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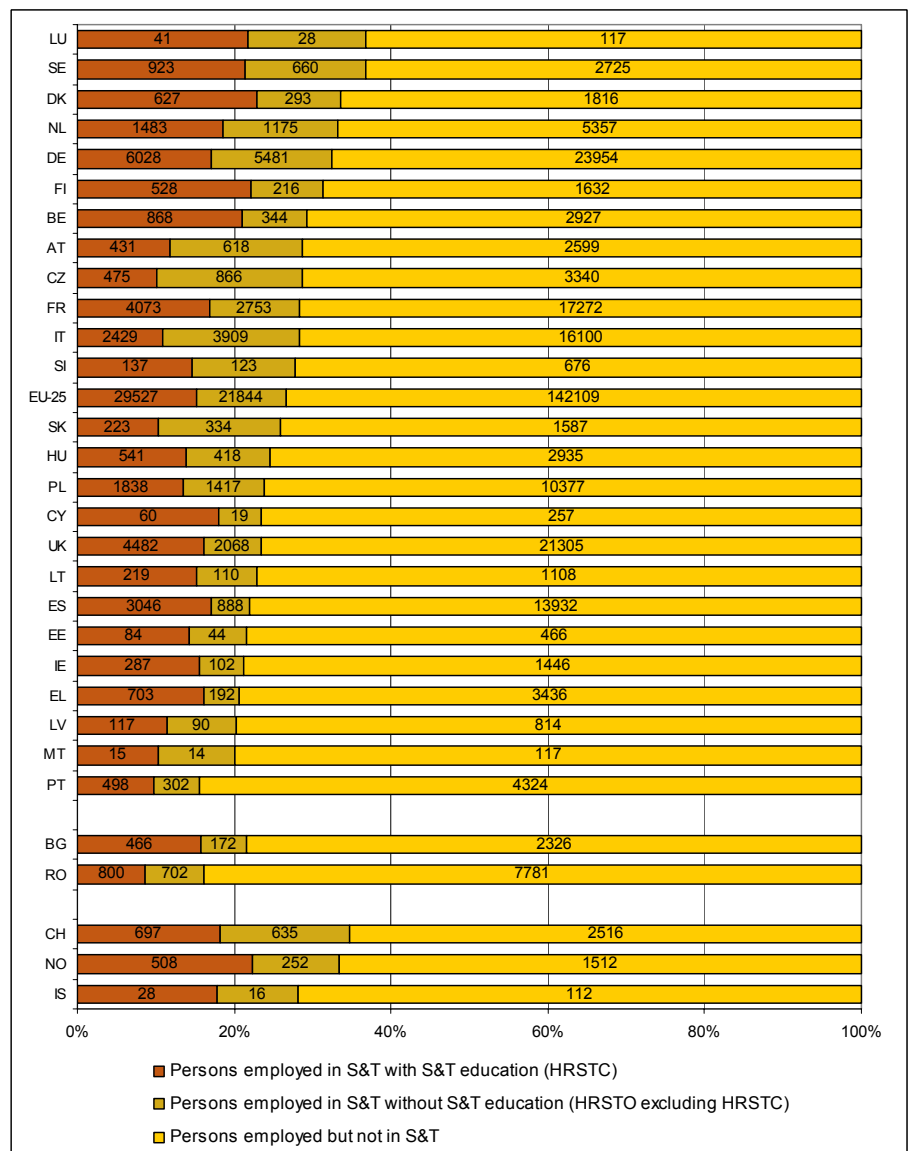


Which are the characteristics of Europe's highly qualified human resources?

Main Findings

- More than 51 million people were employed in science and technology in the EU-25 in 2004. This is close to 30% of the total employed population of 25-64 years.
- Over 2.5 times more men than women were employed as scientists and engineers.
- 80% of science and technology jobs are in the services sectors.
- Ireland has the most dynamic growth of scientists and engineers.

Figure 1: Persons employed 25-64 year olds, in Science and Technology (S&T), with and without S&T education, and persons employed in non-S&T occupations, in thousands and percentages, 2004



Source : Eurostat HRST data base

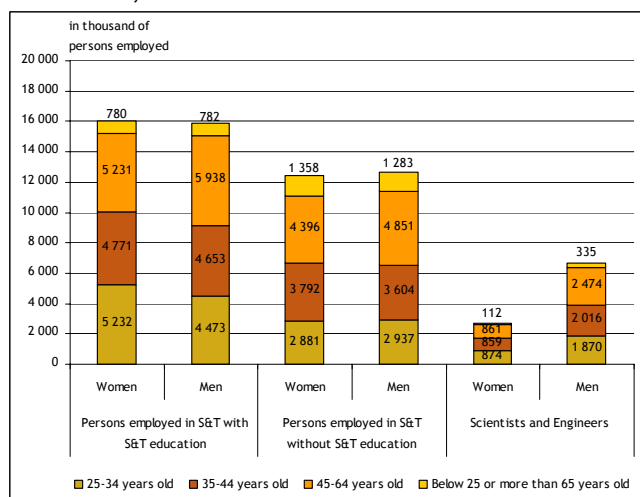
Over 2.5 times more men than women were employed as Scientists or Engineers

In 2004, more than 51 million people in EU-25 were employed in science and technology (S&T), which was close to 30% of the total employed population of 25-64 years olds. Of this 51 million, around 57% had completed a S&T education.

