Statistics in focus

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Women, science and technology: Measuring recent progress towards gender equality

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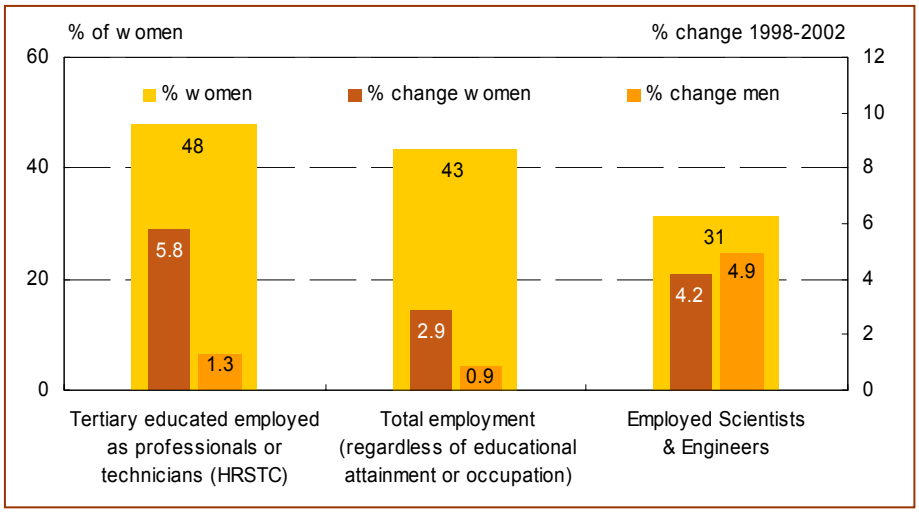
Figure 1: Proportions of women in the EU-25 for total employment, HRSTC and Scientists & Engineers in 2002, % change for men and women 1998-2002



EU-25 is estimated.

- Women researchers are still a minority in the Government and Higher Education Sectors — GOV and HES, a trend that is accentuated in the natural science and engineering fields. These sectors nevertheless have higher proportions of women researchers than the Business Enterprise Sector — BES.
- Women researchers show a greater tendency to work in medical sciences or social sciences.
- In the EU-15 countries, R&D expenditure is more likely to be performed in the Business Enterprise Sector and, consequently, it is less likely that this R&D will be carried out by women: in Germany, the BES accounts for 70% of total national R&D expenditure and women only represent 9.6% of all researchers in this sector.
- In eight of the available 15 countries, the number of women researchers in the Business Enterprise Sector has been increasing at a rate exceeding overall employment growth.
- The proportion of women researchers is lower in most countries than the proportion of women in national employment in general. Spain, Latvia and Portugal are the only exceptions.
- In almost every country for which data are available, women account for a greater proportion of the technician jobs than they do for the research posts. Women form the majority among technicians in 11 out of 21 countries.
- In general, the new Member States have higher proportions of women graduates compared to the EU-15.
- Women graduates are significantly under-represented in scientific and engineering disciplines: there are more men graduating in S&E than women in every country.
- Between 1998 and 2002 the numbers of both women and men employed in S&E and HRSTC increased in most countries and overall. In the EU-15, the S&E growth was higher for women (15.7%) than for men (13.0%), but it was lower for women (4.2%) than for men (4.9%) in the EU-25. This is a signal that the gender gap is widening for S&Es in the EU-25 although it is narrowing at a higher rate for the EU-15 and for HRSTC.

Women slowly catching up among engineering graduates, especially in EU-15 countries

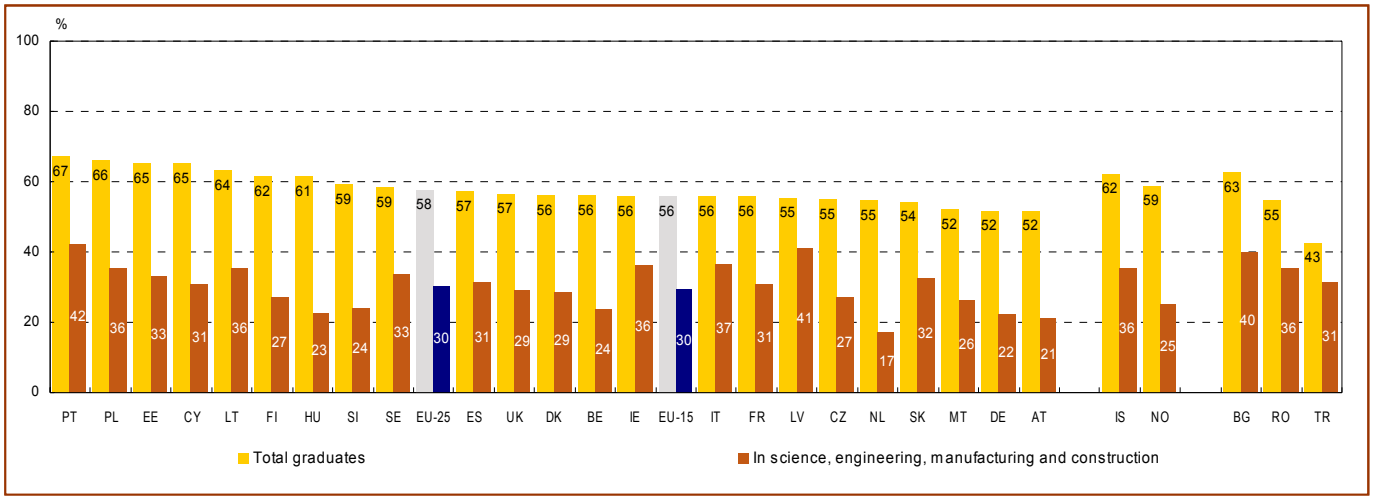
Across the whole of Europe, more women than men are graduating from tertiary education institutes — Figure 2. Moreover, in general, the new Member States have higher proportions of women graduates. In Portugal and Poland, where the ratios of women to men are at their highest, two thirds of all graduates are women. Even in Austria, Germany and Malta, which have the lowest proportions in Europe, more than half of all graduates are women (52%).

