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# Catching up with the EU?

## Comparing highly qualified human resources in the EU and the Acceding Countries

***CORRIGENDUM***
***(page 5, figure 3)***

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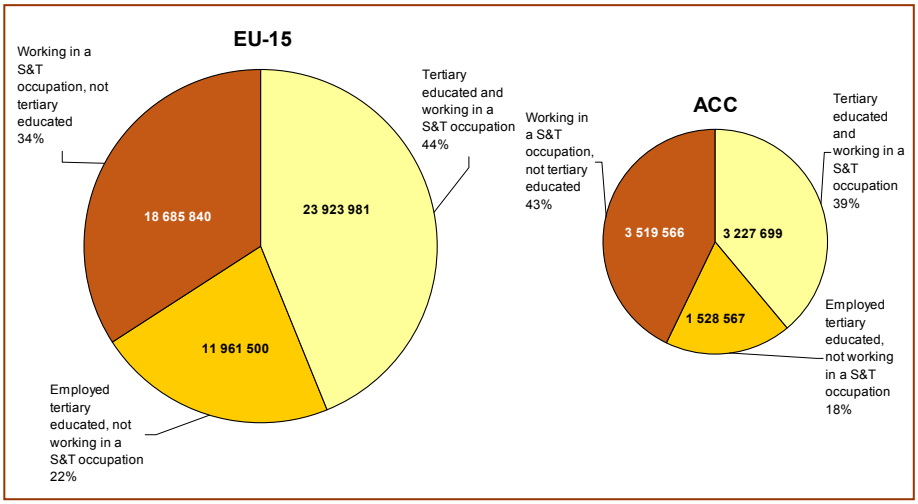
*Figure 1: Tertiary educated and science and technology workers aged 25-64 in the European Union and Acceding Countries in 2002*




Exceptions to the reference year:
AT: 1997; UK: 2000. ACC excludes MT.

*Source*: Eurostat, S&T statistics — EU LFS.

- Around 54.5 million people aged 25-64 (26.6%) in the EU either work in a S&T occupation or have a tertiary level education. In the Acceding Countries, it is just over 8 million (21%).
- Though the proportion of people with a third level education is lower in the Acceding Countries, these people are subsequently more likely to work in S&T occupations than their EU counterparts (61% against 55%).
- For the tertiary educated, unemployment rates are similar in the EU and the Acceding Countries (3%). However, the unemployment rate for people without a tertiary education is significantly higher than in the EU (17% against 9%).
- Whilst in the total population aged 20-29 men and women are represented almost equally, both in the EU and the Acceding Countries, women are more likely to participate in tertiary level education as the share of female tertiary students is 53% in the EU-15 and 57% in the Acceding Countries.
- Compared to the Acceding Countries, studying science is almost twice as popular in the EU. Engineering courses are equally as popular in the Acceding Countries — in these fields women are clearly underrepresented, accounting for only 38% of EU science and only 22% of EU engineering students.
- There has been an increasing number of graduates, both in the EU and the Acceding Countries. The proportion of graduates that are women is higher in the Acceding Countries than in the EU for both science and engineering.
- Foreign participation in tertiary education in the Acceding and Candidate Countries is generally lower and, for these foreign students, science and engineering subjects are less popular.

# Under-representation of women in science and engineering disciplines, both in the EU and the Acceding Countries

Whilst in the EU, there are an equal number of men and women aged 20-29, women are more likely to continue studying at the tertiary level than men (women represent 53% of all EU students). This is true in each Member State except Germany, with particularly high representation in Sweden (59%) and Portugal (57%). It is even more pronounced in the Acceding Countries, where at the aggregated level, women represent 57% of all tertiary level students. In Latvia, Estonia and Lithuania around 6 in every ten students are women — see Table 1.

Science and Engineering presents a whole different story. Studying science is far more popular in the EU than in the Acceding and Candidate Countries, whether you are a man or a woman. At the aggregate level, science courses account for almost twice as many of all courses in the EU compared to the Acceding Countries (11.8% against 6.1%). Not so in engineering, manufacturing and construction. Such courses are equally popular in the Acceding Countries and the EU. A common theme for the two groups of countries is that both science and engineering are predominantly male disciplines. This is most marked in the EU in the Netherlands, where less than one in four science and one in eight engineering students are women.

Foreign students can represent an important share of overall participation levels — Figure 2. The most popular destination for mobile tertiary students in 2001 was the UK, followed by Germany (data are unavailable for France). It is in these two countries as well as Austria and especially Cyprus where foreign students account for the highest proportions of total science and engineering students. In relative terms though, foreign students in Finland are more likely to be following science and engineering courses than anywhere else (38%). This compares favourably with the Acceding and Candidate Countries, where not only is foreign participation generally lower, but also science and engineering subjects are less popular.

*Table 1: Participation in tertiary education in 2001 — in total and selected fields of study, by sex and country in comparison to the population aged 20-29*

