Contents

Regional employment in high-tech sectors

Île de France in the lead

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*One of the key objectives of the European Union is to keep up **regional
competitiveness and employment**. High-tech sectors could help to achieve
this goal as they are generally considered key drivers for economic growth
and productivity. They are associated with innovation and hence tend to gain
a larger market share, create new product markets and use resources more
efficiently. However, employment in high-tech sectors is not evenly distributed
across regions but is mainly concentrated around a few larger cities,
especially Île de France (FR).*

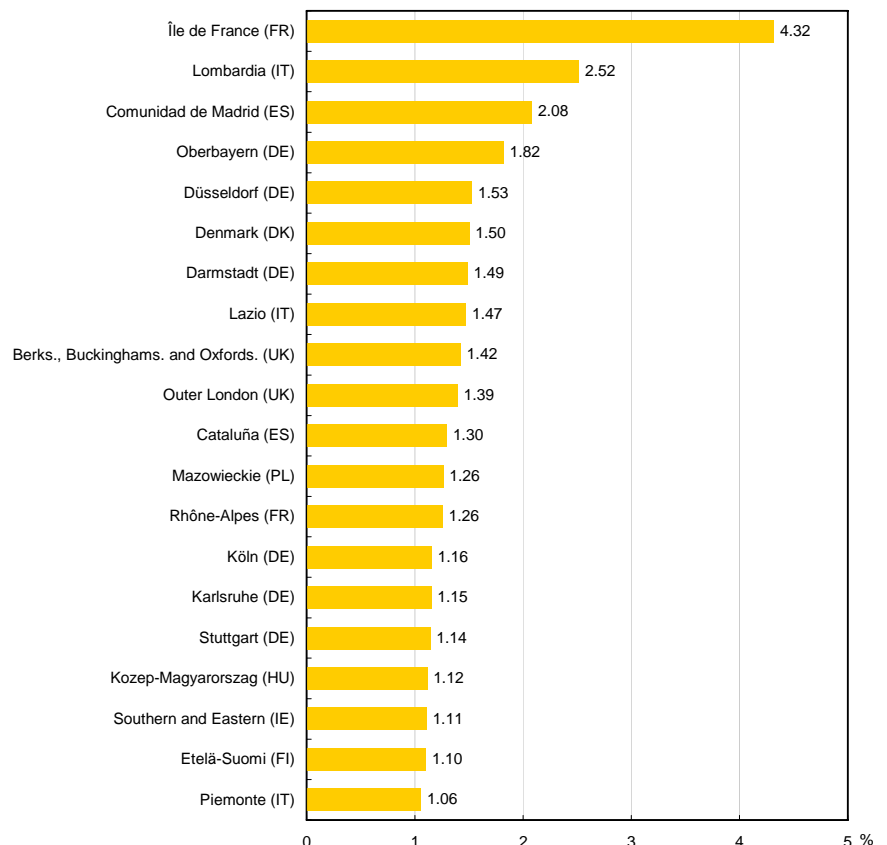## Almost a tenth of EU-27's employment in high-tech sectors is concentrated in three regions

Île de France (FR) alone accounted for more than 4% of employment in high-tech sectors in the EU-27. In that region 400 000 people were employed in such sectors.

Lombardia (IT) and Comunidad de Madrid (ES) followed with 2.52% and 2.06% of EU-27's employment in high-tech sectors (233 000 and 193 000 persons employed) respectively.

No other region of Europe reached 2% of the EU-27 total. However, the top 20 regions together accounted for approximately one third of European employment in high-tech sectors.

Six of these regions were located in Germany, three in Italy, two in Spain, two in France and two in the United Kingdom. Nine of them were capital regions.

**Figure 1: Top 20 regions (NUTS level 2) in terms of absolute employment
in high-tech sectors, expressed as share of total EU-27 employment in
high-tech sectors — 2006**

Source: Eurostat – High-tech statistics

High-tech employment is strong in German regions and keeps growing

Although in absolute terms a large part of the EU-27's employment in high-tech sectors was concentrated in a couple of regions, mainly in Île de France (FR), the ranking in relative terms was different (see Table 2).

The only region in Europe where more than 10% of total employment was in high-tech manufacturing and services was Berkshire, Buckinghamshire and Oxfordshire (UK).

