by priority year

This collection provides users with data concerning patent applications to the *European Patent Office* — EPO. Data are given at national level and cover the period from 1977 to 2004. Data from 2003 and 2004 are provisional. EPO data refer to all patent applications by priority year.

Triadic patent families by earliest priority year

The patent families available in NewCronos refer to triadic families, i.e. a patent is a member of the patent families if and only if it has been applied for and filed at the *European Patent Office* (EPO), at the *Japanese Patent Office* (JPO) and if it has been granted by the *US Patent & Trademark Office* (USPTO). Patent families, as opposed to patents, are provided with the intention of improving international comparability (the home advantage is nullified; the values of the patents are more uniform).

2. Regionalisation

Data production used concordance tables linking postcodes or city names in the address of the inventor to NUTS 2 regions.

3. Nomenclature of territorial units for statistics - NUTS

The Nomenclature of Territorial Units for Statistics - NUTS - was established to provide a single, uniform breakdown of territorial units for the production of regional statistics for the European Union. NUTS is a five-level hierarchical classification comprising three regional and two local levels. In this way, NUTS subdivides each Member State into a whole number of NUTS 1 regions, each of which is in turn subdivided into a whole number of NUTS 2 regions, and so on.

In the present edition of Statistics in Focus all data are presented at NUTS 2 level on the basis of the NUTS 2003 version. The exceptions have been indicated in the tables or figures. Denmark, Estonia, Cyprus, Latvia, Lithuania, Luxembourg, Slovenia and Iceland are classified at NUTS 2 level, which explains their presence amongst the regions. Iceland and Norway are not included in the NUTS classification but do have similar statistical regions. Iceland is classified at statistical region level 2.

4. High technology groups in accordance with the International Patent Classification (IPC)

AVI	Aviation
CAB	Computer and automated business equipment
CTE	Communication technology
LSR	Lasers
MGE	Micro-organism and genetic engineering
SMC	Semi-conductors.

5. ICT sector groups in accordance with the International Patent Classification (IPC)

Telecommunications
Consumer electronics
Computers, office machinery
Other ICT

6. Biotechnology sector

The OECD defines biotechnology as: “*The application of science and technology to living organisms, as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services.*” The choice of the IPC subclasses used for this sector is based on the OECD definition.

Data presented in this Statistics in Focus reflect availability in Eurostat's reference database as at December 2005.

Further information:

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

-  **Science and technology**
 -  Research and development
 -  Survey on innovation in EU enterprises
 -  High tech industry and knowledge based services
 -  Patent statistics
 -  Patent applications to EPO by priority year
 -  EPO patents at the national level
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European Statistical Data Support:

Eurostat set up with the members of the 'European statistical system' a network of support centres, which will exist in nearly all Member States as well as in some EFTA countries.

Their mission is to provide help and guidance to Internet users of European statistical data.

Contact details for this support network can be found on our Internet site: www.europa.eu.int/comm/eurostat/

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