At country level, the proportion of persons employed in S&T in EU countries varied between 16% and 37% of the total.

Luxembourg and Sweden show the highest proportion of persons employed in S&T, above 36%. But the largest proportion of persons employed in S&T with S&T education (23%) is found in Denmark. Portugal and Malta show the lowest proportion of persons employed in S&T (around 16% and 20% respectively).

Figure 2: Age and gender distribution of persons employed in S&T with and without S&T education and S&E in the EU, 2004



Source : Eurostat HRST data base

EU-25: Eurostat estimate.

Figure 2 shows that, in the EU-25, the number of persons employed in S&T with S&T education was greater than the number of persons employed in S&T without having completed S&T education (around 32 million and 25 million respectively).

Overall, by looking at the distribution of persons employed in S&T with or without S&T education for EU-25, there are no significant difference between men and women. The number of females employed in S&T without S&T education was slightly lower than the number of males, around 249 000 less, whereas among those with S&T education, women were slightly more numerous than men, around 167 000 more.

The gap between women and men is much more marked when looking at those employed as Scientists and Engineers (S&E). The number of male S&E was over 2.5 times higher than the number of females.

Looking at the age groups, close to two-thirds of both groups (with and without S&T education) were between 25-44 and only one-third between 45-64 years old.

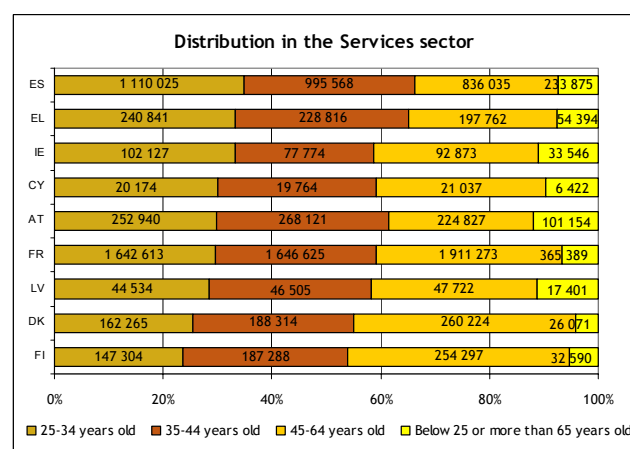
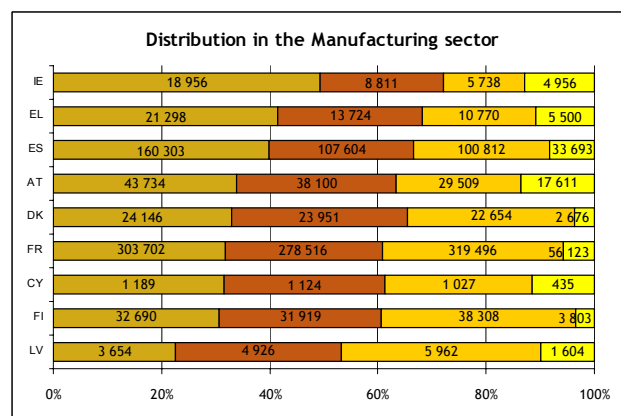
This is the case also for the Scientists and Engineers where about 35% are between 45-64 years old, whereas more than 60% are between 25-44 years old.

Figure 3 shows the age distribution of persons employed in S&T in manufacturing and in the services sector. The results are derived from the 2001 Population and Housing Censuses and are currently available for the countries shown only.

The sector of economic activity obviously has an impact on the age distribution. For all countries shown except Latvia, persons employed in S&T between 25-34 years old were most likely to be found in manufacturing. In Ireland nearly half of the persons employed in S&T were aged between 25-34 years.

The largest percentage of persons employed in S&T between 45-64 years old was found in the services sector. In Finland and Denmark more than 40% of the persons employed in S&T in this sector fell into this age group, while 25% or less were between 25 and 34 years old.

Figure 3: Age distribution of the persons employed in S&T in two selected sectors of economic activity, 2001



Source : Eurostat HRST data base

Census year: FR: 1999; LV FI: 2000; DK, EL, AT, ES, CY: 2001; IE: 2002.

