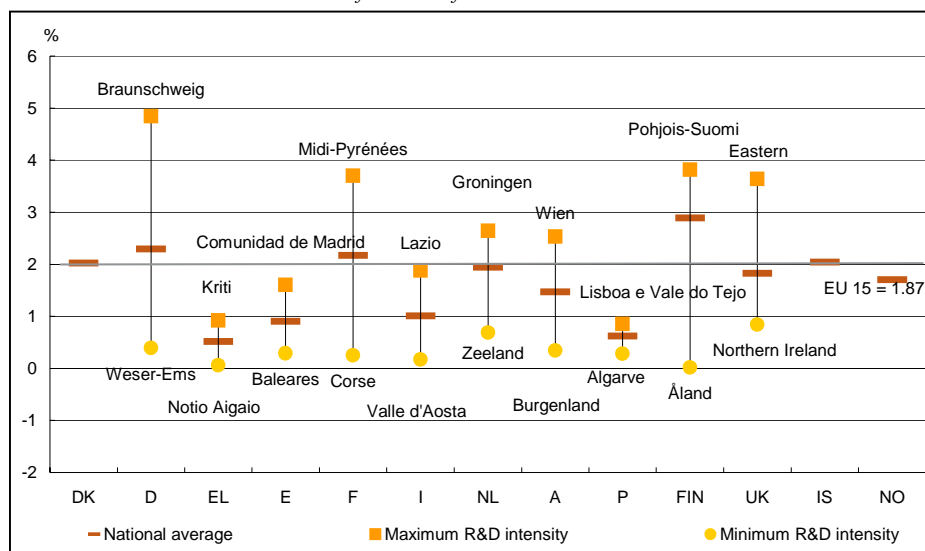


R&D expenditure and personnel in European regions 1997-99

Ibrahim Laafia

German regions lead European R&D activities

Figure 1: Regional R&D expenditure disparities in Europe, as a % of GDP — for all sectors — 1998



Methodological notes

Exceptions to the 1998 reference year are for:
NO:1999; D, EL and P: 1997; I: 1996; A: 1993.

All regional data are at NUTS 2 level except for the UK where the data are at NUTS 1 level.

Source: Eurostat.

- German regions have the highest R&D intensity in Europe. In 1997, Braunschweig allocated 4.84 % of its GDP to total R&D expenditure, just ahead of Stuttgart and Oberbayern which allocated 4.79 and 4.38 % respectively.
- In absolute terms, in 1999 only Île de France (F) was ahead of the 4 German regions (Oberbayern, Stuttgart, Köln and Darmstadt) with EUR 13.4 million in current prices.
- In 1997, 50 % of total European R&D expenditure was concentrated in 28 regions.
- Disparities among European countries still exist. The leading region in 4 countries (Germany, Finland, France and the United-Kingdom) had an R&D intensity higher than 3.5 %. Meanwhile, the R&D intensity of three leading regions remained below the European average in three Member States: Greece, Spain and Portugal.
- In 1998, the highest proportions of R&D personnel as a percentage of the labour force were found in Sweden and in Germany as they recorded 3.65 (Stockholm) and 3.33 % (Oberbayern) respectively.

Statistics
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R&D expenditure in the European regions

Not all the regions devote an equal proportion of GDP to R&D expenditure. In 1998, the highest proportion of GDP devoted to R&D expenditure was recorded in Braunschweig (D) at 4.8 %. Pohjois Suomi (FIN), Midi-Pyrénées (F) and Eastern (UK) followed with ratios close to 4 %.

As seen in Figure 1, the disparities among leading European regions remain high. The most R&D intensive region for 4 countries displays a share of R&D expenditure below the European average, which was equal to 1.87 % of the GDP in 1998.