However, women are significantly under-represented in scientific and engineering disciplines: there are more men than women graduating in S&E in every country. Portugal and Latvia come the closest to parity at 42% and 41%, respectively. But elsewhere, such as in Belgium, Germany, Austria, the Netherlands, Hungary and Slovenia women account for less than a quarter of total S&E graduates.

However, the situation is changing. As shown in Table 2, see pages 4-5, between 1998 and 2001 the total number of science, maths and computing graduates increased by 17.1% (38.8% of this increase is due to women) in the EU-15. In engineering, the rise was 5.8% — of which more than half (56.5%) was due to women.

In the EU-25, the percentage increases in the numbers of female graduates were higher than for women in the EU-15 — 28.4% for science and 30.8% for engineering. Women accounted for 43.7% of overall growth in science and 35.6% in engineering graduates. These figures are initial evidence of some closing of the gender gap for graduates in ***hard*** science disciplines, although parity cannot be envisaged in the short- to medium-term.

Figure 2: Graduation from tertiary education in 2001 — % of women



- EU-25 and EU-15 are estimated.
- Exceptions to the reference year — DK, FR, IT, FI, CY and HU: 2000 data.

Women researchers more likely to work in sectors with lower R&D expenditure

Despite women representing a greater proportion of overall graduates, as is shown in Table 2, women researchers are still a minority in the Government and Higher Education Sectors, a trend that is accentuated in the natural science and engineering fields. Women researchers show a greater tendency to work in medical sciences or social sciences. In all countries except Latvia, R&D is more likely to be conducted by a male than a female researcher. On the whole, the new Member States have a larger proportion of female researchers than high R&D funding countries such as Germany, where only two in every ten GOV or HES researchers are women.

In almost every country for which data are available, women account for a greater proportion of the technician jobs than they do for the research posts. Women form the majority among technicians in 11 out of 21 countries.

The Government and Higher Education Sectors nevertheless have higher proportions of women researchers than in the Business Enterprise Sector. Often representation in the BES is around half of that in the GOV and HES sectors. In Austria, where the lowest proportion of employed researchers in the BES are women, less than one post in ten is held by a woman.

This situation does not look like it is improving. Looking at researchers in the BES, women have only enjoyed higher growth than their male counterparts in 6 out of 16 countries — Table 2. It is worth noting, however, that in most countries, the total number of researchers in the Business Enterprise Sector has been increasing at a rate exceeding overall employment growth — see labour force statistics in Table 2. The same is true for growth in the number of women researchers (8 of 15 available countries).

To highlight trends in the allocation of funds per capita researcher, Table 1 combines information on the distribution of R&D expenditure, the distribution of researchers and the proportion of whom are women. Research in certain scientific fields tends to be concentrated in specific sectors, for example social scientists tend to be concentrated in Universities in many countries and engineers in the BES. In the new Member States, quite often the HES has the highest allocated proportion of R&D expenditure. This is combined with a significant proportion of R&D researchers — 73% in Estonia and 71% in Latvia — and a higher likelihood that researchers are women. In the EU-15 countries, R&D expenditure is more likely to be performed in the Business Enterprise Sector and, consequently, it is less likely that this R&D will be carried out by women: in Germany, the BES accounts for 70% of total national R&D expenditure and women only represent 9.6% of all researchers in this sector.

This inequality can be standardised using the ***Honeypot*** indicator in Table 2, which measures the relationship between R&D expenditure and the concentrations of men and women in particular sectors or scientific fields of R&D. It is based upon the relationship between two values of R&D expenditure per capita for women: an **expected** value and an **observed** value. The **expected** value is calculated by applying the overall proportion of women to the overall amount of R&D expenditure. The **observed** value is calculated by applying the proportion of women in each sector or field of science to the amount of R&D expenditure in each sector or field of science and then summing these amounts. The ***Honeypot*** score is in fact the difference (**observed** minus **expected**) between these values, expressed as a percentage of the **expected** value. Scores in the range of -5% to +5% cannot be regarded as evidence of inequality, whereas scores of less than -10% denote a significant disadvantage to women and scores in excess of +10% indicate a significant advantage to women.

The Czech Republic has a ***Honeypot*** score by sector of -19.6%. This means that women researchers in the Czech Republic, who only represent 27% of all researchers — see Table 1, are losing out on 19.6% of their per capita share of R&D expenditure. This is because women researchers in the Czech Republic could be **expected** on average to perform EUR 223.3 million of national R&D expenditure whereas they are only **observed** to be performing EUR 186.7 million. The results in Table 2 indicate more negative ***Honeypot*** scores for women when the analysis is performed by sector than by field, indicating that the distribution of women and men researchers across the sectors is a greater determinant of inequality than the distribution across the fields. The general trend for negative ***Honeypot*** results indicates that European women researchers are underpinning the low-expenditure areas of R&D but are not exercising their fair share of control in the high-expenditure areas. Since the education data show that men as graduates are currently under-represented in the scientific disciplines that are largely undertaken in the low-expenditure sectors, the prospects for gender equality as measured by the ***Honeypot*** indicator are not promising.