80% of Science and Technology jobs are found in the Services sector

Table 1: Persons employed in S&T by selected sector of activity, in thousands, and % of Scientists and Engineers (S&E), 2004

	Agriculture, hunting, forestry, fishing, mining and quarrying	Utilities and Construction	High and medium high technology manufacturing	Low and medium low technology manufacturing	Manufacturing	S&E as a share of HRSTO	Knowledge-intensive financial services	Knowledge-intensive high-technology services	Knowledge-intensive market services	Other knowledge-intensive services	Less knowledge-intensive services	Services	S&E as a share of HRSTO
EU-25	404.46	3 023.91	3 772.14	3 076.92	6 849.06	24%	2 357.69	2 987.10	6 195.79	20 405.78	11 519.73	43 466.09	15%
BE	3.14 u	77.32	78.55	76.67	155.22	19%	36.91	69.15	139.57	572.23	189.94	1 007.80	27%
CZ	44.38	156.39	105.55	130.58	236.13	11%	60.49	65.68	122.38	418.79	301.75	969.09	11%
DK	:	41.42	52.35	49.79	102.14	21%	46.59	62.21	96.77	405.33	179.58	790.48	15%
DE	75.37	664.72	1 224.62	623.59	1 848.21	29%	485.26	572.41	1 141.02	4 111.96	2 894.69	9 205.34	14%
EE	:	:	7.82 u	8.67 u	16.49	:	:	5.55 u	11.51	53.79	33.65	106.71	13%
EL	:	17.16	20.81	44.49	65.30	20%	43.70	28.35	156.23	438.85	149.77	816.89	20%
ES	29.89	244.63	219.39	248.21	467.60	24%	161.75	211.83	565.24	1 426.72	906.41	3 271.95	20%
FR	15.86 u	395.97	592.73	412.31	1 005.04	29%	234.37	563.93	699.86	2 450.11	1 609.79	5 558.06	14%
IE	:	20.02	30.20	18.74	48.93	39%	19.10	24.57	46.93	176.30	55.62	322.53	31%
IT	25.08	333.76	439.87	384.04	823.91	10%	339.90	343.19	975.21	2 409.67	1 227.71	5 295.67	12%
CY	:	3.67	0.70 u	4.10	4.79	22%	6.09	3.75	11.45	26.59	22.89	70.77	16%
LV	4.86	11.35	3.81 u	15.43	19.24	32%	9.30	7.63	11.38	84.49	61.16	173.97	14%
LT	6.06 u	13.38 u	:	21.17 u	25.76	25%	8.43 u	12.22 u	17.31 u	161.42	85.96	285.33	19%
LU	0.00	3.91	:	3.27	3.67	31%	10.72	2.90	6.67	20.07	22.39	62.76	13%
HU	13.01	57.61	52.61	55.26	107.87	23%	50.64	46.56	81.75	407.87	214.27	801.09	15%
MT	0.00	2.51 u	1.78 u	:	2.84	0%	0.00	0.00	3.02	12.21	6.11	24.06	11%
NL	9.12 u	98.00	90.84	119.37	210.21	24%	155.91	133.18	397.62	1 119.65	505.31	2 311.67	15%
AT	8.34	98.83	74.22	75.48	149.71	8%	38.36	38.90	125.22	317.53	308.53	828.53	11%
PL	73.51	208.27	167.31	235.60	402.91	18%	162.44	124.97	233.27	1 302.47	813.78	2 636.93	11%
PT	:	47.23	34.28	41.85	76.13	19%	32.97	28.09	91.17	335.55	195.92	683.70	17%
SI	3.31	22.82	17.90	31.12	49.01	20%	12.30	10.96	19.39	90.65	64.38	197.67	13%
SK	19.26	61.63	31.06	50.30	81.36	11%	25.64	20.00	49.93	194.63	128.10	418.29	9%
FI	7.29	44.01	57.08	59.06	116.14	35%	15.49	53.70	88.56	285.26	148.89	591.90	19%
SE	5.66	68.47	104.03	69.54	173.57	20%	70.28	128.31	207.46	610.65	339.78	1 356.47	16%
UK	40.25	322.10	360.11	288.78	648.89	36%	328.69	410.48	898.92	2 912.35	1 063.41	5 613.85	16%
IS	:	:	1.37	1.40	2.77	:	3.11	3.28	5.05	19.26	8.90	39.59	19%
NO	14.25	20.13	27.31	26.14	53.45	16%	34.33	48.92	103.68	332.23	157.01	676.18	14%
CH	5.29	50.10	87.14	41.32	128.46	32%	119.37	70.49	168.34	495.51	267.98	1 121.70	18%
BG	13.43	36.61	28.18	48.13	76.31	18%	17.51	29.55	51.93	254.57	167.29	520.85	12%
RO	59.14	163.58	101.27	158.33	259.60	:	45.97	41.76	85.79	532.80	367.65	1 073.97	:
TR	:	:	:	:	:	:	:	:	:	:	:	:	:

Source : Eurostat HRST data base

EU-25: Eurostat estimate.
Exception to the reference year: NL 2003.