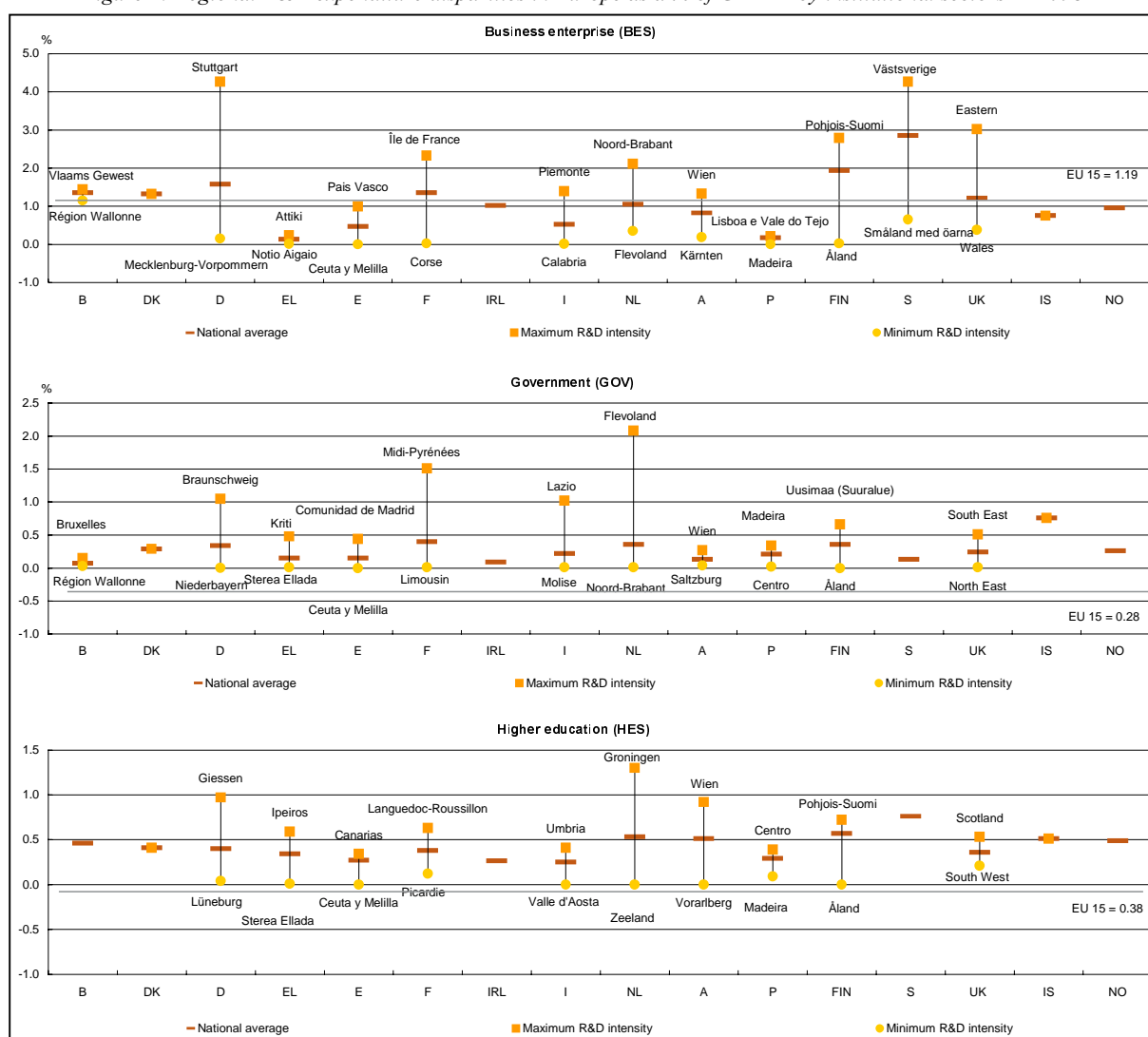
Among regions with a low R&D intensity, disparities also exist, but to a lesser degree. Most of them have a ratio close to zero, except for the United-Kingdom (NUTS 1 level) and the Netherlands.

At the institutional sector level, disparities both between countries and within the country exist, especially for the business enterprise sector (BES) and the government sector (GOV). Few regions reach very high R&D intensity levels (3 for the BES and 1.5 % for the GOV respectively), while the leading regions for some countries are close or below the European average level.

The highest values are reached by different countries depending on the sector taken into account: Västsverige and Stuttgart (4.3 %, S and D) in the BES, Flevoland (2.1 %, NL) in the GOV and Groningen (1.3 %, NL) in the HES. The only regions to be in the top three in all three categories are German regions (Figure 2).

Several countries' leading regions present ratios under the EU average in two sectors: the BES (Greece, Spain, Portugal and Island), and the GOV (Belgium, Denmark and Austria).

Figure 2: Regional R&D expenditure disparities in Europe as a % of GDP — by institutional sectors — 1998



Methodological notes

Exceptions to the 1998 reference year for:

BES: P and NO: 1999; D, EL, IRL and S: 1997; B: data at NUTS 1 level;

GOV: EL, P and NO: 1999; D: 1997; A: 1993; B and UK: data at NUTS 1 level;

HES: EL, P and NO: 1999; I: 1995; A: 1993.