Stockholm (SE) followed with 9.3% of employment in high-tech sectors. Île de France (FR), which led by a long way in absolute terms, ranked third with 8.6%.

Five of the top 20 regions were located in the United Kingdom and five in Germany, while Île de France was the only French region in the top 20.

Capital regions are frequently among the leaders, both in relative terms and also in terms of absolute employment (see Figure 1). In fact seven of the leading regions contain capitals, while the others are mainly urban regions.

With the exception of two German regions — Freiburg (DE) and Oberpfalz (DE) — most jobs in high-tech sectors were in high-tech knowledge-intensive services (KIS). In Stockholm (SE) and Oslo og Akershus (NO) over 90% were in high-tech KIS.

The annual average growth rate of employment in high-tech sectors between 2002 and 2006 varied widely across the leading regions. The highest growth was recorded in Oberpfalz (DE) with an annual rate of 7.7% while employment declined at a rate of 4.3% a year in Bedfordshire and Hertfordshire (UK).

Employment in high-tech sectors expanded in the five leading German regions, but contracted in Île de France (FR), the leading region in absolute terms.

Map 3 provides a more detailed picture of the distribution of employment in high-tech sectors across European regions. As a general rule, employment in high-tech sectors is dispersed across Europe's regions.

However, it is striking that in all Finnish, Irish and Swiss regions at least 4% of employment was in high-tech sectors. Apart from around capitals high-tech was also well developed in southern Germany, south-east United Kingdom and western Hungary.

Table 2: Leading regions (NUTS level 2) in terms of relative employment in high-tech sectors — 2006

Top 20 leading regions	as a % of total employment	in 1000's	Distribution by sub-sector of activity	AAGR (1) 2002-2006
Berkshire, Buckinghamshire and Oxfordshire (UK)	11.4	132		1.7
Stockholm (SE)	9.3	91		-2.7
Île de France (FR)	8.6	400		-3.1
Karlsruhe (DE)	8.3	107		2.4
Kozep-Magyarorszag (HU)	8.3	103		4.0
Freiburg (DE)	8.2	85		1.2
Oberbayern (DE)	7.9	169		0.7
Etelä-Suomi (FI)	7.9	102		-0.1
Darmstadt (DE)	7.7	138		1.3
Oslo og Akershus (NO)	7.7	43		-1.5
Hampshire and Isle of Wight (UK)	7.6	71		-3.4
Surrey, East and West Sussex (UK)	7.4	95		0.7
Oberpfalz (DE)	7.4	37		7.7
Espace Mittelland (CH)	7.4	67		-1.1
Bedfordshire and Hertfordshire (UK)	7.3	59		-4.3
Zürich (CH)	7.3	52		3.0
Prov. Vlaams-Brabant (BE)	7.2	34		3.2
Praha (CZ)	7.1	44		-0.6
Pohjois-Suomi (FI)	7.1	19		0.1
East Anglia (UK)	6.9	75		1.2