Table 1: Distributions of expenditure, researchers and the proportion of women researchers, by institutional sector in 2001

		Sector			
		BES	GOV	HES	Total
BE	Distribution researchers (%)	56.4	6.1	37.6	100.0
	Distribution R&D expenditure (%)	74.5	6.1	19.4	100.0
	% w omen researchers	16.9	29.9	37.2	25.3
CZ	Distribution researchers (%)	32.1	26.1	41.9	100.0
	Distribution R&D expenditure (%)	60.3	25.5	14.3	100.0
	% w omen researchers	16.5	30.9	32.8	27.1
DK	Distribution researchers (%)	41.6	20.7	37.6	100.0
	Distribution R&D expenditure (%)	69.3	11.9	18.8	100.0
	% w omen researchers	22.6	35.1	30.1	28.0
DE	Distribution researchers (%)	58.8	15.0	26.1	100.0
	Distribution R&D expenditure (%)	69.8	13.8	16.5	100.0
	% w omen researchers	9.6	22.1	20.6	14.3
EE	Distribution researchers (%)	14.2	12.8	73.0	100.0
	Distribution R&D expenditure (%)	34.2	14.3	51.4	100.0
	% w omen researchers	28.1	59.2	43.3	43.2
EL	Distribution researchers (%)	13.3	9.3	77.3	100.0
	Distribution R&D expenditure (%)	28.6	21.8	49.7	100.0
	% w omen researchers	23.9	37.5	44.3	40.9
ES	Distribution researchers (%)	15.2	13.5	71.3	100.0
	Distribution R&D expenditure (%)	52.8	16.0	31.2	100.0
	% w omen researchers	19.0	41.2	37.5	35.2
IT	Distribution researchers (%)	31.1	18.9	50.0	100.0
	Distribution R&D expenditure (%)	48.3	20.2	31.4	100.0
	% w omen researchers	:	37.7	:	37.7
CY	Distribution researchers (%)	31.4	24.4	44.2	100.0
	Distribution R&D expenditure (%)	21.3	50.0	28.7	100.0
	% w omen researchers	25.1	36.3	28.2	29.2
LV	Distribution researchers (%)	16.0	13.3	70.7	100.0
	Distribution R&D expenditure (%)	36.4	21.5	42.1	100.0
	% w omen researchers	56.1	55.9	51.4	52.8
LT	Distribution researchers (%)	5.8	23.3	70.9	100.0
	Distribution R&D expenditure (%)	29.1	39.6	31.3	100.0
	% w omen researchers	42.0	46.7	47.5	47.0
HU	Distribution researchers (%)	17.3	18.2	64.4	100.0
	Distribution R&D expenditure (%)	43.7	28.2	28.1	100.0
	% w omen researchers	24.6	35.6	34.6	33.0
AT	Distribution researchers (%)	44.7	7.3	47.9	100.0
	Distribution R&D expenditure (%)	63.7	6.5	29.8	100.0
	% w omen researchers	9.0	31.9	25.7	18.7
PL	Distribution researchers (%)	13.4	14.0	72.6	100.0
	Distribution R&D expenditure (%)	36.1	32.3	31.6	100.0
	% w omen researchers	28.2	42.9	38.9	38.1
PT	Distribution researchers (%)	17.1	19.2	63.7	100.0
	Distribution R&D expenditure (%)	35.7	23.3	41.1	100.0
	% w omen researchers	27.7	56.1	45.1	44.2
SI	Distribution researchers (%)	26.3	28.1	45.7	100.0
	Distribution R&D expenditure (%)	58.8	24.7	16.5	100.0
	% w omen researchers	29.7	45.1	33.0	35.5
FI	Distribution researchers (%)	52.2	14.9	32.9	100.0
	Distribution R&D expenditure (%)	68.2	12.1	19.7	100.0
	% w omen researchers	17.8	37.5	36.6	27.4
SE	Distribution researchers (%)	57.2	6.1	36.7	100.0
	Distribution R&D expenditure (%)	75.2	3.4	21.4	100.0
	% w omen researchers	:	:	30.9	30.9
IS	Distribution researchers (%)	41.9	23.2	34.9	100.0
	Distribution R&D expenditure (%)	60.2	20.5	19.2	100.0
	% w omen researchers	31.8	30.4	35.9	32.9
NO	Distribution researchers (%)	44.3	11.8	43.9	100.0
	Distribution R&D expenditure (%)	59.7	14.6	25.7	100.0
	% w omen researchers	19.2	34.7	35.7	28.3
RO	Distribution researchers (%)	49.4	24.4	26.2	100.0
	Distribution R&D expenditure (%)	61.6	27.1	11.3	100.0
	% w omen researchers	41.5	48.6	40.0	42.8

- Excludes private non profit sector.
- Sum of sectors may not exactly equal 100 due to rounding.
- Exceptions to the reference unit HC
  BE, DE and SE: all FTE.
- Exceptions to the reference year 2001
  IT and AT: 1998; DE, EL, FI and SE: 1999; PL: 2000.
- Due to questions of space, where data is not comprehensive enough, countries are excluded from the Table.