The distribution of persons employed in S&T according to the sector of their economic activity is given in Table 1. Overall, in 2004, the services sector in EU-25 employed most of persons employed in S&T, around 6.3 times more than the manufacturing sector. Less than one percent of persons employed in S&T are in the Agriculture sector.

The distribution between the manufacturing sub-sectors "high and medium high technology manufacturing" and "low and medium low technology manufacturing" was more or less homogeneous; for EU-25 the proportion was respectively 55% and 45%. This distribution also reflects the economic structure of the countries.

However, the proportion of persons employed in S&T in the manufacturing sector working in the "low and medium low technology" sub-sector reached 85% in Cyprus, and 80% in Latvia. On the other hand, for Ireland and Switzerland, 62% and 68% respectively of persons employed in S&T in the manufacturing sector worked in the "high and medium high technology" sub-sector.

In the services sector the "knowledge-intensive services" sector (KIS) employed the highest number of persons employed in S&T, an average of 73% for EU-25 and as high as 83% in Ireland.

Looking at the Scientists and Engineers (S&E), some differences also appeared according to the sector of economic activity. Although services show the highest absolute numbers of S&E, manufacturing employed the largest percentage of S&E (24% against only 15% in services for the EU-25).

At national level, there are some noteworthy differences. In the UK 36% of persons employed in S&T in the manufacturing sector were scientists or engineers (S&E) against a rate of only 16% in the services sector; in Belgium the S&E in manufacturing accounted for only 19% against 27% in services. Ireland has the highest proportion of Scientists and Engineers (S&E) working in the manufacturing sector (39%) and in the services sector (31%). In Austria and the Slovak Republic relatively smaller shares of total persons employed in S&T are S&E, 8% and 11% respectively in the manufacturing sector, and 11% and 9% in services.

Table 2: Number of employed S&T labour force with S&T education by selected field of study and occupation, and distribution between the main sectors of activity