0% 20% 40% 60% 80% 100%

■ High-tech manufacturing ■ High-tech KIS

Source: Eurostat – High-tech statistics

(1) Annual average growth rate (AAGR) 2002-2006 of employment in high-tech sectors (expressed in thousands).
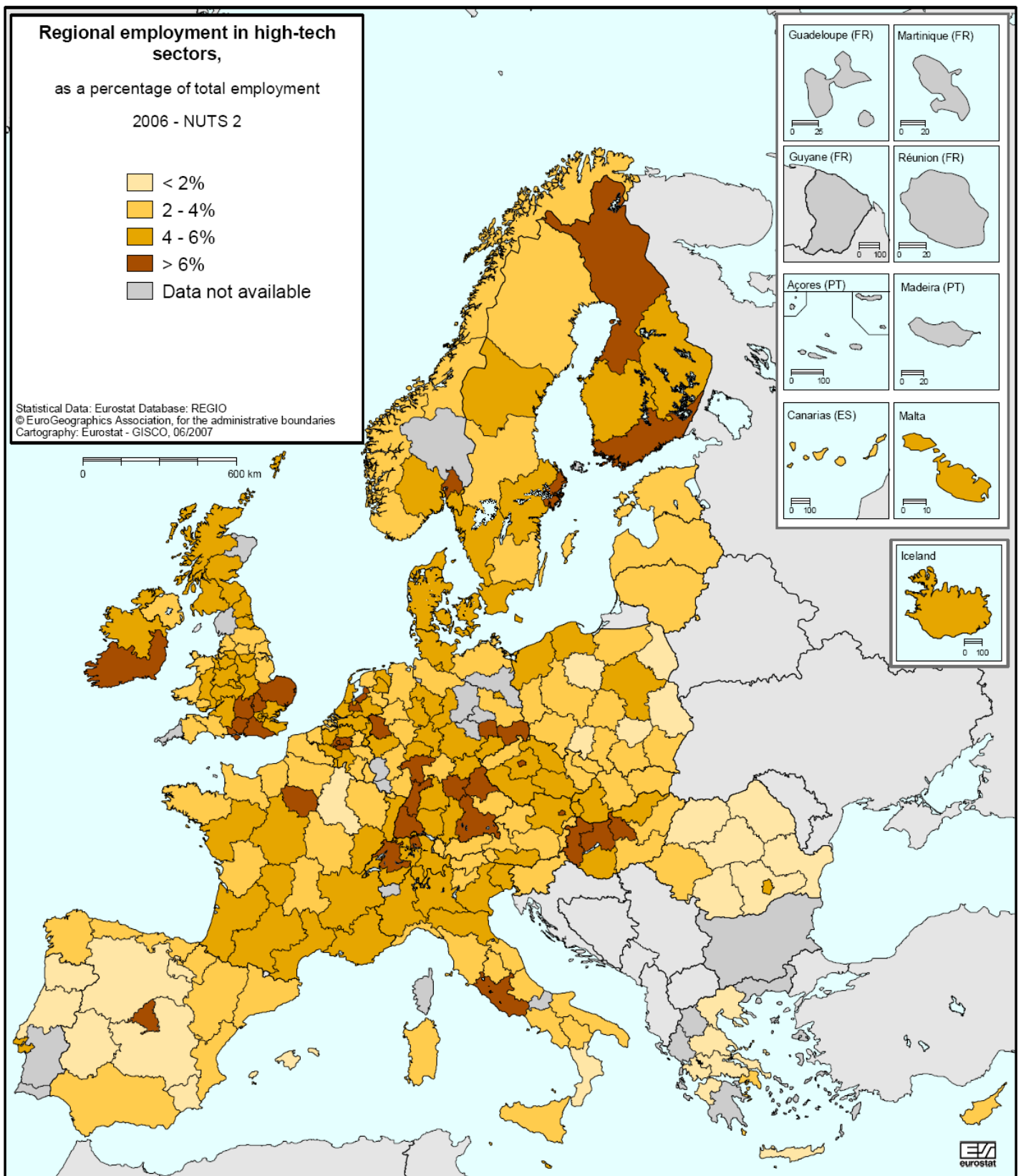Exceptions to the reference year:
 2005: Zürich (CH) and Espace Mittelland (CH).
Exceptions to the reference period:
 2002-2005: Zürich (CH) and Espace Mittelland (CH).

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Map 3: Regional employment (NUTS level 2) in high-tech sectors as a percentage of total employment — 2006

Regional employment in high-tech sectors,

as a percentage of total employment

2006 - NUTS 2

- < 2%
- 2 - 4%
- 4 - 6%
- > 6%
- Data not available

Statistical Data: Eurostat Database: REGIO
© EuroGeographics Association, for the administrative boundaries
Cartography: Eurostat - GISCO, 06/2007