Table 2: Reference data and indicators on Women and Science
Education, Researchers, Technicians, the Honeypot indicator and Labour Force

	EU-25	EU-15	BE	CZ	DK	DE	EE	EL	ES	FR	IE	IT	CY	LV	LT	LU
Education — % change (1998-2001) of ISCED 5A+5B+6 graduates																
Total																
3 – Social Sciences, Business & Law	**23.9**	**7.7**	6.3	28.3	6.1	-11.9	15.2	:	-2.6	3.5	6.6	15.3	-14.8	193.7	58.3	:
4 – Science, Mathematics, & Computing	**25.2**	**17.1**	13.8	8.8	39.6	-17.1	61.1	:	31.3	17.1	14.9	-0.6	-12.8	134.5	64.5	:
5 – Engineering, Manufacturing & Construction	**8.3**	**5.8**	-4.7	-2.8	40.3	-16.2	2.0	:	47.8	-6.9	-2.0	11.5	-2.7	-8.9	45.2	:
6 – Agriculture & Veterinary	**11.1**	**6.4**	7.2	-6.4	6.8	-14.5	-31.1	:	-0.4	77.6	10.8	9.4	20.0	-42.1	44.5	:
7 – Health & Welfare	**19.9**	**17.6**	4.5	140.3	19.0	-2.7	102.2	:	17.5	11.6	24.2	30.6	29.8	-49.7	23.4	:
Women																
3 – Social Sciences, Business & Law	**44.8**	**10.4**	8.9	34.6	10.5	-5.7	16.5	:	1.7	4.0	13.6	15.6	:	125.6	71.6	:
4 – Science, Mathematics, & Computing	**28.4**	**16.1**	18.7	3.8	40.4	-9.7	97.1	:	24.2	6.4	13.8	-3.7	-33.0	128.4	113.0	:
5 – Engineering, Manufacturing & Construction	**30.8**	**17.5**	-20.1	2.5	24.9	0.8	-15.4	:	54.2	-5.8	17.0	14.6	-9.8	5.6	28.5	:
6 – Agriculture & Veterinary	**45.8**	**16.5**	8.6	4.2	10.0	1.7	-43.8	:	-6.1	78.5	6.6	5.8	:	-44.2	70.5	:
7 – Health & Welfare	**26.3**	**21.7**	5.7	182.8	17.6	0.1	113.7	:	18.6	14.3	33.1	39.0	59.2	-48.3	25.2	:
Researchers — 2001																
% age Women in HES+GOV																
All fields	:	:	36.2	31.9	32.9	21.5	43.2	:	40.1	:	:	:	32.2	49.8	46.7	31.0
1 - Natural Sciences — NAT	:	:	31.3	28.9	25.2	17.0	34.4	:	40.4	:	:	:	31.4	47.0	39.7	31.9
2 – Engineering & Technology — ENG	:	:	21.2	22.2	16.8	12.0	30.4	:	35.1	:	:	:	24.3	37.6	25.5	19.3
3 – Medical Science — MED	:	:	47.6	42.6	44.2	32.2	58.9	:	43.5	:	:	:	29.2	70.5	55.3	52.8
4 – Agricultural Science — AGR	:	:	38.9	45.8	39.3	28.4	43.5	:	41.1	:	:	:	20.2	57.1	45.0	50.0
5 – Social Science — SOC	:	:	43.9	38.8	33.6	:	52.8	:	40.7	:	:	:	36.8	37.1	57.6	33.7
6 – Humanities — HUM	:	:	43.6	45.3	39.3	:	64.3	:	41.9	:	:	:	39.3	78.5	65.3	57.1
% change (1998-2001) of researchers in BES																
Women	:	:	7.0	-14.0	81.4	26.9	31.0	:	19.3	:	12.9	:	150.0	-6.7	62.1	:
Men	:	:	9.6	-0.6	4.0	2.8	50.5	:	22.5	:	12.8	:	76.4	-44.3	84.4	:
Total	:	**14.5**	9.1	-3.1	15.1	5.1	44.4	:	21.9	6.6	12.9	-2.9	90.4	-28.0	74.3	:
% age Women in BES	:	:	16.9	16.5	22.6	11.8	28.1	23.9	19.0	:	20.5	:	25.1	56.1	42.0	:
Technicians — 2001 in HES+GOV																
Women	:	:	1 931	4 001	5 694	6 069	442	5 213	6 710	:	:	:	80	505	1 327	24