Country	Occupation ⁽¹⁾	Field of Education ⁽²⁾										TOTAL	
		EF0	EF1	EF2	EF3	EF4	EF5	EF6	EF7	EF8	EF9		
EL <i>Reference year:</i> 2001	ISCO0	:	124	155	1 427	272	1 620	81	980	17 556	977	23 192	
	ISCO1	:	4 128	5 404	40 445	8 991	19 054	1 820	3 698	4 002	4 132	91 674	
	ISCO2	:	69 256	79 548	94 044	55 443	65 175	7 800	68 374	2 083	12 476	454 199	
	ISCO3	:	8 411	6 330	44 650	7 368	18 664	1 997	33 687	11 602	8 943	141 652	
	ISCO4	:	3 386	6 889	36 281	5 592	7 073	1 188	2 657	3 042	3 541	69 649	
	ISCO5	:	4 210	3 948	10 576	3 170	5 737	1 396	3 676	9 360	3 034	45 107	
	ISCO6	:	543	552	1 792	1 343	1 495	799	377	471	253	7 625	
	ISCO7	:	1 133	1 671	3 242	2 502	19 325	628	1 304	2 188	40	32 033	
	ISCO8	:	614	489	1 565	902	3 858	270	368	1 223	21	9 310	
	ISCO9	:	1 955	2 107	3 819	1 940	3 442	579	1 663	714	18	16 237	
	UNK	:	1 587	2 293	6 378	2 592	6 823	613	1 888	1 820	25	24 019	
TOTAL	:	95 347	109 386	244 219	90 115	152 266	17 171	118 672	54 061	33 460	914 697		
ES <i>Reference year:</i> 2001	ISCO0	:	1 035	1 043	3 848	946	2 386	114	1 046	10 824	:	21 242	
	ISCO1	:	21 925	25 645	176 992	34 195	70 993	4 306	19 337	15 687	:	369 080	
	ISCO2	:	300 309	194 432	425 474	169 596	288 135	24 592	387 869	18 240	:	1 808 647	
	ISCO3	:	42 262	45 588	169 603	69 575	54 695	4 796	48 292	30 418	:	465 229	
	ISCO4	:	42 018	38 642	185 817	21 609	17 657	1 593	20 708	23 058	:	351 102	
	ISCO5	:	25 711	18 216	48 448	12 614	13 289	1 239	31 342	12 597	:	163 456	
	ISCO6	:	1 670	1 088	3 327	1 411	2 944	1 702	669	491	:	13 302	
	ISCO7	:	4 586	5 255	12 606	5 282	29 142	792	2 475	2 090	:	62 228	
	ISCO8	:	11 097	6 402	13 209	6 064	12 205	671	3 205	2 518	:	55 371	
	ISCO9	:	9 113	6 616	18 412	6 720	11 520	952	5 339	2 537	:	61 209	
	UNK	:	:	:	:	:	:	:	:	:	:	:	
TOTAL	:	459 726	342 927	1 057 736	328 012	502 966	40 757	520 282	118 460	:	3 370 866		
IE <i>Reference year:</i> 2002	ISCO0	:	158	102	142	101	125	:	25	86	515	1 254	
	ISCO1	:	8057	1 190	6 586	23 796	10 396	8 471	1 551	1 605	5 459	32 059	99 170
	ISCO2	:	8105	24 396	17 604	28 608	22 112	20 192	3 155	34 179	889	56 459	215 699
	ISCO3	:	4387	658	5 991	8 029	7 175	7 621	725	6 023	1 954	17 580	60 143
	ISCO4	:	5497	801	4 848	12 472	5 460	786	352	681	2 447	25 679	59 023
	ISCO5	:	4153	753	2 646	4 321	1 930	1 207	367	1 746	6 416	15 148	38 687
	ISCO6	:	606	:	249	435	326	419	:	101	110	4 202	6 448
	ISCO7	:	2585	163	958	827	2 037	5 204	372	105	362	9 136	21 749
	ISCO8	:	933	112	509	785	1 379	1 549	414	119	564	5 056	11 420
	ISCO9	:	592	152	483	589	735	675	622	144	540	3 482	8 014
	UNK	:	2554	1 519	4 306	5 149	4 332	2 194	509	3 734	1 647	17 223	43 167
TOTAL	:	37627	29 744	44 282	85 153	55 983	48 443	8 067	48 462	20 474	186 539	564 774	
AT <i>Reference year:</i> 2001	ISCO0	:	94	130	457	155	514	41	175	1 768	:	3 334	
	ISCO1	:	448	5 331	4 192	22 798	4 518	42 382	2 200	1 658	4 032	2 711	90 270
	ISCO2	:	48	88 872	29 990	47 239	17 502	27 300	5 093	42 868	1 094	6 880	266 886
	ISCO3	:	464	8 090	6 876	16 363	3 331	29 851	1 706	16 379	3 176	2 794	89 030
	ISCO4	:	80	2 148	2 565	8 294	815	7 106	576	805	1 990	838	25 217
	ISCO5	:	143	1 869	1 735	2 710	544	4 013	537	1 192	4 610	793	18 146
	ISCO6	:	295	357	107	644	60	891	9 835	96	203	290	12 778
	ISCO7	:	365	243	1 196	1 371	164	38 855	363	512	570	914	44 553
	ISCO8	:	:	205	342	648	164	4 546	460	112	224	:	6 701
	ISCO9	:	65	786	826	1 396	352	3 411	573	290	405	508	8 612
	UNK	:	:	:	:	:	:	:	:	:	:	:	:
TOTAL	:	1908	107 995	47 959	101 920	27 605	158 869	21 384	64 087	18 072	15 728	565 527	
FI <i>Reference year:</i> 2000	ISCO0	:	27	57	210	23	1 254	22	96	5 314	:	7 003	
	ISCO1	:	4 294	3 078	26 463	3 386	16 448	1 476	2 204	2 239	14	59 602	
	ISCO2	:	43 696	40 071	57 085	26 182	71 712	6 212	37 984	5 170	90	288 202	
	ISCO3	:	2 064	5 042	78 927	5 396	61 842	6 158	69 445	9 009	31	237 914	
	ISCO4	:	604	2 634	64 231	2 111	2 612	524	1 835	1 979	18	76 548	
	ISCO5	:	1 528	1 592	21 622	879	3 025	733	9 350	7 684	17	46 430	
	ISCO6	:	:	224	3 149	236	1 446	4 680	910	446	:	11 091	
	ISCO7	:	134	1 002	3 506	269	8 244	396	810	290	5	14 656	
	ISCO8	:	:	350	5 584	341	4 759	623	608	615	:	12 880	
	ISCO9	:	192	493	5 146	239	2 161	393	860	1 714	11	11 209	
	UNK	:	1 186	1 978	5 704	922	3 396	537	1 859	718	16	16 316	
TOTAL	:	53 725	56 521	271 627	39 984	176 899	21 754	125 961	35 178	202	781 851		

Source : Eurostat HRST data base

(1) ISCO codes: ISCO0 Armed forces, ISCO1 Legislators, senior officials & manager, ISCO2 Professionals, ISCO3 Technicians & associates, ISCO4 Clerks, ISCO5 Services workers & shops & market sales workers, ISCO6 Skill agricultural & fishery workers, ISCO7 Craft & related workers, ISCO8 Plant & machine operators & assemblers, ISCO9 Elementary occupations.

(2) Field of education codes: EF0 General programs, EF1 Education, EF2 Humanities & Art, EF3 Social sciences, business & law, EF4 Science, mathematics & computing, EF5 Engineering, manufacturing & construction, EF6 Agriculture & veterinary, EF7 Health and welfare, EF8 Services, EF9 Fields unknown or unspecified.