Source: Eurostat.

Table 1: R&D expenditure concentration in EEA regions (in current ECU/EUR) by institutional sectors — 1997

Sectors	Number of region per quartile of R&D expenditure				Total R&D expenditure for EEA in millions — 1997	Total number of region at NUTS 2 level	% of R&D expenditure not broken down by region	Methodological box The exceptions to the reference year are: • All sectors and HES: I: 1996; A: 1993; • BES and GOV: A: 1993 No data at NUTS 2 level are available for: • BES: B, IRL, UK • GOV, HES, TOTAL: B, IRL, S and UK
	Q ₁	Q ₂	Q ₃	1				
All sectors	7	28	:	:	137 714	211	27%	
Business enterprise (BES)	5	21	79	:	87 519	211	20%	
Government (GOV)	5	18	82	:	20 582	211	22%	
Higher education (HES)	11	40	:	:	28 686	211	26%	

For example: for the BES, 25 % of R&D expenditure (Q1) are carried out in 5 regions, 50 % of R&D expenditure (Q2) are carried out in 21 regions, and so on.

Source: Eurostat.

R&D expenditure was highly concentrated in the EEA in 1997: 25 % of total R&D expenditure was carried out in 7 regions when all sectors are taken into account, and 50 % in 28 regions out of a total of 211.

The GOV and the BES are the sectors where R&D expenditure is most concentrated, as less than 21 regions share 50 % of R&D expenditure. For the HES, in turn, 40 regions account for half of the total R&D expenditure (Table 1).

Table 2 gives an overview of the national situation for all sectors. Two main trends and an exception are observed. On the one hand, for some countries half or almost half of the total national R&D expenditure corresponds to one region. These countries are Portugal (Lisboa e Vale do Tejo, 54 %), Austria (Wien), Greece (Attiki), Finland (Uusimaa - Suuralue), Norway (Oslo og Akershus) and France (Île de France).

On the other hand, there are other countries, where the leading region's share of R&D expenditure represents a smaller proportion of the total, and is generally comprised between 20 and 30 %. Germany is the exception, as the breakdown of R&D expenditure seems to be more homogenous than in other countries. R&D expenditure in the first two German regions, Oberbayern and Stuttgart, accounts for 14 and 12 % of the total respectively.

In terms of the shares of R&D expenditure in the EEA total, the performance of the leading regions differs from one country to the other. Only, France's, Germany's and the United-Kingdom's leading regions' ratios exceed 3 %, whereas, this proportion remains under or equal to 1 % for five countries (Spain, Norway, Portugal, Iceland and Greece).

Among the regions with low R&D intensity, relatively high proportions of R&D expenditure can be observed in Norway (Nord-Norge), Finland (Itä-Suomi) and Portugal (Algarve).

Table 2: Regional R&D expenditure disparities measured in current ECU/EUR, all sectors — NUTS 2 level — 1999

Country	Top regions	Regions with high R&D expenditure			Regions with low R&D expenditure					
		Current ECU/EUR			PPS	Current ECU/EUR			PPS	
		Mio	As a % of the country	As a % of the EEA	Mio	Lowest regions	Mio	As a % of the country	As a % of the EEA	Mio
EU-15		153 336		98	148 179					
EEA		155 933		100	150 311					
DK	Denmark	3 305	100							
D	Oberbayern (1997)	5 911	14	4.3	5446	Trier (1997)	75	0.2	0.1	70
	Stuttgart (1997)	5 045	12	3.7	4649	Dessau (1997)	56	0.1	0.0	52
EL	Attiki (1997)	267	49	0.2	335	Ionia Nisia (1997)	4	0.7	0.0	4
	Kentriki Makedonia (1997)	96	18	0.1	121	Notio Aigaio (1997)	2	0.4	0.0	3
E	Comunidad de Madrid	1 589	32	1.0	1900	Baleares	33	0.7	0.0	39
	Cataluña	1 130	23	0.7	1350	La Rioja	20	0.4	0.0	24
F	Île de France	13 426	45	8.6	12603	Limousin	89	0.3	0.1	83
	Rhône-Alpes	2 966	10	1.9	2785	Corse	19	0.1	0.0	18
I	Lombardia (1996)	2 372	24	1.8	2677	Molise (1996)	14	0.1	0.0	16
	Lazio (1996)	1 869	19	1.4	2109	Valle d'Aosta (1996)	5	0.0	0.0	5
NL	Zuid-Holland (1998)	1 698	25	1.2	1671	Flevoland (1998)	116	1.7	0.1	121
	Noord-Brabant (1998)	1 222	18	0.8	1269	Zeeland (1998)	51	0.7	0.0	53
A	Wien (1993)	1 218	52	1.0	1109	Burgenland (1993)	11	0.5	0.0	10
	Steiermark (1993)	331	14	0.3	301	Kärnten (1993)	36	1.5	0.0	33
P	Lisboa e Vale do Tejo	438	54	0.3	510	Algarve	16	2.0	0.0	24
	Norte	169	21	0.1	177	Madeira (PT)	10	1.2	0.0	14
FIN	Uusimaa (Suuralue)	1 804	47	1.2	1301	Itä-Suomi	174	4.5	0.1	159
	Etelä-Suomi	1 152	30	0.7	784	Åland	1	0.0	0.0	0
UK	South East (NUTS 1)	6 021	24	3.9	5774	North East	424	1.7	0.3	406
	Eastern (NUTS 1)	4 595	18	2.9	4407	Northern Ireland	266	1.1	0.2	255
IS	Iceland	152	100	0.1	132					
NO	Oslo og Akershus	1 151	47	0.7	942	Nord-Norge	115	4.7	0.1	94
	Trøndelag	420	17	0.3	344	Sør-Østlandet	42	1.7	0.0	34

