

R&D in higher education and government

R&D personnel in the public sector are highly qualified and specialise in *natural sciences*

Statistics in focus

SCIENCE AND
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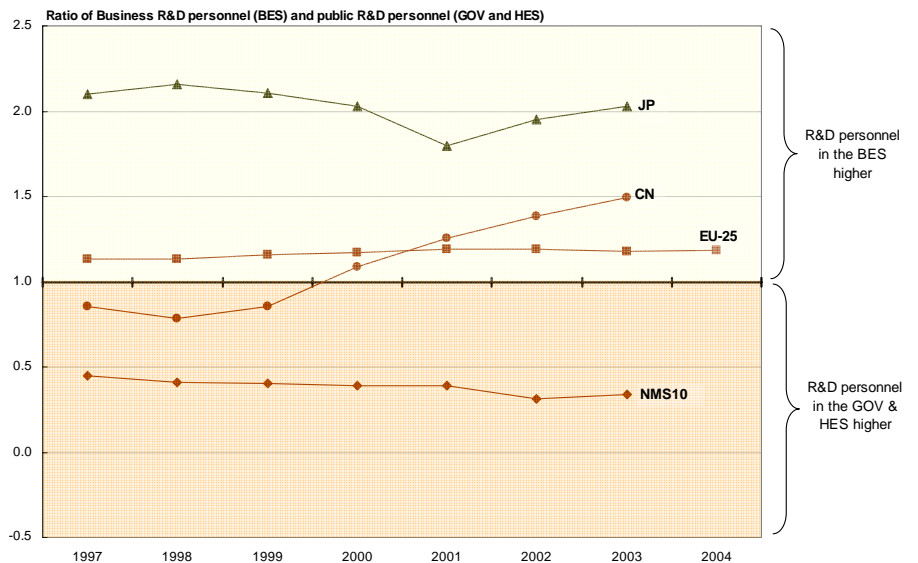
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Figure 1: Ratio of business R&D personnel to public-sector R&D personnel ⁽¹⁾, EU-25, NMS-10, China and Japan — 1997 to 2004



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

⁽¹⁾ The ratio is calculated on the basis of full-time equivalent (FTE).

Main findings

- The higher education (HES) and government (GOV) sectors combined, compared with the business enterprise sector (BES), steadily increased their R&D personnel in the new Member States over the last few years.
- Due to the opening of its university, Luxembourg displayed the highest growth rate (37%) in public researchers between 2003 and 2004.
- Doctorate-holders accounted for a smaller proportion of public R&D personnel in Belgium than in the other EU Member States. By contrast, the share of doctorate-holders in R&D personnel was highest in Portugal and Poland.
- Natural sciences was the most popular field of science in EU-25 with about one third of all public researchers employed in this field.
- Women were generally better represented among researchers in the new Member States and candidate countries.
- The highest annual average growth rates for researchers employed in the public sector over the last four years were in Luxembourg (36.6%), Ireland (17.0%), Slovakia (14.9%) and Lithuania (11.5%).
- In small countries the share of public R&D expenditure has fallen over the last three years.

In 2003 the public sector, defined as higher education (HES) and government (GOV), employed less than half of all R&D personnel in EU-25 (see Figure 1). Compared with Japan and China, however, EU-25 employs a larger share of R&D personnel in the public sector, about twice as many as Japan.

The ratio between public-sector and business enterprise sector (BES) R&D personnel remained stable over time in EU-25, showing a parallel trend in the R&D labour force in every sector of the economy.

This is different in, e.g., China where private-sector (business enterprise) R&D staff numbers grew fast.

Highest proportion of R&D personnel in the public sector in Iceland and Finland

In 2004 the total R&D personnel in the public sector added up to 0.82% of EU-25's total employment (head count). The dispersion between individual countries is quite wide: the highest share (1.97%), recorded by Iceland, was almost eight times the lowest figure - for Romania on 0.26%.