| | Population aged 20-29 in 2001 | | Participation in tertiary education in 2001 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total participation | | | | In science | | | | In engineering, manufacturing and construction | | | |
| | Total | % Women | Total | AAGR 1998-2001 | % population aged 20-29 | % Women in total | Total | AAGR 1998-2001 | % of total participation | % Women in total | Total | AAGR 1998-2001 | % of total participation | % Women in total |
| EU-15 (1) | 48 639 190 | 49.6 | 10 335 634 | 1.2 | 26.0 | 53.2 | 1 223 512 | 1.5 | 11.8 | 38.4 | 1 498 225 | 0.9 | 14.5 | 22.0 |
| BE | 1 313 748 | 49.5 | 359 265 | : | 27.3 | 52.8 | 35 157 | : | 9.8 | 30.8 | 40 886 | : | 11.4 | 18.5 |
| DK | 700 885 | 49.5 | 190 791 | 1.3 | 27.2 | 56.5 | 19 359 | 11.4 | 10.1 | 33.2 | 20 277 | 28.4 | 10.6 | 26.2 |
| DE | 8 807 643 | 49.2 | 2 083 945 | -0.2 | 23.7 | 48.7 | 282 960 | 3.3 | 13.6 | 32.6 | 323 953 | -2.0 | 15.6 | 18.8 |
| EL | 1 393 234 | 51.2 | : | : | : | : | : | : | : | : | : | : | : | : |
| ES | 6 528 391 | 49.2 | 1 833 527 | 1.6 | 28.1 | 52.5 | 237 402 | 3.6 | 13.0 | 37.2 | 303 122 | 3.7 | 16.6 | 25.5 |
| FR | 7 506 610 | 50.4 | : | : | : | : | : | : | : | : | : | : | : | : |
| IE | 651 814 | 49.6 | 166 600 | 5.3 | 25.6 | 54.7 | 26 683 | 3.7 | 20.6 | 45.1 | 19 343 | 5.1 | 14.9 | 18.7 |
| IT | 7 845 371 | 50.2 | 1 812 325 | -1.0 | 23.1 | 56.0 | 135 668 | -11.4 | 7.5 | 49.6 | 299 778 | -1.4 | 16.6 | 26.5 |
| LU (2) | 56 566 | 50.3 | 2 533 | -3.4 | 4.5 | : | 245 | 27.0 | 9.7 | : | 181 | -17.7 | 7.1 | : |
| NL | 2 049 963 | 49.6 | 504 042 | 3.0 | 24.6 | 50.5 | 28 818 | 2.1 | 5.7 | 23.4 | 53 641 | 1.7 | 10.7 | 11.9 |
| AT | 988 044 | 50.9 | 289 722 | -1.8 | 28.6 | : | 33 480 | -3.3 | 11.6 | 32.9 | 40 448 | -2.5 | 14.0 | 18.6 |
| PT | 1 644 896 | 49.9 | 387 703 | 3.3 | 23.6 | 57.0 | 27 671 | -4.0 | 7.1 | 49.9 | 79 006 | 5.9 | 20.4 | 27.8 |
| FI | 626 064 | 48.8 | 279 628 | 3.8 | 44.7 | 53.9 | 30 472 | 8.0 | 10.9 | 41.8 | 72 303 | 5.3 | 25.9 | 18.2 |
| SE | 1 099 610 | 49.1 | 358 020 | 8.4 | 32.6 | 59.1 | 38 971 | 6.2 | 10.9 | 45.4 | 68 206 | 9.0 | 19.1 | 29.3 |
| UK | 7 426 350 | 48.9 | 2 067 349 | 2.2 | 27.8 | 54.5 | 360 106 | 4.6 | 17.4 | 40.0 | 217 529 | -1.2 | 10.5 | 16.6 |
| ACC (1) | 11 415 351 | 49.9 | 2 916 821 | 12.4 | 25.5 | 56.8 | 177 463 | 35.2 | 6.1 | 39.9 | 420 969 | 2.4 | 14.4 | 23.2 |
| CZ | 1 681 855 | 50.0 | 260 044 | 8.7 | 15.5 | 50.1 | 36 338 | : | 14.6 | 24.0 | 41 536 | : | 16.7 | 25.8 |
| EE | 190 484 | 49.4 | 57 778 | 10.3 | 30.3 | 60.1 | 5 011 | 19.1 | 8.7 | 38.9 | 7 320 | 1.5 | 12.7 | 28.1 |
| CY (2) | 83 050 | 51.2 | 11 934 | 4.9 | 14.4 | 58.0 | 1 562 | 19.3 | 13.1 | 36.0 | 550 | -21.2 | 4.6 | 7.8 |
| LV | 324 340 | 49.4 | 102 783 | 13.5 | 31.7 | 61.8 | 6 592 | 26.5 | 6.4 | 38.8 | 10 128 | -7.6 | 9.9 | 24.9 |
| LT | 533 008 | 49.7 | 135 923 | 12.1 | 25.5 | 59.8 | 6 716 | 14.6 | 4.9 | 42.0 | 29 419 | 9.3 | 21.6 | 30.6 |
| HU | 1 603 623 | 49.3 | 330 549 | 9.1 | 20.6 | 54.8 | 16 011 | 5.5 | 4.8 | 31.7 | 51 256 | 4.3 | 15.5 | 20.1 |
| MT (2) | : | : | 7 422 | 13.4 | : | 54.8 | 358 | 10.5 | 4.8 | 31.6 | 459 | 3.2 | 6.2 | 23.3 |
| PL | 5 804 324 | 50.1 | 1 774 985 | 14.2 | 30.6 | 58.0 | 89 143 | 60.3 | 5.5 | 49.5 | 234 638 | 3.0 | 14.4 | 21.7 |
| SI | 300 085 | 48.5 | 91 494 | 10.3 | 30.5 | 56.1 | 4 588 | 12.0 | 5.0 | 30.8 | 16 026 | 6.6 | 17.5 | 24.7 |
| SK | 894 582 | 50.0 | 143 909 | 8.4 | 16.1 | 51.3 | 11 144 | 8.8 | 7.7 | 31.9 | 29 637 | 5.0 | 20.6 | 27.1 |
| BG | 1 087 361 | 50.1 | 247 006 | -1.8 | 22.7 | 56.3 | 11 916 | 1.5 | 4.8 | 55.1 | 52 777 | 4.8 | 21.4 | 36.9 |
| RO | 3 362 735 | 49.7 | 533 152 | 13.9 | 15.9 | 53.5 | 26 662 | 8.5 | 5.3 | 59.8 | 108 672 | 10.7 | 21.6 | 26.6 |
| TR | : | : | 1 091 805 | : | : | 40.5 | 113 673 | : | 10.4 | 40.1 | 211 449 | : | 19.4 | 21.7 |
| IS | 40 190 | 48.5 | 10 184 | 7.9 | 25.3 | 62.7 | 1 303 | 14.5 | 12.8 | 40.6 | 606 | 11.6 | 6.0 | 25.7 |
| NO | 588 048 | 49.7 | 190 054 | 1.3 | 32.3 | 59.2 | 22 841 | 13.7 | 12.8 | 33.7 | 12 386 | -6.1 | 6.9 | 24.0 |
| JP | : | : | 3 972 468 | : | : | 44.9 | 114 901 | : | 3.1 | 24.4 | 701 698 | : | 18.8 | 11.3 |

(1) EU-15 and ACC are estimated; ACC population aged 20-29 excludes MT.
(2) Annual average growth rate calculated for 1999-2001.
Exception to the reference year: Education data for AT: 2000.

