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Science, technology and innovation in Europe

2008 edition

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Eurostat is the Statistical Office of the European Communities. Its mission is to provide the European Union with high-quality statistical information. For that purpose, it gathers and analyses figures from the national statistical offices across Europe and provides comparable and harmonised data for the European Union to use in the definition, implementation and analysis of Community policies. Its statistical products and services are also of great value to Europe's business community, professional organisations, academics, librarians, NGOs, the media and citizens.

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Eurostat has set up with the members of the 'European statistical system' (ESS) a network of user support centres which 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 Eurostat Internet site.

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INHALT

This pocketbook gives an insight into the comprehensive domain of science, technology and innovation statistics. All statistical data and indicators presented are based on a number of data sources available at Eurostat. The most relevant indicators have been chosen to provide the reader with statistical information in order to appreciate the evolution and make-up of science, technology and innovation (STI) in Europe and the position of the EU with regard to its partners.

Responding to developments in policy and in the scientific community, Eurostat has long been collecting STI data. This publication may be viewed as a compendium of data available within Eurostat. However, it is by no means an exhaustive collection; it can be seen as a showcase for the main data sets that currently exist. Although most data in the publication originate from Eurostat, other databases relevant in the STI field have also been exploited. This is the case of the OECD's Main Science and Technology Indicators (MSTI). The particular source of each indicator is specified for each table or graph.

The focus is on the 27 European Union Member States and the candidate countries. However, to allow international comparisons, data for Iceland, Liechtenstein, Norway, Switzerland, China, Japan, the Russian Federation and the United States are also considered when available.

The pocketbook is divided into three main parts and seven chapters. The three main parts are:

- Part 1 — Investing in R&D,
- Part 2 — Monitoring the knowledge workers,
- Part 3 — Productivity and competitiveness.

The first part includes the chapters on government budget appropriations or outlays on R&D (or GBAORD — Chapter 1) and on R&D expenditure (Chapter 2). Part 2 on knowledge workers shows data on R&D personnel (Chapter 3) and human resources in S&T fields (HRST — Chapter 4). Part 3 on productivity and competitiveness includes statistics on innovation (Chapter 5), patents (Chapter 6) and high technology (Chapter 7).

After the three main parts of the pocketbook the reader will find methodological notes (including definitions and abbreviations) for each of the statistical data sources used.

NOTICE TO THE READER:

Tables and figures in this publication refer to the data on Eurostat's NewCronos database at the time of writing (November 2007). However, as NewCronos is regularly updated when new data are received, the extracted data could subsequently differ from those available at the time of publishing.

SCIENCE AND TECHNOLOGY IN EUROPE

STATISTICAL POCKETBOOK

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PART 1

Investing in R&D

Chapter 1 - GBAORD

Government budget appropriations or outlays on R&D (GBAORD) are all appropriations allocated to R&D in central government or federal budgets.

In 2005, GBAORD, expressed as a percentage of GDP, amounted to 1.06%, 0.74% and 0.71% for the United States, the EU-27 and Japan respectively.

Between 1995 and 2000, GBAORD declined slightly in the EU-27 and the United States but increased in Japan. In other words, Japan closed the gap between 1995 and 2000.

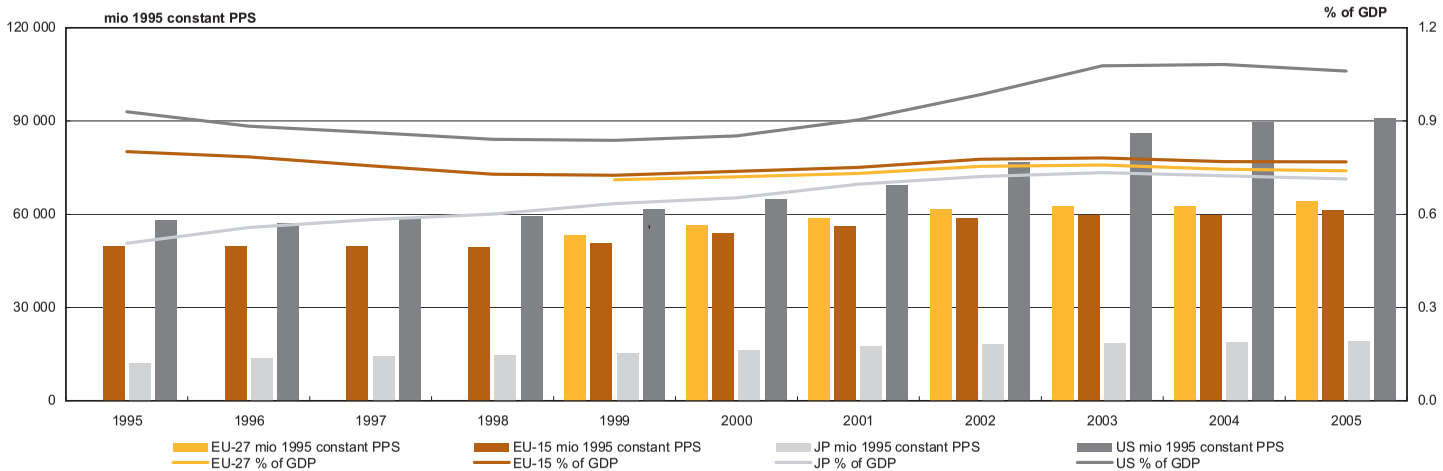
Between 2000 and 2005, Japan and the EU-27 remained fairly stable whereas GBAORD in the United States experienced significant growth. The United States increased its leadership during this period.

Iceland took the lead with 1.42% of GDP devoted to GBAORD in 2005. Only one EU-27 Member State had a GBAORD higher than 1% of its GDP: Finland, with 1.03%.

In 2005, in absolute terms, GBAORD in the EU-27 exceeded EUR 80 billion, whereas it amounted to EUR 106 billion in the United States and was less than EUR 27 billion in Japan. Five Member States accounted for almost 80% of the total EU-27 GBAORD in 2005: Germany, France, the United Kingdom, Italy and Spain.

In 2005, the EU-27 allocated 31.4% of its total GBAORD to “Research financed from general university funds (GUF)”. In Japan, “Research financed from GUF” was also the main socio-economic objective (33.5%) whereas it was “Defence” in the United States, with more than half of total GBAORD (56.6%). By way of comparison, “Defence” within the EU-27 came only as the third main objective and accounted for 13.3% of total GBAORD.

Figure 1.1 Total GBAORD as a percentage of GDP and in million constant 1995 PPS, EU-27, Japan and the United States — 1995 to 2005

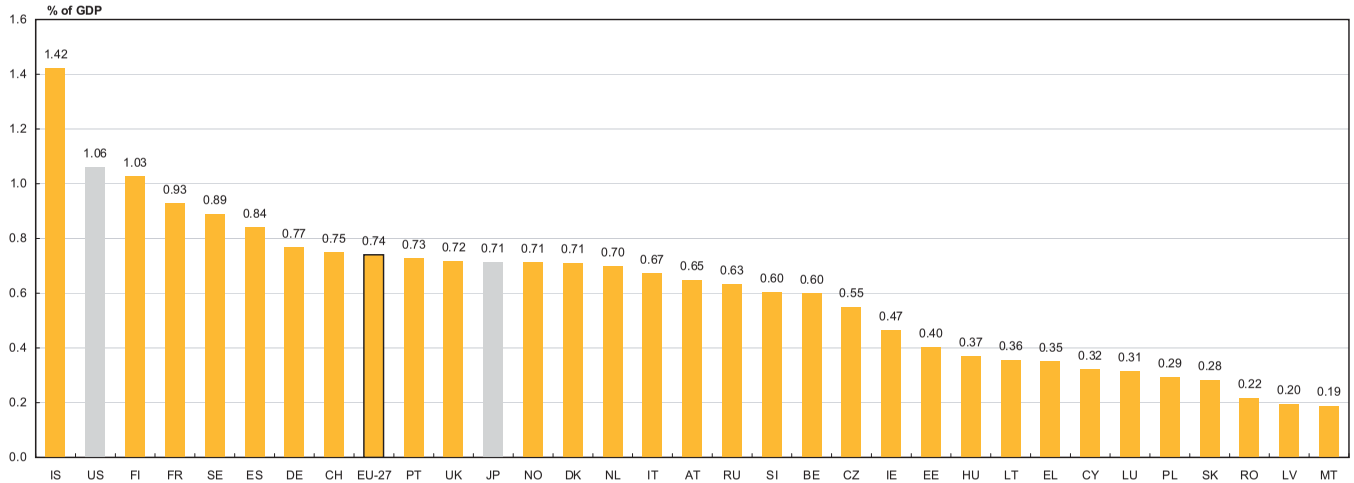


EU-27 and EU-15: Eurostat estimations.
JP 2005: Provisional.
US 2000: Break in series; US 2004: National estimation.

JP and US : Federal or central government only.
US: Excludes data for the R&D content of general payment to the Higher Education sector for combined education and research (public GUF).

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Figure 1.2 Total GBAORD as a percentage of GDP, EU-27 and selected countries — 2005



Exceptions to the reference year:2004: CH and RU.
EU-27: Eurostat estimation.
Provisional data: FR, AT, NL, UK, IS and JP.
National estimation: EE.

US: Excludes data for the R&D content of general payment to the Higher Education sector for combined education and research (public GUF).
AT, JP and US : Federal or central government only.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 1.3 **Total GBAORD in EUR million and by socio-economic objectives as a % of total, EU-27 and selected countries — 2005**

	Exploration and exploitation of the earth	Infrastructure and general planning of land-use	Control and care of the environment	Protection and improvement of human health	Production, distribution and rational utilization of energy	Agricultural production and technology	Industrial production and technology	Social structures and relationships	Exploration and exploitation of space	Research financed from GUF	Non-oriented research	Other civil research	Defence	Total civil GBAORD	Total GBAORD in mio eur
EU-27	1.7 s	1.7 s	2.7 s	7.4 s	2.7 s	3.5 s	11.0 s	3.1 s	4.9 s	31.4 s	15.1 s	1.6 s	13.3 s	86.7	81 328 s
BE	0.6	0.9	2.3	1.9	1.9	1.3	33.4	4.0	8.4	17.8	24.2	2.9	0.3	99.7	1 788
BG	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
CZ	2.3	4.1	2.9	6.8	2.4	5.0	11.9	2.8	0.8	25.4	27.3	5.7	2.5	97.5	552
DK	0.6	0.9	1.7	7.2	1.7	5.6	6.3	6.3	2.0	45.3	20.6	1.2	0.7	99.3	1 482
DE	1.8 i	1.8 i	3.4 i	4.3 i	2.8 i	1.8 i	12.6 i	3.9 i	4.9 i	40.6 i	16.3 i	0.7 i	5.8 i	94.2 i	17 221
EE	0.3 e	8.1 e	5.4 e	4.3 e	2.2 e	13.5 e	5.8 e	6.4 e	0.0 e	:	49.2 e	4.0 e	1.0 e	99.0 e	45 e
IE	2.4	0.0	0.8	5.3	:	8.9	14.2	2.4	1.5	64.3	0.1	:	:	100.0	751
GR	3.4	2.2	3.6	7.0	2.1	5.4	9.0	5.3	1.6	42.2	17.0	0.8	0.5	99.5	635
ES	1.6	5.5	3.0	8.2	2.2	6.3	18.5	2.2	3.5	17.8	11.0	3.7	16.4	83.6	7 634
FR	0.9 p	0.6 p	2.7 p	6.1 p	4.5 p	2.3 p	6.2 p	0.4 p	9.0 p	24.8 p	17.8 p	2.3 p	22.3 p	77.7 p	15 950 p
IT	2.9	1.0	2.7	9.9	4.0	3.4	12.9	5.3	8.0	40.3	5.8	0.1	3.6	96.4	9 577
CY	1.9	1.5	1.1	10.4	0.4	23.5	1.3	8.2	:	28.7	22.9	:	:	100.0	44
LV	0.6	2.3	0.6	4.0	1.7	7.3	5.1	1.7	1.1	:	74.6	:	1.1	98.9	25
LT	2.6	1.8	6.8	12.4	3.4	17.5	6.0	20.1	:	:	:	29.3	0.2	99.8	74
LU	0.5	3.4	3.1	7.8	0.6	1.8	21.0	16.4	:	16.4	25.6	3.4	:	100.0	95
HU	2.9	2.1	9.7	13.1	10.4	16.4	19.6	9.1	2.3	9.1	5.0	0.3	0.1	99.9	329

Footnote i: DE: Unrevised breakdown not adding to the revised total.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 1.3 **Total GBAORD in EUR million and by socio-economic objectives as a % of total, EU-27 and selected countries — 2005**

	Exploration and exploitation of the earth	Infrastructure and general planning of land-use	Control and care of the environment	Protection and improvement of human health	Production, distribution and rational utilization of energy	Agricultural production and technology	Industrial production and technology	Social structures and relationships	Exploration and exploitation of space	Research financed from GUF	Non-oriented research	Other civil research	Defence	Total civil GBAORD	Total GBAORD in mio eur
MT	:	0.0	:	:	0.1	5.6	:	6.9	:	86.9	:	0.6	:	100.0	9
NL	0.3 bp	3.6 bp	1.2 bp	3.8 bp	2.2 bp	6.1 bp	11.5 bp	2.1 bp	2.5 bp	49.0 bp	10.8 bp	4.6 bp	2.2 bp	97.8 bp	3 557 bp
AT	2.1 pi	2.2 pi	1.9 pi	4.4 pi	0.8 pi	2.5 pi	12.8 pi	3.4 pi	0.9 pi	55.0 pi	13.1 pi	0.9 pi	0.0 pi	100.0 pi	1 593 pi
PL	1.8	1.2	2.4	1.9	0.9	1.3	5.9	0.9	0.0	5.3	76.9	0.2	1.3	98.7	719
PT	1.6	4.5	3.5	7.6	0.9	9.9	15.1	3.4	0.2	38.8	10.4	3.4	0.6	99.4	1 082
RO	1.2	3.4	2.1	4.4	0.9	4.3	10.7	0.3	2.4	:	40.9	27.8	1.7	98.3	174
SI	0.4	0.8	3.1	2.0	0.5	3.2	22.6	2.7	:	:	59.7	0.2	4.9	95.1	167
SK	:	0.6	1.0	3.3	1.6	11.5	5.0	3.6	:	25.6	35.9	3.5	8.3	91.7	108
FI	1.0	2.0	1.8	5.9	4.8	5.9	26.1	6.1	1.8	26.1	15.2	:	3.3	96.7	1 614
SE	0.7	3.8	2.2	1.0	2.3	2.2	5.4	5.0	1.2	46.1	12.7	:	17.4	82.6	2 561
UK	2.3 p	1.1 p	1.8 p	14.7 p	0.4 p	3.3 p	1.7 p	3.5 p	2.0 p	21.7 p	16.0 p	0.5 p	31.0 p	69.0 p	12 950 p
IS	:	8.4 p	0.4 p	7.3 p	2.2 p	21.3 p	2.3 p	8.9 p	:	33.1 p	16.1 p	:	:	100.0 p	186 p
NO	1.9	1.9	2.0	11.0 11	2.9	8.5	8.2	6.3	2.1	36.2	12.6	:	6.4	93.6	1 727
CH	0.3 i	0.6 i	0.1 i	1.8 i	1.0 i	2.8 i	3.4 i	1.9 i	4.0 i	58.9 i	9.8 i	14.9 i	0.4 i	99.6 i	2 189 i
JP	1.8 i	4.2 i	0.9 i	3.9 i	17.1 i	3.3 i	7.1 i	0.7 i	6.7 i	33.5 i	15.6 i	:	5.1 i	94.9 i	26 840 i
RU	1.5	1.4	1.6	2.0	2.0	9.9	11.2	2.0	10.1	:	14.0	0.9	43.5	56.5	2 186
US	0.7 pi	1.5 pi	0.4 pi	22.8 pi	1.1 pi	1.9 pi	0.4 pi	1.1 pi	7.9 pi	:	5.6 pi	:	56.6 pi	43.4 pi	106 025 pi

Footnote i:
AT, CH and US: Federal or central government only.
US (total): Excludes data for the R&D content of general payment to the Higher Education sector for combined education and research (public GUF).

Exceptions to the reference year: 2004: CH and JP; 2001: RU by NABS.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Chapter 2 - R&D Expenditure

The EU goals in Research and Development, as set by the Lisbon strategy, are to achieve by 2010 an R&D intensity (R&D expenditure as a percentage of GDP) of at least 3% for the EU, and to have two thirds of R&D expenditure financed by the business enterprise sector.

In 2005, R&D intensity in the EU-27 stood at 1.84%, compared to 1.87% in 2003. R&D intensity remained significantly lower in the EU-27 than in other major economies.

R&D expenditure was 2.62% of GDP in the United States, 3.33% in Japan, and only 1.34% in China. R&D intensity increased significantly since 2003 in China and to a lesser extent in Japan but declined slightly in the EU-27 and in the United States.

In 2005, only two Member States exceeded the EU goal of achieving an R&D intensity of 3% of GDP: Sweden (3.86%) and Finland (3.48%).

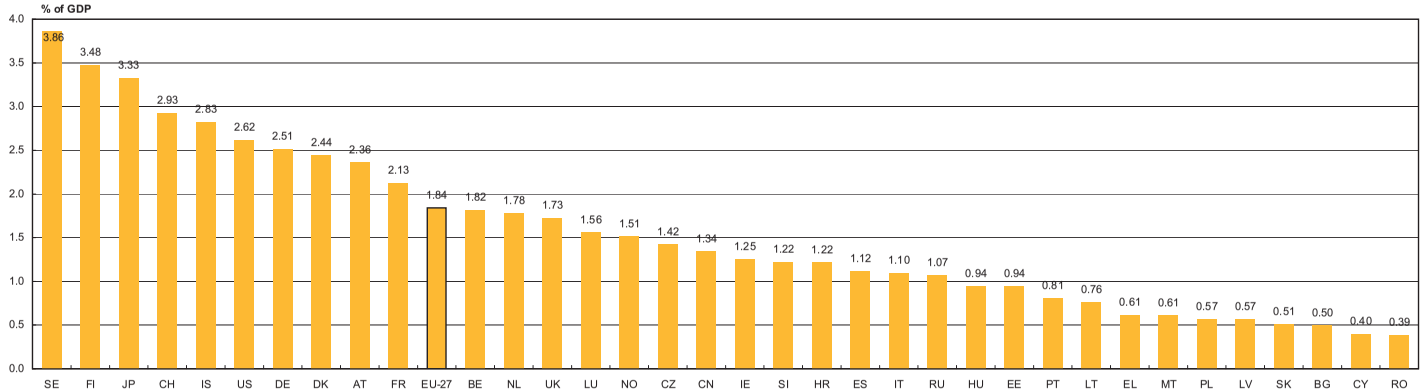
In 2005, EUR 201 billion was devoted to R&D in the EU-27. By way of comparison, R&D expenditure was about EUR 120 billion in Japan (2003) whereas it reached EUR 251 billion in the United States (2004).

In 2004, 55% of EU-27 R&D expenditure was financed by the business enterprise sector (BES). At national level, three EU-27 Member States fulfilled and even surpassed the second EU goal of having two thirds of R&D expenditure financed by the BES: Luxembourg (80%), Finland (69%) and Germany (67%).

In the EU-27 as a whole and in most of the Member States, the greatest share of business R&D expenditure was spent in the manufacturing sector, followed by services. In general, the highest proportion of business R&D expenditure was spent in the largest enterprises (more than 500 employees).

In absolute terms, the leading EU-27 region in terms of R&D expenditure was, by far, Île de France (FR), with 7.7% of EU-27 total R&D expenditure. However, the leading regions in terms of R&D intensity were mainly located in Germany and in Sweden. In 2003 Braunschweig (DE) came first, with an R&D intensity amounting to 8.70%, followed by Västsverige (SE), with 6.03%. R&D intensity in all other EU-27 regions was below 5%.

Figure 2.1 R&D intensity (R&D expenditure as % of GDP), EU-27 and selected countries — 2005

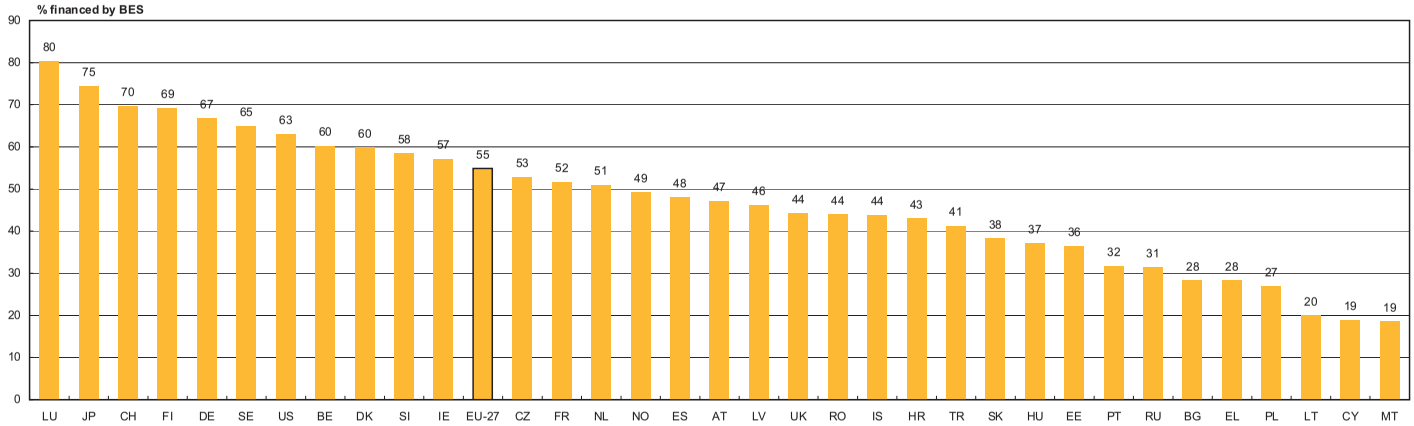


Footnote i:
DE: Includes other classes.
HU: Defence excluded (all or mostly).
SI: Underestimated or based on underestimated data.
US: Federal or central government only; Excludes most or all capital expenditure.

National estimation: DE.
Provisional data: BE, DK, EE, IE, EL, ES, FR, CY, LU, MT, NL, AT, PT, NO and US.
Exceptions to the reference year: 2004: IT, NL, RO, UK, IS, CH and HR.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Figure 2.2 **Percentage of R&D expenditure financed by the business enterprise sector, EU-27 and selected countries — 2004**



EU-27: Eurostat estimation.
IE and US: Provisional data.
HU: Defence excluded.

US: Excludes most or all capital expenditure.
Exceptions to the reference year :2003: BE, DK, EL, LU, NL, PT, SE, IS, NO, JP and US; 2002: MT and TR.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 2.3 R&D expenditure in EUR million and annual average growth rate (AAGR), by sector of performance, EU-27 and selected countries — 2000-2005

	All sectors			Business enterprise sector			Government sector			Higher education sector		
	2000	2005	AAGR 2000-2005	2000	2005	AAGR 2000-2005	2000	2005	AAGR 2000-2005	2000	2005	AAGR 2000-2005
EU-27	170 632 s	201 020 s	3.33	110 472 s	128 091 s	3.00	23 519 s	26 447 s	2.37	35 285 s	44 357 s	4.68
BE	4 964	5 428 p	1.80	3 589	3 705 p	0.64	312	416 p	5.90	1 005	1 237 p	4.24
BG	71	106	8.33	15	23	8.49	49	71	7.75	7	11	9.69
CZ	744	1 417	13.75	446	914	15.41	188	265	7.05	106	232	17.01
DK	3 892	5 097 p	5.54	2 596	3 481 p	6.04	492	367 p	-5.67	770	1 215 p	9.56
DE	50 619	56 356 e	2.17	35 600	39 406 e	2.05	6 873	7 650 e	2.17	8 146	9 300 e	2.68
EE	37	104 p	22.96	8	47 p	41.32	9	12	6.51	19	43	17.30
IE	1 284 e	2 020 p	9.48	900	1 320 p	7.96	104	135 p	5.37	280 e	565 p	15.05
EL	852	1 112 p	6.90	278	326 p	4.04	188	228 p	4.98	383	548 p	9.41
ES	5 719	10 100 p	12.05	3 069	5 491 p	12.34	905	1 707 p	13.53	1 694	2 888 p	11.26
FR	30 954 b	36 396 p	3.29	19 348	22 543 p	3.10	5 361 b	6 305 p	3.30	5 804 b	7 100 p	4.11
IT	12 460	15 253	5.19	6 239	7 293	3.98	2 356	2 722	3.67	3 865	5 005	6.67
CY	25	54 p	17.30	5	12 p	18.68	11	18 p	9.15	6	20 p	27.46
LV	38	73	14.13	15	30	14.40	8	14	10.37	14	29	15.86
LT	73	157	16.53	16	32	15.30	31	39	5.06	27	86	26.29
LU	364	458 p	4.71	337	395 p	3.23	26	56 p	16.59	1	7 p	50.72
HU	405 i	838 i	15.63	180	362	15.02	106 i	235 i	17.27	97	211	16.69
MT	12	27 p	32.30	3	19 p	85.86	2	1	-26.37	7	8	4.01

Exceptions to the reference year 2000: 2001: EL; 2002: MT.
Exception to the reference year 2005: 2004: IT.
Exceptions to the reference period 2000-2005: 2000-2004: IT; 2001-2005: EL; 2002-2005: MT.

Footnote i:
DE: Includes other classes.
HU: Defence excluded (all or mostly).