After Iceland, public R&D's share of total employment was highest in Hungary, Estonia, Croatia and Switzerland and in the Nordic countries (excluding

Denmark). Portugal, with 0.56% of total employment in R&D activities in the public sector, was amongst the bottom positions, close to Cyprus, Russia and Bulgaria.

Public R&D personnel held fairly stable in most European countries between 2002 and 2004, but increased significantly in the Czech Republic and Slovakia and decreased in Malta and Slovenia over the same period.

Table 2: R&D personnel and researchers in the public sector, EU Member States and selected countries, 2002-2004

	R&D personnel in public sector						Researchers in public sector					
	As a % of total employment (HC)			Full-time equivalent (FTE)			Full-time equivalent (FTE)			As a % of total R&D personnel in public sectors		
	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004
EU-25	0.83 s	0.84 s	0.82 s	897 882 s	908 651 s	924 498 s	576 294 s	587 549 s	605 388 s	64 s	65 s	65 s
EU-15	0.84 s	0.85 s	0.83 s	770 005 s	783 001 s	797 277 s	483 218 s	494 136 s	509 160 s	63 s	63 s	64 s
BE	0.86	0.87	:	19 795	20 290	21 340 p	14 046	14 416	15 007 p	71	71	70 p
BG	0.54	0.53	:	13 339	13 292	13 420	8 248	8 306	8 530	62	62	64
CZ	0.66	0.66	0.70	13 198	13 964	13 526	8 712	9 151	8 935	66	66	66
DK	0.88	0.91	0.92	13 694	14 136	14 389	9 647	10 006	10 133	70	71	70
DE	:	0.93	:	177 404	174 461	171 000 e	110 372	106 962	107 500 e	62	61	63 e
EE	0.97	1.00	1.00	3 358	3 283	3 562	2 553	2 452	2 648	76	75	74
IE	0.70	0.73	0.74	4 378	5 170	6 063	3 384	4 027	4 710	77	78	78
EL	:	1.03	:	:	20 049	20 655 p	:	11 208	11 428 p	:	56	55 p
ES	0.95	0.96	0.97	77 444	86 067	90 497	58 352	64 685	68 767	75	75	76
FR	0.85 i	0.84 i	:	145 814	146 606	:	87 695 i	88 944 i	:	60 i	61 i	:
IT	0.74	0.74	:	91 209	90 869	:	41 866	41 750	:	46	46	:
CY	0.40	0.40	:	581	642	645 p	298	365	380 p	51	57	59 p
LV	0.69	0.68	0.70	4 029	3 972	4 221	2 775	2 739	2 875	69	69	68
LT	0.93	0.96	:	9 119	8 984	9 576	6 061	6 164	6 872	66	69	72
LU	:	0.32 u	:	:	510 u	663 u	:	355 u	485 u	:	70 u	73 u
HU	1.01	1.00	1.04	16 507	16 131	16 122	10 621	10 698	10 595	64	66	66
MT	0.71	0.60	0.61	400	320	334	225	225	237	56	70	71
NL	0.57 e	0.61 bei	:	39 489	41 501 bi	41 679 pi	17 238 b	17 883 bi	:	44 b	43 bi	:
AT	0.84	:	:	11 939	:	:	7 975	:	:	67	:	:
PL	0.81	0.82	0.80	67 604	65 555	65 257	51 963	51 688	52 520	77	79	80
PT	0.55 e	0.56	:	16 104 e	16 064	16 130 e	13 045 e	13 502	14 015 e	81 e	84	87 e
RO	0.21	0.25	0.26	14 400	15 932	16 770	9 613	10 984	11 980	67	69	71
SI	0.75	0.57	0.58	3 923	3 100	3 232	2 859	2 222	2 328	73	72	72
SK	0.74	0.76	0.81	9 158	9 699	10 779	7 009	7 709	8 854	77	79	82
FI	1.39	1.44	1.49	24 267	24 839	25 159	:	:	17 237	:	:	69
SE	:	1.29	:	:	24 495	24 966	:	19 433	20 139	:	79	81
UK	:	:	:	:	:	:	:	:	:	:	:	:
IS	:	1.97	:	1 513 e	1 503	1 540	:	1 029	1 055	:	68	68
NO	1.26	1.26	:	12 675	12 888	13 485	:	9 509	10 100	:	74	75
EEA	:	:	:	912 070 s	923 042 s	939 523 s	586 408 s	598 087 s	616 543 s	64 s	65 s	66 s
CH	1.05 ei	:	1.11 ei	17 720 ei	:	19 165 ei	11 700 ei	:	12 760 ei	66 ei	:	67 ei
HR	0.92	0.98	1.06	10 473	6 983	8 331	7 319	4 948	6 125	70	71	74
TR	0.34	:	:	23 046	:	:	20 298 i	:	:	88 i	:	:
JP	0.62	0.63	:	284 613 b	285 942	:	204 403 b	206 107	:	72 b	72	:
RU	0.46	0.46	0.44	377 648	378 055	381 824	215 087	217 544	218 740	57	58	57