Men	:	:	1 950	2 754	2 344	6 082	179	4 630	7 383	:	:	:	162	302	553	26
Total	:	:	3 881	6 755	8 038	12 151	621	9 843	14 093	:	:	77 844	242	807	1 880	50
% age Women	:	:	49.8	59.2	70.8	49.9	71.2	53.0	47.6	:	:	:	33.1	62.6	70.6	48.0
Honeypot Indicator — 2001																
R&D expenditure in Mio EUR	**178 903**	**175 507**	5 515	832	4 265	52 002	49	841	6 227	32 887	1 339	13 572	27	38	91	364
Honeypot score by sector in %	:	:	-16.1	-19.6	-9.8	-9.3	-6.6	:	-24.1	:	:	:	7.0	2.5	-9.4	:
Expected R&D expenditure per capita — women	:	:	1 412	223.3	1 196	6 912.9	21	:	2 202	:	:	:	8	20	155	:
Observed R&D expenditure per capita — women	:	:	1 215.9	186.7	1 090	6 325.0	20	:	1 774	:	:	:	9	20	142	:
Honeypot score by main field of science in %	:	:	-3.5	-1.6	-0.7	-1.9	-1.0	:	-0.2	:	:	:	-8.2	:	-9.1	-31.5
Expected R&D expenditure per capita — women	:	:	504	104	428	3 077	14	:	1 169	:	:	:	6	13	30	11
Observed R&D expenditure per capita — women	:	:	487	103	425	3 020	13	:	1 166	:	:	:	6	:	28	8
Labour Force (Employment, S&E, HRSTC)																
Total number (000) employed 2002	**191 741**	**162 974**	4 052	4 763	2 741	36 275	581	3 949	16 241	23 885	1 750	21 757	315	988	1 421	188
% age Women	**43.4**	**43.1**	42.5	43.7	46.8	44.6	49.3	38.1	37.5	45.3	41.9	37.7	43.9	49.1	49.1	40.1
% change for total employment (1998-2002)																
Women	**2.9**	**9.5**	8.5	-1.6	4.3	5.6	-3.7	3.0	26.7	8.6	23.0	12.2	30.4	-0.2	-6.8	18.0
Men	**0.9**	**4.4**	2.7	-1.4	0.6	-0.6	-5.3	-2.5	13.9	6.3	13.0	3.9	8.0	-2.9	-11.3	5.8
Total	**1.8**	**6.5**	5.1	-1.5	2.3	2.1	-4.5	-0.5	18.4	7.4	17.0	6.9	16.8	-1.6	-9.1	10.3
Scientists & Engineers (ISCO 21 or 22)																
% age Women	**31.4**	**30.7**	46.4	30.0	26.8	20.8	52.6	30.8	41.8	22.1	49.7	30.2	37.5	58.0	58.1	21.1
% change (1998-2002)																
Women	**4.2**	**15.7**	16.2	12.5	29.4	13.6	57.7	9.4	43.9	17.9	24.8	30.1	46.7	17.5	-14.2	19.8
Men	**4.9**	**13.0**	25.8	9.1	17.1	3.7	39.7	0.4	29.4	23.4	24.9	17.0	34.7	-21.9	-14.7	-5.0
Total	**4.7**	**13.8**	21.1	10.1	20.2	5.6	48.6	3.0	35.0	22.1	24.9	20.6	39.0	-3.1	-14.4	-0.6
HRSTC (ISCO 2 or 3 and ISCED 5a, 5b or 6)																
% age Women	**48.0**	**48.4**	52.7	44.6	56.5	42.4	67.9	48.9	49.0	51.3	52.7	47.0	48.7	67.8	72.0	40.4
% change for HRSTC (1998-2002)																
Women	**5.8**	**14.9**	9.5	20.5	19.8	0.1	4.8	9.6	39.3	19.5	20.6	37.0	58.3	11.3	9.7	10.6
Men	**1.3**	**7.4**	7.4	19.2	8.9	-5.6	42.1	-1.0	32.5	16.0	10.3	20.5	28.7	-10.1	10.8	7.4
Total	**3.5**	**10.9**	8.5	19.8	14.8	-3.3	14.5	3.9	35.7	17.8	15.5	27.7	41.6	3.4	10.0	8.7
	EU-25	EU-15	BE	CZ	DK	DE	EE	EL	ES	FR	IE	IT	CY	LV	LT	LU