Source: Eurostat.

Table 3: Top 10 regions in terms of R&D intensity by institutional sector in the EEA countries, 1998

All sectors					Business enterprise (BES)						
R&D expenditure					R&D expenditure						
Region	Country	As a %	Current	PPS	Region	Country	As a %	Current	PPS		
		of GDP	ECU/EUR	Mio			Mio	of GDP	ECU/EUR	Mio	Mio
EU-15		1.87	142 002	98	137 083	EU-15		1.19	90 817	99	86 899
EEA		1.87	144 424	100	139 112	EEA		1.19	92 154	100	88 017
Braunschweig (1997)	D	4.84	1 675	1.2	1 543	Stuttgart (1997)	D	4.27	4 499	5.1	4 145
Stuttgart (1997)	D	4.79	5 045	3.7	4 649	Västsverige (1997)	S	4.27	1 585	1.8	1 319
Oberbayern (1997)	D	4.38	5 911	4.3	5 446	Stockholm (1997)	S	3.88	2 119	2.4	1 764
Tübingen (1997)	D	4.05	1 608	1.2	1 481	Oberbayern (1997)	D	3.38	4 568	5.2	4 209
Pohjois-Suomi	FIN	3.82	410	0.3	376	Tübingen (1997)	D	3.31	1 313	1.5	1 210
Uusimaa (Suuralue)	FIN	3.73	1 571	1.1	1 441	Braunschweig (1997)	D	2.94	1 017	1.2	937
Midi-Pyrénées	F	3.70	1 803	1.2	1 673	Sydsverige (1997)	S	2.80	736	0.8	613
Rheinessen-Pfalz (1997)	D	3.50	1 527	1.1	1 407	Rheinessen-Pfalz (1997)	D	2.79	1 217	1.4	1 121
Ile de France	F	3.43	12 416	8.6	11 521	Pohjois-Suomi	FIN	2.79	299	0.3	275
Berlin (1997)	D	3.41	2 566	1.9	2 364	Uusimaa (Suuralue)	FIN	2.39	1 006	1.1	923

Government (GOV)					Higher education (HES)						
R&D expenditure					R&D expenditure						
Region	Country	As a %	Current	PPS	Region	Country	As a %	Current	PPS		
		of GDP	ECU/EUR	Mio			Mio	of GDP	ECU/EUR	Mio	Mio
EU-15		0.28	21 141	96	20 666	EU-15		0.38	29 059	91	28 523
EEA		0.28	22 008	100	21 017	EEA		0.38	31 852	100	29 081
Flevoland	NL	2.08	100	0.5	104	Groningen	NL	1.30	189	0.6	197
Midi-Pyrénées	F	1.51	736	3.3	683	Giessen	D	0.97	202	0.6	186
Braunschweig	D	1.05	376	1.7	346	Wien (1993)	A	0.92	442	1.9	402
Lazio	I	1.02	1 109	5.0	1 253	Steiermark (1993)	A	0.82	152	0.6	138
Berlin	D	0.98	743	3.4	684	Braunschweig	D	0.82	296	0.9	273
Karlsruhe	D	0.92	714	3.2	657	Utrecht	NL	0.82	252	0.8	263
Languedoc-Roussillon	F	0.91	344	1.6	319	Halle	D	0.77	111	0.3	102
Dresden	D	0.85	238	1.1	219	Berlin	D	0.76	577	1.8	532
Köln	D	0.77	834	3.8	769	Leipzig	D	0.72	137	0.4	126
Zuid-Holland	NL	0.71	554	2.5	578	Gelderland	NL	0.72	266	0.8	278

Source: Eurostat.