Source: Eurostat - R&D statistics

Notes:

FR: Excluding (all or most) defence.

NL: Including other classes.

CH: Federal or central government only.

TR: University graduates instead of researchers.

Table 2 also shows the proportion of researchers (RSE) in the total R&D personnel employed in the public sector. The highest figures were in Portugal with 87%, followed by Slovakia (82%) and Sweden (81%).

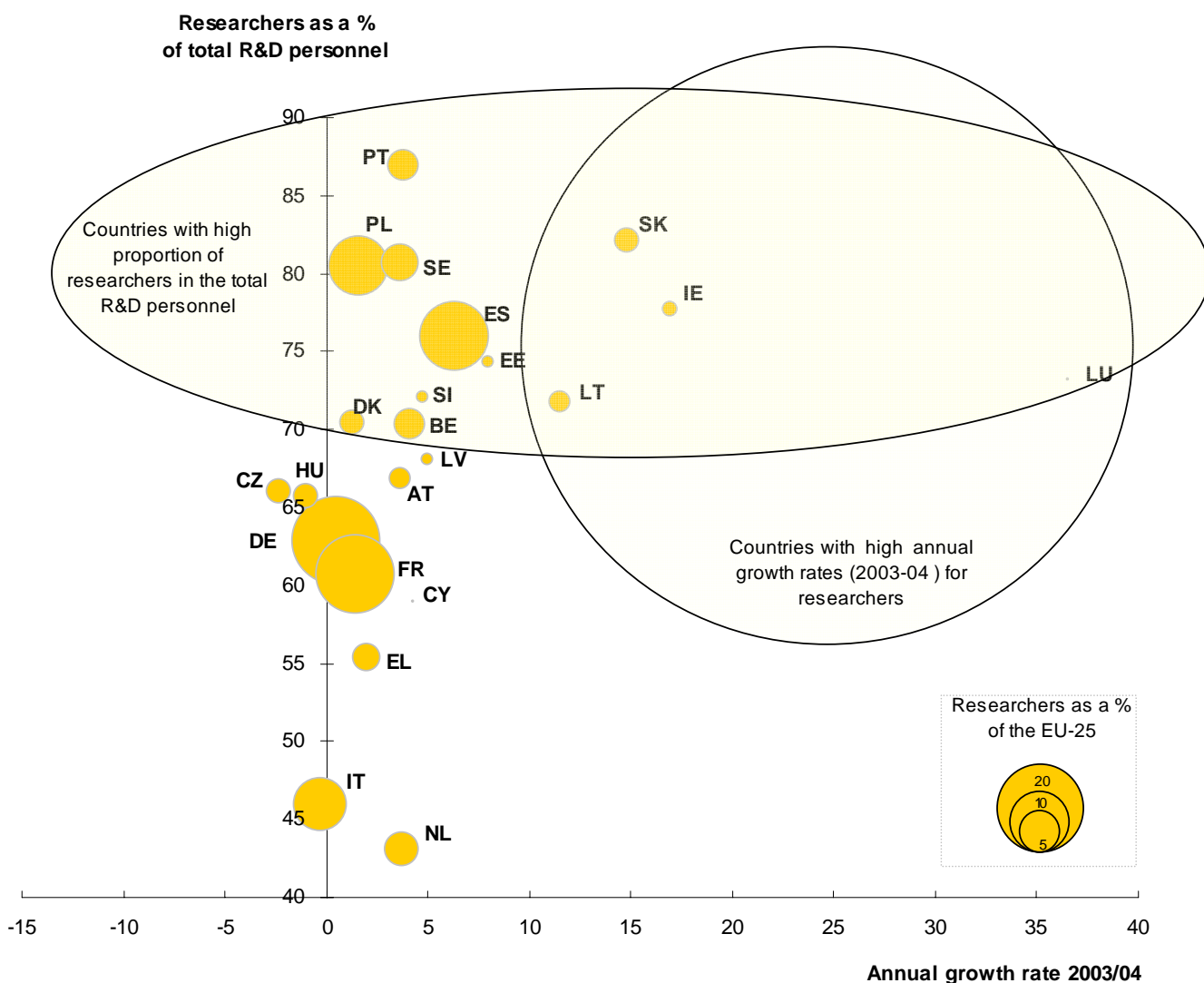
By contrast, under 50% of total R&D personnel were researchers in Italy and the Netherlands, both well below the EU-25 average of 65%.