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 2.3

R&D expenditure in EUR million and annual average growth rate (AAGR), by sector of performance, EU-27 and selected countries — 2000-2005

	All sectors			Business enterprise sector			Government sector			Higher education sector		
	2000	2005	AAGR 2000-2005	2000	2005	AAGR 2000-2005	2000	2005	AAGR 2000-2005	2000	2005	AAGR 2000-2005
NL	7 626	8 723 p	3.42	4 458	5 039	3.11	974 b	1 252	6.48	2 120 b	2 430 p	3.47
AT	4 029 e	5 784 p	7.50	2 638	3 919 p	8.23	242	297 p	4.21	1 135	1 544 p	6.36
PL	1 197	1 386	2.98	432	440	0.38	386	504	5.48	377	438	3.01
PT	927 e	1 189 p	5.11	258 e	430 p	10.82	222 e	162 p	-6.08	348 e	465 p	6.01
RO	149	235	12.15	103	130	5.96	28	80	30.17	17	24	7.95
SI	297	338 i	2.62	167	241 p	7.56	77	64 i	-3.53	49	32 i	-8.30
SK	143	194	6.35	94	97	0.61	35	58	10.33	14	40	23.90
FI	4 423	5 474	4.36	3 136	3 877	4.33	468	523	2.25	789	1 042	5.71
SE	10 511 i	11 109	1.39	8 118 i	8 410	0.89	297 i	343	3.63	2 085	2 314	2.64
UK	29 070	29 956	0.75	18 884	18 883	0.00	3 672	3 078	-4.32	5 985	7 012	4.04
IS	251 e	297	4.23	142 e	167	4.26	64 e	63	-0.66	41 e	60	10.01
NO	3 037	3 599 p	4.33	1 814	1 944 p	1.75	444	577 p	6.79	780	1 078 p	8.43
CH	6 852	8 486	5.49	5 065	6 257	5.43	90 bi	91 i	0.23	1 566	1 943	5.54
HR	271	345	12.90	115	144	11.54	60	72	9.52	95	129	16.60
CN	1 389	:	:	465	:	:	86	:	:	839	:	:
JP	153 860	119 748	-8.02	109 181	89 783	-6.31	15 217	11 149	-9.85	22 354	16 358	-9.89
RU	2 948	5 473	16.73	2 087	3 780	16.02	721	1 383	17.71	134	299	22.16
US	289 917 i	251 254 pi	-3.51	216 552 i	176 241 pi	-5.02	29 926 i	30 652 pi	0.60	33 221 i	34 111 pi	0.66

Exceptions to the reference year 2000: 2001: SE and NO; 2002: HR.
Exceptions to the reference year 2005:2004: NL, RO, UK, IS, CH, HR, RU, US; 2003: JP.
Exceptions to the reference period 2000-2005: 2000-2003: JP; 2000-2004: NL, RO, UK, IS, CH, RU, US; 2001-2005: SE and NO; 2002-2004: HR.

Footnote i:
SK: Defence excluded (all or mostly).
SI and SE: Underestimated or based on underestimated data.
SE, CH and US: Federal or central government only.
US: Excludes most or all capital expenditure.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 2.4 R&D expenditure as a percentage of GDP, by sector of performance, EU-27 and selected countries — 2003 to 2005

	All sectors			Business enterprise sector			Government sector			Higher education sector		
	2003	2004	2005	2003	2004	2005	2003	2004	2005	2003	2004	2005
EU-27	1.87 s	1.84 s	1.84 s	1.19 s	1.17 s	1.17 s	0.25 s	0.24 s	0.24 s	0.41 s	0.40 s	0.41 s
BE	1.89	1.85 p	1.82 p	1.31	1.28 p	1.24 p	0.13	0.13 p	0.14 p	0.42	0.41 p	0.41 p
BG	0.50	0.51	0.50	0.10	0.12	0.11	0.35	0.34	0.33	0.05	0.05	0.05
CZ	1.25	1.26	1.42	0.76	0.80	0.92	0.29	0.27	0.27	0.19	0.19	0.23
DK	2.56	2.48 p	2.44 p	1.77	1.69	1.67 p	0.18	0.17	0.18 p	0.59	0.61	0.58 p
DE	2.52	2.50	2.51 e	1.76	1.75	1.76 e	0.34 i	0.34 i	0.34 ei	0.43	0.41	0.42 e
EE	0.79	0.88	0.94 p	0.27	0.34	0.42 p	0.12	0.12	0.11	0.37	0.40	0.39
IE	1.16 e	1.21 p	1.25 p	0.77	0.78 p	0.82 p	0.09	0.09	0.08 p	0.29 e	0.33	0.35 p
EL	0.63	0.61 p	0.61 p	0.20	0.19 p	0.18 p	0.13	0.12 p	0.13 p	0.29	0.29 p	0.30 p
ES	1.05	1.06	1.12 p	0.57	0.58	0.61 p	0.16	0.17	0.19 p	0.32	0.31	0.32 p
FR	2.17	2.14	2.13 p	1.36	1.34	1.32 p	0.36	0.37	0.37 p	0.42	0.41	0.42 p
IT	1.11	1.10	:	0.52	0.53	0.55 p	0.19	0.20	0.17 p	0.37	0.36	:
CY	0.35	0.37	0.40 p	0.07	0.08	0.09 p	0.13	0.13	0.13 p	0.11	0.13	0.15 p
LV	0.38	0.42	0.57	0.13	0.19	0.23	0.09	0.08	0.11	0.16	0.15	0.23
LT	0.67	0.76	0.76	0.14	0.16	0.16	0.18	0.19	0.19	0.35	0.41	0.42
LU	1.66	1.66	1.56 p	1.48	1.46	1.34 p	0.18	0.18	0.19 p	0.01 e	0.02	0.02 p
HU	0.93 i	0.88 i	0.94 i	0.34	0.36	0.41	0.29 i	0.26 i	0.26 i	0.25	0.22	0.24
MT	0.26	0.63 b	0.61 p	0.08	0.45 b	0.42 p	0.02	0.01	0.02	0.16	0.17	0.17

Footnote i:
DE: Includes other classes.
HU: Defence excluded (all or mostly).

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 2.4 R&D expenditure as a percentage of GDP, by sector of performance, EU-27 and selected countries — 2003 to 2005

	All sectors			Business enterprise sector			Government sector			Higher education sector		
	2003	2004	2005	2003	2004	2005	2003	2004	2005	2003	2004	2005
NL	1.76	1.78 p	:	1.01	1.03	1.02 p	0.25 b	0.26	0.24 p	0.49	0.50 p	:
AT	2.21 e	2.23	2.36 p	:	1.51	1.60 p	:	0.11	0.12 p	:	0.59	0.63 p
PL	0.54	0.56	0.57	0.15	0.16	0.18	0.22	0.22	0.21	0.17	0.18	0.18
PT	0.74	0.77 p	0.81 p	0.25	0.27 p	0.29 p	0.13	0.12 p	0.11 p	0.28	0.30 p	0.32 p
RO	0.39	0.39	:	0.22	0.21	:	0.12	0.13	:	0.04	0.04	:
SI	1.32	1.45	1.22 i	0.84	0.97	0.87 p	0.29	0.29	0.23 i	0.18	0.19	0.12 i
SK	0.58	0.51	0.51	0.32	0.25	0.25	0.18 i	0.16 i	0.15	0.08	0.10	0.10
FI	3.43	3.46	3.48	2.42	2.42	2.46	0.33	0.33	0.33	0.66	0.68	0.66
SE	3.95 i	:	3.86	2.93 i	:	2.92	0.14 i	:	0.12	0.87	:	0.80
UK	1.79	1.73	:	1.14	1.09	:	0.18	0.18	:	0.40	0.40	:
IS	2.86	2.83	:	1.48	1.59	:	0.71	0.60	:	0.61	0.57	:
NO	1.73	1.62	1.51 p	0.99	0.89	0.82 p	0.26	0.25	0.24 p	0.48	0.48	0.45 p
CH	:	2.93	:	:	2.16	:	:	0.03 i	:	:	0.67	:
HR	1.11	1.22	:	0.44	0.51	:	0.24	0.25	:	0.43	0.45	:
CN	1.13	1.23	1.34	0.71	0.82	0.91	0.31	0.28	0.29	0.12	0.13	0.13
JP	3.20	3.17	3.33	2.40	2.38	2.54	0.30	0.30	0.28	0.44	0.43	0.45
RU	1.28	1.16	1.07	0.88	0.80	0.73	0.32	0.29	0.28	0.08	0.06	0.06
US	2.66 i	2.58 i	2.62 pi	1.84 i	1.79 i	1.82 pi	0.33 i	0.32 i	0.31 pi	0.37 i	0.37 i	0.37 pi

Footnote i:
SK: Defence excluded (all or mostly).
SI and SE: Underestimated or based on underestimated data.
SE, CH and US: Federal or central government only.
US: Excludes most or all capital expenditure.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 2.5 Business enterprise R&D expenditure in EUR million, by sector of activity (NACE Rev 1.1), EU-27 and selected countries — 2004

	Total	Agriculture, hunting, forestry and fishing	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Services
EU-27	123 582 s	837 s	478 s	101 132 s	797 s	416 s	19 922 s
BE	3 714 p	50 e	7 e	2 937 e	26 e	59 e	668 e
BG	24	:	:	11	0	0	13
CZ	701	3	1	429	0	9	259
DK	3 332	:	:	:	:	:	:
DE	38 611	76	24	35 176	83	30	3 222
EE	32	0	:	13	0	:	18
IE	1 150 p	5 p	0 p	700 p	0 p	0 p	445 p
EL	313	2	4	200	0	1	107
ES	4 865	55	7	2 748	33	70	1 952
FR	21 646	311	152	18 463	393	86	2 025
IT	7 057	0	52	5 195	28	12	1 769
CY	10	0	0	3	0	0	6
LV	21	0	:	9	0	0	11
LT	29	:	1	23	0	:	6
LU	379	:	:	179	0	:	200
HU	297	4	0	239	2	1	52

EU-27: Distribution by sector of activity is estimated on the basis of available Member States.
Exceptions to the reference year: 2003: EL, FR and LU.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 2.5 **Business enterprise R&D expenditure in EUR million, by sector of activity (NACE Rev 1.1), EU-27 and selected countries — 2004**

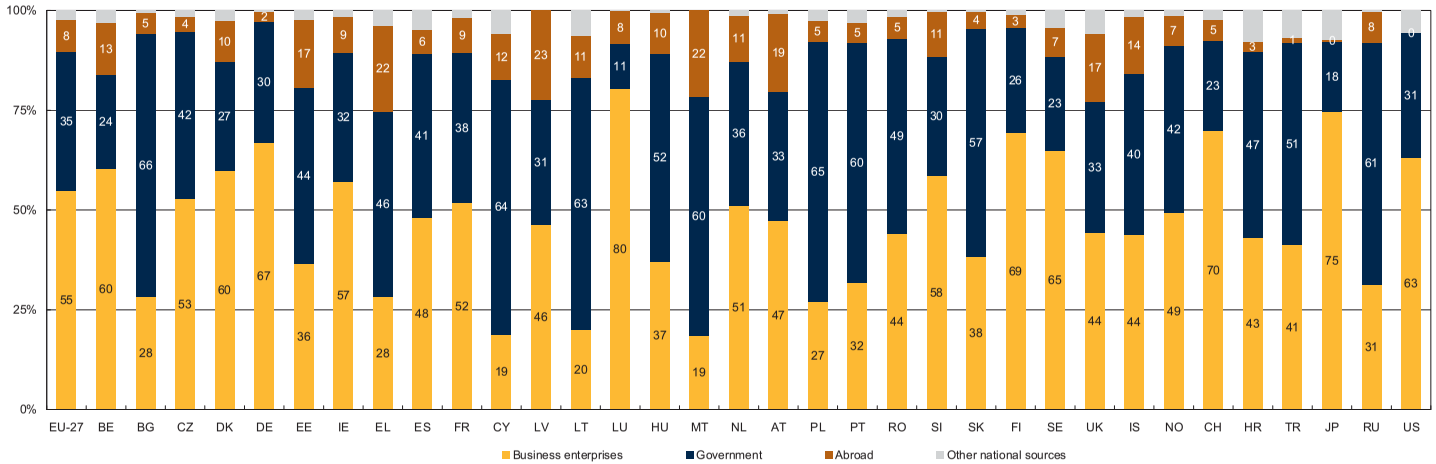
	Total	Agriculture, hunting, forestry and fishing	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Services
MT	3	:	0	2	0	0	1
NL	4 804	68	95	3 750	24	29	839
AT	3 556	3	3	2 550	8	17	975
PL	327	15	8	207	4	11	81
PT	338	1	1	151	3	4	179
RO	130	16	10	81	6	4	13
SI	254	0	4	205	0	0	45
SK	86	2	0	32	:	:	51
FI	3 683	1	6	2 937	6	27	707
SE	7 886 i	23	7	6 336	54	:	1 466
UK	18 319	174	81	15 224	99	44	4 156
IS	142	3	0	40	1	1	96
NO	1 821	27	98	799	6	24	867
CH	6 257	:	:	5 033	:	:	1 224
HR	114	4	:	10	0	3	97
TR	367	3	1	318	3	0	43
RU	3 353	38 i	50 i	687 i	11 i	9 i	2 398 i

Footnote i:
SE: Underestimated or based on underestimated data.
US: Excludes most or all capital expenditure.

Exceptions to the reference year: 2003: NL, PT, SE, UK, IS, HR and RU; 2002: MT and TR.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Figure 2.6 Total R&D expenditure by source of funds as a percentage of total, EU-27 and selected countries — 2004

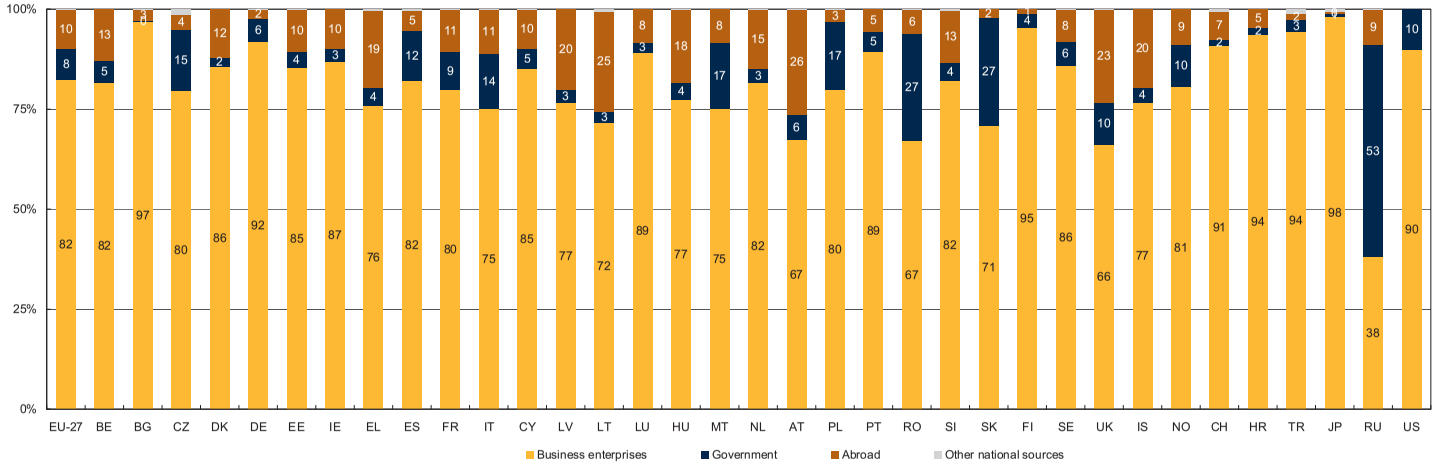


EU-27: Eurostat estimation.
Exceptions to the reference year: 2003: BE, DK, EL, LU, NL, PT, SE, IS, NO, JP and US; 2002: MT and TR.
IE and US: Provisional data.

HU: Defence excluded.
US: Excludes most or all capital expenditure.
IT: No data available.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Figure 2.7 Business enterprise R&D expenditure by source of funds as a percentage of total, EU-27 and selected countries — 2004



EU-27: Eurostat estimation.
Exceptions to the reference year: 2003: BE, DK, EL, LU, NL, PT, SE, IS, NO, JP and US; 2002: MT and TR.

IE and US: Provisional data
US: Excludes most or all capital expenditure.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 2.8 Business enterprise R&D expenditure in EUR million, by size class, EU-27 and selected countries — 2004

	Total	0 person employed	1 to 9 persons employed	10 to 49 persons employed	50 to 249 persons employed	250 to 499 persons employed	500 and more persons employed
EU-27	123 582 s	34 s	1 374 s	5 872 s	14 257 s	8 700 s	93 345 s
BE	3 608	9	128	441	794	380	1 857
BG	24	0	1	2	3	9	7
CZ	701	4	12	62	176	81	365
DK	3 355	:	148	357	518	413	1 919
DE	38 029	:	70	668	2 448	1 705	33 139
EE	32	:	4	7	7	3	12
IE	1 150 p	0 p	36 p	219 p	294 p	174 p	428 p
EL	313	:	4	56	105	24	125
ES	4 865	:	115	806	1 257	662	2 025
FR	22 210	:	:	:	:	:	:
IT	7 293	:	:	:	:	:	:
CY	10	0	2	1	2	0	5
LV	21	:	2	5	6	1	6
LT	29	:	2	3	11	4	9
LU	393	:	:	:	:	:	:

EU-27:Distribution by size class is estimated on the basis of available Member States.
Exceptions to the reference year: 2003: BE, DK, DE and EL.

Source: Eurostat, R&D statistics

Table 2.8 **Business enterprise R&D expenditure in EUR million, by size class, EU-27 and selected countries — 2004**

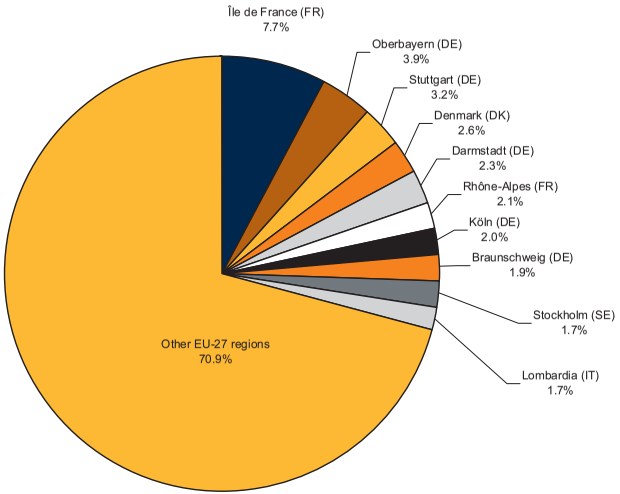
	Total	0 person employed	1 to 9 persons employed	10 to 49 persons employed	50 to 249 persons employed	250 to 499 persons employed	500 and more persons employed
HU	297	:	10 i	20	23	23	220
MT	3	:	:	1	1	0	0
NL	4 804	:	:	388	898	:	:
AT	3 556	:	90 i	251	622	372	2 222
PL	327	1	2	18	106	73	126
PT	338	:	14	52	69	69	134
RO	130	1	35	9	30	15	39
SI	254	1	8	11	52	16	166
SK	86	2	2	5	33	19	26
FI	3 683	:	80 i	268	403	338	2 595
SE	7 886 i	:	:	:	964	455	6 466
UK	18 319	9	314	826	2 729	1 933	13 967
IS	:	:	:	:	:	:	:
NO	1 960	:	:	459	645	140	715
CH	6 257	:	77	426	777	709	4 269
RU	3 176	298	207	783	509	1 229	150

Footnote i:
HU, AT and FI: Includes other classes.
SE: Underestimated or based on underestimated data.

Exceptions to the reference year: 2003: NL, PT, SE, UK and NO; 2002: MT and RU.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Figure 2.9 Percentage of R&D expenditure in the top 10 EU regions in EUR million, all sectors — 2003



Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 2.10 **Top 15 EU regions in terms of R&D expenditure as a percentage of GDP, all sectors — 2003**

Regions	% of GDP	EUR million	% of EU-27
EU-27	1.87 s	187 708 s	100 s
Braunschweig (DE)	**8.70**	3 595	1.9
Västsverige (SE)	**6.03**	3 135	1.7
Stuttgart (DE)	**4.66**	5 996	3.2
Oberbayern (DE)	**4.60**	7 352	3.9
Pohjois-Suomi (FI)	**4.60**	726	0.4
Stockholm (SE)	**4.31**	3 276	1.7
Östra Mellansverige (SE)	**4.25**	1 632	0.9
Sydsverige (SE)	**4.13**	1 490	0.8
Berlin (DE)	**3.94**	3 096	1.6
Tübingen (DE)	**3.89**	1 908	1.0
East Of England (UK)	**3.85**	4 595	2.4
Karlsruhe (DE)	**3.83**	3 166	1.7
Midi-Pyrénées (FR)	**3.72**	2 283	1.2
Etelä-Suomi (FI)	**3.55**	2 933	1.6
Länsi-Suomi (FI)	**3.49**	1 139	0.6

UK: NUTS level 1.
Exception to the reference year: East Of England (UK): 1999.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

PART 2

Monitoring the knowledge workers

Chapter 3 - R&D Personnel

In 2004, 1.44% of total EU-27 employment was made up by R&D personnel (in head count — HC). At national level, the highest shares of R&D personnel (HC) in total employment were observed in Iceland (3.53%), Finland (3.24%) and Sweden (2.51%).

In absolute terms, R&D personnel in the EU-27 accounted for more than 2 million people in full-time equivalent (FTE). More than half of R&D personnel (1.1 million FTE) were more precisely employed in the business enterprise sector. Total and business R&D personnel both increased between 2000 and 2004 at an annual average growth rate of 1.5%. During the same period, R&D personnel increased even faster in the higher education sector (2.6%) while declining in the government sector (-0.7%).

The breakdown of researchers by institutional sector shows a complex picture across the EU-27. As an EU-27 average, 49% of researchers (in FTE) were concentrated in the business enterprise sector.

Research is still a predominantly male business: in 2004, women working in R&D were in the minority (28.3%) in the EU-27. Only in Latvia were more than half of all researchers women (52.8%). The share of women among researchers (18.4%) was even lower in the business enterprise sector.

Industry, and more specifically the manufacturing sector, was home to most of the business researchers in the EU-27 in 2004. Nevertheless, in the services sector the share of R&D personnel was not negligible in some Member States such as the United Kingdom, where more than one researcher in four was employed in that sector.

Within the EU-27, researchers in the government and higher education sectors were specialised firstly in natural sciences (28.5%), secondly in engineering and technology (20.9%) and then in social sciences (15.6%).

In absolute terms, the top EU-27 region in terms of R&D personnel was, by far, Île de France (FR), with more than 135 000 people (FTE). Capital regions were well represented among the leading regions and this was even more obvious in relative terms.

Table 3.1 R&D personnel in FTE in 2004 and annual average growth rate (AAGR) 2000-2004 (1), by sector of performance, EU-27 and selected countries

	All sectors		Business enterprise sector		Government sector		Higher education sector	
	R&D PSL in FTE	AAGR 2000-2004	R&D PSL in FTE	AAGR 2000-2004	R&D PSL in FTE	AAGR 2000-2004	R&D PSL in FTE	AAGR 2000-2004
EU-27	2 089 675 s	1.5 s	1 114 016 s	1.5 s	312 422 s	-0.7 s	642 266 s	2.6 s
BE	52 256	-1.8	31 375	-4.0	3 757	1.2	16 532	1.7
BG	15 647	0.6	2 158	0.2	10 384	-0.7	3 036	5.9
CZ	28 765	4.4	15 064	6.9	7 422	0.9	6 104	3.4
DK	41 607	3.2	27 230	4.3	3 439	-13.2	10 697	8.8
DE	472 533	-0.7	298 072	-1.1	73 867	1.8	100 594	-1.2
EE	4 735	6.3	1 083	26.9	810	-3.9	2 752	4.5
IE	15 713	5.3	9 650	2.6	1 222	-4.0	4 841	16.8
EL	31 849	2.6	11 608	1.9	5 101	4.0	14 947	2.4
ES	161 933	7.6	71 123	10.9	27 166	4.9	63 331	6.4
FR	352 485	1.9	197 223	2.6	51 931 i	-0.7	97 036	1.9
IT	164 026	2.2	67 519	1.3	32 401	0.9	60 694	2.6
CY	1 017	10.6	224	11.7	352	0.3	368	28.0
LV	5 103	-1.6	881	-10.4	1 013	-4.0	3 208	2.6
LT	10 557	-2.7	981	14.6	3 041	-11.6	6 535	1.1
LU	4 318	4.2	3 655	2.3	512	14.0	151	60.0
HU	22 826	-0.8	6 704	0.9	7 595	-1.9	8 527	-1.0
MT	717 b	22.8	383 b	126.0	45	-42.1	288	4.3

(1) Calcultated on R&D personnel expressed in FTE.
Exceptions to the refernce year: 2003: BE, DK and DE.
Exceptions to the reference period: 2001-2004: BE; 2002-2004: MT.

Footnote i:
FR: Defence excluded (all or mostly).

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 3.1 R&D personnel in FTE in 2004 and annual average growth rate (AAGR) 2000-2004 (1), by sector of performance, EU-27 and selected countries

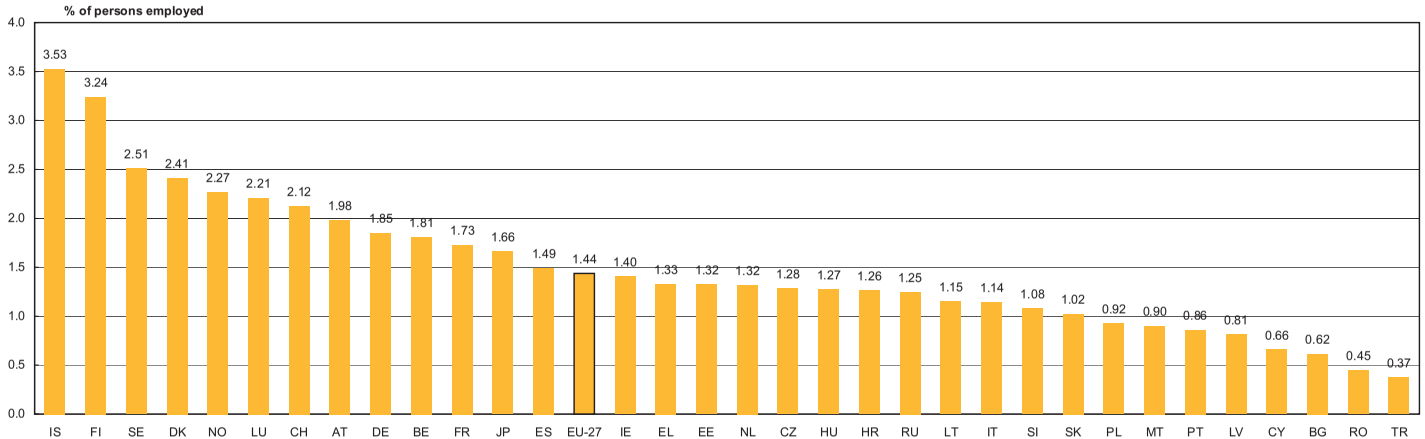
	All sectors		Business enterprise sector		Government sector		Higher education sector	
	R&D PSL in FTE	AAGR 2000-2004	R&D PSL in FTE	AAGR 2000-2004	R&D PSL in FTE	AAGR 2000-2004	R&D PSL in FTE	AAGR 2000-2004
NL	91 594 p	1.0	49 915	1.2	13 579	1.8	28 100 p	1.2
AT	42 891	5.0	29 143	4.4	2 035	-0.6	11 502	7.9
PL	78 362	-0.2	12 978	-8.6	19 685	1.1	45 572	2.4
PT	25 529	4.0	6 124	14.7	4 917	-6.5	11 147	4.4
RO	33 361	-0.4	16 368	-7.7	9 853	6.8	6 917	16.3
SI	7 132	-4.5	3 855	-1.6	1 750	-9.1	1 482	-4.0
SK	14 329	-1.5	3 473	-9.5	3 493 i	-4.4	7 285	5.6
FI	58 281	2.6	32 612	2.6	7 337	0.1	17 822	3.6
SE	72 978	0.1	48 113	-1.6	3 000	2.8	21 495	3.4
UK	:	:	151 908	1.1	20 796	-8.5	:	:
IS	2 940	3.6	1 352	5.6	775	4.1	728	0.2
NO	29 748	3.2	16 263	3.1	4 985	1.5	8 500	4.3
CH	52 250	0.0	33 085	-2.2	810 i	-2.5	18 355 e	4.8
HR	11 162	-7.2	2 831	6.7	3 634	9.5	4 697	-20.6
TR	28 964	3.6	5 918	-0.9	5 502	16.3	17 544	
JP	882 414	-0.5	580 628	-0.1	61 893	1.5	224 049	-0.6
RU	951 569	-1.4	568 173	-2.5	282 422	0.5	99 402	0.0

(1) Calcultated on R&D personnel expressed in FTE.
Exceptions to the refernce year: 2003: PT, SE, IS and JP; 2002: TR.
Exceptions to the reference period: 2000-2002: TR; 2000-2003: IS and JP; 2001-2004: SE and NO; 2002-2004: AT and HR.