Table 4: Top 10 regions in terms of R&D expenditure, in current ECU/EUR for all sectors and the BES in the EEA countries — 1999

All sectors					Business enterprise (BES)				
R&D expenditure					R&D expenditure				
Region	Country	Current ECU/EUR		PPS	Region	Country	Current ECU/EUR		PPS
		Mio	% of the EEA	Mio			Mio	% of the EEA	Mio
EU-15		153 336	98	148 179	EU-15		99 542	99	95 359
EEA		155 933	100	150 311	EEA		100 972	100	96 531
Ile de France	F	13 426	8.6	11 521	Ile de France	F	9 381	9.3	7 824
Oberbayern (1997)	D	5 911	4.3	5 446	Oberbayern (1997)	D	4 568	5.2	4 209
Stuttgart (1997)	D	5 045	3.7	4 649	Stuttgart (1997)	D	4 499	5.1	4 145
Denmark	DK	3 305	2.1	2 687	Darmstadt (1997)	D	2 636	3.0	2 428
Köln (1997)	D	3 193	2.3	2 942	Stockholm	S	2 483	2.5	1 764
Darmstadt (1997)	D	3 128	2.3	2 883	Denmark	DK	2 059	2.0	1 691
Rhône-Alpes	F	2 966	1.9	2 642	Rhône-Alpes	F	2 014	2.0	1 770
Berlin (1997)	D	2 566	1.9	2 364	Lombardia (1998)	I	1 873	2.0	2 117
Karlsruhe (1997)	D	2 423	1.8	2 233	Köln (1997)	D	1 801	2.1	1 659
Lombardia (1996)	I	2 372	1.8	2 677	Düsseldorf (1997)	D	1 547	1.8	1 425

Source: Eurostat.

Germany dominate the top 10 European regions when R&D expenditure is measured both as a share of GDP and in absolute terms.

For all the sectors, Braunschweig (4.84 %), Stuttgart (4.79 %) and Oberbayern (4.38 %) display the highest R&D intensities in Europe in 1997. Besides German regions, only two Finnish and two French regions are present in the top 10 European regions.

Nevertheless, the analysis per sector reveals that if German regions appear in the majority in each of them, only Braunschweig features simultaneously in all three sectors and Berlin in the GOV and the HES. On the other hand, no region of any other country is present in three or even two sectors.

For the BES, the highest R&D intensity corresponds to Stuttgart (D) and Västsverige (S) with 4.27 % each. This proportion is the highest among all the sectors. It is also in the BES where there is the greatest gap between the first region and the 10th (1.88 percentage points) and the distribution is relatively homogeneous. In the GOV and the HES, the gap is

also relatively large, as R&D intensity for the leading region is at least 0.33 percentage points above the second one.

In the GOV, Dutch, French and Italian regions share the top 10 places with the German regions. In the HES in turn, Dutch and Austrian regions share the top 10 regions with German ones (Table 3).

In absolute terms in 1999, Île de France (F) with 13.4 Mio of current EUR and 9 % of EEA R&D total expenditure, comes far before the other European regions, which are German, French, Italian and the Denmark (which is classified at NUTS 2 level), (Table 4).

European regions reveal a strong dynamism between 1995-99.

Most of the European regions displayed a strong dynamism during the 1995-97 period. For all sectors, 17 regions out of 2 had an annual average growth rate (AAGR) above 10 %. Greek and Italian regions particularly stand out themselves with very high rates (Table 5).