Public-sector researchers increased in Luxembourg, Ireland, Slovakia and Lithuania

The annual growth rates in researchers employed in the public sector between 2003 and 2004 showed a maximum of 10%, with the exceptions of Luxembourg on 37% (due to the opening of its university), along with Ireland, Slovakia and Lithuania on 17%, 15% and 12% respectively.

Among countries with a large population of public researchers, Spain recorded the highest growth rate (over 6%) followed by Poland, France and Germany.

Figure 3: Researchers in the public sector in 2004 as a percentage of total R&D personnel, as a share of EU-25 and annual growth rate ⁽¹⁾, 2003-2004



Source: Eurostat - R&D statistics

⁽¹⁾ The shares "Researchers as a % of EU-25" and the annual growth rates have been calculated as researchers in FTE.

Exceptions to the reference year:
FR, IT, AT: 2002.

Exceptions to the reference period:
FR, IT, AT: 1998-2002.

Provisional data: BE, EL, CY.
Break in series: NL (2003).
Underestimated data: AT (1998).

National estimates: DE, PT.
Including other classes: NL (2003).
Excluding defence: FR (RSE - 2003).

Most R&D personnel employed in the public sector are highly qualified

In most EU countries the R&D personnel employed in the public sector are highly skilled.

Under 20% of R&D personnel hold qualifications lower than ISCED level 5, i.e. equivalent to first-stage tertiary education not leading directly to an advanced research qualification. However, fewer than two out of every three researchers have completed doctoral studies, the top grade in the ISCED classification (level 6).

The highest proportions of doctorate-holders were reported in Portugal and Poland for both researchers and total R&D personnel.

In Belgium, by contrast, doctorate-holders are a minority in the qualified R&D labour force (ISCED level 6), making up under one out of every four people engaged in public research activities.

Table 4: Total R&D personnel and researchers in the public sector by level of education (ISCED), by head count (HC), in EU Member States and selected countries, 2004