*Source*: Eurostat, S&T statistics — UOE questionnaire.

*Figure 2: Participation of foreign students in tertiary education in 2001 — total and share of science and engineering students*

| | Foreign students in any field | Foreign students in S&E fields | | Share of foreigners in total S&E students |
|---|---|---|---|---|
| | Total | Total | % | |
| BE | 38 150 | 5 691 | 17.7 | 7 |
| DK | 12 586 | 2 930 | 23.3 | 7 |
| DE | 199 132 | 61 684 | 32.6 | 10 |
| EL | : | : | : | |
| ES | 40 689 | : | : | |
| FR | : | : | : | |
| IE | 8 207 | : | : | |
| IT | 29 228 | 5 433 | 18.6 | 1 |
| LU | : | : | : | |
| NL | 16 589 | 3 073 | 18.6 | 4 |
| AT | 35 891 | 8 782 | 24.5 | 12 |
| PT | 14 202 | 3 460 | 24.4 | 3 |
| FI | 6 288 | 2 378 | 37.8 | 2 |
| SE | 26 304 | 8 250 | 31.4 | 8 |
| UK | 225 722 | 74 047 | 32.8 | 13 |
| CZ | 7 750 | 1 997 | 25.8 | 3 |
| EE | 863 | : | : | |
| CY | 2 472 | 331 | 13.4 | 16 |
| LV | 7 917 | 180 | 2.3 | 1 |
| LT | 628 | 94 | 15.0 | 0.3 |
| HU | 11 242 | 2 290 | 20.4 | |
| MT | 341 | 25 | 7.3 | 3 |
| PL | 6 659 | 580 | 8.7 | 0.2 |
| SI | 864 | 235 | 27.2 | 1 |
| SK | 1 690 | 217 | 12.8 | 1 |
| BG | 8 130 | 1 205 | 15.0 | 2 |
| RO | 11 669 | 961 | 8.4 | 1 |
| TR | 16 656 | 3 492 | 21.0 | 1 |
| IS | 421 | 53 | 12.6 | |
| NO | 8 857 | 2 045 | 25.6 | |
| JP | 63 637 | 11 372 | 19.9 | |

Exceptions to the reference year — ES and AT: 2000.

*Source*: Eurostat, S&T statistics — UOE questionnaire.

## Increasing numbers of graduates in the EU and the Acceding Countries

Table 2 shows there to be an increasing number of graduates both in the EU and the Acceding Countries. In the EU in 2001, there were on average 40 new graduates per 1000 20-29 year olds. In the Acceding Countries, this figure was 55. The number of graduates in the Acceding Countries is, moreover, expanding at a higher rate than in the EU.

*Table 2: Graduation from tertiary education in 2001 — in total and selected fields of study, by sex and country in comparison to the population aged 20-29*