0   600 km

Guadeloupe (FR)   Martinique (FR)
Guyane (FR)   Réunion (FR)
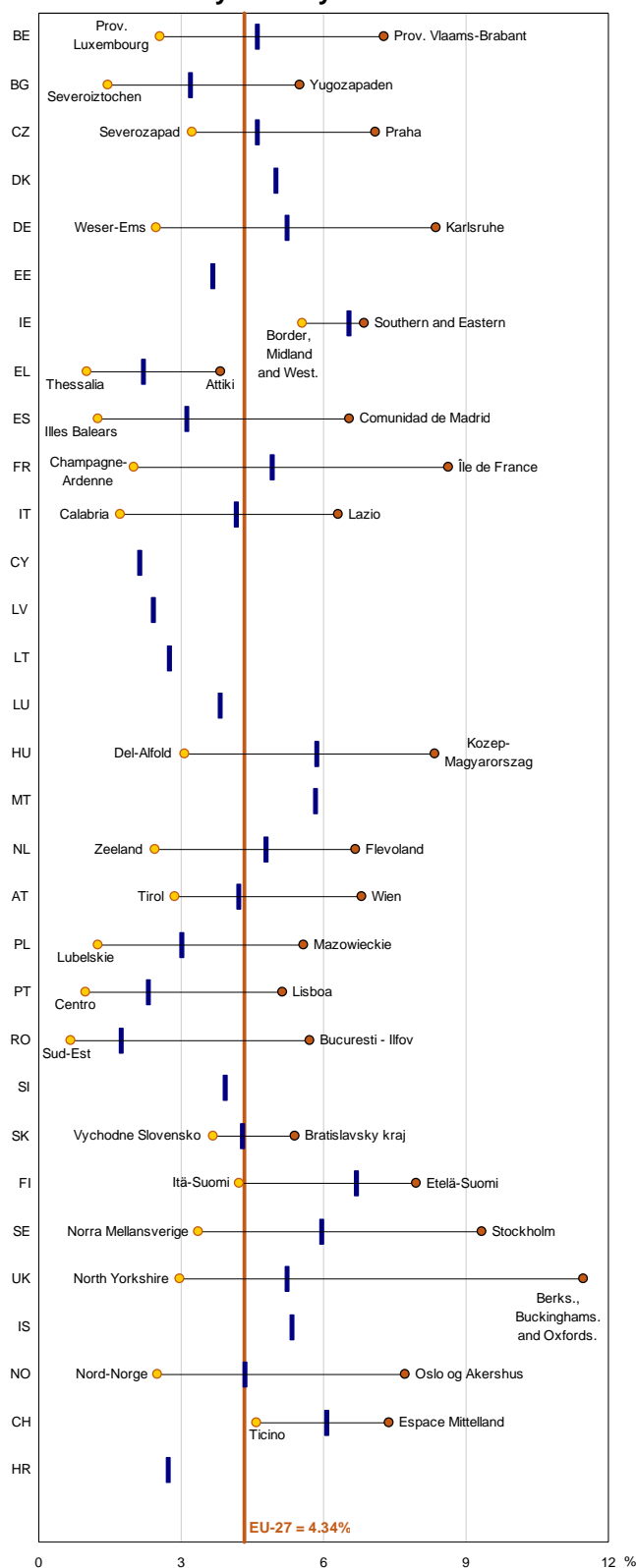Açores (PT)   Madeira (PT)
Canarias (ES)   Malta
Iceland

Source: Eurostat – High-tech statistics

Exceptions to the reference year:
    2005: LU, IS and CH.
Unreliable data: See methodological notes on page 7.

Figure 4: Regional disparities (NUTS level 2) in employment in high-tech sectors, as a percentage of total employment, by country — 2006

Source: Eurostat – High-tech statistics

Data for the lowest region unreliable in:
BE, BG, EL, NL, PL and RO.
Exceptions to the reference year:
2005: LU, IS and CH.

Regional policies – Key objectives

The **regional competitiveness and employment objective** aims at strengthening competitiveness and attractiveness, as well as employment, through a two-fold approach. First, development programmes will help regions to anticipate and promote economic change through innovation and the promotion of the knowledge society, entrepreneurship, the protection of the environment, and the improvement of their accessibility. Second, more and better jobs will be supported by adapting the workforce and by investing in human resources.

For further information see:

http://ec.europa.eu/regional_policy

Source: European Commission, inforegio, 2007

Figure 4 shows the regional disparities in the share of employment accounted for by high-tech sectors in the EU-27. For each country, this figure maps the national average, the region with the lowest percentage and the region with the highest percentage of employment in high-tech sectors.

In 2006 the percentage share of employment taken by high-tech sectors ranged from 0.6% in Sud-Est (RO) to 11.4% in Berkshire, Buckinghamshire and Oxfordshire (UK).

With the exception of Greece, all countries (which are not classified as a region at NUTS level 2) had at least one region with a rate of employment in high-tech sectors above the European average (4.34%).

By contrast, Ireland was the only EU country (which is not classified as a region at NUTS level 2) in which every region reported shares above the European average. This was also the case in Switzerland.