• ***See methodological notes to Table 2 on Page 7.***

eurostat

Table 2: Reference data and indicators on Women and Science
Education, Researchers, Technicians, the Honeypot indicator and Labour Force

HU	MT	NL	AT	PL	PT	SI	SK	FI	SE	UK	IS	NO	BG	RO	TR	
Education — % change (1998-2001) of ISCED 5A+5B+6 graduates																
Total																
65.3	44.4	3.7	9.4	:	:	27.5	59.9	-16.9	6.4	30.0	50.0	-3.6	33.5	11.9	22.4	3 – Social Sciences, Business & Law
-30.5	196.4	-2.6	-25.4	:	:	-5.4	88.7	12.1	43.0	57.4	39.3	69.6	36.0	6.0	23.5	4 – Science, Mathematics, & Computing
-1.9	171.1	-9.0	-12.1	:	:	7.0	79.8	-4.7	55.7	21.0	39.5	-21.5	35.6	15.4	11.8	5 – Engineering, Manufacturing & Construction
25.8	:	3.5	-26.4	:	:	21.6	41.7	13.1	13.4	11.5	:	-20.3	14.7	6.7	-0.9	6 – Agriculture & Veterinary
65.3	102.2	12.5	8.7	:	:	29.6	46.0	-13.1	18.8	47.6	24.4	-4.3	-25.1	-11.7	19.7	7 – Health & Welfare
Women																
53.6	35.4	9.6	16.3	:	:	29.5	66.1	-15.8	9.7	29.9	90.0	-4.8	34.4	13.9	21.0	3 – Social Sciences, Business & Law
-51.3	177.8	1.9	-6.8	:	:	-18.8	134.7	11.1	87.4	74.2	90.2	64.7	26.8	9.0	29.3	4 – Science, Mathematics, & Computing
-14.0	2 300.0	-8.8	11.8	:	:	16.7	94.6	14.4	95.8	22.5	71.4	-36.5	16.7	27.9	13.8	5 – Engineering, Manufacturing & Construction
32.5	:	17.5	-16.3	:	:	33.0	41.3	29.9	28.6	31.4	:	-13.8	7.8	3.1	2.6	6 – Agriculture & Veterinary
55.8	67.0	13.4	9.0	:	:	34.3	45.4	-11.8	20.5	57.9	29.1	-4.2	-36.3	-16.6	12.6	7 – Health & Welfare
Researchers — 2001																
% age Women in HES+GOV																
:	:	:	:	:	49.4	38.6	43.3	:	38.7	31.8	33.1	35.5	45.3	45.6	:	All fields
:	:	:	:	:	52.0	31.7	41.3	:	33.1	31.8	26.6	24.5	49.0	43.1	38.2	1 - Natural Sciences — NAT
:	:	:	:	:	32.3	22.9	34.3	:	22.4	:	34.1	17.0	27.1	38.2	29.1	2 – Engineering & Technology — ENG
:	:	:	:	:	59.8	60.9	49.5	:	51.0	:	41.8	44.9	54.4	65.5	41.4	3 – Medical Science — MED
:	:	:	:	:	50.1	43.4	47.9	:	42.1	:	24.0	34.9	45.1	37.7	25.6	4 – Agricultural Science — AGR
:	:	:	:	:	53.4	45.4	51.7	:	46.1	31.7	44.1	39.8	50.9	56.8	35.6	5 – Social Science — SOC
:	:	:	:	:	54.1	49.1	45.6	:	48.1	:	35.4	41.0	62.3	42.2	30.7	6 – Humanities — HUM
% change (1998-2001) of researchers in BES																
15.9	:	:	:	:	:	11.1	:	:	:	:	97.5	18.8	:	-43.0	-7.6	Women
32.7	:	:	:	:	:	-0.1	:	:	:	:	29.3	21.9	:	-39.1	14.0	Men
28.1	:	14.9	:	-7.3	39.0	3.0	-18.3	28.4	9.1	1.0	45.2	21.3	:	-40.8	7.7	Total
24.6	:	:	9.0	28.2	27.7	29.7	:	17.8	:	:	31.8	19.2	:	41.5	24.8	% age Women in BES
Technicians — 2001 in HES+GOV																
3 572	:	:	:	7 847	792	527	:	5 472	3 238	1 866	329	:	:	1 157	217	Women
1 988	:	:	:	5 624	976	503	:	4 439	4 056	4 205	346	:	:	830	985	Men
5 560	:	4 682	:	13 471	1 768	1 030	2 009	9 911	7 305	6 071	675	8 323	:	1 987	1 202	Total
64.2	:	:	:	58.3	44.8	51.2	:	55.2	44.4	30.7	48.7	:	:	58.2	18.1	% age Women
Honeypot Indicator — 2001																
548	:	8 090	4 031	1 323	1 038	341	149	4 619	10 459	30 255	261	3 037	71	177	:	R&D expenditure in Mio EUR
-8.3	:	:	-21.1	:	-5.8	-4.1	:	-19.9	:	:	-6.1	-10.0	:	0.9	:	Honeypot score by sector in %
166	:	:	635	:	453	121	:	1 110	:	:	90	859	:	76	:	Expected R&D expenditure per capita — women
153	:	:	524	:	428	116	:	926	809	:	85	781	:	76	:	Observed R&D expenditure per capita (women)
:	:	:	:	:	-2.1	-4.9	-1.5	:	0.2	0.0	-2.6	-4.3	-3.0	-2.2	:	Honeypot score by main field of science (%)
:	:	:	:	:	294	53	21	:	786	934	34	434	26	31	:	Expected R&D expenditure per capita (women)
:	:	:	:	:	288	51	21	:	788	934	33	416	25	30	:	Observed R&D expenditure per capita (women)
Labour Force (Employment, S&E, HRSTC)																
3 846	:	8 176	3 734	13 820	5 133	922	2 111	2 406	4 348	28 338	158	2 293	2 800	9 768	:	Total number (000) employed 2002
45.0	:	43.5	45.0	45.6	45.3	45.8	45.8	48.3	47.9	45.1	46.3	47.2	47.5	46.3	:	% age Women
% change for total employment (1998-2002)																
5.9	:	15.4	5.6	-8.2	9.4	1.0	-0.3	12.5	12.1	5.7	9.9	3.8	-0.7	-12.9	:	Women
5.4	:	6.9	0.9	-11.5	6.4	2.8	-1.2	8.6	8.5	4.0	8.8	1.4	-4.1	-11.2	:	Men
5.6	:	10.5	3.0	-10.0	7.7	2.0	-0.8	10.4	10.2	4.8	9.3	2.5	-2.5	-12.0	:	Total
Scientists & Engineers (ISCO 21 or 22)																
34.1	:	28.7	29.2	35.7	46.3	33.0	34.9	29.2	35.6	36.7	43.5	32.7	49.7	:	:	%age Women
% change (1998-2002)																
16.5	:	17.9	18.3	-9.3	13.0	18.9	-18.4	-46.7	22.6	9.7	9.2	20.0	-3.5	:	:	Women
18.8	:	9.0	10.5	9.7	2.1	40.4	-19.2	27.3	41.9	8.9	27.1	29.2	-11.0	:	:	Men
18.0	:	11.4	12.7	2.0	6.9	32.5	-18.9	-9.5	34.4	9.2	18.6	26.0	-7.4	:	:	Total
HRSTC (ISCO 2 or 3 and ISCED 5a, 5b or 6)																
56.3	:	45.6	52.5	60.2	63.6	59.0	54.5	55.2	57.9	47.4	52.9	52.5	65.4	50.4	:	%age Women
% change for HRSTC (1998-2002)																
14.4	:	20.4	92.8	18.2	21.3	-2.8	17.8	19.0	11.2	9.8	15.6	23.7	6.9	13.6	:	Women
8.6	:	1.8	50.8	6.3	1.9	2.7	2.4	18.9	-2.5	4.0	1.4	25.1	6.7	10.4	:	Men
11.8	:	9.5	70.2	13.1	13.4	-0.6	10.3	19.0	5.0	6.8	8.5	24.4	6.8	12.0	:	Total
HU	MT	NL	AT	PL	PT	SI	SK	FI	SE	UK	IS	NO	BG	RO	TR	