Footnote i:
SK: Defence excluded (all or mostly).
CH: Federal or central government only.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

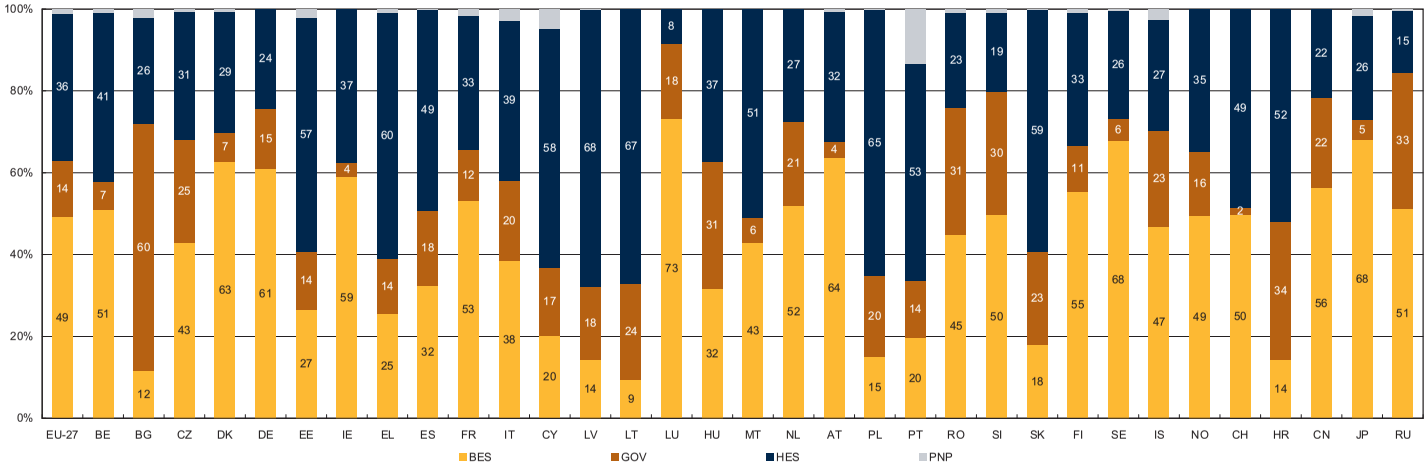
Figure 3.2 R&D personnel as a percentage of persons employed (HC), EU-27 and selected countries — 2004



Exceptions to the reference year: 2003: BE, DE, EL, LU, NL, PT, SE, IS, NO and JP; 2002: TR.
FR, HU and SK: Defence excluded (all or mostly).
CH: Federal or central government only.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Figure 3.3 Researchers by sector of performance (FTE), EU-27 and selected countries — 2004

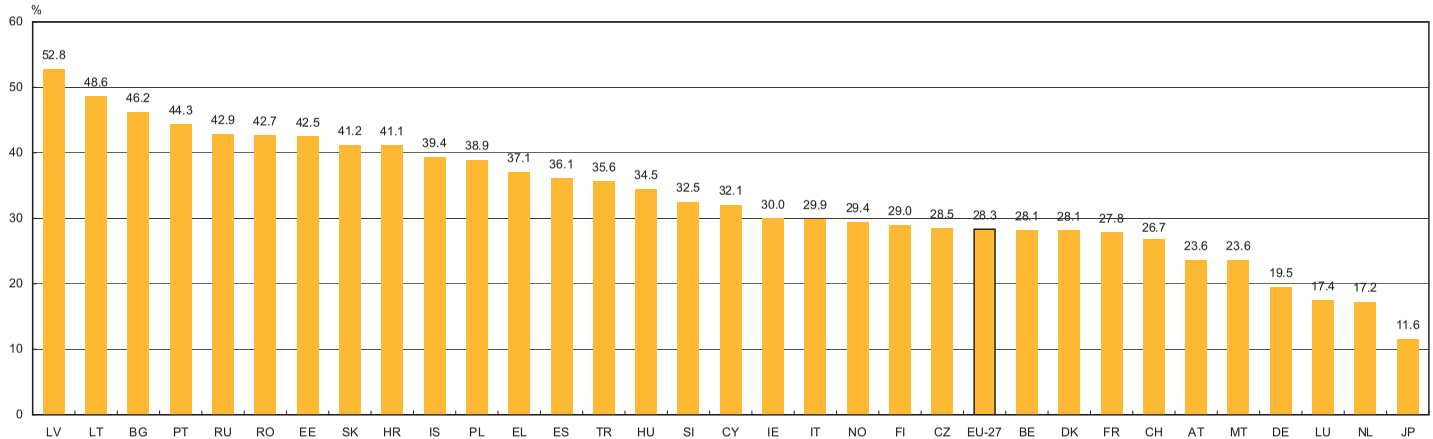


Exceptions to the reference year: 2003:FR; IT, CH and HR; 2002: NL, CN and JP.
Eurostat estimation: EU-27.
Provisional data: BE, IE, EL, ES, CY, LU, MT, PT.
National estimation: DE.

FR, HU and SK: Defence excluded (all or mostly).
SE, NO and TR: University graduates instead of reseachers.
CH: Federal or central government only.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Figure 3.4 Percentage of women researchers (in HC), all sectors, EU-27 and selected countries — 2004

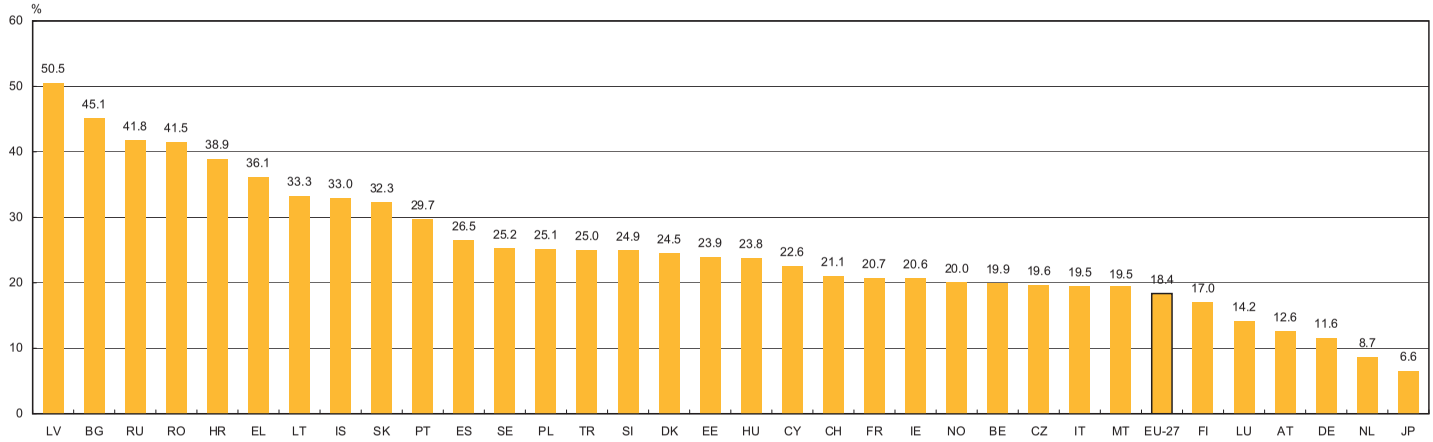


Exceptions to the reference year: 2003: BE, DK, DE, EL, LU, NL, PT, IS, NO and JP; 2002: TR.
EU-27: Eurostat estimation.
LU and NL: National estimations.
MT: Break in series.

NO: University graduates instead of reseachers.
RU: Underestimated or based on underestimated data.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Figure 3.5 Percentage of women researchers (in HC), business enterprise sector, EU-27 and selected countries — 2004



Exceptions to the reference year: 2003: DK, DE, EL, LU, NL, PT, SE, IS and JP; 2002: TR.
EU-27: Eurostat estimation.
BE (BES): Provisional data.
LU: National estimations.

MT: Break in series.
SE and NO: University graduates instead of reseachers.
RU: Underestimated or based on underestimated data.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 3.6 Business enterprise researchers in FTE, by economic activity (NACE Rev 1.1), EU-27 and selected countries — 2004

	Total	Agriculture, hunting, forestry and fishing	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Services
EU-27	609 407	5 398	2 117	426 748	4 021	3 388	167 735 s
BE	16 322 p	186 i	33 i	10 699 i	116 i	368 i	5 211 i
BG	1 239	:	:	462	0	0	773
CZ	7 297	28	1	3 654	3	53	3 558
DK	15 877	78	:	9 414	:	62	6 287
DE	161 980	215	54	142 537	421	215	18 540
EE	661	0	:	314	17	:	327
IE	6 300	8	2	3 290	0	0	3 000
GR	4 295	10	13	1 960	2	19	2 290
ES	32 054	233	45	15 366	185	701	15 524
FR	106 439	1 145	436	85 245	1 725	408	17 479
IT	27 594	:	94	17 071	88	39	10 302
CY	108	2	0	47	3	1	56
LV	448	:	:	176	:	11	261
LT	484	:	6	364	2	:	112
LU	1 546	:	:	:	:	:	:

EU-27:Distribution by sector of activity is estimated on the basis of available Member States.
Exceptions to the reference year: 2003: DE and EL.
Footnote i: BE: Unrevised breakdown not adding to the resised total.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 3.6 **Business enterprise researchers in FTE, by economic activity (NACE Rev 1.1), EU-27 and selected countries — 2004**

	Total	Agriculture, hunting, forestry and fishing	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Services
HU	4 309	95	3	2 859	69	13	1 270
MT	47	:	0	30	1	0	16
NL	23 158	211	336	14 044	152	746	7 669
AT	16 508	13	10	11 458	42	81	4 904
PL	8 334	0	2	3 872	14	0	4 447
PT	3 794	24	2	1 414	14	56	2 283
RO	9 092	1 305	718	5 644	501	68	856
SI	1 657	0	25	1 272	0	0	360
SK	1 815	48	0	464	:	:	1 297
FI	23 397	3	22	18 516	27	109	4 720
SE	28 403 i	98	42 i	21 567 i	121 i	:	6 575 i
UK	96 747	1 000	:	:	:	:	28 000
NO	11 063 i	76	433	4 570	35	119	5 830
CH	12 640	:	:	9 365	:	:	3 275
HR	1 015	21	0	222	:	23	749
TR	3 697	61	45	2 715	20	4	852

Footnote i: SE and NO: University graduates instead of researchers.
Exceptions to the reference year: 2003: PT and SE; 2002: TR.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 3.7 Researchers by field of science in FTE, government and higher education sectors, EU-27 and selected countries — 2004

	Total	Agriculture	Engineering and technology	Medical sciences	Natural sciences	Social sciences	Humanities
EU-27	625 898 s	6.5 s	20.9 s	15.8 s	28.5 s	15.6 s	12.7 s
BE	14 416	10.7	20.7	18.1	22.1	17.7	10.6
BG	8 530	12.2	25.0	7.9	33.8	10.3	10.7
CZ	8 935	8.2	24.1	9.3	36.1	11.7	10.5
DK	10 133	10.5	13.8	23.6	23.1	13.5	15.4
DE	108 410	4.5	23.5	11.4	37.0	10.0	13.6
EE	2 648	5.7	19.5	6.8	35.7	15.8	16.5
IE	4 710	7.2	16.3	15.1	34.3	17.6	9.5
EL	:	:	:	:	:	:	:
ES	68 767	7.5	19.2	22.7	18.5	18.3	13.8
FR	90 276 i	:	:	:	:	:	:
IT	42 463	6.8	16.1	20.3	41.4	13.2	2.2
CY	452	6.1	6.6	1.6	44.4	27.0	14.3
LV	2 875	6.5	17.2	5.7	36.8	19.8	14.1
LT	6 872	4.9	18.4	11.8	26.6	18.9	19.4

EU-27:Distribution by field of science is estimated on the basis of available Member States.
Distribution by field of science:Government sector only: IT.
Exception to the reference year: 2003: BE.

Footnote i: FR: Defence excluded (all or mostly).

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Table 3.7 Researchers by field of science in FTE, government and higher education sectors, EU-27 and selected countries — 2004

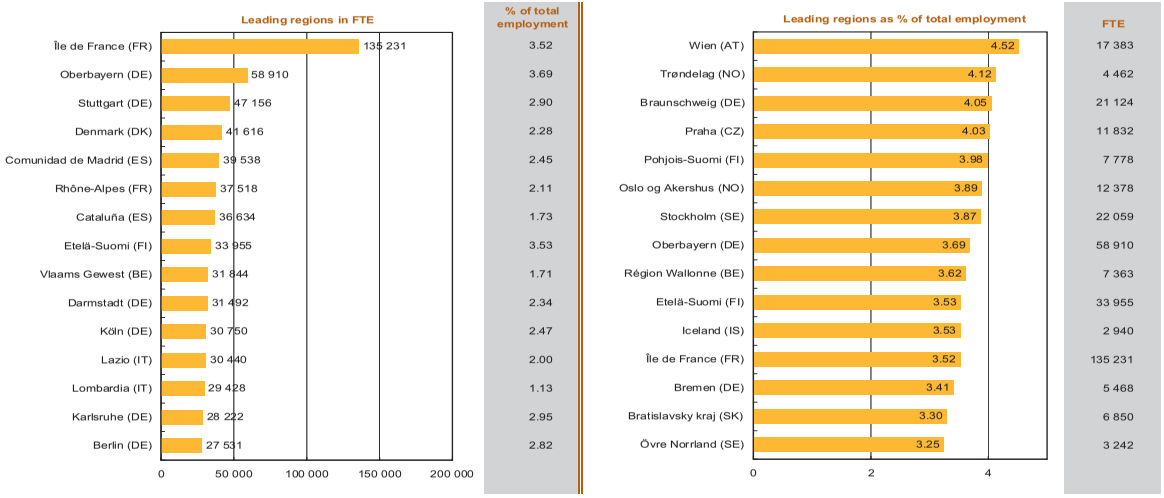
	Total	Agriculture	Engineering and technology	Medical sciences	Natural sciences	Social sciences	Humanities
LU	485	:	:	:	:	:	:
HU	10 595	9.7	12.1	12.8	28.2	16.0	21.2
MT	237	2.0	11.7	31.7	10.0	30.1	13.5
NL	17 883	:	:	:	:	:	:
AT	9 311	4.0	15.3	20.3	31.3	16.4	12.7
PL	52 520	8.6	21.6	15.9	24.3	18.8	10.8
PT	13 502	10.8	19.6	9.8	31.0	20.4	8.4
RO	11 980	3.7	31.9	20.4	25.5	11.4	7.1
SI	2 328	12.3	20.0	11.5	39.3	10.3	6.7
SK	8 854 i	6.4 i	21.4 i	15.8 i	32.9 i	17.5	6.0
FI	17 237	:	:	:	:	:	:
SE	20 139 i	:	:	:	:	:	:
UK	:	:	:	:	:	:	:
NO	9 509 i	8.6	11.8	20.5	22.2	26.3	10.5

Footnote i:
SK: Defence excluded (all or mostly).
SE and NO: University graduates instead os researchers.

Exceptions to the reference year: 2003: NL, PT and NO.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Figure 3.8 Top 15 regions in terms of R&D personnel in FTE and as a percentage of total eployment (HC), all sectors — 2003



Exceptions to the reference year: 2004: CZ, ES, AT, FI; 2002: FR; 1999: SE.
NUTS 1: BE.

Source: Eurostat, R&D statistics - OECD - MSTI 2007-1

Chapter 4 - Human Resources in Science and Technology

Human resources in science and technology (HRST) are defined as individuals who have successfully completed tertiary-level education in an S&T field of study (HRSTE) and/or work in an S&T occupation as professionals or technicians (HRSTO). Statistics on HRST contribute significantly to measuring the new economy and its dynamism. They review the supply of and demand for highly qualified persons in science and technology by measuring HRST stocks and flows.

As regards education, the growing number of people choosing to follow a tertiary education is confirmed. In 2005, Finland recorded the highest proportion of people in tertiary education compared to the population aged 20-29 years (47%), followed by Greece (44%), Lithuania (41%) and Sweden (40%). Out of the 27 EU Member States, Austria and Spain were the only two showing a decrease between 2000 and 2005 in their proportions of students in tertiary education compared to the population aged 20-29 years.

In Europe, the share of females among students in tertiary education reached nearly 55% in 2005. Nevertheless, the situation is different when looking at graduates in science and engineering: graduates in this specific field of education were mainly males (more or less 70%).

In terms of the stock of HRST, the EU accounted for more than 96 million highly qualified knowledge workers in 2006. Of this population, 36 million were considered to be HRST by virtue of both education and occupation (HRSTC).

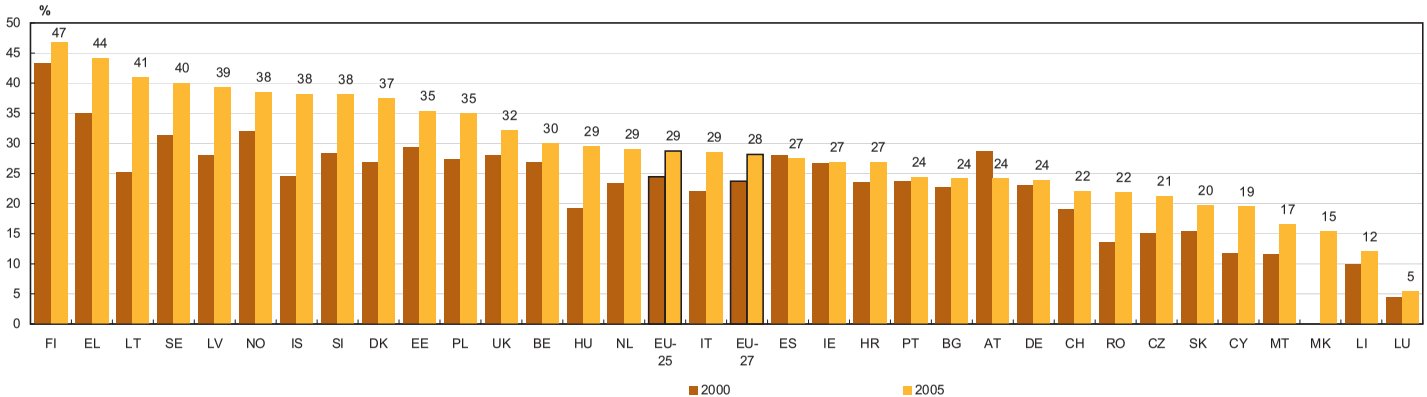
Looking at the field of study of the HRST by virtue of education (HRSTE), of the 68 million HRSTE in 2006, close to 20 million were qualified either in "Science, mathematics and computing" or in "Engineering, manufacturing and construction". Of these 20 million people, 65% graduated in Engineering. 15% of the HRSTE with a background in Engineering were female while the female share was 38% for HRSTE that had completed a tertiary education in "Science, mathematics and computing".

In 2006, in the EU, a large majority of employees in science and technology occupations (HRSTO) worked in the service sector (more than 48 million), with the larger share in knowledge-intensive services (35 million). In the manufacturing sector, the number of science and technology occupations was less abundant (7 million), with more than half of these (almost 4 million) in high-tech and medium-high-tech manufacturing. In the EU the majority of the HRSTO in the service sector were female (55%), while only 30% of those working in the manufacturing sector were female.

In all EU and EFTA countries, the unemployment rates for HRST were significantly lower than for non-HRST in 2006. In the EU-27, the unemployment rates for the two groups were 3.2% and 9.5% respectively. The smallest difference in 2006 between the unemployment rates for HRST and non-HRST was registered in Cyprus, with 3.7% and 4.7% respectively.

Finally, in terms of the international mobility of HRST, in 2006, 4.9% of the EU's HRST were foreigners. Luxembourg, with more than 44% of HRST having a citizenship different from the country of residence, was by far the top-ranked country. It was followed by Switzerland (18.0%), Estonia (14.4%) and Cyprus (13.3%).

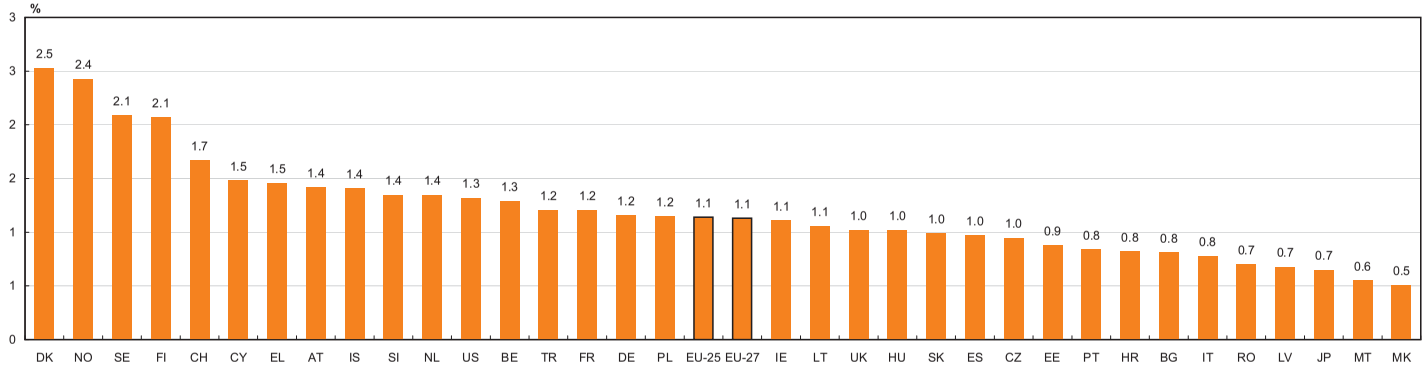
Figure 4.1 Students in tertiary education as a % of people aged 20-29 by country, EU-27 and selected countries — 2000 and 2005



Exceptions to the reference years: for 2000: EL and CH 2002; LI and HR 2003; for 2005 LU 2002.
EU-25 and EU-27: Eurostat estimations.
Data for FR missing.

Source: Eurostat, HRST statistics

Figure 4.2 Public expenditure on education as a % of GDP, at tertiary level of education (ISCED5-6), EU-27 and selected countries — 2004



Exceptions to the reference year: TR and MK 2003.
EU-25 and EU-27: Eurostat estimations.

Source: Eurostat, HRST statistics

Table 4.3 Students in tertiary education, total and percentage of women, EU-27 and selected countries — 2000 to 2005

	Total in thousands						% of women					
	2000	2001	2002	2003	2004	2005	2000	2001	2002	2003	2004	2005
EU-27	15 605 s	16 576 s	17 139 s	17 754 s	18 568 s	18 506 s	53.4 s	53.9 s	54.5 s	53.4 s	53.8 s	54.9 s
EU-25	14 891 s	15 796 s	16 329 s	16 880 s	17 654 s	17 529 s	53.4 s	53.9 s	54.5 s	53.3 s	53.8 s	55.0 s
BE	356	359	367	375	386	390	52.3	52.8	53.1	53.3	53.8	54.4
BG	261	247	228	231	228	238	57.3	56.3	54.0	52.8	52.5	52.1
CZ	254	260	284	287	319	336	49.0	50.1	51.2	50.7	51.2	52.6
DK	189	191	195	202	217	232	56.9	56.5	57.5	57.9	57.9	57.4
DE	2 055	2 084	2 160	2 242	2 330	2 269	48.1	48.7	49.0	49.5	49.4	49.7
EE	54	58	61	64	66	68	58.5	60.1	61.5	61.5	61.8	61.5
IE	161	167	176	182	188	186	54.1	54.7	55.1	55.7	55.2	54.7
EL	422	478	529	561	597	647	50.0	51.1	51.2	51.0	51.7	51.1
ES	1 829	1 834	1 833	1 841	1 840	1 809	52.9	52.5	53.1	53.1	53.8	53.7
FR	2 015	2 032	2 029	2 119	2 160	:	54.2	54.1	54.8	55.0	55.0	:
IT	1 770	1 812	1 854	1 913	1 986	2 015	55.5	56.0	56.2	56.2	56.2	56.6
CY	10	12	14	18	21	20	57.1	58.0	54.8	49.5	47.9	52.0
LV	91	103	111	119	128	131	63.4	61.8	61.5	61.7	62.3	63.2
LT	122	136	149	168	183	195	60.0	59.8	60.5	60.0	60.0	60.1
LU	2	3	3	3	:	:	:	:	:	53.3	:	:
HU	306	331	354	390	422	436	54.9	54.8	55.3	56.7	57.3	58.4
MT	6	7	7	9	8	9	53.3	54.8	56.9	56.9	55.9	56.3
NL	488	504	511	527	543	565	50.0	50.5	50.8	51.0	50.9	51.0

EU-27, EU-25 and EEA: Eurostat estimations.