	Total personnel by HC				Researchers by HC			
	Tertiary education		Other	Total	Tertiary education		Other	Total
	Level 6	Level 5			Level 6	Level 5		
EU-25	:	:	:	1 595 447 s	:	:	:	1 068 138 s
EU-15	:	:	:	1 379 561 s	:	:	:	900 576 s
BE	5 668	24 396	5 135	35 200	5 668	18 753	78	24 499
BG	5 337	6 302	3 258	14 897	5 269	4 077	55	9 401
CZ	12 397	13 297	7 251	32 945	11 984	:	:	22 058
DK	:	:	:	25 230	:	:	:	17 574
DE	:	:	:	:	:	:	:	:
EE	2 128	3 480	385	5 993	2 092	2 388	:	4 480
IE	5 328 e	:	:	13 784	5 328	:	:	9 521
EL	15 813	18 582	9 841	44 236	:	:	:	:
ES	60 827	78 253	18 731	157 811	60 549	58 269	338	119 156
FR	:	:	:	:	:	:	:	:
IT	:	:	:	:	:	:	:	:
CY	417	517	391	1 325	414	358	:	772
LV	2 816	:	1 404	8 273	2 816	:	:	5 625
LT	5 224	:	1 697	13 753	5 212	:	:	10 040
LU	:	:	:	602 i	112	:	5	414 i
HU	10 003	18 472	12 270	40 745	9 955	14 977	33	24 965
MT	409	:	229	901	409	:	:	672
NL	:	:	:	15 137 i	:	:	:	8 533 i
AT	9 075	12 224	9 783	31 082	8 964	10 688	130	19 782
PL	57 653	36 568 i	16 180	110 401	57 653	28 630 i	:	86 283
PT	16 451	8 482	3 828	28 761	16 451	8 482	:	24 933
RO	7 163	12 263	4 475	23 901	6 645	11 159	:	17 804
SI	2 301	2 389	782	5 472	2 230	1 654	:	3 884
SK	7 952	7 368	2 168 i	17 488	7 922	6 951	247 i	15 120
FI	10 477	19 303	5 461	35 241	:	:	:	23 507
SE	17 976	26 011	11 443	55 430	:	:	:	40 979
UK	:	:	:	22 793	:	:	:	10 012
IS	713	2 017	656	3 063	:	:	:	2 106
NO	6 966	:	:	28 603	6 966	:	:	20 546
EEA	:	:	:	:	:	:	:	:
CH	:	:	16 555 e	46 270 ei	:	:	:	29 255 ei
HR	:	:	:	16 506	:	:	:	11 911
TR	32 102	:	3 619	70 851	32 064	:	150	66 011
JP	:	:	:	408 350	:	:	:	320 598
RU	71 199	174 321	55 972	301 492	70 780	91 240	:	162 020

Source: Eurostat - R&D statistics

Exceptions to the reference year: BE, PT, SE, UK, CY, LT, IS, NO, BG, JP (2003); ES, AT, TR (2002).

Notes:

LU – Data unreliable or uncertain.

NL, PL, SK - Including other classes.

CH - Federal and central government only.

Natural sciences: the most popular discipline among public researchers

Natural sciences were the field in which the largest proportion of public researchers (about one third) worked. Second came *engineering and technology* with around 127 000 public researchers in EU-25. Third place went to *medical sciences*, *social sciences* and *humanities*.

The proportion of women among researchers in the different fields varies. Austria and Germany – two countries showing a strong orientation towards *engineering and technology* - reported proportions of only 11% and 13% of women researchers respectively.

The highest average shares for female employment are found in *medical sciences*, followed shortly behind by the *humanities* and *social sciences*. At country level, the records for all female employment are held by Latvia (54%) and Portugal (50%), followed by Lithuania (49%). At the other end of the scale, the Netherlands (14%), Germany (24%) and Austria (28%) are the countries with the lowest rates of public R&D employment for women.