• *See methodological notes to Table 2 on Page 7.*

Level of education impacts differently on employment outcomes for women and men

The proportion of women researchers is lower in most countries than the proportion of women in national employment in general — Table 2. Spain, Latvia and Portugal are the only exceptions. In Austria, Germany and Finland, there are over 30 percentage points difference between the proportion of women researchers in the BES and the proportion of women in employment.

Nevertheless, between 1998 and 2002 the numbers of both women and men employed as scientists and engineers (S&E) and HRSTC (people working in professional or technician posts who are also educated at the tertiary level) increased in most countries and overall. Women constitute almost half of all HRSTC, and are better represented among HRSTC than in the labour force in general. Furthermore their growth rates are higher than those of men, indicating that they could become a majority in these occupations in the near future.

In the EU-15, the S&E growth was higher for women (15.7%) than for men (13.0%), but it was lower for women (4.2%) than for men (4.9%) in the EU-25. This is a signal that the gender gap is widening for S&Es in the EU-25 although it is narrowing at a higher rate for the EU-15 and for HRSTC. In fact this is the main area of scientific employment where the prognosis for women is discouraging. Growth in the numbers of scientists and engineers is significantly lower in the new Member States and particularly for women. Much of this lower level of growth is due to a 9.3% decrease in the numbers of women S&E in Poland, where the numbers of men S&E increased by 9.7% over the same period.

Table 3 compares unemployment and inactivity, principally for the tertiary educated. Women are as likely to be unemployed as men — they account for 49.4% of total unemployment in the EU-25, but are more likely to be inactive (out of the labour force). Among higher education graduates they are slightly more likely than their male counterparts to be unemployed and significantly more likely to be inactive, but somewhat less likely to be inactive than women overall.

Among the unemployed, women are more likely than men to have successfully completed tertiary education. Conversely, among the inactive, men are more likely than women to have completed tertiary education in 14 out of the 25 Member States.

Table 3: The non-working tertiary educated aged 25-64 in 2002

	Total unemployed	Total inactive	Tertiary educated		Unemployed		Inactive	
			Unemployed	Inactive				
	% of which women		% of which women		% of women that are tertiary educated	% of men that are tertiary educated	% of women that are tertiary educated	% of men that are tertiary educated
EU-25	**49.4**	**68.8**	**53.7**	**62.6**	**14.3**	**12.1**	**9.0**	**11.6**
EU-15	**49.7**	**69.6**	**52.8**	**61.8**	**16.6**	**14.8**	**9.2**	**12.8**
BE	50.0	66.6	49.2	64.0	17.3	17.9	12.7	14.2
CZ	57.5	71.2	36.0	70.3	2.2	5.4	6.1	6.4
DK	50.8	61.8	51.4	65.2	28.2	27.1	15.6	13.4
DE	43.9	66.4	42.2	53.7	12.4	13.4	10.1	17.2
EE	43.2	67.1	58.4 u	81.4	23.5 u	: u	26.6	12.4 u
EL	61.9	76.7	65.5	63.1	18.5	15.8	6.3	12.2
ES	59.3	76.7	66.6	66.7	25.8	18.9	9.3	15.4
FR	52.6	66.2	49.1	68.7	16.7	19.2	12.7	11.3
IE	36.3	74.7	40.5 u	73.2	22.7 u	17.6	13.9	13.8
IT	54.8	72.1	63.9	65.7	11.3	7.7	3.6	4.9
CY	57.9	78.2	54.9 u	68.7	21.4 u	24.2 u	12.1	19.9
LV	42.1	66.4	48.8 u	68.5	13.7 u	10.4 u	11.5	10.5
LT	48.6	65.2	61.7	71.0	41.2	24.2	33.4	25.6
LU	55.6	73.2	: u	63.9	: u	: u	7.7	11.7
HU	40.7	64.2	67.1	63.0	8.8	2.9 u	6.9	7.2
MT	:	:	:	:	:	:	:	:
NL	48.8	71.2	41.4	62.3	19.6	26.6	11.1	16.7
AT	41.4	66.7	47.6	55.3	8.3	6.5	7.2	11.7
PL	48.6	63.3	61.8	68.3	6.2	3.6	5.6	4.5
PT	55.1	70.6	82.4	67.5	13.8 u	: u	3.1	3.6 u
SI	49.0	60.4	60.4 u	54.0 u	9.4 u	5.8 u	6.3 u	8.2 u
SK	46.8	68.3	55.0 u	72.0	3.0	2.1 u	5.3	4.5
FI	46.1	55.7	55.8	61.9	23.5	15.9	20.0	15.5
SE	43.2	56.5	44.3	58.8	18.8	18.0	17.7	16.1
UK	39.7	67.7	37.7	58.5	18.9	20.7	14.6	17.0
IS	68.5	75.0	: u	72.6	: u	: u	12.0	: u
NO	48.7	60.9	46.2	61.4	31.1	34.2	19.4	19.3
BG	46.6	58.4	61.1	69.6	15.5	8.6	14.7	9.0
RO	42.7	63.9	47.6	51.8	6.8	5.5	4.1	6.8
TR	:	:	:	:	:	:	:	:

- Exceptions to the reference year 2002: IS = 2001.
- :u = reliable data not available.
- u = data should be treated with caution.