Table 5: Annual average growth rate of R&D expenditure (1995 ECU/EUR constant prices) for the two most R&D dynamic regions per country — by institutional sectors — 1997-1999

Country	All sectors		Business enterprise (BES)		Government (GOV)		Higher education (HES)	
	Region	AAGR (1999-97) in % (constant ECU/EUR at 95 prices)	Region	AAGR (1999-97) in % (constant ECU/EUR at 95 prices)	Region	AAGR (1999-97) in % (constant ECU/EUR at 95 prices)	Region	AAGR (1999-97) in % (constant ECU/EUR at 95 prices)
EU-15		4.5		5.5		1.8		3.2
EEA		4.4		5.4		1.7		3.3
B			Vlaams Gewest (NUTS 1)	8	Vlaams Gewest (NUTS 1)	9		
			Région Wallonne (NUTS 1)	2	Région Wallonne (NUTS 1)	3		
DK	Denmark	4	Denmark	5	Denmark	5	Denmark	1
D	Düsseldorf (1995-97)	15	Düsseldorf (1995-97)	18	Oberpfalz (1996-98)	22	Koblenz (1996-98)	15
	Rheinessen-Pfalz (1995-97)	10	Brandenburg (1995-97)	13	Mecklenburg-Vorpommern (1996-98)	19	Schwaben (1996-98)	13
EL	Dytiki Makedonia (1995-97)	48	Dytiki Ellada (1995-97)	15	Attiki	23	Ipeiros	27
	Peloponnisos (1995-97)	34	Kentriki Makedonia (1995-97)	3	Ionia Nisia	14	Attiki	22
E	Aragon	22	Cantabria	37	Aragon	25	Castilla-la Mancha	11
	Comunidad Foral de Navarra	18	Aragon	33	Murcia	18	Cataluña	9
F	Corse	22	Basse-Normandie	17	Languedoc-Roussillon	15	Corse	8
	Basse-Normandie	12	Haute-Normandie	10	Midi-Pyrénées	13	Picardie	5
IRL	Ireland (1995-97)	11	Ireland (1995-97)	12	Ireland (1997-99)	-5	Ireland (1996-98)	10
I	Valle d'Aosta (1994-96)	41	Liguria (1996-98)	8	Puglia (1996-98)	46	Umbria (1994-96)	9
	Molise (1994-96)	22	Emilia-Romagna (1996-98)	7	Calabria (1996-98)	25	Lazio (1994-96)	8
NL	Gelderland (1997-98)	3	Flevoland (1996-98)	10	Zuid-Holland (1996-98)	18	Limburg (NL) (1997-98)	10
	Zuid-Holland (1997-98)	2	Gelderland (1996-98)	7	Flevoland (1996-98)	0	Groningen (1997-98)	3
A	Burgenland (1989-93)	19	Burgenland (1989-93)	26	Salzburg (1989-93)	19	Niederösterreich (1989-93)	16
	Wien (1989-93)	6	Wien (1989-93)	8	Wien (1989-93)	11	Oberösterreich (1989-93)	10
P	Algarve	29	Acores (PT)	48	Centro (P)	41	Acores (PT)	32
	Norte	17	Algarve	41	Algarve	41	Alentejo	22
FIN	Pohjois-Suomi	21	Pohjois-Suomi	25	Väli-Suomi	41	Uusimaa (Suuralue)	16
	Åland	20	Etelä-Suomi	17	Itä-Suomi	12	Pohjois-Suomi	13
S			Sydsverige	10				
			Stockholm	8				
UK	Wales (NUTS 1)	20	Wales (NUTS 1)	31	Wales (NUTS 1)	35	Northern Ireland (NUTS 1)	8
	North West (NUTS 1)	8	North West (NUTS 1)	10	South West (NUTS 1)	2	East Midlands (NUTS 1)	7
IS	Iceland	6	Iceland	5	Iceland	9	Iceland	3
NO	Trøndelag	9	Nord-Norge	25	Agder og Rogaland	8	Sør-Østlandet	18
	Nord-Norge	4	Trøndelag	12	Hedmark og Oppland	0	Hedmark og Oppland	12

Methodological notes

The following regions have not been included in the ranking because of very high AAGR (more than 50%). These regions are (name of the region, country, AAGR):

- All sectors: Ionia Nisia (EL, 73 %); Zeeland (NL, 113 %); Acores (P, 132 %).
- BES: Ionia Nisia (EL, 68 %); Kriti (EL, 73 %); Balears (E, 124 %); Extremadura (E, 165 %).
- GOV: Corse (F, 165 %); Sicilia (I, 137 %); Groningen (NL, 54 %); Zeeland (NL, 79 %); Åland (FIN, 70 %).
- HES: Dessau (D, 446 %); Dytiki Ellada (EL, 100 %); Basse-Normandie (F, 69 %); Acores (P, 242 %); Thessalia (EL, 80 %).

UK: North West includes Merseyside.

R&D personnel in the European regions

In 1998, Stockholm was the region with the highest proportion of R&D personnel (3.65 % of the labour force in Europe). Most of the European top ten regions in the BES and the GOV are German as it is for R&D expenditure.