Social sciences, business and law popular background among S&T labour force with S&T education

Table 3: Proportion of the sectors of activity of employed S&T labour force with S&T education having studied Science and Engineering (EF4 and EF5 codes)

Sector of activity	EL	ES	IE	AT	FI
	% of employed S&T labour force with S&T education having studied SE				
Agriculture, hunting, forestry, fishing, mining and quarrying	1.8	1.8	1.4	1.0	1.2
Construction and utilities	9.9	11.0	8.7	14.4	10.6
High and medium high manufacturing	3.8	9.0	19.1	14.6	18.9
Low and medium low manufacturing	6.7	7.8	6.8	17.1	11.8
Knowledge-intensive services	52.7	49.8	47.3	28.9	40.6
Less knowledge-intensive services	25.1	20.6	16.7	24.0	17.0

Source : Eurostat HRST data base

Table 2 presents for a number of countries, a cross tabulation of S&T labour force with S&T education, according to their field of study and occupation. Data for this exercise come from the 2001 Population and Housing Censuses.

The field of “Social sciences, business and law” (EF3) appears as the preferred field of education of the employed S&T labour force with S&T education. Of the five countries shown in Table 2, four declared that the largest part of their employed S&T labour force with S&T education graduated in this field. Finland has the greatest proportion with 35%, while Austria is the exception with only 18% for this field of education against 28% for “Engineering, manufacturing and construction” (EF5). Excluding the “General programs”, “Agriculture and Veterinary” (EF6) is the field of education that was chosen least. Indeed, for the five countries shown, only 2 to 3% graduated from this field of study.

It is worth noting the relation between two fields of study, EF4 and EF5, which together make up Science and Engineering (SE). “Engineering, manufacturing and construction” seems to be the preferred field of education of the two. In Austria and Finland, for example, more than 80% of the SE graduates come from this field. A more balanced distribution is found in Ireland, where 44% and 46% graduated from EF4 and EF5 respectively.

As the occupations “Professionals” (ISCO2) and “Technicians and associate professionals” (ISCO3) normally require tertiary education, more than a half of employed S&T labour force with S&T education are found in these occupations. In Spain and Finland, for example, up to 67% of the employed S&T labour force with S&T education are in one of these two occupations. For Ireland, this ratio falls to 50%. Nearly 54% of the employed S&T labour force with S&T education in Spain were found in the occupation “Professionals” in 2001.

For the countries studied, the least common occupation for employed S&T labour force with S&T education are the “Armed forces” (ISCO0) with a proportion below 1% in four of the five countries,

and “Skilled agricultural and fishery workers” (ISCO6) with a proportion below 2%, also in four of the five countries.

Of the employed graduates in science and engineering (SE) less than 1% were found in ISCO0 and ISCO6. Instead, this group is mainly employed as “Professionals”, with a rate close to 50%. Dividing the SE graduates according to the two educational fields of education concerned reveals some differences. For those that have graduated from “Engineering, manufacturing and construction”, even if the larger part is still employed as “Professionals”, a significant number (between 5 % and 24 %) are employed as “Craft and related trades workers” (ISCO 7).

Looking in Table 3, the sector agriculture employed the smallest proportion of SE graduates. In Finland, this percentage was 1 %, rising to only 1.8% in Spain.