| | Graduates from tertiary education in 2001 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total graduates | | | | In science | | | | | In engineering, manufacturing and construction | | | | |
| | Total | AAGR 1998-2001 | Per 1000 population aged 20-29 | % Women in total | Total | AAGR 1998-2001 | Per 1000 population aged 20-29 | % of total graduates | % Women in total | Total | AAGR 1998-2001 | Per 1000 population aged 20-29 | % of total graduates | % Women in total |
| EU-15 (1) | 1 963 415 | 2.5 | 40.4 | 55.9 | 218 755 | 5.4 | 4.5 | 11.1 | 41.0 | 286 087 | 1.9 | 5.9 | 14.6 | 20.9 |
| BE | 70 202 | : | 53.4 | 56.1 | 5 704 | : | 4.3 | 8.1 | 31.4 | 7 535 | : | 5.7 | 10.7 | 18.2 |
| DK (2) | 39 017 | 12.1 | 55.7 | 56.3 | 3 163 | 18.1 | 4.5 | 8.1 | 32.5 | 5 293 | 18.4 | 7.6 | 13.6 | 26.2 |
| DE | 296 640 | -2.7 | 33.7 | 51.6 | 26 460 | -6.1 | 3.0 | 8.9 | 32.9 | 50 157 | -5.7 | 5.7 | 17.0 | 16.7 |
| EL | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| ES | 277 853 | 4.9 | 42.6 | 57.2 | 29 200 | 9.5 | 4.5 | 10.5 | 40.8 | 45 112 | 13.9 | 6.9 | 16.3 | 25.1 |
| FR (2) | 508 189 | 1.1 | 67.7 | 55.8 | 78 074 | 8.2 | 10.4 | 15.4 | 42.6 | 76 682 | -3.5 | 10.2 | 15.1 | 18.7 |
| IE | 45 818 | 4.0 | 70.3 | 56.0 | 8 707 | 4.7 | 13.4 | 19.8 | 47.6 | 5 331 | -0.7 | 8.2 | 12.1 | 18.0 |
| IT (2) | 202 309 | 6.1 | 25.8 | 55.9 | 15 577 | -0.3 | 2.0 | 7.7 | 54.5 | 31 013 | 5.6 | 4.0 | 15.4 | 27.6 |
| LU | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| NL | 81 603 | 0.6 | 39.8 | 54.7 | 4 279 | -0.9 | 2.1 | 5.2 | 27.4 | 8 385 | -3.1 | 4.1 | 10.3 | 12.3 |
| AT | 27 099 | 0.8 | 27.4 | 51.5 | 1 840 | -9.3 | 1.9 | 6.8 | 39.0 | 5 583 | -4.2 | 5.7 | 20.7 | 15.1 |
| PT | 61 136 | : | 37.2 | 67.1 | 3 102 | : | 1.9 | 5.1 | 58.2 | 7 155 | : | 4.3 | 11.7 | 35.3 |
| FI (2) | 36 141 | -3.7 | 57.7 | 61.7 | 2 728 | 5.9 | 4.4 | 7.5 | 46.4 | 7 376 | -2.4 | 11.8 | 20.4 | 20.3 |
| SE | 42 741 | 7.1 | 38.9 | 58.5 | 4 329 | 12.7 | 3.9 | 10.1 | 46.5 | 9 373 | 15.9 | 8.5 | 21.9 | 27.5 |
| UK | 273 987 | 10.3 | 36.9 | 56.6 | 35 519 | 16.3 | 4.8 | 13.0 | 37.2 | 27 066 | 6.6 | 3.6 | 9.9 | 18.0 |
| ACC (1) | 631 073 | 19.5 | 55.3 | 63.7 | 26 758 | 42.3 | 2.3 | 4.2 | 48.1 | 55 433 | 7.3 | 4.9 | 8.8 | 25.6 |
| CZ | 43 629 | 12.5 | 25.9 | 55.3 | 4 569 | : | 2.7 | 11.0 | 25.1 | 5 017 | : | 3.0 | 12.1 | 28.9 |
| EE | 7 600 | 10.0 | 39.9 | 65.3 | 456 | 28.1 | 2.4 | 6.0 | 45.4 | 923 | 31.9 | 4.8 | 12.1 | 27.4 |
| CY | 2 813 | : | 33.9 | 65.2 | 156 | : | 1.9 | 5.5 | 42.9 | 180 | : | 2.2 | 6.4 | 20.6 |
| LV | 20 308 | 24.8 | 62.6 | 55.4 | 1 032 | 32.9 | 3.2 | 5.1 | 56.9 | 1 441 | -3.0 | 4.4 | 7.1 | 29.9 |
| LT | 27 471 | 12.7 | 51.5 | 63.5 | 1 352 | 18.0 | 2.5 | 4.9 | 52.1 | 5 673 | 13.2 | 10.6 | 20.7 | 31.7 |
| HU (2) | 57 882 | 15.0 | 36.1 | 61.4 | 1 379 | -16.6 | 0.9 | 2.4 | 31.6 | 5 820 | -0.9 | 3.6 | 10.1 | 20.5 |
| MT (3) | 2 003 | 22.4 | : | 52.0 | 83 | 72.2 | : | 4.1 | 30.1 | 103 | 64.6 | : | 5.1 | 23.3 |
| PL | 431 104 | 23.6 | 74.3 | 65.9 | 15 011 | 83.8 | 2.6 | 4.8 | 58.5 | 29 831 | 9.8 | 5.1 | 9.5 | 24.0 |
| SI | 11 991 | 7.1 | 40.0 | 59.4 | 437 | -1.8 | 1.5 | 3.6 | 35.7 | 1 995 | 2.3 | 6.6 | 16.6 | 21.7 |
| SK | 26 272 | 14.6 | 29.4 | 54.2 | 2 283 | 23.6 | 2.6 | 8.7 | 34.0 | 4 450 | 21.6 | 5.0 | 16.9 | 31.6 |
| BG | 47 504 | 4.3 | 43.7 | 62.5 | 1 989 | 10.8 | 1.8 | 4.2 | 56.6 | 7 128 | 10.7 | 6.6 | 15.0 | 35.5 |
| RO | 76 230 | 4.0 | 22.7 | 54.8 | 4 333 | 2.0 | 1.3 | 5.8 | 64.6 | 14 032 | 4.9 | 4.2 | 18.9 | 26.7 |
| TR (3) | 241 464 | 16.1 | : | 42.8 | 19 961 | 11.1 | : | 9.6 | 44.4 | 41 506 | 5.8 | : | 20.0 | 24.8 |
| IS | 2 066 | 11.9 | 51.4 | 62.1 | 280 | 11.7 | 7.0 | 13.6 | 41.4 | 113 | 11.7 | 2.8 | 5.5 | 21.2 |
| NO | 32 092 | -6.3 | 54.6 | 58.8 | 2 675 | 19.3 | 4.5 | 8.7 | 29.7 | 2 486 | -7.7 | 4.2 | 8.1 | 20.6 |
| JP | 1 067 878 | : | : | 49.4 | 28 884 | : | : | 2.8 | 25.2 | 204 502 | : | : | 19.9 | 12.2 |
| US | 2 150 954 | : | : | 57.0 | 190 115 | : | : | 8.9 | 44.2 | 179 276 | : | : | 8.4 | 18.7 |

(1) EU-15 and ACC are estimated; ACC population aged 20-29 excludes MT.
(2) Annual average growth rate calculated for 1998-2000.
(3) Annual average growth rate calculated for 1999-2001.
Exceptions to the reference year: DK, FR, IT, FI, CY, HU and US: 2000.

*Source*: Eurostat, S&T statistics — UOE questionnaire.

In 2001, Ireland had the highest proportion of science graduates (20%). Only France (15%) and the UK (13%) stood between this and the highest proportion for the Acceding Countries: 11% in the Czech Republic, where furthermore, female science graduates are strongly under-represented (25% of all graduates). Science graduates accounted for 11% of total graduates in 2001 in the EU compared to 9% in the USA, 4% in the Acceding Countries and 3% in Japan.

Most countries have a higher number of engineering graduates than they do for science. This is the case for all but two European countries: Ireland and the UK; though in France and Norway it is more or less equal. The proportion of graduates that are women is higher in the Acceding Countries than in the EU for both science and engineering. In the Acceding Countries, women represent 48% of all science graduates, compared to 41% in the EU. In engineering, a quarter of all graduates are women in the Acceding Countries but just a fifth in the EU.