R&D personnel trends are similar with those in R&D expenditure. The top 10 regions in terms of R&D researchers belong to few countries, 4 different countries in the BES and 6 for the other sectors. Nevertheless, some differences appear in particular in the HES where the top 10 regions in R&D personnel and expenditure do not correspond totally.

Even if the distribution of R&D personnel in % of the labour force is homogenous between these leading regions, except for Flevoland (NL) in the GOV, the gap between the first and the 10th region remains important. It comes to 1 percentage point for all the sectors, the BES and the HES, and 0.6 in the GOV.

Germany and Sweden are the most represented countries when all sectors are taken into account with 4 and 3 regions in the top ten respectively. Stockholm has the highest percentage of R&D personnel in the labour force (3.65 %, S) preceding Oberbayern (3.33 %, D) and Braunschweig (3.18 %, D).

In the BES, the top three regions are almost the same, 2.32 % of the labour force works in R&D in Oberbayern (D), against 2.23 % in Stuttgart (D) and 1.92 % in Stockholm (S).

Two Dutch regions appear in the GOV with leading Flevoland whose R&D personnel is about 1.2 % of the labour force. Braunschweig (D) comes in second position with a ratio of 0.75 %, before Lazio (I) which displays 0.73 %.

Unlike the situation observed for R&D expenditure, German regions are absent in the top 10 HES regions in terms of R&D personnel, which is dominated by Sweden and Greece with 3 regions for each country. Övre Norrland (S), Voreio Aigaio (EL) and Ipeiros (EL), with more than 1.7 %, have the highest proportions of R&D personnel in their labour force.

Table 6: Top 10 regions in terms of R&D personnel as a % of labour force by institutional sectors — in the EEA countries — 1998

All sectors					Business enterprises (BES)				
Region	Country	R&D personnel			Region	Country	R&D personnel		
		In % of the labour force	In head count	% of EEA			In % of the labour force	In head count	% of EEA
		%	Thousand	% of EEA			%	Thousand	% of EEA
EU-15		1.31	2 225	98	EU-15		0.62	1 044	98
EEA		1.32	2 272	100	EEA		0.62	1 063	100
Stockholm	S	3.65	32.6	1.4	Oberbayern (1997)	D	2.32	47.7	4.6
Oberbayern (1997)	D	3.33	68.5	3.1	Stuttgart (1997)	D	2.23	42.9	4.2
Braunschweig (1997)	D	3.18	24.0	1.1	Stockholm (1997)	S	1.92	17.2	1.7
Wien	A	3.14	25.3	1.1	Tübingen (1997)	D	1.64	13.8	1.3
Île de France	F	2.89	154.6	6.8	Braunschweig (1997)	D	1.61	12.2	1.2
Pohjois-Suomi	FIN	2.70	7.0	0.3	Darmstadt (1997)	D	1.58	28.4	2.8
Östra Mellansverige (1997)	S	2.70	20.2	0.9	Île de France	F	1.55	83.0	7.8
Stuttgart (1997)	D	2.67	51.3	2.3	Västsvrige (1997)	S	1.55	13.4	1.3
Västsvrige (1997)	S	2.57	22.2	1.0	Pohjois-Suomi	FIN	1.52	3.9	0.4
Island	IS	2.51	3.8	0.2	Rheinessen-Pfalz (1997)	D	1.38	12.8	1.2
Government (GOV)					Higher education (HES)				
Region	Country	R&D personnel			Region	Country	R&D personnel		
		In % of the labour force	In head count	% of EEA			In % of the labour force	In head count	% of EEA
		%	Thousand	% of EEA			%	Thousand	% of EEA
EU-15		0.19	320	98	EU-15		0.48	821	95
EEA		0.19	327	100	EEA		0.49	864	100
Flevoland (1996)	NL	1.22	1.6	0.5	Övre Norrland (1997)	S	1.97	5.1	0.6
Braunschweig (1997)	D	0.75	5.6	1.7	Voreio Aigaio (1997)	EL	1.74	1.0	0.1
Lazio	I	0.73	15.4	4.7	Ipeiros (1997)	EL	1.69	1.8	0.2
Island	IS	0.72	1.1	0.3	Östra Mellansverige (1997)	S	1.56	11.7	1.4
Comunidad de Madrid	E	0.68	14.8	4.5	Wien	A	1.46	11.8	1.4
Karlsruhe (1997)	D	0.67	8.5	2.6	Stockholm (1997)	S	1.41	12.7	1.5
Berlin (1997)	D	0.61	10.9	3.4	Bruxelles-capitale (1995)	B	1.34	5.2	0.7
Köln (1997)	D	0.59	11.2	3.5	Dytiki Ellada (1997)	EL	1.20	3.0	0.4
Kriti (1997)	EL	0.58	1.3	0.4	Comunidad Foral de Navarra	E	1.17	2.6	0.3
Zuid-Holland (1996)	NL	0.58	9.1	2.7	Västsvrige (1997)	S	1.01	8.7	1.1

Source: Eurostat.