➢ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

Research and experimental development — R&D

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 — *Frascati Manual*, § 63.

Institutional classifications

- **The business enterprise sector — BES**

The business enterprise sector includes: 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 institutions mainly serving them — *Frascati Manual*, § 163.

- **The government sector — GOV**

The government sector includes: 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) 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.

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**

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.

- **Technicians**

Technicians…participate in R&D by performing scientific and technical tasks involving the application of concepts and operational methods, normally under the supervision of researchers... — *Frascati Manual*, § 306.

- **Full-time equivalent — FTE**

One FTE may be thought of as one person-year. For instance, a person who normally spends 30 % of his time on R&D and the rest of it on other work (e.g. lecturing, university administration, guidance) should be counted as only 0.3 FTE — *Frascati Manual*, section 5.3.3.

- **Head Count — HC**

The number of individuals who are employed mainly or partly on R&D — *Frascati Manual*, section 5.3.2.

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 — see the *Frascati Manual* sections 4.4, 3.6.2 and 3.7.2.

Reference manual

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

Human resources in science and technology — HRST

HRST and their sub-groups are measured using characteristics of educational attainment and occupation and follow the guidelines of the *Canberra Manual*.

- **HRSTC: Human Resources in Science and Technology — Core**

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).

- **S&E: Scientists and Engineers**

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

Note that according to the *Canberra Manual*, the seven broad S&T fields of study are Natural Sciences, Engineering and Technology, Medical Sciences, Agricultural sciences, social sciences and humanities, other fields — *Canberra Manual*, § 71.

Reference manual

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

The International Standard Classification of Education — ISCED 97

The following programmes are at the tertiary level of education:

- **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 requirements.

- **ISCED level 5B**

programmes that are generally more practical/technical/occupationally specific than ISCED 5A programmes.

- **ISCED level 6**

this level is reserved for tertiary programmes that lead to the award of an advanced research qualification. The programmes are devoted to advanced study and original research.

The International Standard Classification of Occupations — ISCO

- **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.

Methodological notes to Table 2, pages 4-5

- **Graduates**
  - **Exceptions to the reference period 1998-2001**
    DK, FR, IT, HU and FI: 1998-2000; CY: 1999-2000;
    EE, MT and TR 1999-2001; BE: 2000-2001.
  - Due to a break in series data for Science, Mathematics, & Computing and Engineering, Manufacturing & Construction in CZ refer to the period 2000-2001.
- **Researchers in GOV and HES**
  - **Exceptions to the reference year 2001**— LV: 1999; DE and TR: 2000.
  - BE, ES and PT: estimated data for GOV and HES.
  - UK: joint figures of Social Sciences and Humanities, joint figures of NAT, ENG, MED and AGR: breakdown is not possible.
  - LU, UK and NO: data are in HC;
    SE and TR: data by field of science is for HES only.
- **Researchers in BES**
  - **Exceptions to the reference year 2001**
    AT: 1998; EL, FI and TR: 1999; PL: 2000.
  - **Exceptions to the reference period 1998-2001**
    EL, FI, SE and TR: 1997-99; FR and IT: 1998-2000;
    CZ, DE, ES, IE, NL, PT, IS and NO: 1999-2001; BE, LV and LT: 2000-2001.
  - **Exceptions to the reference unit HC** — BE, DE, IE, SE and UK: all FTE.
  - EU-15: Eurostat estimation; BE, DE and PT: estimated data;
    NL: MSTI data in 1998; SE: MSTI data in 1999.
- **Technicians**
  - **Exceptions to the reference year 2001**
    EL, IT, FI and TR: 1999; DE, LU and PL: 2000.
  - **Exceptions to the reference unit HC** — BE, DE, PT and UK: all FTE.
  - **Exceptions to the reference sectors**
    DE, SE and TR: HES only; LU and UK: GOV only.
  - BE: estimated and revised values; UK: revised values;
    IT: Technicians include support staff.
- **R&D Expenditure**
  - **Exception to the reference year 2001** — LU: 2000.
  - EU-15: Eurostat estimation; BE: estimated and revised value;
    DE, ES, LU, NL and UK: revised value; EL and PT: estimated value;
    AT: provisional value, national estimate or projection adjusted, if necessary, by the Secretariat to meet OECD norms, MSTI data.
- **Honeypot**
  - **Exceptions to the reference year 2001 for Honeypot scores by sector**
    AT: 1998; FI: 1999. Honeypot scores by sector are calculated using researchers in HC except for: BE and DE.
  - **Exception to the reference year 2001 for Honeypot scores by field**
    DE: 1999. Honeypot scores by field are for GOV and HES only and are calculated using researchers in FTE except for: LU, UK and NO.
- **Labour Force Survey**
  - **Exceptions to the reference year 2002**
    UK: 2000 for S&E and HRSTC; IS: 2001.
  - RO: data not available at ISCO 2 digit level between 1998 and 2002.

Further information:

➢ **Reference publications**

Title Statistics on Science and Technology in Europe, 2003 edition
Catalogue No KS-57-03-104-EN-C Price EUR 35

➢ **Databases**

NewCronos, Theme 9, Domains: r_d and hrst

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