When you get to PhD level, the picture changes yet again — Table 3. In the EU, 74 908 people obtained their doctoral degree in 2001 compared to just 7 555 in the Acceding Countries, 13 179 in Japan and 44 808 in the USA. Of the EU countries, Germany had by far the highest number of doctorate recipients in 2001, as did Poland among the Acceding Countries. But the propensity to obtain a doctoral degree is highest in Germany, Finland and Sweden: close to 6 in every thousand 25-29 year olds graduated with a doctoral degree in 2001.

For the total of fields, in the EU and the Acceding Countries doctorate graduates are more likely to be male than for total tertiary graduates. A noticeable trend, however, is that doctorate recipients are far more likely to obtain their diploma in science than is the case for tertiary level graduates. Almost a third of all EU doctorate degrees are obtained in science compared to just one in ten when all graduates are taken together — Table 2. In the Acceding Countries too, science represents between four and five times as much at the doctorate level than for overall tertiary graduates. But it is in engineering that a high proportion of Acceding Country doctorate recipients are earning their degree. At around 16%, this represents a higher proportion of total doctorates than in both the EU and the USA (13% and 12.3% respectively), though lower than in Japan (23%).

*Table 3: ISCED level 6 (PhD) graduation in 2001 — in total and selected fields of study, by sex and country in comparison to the population aged 25-29*

| | Population aged 25-29 in 2001 | | Graduates at ISCED 6 level (PhDs) in 2001 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total graduates at ISCED 6 level (PhDs) | | | | In science | | | | In engineering, manufacturing and construction | | | |
| | Total | % Women | Total | AAGR 1998-2001 | Per 1000 population aged 25-29 | % Women in total | Total | AAGR 1998-2001 | % of total ISCED 6 graduates | % Women in total | Total | AAGR 1998-2001 | % of total ISCED 6 graduates | % Women in total |
| EU-15 (1) | 25 666 218 | 49.3 | 74 908 | 3.1 | 2.9 | 39.6 | 23 149 | 2.1 | 30.9 | 35.7 | 9 754 | 2.6 | 13.0 | 20.6 |
| BE | 678 094 | 49.5 | 1 317 | : | 1.9 | 31.9 | 521 | : | 39.6 | 33.6 | 169 | : | 12.8 | 15.4 |
| DK (2) | 389 688 | 48.4 | 795 | : | 2.0 | 37.4 | 190 | : | 23.9 | 32.6 | 207 | : | 26.0 | 23.7 |
| DE | 4 477 299 | 48.6 | 24 796 | -0.1 | 5.5 | 35.3 | 6 831 | -2.3 | 27.5 | 26.8 | 2 333 | 1.2 | 9.4 | 11.8 |
| EL | 698 111 | 49.4 | : | : | : | : | : | : | : | : | : | : | : | : |
| ES | 3 429 463 | 49.1 | 6 453 | 2.9 | 1.9 | 42.9 | 1 842 | 1.3 | 29.4 | 44.6 | 538 | 5.2 | 8.6 | 23.2 |
| FR (2) | 3 967 002 | 50.1 | 10 404 | 1.1 | 2.6 | 42.7 | 1 761 | 0.3 | 48.0 | 39.3 | 956 | -10.3 | 9.2 | 26.8 |
| IE | 316 788 | 49.5 | 572 | 6.4 | 1.8 | 44.4 | 293 | 3.5 | 51.3 | 42.7 | 63 | : | 11.0 | 22.2 |
| IT (2) | 4 352 023 | 49.8 | 4 044 | 1.9 | 0.9 | 50.8 | 821 | 10.2 | 20.3 | 47.7 | 808 | 3.0 | 20.0 | 34.4 |
| LU | 30 865 | 50.3 | : | : | : | : | : | : | : | : | : | : | : | : |
| NL | 1 091 416 | 49.7 | 2 533 | 0.2 | 2.3 | 31.5 | 530 | 2.2 | 20.9 | 25.5 | 390 | -3.7 | 15.4 | 13.8 |
| AT | 544 861 | 51.0 | 1 871 | -0.5 | 3.4 | 37.1 | 405 | -3.6 | 21.7 | 35.6 | 400 | 10.8 | 21.4 | 13.0 |
| PT | 827 198 | 49.8 | 2 791 | : | 3.4 | 50.7 | 434 | : | 15.5 | 49.8 | 468 | : | 16.8 | 39.1 |
| FI (2) | 308 531 | 47.8 | 1 797 | 2.1 | 5.8 | 45.8 | 345 | 7.6 | 19.2 | 37.4 | 321 | -5.3 | 17.9 | 21.2 |
| SE | 587 072 | 48.9 | 3 388 | 7.5 | 5.8 | 39.2 | 746 | 1.0 | 22.0 | 33.0 | 911 | 13.0 | 26.9 | 24.1 |
| UK | 3 967 808 | 48.7 | 14 147 | 8.8 | 3.6 | 39.5 | 5 202 | 10.6 | 36.8 | 38.9 | 2 190 | 3.1 | 15.5 | 18.8 |
| ACC (1) | 5 666 496 | 49.5 | 7 555 | 1.0 | 1.3 | 41.1 | 1 472 | 0.0 | 19.5 | 37.8 | 1 196 | -3.2 | 15.8 | 22.6 |
| CZ | 875 549 | 49.2 | 1 066 | 12.3 | 1.2 | 34.7 | 349 | : | 32.7 | 24.4 | 207 | : | 19.4 | 27.1 |
| EE | 99 436 | 50.9 | 149 | 12.0 | 1.5 | 51.7 | 22 | : | 14.8 | 31.8 | 9 | : | 6.0 | - |
| CY | 43 741 | 50.1 | 13 | : | 0.3 | 76.9 | 3 | : | 23.1 | 66.7 | : | : | : | : |
| LV | 163 828 | 49.5 | 37 | : | 0.2 | 48.6 | 18 | : | 48.6 | 44.4 | 7 | : | 18.9 | 28.6 |
| LT | 277 016 | 49.4 | 261 | 15.1 | 0.9 | 52.5 | 42 | : | 16.1 | 45.2 | 60 | : | 23.0 | 30.0 |
| HU (2) | 799 586 | 49.1 | 793 | -18.9 | 1.0 | 38.0 | 142 | -37.0 | 17.9 | 26.1 | 50 | : | 6.3 | 24.0 |
| MT (3) | : | : | 6 | : | : | : | : | : | : | : | 1 | : | 16.7 | : |
| PL | 2 825 651 | 49.7 | 4 400 | : | 1.6 | 41.6 | 709 | : | 16.1 | 44.6 | 679 | : | 15.4 | 19.6 |
| SI | 147 666 | 48.0 | 298 | 4.0 | 2.0 | 49.0 | 76 | : | 25.5 | 43.4 | 57 | : | 19.1 | 22.8 |
| SK | 434 024 | 49.5 | 532 | 13.1 | 1.2 | 39.8 | 111 | 13.0 | 20.9 | 45.0 | 126 | -2.5 | 23.7 | 28.6 |
| BG | 551 669 | 48.9 | 376 | 5.6 | 0.7 | 42.0 | 68 | : | 18.1 | 45.6 | 58 | : | 15.4 | 27.6 |
| RO | 1 638 859 | 47.4 | : | : | : | : | : | : | : | : | : | : | : | : |
| TR (3) | : | : | 1 985 | -12.9 | : | 38.4 | 320 | 3.8 | 16.1 | 44.4 | 320 | -2.8 | 16.1 | 32.2 |
| IS (3) | 19 947 | 48.3 | 3 | : | 0.2 | 100.0 | : | : | : | : | : | : | : | : |
| NO | 321 888 | 50.2 | 768 | 3.1 | 2.4 | 34.4 | 11 | : | 2.1 | 9.1 | 79 | : | 15.4 | 13.9 |
| JP | : | : | 13 179 | : | : | 22.8 | 2 070 | : | 15.8 | 17.2 | 3 048 | : | 23.2 | 8.5 |
| US | : | : | 44 808 | : | : | 44.1 | 10 768 | : | 24.1 | 33.2 | 5 519 | : | 12.3 | 15.9 |