Table 5: Total and female researchers in the public sector ⁽¹⁾ by field of science (FOS), in FTE and as a percentage of the total, in EU Member States and selected countries, 2004

	Researchers													
	Natural sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities		Total	
	Total FTE	Female %	Total FTE	Female %	Total FTE	Female %	Total FTE	Female %	Total FTE	Female %	Total FTE	Female %	Total FTE	Female %
EU-25	179 134 s	:	126 969 s	:	87 702 s	:	29 809 s	:	79 819 s	:	84 118 s	:	587 549 s	35 s
EU-15	:	:	:	:	:	:	:	:	:	:	:	:	494 136 s	:
BE	3 192	32	2 983	21	2 614	50	1 547	39	2 552	45	1 528	46	14 416	38
BG	2 825	52	2 042	29	706	54	1 057	50	771	47	905	63	8 306	47
CZ	3 227	30	2 155	23	835	44	731	39	1 047	41	940	41	8 935	33
DK	2 341	25	1 403	17	2 390	45	1 065	47	1 370	34	1 565	42	10 133	35
DE	38 210	20	24 710	13	13 216	35	4 949	31	10 868	32	15 010	33	106 962	24
EE	946	37	516	23	181	64	151	46	418	57	436	69	2 648	45
IE	1 614	34	770	22	712	53	340	32	827	45	447	45	4 710	38
EL	:	:	:	:	:	:	:	:	:	:	:	:	11 208	:
ES	12 750	40	13 198	36	15 620	47	5 145	46	12 567	40	9 487	42	68 767	42
FR	:	:	:	:	:	:	:	:	:	:	:	:	:	:
IT	:	:	:	:	:	:	:	:	:	:	:	:	:	:
CY	154	35	17	18	6	35	38	18	101	35	49	41	365	33
LV	1 058	54	494	54	164	54	186	54	568	54	405	54	2 875	54
LT	1 784	43	1 162	27	741	55	321	55	1 072	60	1 084	67	6 164	49
LU	:	:	:	:	:	:	:	:	:	:	:	:	485 i	:
HU	2 990	:	1 284	:	1 352	:	1 026	:	1 696	:	2 247	:	10 595	:
MT	24	18	28	14	75	27	5	28	71	41	32	29	237	29
NL	:	:	:	:	:	:	:	:	:	:	:	:	19 002 ei	14
AT	2 486	21	1 159	11	1 603	37	363	31	1 248	34	1 117	39	7 975	28
PL	12 781	38	11 336	20	8 359	54	4 521	47	9 856	46	5 668	46	52 520	40
PT	4 185	53	2 644	33	1 324	61	1 455	55	2 756	54	1 139	53	13 502	50
RO	3 057	45	3 819	41	2 439	60	449	37	1 364	49	852	42	11 980	47
SI	802	33	611	23	301	60	260	46	712	47	173	45	2 859	39
SK	2 912	37	1 897	33	1 402	59	567	45	1 549	50	528	50	8 854	43
FI	:	:	:	:	:	:	:	:	:	:	:	:	17 237	:
SE	:	:	:	:	:	:	:	:	:	:	:	:	20 139	:
UK	:	:	:	:	:	:	:	:	:	:	:	:	9 126 e	:
IS	:	:	:	:	:	:	:	:	:	:	:	:	1 055	:
NO	2 112	:	1 126	:	1 954	:	819	:	2 497	:	1 001	:	9 509	:
EEA	182 463 s	:	129 300 s	:	89 239 s	:	30 379 s	:	81 170 s	:	85 537 s	:	598 087 s	35 s
CH	:	:	:	:	:	:	:	:	:	:	:	:	12 760 ei	:
HR	1 108	46	1 160	30	1 503	51	480	42	1 225	51	649	57	6 125	46
TR	:	:	:	:	:	:	:	:	:	:	:	:	:	:
JP	:	:	:	:	:	:	:	:	:	:	:	:	:	:
RU	:	:	:	:	:	:	:	:	:	:	:	:	218 740	:
US	:	:	:	:	:	:	:	:	:	:	:	:	:	:

Source: Eurostat - R&D statistics

⁽¹⁾ Only if data is available for both GOV and HES, the sum for these two sectors is included in the table. Exceptions to the reference year (2004):

Total RSE: EU-25, BE, DE, PT, CY, LT, NO, EEA, BG (2003); AT, SI (2002);
Female RSE: EU-25, BE, DE, NL, PT, CY, LT, EEA, BG (2003); AT, SI (2002).