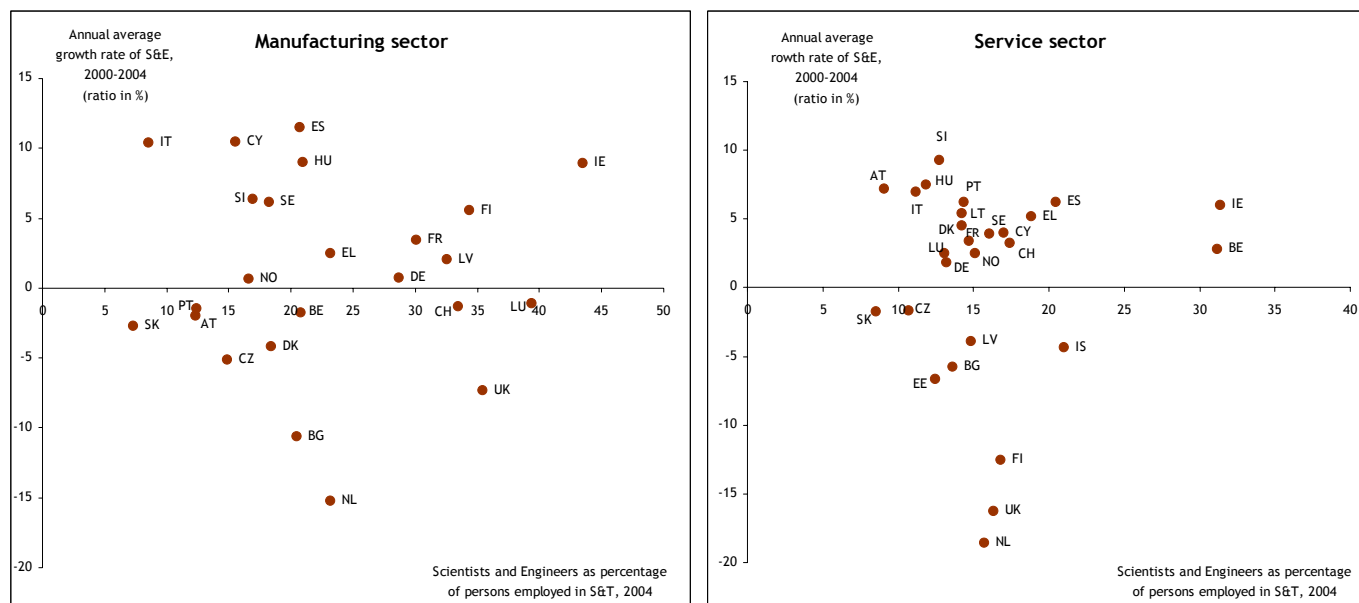
On the other hand, the “Knowledge-intensive services” sector employed the largest percentage of graduates from SE (as high as 52.7% in Greece). This tendency applies for all countries for which data are available. Combining the “Knowledge-intensive services” sector and “Less knowledge-intensive services” sector shows that three Scientists and Engineers out of four were employed in services.

For Austria this proportion was smaller than for the other countries: only 28.9% of the Scientists and Engineers worked in the “Knowledge-intensive services” sector and 24.0% in the “Less knowledge-intensive services” sector. Manufacturing in Austria employed more SE graduates than in the other countries, with 14.6% of Scientists and Engineers in the “High and medium high manufacturing” sector and 17.1% in the “Low and medium low manufacturing” sector.

The share of SE graduates employed in the “Construction and utilities” sector varied from country to country. In Austria, more than 14% of the SE graduates were employed in this sector. At the other end of the scale, the proportion in Ireland did not exceed 9%.

Ireland had the most dynamic population of Scientists and Engineers

Figure 4: Comparison between the annual average growth rate of the Scientists and Engineers (S&E) and their number as percentage of persons employed in S&T, for manufacturing and services, 2004



Source : Eurostat HRST data base

Figure 4 shows the comparison between the annual average growth rate (AAGR) of Scientists and Engineers (S&E) in 2000-2004 and the proportion of S&E among persons employed in S&T, for the services sector and the manufacturing sector.

In **manufacturing**, the situation between the different countries is very heterogeneous. Ireland and Finland combine a very high share of S&E, almost 45% and 35 % respectively in 2004, with a high growth annual rate, on average 9% for Ireland and 6 % for Finland per year between 2000 and 2004.

On the other hand, in the UK and Luxembourg, where S&E are well represented among persons employed in S&T, negative growth rates are seen between 2000 and 2004 (-7% and -1%, respectively). In comparison, Italy and Spain have relatively fewer Scientists and Engineers in manufacturing, 9% and 21% respectively, but this is growing at rates of 10% and 11% respectively. This is also true for Cyprus where the annual average growth rate is 10%.

Netherlands and Bulgaria showed annual reduction rates of -15% and -11%, respectively, despite the fact that the proportion of S&E among persons employed in S&T is around average (around 20%).

For the **services** sector the situation is more homogeneous between countries.

Around 25 of the 30 countries that are represented in the graph are grouped in the same zone. The annual growth rate for those countries varies between -5% and 10%, whereas the proportion of S&E among persons employed in S&T is between 10% and 20%.

In the margin of this main group, two subsets of countries can be distinguished. The first consists of the Netherlands, Finland and the UK. While the proportion of Scientists and Engineers in the services sector in these countries is close to average (around 16%), AAGR between 2000-2004 was negative, (between -19% and -12%). For the UK and the Netherlands, this situation is similar to that of the manufacturing sector. However, for Finland, where AAGR of S&E in manufacturing was high, the strong decrease in the number of S&E in services (-13% annually) is more surprising.

The other group, represented by Ireland and Belgium, has the highest proportion of S&E (around 31%) among persons employed in S&T in the services sector. They combine this high share with comparatively high growth rates between the years 2000 and 2004 (up to 6% for Ireland).

Overall, between 2000 and 2004, Ireland appeared as the most dynamic country for S&E occupations, both in the manufacturing sector and in the services sector.

➤ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

1. Human resources in science and technology—HRST

HRST (S&T labour force) and their sub-groups are measured using characteristics of educational achievement and occupation and follow the guidelines of the *Canberra Manual*.