In every country apart from Belgium, the Netherlands, Germany and the UK, the leading region was the capital region.

Taking into account the national averages, the three main European economies — Germany, France and the United Kingdom — had shares of employment in high-tech sectors above the European average. This was also the case, in general, for the northern European countries. Regional disparities in employment in high-tech sectors were generally largest in these countries.

By contrast, the national average was below the European average in a large proportion of the new Member States which joined the EU in 2004 or 2007 and in the majority of southern European countries.

In Ireland, Greece, Slovakia and, to a lesser extent, Switzerland, regional disparities in employment in high-tech sectors were only minor.

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How many people employed in high-tech sectors are professionals or technicians?

Not everyone employed in a high-tech sector counts as human resources in a science and technology occupation (HRSTO) or, in other words, as employed as a professional or technician.

Table 5 displays, by country, the national average and the NUTS level 1 region with the highest share of people employed in high-tech sectors as professionals or technicians.

As a European average, 47.9% of employees in high-tech sectors were professionals or technicians – a total of 4.4 million workers.

This share was over 50% in six Member States and also in Iceland and Norway. The highest share by far was recorded by Sweden with 67.8%, followed by Norway (60.2%). No other Member State registered a share higher than 60%.

At the other end of the scale, Ireland, Greece, Latvia, Lithuania, Hungary and the United Kingdom had shares below 40% for this form of employment.

Looking at the leading regions, Sweden (classified as a region at NUTS level 1) showed the second highest rate after Île de France (FR) with 67.8% compared with 69.0%. This is remarkable in that in the case of Sweden the whole country is being compared with just the leading regions in other countries. Amongst other countries classified as regions at NUTS level 1, Denmark also shows a high share (58.9%), but still comes quite a long way behind the share in Sweden.

Capitals were the leading regions in every country, apart from in Italy where Nord-Ovest showed the highest share. However, this region of Italy (NUTS level 1) includes major cities such as Milan (Lombardia) and Turin (Piemonte).

Table 5: People employed as professionals or technicians (HRSTO) in high-tech sectors, as a share of employment and total number, national average and leading region (NUTS level 1) — 2006

	National average		Leading region		
	As a % of employment in high-tech sectors	Total number in 1000's	Region	As a % of employment in high-tech sectors	Total number in 1000's
EU-27	**47.9**	**4 439 s**	**Île De France**	**69.0**	**276**
BE	43.4	84	Région De Bruxelles-Capitale	50.2	11
BG	45.3	45	:	:	:
CZ	48.4	107	Czech Republic	48.4	107
DK	58.9	82	Denmark	58.9	82
DE	49.5	961	Berlin	62.6	54
EE	46.5 u	11 u	Estonia	46.5 u	11 u
IE	32.0	42	Ireland	32.0	42
EL	35.1	34	Attiki	41.1	26
ES	50.7	311	Comunidad De Madrid	58.1	112
FR	56.3	684	Île De France	69.0	276
IT	53.6	517	Nord-Ovest	59.2	212
CY	40.0	3	Cyprus	40.0	3
LV	38.7	10	Latvia	38.7	10
LT	33.9 u	14 u	Lithuania	33.9 u	14 u
LU	40.6	3	Luxembourg	40.6	3
HU	35.7	82	Kozep-Magyarorszag	50.4	52
MT	45.3	4	Malta	45.3	4
NL	45.9	181	West-Nederland	49.8	97
AT	48.2	79	Ostösterreich	51.1	45
PL	47.8	207	Centralny	58.5	82
PT	42.1	50	:	:	:
RO	45.5	74	Macroregiunea Trei	56.2	41
SI	44.9	17	Slovenia	44.9	17
SK	46.9	46	Slovakia	46.9	46
FI	50.6	83	Manner-Suomi	50.8	83
SE	67.8	179	Sweden	67.8	179
UK	36.1	533	London	45.5	90
IS	58.0	5	Iceland	58.0	5
NO	60.2	61	Norway	60.2	61
CH	43.2	104	Switzerland	43.2	104

Source: Eurostat – High-tech statistics

Exceptions to the reference year:
  2005: LU, IS and CH.
Countries classified as a region at NUTS level 1:
  CZ, DK, EE, IE, CY, LV, LT, LU, MT, SI, SK, SE, IS, NO and CH.