Source: Eurostat, HRST statistics

Table 4.3 **Students in tertiary education, total and percentage of women, EU-27 and selected countries — 2000 to 2005**

	Total in thousands						% of women					
	2000	2001	2002	2003	2004	2005	2000	2001	2002	2003	2004	2005
AT	290	323	283	230	239	244	48.5	50.4	51.1	53.0	53.3	53.7
PL	1 580	1 775	1 906	1 983	2 044	2 118	57.5	58.0	57.9	57.8	57.6	57.5
PT	:	388	394	:	395	381	:	57.0	56.8	:	56.1	55.7
RO	453	533	582	644	686	739	51.8	53.5	54.4	54.3	54.8	54.6
SI	84	91	99	101	104	112	56.1	56.1	57.5	56.2	56.9	57.8
SK	136	144	152	158	165	181	50.4	51.3	52.1	53.1	54.1	55.3
FI	270	280	284	292	300	306	53.7	53.9	54.1	53.5	53.4	53.6
SE	347	358	383	415	429	427	58.2	59.1	59.5	59.6	59.5	59.6
UK	2 024	2 067	2 241	2 288	2 247	2 288	53.9	54.5	55.2	55.9	57.0	57.2
IS	10	10	12	13	15	15	61.9	62.7	63.2	63.7	64.5	64.9
LI	:	:	:	0	1	1	:	:	:	27.0	26.7	28.8
NO	191	190	197	212	214	214	58.4	59.2	59.6	59.7	59.6	59.6
EEA	15 806 s	16 777 s	17 348 s	17 980 s	18 797 s	18 735 s	53.5 s	54.0 s	54.5 s	53.4 s	53.8 s	54.9 s
CH	:	:	170	186	196	200	:	:	43.3	44.2	44.9	46.0
HR	:	:	:	122	126	135	:	:	:	53.2	53.7	53.8
MK	37	40	45	46	47	49	55.0	55.8	55.2	56.2	57.0	56.7
TR	1 015	1 092	1 156	1 257	1 973	2 106	39.8	40.5	41.0	40.4	41.4	41.9
JP	3 982	3 972	3 967	3 984	4 032	4 038	44.9	44.9	45.1	45.6	45.8	45.9
US	13 203	13 596	15 928	16 612	16 900	17 272	55.8	55.9	:	56.6	57.1	57.2

EU-27, EU-25 and EEA: Eurostat estimations.

Source: Eurostat, HRST statistics

Table 4.4 Graduates from tertiary education, total and as a percentage of people aged 25-29, percentage in science and engineering and percentage of women, EU-25 and selected countries — 2000 to 2005

	Number of graduates from tertiary education				of which % in science and engineering		Share of women			
	in thousands		as a % of 25-29 years old population				as a % of total graduates		as a % of the S&E graduates	
	2000	2005	2000	2005	2000	2005	2000	2005	2000	2005
EU-27	2 854 s	3 753 s	8.5 s	11.4 s	24.0 s	22.8 s	56.7 s	58.7 s	30.8 s	31.1 s
EU-25	2 739 s	3 551 s	9.7 s	12.9 s	24.1 s	22.8 s	56.6 s	58.8 s	30.5 s	30.5 s
BE	68	80	9.8	12.0	18.9	17.7	55.9	58.4	25.0	27.3
BG	47	46	8.4	9.3	17.3	21.1	64.4	58.9	45.6	41.1
CZ	38	55	4.6	6.3	24.4	23.9	55.5	56.5	27.0	27.4
DK	39	50	10.4	14.8	21.7	18.9	56.3	58.9	28.5	33.9
DE	302	344	6.4	7.3	26.5	27.2	50.3	53.0	21.6	24.4
EE	7	12	7.7	12.6	18.9	20.2	66.0	70.2	35.4	43.5
IE	42	60	14.5	17.0	34.4	28.2	55.1	55.6	37.9	30.5
EL	:	60	:	7.5	:	27.3	:	61.5	:	40.9
ES	260	288	7.8	7.8	25.0	27.2	57.3	58.0	31.5	29.6
FR	508	665	12.6	18.3	30.5	26.9	55.8	55.9	30.8	28.4
IT	202	298	4.6	7.6	23.0	23.4	55.9	57.5	36.6	36.1
CY	3	4	6.0	6.7	11.9	11.5	65.2	61.0	31.0	38.1
LV	15	26	9.3	16.5	15.9	12.6	63.4	70.5	31.4	32.8
LT	25	41	10.1	18.4	26.0	21.8	62.6	66.4	35.9	35.2
LU	1	:	2.2	:	14.6	:	:	:	:	:
HU	60	74	8.3	9.0	12.0	10.6	55.3	64.5	22.6	30.0
MT	2	3	7.5	10.5	9.3	7.5	52.0	60.6	26.3	30.1
NL	79	107	6.9	10.8	15.7	15.9	54.2	56.5	17.6	20.3

EU-27, EU-25 and EEA: Eurostat estimations.

Source: Eurostat, HRST statistics

Table 4.4 **Graduates from tertiary education, total and as a percentage of people aged 25-29, percentage in science and engineering and percentage of women, EU-25 and selected countries — 2000 to 2005**

	Number of graduates from tertiary education				of which % in science and engineering		Share of women			
	in thousands		as a % of 25-29 years old population				as a % of total graduates		as a % of the S&E graduates	
	2000	2005	2000	2005	2000	2005	2000	2005	2000	2005
AT	25	33	4.4	6.5	30.0	30.6	47.5	51.6	19.9	23.3
PL	350	501	12.5	17.0	11.2	14.1	64.9	65.9	35.9	36.6
PT	54	70	6.8	8.4	18.6	26.7	65.6	65.2	41.9	39.9
RO	68	157	4.2	8.8	25.1	22.5	52.5	57.1	35.1	40.0
SI	11	16	7.9	10.2	22.8	18.4	57.2	61.8	22.8	26.2
SK	23	36	5.4	7.8	20.8	25.8	54.9	57.1	30.1	35.3
FI	36	39	11.9	11.9	28.0	30.0	61.7	62.0	27.3	29.7
SE	42	58	7.1	10.6	30.6	26.6	58.4	63.3	32.1	33.8
UK	504	633	12.7	17.8	27.9	22.1	54.9	58.0	32.1	30.8
IS	2	3	9.1	14.8	19.7	14.8	64.4	67.6	37.9	37.2
LI	:	0	:	6.0	:	42.4	:	25.0	:	28.6
NO	30	32	9.1	11.1	16.1	15.8	60.0	61.8	26.8	26.0
EEA	2 886 s	3 788 s	9.5 s	12.7 s	24.0 s	22.7 s	56.7 s	58.7 s	30.8 s	31.0 s
CH	:	60	:	13.0	:	21.8	:	44.1	:	16.1
HR	:	20	:	6.3	:	17.9	:	32.7	:	58.8
MK	4	6	:	3.6	30.4	22.5	60.1	65.5	41.6	46.9
TR	190	272	3.1	4.2	30.0	28.1	41.7	43.7	31.1	28.5
JP	1 081	1 059	:	:	21.9	21.4	49.7	49.4	12.9	14.7
US	2 151	2 558	:	:	17.2	16.8	57.0	58.0	31.8	31.1

EU-27, EU-25 and EEA: Eurostat estimations.

Source: Eurostat, HRST statistics

Table 4.5 Stocks of HRST, total and percentage of women, EU-27 and selected countries — 2006

	HRST		HRSTE (Excluding HRSTC)		HRSTO (Excluding HRSTC)		HRSTC	
	in thousands	% of women	in thousands	% of women	in thousands	% of women	in thousands	% of women
EU-27	96 150 s	49.8 s	33 191 s	47.9 s	27 094 s	50.0 s	35 867 s	51.4 s
EU-25	92 628 s	49.6 s	32 068 s	47.9 s	26 168 s	49.65 s	34 395 s	51.1 s
BE	2 415	49.9	1 035	51.7	426	40.85	954	52.1
BG	1 228	58.3	561	54.4	163	44.79	504	67.1
CZ	1 916	51.3	344	44.8	1 012	56.72	560	45.5
DK	1 478	51.2	446	46.9	344	47.38	689	55.9
DE	19 395	46.4	5 787	36.3	7 021	57.31	6 587	43.5
EE	341	62.2	167	55.7	56	60.71	118	72.0
IE	845	52.7	400	53.0	117	48.72	328	53.7
EL	1 654	48.1	641	47.3	234	47.01	779	49.0
ES	9 483	48.9	4 759	49.1	1 014	38.17	3 710	51.5
FR	12 582	50.0	5 026	53.9	2 909	40.91	4 647	51.4
IT	9 088	48.8	1 961	56.1	4 408	44.49	2 719	50.6
CY	165	50.3	72	55.6	22	31.82	71	50.7
LV	444	61.5	151	57.6	132	58.33	161	67.7
LT	672	62.1	287	50.5	119	72.27	266	69.9
LU	97	46.4	20	45.0	29	48.28	47	46.8

EU-27, EU-25 and EEA: Eurostat estimations.
Exceptions to the reference year: BE, IE, IS and NO 2005.

Source: Eurostat, HRST statistics

Table 4.5 **Stocks of HRST, total and percentage of women, EU-27 and selected countries — 2006**

	HRST		HRSTE (Excluding HRSTC)		HRSTO (Excluding HRSTC)		HRSTC	
	in thousands	% of women	in thousands	% of women	in thousands	% of women	in thousands	% of women
HU	1 573	57.4	528	51.5	451	64.52	595	57.0
MT	54	42.6	13	46.2	21	33.33	20	50.0
NL	4 228	48.2	1 284	44.2	1 217	52.75	1 727	48.1
AT	1 637	44.7	441	35.4	738	49.1	458	46.7
PL	5 723	58.2	1 916	53.0	1 510	61.3	2 298	60.3
PT	1 226	52.8	326	57.1	352	36.6	548	60.8
RO	2 294	53.7	562	42.5	763	63.3	968	52.6
SI	410	53.4	109	47.7	136	49.3	166	60.2
SK	885	55.0	201	44.3	395	63.5	288	50.7
FI	1 367	54.1	529	53.1	278	45.7	560	59.1
SE	2 355	51.5	624	52.9	692	39.2	1 040	58.8
UK	12 595	48.1	5 001	47.5	2 535	41.9	5 059	51.7
IS	67	53.7	13	53.8	21	52.4	33	54.5
NO	1 170	49.8	341	49.3	267	40.4	562	54.6
EEA	97 387 s	49.8 s	33 545 s	48.0 s	27 382 s	49.9 s	36 462 s	51.5 s
CH	2 157	42.4	588	34.0	782	55.4	787	35.8

EU-27, EU-25 and EEA: Eurostat estimations.
Exceptions to the reference year: BE, IE, IS and NO 2005.

Source: Eurostat, HRST statistics

Table 4.6 HRSTE by field of study, total and percentage of women, EU-27 and selected countries — 2006

	Total		Science, mathematics and computing		Engineering, manufacturing and construction	
	in thousands	% of women	in thousands	% of women	in thousands	% of women
EU-27	68 428 s	49.8 s	6 863 s	38.3 s	12 794 s	15.1 s
EU-25	65 833 s	49.6 s	6 603 s	37.7 s	12 139 s	14.1 s
BE	1 985	51.8	216	37.0	269	13.4
BG	1 065	60.4	42	61.9	252	35.7
CZ	904	45.2	70	35.7	228	16.7
DK	1 135	52.3	56	26.8	200	21.0
DE	12 137	40.1	807	26.6	3 488	11.6
EE	285	62.5	14 u	50.0 u	79	35.4
IE	725	53.2	129	44.2	88	9.1
EL	1 420	48.2	124	33.1	227	22.0
ES	8 469	50.1	875	39.8	1 586	10.7
FR	9 647	52.6	1 194	36.6	1 491	13.8
IT	4 670	52.9	474	54.4	662	24.2
CY	143	53.1	13	46.2	19	21.1
LV	282	64.9	22	50.0	38	31.6
LT	553	59.9	40	52.5 u	144	29.9
LU	67	46.3	7	28.6	10	10.0 u

EU-27, EU-25 and EEA: Eurostat estimations.
Exceptions to the reference year: BE, IE, IS and NO 2005.

Source: Eurostat, HRST statistics

Table 4.6 HRSTE by field of study, total and percentage of women, EU-27 and selected countries — 2006

	Total		Science, mathematics and computing		Engineering, manufacturing and construction	
	in thousands	% of women	in thousands	% of women	in thousands	% of women
HU	1 123	54.4	61	29.5	221	20.4
MT	33	48.5	2 u	: u	3 u	: u
NL	3 011	46.4	172	22.7	288	7.3
AT	899	41.2	48	33.3	253	11.1
PL	3 915	57.6	514	47.5	609	20.5
PT	874	59.4	123	57.7	134	25.4
RO	1 530	48.9	218	51.8	403	31.5
SI	275	55.3	12	33.3	52	17.3
SK	489	48.1	32	46.9	120	19.2
FI	1 089	56.2	55	47.3	242	11.2
SE	1 664	56.6	99	37.4	251	21.9
UK	10 039	49.6	1 444	34.6	1 437	10.2
IS	46	54.3	4	25.0	6	0.0
NO	903	52.6	42	31.0	53	11.3
EEA	69 377 s	49.8 s	6 909 s	38.3 s	12 853 s	15.1 s
CH	1 172	35.0	104	22.1	288	8.7

EU-27, EU-25 and EEA: Eurostat estimations.
Exceptions to the reference year: BE, IE, IS and NO 2005.

Source: Eurostat, HRST statistics

Table 4.7 **Employed HRSTO aged 25-64, by sectors of economic activity (NACE), total number and percentage of women, EU-27 and selected countries — 2006**

	Manufacturing				Services				Total High-technology sector [1]	
	Total		High- and medium high-tech		Total		Knowledge-intensive services			
	in thousands	% of women	in thousands	% of women	in thousands	% of women	in thousands	% of women	in thousands	% of women
EU-27	7 362 s	30.3 s	3 986 s	24.1 s	48 293 s	55.3 s	35 140 s	57.8 s	4 127 s	25.2 s
EU-25	7 042 s	29.4 s	3 866 s	23.6 s	46 548 s	55.0 s	33 985 s	57.4 s	4 015 s	24.8 s
BE	168	22.6	83	20.5	1 066	53.7	858	57.5	75	20.0
BG	67	50.7	25	44.0 u	529	65.8	369	70.5	40	40.0
CZ	262	39.7	127	33.9	1 051	59.8	714	63.2	96	29.2
DK	112	36.6	58	36.2	836	56.9	641	58.5	76	28.9
DE	1 898	26.2	1 273	21.4	10 026	55.6	6 734	57.0	873	23.9
EE	15 u	60.0 u	: u	: u	128	71.9	85	72.9	8 u	: u
IE	46	30.4	29	27.6	334	56.9	278	59.7	35	25.7
EL	65	35.4	22	31.8	887	50.1	704	52.3	35	25.7
ES	486	30.5	208	33.2	3 736	51.8	2 774	54.3	310	23.2
FR	895	22.2	538	19.0	5 882	52.6	4 090	55.3	663	26.5
IT	949	29.4	502	23.7	5 586	51.3	4 244	55.0	500	25.6
CY	4	50.0	1 u	: u	76	46.1	53	50.9	3	: u
LV	18	50.0	: u	: u	214	67.3	126	73.8	10	: u
LT	32	62.5 u	: u	: u	299	74.9	200	80.0	10 u	: u
LU	3	33.3 u	1 u	: u	69	49.3	48	50.0	3	33.3 u

EU-27, EU-25 and EEA: Eurostat estimations.
Exceptions to the reference year: BE, IE, IS and NO 2005.
([1]) Total High-techonology sector is a sum of high-tech manufacturing and knowledge-intensive high-technology services

Source: Eurostat, HRST statistics

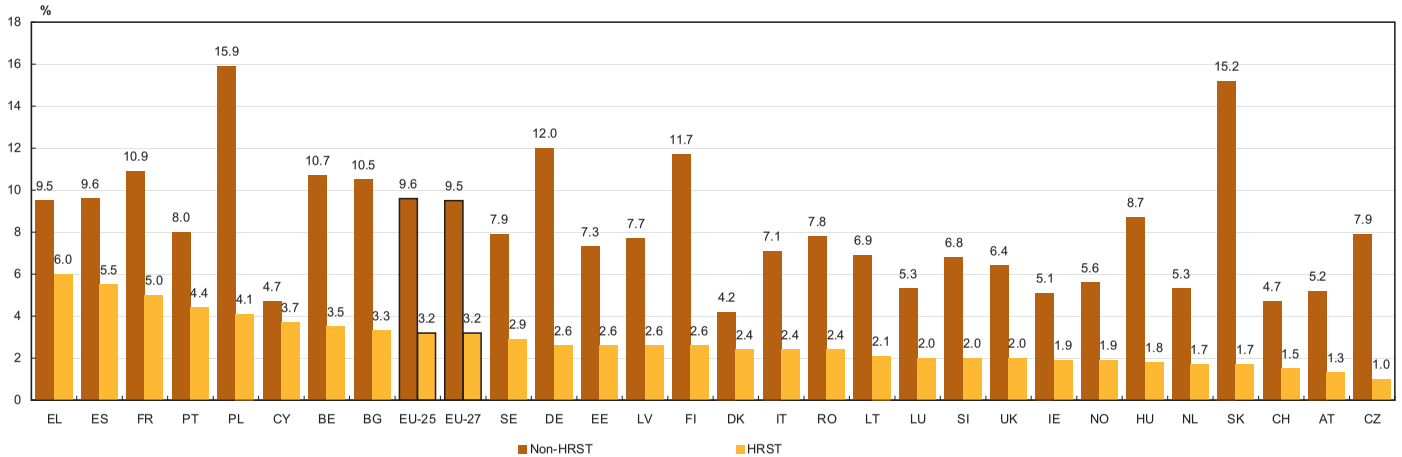
Table 4.7 **Employed HRSTO aged 25-64, by sectors of economic activity (NACE), total number and percentage of women, EU-27 and selected countries — 2006**

	Manufacturing				Services				Total High-technology sector [1]	
	Total		High- and medium high-tech		Total		Knowledge-intensive services			
	in thousands	% of women	in thousands	% of women	in thousands	% of women	in thousands	% of women	in thousands	% of women
HU	106	43.4	56	35.7	833	64.1	608	66.3	77	31.2
MT	3	: u	: u	: u	30	43.3	22	50.0	3 u	: u
NL	205	26.3	75	21.3	2 321	53.1	1 846	56.8	153	17.6
AT	157	26.8	82	19.5	868	52.8	586	54.9	67	22.4
PL	423	43.5	172	35.5	2 899	65.7	2 059	70.7	177	36.2
PT	76	35.5	32	: u	731	55.0	507	57.6	48	20.8
RO	253	49.8	95	40.0	1 216	61.9	786	68.8	72	38.9
SI	55	38.2	23	34.8	214	63.1	147	67.3	15	26.7
SK	97	45.4	47	44.7	483	63.8	330	67.6	42	40.5
FI	117	35.0	61	26.2	635	60.2	468	62.0	78	30.8
SE	166	30.1	96	26.0	1 416	55.4	1 075	57.4	170	29.4
UK	684	25.6	380	18.7	5 928	52.8	4 788	53.9	488	18.4
IS	3	33.3	1	: u	44	59.1	36	61.1	4	: u
NO	55	23.6	26	: u	701	53.5	548	56.4	63	25.4
EEA	7 420 s	30.2 s	4 013 s	23.9 s	49 038 s	55.3 s	35 724 s	57.8 s	4 194 s	25.1 s
CH	155	22.6	106	19.8	1 196	48.7	917	50.6	100	18.0

EU-27, EU-25 and EEA: Eurostat estimations.
Exceptions to the reference year: BE, IE, IS and NO 2005.
([1]) Total High-techonology sector is a sum of high-tech manufacturing and knowledge-intensive high-technology services

Source: Eurostat, HRST statistics

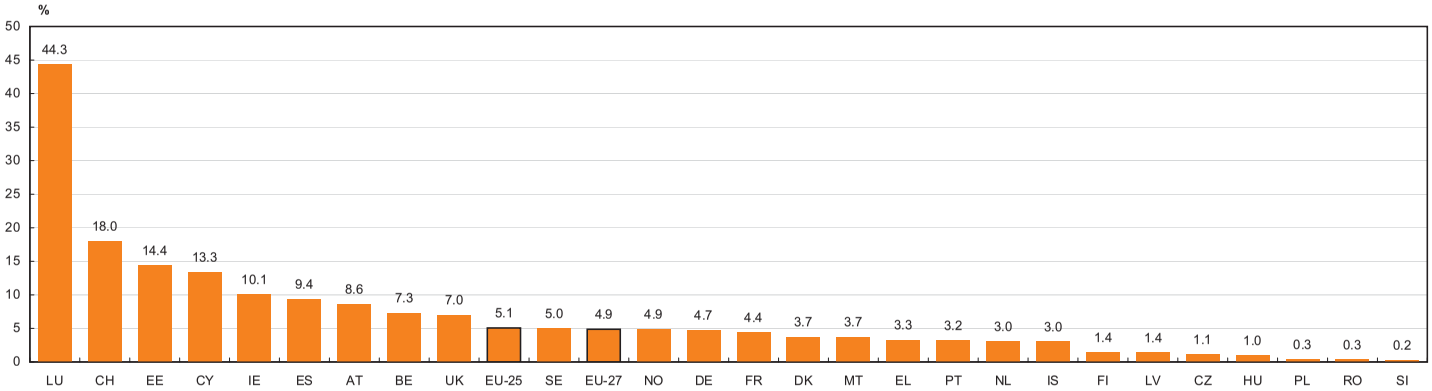
Figure 4.8 Unemployment rate for HRST and non-HRST, EU-27 and selected countries — 2006



Exceptions to the reference year: BE, IE, IS and NO 2005.

Source: Eurostat, HRST statistics

Figure 4.9 Share of foreign HRST among the total HRST population aged 15-74, EU-27 and selected countries — 2006



Exceptions to the reference year: BE, IE, IS and NO 2005.
Eurostat estimations excluding IT: EU-25 and EU-27.
Foreign HRST are defined as HRST having a citizenship different to the country of residence.

Source: Eurostat, HRST statistics

PART 3

Productivity and competitiveness

Chapter 5 - Innovation

The Fourth Community Innovation Survey (CIS 4)

CIS 4 collects information about both product and process innovation and also non-technological innovation such as in organisation and marketing. Most of the questions cover new or significantly improved goods or services or the introduction of new or significantly improved processes, logistics or distribution methods. Organisational and marketing innovation is covered by one specific question; both are believed to play a significant role in the ability of firms to increase their sales and/or profitability from other innovation investments.

The CIS 4 survey is based on Commission Regulation No 1450/2004, which establishes the legal basis for innovation statistics and makes it compulsory to deliver data on a number of basic variables.

The CIS 4 questionnaire not only focuses on product and process innovation, but also looks at the effects of innovation, the sources of information for innovation activities and innovation expenditure and examines the factors hampering innovation and use of intellectual property rights. It is shorter than the CIS 3 questionnaire and is perceived as less difficult by the countries participating.

CIS 4 was launched in 2005 in nearly all countries concerned and uses a harmonised questionnaire and survey method which define the structure of the questions to be asked and the statistical methods to be used by the countries participating.

The observation period to be covered by the survey is 2002-2004 inclusive, i.e. the three years from the beginning of 2002 to the end of 2004. The reference period for CIS 4 is the year 2004.

Main findings of CIS 4

In Germany 65% of enterprises were active in innovation in 2004, which was far more than the EU-27 average of 40%.

Close to one quarter of the turnover of Bulgarian innovative enterprises was related to new or significantly improved products which are new to the market.

France, Sweden and Denmark spent more than 60% of their total innovation expenditure in-house, with respectively 68%, 63% and 62%.

In Lithuania, 56% of innovative enterprises cooperated in 2004, whereas this was the case at EU-27 level for only 26% of innovative enterprises.

Less than 9% of innovative enterprises in the EU-27 received any public funding. At national level this percentage varied between 5% in Bulgaria and 39% in Italy.

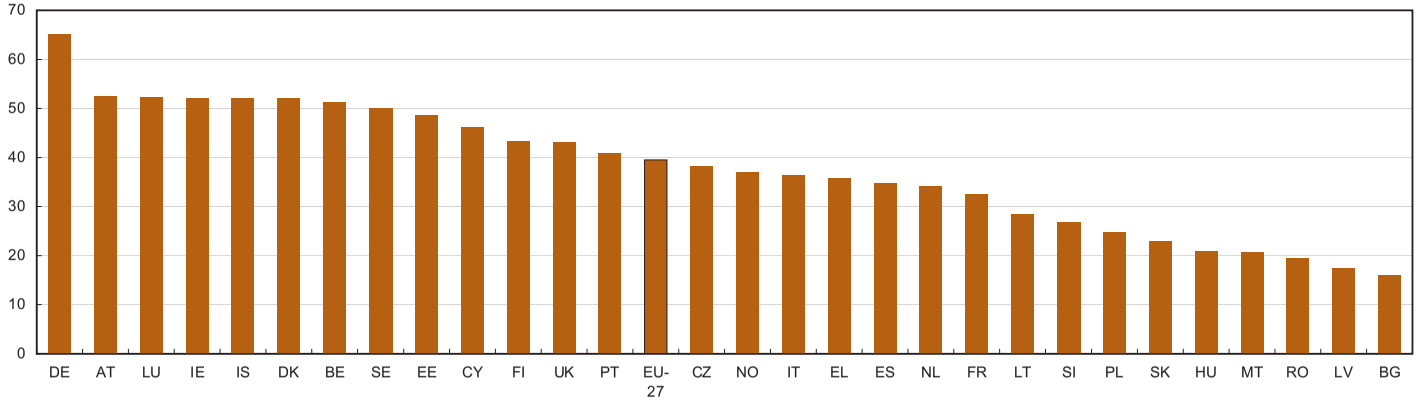
The most important effect of innovation seemed to be the product-oriented effect of improving the quality of goods and services. 38% of innovative enterprises in the EU-27 choose this innovation effect.

At EU-27 level nearly 24% of innovative enterprises considered the hampering factor “Innovation costs are too high” to be highly important. This hampering factor accounted for 9% of responses in Portugal and 40% in Spain.

Innovative enterprises protected their intellectual property by registering trademarks, applying for patents and registering industrial designs. Claiming copyrights was the least used protection method.