(1) EU-15 and ACC are estimated.
(2) Annual average growth rate calculated for 1998-2000.
(3) Annual average growth rate calculated for 1999-2001.
Annual average growth rate only calculated if more than 100 cases in 2001. Exceptions to the reference year — DK, FR, IT, FI, CY, HU and US: 2000.

*Source*: Eurostat, S&T statistics — UOE questionnaire.

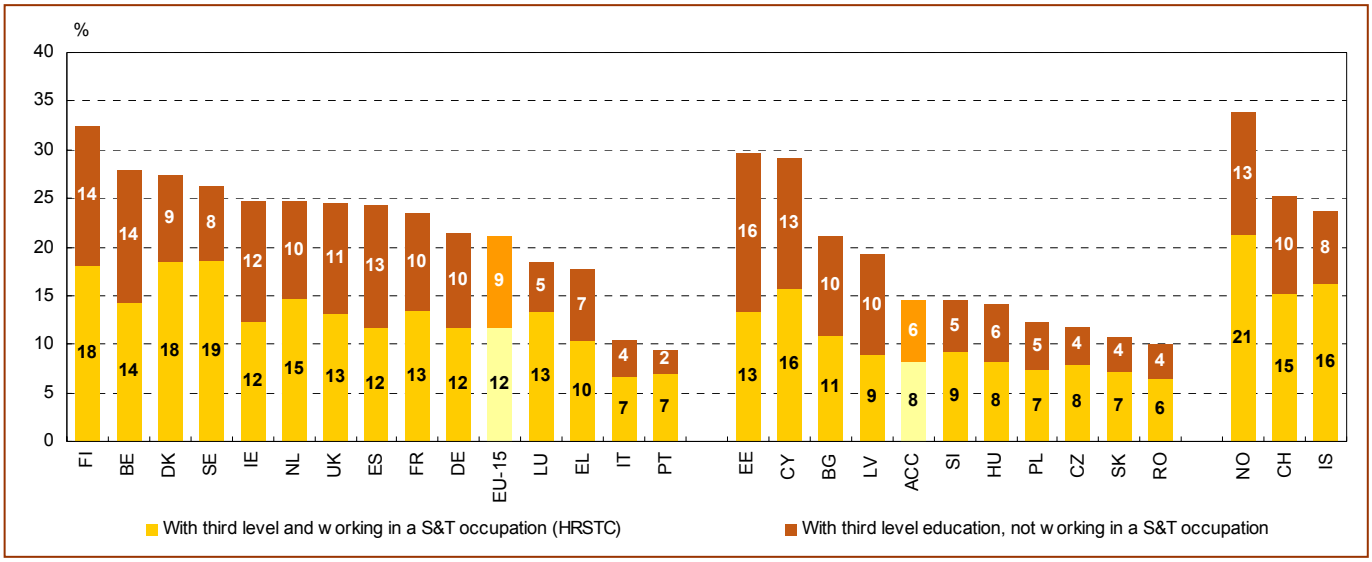
## Catching up in practice: although at 59% of the EU average for possession of tertiary education, Acceding Countries reach 82% of the EU average for people working in S&T

Even though the official definition of HRST as shown in the Canberra Manual contains the terms "S&T", these terms do not restrict the definition: HRSTE covers all fields of study i.e. anybody who successfully completed third level education; HRSTO refers to two specific major ISCO classes that are broader than what one might expect from scientific and technological activities in a stricter sense (see methodological notes).

Around 54.5 million people aged 25-64 (26.6%) in the EU either work in a S&T occupation or have a tertiary level education (Figure 1, cover page). Of these, the largest part (44%) both work in S&T and have a tertiary degree. In the Acceding Countries, where just over 8 million people either work in S&T or have a tertiary education (21% of 25-64 year olds), S&T posts are more likely to be filled by people without a tertiary level education.