Figure 6 shows the top 25 regions in terms of people employed as professionals or technicians in high-tech sectors (HRSTO) and the corresponding proportion of total employment in these economic activities.

Half or more of the employees in high-tech sectors were in fact professionals or technicians in the 23 leading European regions (NUTS level 1).

As mentioned earlier, Île de France (FR) ranked first followed by Sweden. In two other regions – Berlin (DE) and Sud-Ouest (FR) – more than 60% of employees in high-tech sectors were technicians or professionals.

Norway, Denmark and Iceland, like Sweden, are also classified as a region at NUTS level 1 and were among the leading regions with shares of 60.2%, 58.9% and 58.0% respectively.

Five of the top 25 regions were located in France, three in Germany and three in Spain.
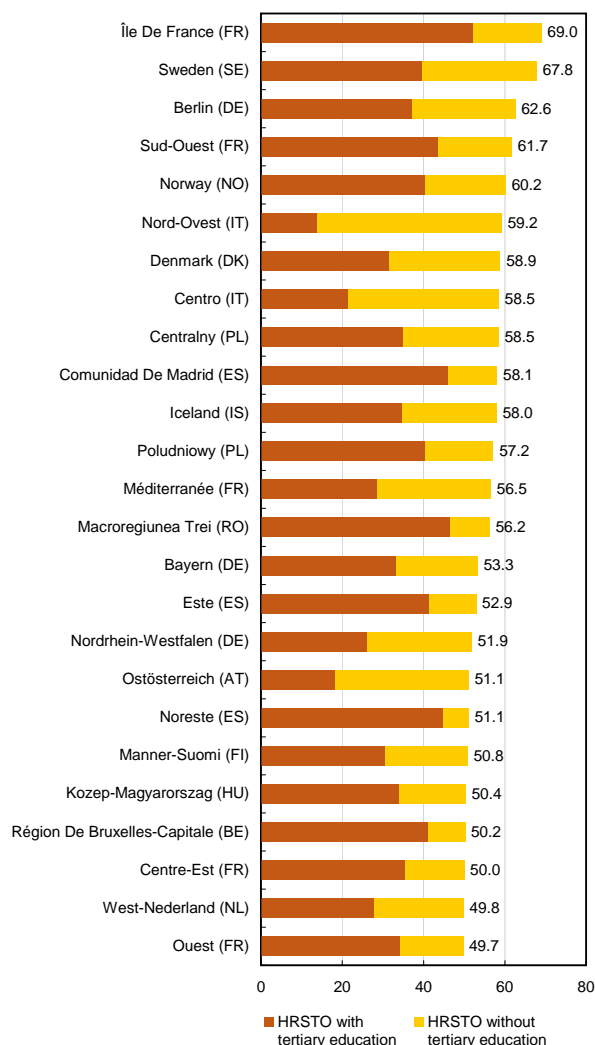
If only the shares of professionals and technicians with tertiary education are taken into account, the top three regions are in fact capital regions: Île de France (FR), Macroregiunea Trei (RO) and Comunidad De Madrid (ES).

Île de France (FR) was the only region in Europe where more than half of the employees in high-tech sectors were professionals or technicians with tertiary education.

Out of the leading regions, conversely Ostösterreich (AT) and the two Italian regions Nord-Ovest and Centro employed a large share of professionals and technicians in high-tech sectors, but only a minority of them had tertiary education.

The share of professionals and technicians with or without tertiary education also indicates the state and permeability of the national labour market.

Figure 6: Top 25 regions (NUTS level 1) in terms of professionals or technicians (HRSTO) as a share of employment in high-tech sectors — 2006

Source: Eurostat – High-tech statistics
Exceptions to the reference year:
  Iceland (IS): 2005.
Countries classified as a region at NUTS level 1:
  CZ, DK, EE, IE, CY, LV, LT, LU, MT, SI, SK, SE, IS, NO and CH.

HRSTO: Facts and trends in Quebec and in Canada

Between 1990 and 2005, the total population of HRSTO, with or without a university degree, increased faster than the employed population (or total employment) irrespective of the territory concerned (Quebec, Canada, Ontario, Alberta, British Columbia, Montreal CMA, Toronto CMA and Vancouver CMA). Nevertheless, the increase was stronger in the west, i.e. in Alberta, in British Columbia and in Vancouver CMA, due to the impressive expansion of the mining and energy sectors during the last couple of years. In all the territories, however, the HRSTO population holding a university degree increased much faster than the HRSTO population without a university degree – this is reflected by the increasing share of university degree-holders among the HRSTO.