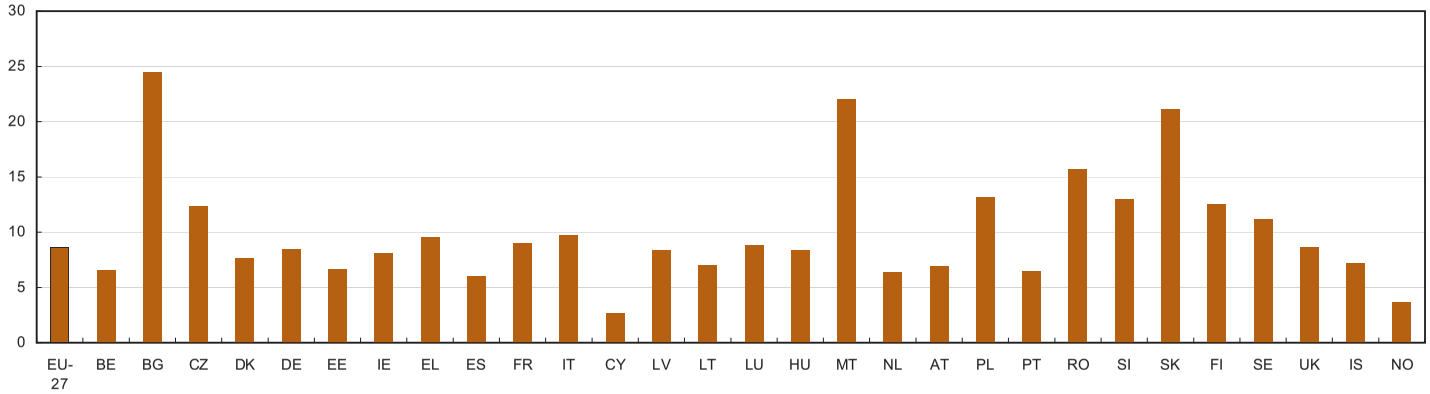
About 24% of EU-27 enterprises declared that they had introduced organisational innovation, and 13% marketing innovation.

Figure 5.1 Innovative enterprises, as a percentage of all enterprises, by country, EU-27 and selected countries — 2004



Source: Eurostat, Community Innovation statistics, 2004

Figure 5.2 Turnover related to new or significantly improved products which are new to the market, as a percentage of total turnover of innovative enterprises, by country, EU-27 and selected countries — 2004



FR: data unreliable.

Source: Eurostat, Community Innovation statistics, 2004

Table 5.3 Turnover related to new or significantly improved products which are new to the enterprise but not new to the market, as a percentage of total turnover of innovative enterprises, by sector, by country, EU-27 and selected countries — 2004

	Manufacturing					Services	
	Total	High-tech	Medium high-tech	Medium low-tech	Low-tech	Total	High-tech KIS
BE	5.6	6.6 c	68.5	14.3 c	9.5 c	5.6	3.2
BG	4.2	0.4 c	25.2	18.0 c	48.4 c	7.6	0.3 c
CZ	8.6	11.7	43.9	25.2 c	18.8 c	3.8	23.3
DK	5.7	8.4	21.0	19.6	51.0	2.8	29.5
DE	7.4	7.4	69.5	8.8	11.9	3.7	10.8
EE	6.9	13.7	22.9	19.4 c	43.8	4.7	8.1
IE	5.5	:	:	:	:	1.0	:
EL	6.5	2.4	27.3	14.8	55.5	5.8	30.1
ES	6.9	5.0	58.2	15.8	21.1	8.7	12.3
FR	5.7 u	9.7 u	62.1 u	12.4 u	15.4 u	2.3 u	20.7 u
IT	5.0	8.2	56.2	10.5 c	21.0	3.4	29.7
CY	0.7	0.0	10.8	22.6	66.6	4.4	8.7
LV	2.1	:	27.0 c	19.4 c	47.7 c	1.5	3.8
LT	6.9	5.3	10.0	6.8 c	38.0 c	1.6	15.6

Note: The "Total" columns of Manufacturing and Services are percentages of "total turnover of innovative enterprises" whereas the additional aggregates are percentages of "turnover of new or significantly improved products only new to the firm" of respectively the Manufacturing and Services sector.

Source: Eurostat, Community Innovation statistics, 2004

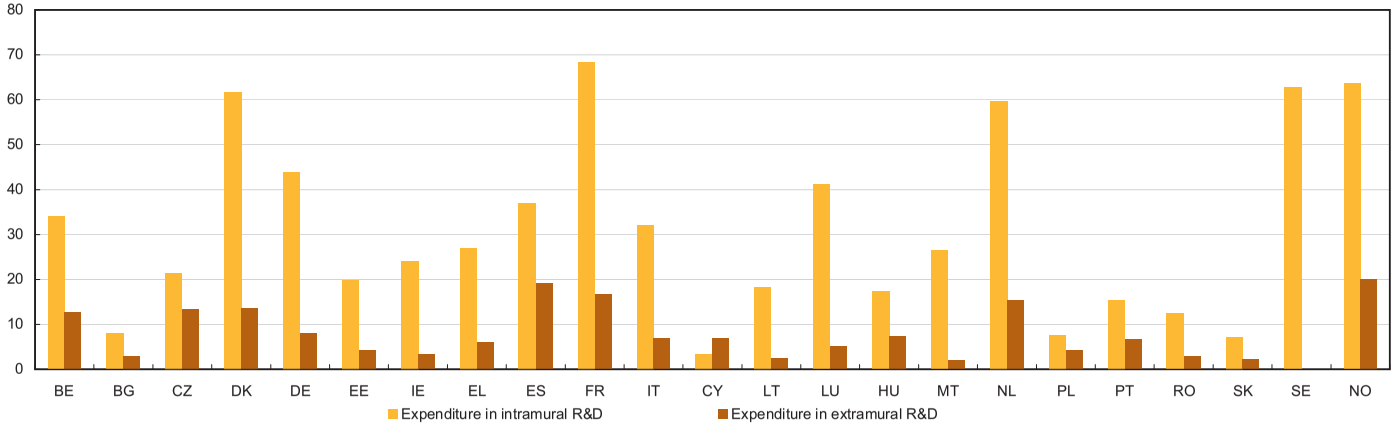
Table 5.3 **Turnover related to new or significantly improved products which are new to the enterprise but not new to the market, as a percentage of total turnover of innovative enterprises, by sector, by country, EU-27 and selected countries — 2004**

	Manufacturing					Services	
	Total	High-tech	Medium high-tech	Medium low-tech	Low-tech	Total	High-tech KIS
LU	2.7	:	:	3.4	:	9.8	2.7 c
HU	3.8	34.0	39.9	11.2 c	10.2 c	1.2	4.8
MT	12.2	1.2 c	14.6 c	0.6	82.5 c	1.9	39.9 c
NL	4.2	3.5	43.4	7.7 c	28.7 c	2.6	10.7
AT	4.3	2.6 c	15.7 c	10.0 c	13.1 c	2.8	10.8 c
PL	6.8	0.7 c	47.6	12.7 c	24.4 c	1.9	6.8
PT	4.7	5.5	11.3	27.4 c	37.8 c	3.6	12.4
RO	11.5	1.7	43.5	18.3	36.5	7.2	37.4
SI	:	:	:	:	:	2.1	15.2
SK	4.9	4.3	30.4	25.4 c	14.2 c	2.5	27.1
FI	4.6	7.9 c	31.8	12.0 c	18.4	2.0	20.3
SE	2.8	5.3	55.8	9.8 c	27.1 c	3.5	18.3 c
UK	3.6	13.0	35.7	19.7	31.6	6.7	13.4
IS	1.5	21.4	19.2	8.6	50.8	8.1	8.5
NO	4.3	13.6	32.7	21.8	31.9 c	4.4	12.2

Note: The "Total" columns of Manufacturing and Services are percentages of "total turnover of innovative enterprises" whereas the additional aggregates are percentages of "turnover of new or significantly improved products only new to the firm" of respectively the Manufacturing and Services sector.

Source: Eurostat, Community Innovation statistics, 2004

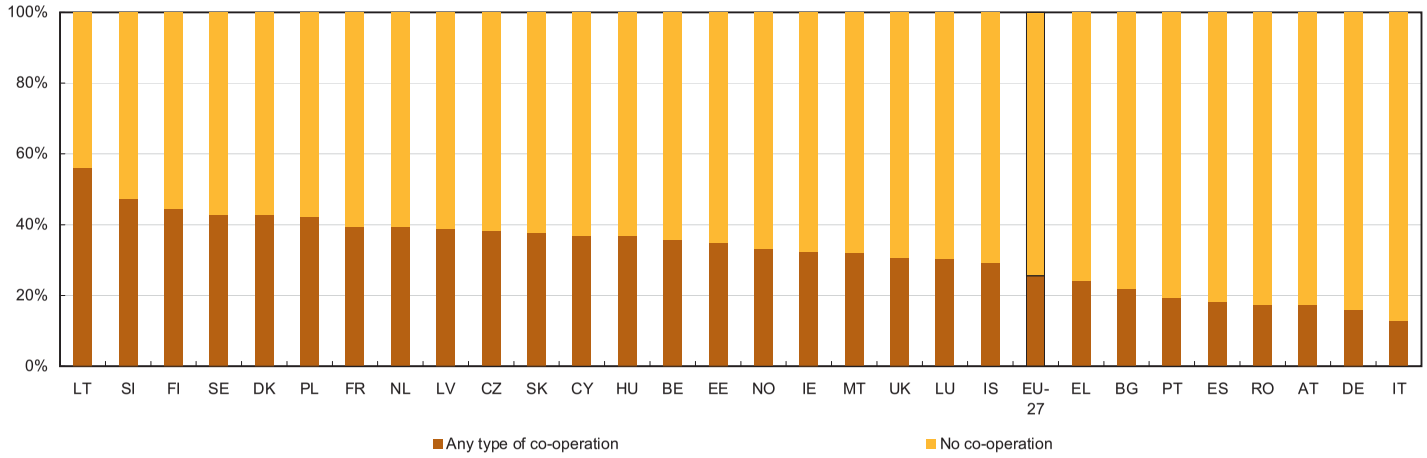
Figure 5.4 Intramural and extramural expenditure for R&D of innovative enterprises, as a percentage of total innovation expenditure, by country, EU-27 and selected countries — 2004



Missing or confidential data: LV, AT, SI, SE (only extramural R&D), FI, UK.

Source: Eurostat, Community Innovation statistics, 2004

Figure 5.5 Innovative enterprises broken down into those that co-operate and those that do not co-operate, as a percentage of innovative enterprises, by country, EU-27 and selected countries — 2004



Source: Eurostat, Community Innovation statistics, 2004

Table 5.6 **Innovative enterprises receiving public funding of innovation by source of funds, as a percentage of innovative enterprises, by country, EU-27 and selected countries — 2004**

	Enterprise that received any public funding	Enterprise that received funding from local or regional authorities	Enterprise that received funding from central government (including central government agencies or ministries)	Enterprise that received funding from the European Union	Enterprise that received funding from the 5th or 6th Framework Programme
EU-27	8.9	5.1	4.8	1.9	0.9
BE	22.8	15.9	9.2	3.6	2.2
BG	4.9	0.5	1.4	3.9	1.2
CZ	15.9	2.3	10.9	4.5	3.2
DK	15.0	2.1	8.7	6.5	3.4
DE	14.1	7.7	7.6	4.0	3.2
EE	9.7	0.6	8.2	1.8	0.5
IE	:	:	:	:	:
EL	29.0	5.5	19.9	19.7	7.8
ES	25.9	18.7	10.3	3.7	1.4
FR	20.4	8.0	15.1	5.1	1.8
IT	38.6	25.7	14.9	3.3	1.2
CY	35.5	0.3	33.8	3.1	1.0
LV	:	:	:	:	:
LT	12.7	2.1	7.5	5.4	0.6

Source: Eurostat, Community Innovation statistics, 2004

Table 5.6 **Innovative enterprises receiving public funding of innovation by source of funds, as a percentage of innovative enterprises, by country, EU-27 and selected countries — 2004**

	Enterprise that received any public funding	Enterprise that received funding from local or regional authorities	Enterprise that received funding from central government (including central government agencies or ministries)	Enterprise that received funding from the European Union	Enterprise that received funding from the 5th or 6th Framework Programme
LU	24.8	3.0	22.4	1.8	1.2
HU	27.3	2.6	25.5	4.3	1.9
MT	16.7	2.1	14.6	2.8	: c
NL	37.5	6.6	32.5	5.6	2.2
AT	33.9	20.6	24.7	9.3	2.6
PL	12.4	:	:	:	:
PT	11.1	1.1	6.8	5.2	2.9
RO	10.8	2.3	3.2	7.3	1.1
SI	: c	: c	: c	: c	: c
SK	12.1	3.4	5.1	5.3	0.6
FI	35.1	6.6	31.2	8.4	4.3
SE	:	:	:	:	:
UK	:	:	:	:	:
IS	:	:	:	:	:
NO	43.5	1.7	42.8	1.9	1.7

Source: Eurostat, Community Innovation statistics, 2004

Table 5.7 Product oriented and other effects of innovation, as a percentage of innovative enterprises, by country, EU-27 and selected countries — 2004

	Product oriented effects			Other effects	
	Increased range of goods and services	Entered new markets or increased market share	Improved quality in goods or services	Reduced environmental impacts or improved health and safety	Met regulation requirements
EU-27	34.0	29.2	37.6	14.1	18.3
BE	34.8	33.3	46.6	13.3	14.4
BG	42.8	32.9	45.6	20.7	26.7
CZ	40.6	25.7	40.0	15.5	8.0
DK	25.2	19.8	26.7	8.7	12.6
DE	38.0	31.7	37.7	10.3	10.4
EE	35.2	33.2	34.2	9.1	15.6
IE	40.7	32.8	32.7	11.1	13.8
EL	36.6	29.7	58.8	21.2	18.6
ES	28.1	19.6	35.2	16.2	23.0
FR	52.6	58.6	49.5	19.1	29.1
IT	25.4	15.2	34.1	14.7	19.5
CY	26.6	17.1	29.7	29.8	46.8
LV	10.5	17.7	7.1	14.9	14.3
LT	24.1	20.8	27.9	8.8	20.8

Source: Eurostat, Community Innovation statistics, 2004

Table 5.7 **Product oriented and other effects of innovation, as a percentage of innovative enterprises, by country, EU-27 and selected countries — 2004**

	Product oriented effects			Other effects	
	Increased range of goods and services	Entered new markets or increased market share	Improved quality in goods or services	Reduced environmental impacts or improved health and safety	Met regulation requirements
LU	48.2	34.5	53.2	15.3	37.6
HU	31.5	19.6	35.2	13.2	19.4
MT	21.5	19.4	21.5	11.8	18.8
NL	38.8	33.2	46.9	12.3	14.3
AT	25.4	20.8	35.3	8.2	13.5
PL	33.4	26.7	35.1	19.2	25.4
PT	9.7	15.4	9.5	12.7	12.5
RO	17.1	29.1	37.1	17.7	14.9
SI	38.1	32.2	49.6	18.6	15.5
SK	34.1	25.3	34.8	12.2	13.7
FI	25.3	21.7	24.2	7.2	9.8
SE	31.2	19.8	29.3	9.7	12.9
UK	37.1	36.5	40.9	15.5	25.7
IS	30.6	19.3	23.4	2.9	7.2
NO	23.1	16.2	23.6	8.1	12.4

Source: Eurostat, Community Innovation statistics, 2004

Table 5.8 Process oriented effects of innovation, as a percentage of innovative enterprises, by country, EU-27 and selected countries — 2004

	Process oriented effects			
	Improved flexibility of production or service provision	Increased capacity of production or service provision	Reduced labour costs per unit output	Reduced materials and energy per unit output
EU-27	24.6	24.2	17.6	9.5
BE	24.7	25.8	16.6	8.8
BG	22.8	23.4	18.9	17.0
CZ	26.8	25.3	16.9	13.7
DK	21.9	18.4	14.5	6.7
DE	27.5	20.0	15.1	9.5
EE	22.2	22.9	15.2	12.2
IE	22.1	23.5	19.3	10.2
EL	43.0	40.0	13.7	9.3
ES	25.2	32.5	12.7	7.1
FR	30.9	32.3	34.9	15.9
IT	18.7	23.2	18.1	4.4
CY	64.7	56.8	27.0	8.2
LV	15.5	13.6	18.5	19.4
LT	19.6	21.1	9.3	5.9

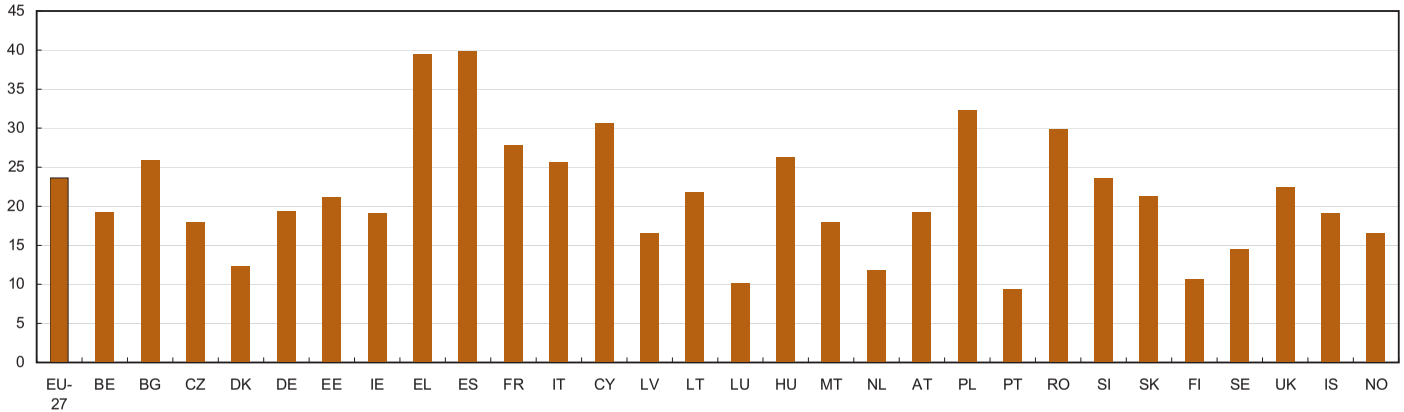
Source: Eurostat, Community Innovation statistics, 2004

Table 5.8 **Process oriented effects of innovation, as a percentage of innovative enterprises, by country, EU-27 and selected countries — 2004**

	Process oriented effects			
	Improved flexibility of production or service provision	Increased capacity of production or service provision	Reduced labour costs per unit output	Reduced materials and energy per unit output
LU	37.6	30.3	16.2	7.6
HU	20.9	21.9	4.1	6.3
MT	17.4	15.3	6.9	4.9
NL	34.0	30.5	20.9	12.8
AT	23.1	19.0	7.0	4.9
PL	21.1	23.2	15.0	12.0
PT	8.8	6.1	18.0	25.8
RO	28.6	32.3	15.5	0.0
SI	30.8	31.0	28.4	17.2
SK	27.1	24.5	6.8	8.8
FI	15.9	17.1	13.0	5.9
SE	16.3	21.6	17.9	7.1
UK	23.7	23.2	:	:
IS	16.0	15.3	13.8	5.7
NO	13.6	13.4	10.0	4.3

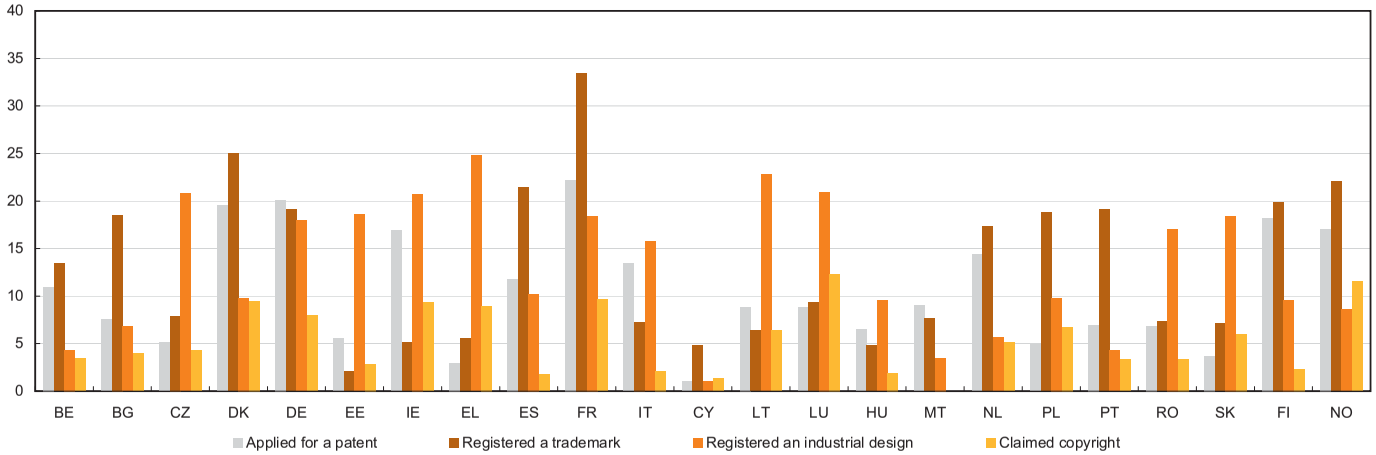
Source: Eurostat, Community Innovation statistics, 2004

Figure 5.9 Highly important hampering effect (Innovation costs are too high), as a percentage of innovative enterprises, by country, EU-27 and selected countries — 2004



Source: Eurostat, Community Innovation statistics, 2004

Figure 5.10 Intellectual property rights of innovative enterprises, as a percentage of innovative enterprises, by country, EU-27 and selected countries — 2004



Missing or confidential data: LV, AT, SI, SE, UK; MT only claimed copyright.

Source: Eurostat, Community Innovation statistics, 2004

Table 5.11 **Innovative enterprises that introduced organisational and/or marketing innovations by country, as a percentage of all enterprises, by country, EU-27 and selected countries — 2004**

	Enterprise introduced marketing innovation	Enterprise introduced organisational innovation	Enterprise introduced organisational and/or marketing innovation
EU-27	13.1	23.9	26.2
BE	20.0	29.9	35.1
BG	6.2	6.6	8.4
CZ	14.9	24.1	26.6
DK	15.9	39.4	42.1
DE	21.8	42.3	47.0
EE	20.6	30.0	35.1
IE	19.2	33.5	36.3
EL	13.9	23.3	25.8
ES	8.6	19.7	20.9
FR	12.0	20.0	23.1
IT	11.2	19.0	21.3
CY	23.8	27.4	34.5
LV	:	:	:
LT	10.5	16.8	19.9

Source: Eurostat, Community Innovation statistics, 2004

Table 5.11 **Innovative enterprises that introduced organisational and/or marketing innovations by country, as a percentage of all enterprises, by country, EU-27 and selected countries — 2004**

	Enterprise introduced marketing innovation	Enterprise introduced organisational innovation	Enterprise introduced organisational and/or marketing innovation
LU	23.7	39.5	42.7
HU	7.7	10.3	12.7
MT	9.2	11.9	14.4
NL	9.5	16.4	19.5
AT	22.1	36.3	39.9
PL	12.7	14.2	17.3
PT	15.4	27.0	29.7
RO	1.0	5.7	13.8
SI	:	:	:
SK	6.9	12.5	14.1
FI	:	:	:
SE	:	:	:
UK	:	:	:
IS	:	:	:
NO	18.0	15.8	24.4

Source: Eurostat, Community Innovation statistics, 2004

Chapter 6 - Patents

For the first time, the patent statistics published by Eurostat as of 2007 are almost exclusively based on the Worldwide Statistical Patent Database PATSTAT. PATSTAT has been created by the European Patent Office (EPO) in collaboration with the OECD Interinstitutional Patent Task Force members (EPO, Eurostat, OECD, JPO — Japanese Patent Office, USPTO — US Patent and Trademark Office, NSF — US National Science Foundation and WIPO — World Intellectual Property Organisation). Since 2006 an update of the database is made available to the task force members every six months (end of March and end of September).

Along with the change of the data source goes the application of a slightly different methodology for the indicators on patent applications to the EPO. From now on, all direct patent applications to the EPO (EPO-direct) are taken into account, but among the PCT applications made to the EPO (applications following the procedure laid down by the Patent Cooperation Treaty — PCT) only those that have entered into the regional phase are selected. As PCT patent applications in the international phase designating the EPO will no longer be included in the calculation of indicators on patent applications to the EPO, the resulting data shown here are lower than those in former publications. This new methodological approach is in line with the methodology also applied by the OECD.

Eurostat publishes the following indicators:

- Patent applications to the European Patent Office (EPO) by priority year;
- Patents granted by the United States Patent and Trademark Office (USPTO) by priority year;
- Triadic patent families (patents taken at the EPO, USPTO and Japanese Patent Office — JPO and protecting the same invention) by earliest priority year.

Data on patent applications to the EPO are final for 2003 and are nowcasts or provisional for 2004. For patents granted to the USPTO data are final for 2000 and are nowcasts or provisional for 2001.

The largest share of the EPO patent applications came in 2004 from Germany, followed by France and the United Kingdom. Germany had also the highest level of patent applications per million inhabitants, followed by Sweden and Finland.

Patent data are related to the International Patent Classification (IPC). The IPC codes given to each patent allow them to be aggregated in different technological areas such as biotechnology, high technology and ICT (information and communications technology). A concordance table links the IPC codes to NACE codes to show patent data according to industrial sectors.

Patents can be broken down also by institutional sector. The main sectors considered are business enterprise, government and higher education.

In 2003 the highest share of EU-27 patent applications to the EPO was related to IPC section B: ”Performing operations; transporting”. The high-tech sector can be split into six sub-groups. For the EU-27, the ranking by number of patent applications is as follows: “Communication technology”, “Computer and automated business equipment”, “Micro-organism and genetic engineering”, “Semiconductors”, “Aviation” and “Lasers”. A closer look at high-tech patent applications per million inhabitants shows that Finland ranked first, far ahead of the Netherlands and Sweden.

Concerning patents granted by the USPTO, the rankings between EU Member States are comparable to those for patent applications to the EPO. However, the number of patents granted to United States inventors is more than three times higher than those of the EU-27. Among the triadic patent families, the Unites States led in 2001 while Japan took over the second place from the EU-27, which ranked third.