Within the EU, Finland has the highest percentage of tertiary educated citizens at nearly 40%. They are closely followed by Spain, Belgium, France and Ireland, all far above the EU average of around 26.5%. This compares favourably with the Acceding and Candidate Countries, where a smaller part of the population has a tertiary level education (59% of the EU average).

*Figure 3: Proportion of people with third level education (HRSTE) working or not working in a S&T occupation compared to the total population aged 25-64 — 2002*




Exceptions to the reference year:
UK: 2000; IS: 2001. ACC excludes MT.
Reliable data not available for AT or LT.

*Source*: Eurostat, S&T statistics — EU LFS.

However, possessing a third level education and applying it to an equivalent occupation level is another matter. This you are most likely to do living in Luxembourg, where 77% of the 45 000 resident 25-64 year olds with tertiary education also work in a S&T occupation — equivalent to 17% of all 25-64 year olds in Figure 3. Calculated this way, 72% of people with a third level education also work in a S&T occupation in Slovenia and Portugal. In fact, with the proportion of people with a third level education being lower in the Acceding Countries, these people are subsequently more likely to work in S&T occupations than their EU counterparts (61% against 55%).

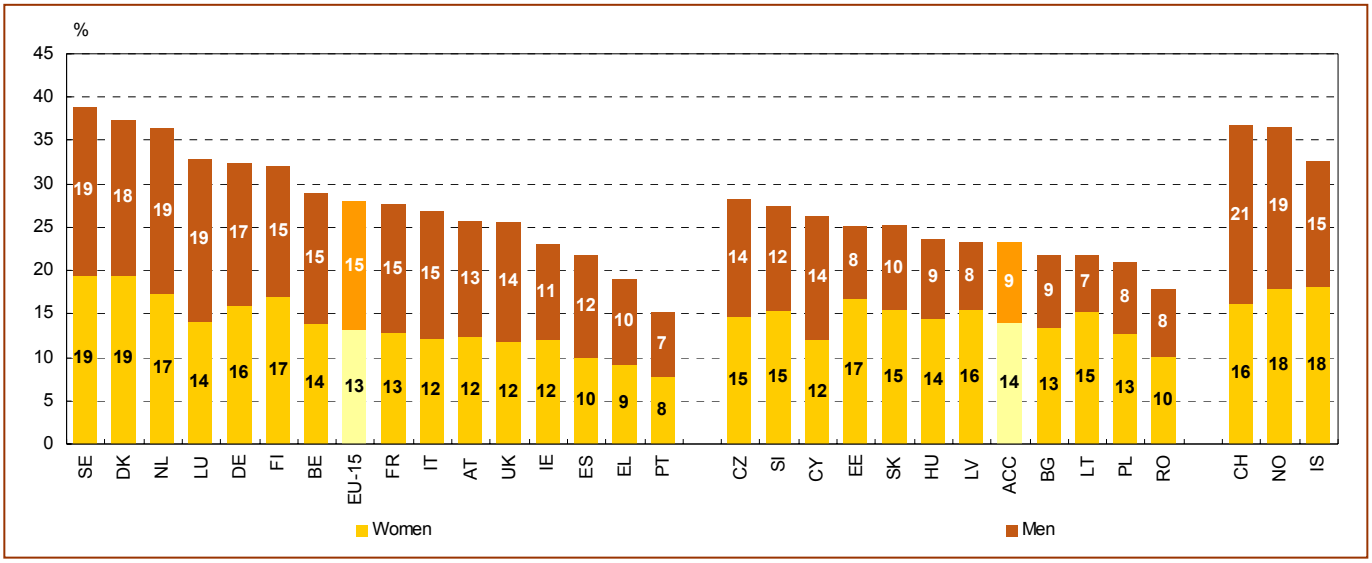
This *utilisation rate* is lowest in Spain and Ireland for the EU, and Latvia and Cyprus for the Acceding Countries, where you are under or around half as likely as the average to work in S&T having attained a tertiary education.

Though less prevalent in the Acceding Countries compared to the EU, people in science and technology type occupations (HRSTO) nevertheless account for around a quarter of all those in the labour force — Figure 4, next page. This is equivalent to around 82% of the EU average. The principle reason why the Acceding Countries fare less well than the EU on these terms is that men are less likely to work in S&T in the Acceding Countries than they are in the EU.

In Sweden and Denmark, nearly four in every ten people in the labour force work in a S&T type occupation. This compares with between 15% and 20% for Portugal and Greece. Of the big four European economies, only Germany has a higher than average number of people working in S&T type occupations. Iceland, Norway and Switzerland compare with the most S&T occupation-oriented EU countries.

In the Acceding Countries, the Czech Republic, Slovenia and Cyprus have the highest ratios of the labour force in S&T occupations at just over a quarter.

*Figure 4: HRSTO as a % of the labour force aged 25-64 by sex in 2002*




Exceptions to the reference year:
UK: 2000; IS: 2001. ACC excludes MT.