Notes:

LU - Opening of the University of Luxembourg.
NL - Including other classes.
CH - Federal and central government only.

Lowest share of R&D expenditure in the public sector: Luxembourg

In 2004 the public sector in Europe spent about EUR 67 billion on R&D. Federal public R&D expenditure in the United States was similar to spending in Europe. Europe's public sector accounted for a larger share of total R&D expenditure with more than one third, against one quarter in the US.

Over the last three years most EU-25 Member States reported only slight increases or stagnations in their public R&D expenditure, while Japan and the United States showed decreases in absolute terms, although the shares of their public R&D expenditure remained unchanged.

Four countries spent more than 70% of their total R&D expenditure in their public sector: Lithuania (79%), followed by Bulgaria (76%), Poland and Cyprus (both 71%). Luxembourg, on the other hand, came last with 12%, trailing behind Japan (23%), Belgium and Finland (29% each). The big four EU Member States — Germany, France, the United Kingdom and Italy — spent between 30% and 50% of their total R&D expenditure in the public sector.

Table 6: R&D expenditure in the public sector in EUR million and share of total R&D expenditure in EU Member States and selected countries, 2002-2004

	Government sector			Higher education sector			Share of public sector in total R&D expenditure		
	2002	2003	2004	2002	2003	2004	2002	2003	2004
EU-25	24 146 s	24 478 s	24 836 s	40 470 s	41 224 s	42 537 s	35 s	35 s	35 s
EU-15	22 972 s	23 412 s	23 746 s	39 566 s	40 362 s	41 598 s	34 s	34 s	34 s
BE	373	354	387 p	1 100	1 150	1 180 p	28	29	29 p
BG	58	62	67	8	9	9	81	80	76
CZ	220	236	233	150	155	162	39	39	36
DK	341 b	340	336	1 068 b	1 127	1 198	30 b	30	31
DE	7 333 i	7 307 i	7 514 i	9 080	9 202	9 089	31 i	30 i	30 i
EE	9	11	11	27	32	38	65	63	59
IE	125	127	138	322	404 e	492	31	33 e	35
EL	193	198	203 p	420	457	492 p	:	67	68 p
ES	1 108	1 262	1 428	2 142	2 492	2 642	45	46	45
FR	5 709	5 767	6 059	6 512	6 693	6 806	35	36	36
IT	2 565	2 582	2 722	4 792	5 000	5 005	50	51	51
CY	14	16	17	10	13	16	70	71	71
LV	8	9	9	17	16	17	59	66	55
LT	33	29	34	50	58	74	83	79	79
LU	38	45	49	2	2 e	6	:	11 e	12
HU	232 i	217 i	213 i	178	185	177	58 i	58 i	54 i
MT	2	1	1	7	7	8	75	69	30
NL	1 106	1 213 b	1 252	2 312	2 356	2 430 p	43	43 b	42 p
AT	266	268	270	1 266	1 334	1 402	33	32	32
PL	533	421	444	398	329	364	79	72	71
PT	194 e	172	167 ep	386 e	392	429 ep	56 e	55	54 ep
RO	44	65	80	29	19	24	40	42	44
SI	83	72	75	56	45	49	39	36	33
SK	39 i	53 i	53 i	13	22	35	36 i	45 i	51 i
FI	501	485	497	926	962	1 040	30	29	29
SE	334	371 i	357	2 215	2 344	2 329	:	26 i	:
UK	2 786	2 935	3 078	7 023	6 436	7 012	32	33	34
IS	69 e	68	63	45 e	58	60	41 e	46	41
NO	535	515	514	907	937	983	43	43	45
EEA	24 750 s	25 061 s	25 413 s	41 422 s	42 218 s	43 579 s	35 s	35 s	35 s
CH	95 i	:	91 i	1 881	:	1 943	:	:	24
HR	60	64	72	95	114	129	57	61	58
TR	90	90	93	823	905	975	71	:	:
JP	12 563	11 149	:	18 286	16 358	:	23	23	:
RU	1 112	1 239	1 383	247	297	299	30	31	31
US	35 583 i	32 028 pi	30 652 pi	39 324 i	35 514 pi	34 111 pi	26 i	26 pi	26 pi

Source: Eurostat - R&D statistics

Notes:

DE: Including other classes.
 HU, SK: Excluding (all or most) defence.
 SE, CH, US: Federal or central government only.