Table 6.1 Patent applications to the EPO, total number, per million inhabitants, by IPC section as a percentage of total and annual average growth rate, EU-27 and selected countries — 1999-2004 (estimates)

	Total number		Per million inhabitants		Distribution by IPC section as a percentage of total — 2003								Annual average growth rate 1999-2004e
	1999	2004e	1999	2004e	Human necessities	Performing operations, transporting	Chemistry, metallurgy	Textiles, paper	Fixed constructions	Mech. engineering, lighting, heating, weapons, blasting	Physics	Electricity	
EU-27	48 657	54 707	101.1	112.0	15.4	21.4	13.2	2.0	4.6	11.0	16.3	16.1	2.4
BE	1 317	1 405	128.9	135.1	15.9	18.4	26.4	2.6	5.1	6.5	12.6	12.4	1.3
BG	8	13	1.0	1.7	14.1	14.1	9.4	0.0	4.7	9.4	21.3	27.0	10.9
CZ	60	92	5.8	9.0	15.5	12.6	25.2	11.0	11.1	9.4	5.2	10.0	8.8
DK	835	1 082	157.2	200.5	28.8	12.5	18.9	0.4	6.4	8.1	9.9	14.8	5.3
DE	20 956	23 261	255.5	281.8	12.4	24.5	12.9	2.1	4.3	13.9	15.2	14.7	2.1
EE	7	:	5.3	:	9.3	0.0	40.4	0.0	0.0	0.0	16.8	33.6	:
IE	211	236	56.5	58.7	29.6	15.5	9.9	0.0	3.7	2.1	22.7	16.6	2.3
EL	51	75	4.7	6.8	20.9	16.7	8.6	0.0	4.7	12.3	18.1	18.6	7.9
ES	729	1 209	18.3	28.6	21.9	26.4	14.3	2.1	8.0	8.9	8.4	10.1	10.7
FR	7 176	7 984	119.3	128.5	16.8	19.8	12.6	1.2	4.0	10.7	16.3	18.6	2.2
IT	3 719	4 581	65.4	79.1	19.6	27.9	10.5	3.7	5.8	12.6	9.1	10.8	4.3
CY	4	:	6.1	:	4.0	21.5	16.1	0.0	16.1	16.1	0.0	26.1	:
LV	2	:	0.7	:	12.2	26.8	54.9	0.0	0.0	0.0	0.0	6.1	:
LT	3	10	0.9	2.8	0.0	0.0	17.7	0.0	0.0	7.6	74.7	0.0	26.2
LU	63	106	147.4	235.8	1.7	36.2	14.2	1.4	6.7	23.2	9.0	7.5	11.1
HU	115	:	11.2	:	26.7	13.5	26.4	0.0	4.8	5.4	5.2	18.0	:
MT	5	4	13.2	9.7	23.1	23.1	7.6	0.0	0.0	0.0	46.2	0.0	-5.0
NL	2 910	3 956	184.7	243.3	12.9	13.1	11.4	1.0	4.3	4.0	34.1	19.2	6.3

Source: Eurostat, Patent statistics

Table 6.1 Patent applications to the EPO, total number, per million inhabitants, by IPC section as a percentage of total and annual average growth rate, EU-27 and selected countries — 1999-2004 (estimates)

	Total number		Per million inhabitants		Distribution by IPC section as a percentage of total — 2003								Annual average growth rate 1999-2004e
	1999	2004e	1999	2004e	Human necessities	Performing operations, transporting	Chemistry, metallurgy	Textiles, paper	Fixed constructions	Mech. enginee-ring, lighting, heating, wea-pons, blasting	Physics	Electricity	
AT	1 068	1 348	133.8	165.6	15.4	22.8	13.6	3.3	8.4	10.9	11.0	14.5	4.8
PL	35	140	0.9	3.7	17.5	16.8	14.8	1.8	7.7	13.8	13.1	14.4	32.1
PT	36	61	3.6	5.8	16.5	22.9	17.6	4.7	4.9	11.7	14.7	7.0	11.0
RO	7	25	0.3	1.2	26.1	0.9	6.5	0.0	19.6	6.5	16.4	24.0	28.6
SI	31	107	15.9	53.8	27.3	13.1	13.3	3.6	9.9	5.9	10.8	16.2	27.9
SK	15	20	2.9	3.7	21.9	15.8	17.5	2.3	3.5	12.1	12.3	14.7	5.0
FI	1 398	1 154	271.0	221.1	8.3	15.0	8.3	3.6	2.7	3.5	17.8	40.8	-3.8
SE	2 182	2 172	246.4	242.0	17.0	20.9	9.7	2.2	4.3	10.9	14.0	20.9	-0.1
UK	5 712	5 869	97.5	98.3	19.7	14.9	16.4	0.9	4.1	7.1	21.1	15.7	0.5
IS	35	:	128.6	:	32.7	6.0	24.1	0.0	0.0	3.8	29.2	4.0	:
LI	20	22	624.1	628.7	29.6	14.9	10.7	0.0	13.7	16.0	10.4	4.6	1.5
NO	371	287	83.4	62.7	22.1	16.9	10.7	0.3	8.3	10.7	14.3	16.8	-5.0
CH	2 463	3 087	345.7	419.1	20.2	21.0	14.0	3.0	4.9	7.2	18.3	11.4	4.6
HR	18	48	4.0	10.9	44.1	7.8	25.8	0.0	9.5	2.6	3.5	6.7	21.4
TR	22	106	0.3	1.5	19.2	6.6	9.7	11.7	2.3	25.5	10.3	14.6	36.9
CN	184	967	0.2	0.7	15.1	10.0	13.6	1.6	2.6	4.2	17.1	35.7	39.3
JP	18 379	23 301	145.3	182.4	8.8	17.0	14.8	1.1	0.8	8.8	25.1	23.5	4.9
RU	213	254	1.5	1.8	17.8	14.6	23.9	1.0	2.9	8.4	11.7	19.8	3.6
US	29 801	34 489	109.7	117.3	20.0	12.8	14.5	1.0	1.3	6.1	23.3	19.2	3.0

Source: Eurostat, Patent statistics

Table 6.2 Patents granted by the USPTO, total number, per million inhabitants, by IPC section as a percentage of total and annual average growth rate, EU-27 and selected countries — 1996-2001 (estimates)

	Total number		Per million inhabitants		Distribution by IPC section as a percentage of total — 2000								Annual average growth rate 1996-2001e
	1996	2001e	1996	2001e	Human necessities	Performing operations, transporting	Chemistry, metallurgy	Textiles, paper	Fixed constructions	Mech. engineering, lighting, heating, weapons, blasting	Physics	Electricity	
EU-27	26 146	27 837	55	58	12.5	21.2	12.4	1.7	2.8	11.3	19.7	17.8	1.3
BE	709	597	70	58	10.1	18.2	28.4	3.8	2.6	6.4	15.4	14.3	-3.4
BG	2	5	0	1	37.2	0.0	2.7	0.0	0.0	43.4	16.6	0.0	18.1
CZ	30	:	3	:	4.3	8.5	15.7	11.4	0.0	10.2	28.4	21.4	:
DK	480	480	91	90	24.4	11.0	18.7	0.5	3.0	10.8	14.6	16.2	0.0
DE	10 712	11 980	131	146	9.0	25.0	12.8	1.7	2.0	15.2	18.5	15.4	2.3
EE	3	4	2	3	5.5	0.0	16.1	0.0	0.0	0.0	67.7	10.6	10.4
IE	115	182	32	48	14.4	13.9	5.2	0.0	2.5	2.4	32.1	29.0	9.7
EL	30	11	3	1	39.9	19.2	8.7	0.0	0.0	5.8	7.7	14.4	-17.4
ES	276	339	7	8	21.8	28.4	11.1	1.9	5.6	8.8	10.3	11.6	4.2
FR	4 010	3 752	67	62	16.1	20.0	12.2	0.7	2.5	8.7	20.1	19.0	-1.3
IT	1 717	1 921	30	34	16.2	25.8	11.4	2.6	2.7	10.2	15.6	14.9	2.3
CY	0	6	1	8	10.6	21.3	4.3	0.0	0.0	0.0	63.8	0.0	78.1
LV	3	7	1	3	73.4	0.0	8.1	0.0	0.0	0.0	18.6	0.0	15.3
LT	1	6	0	2	0.0	6.5	78.7	0.0	0.0	0.0	3.1	11.4	44.8
LU	30	:	73	:	0.4	49.6	25.8	0.0	2.2	10.0	5.2	6.6	:
HU	45	65	4	6	19.0	14.2	12.7	0.0	0.0	4.7	21.2	28.1	8.0
MT	1	4	3	10	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	32.0
NL	1 321	1 529	85	96	14.8	13.4	12.8	0.7	2.8	5.9	24.2	24.9	3.0

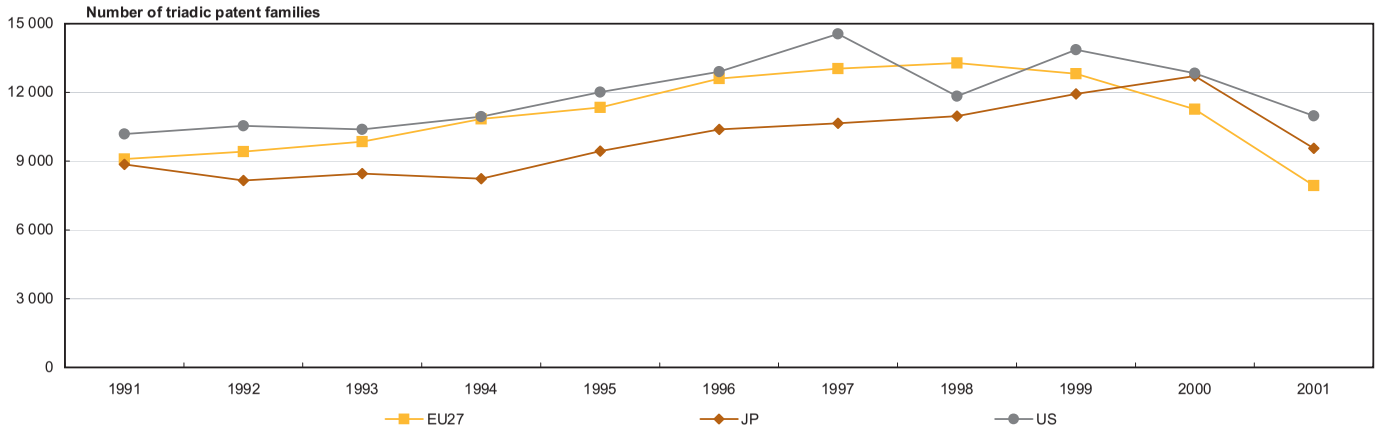
Source: Eurostat, Patent statistics

Table 6.2 **Patents granted by the USPTO, total number, per million inhabitants, by IPC section as a percentage of total and annual average growth rate, EU-27 and selected countries — 1996-2001 (estimates)**

	Total number		Per million inhabitants		Distribution by IPC section as a percentage of total — 2000								Annual average growth rate 1996-2001e
	1996	2001e	1996	2001e	Human necessities	Performing operations, transporting	Chemistry, metallurgy	Textiles, paper	Fixed constructions	Mech. engineering, lighting, heating, weapons, blasting	Physics	Electricity	
AT	466	645	59	80	12.3	23.8	12.3	2.8	5.1	14.7	13.8	15.1	6.7
PL	28	:	1	:	32.6	9.0	11.8	0.0	1.7	13.3	19.9	9.9	:
PT	6	:	1	:	26.4	31.7	7.9	0.0	0.0	10.6	12.7	10.6	:
RO	6	:	0	:	0.0	12.5	0.0	0.0	0.0	11.0	46.4	9.9	:
SI	14	30	7	15	46.7	3.6	16.5	0.0	7.2	9.3	3.6	11.3	17.4
SK	4	6	1	1	18.2	3.6	20.3	0.0	0.0	52.9	0.0	4.8	8.6
FI	762	843	149	163	8.8	16.1	6.6	6.2	2.4	5.1	20.4	33.7	2.0
SE	1 636	1 420	185	160	16.4	19.3	6.1	2.8	2.0	8.9	17.1	26.4	-2.8
UK	3 738	3 878	64	66	14.0	14.6	11.9	1.0	5.6	7.9	26.9	17.4	0.7
IS	15	35	57	122	50.3	11.6	1.9	0.0	0.0	0.0	12.9	19.4	17.6
LI	25	:	811	:	23.6	15.3	36.8	0.0	0.0	11.1	10.4	2.8	:
NO	248	241	57	54	15.7	18.6	9.0	0.0	12.8	9.4	20.4	12.1	-0.6
CH	1 341	1 414	190	196	18.1	22.0	13.4	2.6	2.1	7.8	20.8	12.9	1.1
HR	9	14	2	3	52.9	6.3	12.7	0.0	6.3	12.7	4.3	4.8	9.8
TR	7	:	0	:	51.0	9.3	5.6	7.1	0.0	7.1	7.1	12.1	:
CN	111	520	0	0	15.0	12.1	12.1	0.2	2.1	5.8	18.4	33.9	36.2
JP	32 666	39 470	260	310	5.2	16.9	8.1	0.5	0.7	7.5	33.6	26.8	3.9
RU	246	261	2	2	8.9	9.6	20.6	0.4	2.9	7.2	30.6	18.1	1.2
US	85 745	100 493	325	352	17.3	15.4	8.8	0.7	3.0	6.6	27.8	20.1	3.2

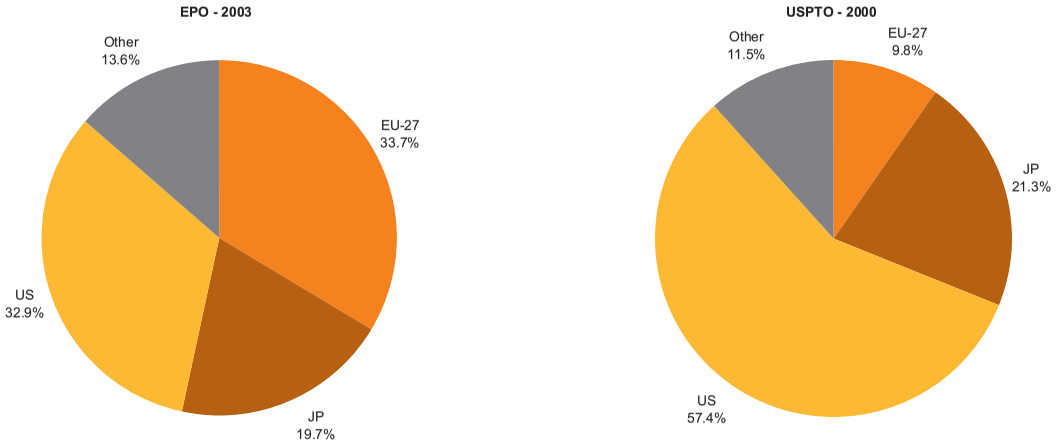
Source: Eurostat, Patent statistics

Figure 6.3 Triadic patent families, EU-27, Japan and United States — 1991 to 2001



Source: Eurostat, Patent statistics

Figure 6.4 Distribution of high-tech patent applications to the EPO (2003) and of high-tech patents granted by the USPTO (2000), EU-27, Japan and United States



Source: Eurostat, Patent statistics

Table 6.5 High-tech patent applications to the EPO, total number, per million inhabitants, per million labour force and annual average growth rate, EU-27 and selected countries — 1993, 1998 and 2003

	Total number			AAGR		per million inhabitants	per million labour force
	1993	1998	2003	1993-1998	1998-2003	2003	2003
EU-27	2 866	7 126	8 433	20.0	3.4	17.3	37.4
BE	93	172	202	13.0	3.3	19.5	45.6
BG	1	2	3	14.9	11.4	0.4	0.8
CZ	1	4	6	29.6	10.6	0.6	1.2
DK	49	152	195	25.4	5.1	36.1	68.0
DE	834	2 368	2 734	23.2	2.9	33.1	69.0
EE	1	1	6	1.7	52.0	4.4	9.0
IE	8	39	43	38.8	1.7	10.7	22.4
EL	1	4	17	23.6	34.5	1.5	3.6
ES	26	71	111	21.7	9.6	2.7	5.7
FR	619	1 244	1 622	15.0	5.5	26.3	60.2
IT	189	312	413	10.6	5.7	7.2	17.1
CY	:	:	3	:	:	3.7	7.6
LV	:	:	1	:	:	0.2	0.4
LT	:	:	1	:	:	0.2	0.4
LU	:	5	4	:	-2.8	9.7	22.3
HU	5	9	24	13.6	22.5	2.4	5.9
MT	:	:	:	:	:	:	:
NL	251	645	788	20.8	4.1	48.7	93.5

Source: Eurostat, Patent statistics

Table 6.5 High-tech patent applications to the EPO, total number, per million inhabitants, per million labour force and annual average growth rate, EU-27 and selected countries — 1993, 1998 and 2003

	Total number			AAGR		per million inhabitants	per million labour force
	1993	1998	2003	1993-1998	1998-2003	2003	2003
AT	35	78	185	17.0	18.9	22.8	46.7
PL	1	2	12	20.4	38.0	0.3	0.7
PT	1	2	11	11.3	41.4	1.1	2.1
RO	:	0	2	:	36.8	0.1	0.2
SI	4	7	4	12.2	-9.3	2.0	4.2
SK	:	1	4	:	38.0	0.7	1.4
FI	122	466	542	30.8	3.1	104.1	208.5
SE	112	464	402	32.9	-2.8	44.9	87.8
UK	515	1 081	1 101	16.0	0.4	18.5	37.7
IS	3	7	11	20.9	9.0	38.9	70.0
LI	2	0	2	-30.3	43.4	59.1	:
NO	6	38	57	44.9	8.1	12.4	23.9
CH	92	225	256	19.5	2.6	34.9	:
HR	:	2	0	:	-30.3	0.1	0.2
TR	1	4	12	43.3	27.6	0.2	0.5
CN	2	20	334	60.5	74.8	0.3	0.4
JP	2 485	3 886	4 924	9.4	4.8	38.6	73.9
RU	15	34	48	16.8	7.3	0.3	0.7
US	3 749	7 142	8 225	13.8	2.9	28.3	55.6

Source: Eurostat, Patent statistics

Table 6.6 High-tech patent applications to the EPO, total number and by high-tech field as a percentage, EU-27 and selected countries — 2003

	Total number	Aviation	Computer and automated business equipment	Communication technology	Laser	Micro-organism and genetic engineering	Semiconductors
EU-27	8 433	2.5	28.1	47.7	1.1	11.8	8.7
BE	202	1.5	22.6	40.8	0.0	20.3	14.8
BG	3	0.0	36.4	0.0	9.1	36.4	18.2
CZ	6	0.0	16.6	19.4	0.0	64.2	0.0
DK	195	2.1	13.5	44.7	0.5	37.8	1.4
DE	2 734	2.9	28.3	43.6	1.4	12.7	11.0
EE	6	0.0	16.9	33.7	0.0	22.4	27.0
IE	43	0.0	36.7	33.2	3.1	5.3	21.6
EL	17	3.0	25.4	58.2	0.0	11.4	2.0
ES	111	2.7	26.1	44.5	2.2	23.2	1.3
FR	1 622	4.4	27.4	49.5	1.1	9.2	8.5
IT	413	1.8	31.9	42.1	2.1	10.8	11.3
CY	3	38.2	0.0	23.7	0.0	38.2	0.0
LV	1	0.0	0.0	100.0	0.0	0.0	0.0
LT	1	0.0	0.0	0.0	0.0	100.0	0.0
LU	4	0.0	76.9	23.1	0.0	0.0	0.0
HU	24	4.1	4.1	80.1	0.0	11.6	0.0
MT	:	:	:	:	:	:	:
NL	788	0.6	37.9	40.8	0.2	8.8	11.7

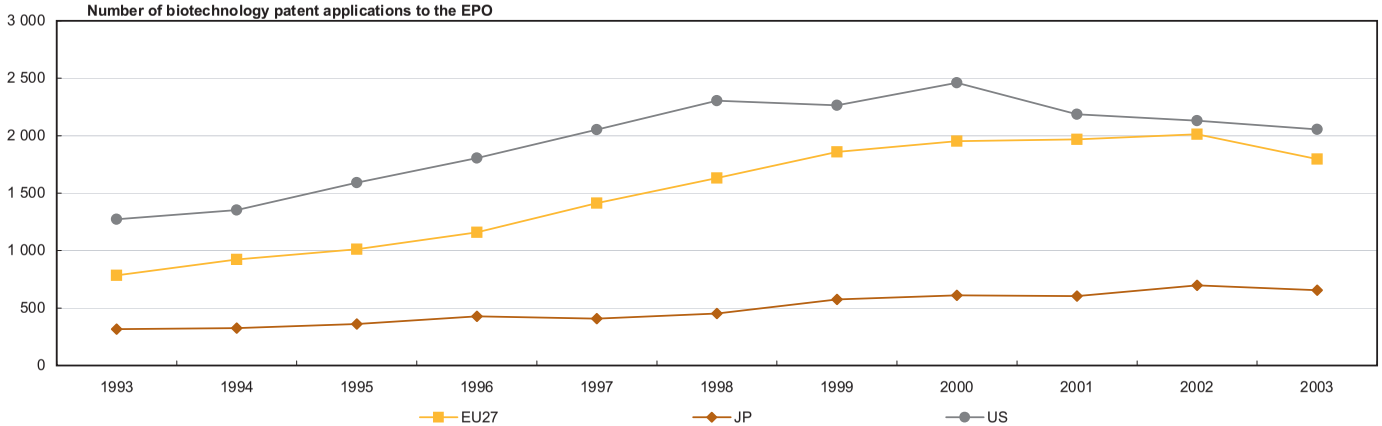
Source: Eurostat, Patent statistics

Table 6.6 High-tech patent applications to the EPO, total number and by high-tech field as a percentage, EU-27 and selected countries — 2003

	Total number	Aviation	Computer and automated business equipment	Communication technology	Laser	Micro-organism and genetic engineering	Semiconductors
AT	185	0.5	23.3	45.7	2.6	15.0	12.8
PL	12	8.6	30.9	34.3	0.0	18.0	8.2
PT	11	0.0	17.7	22.1	0.0	51.4	8.8
RO	2	0.0	15.8	68.4	0.0	0.0	15.8
SI	4	0.0	0.0	100.0	0.0	0.0	0.0
SK	4	0.0	40.0	60.0	0.0	0.0	0.0
FI	542	0.6	20.5	74.9	0.0	3.0	1.0
SE	402	0.7	18.2	68.8	0.5	8.9	2.8
UK	1 101	2.1	32.8	44.2	1.6	12.9	6.4
IS	11	0.0	25.2	8.9	0.0	65.9	0.0
LI	2	0.0	0.0	0.0	0.0	50.0	50.0
NO	57	1.8	20.7	61.4	0.0	14.5	1.8
CH	256	2.6	28.3	44.0	3.1	15.6	6.4
HR	0	0.0	0.0	100.0	0.0	0.0	0.0
TR	12	0.0	21.8	50.7	0.0	27.5	0.0
CN	334	0.0	18.4	69.4	0.0	8.5	3.7
JP	4 924	0.3	35.4	38.6	1.1	8.6	16.0
RU	48	3.9	8.9	46.9	2.1	28.4	9.7
US	8 225	1.4	36.7	37.9	1.1	13.0	10.0

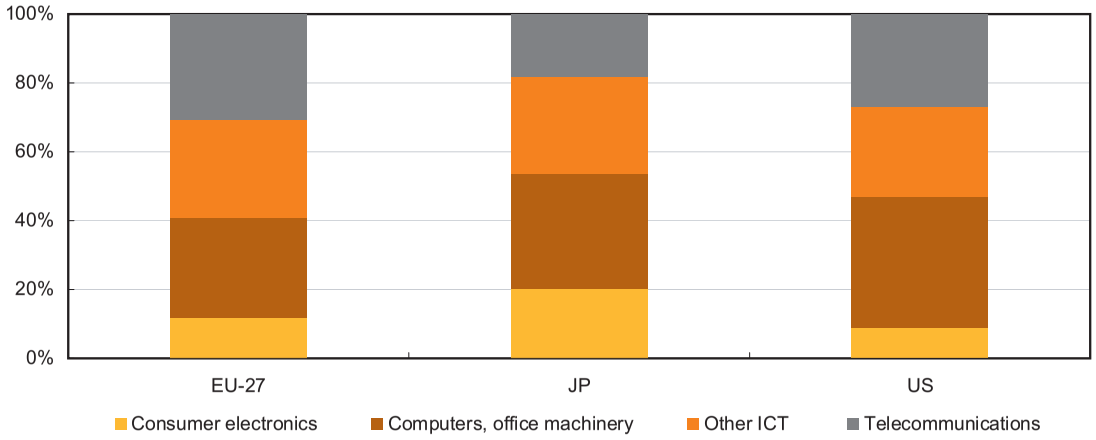
Source: Eurostat, Patent statistics

Figure 6.7 Biotechnology patent applications to the EPO, EU-27, Japan and the United States — 1993 to 2003



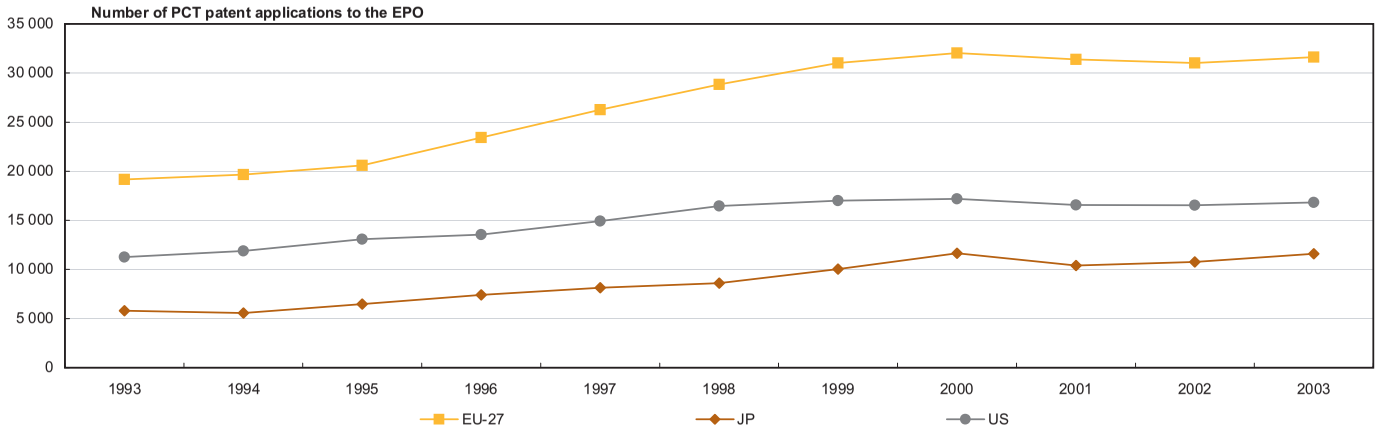
Source: Eurostat, Patent statistics

Figure 6.8 ICT patent applications to the EPO, by ICT group as a percentage of total, EU-27, Japan and the Unites States — 2003



Source: Eurostat, Patent statistics

Figure 6.9 PCT patent applications to the EPO, EU-27, Japan and the United States — 1993 to 2003



Source: Eurostat, Patent statistics

Source: Eurostat, Patent statistics

Chapter 7 - High-technology

In 2005, early-stage venture capital investment (VCI) amounted to 0.022% of GDP in the EU-15. With 0.052% of GDP, Sweden was in 2004 the country where early-stage VCI was highest, closely followed by Denmark, with 0.051% of GDP. At the expansion and replacement stage, EU-15 VCI amounted to 0.12% of GDP. Denmark ranked first with 0.35%.