Source: Institut de la statistique du Québec (ISQ), Ressources humaines en Science et technologie au Québec, 2007

➤ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

Sources

The database on statistics on high-tech industries and knowledge-intensive services includes data on employment and on human resources in science and technology (HRST) in high-technology (and other) sectors. It is disseminated by Eurostat under "Science and technology".

Data on employment and on HRST in high-tech sectors are extracted and aggregated on the basis of the NACE using data from the Community Labour Force Survey (CLFS).

Data are currently available at national and regional levels. Regional data follow the NUTS nomenclature and are available at NUTS levels 1 and 2.

Definitions

Employment

Employed persons are persons aged 15 and over who, during the reference week, performed work, even for just one hour a week, for pay, profit or family gain or were not at work but had a job or business from which they were temporarily absent, e.g. because of illness, holidays, industrial dispute, education or training.

Human resources in science and technology

The general recommendations on collection of HRST data are laid down in the OECD Canberra Manual, where HRST are defined as persons fulfilling one of the following conditions:

- successfully completed education at tertiary level in an S&T field of study (ISCED '97 version levels 5a, 5b or 6) or;
- not formally qualified as above but employed in an S&T occupation where the above qualifications are normally required (ISCO '88 COM codes 2 or 3).

The data presented in this issue of Statistics in Focus are mainly for HRST occupations (HRSTO), in other words for persons employed in an S&T occupation (professionals and technicians).

NUTS

In this publication regional data are presented in accordance with the Nomenclature of Territorial Units for Statistics (NUTS), at NUTS level 1 and level 2. More information on the NUTS classification can be found on the Internet site:

http://europa.eu.int/comm/eurostat/ramon/nuts/home_regions_en.html

Quality of the data

The guidelines on the quality of the data established by the CLFS are applied to the database on high-tech industries and knowledge-intensive services. Regions for which no publishable quality has been achieved are therefore shown as not available.

Regions for which the data are classified as unreliable but publishable in MAP 3 are:

AT11, AT34, BE34, BG12, BG13, ES23, FR21, FR25, FR26, FR53, FR63, GR14, GR23, GR24, GR43, ITD1, ITF5, NL13, NL34, PL31, PL32, PL33, PL34, PL43, PL52, PL61, PL62 and RO22.

Classification of high-tech sectors

Total high-tech sector

The total high-tech sector equals aggregation of the:

- High-tech manufacturing sector; plus
- High-tech KIS-sector.

High-tech manufacturing sector

The classification of high and medium-high technology manufacturing sectors is based on the Eurostat/OECD classification — itself based on the ratio of R&D expenditure to GDP or R&D intensity. Since the CLFS allows reporting of NACE at only two-digit level, the aggregation is constructed as follows:

High-technology manufacturing	NACE Rev. 1.1 codes: **30** Manufacture of office machinery and computers **32** Manufacture of radio, television and communication equipment and apparatus **33** Manufacture of medical, precision and optical instruments, watches and clocks

High-tech knowledge-intensive services sector

The knowledge intensity reflects the integration with a generic or service-specific science and technology base. It can be seen as a combination of knowledge embedded in new equipment, personnel and R&D intensity.

The aggregation is constructed as follows:

High-technology KIS	NACE Rev. 1.1 codes: **64** Post and telecommunications **72** Computer and related activities **73** Research and development

For further details on the NACE classification, please refer to the Internet site http://ec.europa.eu/eurostat/ramon.

Statistical abbreviations and symbols

AAGR   Annual average growth rate
HRST   Human resources in science and technology
HRSTO Human resources in science and technology occupations
KIS   Knowledge-intensive services
s   Eurostat estimate
u   Unreliable data
:   Not available

Data presented in this issue of Statistics in Focus show the data available in Eurostat's reference database on 25 April 2007.

Further information:

Data: EUROSTAT Website/Home page/Science and technology/Data

📁 **Science and technology**

    📁 Research and development

    📁 Community innovation survey

    📁 High-tech industry and knowledge-intensive services

    📁 Patent statistics

    📁 **Human Resources in Science & Technology**

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