➤ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

Research and experimental development (R&D)

Research and experimental development 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 use of this stock of knowledge to devise new applications.

Institutional classifications

Internal expenditure and R&D personnel are broken down by the four institutional sectors in which the R&D takes place.

The business enterprise sector (BES)

With regard to R&D, the business enterprise sector includes: all firms, organisations and institutions whose primary activity is market production of goods or services (other than higher education) for sale to the general public at an economically significant price and the private non-profit institutions mainly serving them — *Frascati Manual*, § 163.

The government sector (GOV)

In the field of R&D, the government sector includes: all departments, offices and other bodies which provide but normally do not sell to the community those common services, other than higher education, which cannot otherwise be conveniently and economically provided, and administer the state and the economic and social policy of the community (public enterprises are included in the business enterprise sector) as well as PNPs controlled and mainly financed by government — *Frascati Manual*, § 184.

The higher education sector (HES)

This sector comprises: all universities, colleges of technology and other institutes of post-secondary education, whatever their source of finance or legal status. It also includes all research institutes, experimental stations and clinics operating under the direct control of or administered by or associated with higher education establishments — *Frascati Manual*, § 206.

The public sector

The public sector comprises the higher education and government sectors combined.

R&D indicators:

R&D personnel

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.

Researchers (RSE)

Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems, and in the management of the projects concerned — *Frascati Manual*, § 301.

Full-time equivalent (FTE)

One FTE may be thought of as one person-year. For instance, a person who normally spends 40% of his time on R&D and the rest of it on other work (e.g. lecturing, university administration, guidance, etc.) should be counted as only 0.4 FTE — *Frascati Manual*, § 331-345.

Personnel by number of individuals (by headcount, HC)

This means the number of individuals who are employed mainly or partly on R&D — *Frascati Manual*, § 326-330.

R&D personnel and researchers as a percentage of employment

The source for the employment statistics is the European Labour Force Survey (EU LFS).

Fields of science

The classification by fields of science is based on the nomenclature suggested by UNESCO: [Recommendation concerning the International Standardisation of Statistics on Science and Technology](#) — *Frascati Manual* § 273-276; 200-204; 222-226.

Level of education

Programmes at the third level of education are classified according to the International Standard Classification of Education (ISCED '97) into the following levels:

ISCED level 6

Second stage of tertiary education, leading to an advanced research qualification.

ISCED level 5a

Programmes that are largely theoretically based and are intended to provide sufficient qualifications for gaining entry into advanced research programmes and professions with high skill levels.

ISCED level 5b

Programmes that are generally more practical/technical /occupationally specific than ISCED level 5a programmes.

European aggregates

For R&D personnel, EU totals are calculated as the sum of the national data by sector. If 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 by head count (HC). The estimates for R&D personnel in full-time equivalent (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.

Sources

United States, Japan and China: OECD, *Main Science and Technology Indicators* – MSTI 2006/1.

General abbreviations

AAGR	annual average growth rate
p	provisional value
e	estimated value
s	Eurostat estimate
r	revised value
f	forecast
b	break in series
i	more information in metadata
:	not available

Reference manual

Standard method proposed for research and experimental development surveys — *Frascati Manual*, OECD, 2002.

This issue of *Statistics in Focus* shows the data available in Eurostat's reference database on 11 October 2006.

Further information:

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

Science and technology

Research and development

Statistics on research and development

R&D expenditure at national and regional level

R&D personnel at national and regional level

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