Within the EU-27 in 2004, 137 000 enterprises in the manufacturing sector were considered high-tech. Almost one quarter (32 000 enterprises) were located in Italy.

The knowledge-intensive sector (KIS) of the EU-27 added up to more than 600 000 enterprises. These were mostly located in the United Kingdom (121 000 enterprises) and Italy (101 000 enterprises).

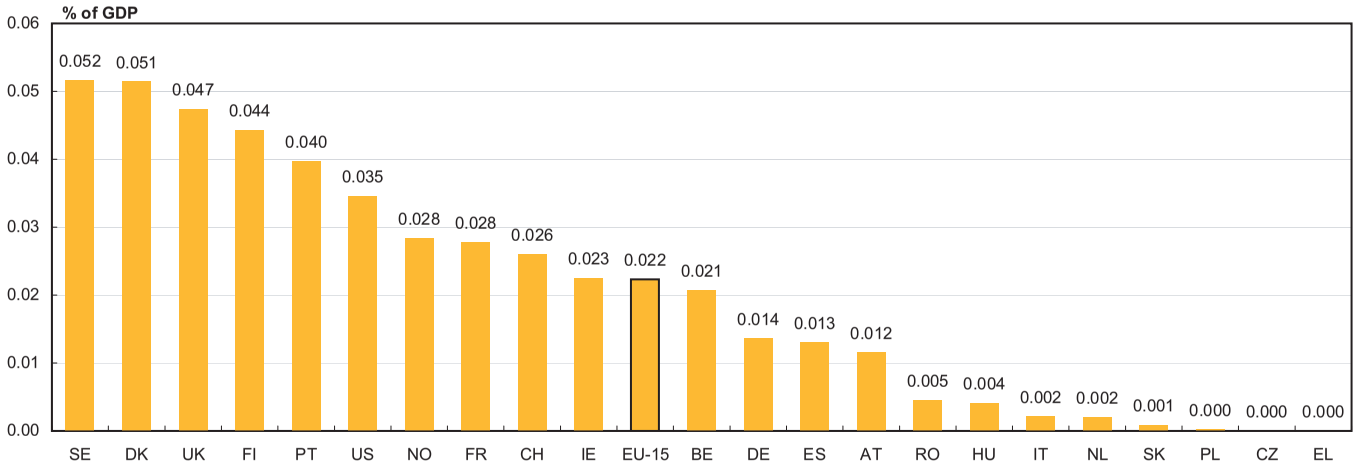
In 2005, the EU-27 was the leading exporter of high-tech products in the world. The world market share for high-tech exports amounted to 17.2%, 16.6% and 15.1% respectively for the EU-27, the United States and China. Within the EU-27, Germany was the leading exporter of high-tech products.

Within the EU-27 in 2006, almost 138 million people were employed in the services sector, whereas less than 38 million were employed in manufacturing. Employment in the total manufacturing and services sector remained quite stable in the EU-27 between 2001 and 2006. However, employment in high-tech KIS increased slightly during the same period, with an annual average growth rate (AAGR) of 1.0%, although employment in high-tech manufacturing declined, with an AAGR of -2.6%.

Women as employees were under-represented in the manufacturing sector in the EU-27 (31%). In the high-tech manufacturing sector, their share was slightly higher (35%). By contrast, in the services sector women reached and surpassed parity (54%), but not in the specific sector of high-tech KIS (35%).

At regional level, in 2006 capital regions and regions close to capitals were often well ranked in terms of employment in total high-tech sectors.

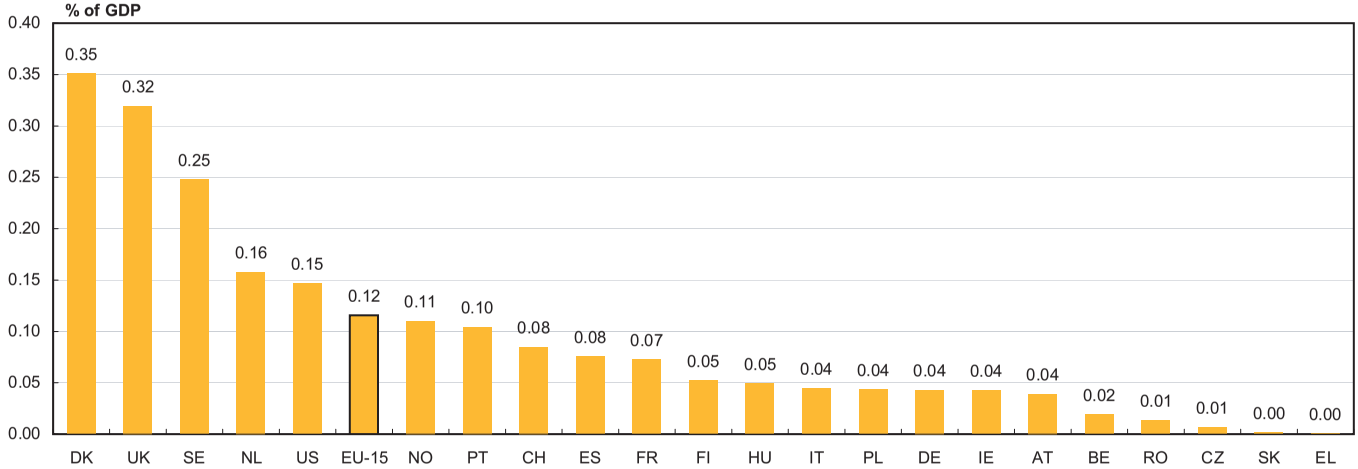
Figure 7.1 Venture capital at early stage as a percentage of GDP, EU-15 and selected countries — 2005



EU-15: Eurostat estimation.

Source: Eurostat, High-tech statistics

Figure 7.2 Venture capital at expansion and replacement stage as a percentage of GDP,EU-15 and selected countries — 2005



EU-15: Eurostat estimation.

Source: Eurostat, High-tech statistics

Table 7.3 Number of enterprises, turnover, production value and value added in high-tech manufacturing sector and in high-tech knowledge intensive services, EU-27 — 2004

	High-tech manufacturing				High-tech knowledge intensive services			
	Number of enterprises	Turnover in EUR million	Prod. Value in EUR million	Value added in EUR million	Number of enterprises	Turnover in EUR million	Prod. Value in EUR million	Value added in EUR million
EU-27	137 321 s	:	:	:	600 312 s	845 954 s	783 489 s	419 315 s
BE	1 958	15 173	16 589	6 459	14 648	23 426	23 448	11 426
BG	1 247	526	494	156	3 790	1 775	1 685	1 004
CZ	8 682	9 013	8 689	1 556	24 868	7 344	6 746	3 561
DK	1 112	8 914	8 976	3 917	8 481	15 227	13 967	7 264
DE	19 992	150 823	129 355	49 671	57 527	158 784	139 123	84 122
EE	256	:	:	:	955	772	742	352
IE	309	30 458	30 036	8 714	6 045	16 348	11 205	8 077
EL	:	:	:	:	10 859	9 943	12 579	5 058
ES	7 922	22 890	21 366	6 375	34 787	56 007	44 536	27 388
FR	16 391	141 886	132 319	31 747	56 943	123 425	120 051	61 666
IT	32 098	60 621	58 873	18 887	101 056	98 236	97 580	45 823
CY	85	90	89	37	231	538	525	429
LV	242	:	:	:	1 216	832	770	463
LT	363	379	384	125	1 325	998	876	420

High-tech manufacturing:
EU-27: Excludes EL and MT.
Exceptions to the reference year: 2003: BG and IE; 2002: LT; 2001: CY.

High-tech KIS:
Exception to the reference year: 2002: CY.

Source: Eurostat, High-tech statistics

Table 7.3 **Number of enterprises, turnover, production value and value added in high-tech manufacturing sector and in high-tech knowledge intensive services, EU-27 — 2004**

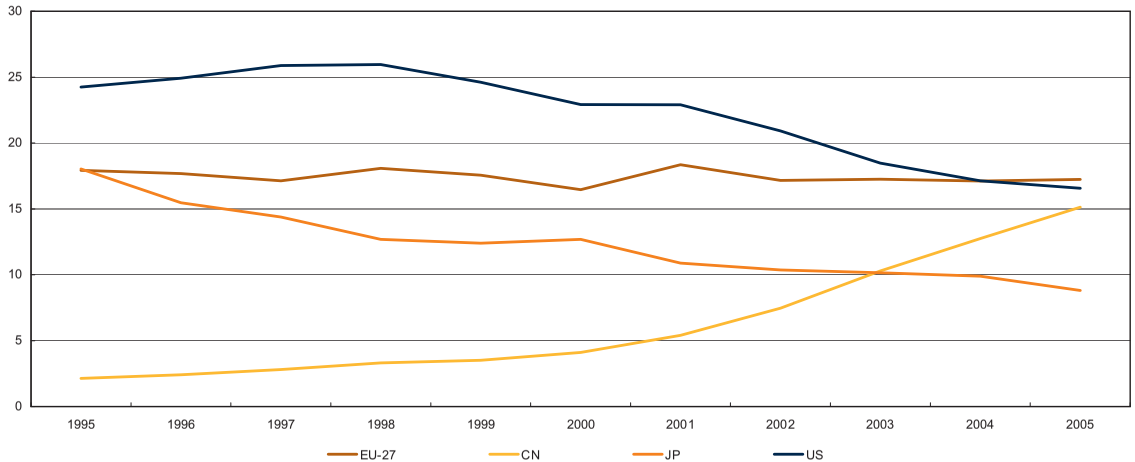
	High-tech manufacturing				High-tech knowledge intensive services			
	Number of enterprises	Turnover in EUR million	Prod. Value in EUR million	Value added in EUR million	Number of enterprises	Turnover in EUR million	Prod. Value in EUR million	Value added in EUR million
LU	62	:	:	:	1 095	2 210	1 964	1 211
HU	6 029	15 887	14 818	2 899	27 224	8 032	5 316	3 163
MT	:	:	:	:	684	314	312	230
NL	3 040	:	:	:	24 075	39 598	38 738	19 678
AT	1 829	11 344	10 031	4 192	13 908	15 570	11 164	7 179
PL	14 874	7 266	6 701	2 226	31 541	14 106	12 629	7 350
PT	1 302	5 042	4 890	1 214	3 665	10 292	9 603	4 513
RO	1 784	1 121	1 005	359	12 132	3 933	3 581	1 965
SI	913	2 022	1 882	908	3 061	1 980	1 690	873
SK	401	1 658	1 579	179	1 373	2 257	2 050	1 085
FI	1 253	29 588	17 787	6 469	5 297	12 909	12 530	4 832
SE	3 625	24 299	25 831	10 591	32 588	28 659	26 945	12 550
UK	11 552	90 228	81 435	35 073	120 938	192 438	183 135	97 636

High-tech manufacturing:
Exception to the reference year: 2003: SI.

High-tech KIS:
Exceptions to the reference year: 2002: LU and MT.

Source: Eurostat, High-tech statistics

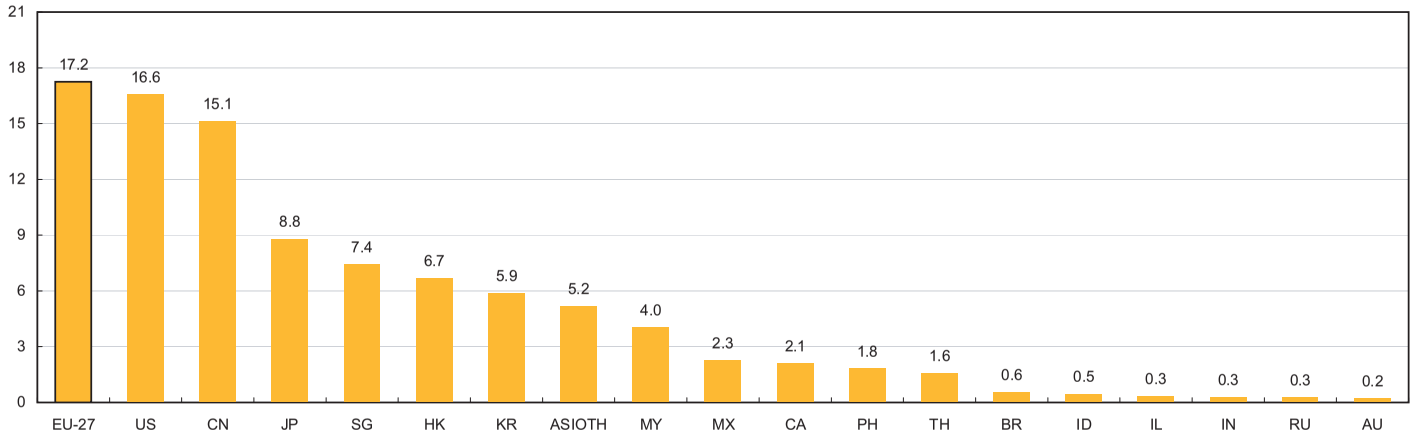
Figure 7.4 World market shares for high-tech exports, EU-27, China, Japan and United States — 1995 to 2005



EU-27: Excludes intra-EU trade.
CN: Excludes HK.

Source: Eurostat, High-tech statistics

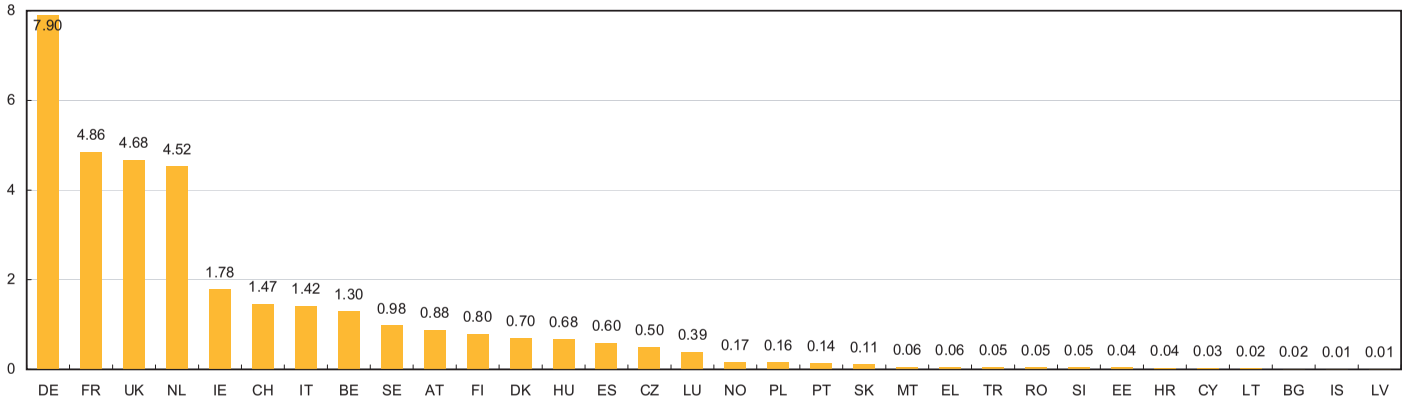
Figure 7.5 World market shares for high-tech exports, EU-27 and world main exporting countries — 2005



EU-27: Excludes intra-EU trade.
CN: Excludes HK.

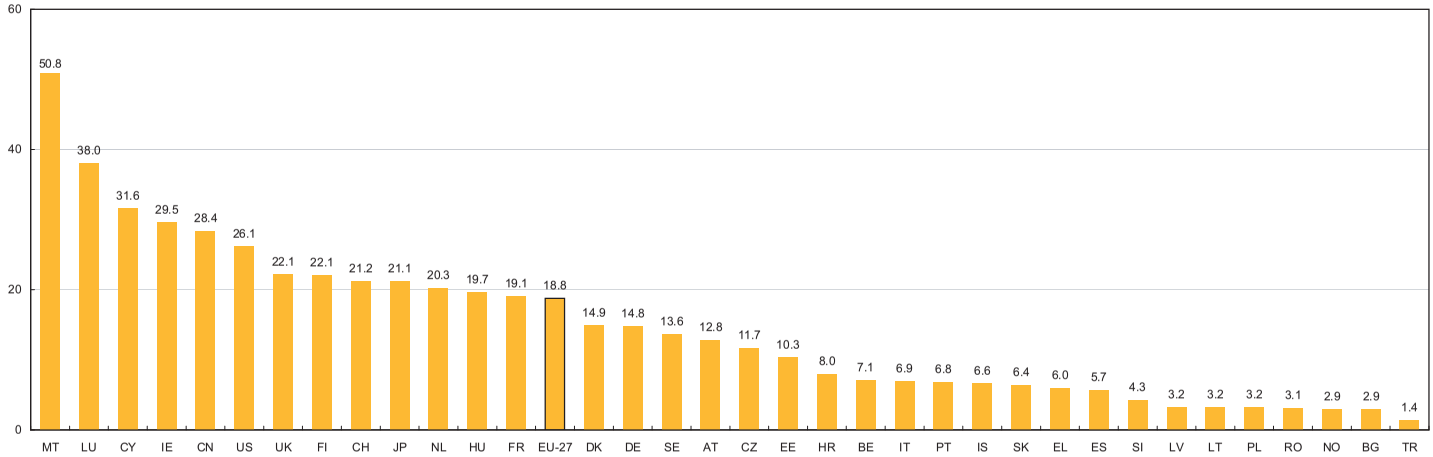
Source: Eurostat, High-tech statistics

Figure 7.6 World market shares for high-tech exports, EU-27 Member states and selected countries — 2005



Source: Eurostat, High-tech statistics

Figure 7.7 High-tech exports as a percentage of total exports, EU-27 and selected countries — 2005



EU-27: Excludes intra-EU trade.

Source: Eurostat, High-tech statistics

Table 7.8 Employment in manufacturing sectors, total and percentage of women in 2006, and annual average growth rate 2001-2006, EU-27 and selected countries

	Total			High-tech			Medium high-tech		
	Total in thousands	Percentage of women	AAGR 2001-2006	Total in thousands	Percentage of women	AAGR 2001-2006	Total in thousands	Percentage of women	AAGR 2001-2006
EU-27	37 951 s	31 s	0.0 s	2 193 s	35 s	-2.6 s	11 505 s	24 s	0.1 s
BE	726	25	-1.0	30	32	-5.3	245	22	0.4
BG	745	50	2.4	16	53 u	1.5	136	32	-0.1
CZ	1 361	37	0.7	81	49	1.9	420	34	3.4
DK	429	31	-2.7	22	42	-4.0	146	27	-2.1
DE	8 185	29	-1.0	636	32	-2.1	3 359	22	-0.2
EE	136	46	-0.3	7 u	: u	3.7 u	17	: u	-4.9
IE	272	31	-2.3	52	40	-3.8	64	34	-0.2
EL	561	27	-0.6	11	25 u	2.8	90	21	2.4
ES	3 130	25	0.7	88	33	-1.4	796	21	0.2
FR	3 858	28	-2.5	256	36	-5.2	1 212	24	-2.3
IT	4 820	29	-0.2	294	32	4.8	1 447	23	1.4
CY	37	33	-1.1	1 u	: u	: u	3	38 u	1.0
LV	161	44	-0.7	: u	: u	: u	17	37 u	2.5
LT	265	48	1.3	9 u	: u	3.1 u	28 u	29 u	-4.2 u
LU	16	17	-5.1	: u	: u	: u	2	: u	2.2

Exceptions to the reference year: 2005: BE and IE.
Exceptions to the reference period: 2001-2005: BE and IE.

Source: Eurostat, High-tech statistics

Table 7.8 **Employment in manufacturing sectors, total and percentage of women in 2006, and annual average growth rate 2001-2006, EU-27 and selected countries**

	Total			High-tech			Medium high-tech		
	Total in thousands	Percentage of women	AAGR 2001-2006	Total in thousands	Percentage of women	AAGR 2001-2006	Total in thousands	Percentage of women	AAGR 2001-2006
HU	868	39	-1.9	98	51	-0.8	235	30	0.0
MT	27	25	-3.3	5	44 u	-0.1	5	: u	-5.8
NL	1 043	22	-1.0	51	21	-11.0	205	17	-4.2
AT	741	26	0.1	53	30	-4.2	219	20	4.8
PL	2 971	33	3.5	84	44	10.6	661	25	5.0
PT	978	42	-2.1	22	44	-3.4	147	29	-1.1
RO	1 978	48	-0.1	29	38 u	-3.7	478	34	-0.7
SI	268	36	-0.7	10	47	5.4	72	35	0.1
SK	609	37	2.4	41	60	15.2	179	33	7.9
FI	444	29	-1.4	51	29	-0.5	116	20	-1.6
SE	660	25	-2.7	40	32	-11.8	240	23	-1.6
UK	3 660	26	-3.8	288	30	-7.0	1 272	21	-3.6
IS	22	31	-1.0	: u	: u	: u	3	: u	2.6
NO	:	:	:	:	:	:	:	:	:
CH	601	28	-2.0	92	36	-2.2	202	23	-1.3
HR	302	36	-0.7	8 u	44	5.6 u	66	20	0.8

Exception to the reference year: 2005: IS.
Exceptions to the reference period: 2001-2005: IS; 2004-2006: PL.

Source: Eurostat, High-tech statistics

Table 7.9 Employment in services sectors, total and percentage of women in 2006, and annual average growth rate 2001-2006, EU-27 and selected countries

	Total			Knowledge intensive services (KIS)			High-tech KIS		
	Total in thousands	Percentage of women	AAGR 2001-2006	Total in thousands	Percentage of women	AAGR 2001-2006	Total in thousands	Percentage of women	AAGR 2001-2006
EU-27	137 597 s	54 s	0.2 s	67 358 s	70 s	2.9 s	6 793 s	35 s	1.0 s
BE	3 096	55	1.4	1 621	62	1.4	158	28	-0.8
BG	1 784	60	2.4	683	70	1.4	80	51	1.5
CZ	2 712	57	1.2	1 209	68	1.4	142	41	-1.2
DK	2 064	59	1.3	1 220	66	1.0	123	31	-1.7
DE	25 293	59	1.4	12 715	68	2.4	1 294	36	2.0
EE	397	72	3.2	185	79	2.8	16	: u	-3.6
IE	1 277	64	3.8	654	73	4.5	69	30	-0.6
EL	2 932	53	3.3	1 109	64	3.8	88	40	5.2
ES	12 968	68	5.4	5 514	79	6.7	589	43	6.5
FR	17 881	59	1.6	8 928	66	1.5	929	35	-0.8
IT	15 050	54	2.3	6 975	68	4.0	702	37	1.5
CY	260	62	3.4	101	74	4.3	7	39	4.5
LV	674	72	3.6	277	80	3.1	27	64	5.5
LT	867	68	2.5	383	73	0.8	31	59 u	1.7
LU	159	55	2.2	85	70	5.1	6	31	2.5

Exceptions to the reference year: 2005: BE and IE.
Exceptions to the reference period: 2001-2005: BE and IE.

Source: Eurostat, High-tech statistics

Table 7.9 **Employment in services sectors, total and percentage of women in 2006, and annual average growth rate 2001-2006, EU-27 and selected countries**

	Total			Knowledge intensive services (KIS)			High-tech KIS		
	Total in thousands	Percentage of women	AAGR 2001-2006	Total in thousands	Percentage of women	AAGR 2001-2006	Total in thousands	Percentage of women	AAGR 2001-2006
HU	2 471	60	1.5	1 117	71	1.9	134	44	1.6
MT	107	41	1.7	47	55	2.9	5	: u	2.5
NL	6 334	53	0.5	3 432	63	1.3	312	24	-1.4
AT	2 602	60	1.7	1 194	66	2.0	108	27	-0.8
PL	7 936	31	-11.0	3 589	:	:	346	:	:
PT	2 966	60	1.8	1 171	75	3.5	94	42	5.3
RO	3 595	57	2.3	1 356	72	2.7	150	45	-0.7
SI	529	62	2.2	250	75	3.5	26	30	1.1
SK	1 308	61	1.8	573	70	1.3	59	40	-1.6
FI	1 711	63	1.2	1 011	71	1.5	113	39	1.3
SE	3 363	59	1.0	2 111	66	1.1	224	32	-0.1
UK	21 634	58	1.4	12 126	65	1.9	1 186	22	-1.6
IS	115	60	1.2	70	70	2.0	8	34	-1.8
NO	1 733	58	0.7	1 042	66	1.2	91	30	-2.2
CH	2 974	56	1.2	1 665	60	1.7	153	30	-2.0
HR	894	58	1.9	363	69	2.5	33	35 u	-3.7

Exceptions to the reference year: 2005: IS and NO.
Exceptions to the reference period: 2001-2005: IS and NO; 2002-2006: HR.

Source: Eurostat, High-tech statistics

Figure 7.10 Leading regions in terms of employment in total high-tech sectors ([1]) — 2006

([1]) total high-tech sectors corresponds to the sum of high-tech manufacturing sector and high-tech KIS sectors.

Source: Eurostat, High-tech statistics

Methodological Notes

GBAORD

1. Definition

Government budget appropriations or outlays on R&D (GBAORD) are all appropriations allocated to R&D in central government or federal budgets and therefore refer to budget provisions, not to actual expenditure. Provincial or state governments should be included where the contribution is significant. Unless otherwise stated, data include both current and capital expenditure and cover not only government-financed R&D performed in government establishments, but also government-financed R&D in the business enterprise, private non-profit and higher education sectors, as well as abroad (Frascati Manual, § 496). Data on actual R&D expenditure, which are not available in their final form until some time after the end of the budget year concerned, may well differ from the original budget provisions. This and further methodological information can be found in the Frascati Manual, OECD, 2002.
GBAORD data are assembled by national authorities using data for public budgets. These measure government support for R&D activities, or, in other words, how much priority governments place on the public funding of R&D.
Eurostat collects aggregated data which are checked and processed, and compared with other data sources such as the OECD. Then, all the necessary aggregates are calculated (or estimated).

2. Sources

The basic data are forwarded to Eurostat by the national administrations of Member States and other countries. Data for Japan and the United States come from the OECD's Main Science and Technology Indicators (MSTI).

3. Statistical data compilation

Until 2003, data on GBAORD were collected under a gentlemen's agreement. From the reference year 2004 on, data collection is based on Commission Regulation No 753/2004 on statistics on science and technology (OJ L 118, 23.4.2004, p. 23).

4. Breakdown by socio-economic objectives

Government R&D appropriations or outlays on R&D are broken down by socio-economic objectives on the basis of NABS — *Nomenclature for the analysis and comparison of scientific programmes and budgets*, Eurostat, 1994. The 1993 version of NABS applies from the 1993 final and the 1994 provisional budgets onwards. Not all countries collect the data directly by NABS: some follow other compatible classifications (OECD, Nordforsk), which are then converted to the NABS classification (see Table 8.2 of the Frascati Manual).