• Persons employed in S&T: Human Resources in Science and Technology — Occupation (HRSTO)

Individuals who are employed in a S&T occupation (ISCO '88 COM codes 2 or 3).

• S&T labour force with S&T education: Human Resources in Science and Technology — Education (HRSTE)

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

• Persons employed in S&T with S&T education: Human Resources in Science and Technology — Core (HRSTC)

Individuals who have successfully completed education at the third level in a S&T field of study (ISCED '97 version levels 5a, 5b or 6) and are employed in a S&T occupation (ISCO '88 COM codes 2 or 3).

• Scientists and Engineers: S&E

physical, mathematical and engineering occupations (ISCO '88 COM code 21); life science and health occupations (ISCO '88 COM code 22).

Reference manual

Manual on the measurement of human resources devoted to S&T — Canberra Manual, Eurostat/OECD, 1994.

2. Fields of Education

Labels of the codes used to define the field of study in Tables 5:

- EF 0: General programs
- EF 1: Education
- EF 2: Humanities and art
- EF 3: Social sciences, business and law
- EF 4: Science, mathematics and computing
- EF 5: Engineering, manufacturing and construction
- EF 6: Agriculture and veterinary
- EF 7: Health and welfare
- EF 8: Services
- EF 9: Fields unknown or unspecified

3. The International Standard Classification of Occupations — ISCO

The ISCO code definitions are:

- ISCO 0: Armed forces
- ISCO 1: Legislators, senior officials and managers
- ISCO 2: Professionals: occupations whose main tasks require a high level of professional knowledge and experience in the fields of physical and life sciences, or social sciences and humanities.
- ISCO 3: Technicians and associate professionals: occupations whose main tasks require technical knowledge and experience in one or more fields of physical and life sciences, or social sciences and humanities.
- ISCO 4: Clerks
- ISCO 5: Services workers and shop and market sales workers
- ISCO 6: Skill agricultural and fishery workers
- ISCO 7: Craft and related workers
- ISCO 8: Plant and machine operators & assemblers
- ISCO 9: Elementary occupations

4. Data source

The data presented are, when nothing else is indicated, derived from the **European Union Labour Force Survey (EU LFS)**. The most recent data were extracted in October 2005 and refer to the spring quarter of 2004. These HRST indicators can be found in Eurostat's HRST domain of NewCronos, Theme 9.

The second data source used is the **2001 Round of Housing and Population Censuses**. The censuses are normally carried out as traditional census, a register based census or a mixture of both. The target population

is all individuals from the age of 15 and upwards, usually residing within the surveying country.

The specific tabulation used on the base of this data was only available for 5 countries. For more details please see:

http://europa.eu.int/estatref/info/sdds/en/hrst/hrst_chm_base.htm

Quality of the data

The guidelines on the sample size reliability of the data established by the EU LFS are applied to the HRST database. Therefore breakdowns for which quality levels are considered insufficient are either flagged as not available or unreliable.

5. NACE

Data presented by sector of economic activity are based on the statistical classification of economic activities in the European Community, NACE Rev.1.1., with the following details:

Manufacturing (15 to 37)

High and medium high technology manufacturing

24 Manufacture of chemicals and chemical products; **29 to 35** Manufacture of machinery and equipment n.e.c.; man. of electrical and optical equipment; man. of motor vehicles, trailers and semi-trailers; man. of other transport equipment

Low and medium low technology manufacturing

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; **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; **36 to 37** Manufacturing n.e.c.

Services (50 to 99)

Total knowledge-intensive services

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

Knowledge-intensive high-tech. services

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

Knowledge-intensive market 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

Knowledge-intensive financial services

65 to 67 Financial intermediation

Other knowledge-intensive services

80 Education; **85** Health and social work; **92** Recreational, cultural and sporting activities

Less knowledge-intensive services

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 organization n.e.c.; **93** Other service activities; **95** Activities of households as employers of domestic staff; **99** Extra-territorial organizations and bodies

Agriculture, hunting, forestry, fishing, mining and quarrying (01-14)

Utilities and construction (40, 41 and 45)

(Two-digit codes are referring to NACE divisions)

6. Statistical abbreviations and Symbols

: not available u Unreliable value

Further information:

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

Science and technology

- Human Resources in Science & Technology
 - Stocks of HRST at the national and regional levels; unemployment for HRST and non-HRST
 - Annual data on HRST and sub-groups of HRST at the national level
 - Annual data on HRST and sub-groups of HRST at the national level, by gender
 - Annual data on employed HRST at the national level, by sector of activity
 - Data on HRST and mobility derived from the 2001 round of Population and Housing Censuses
 - Employed human resources in science and technology by sector of activity
 - Employed HRST and sub-groups of HRST by sector of activity and age group
 - Tertiary educated human resources in science and technology (HRSTE) by field of study
 - Employed HRSTE by field of study, sector of activity and gender
 - Employed HRSTE by field of study, occupation and gender

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