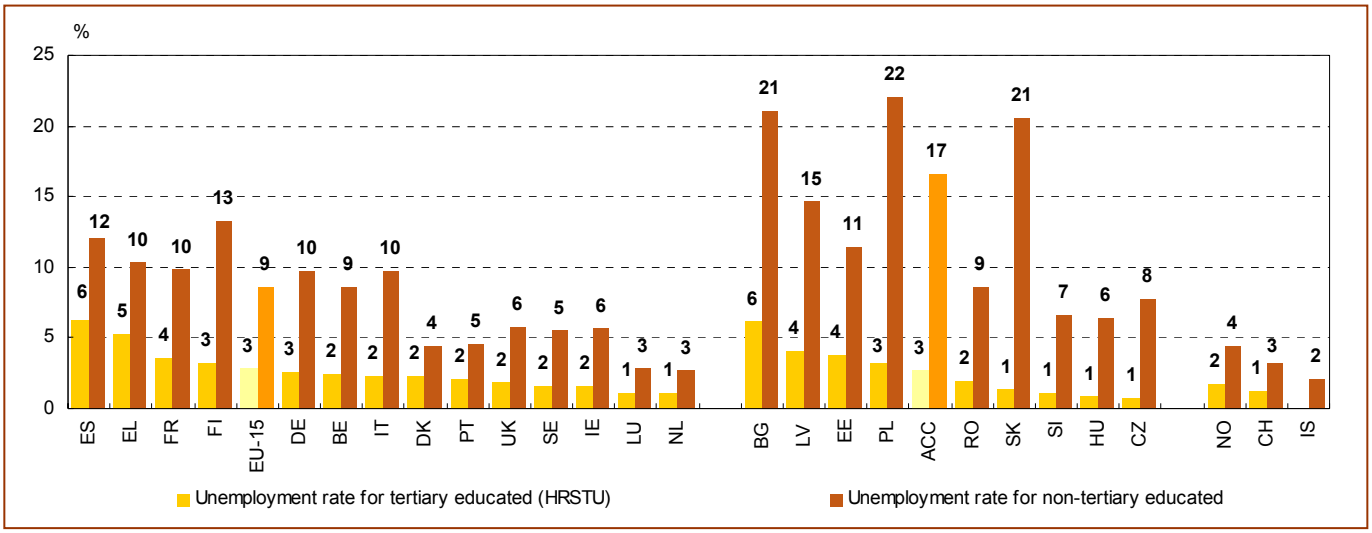
*Source*: Eurostat, S&T statistics — EU LFS.

## Completion of tertiary education significantly reduces the risk of unemployment, especially in the Acceding Countries

As shown in Figure 5, for the tertiary educated, unemployment rates are similar in the EU and the Acceding Countries — both standing at 3% (HRSTU). Deviation from this average is small in both groups of countries, the highest unemployment rate is evident in Spain in the EU and Bulgaria in the Acceding Countries (6%).

It is finding and retaining a job when you do not possess a third level education that is more difficult. Though this also applies in the EU, and most notably in Finland, Spain, Italy and Germany, unemployment rates for non-tertiary educated are still around half that apparent for the Acceding Countries. The starkest contrasts can be found in Poland and Slovakia, where the difference in unemployment rates between those that have a third level education and those that do not firmly underlines the personal benefit of remaining in education when possible.

*Figure 5: Unemployment rates for tertiary and non-tertiary educated people aged 25 – 64 in 2002*




ACC excludes MT.
Reliable data not available for AT, CY and LT, also for IS for HRSTU.
HRSTU data for LU and SI should be treated with caution.

*Source*: Eurostat, S&T statistics — EU LFS.

## ➢ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

### Human resources in science and technology — HRST — according to the *Canberra Manual*

Prepared jointly by the OECD and the European Commission/Eurostat, this manual is intended to provide guidelines for the measurement and the classification of HRST and its subcategories and the analysis of such data. The work was carried out in response to policy needs and priority issues identified by these and other organisations.

As is shown below, even though the official definition of HRST as shown in the Canberra Manual contains the terms "S&T", these terms do not restrict the definition: HRSTE covers all fields of study i.e. anybody who successfully completed third level education; HRSTO refers to two specific major ISCO classes that are broader than what one might expect from scientific and technological activities in a stricter sense.

| *Category* | *People that have/are* |
|---|---|
| • **HRST:** Human Resources in Science and Technology | • successfully completed education at the third level in a S&T field of study* (ISCED '97 version levels 5a, 5b or 6) or<br>• are not formally qualified as above but are employed in a S&T occupation where the above qualifications are normally required (ISCO '88 COM codes 2 or 3) |
| ***Sub-categories of HRST*** | ***People belonging to HRST that have/are*** |
| • **HRSTO:** Human Resources in Science and Technology — Occupation | • employed in a S&T occupation (ISCO '88 COM codes 2 or 3). |
| • **HRSTE:** Human Resources in Science and Technology — Education | • successfully completed education at the third level in a S&T field of study* (ISCED '97 version levels 5a, 5b or 6) |
| • **HRSTC:** Human Resources in Science and Technology — Core | • successfully completed education at the third level in a S&T field of study* (ISCED '97 version levels 5a, 5b or 6) and<br>• are employed in a S&T occupation (ISCO '88 COM codes 2 or 3) |
| • **HRSTU:** Human Resources in Science and Technology — Unemployed | • successfully completed education at the third level in a S&T field of study* (ISCED '97 version levels 5a, 5b or 6) and are unemployed |

* 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, humanities, other fields (Canberra Manual, Paragraph 71).

### The International Standard Classification of Education — ISCED 97

| *Levels of tertiary 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 |

***S&E (field of study)***

| *Title* | *Short name* | *Description* | *ISCED subject codes* |
|---|---|---|---|
| Science and Engineering | S&E | • Life sciences, Physical sciences, Mathematics and statistics, Computing, Engineering and engineering trades, Manufacturing and processing, Architecture and building. | • 42, 44, 46, 48, 52, 54, 58 |

### The International Standard Classification of Occupations — ISCO

| | |
|---|---|
| • ISCO 1 (legislators, senior officials and managers) | • occupations whose main tasks consist of ... planning, directing and co-ordinating the policies and activities of enterprises and organisations, or departments. |
| • 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. |

### Non-national students

Overestimation of non-national students may exist in some countries where permanently resident second generation migrants with foreign nationalities constitute an important group of students.

### Abbreviations

| | | |
|---|---|---|
| AAGR: | Annual average growth rate | |
| EU LFS: | European Union Labour Force Survey | * Note that EU LFS data were extracted in April 2003 and refer to the spring quarter of each year. |
| UOE questionnaire: | Unesco/OECD/Eurostat questionnaire. | * Note that Education data were extracted in July 2003. |

# *Further information:*

➢ **Reference publications**

Title Statistics on Science and technology in Europe, 2003 edition (forthcoming)

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