5. Exceptions

No data exist for Bulgaria, and therefore EU aggregates exclude Bulgaria.
No GBAORD data exist for Luxembourg before 2000, and therefore EU aggregates exclude Luxembourg before that year.
No GBAORD data exist for Cyprus before 2004, and therefore EU aggregates exclude Cyprus before that year.
No GBAORD data exist for Hungary before 2005, and therefore EU aggregates exclude Hungary before that year.

R&D expenditure and personnel

1. Concepts and definitions

The basic concepts, guidelines for collecting data and the classifications used in compiling statistics on research and experimental development are given in the Frascati Manual, OECD, 2002. R&D expenditure and personnel are particularly detailed in Chapters 5 and 6 respectively. Regional data are collected according to the standards defined by the Regional Manual, Eurostat, 1996. Research and experimental development (R&D) activities comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications. There are two basic statistical variables in this domain, namely R&D expenditure and personnel.

2. Sources

The basic data are forwarded to Eurostat by the national administrations of Member States and other countries. Data for China, Japan and the United States come from the OECD's Main Science and Technology Indicators (MSTI).

3. Statistical data compilation

Until 2003, data on R&D were collected under a gentlemen's agreement. From the reference year 2003 on, data collection is based on Commission Regulation No 753/2004 on statistics on science and technology (OJ L 118, 23.4.2004, p. 23).

3. R&D expenditure

Intramural expenditures are all expenditures for R&D performed within a statistical unit or sector of the economy during a specific period, whatever the source of funds (*Frascati Manual, § 358*).

R&D intensity

R&D intensity is R&D expenditure expressed as a percentage of GDP.

For the computation of R&D intensity at national level (EEA countries), GDP from national accounts is used as reference data. At regional level, GDP data are taken from the regional accounts. Both data series were extracted from NewCronos.

4. R&D personnel

Data on R&D personnel measure the resources going directly to R&D activities. The total R&D personnel is defined as follows:

> All persons employed directly on R&D should be counted, as well as those providing direct services such as R&D managers, administrators and clerical staff. Those providing indirect services, such as canteen and security staff, should be excluded (*Frascati Manual, § 294-296*).

Full-time equivalent — FTE

A full-time equivalent corresponds to one year's work by one person. Thus, someone who normally devotes 40% of his/her time to R&D and the rest to other activities (e.g. teaching, university administration or counselling) should be counted as only 0.4 FTE.

Personnel in head count — HC

Head count corresponds to the number of individuals who are employed mainly or partly on R&D. For purposes of comparison between different regions and periods, this indicator is often used in conjunction with employment or population variables.

5. Institutional classification

Internal expenditure and R&D personnel are broken down by institutional sector, i.e. the sector in which the R&D is performed. There are four main sectors:

- The business enterprise sector – BES;
- The government sector – GOV;
- The higher education sector – HES;
- The private non-profit sector – PNP.

6. Geographical coverage

These data are available for EU-27 Member States, candidate countries, Iceland, Norway, Switzerland, China, Japan, Russia and the United States at national level and for European countries at regional level (NUTS level 2).

7. Aggregates

For both R&D expenditure and personnel, EU totals are calculated as the sum of the national data by sector. Where data are missing, estimates are first made for the country in question, reference period, institutional sector or relevant R&D variable, as appropriate. This method is not applied identically to the calculation of R&D personnel in head count (HC). The estimates for R&D personnel in full-time equivalents (FTE) serve as a basis for the HC calculation. An FTE/HC ratio based on available FTE and HC personnel data at national level is estimated for the EU aggregates, by institutional sector and by year. This ratio is then applied to the FTE data to calculate the EU totals in HC

- EU and EEA aggregates are estimated values.
- EEA: Liechtenstein is not included.

8. Time series

Data are presented for the period 2000-2005. However, data series in NewCronos are available from 1981 onwards with differences in terms of availability according to variables and institutional sectors. Not all years are complete, and therefore the latest year available for each country is presented in the analysis.

Additional information on the methodology used may be found in Eurostat's NewCronos reference database.

Human resources in science and technology

Statistics on human resources in science and technology — HRST — can improve our understanding of both the demand for, and supply of, highly qualified personnel. The data presented in this publication focus on two main aspects: stocks and flows. The former serves to show the needs and the current situation of the highly skilled labour force and the latter indicates to what degree this demand is likely to be met in the future.

Human resources in science and technology are defined according to the OECD Canberra Manual as persons fulfilling one of the following conditions:

- Successfully completed education at the third 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 conditions of the above educational or occupational requirements are considered according to internationally harmonised standards:

- the International Standard Classification of Education — ISCED — giving the level of formal education achievement;
- the International Standard Classification of Occupation — ISCO — detailing the type of occupation.

According to the OECD Canberra Manual, the seven broad S&T fields of study are: Natural Sciences, Engineering and Technology, Medical Sciences, Agricultural Sciences, Social Sciences, Humanities, and Other fields (*Canberra Manual*, § 71).

For further information, see also Eurostat's reference database (http://epp.eurostat.ec.europa.eu) under Science and Technology / Human Resources in Science & Technology.

1. Stocks

HRST stocks provide information on the number of HRST at a particular point in time. Stock data relate to the employment status as well as the occupational and educational profiles of individuals in the given year.

HRST stock data and their derived indicators are extracted and built up using data from the EU Labour Force Survey — EU-LFS. The EU-LFS is based on a sample of the population. All results conform to Eurostat guidelines on sample-size limitations and are therefore not published if the degree of sampling error is likely to be high and flagged as unreliable if the degree of reliability is too small.

Readers should note that the used population excludes anyone below the age of 15 or over the age of 74. This is because no-one below the age of 15 will fulfil either of the requirements for being classified as HRST and also for data quality reasons.

The main categories of HRST are as follows:

HRST — Human Resources in Science and Technology

- successfully completed education at the third 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).

HRSTO — Human Resources in Science and Technology — Occupation

- employed in an S&T occupation (ISCO '88 COM codes 2 or 3).

HRSTE — Human Resources in Science and Technology — Education

- successfully completed education at the third level in an S&T field of study (ISCED '97 version levels 5a, 5b or 6).

HRSTC — Human Resources in Science and Technology — Core

- successfully completed education at the third level in an S&T field of study (ISCED '97 version levels 5a, 5b or 6)

and

- employed in an S&T occupation (ISCO '88 COM codes 2 or 3).

SE — Scientists and Engineers

- employed in "Physical, mathematical and engineering" occupations or in "life science and health occupations" (ISCO '88 COM codes 21 and 22).

HRSTU — Human Resources in Science and Technology — Unemployed

- successfully completed education at the third level in an S&T field of study (ISCED '97 version levels 5a, 5b or 6) and are unemployed.

NHRSTU — Unemployed non-HRST

- no education at the third level in an S&T field of study and are unemployed.

2. Inflows

HRST inflows are the number of people who do not fulfil any of the conditions for inclusion in HRST at the beginning of a time period but gain at least one of them during the period. The number of graduates from a country's higher education system represents the main inflow into the national stock of HRST.

HRST education inflow data are extracted from the Eurostat Education database building on data coming from the Unesco/OECD/Eurostat questionnaire on education, which is based on the ISCED classification. Users should note that European education systems differ between countries and that duplications of degrees might exist for some countries.

This publication includes the following totals and sub-totals (ISCED 1997 version:

Total: Sum of all fields of study
Science and Engineering (S&E):
- **Science** ccovers the educational fields of Life sciences, Physical sciences, Mathematics and statistics, Computing (codes 42, 44, 46, 48);
- **Engineering** groups the fields of education in Engineering and engineering trades, Manufacturing and processing, Architecture and building (codes 52, 54, 58).

3. Sectors of economic activity

The following sectors of economic activity based on NACE Rev. 1.1 (Statistical classification of economic activities in the European Communities) used in this publication are defined as follows:

- Total manufacturing (NACE D)
  - High- and medium-high-technology manufacturing (NACE 24+29 +30+31+32+33+34+35)
- Total services (NACE G to Q)
  - Knowledge-intensive services (KIS) (NACE 61+62+64+65 to 67+70 to 74+80+85+92)
- Total high-technology sector is the sum of high-tech manufacturing and knowledge-intensive high-technology services (NACE 24.4+30+32+33+35.3+64 +72+73)

3. Foreigners

Finally, HRST by nationality are based on the citizenship of the person. This is defined as the particular bond between an individual and his/her state acquired by birth or naturalisation whether by declaration, option, marriage or other means in accordance with national legislation. In this publication, foreign HRST are defined as HRST having a citizenship different to the country of residence.

For further information, see also Eurostat's SDDS metadata (http://epp.eurostat.ec.europa.eu) under Science and Technology / Human Resources in Science & Technology.

Innovation

1. Community Innovation Survey

At European level, the Community Innovation Survey (CIS) data are the main source of information for studying innovation drivers and company behaviour towards innovation.

The Community Innovation Survey (CIS) is a survey of innovation activity in enterprises covering EU Member States, candidate countries, Iceland and Norway.

The data are collected on a two-yearly basis (from 2004 onwards). The latest survey (CIS 4) was carried out in 25 Member States, candidate countries, Iceland and Norway in 2005, based on the reference year 2004.

In order to ensure comparability across countries, Eurostat, in close cooperation with the EU Member States, developed standard core questionnaires for CIS 4, accompanied by a set of definitions and methodological recommendations.

CIS 4 is based on the Oslo Manual (2nd edition, 1997), which gives methodological guidelines and defines the concept of innovation, and on Commission Regulation No 1450/2004.

2. Statistical units

The main statistical unit for CIS 4 was the enterprise. .

The target population CIS 4 was the total population of enterprises (with 10 or more employees) engaged primarily in the following market activities: mining and quarrying (NACE 10-14), manufacturing (NACE 15-37), electricity, gas and water supply (NACE 40-41), wholesale trade (NACE 51), transport, storage and communication (NACE 60-64), financial intermediation (NACE 65-67), computer and related activities (NACE 72), architectural and engineering activities (NACE 74.2) and technical testing and analysis (NACE 74.3).

3. Calculation of the EU-27 aggregate

The present publication only shows EU-27 data as percentages. These percentages sum up available data for all EU-27 Member States in the numerator and in the denominator, but the number of countries included in the numerator and in the denominator is always the same.

The notes below the figures and tables indicate the countries for which data are missing.

4. Calculation of aggregates based on NACE REV. 1.1

Aggregations are only made at a NACE 2-digit level. This means that:

- High-technology includes the NACE codes 30, 32 and 33,
- Medium-high-technology includes the NACE codes 24, 29, 31, 34 and 35,
- Medium-low-technology includes the NACE codes 23 and 25 to 28 and
- Low-technology includes the NACE codes 15 to 22 and 36 to 37.
- High-tech KIS includes the NACE codes 64, 72 and 73.

5. Type of survey

Most Member States and other countries carried out CIS 4 by means of a stratified sample survey, while a number used a census or a combination of the two.

The enterprise size classes referred to in this publication are:

- small: 10-49 employees;
- medium-sized: 50-249 employees;
- large: 250+ employees.

The economic activities covered by this publication are based on the NACE Rev. 1.1 classification. The two sectors used are:

- industry, which includes mining and quarrying (NACE C), manufacturing (NACE D) and electricity, gas and water supply (NACE E); and
- services, which includes NACE I and J plus NACE divisions 51, 72, 74.2 and 74.3.

The CIS 4 data are organised in the Eurostat reference database following broadly the same structure as the questionnaire.

6. Reference period

CIS 4 covered the observation period 2002-2004 inclusive, i.e. the three-year period from the beginning of 2002 to the end of 2004. The reference period for CIS 4 was the year 2004.

All the countries covered collected data for this observation period; only the Czech Republic took 2003-2005 as the observation period.

7. Definitions

OSLO MANUAL 1997

Innovation: a new or significantly improved product (good or service) introduced to the market or a new or significantly improved process introduced within an enterprise. Innovations are based on the results of new technological developments, new combinations of existing technology or utilisation of other knowledge acquired by the enterprise.

Enterprises engaged in innovation activity (propensity to innovate): enterprises that introduce new or significantly improved products (goods or services) to the market or enterprises that implement new or significantly improved processes. Innovations are based on the results of new technological developments, new combinations of existing technology or utilisation of other knowledge acquired by the enterprise. The term covers all types of innovator, i.e. product innovators, process innovators and enterprises with only ongoing and/or abandoned innovation activities.

Product innovation is introduction to the market of a new good or service or of a good or service with significantly improved capabilities, such as improved software, user-friendliness, components or sub-systems.

Process innovation is implementation of a new or significantly improved production process, distribution method or support activity for goods or services. Purely organisational innovations are excluded.

Organisational innovation is implementation of new or significant changes in a firm's structure or management methods that are intended to improve the firm's use of knowledge, the quality of its goods and services or the efficiency of its workflows.

Marketing innovation is implementation of new or significantly improved designs or sales methods to increase the appeal of goods and services or to enter new markets.

Intramural (in-house) R&D: Creative work undertaken within the enterprise to increase the stock of knowledge and use it to devise new and improved products and processes (including software development).

Extramural R&D: Same activities as above, but performed by other companies (including other enterprises within the same group) or by public or private research organisations and purchased by the enterprise.

Patent

1. Sources and definitions

A patent is a legal title granting its holder the exclusive right to make use of an invention for a limited area and time. An invention needs to fulfil three criteria to be granted as a patent: (1) novelty, (2) inventive step, and (3) industrial applicability. All patent applications and granted patents are published. They provide a useful indicator of innovative developments in all areas of technology, and they can indicate the level of innovative activity in a particular market, region or country.

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. This database, also known as "PATSTAT", was developed by the EPO in 2005, using their collection and knowledge of patent data.

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2. EPO patent applications by priority year

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 may 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.

Nowcasts for EPO data

For the calculation of the EPO data for 2004 a linear regression has been performed using the ratio of direct patent applications to the EPO to all patent applications to the EPO for the years 2000 to 2003.

As explained in the methodology for the EPO patent indicators, direct applications and PCT applications in the regional phase are taken into account. The "nowcasting" methodology is built on the assumption that the relationship between direct applications and PCT applications in the regional phase can be estimated for 2004 by a linear regression of this relationship for the period 2000 to 2003. The estimate has been applied to the number of direct applications for 2004.

3. USPTO patent granted by priority year

Eurostat uses also the same methodology as the OECD for patents granted by the USPTO. Differences may be explained by the fact that the data sources are not exactly the same and by the date of data extraction.

Nowcasts for USPTPO data

For the estimation of USPTO data for 2001 a linear regression based on the values for 1997 to 2000 has been used. The estimate has been applied to the total number of patents granted by the USPTO in 2001.

4. Triadic patent families by earliest priority year

A patent family is defined as a set of patents taken in various countries for protecting the same invention, i.e. related patents are grouped into a single record to derive a unique patent family. A patent is a member of a triadic patent family if and only if it has been applied for and filed at the European Patent Office (EPO) and the Japanese Patent Office (JPO) and if it has been granted by the US Patent and Trademark Office (USPTO). Patent families, as opposed to patents, are intended to improve international comparability (the home advantage is eliminated; the values of the patents are more homogeneous).

Data on triadic patent families are presented by priority year, i.e. the year of the first international filing of a patent. This exacerbates the disadvantage of traditional patent counts with respect to timeliness, and therefore the latest available data refer to 2001 only.

5. 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. The drawback of this choice is that the data on USPTO patents granted have declined in recent years, due to administrative delays between the priority date and the grant date. To a lesser extent this is also the case for the EPO data.

6. 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 ¼ of a patent for France, ¼ for the US and ½ a patent for Germany.

7. International patent classification

On 1 January 2006 the eighth edition of the International Patent Classification (IPC) entered into force. The World Intellectual Property Organization (WIPO), a specialised agency of the United Nations, is responsible for updating the IPC. The IPC is a comprehensive subject classification system applied to all patents by the patent-issuing authorities. The IPC is a hierarchical system divided into sections, classes, subclasses and groups. Each IPC code is a combination of letters and numbers referring to the different categories of the system. A patent can have only one IPC code or more.

8. 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.

9. 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.

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

- Telecommunications
- Consumer electronics
- Computers, office machinery
- Other ICT

11. PCT patent applications

These patent applications are filed first with the World Intellectual Property Organization (WIPO), designating the EPO as main patent office.

Users should note that data on PCT applications to the EPO are not compiled using the nationality of the inventor but the nationality of the applicant.

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

High-technology

1. Sources and definitions

1.1. Venture capital investments

Venture Capital Investment (VCI) is defined as private equity raised for investment in companies. Management buyouts, management buy-ins, and venture purchase of quoted shares are excluded.
Data are broken down into two investment stages:

- Early stage (seed + start-up) and
- Expansion and replacement stage (expansion and replacement capital).

The basic data are provided by the European Private Equity and Venture Capital Association (EVCA). For more information on venture capital, please refer to: http://www.evca.com.

For all further details please see also the Eurostat metadata on high-technology statistics disseminated on Eurostat's reference webpage.

1.2. High-tech enterprises

Data on high-tech enterprises and derived indicators are extracted and built up using data from the Structural Business Statistics — SBS.

Number of enterprises includes all units active during at least a part of the reference period.

Turnover ccomprises the totals invoiced by the observation unit during the reference period, and this corresponds to market sales of goods or services supplied to third parties.

Value added at factor cost is the gross income from operating activities after adjusting for operating subsidies and indirect taxes.

Production value measures the amount actually produced by the unit, based on sales, including changes in stocks and the resale of goods and services.

For all further details please see also the Eurostat metadata on high-technology statistics disseminated on Eurostat's reference webpage.

1.3. High-tech trade

High-tech trade data is extracted from the COMEXT database — Eurostat's database of official statistics on EU external trade and trade between EU Member States.

Trade data reported by other countries is extracted from the UN Statistical Office's Comtrade database and included in the COMEXT database as a separate dataset.

It should therefore be noted that data used in this publication originates from two different sources with partly different methodology. For more information regarding external trade methodologies, please refer to:

http://europa.eu.int/estatref/info/sdds/en/ext/ext_sm.htm

High-technology product groups are defined according to the R&D intensity of products following the concepts developed by the OECD — R&D expenditure/total sales covering six countries. These can be classified in the following nine groups: Aerospace, Computers-Office machinery, Electronics-Telecommunications, Pharmacy, Scientific instruments, Electrical machinery, Chemistry, Non-electrical machinery, and Armament.

1.4. Employment in high-tech

Employment in high-tech data and derived indicators are extracted and built up using data from the Community Labour Force Survey — CLFS.

For all further details please see also the Eurostat metadata on high-technology statistics disseminated on Eurostat's reference webpage.

2. Definition of high-tech and knowledge-intensive services sectors

2.1. High-tech classification of manufacturing industries

Eurostat and OECD use the following breakdown of the manufacturing industry according to global technological intensity and based on NACE rev. 1.1 at 3-digit level (owing to restrictions of the data source, a different but derived classification based on NACE at 2-digit level was used for data on employment in high-tech and data on earnings in high-tech):

High-technology

24.4 Manufacture of pharmaceuticals, medicinal chemicals and botanical products; 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; 35.3 Manufacture of aircraft and spacecraft.

Medium-high-technology

24 Manufacture of chemicals and chemical products, excluding 24.4 Manufacture of pharmaceuticals, medicinal chemicals and botanical products; 29 Manufacture of machinery and equipment n.e.c.; 31 Manufacture of electrical machinery and apparatus n.e.c.; 34 Manufacture of motor vehicles, trailers and semi-trailers; 35 Manufacture of other transport equipment, excluding 35.1 Building and repairing of ships and boats and excluding 35.3 Manufacture of aircraft and spacecraft.

Medium-low-technology

23 Manufacture of coke, refined petroleum products and nuclear fuel; 25 to 28 Manufacture of rubber and plastic products; basic metals and fabricated metal products; other non-metallic mineral products; 35.1 Building and repairing of ships and boats.

Low-technology

15 to 22 Manufacture of food products, beverages and tobacco; textiles and textile products; leather and leather products; wood and wood products; pulp, paper and paper products, publishing and printing; 36 to 37 Manufacturing n.e.c.

2.2. Knowledge-intensive and less knowledge-intensive services

Following a similar logic as for manufacturing, Eurostat defines the following sectors as knowledge-intensive services (KIS) or as less knowledge-intensive services (LKIS):

Knowledge-intensive services (KIS)

61 Water transport; 62 Air transport; 64 Post and telecommunications; 65 to 67 Financial intermediation; 70 to 74 Real estate, renting and business activities; 80 Education; 85 Health and social work; 92 Recreational, cultural and sporting activities.

High-tech KIS

64 Post and telecommunications; 72 Computer and related activities; 73 Research and development.

Market KIS (excl. financial intermediation and high-tech services)

61 Water transport; 62 Air transport; 70 Real estate activities; 71 Renting of machinery and equipment without operator and of personal and household goods; 74 Other business activities.

Financial KIS

65 to 67 Financial intermediation.

Less Knowledge-Intensive Services (LKIS)

50 to 52 Motor trade; 55 Hotels and restaurants; 60 Land transport; transport via pipelines; 63 Supporting and auxiliary transport activities; activities of travel agencies; 75 Public administration and defence; compulsory social security; 90 Sewage and refuse disposal, sanitation and similar activities; 91 Activities of membership organizations n.e.c.; 93 Other service activities; 95 Activities of households as employers of domestic staff; 99 Extra-territorial organizations and bodies.

Less Knowledge-Intensive Market services

50 to 52 Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods; 55 Hotels and restaurants; 60 Land transport; transport via pipelines; 63 Supporting and auxiliary transport activities; activities of travel agencies.

Abbreviations and symbols

STATISTICAL SYMBOLS AND ABBREVIATIONS

b	Break in series
e	Estimation
f	Forecast
p	Provisional
r	Revised value
s	Eurostat estimate
u	Unreliable data
:	Data not available
:c	Confidential data
:u	Extremely unreliable data
-	Not applicable or real zero
%	Percentage
0	Less than fifty percent of the unit use
1000s	Thousands
2004	Calendar year (e.g. from 1.1.2004 to 31.12.2004)
2003/2004	Academic year (e.g. from 1.9.2003 to 31.8.2004)
2000-2005	Period of several calendar years (e.g. from 1.1.2000 to 31.12.2005)
mio	Million

ABBREVIATIONS

AGR	Annual Growth Rate
AAGR	Annual Average Growth Rate
BERD	Business Enterprise intramural expenditure on R&D
BES	Business Enterprise Sector
CC	Candidate Countries
CIS4	Fourth Community Innovation Survey
CLFS/LFS	(Community) Labour Force Survey
COMEXT	Eurostat reference database containing external trade statistics
EC	European Community/Communities
EEA	European Economic Area (EU-27, Iceland, Liechtenstein and Norway)
EFTA	European Free Trade Association
EHT	Employment in high- and medium-high-tech sectors
EPO	European Patent Office
ESA	European System of Accounts
EU/EU-25/EU-27	European Union (25/27 Member States)
EU-15	European Union (15 Member States)
EUR	Euro
Eurostat	Statistical Office of the European Communities
EXP	Expenditure
FTE	Full-Time Equivalent

GBAORD .....Government Budget Appropriations or Outlays on R&D
GDP .....Gross Domestic Product
GERD .....Gross Domestic Expenditure on R&D
GOV .....Government sector
GUF .....General University Funds
HC .....Head Count
HES .....Higher Education Sector
HRST .....Human Resources in Science and Technology
HRSTC .....Human Resources in Science and Technology – Core
HRSTE .....Human Resources in Science and Technology – Education
HRSTO .....Human Resources in Science and Technology – Occupation
HRSTU .....Human Resources in Science and Technology – Unemployed
IPC .....International Patent Classification
ICT .....Information and Communications Technology
ISCED .....International Standard Classification of Education
ISCO .....International Standard Classification of Occupations
JPO .....Japanese Patent Office
KIS .....Knowledge-Intensive Services
LKIS .....Less Knowledge-Intensive Services
MS .....Member States
MSTI .....Main Science and Technology Indicators (OECD)
NABS .....Nomenclature for the analysis and comparison
.....of scientific programmes and budgets
NACE .....Statistical classification of economic activities
.....in the European Communities
NewCronos .....Eurostat's statistical reference database
NUTS .....Nomenclature of Territorial Units for Statistics
OECD .....Organisation for Economic Cooperation and Development
PCT .....Patent Cooperation Treaty
PNP .....Private Non-Profit sector
PPS .....Purchasing Power Standard
PSL .....Personnel
R&D .....Research and Development
RSE .....Researchers
S&E .....Science and Engineering
S&T .....Science and Technology
SME .....Small and Medium-sized Enterprises
USPTO .....United States Patent and Trademark Office
VCI .....Venture Capital Investment
WIPO .....World Intellectual Property Organisation

COUNTRIES ABBREVIATIONS

EU Member States

BE . . . . . Belgium
BG . . . . . Bulgaria
CZ . . . . . Czech Republic
DK . . . . . Denmark
DE . . . . . Germany
EE . . . . . Estonia
IE . . . . . Ireland
EL . . . . . Greece
ES . . . . . Spain
FR . . . . . France
IT . . . . . Italy
CY . . . . . Cyprus
LV . . . . . Latvia
LT . . . . . Lithuania
LU . . . . . Luxembourg
HU . . . . . Hungary
MT . . . . . Malta
NL . . . . . Netherlands
AT . . . . . Austria
PL . . . . . Poland
PT . . . . . Portugal
RO . . . . . Romania
SI . . . . . Slovenia
SK . . . . . Slovakia
FI . . . . . Finland
SE . . . . . Sweden
UK . . . . . United Kingdom

Candidate countries

FYROM . . . . . Former Yugoslav Republic of Macedonia
HR . . . . . Croatia
TR . . . . . Turkey

Other countries

CA . . . . . Canada
CH . . . . . Switzerland
CN . . . . . China
IS . . . . . Iceland
JP . . . . . Japan
LI . . . . . Liechtenstein
NO . . . . . Norway
RU . . . . . Russia
US . . . . . United States of America

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Science, technology and innovation in Europe

This publication draws a comprehensive picture of the Science, Technology and Innovation activities in the European Union as carried out by its people, enterprises and governments. It provides the reader with statistical information to appreciate the evolution and composition of science and technology in Europe and its position with regard to its partners.

The pocketbook is divided into seven chapters among which: Government budget appropriations or outlays on Research and Development (GBAORD), R&D Expenditure, R&D Personnel, Human Resources in Science and Technology, Innovation, Patents, High-technology.

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