➤ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

Research and development input indicators:

R&D expenditure and R&D personnel

The definitions of R&D personnel and R&D expenditure are taken from the Frascati Manual and the Regional Manual.

• R&D expenditure

Intramural expenditure are all expenditure for R&D performed within a statistical unit or sector of the economy, whatever the source of funds. Expenditure made outside the statistical unit or sector but in support of intramural R&D (e.g. purchase of supplies for R&D) are included. Both current and capital expenditure are included.

Regional intramural expenditure are all expenditure for R&D performed within a statistical unit or a sector in a region, whatever the source of funds is.

• 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 an indirect service, such as canteen and security staff, should be excluded, even though their wages and salaries are included as an overhead cost in the measurement of expenditure.

Adjusted to regional purpose, the definition of R&D personnel gives: all persons employed directly on R&D in a region should be counted.

– Full-time equivalent - FTE: 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: 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.

Institutional classifications

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: business enterprise, government, higher education and private non-profit institutions.

The business enterprise sector (BES)

With regard to R&D, the business enterprise sector includes (Frascati Manual, § 145): all firms, organisations and institutions whose primary activity is the 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 institutes mainly serving them.

The government sector (GOV)

In the field of R&D, the government sector includes (Frascati Manual, § 168): all departments, offices and other bodies which furnish 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), and PNP controlled and mainly financed by government.

The higher education sector (HES)

This sector is composed of (Frascati Manual, § 190): all universities, colleges of technology and other institutes of post-secondary education, whatever their source of finance or legal status is.

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.

The private non-profit sector (PNP)

The field covered by this sector includes (Frascati Manual, § 178): Non-market, private non-profit institutions serving households (i.e. the general public); and private individuals or households.

Nomenclature of territorial units for statistics (NUTS)

The Nomenclature of Territorial Units for Statistics (NUTS) was established by the Statistical Office of the European Communities, in cooperation with the Commission's other departments, to provide a single, uniform breakdown of territorial units for the production of regional statistics for the European Union.

The NUTS is a five-level hierarchical classification comprising three regional and two local levels. In this way, NUTS subdivides each Member State into a whole number of NUTS 1 regions, each of which is in turn subdivided into a whole number of NUTS 2 regions, and so on.

In the present Statistics in Focus (SIF) all data are presented at NUTS 2 level on the basis of the NUTS 1998 version. The exceptions have been indicated in the tables or figures.

Denmark is classified at NUTS 2 level, which explain its presence amongst the regions.

Iceland and Norway are not included in the NUTS classification but are statistical regions. Iceland is classified at the statistical region level 2.

Time series

Data measured in constant 1995 ECU/EUR are first corrected for inflation using the GDP deflator (a Paasche index with 1995 = 100 as a base) of the country in question before applying the 1995 ECU/EUR exchange rate. The GDP deflator in general conforms to the 1995 European System of Accounts (ESA 95), available on NewCronos (Theme 2). Where the series was incomplete, the adjusted GDP deflator from ESA 79 was used. Appropriate caution should be employed interpreting the results in such cases.

As with the GDP deflator, time series on GDP are built up using the two systems of European accounts.

R&D intensity

Some methodological changes occurred this year for the calculation of R&D intensity. Previously the GDP from Theme 1 and including both regional and national level data was used as a priority. Now, the GDP from national account data serves for the computation of the R&D intensity at the national level and the GDP from the regional account data is used at the regional level. As it is mentioned for the GDP deflator, GDP ESA 1995 data, were completed with ESA 79 data where necessary. More information is available on New Cronos Theme 9.

Bibliography

The Regional Dimension of R&D and Innovation Statistics and Experimental Development - Regional Manual, European Commission, 1996.

Proposed Standard Practice for Surveys of Research and Development - Frascati Manual, OECD, 1994.

Further information:

➤ Reference publications

Title Research and development: annual statistics, 2001 edition
 Catalogue No KS-41-01-591-EN-C Price EUR 29.5

➤ Databases

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