Women in ICT

Status and the way ahead

07 January 2008

European Commission
Information Society and Media

Directorate G
Advisor to Director

We are facing serious skill shortages in fast growth technology sectors, in particular in the ICT industry. There are frequent calls by top industrialists for more efforts to attract more young people into the sector, but in fact very little has been done to interest one half of the this population: young women. This is a mistake and this report shows how big a mistake we are making.

At the age of 15 both girls and boys have about the same preferences and ability in science and technology, but as they progress to become adults girls drop out of engineering and technology in favour of other subjects. By the time they get to university and on to grad school, female computer scientists are out-numbered six to one by men and the situation is even worse in engineering. This is in spite of women outnumbering men in third level education overall. This imbalance persists on into industry: women R&D personnel in tech sectors account for below 20% of researchers and later on women earn less and find themselves in management roles less often: only 30% of European Mangers are women.

The lesson I draw, is that if we are short on skills we should do more to attract girls into the technology sector. This means changing the image of the industry in order to make it more women friendly. I have been getting significant industry support to do this through the "IT girls" initiative, which gives a small number of young women, around 15 years old, a one-day shadowing experience alongside a female ICT professional. This can help to break down the misconception that the tech sector is "boys only". If you want to know more about the IT-Girls, here is the link to last years programme:
http://ec.europa.eu/information_society/activities/itgirls/index_en.htm

But industry needs to do something constructive as well. It is in the self-interest of the industry leaders to recruit, train and retain women leaders. They are talented, creative and every bit as bright and hard working as the young men. I call on industry executives to take a concrete step towards solving its own skill shortages by joining me on my mission to get women into ICT. I invite them to work with me on defining a better offer for young women to enter and stay in the ICT sector.

Viviane Reding
Member of the European Commission responsible for Information Society and Media

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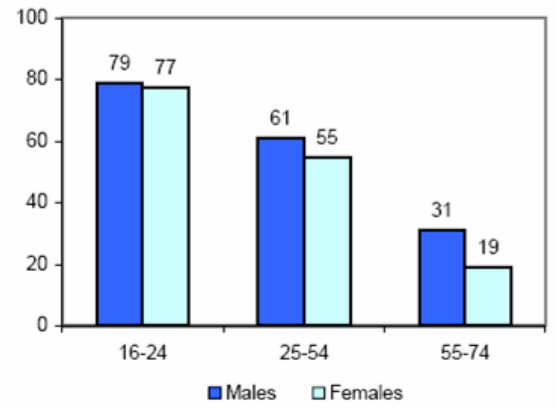
1. EXECUTIVE SUMMARY

ICT is a key contributor to European productivity and competitiveness and it is vital that the technology sectors capitalise on the full potential of the workforce available. To meet the continuing growth in ICT we need to encourage more women to consider ICT related careers. Moreover, we need to promote the challenging and exciting opportunities offered in these fast moving technology sectors.

This report provides evidence of gender imbalances identified in the main activities that shape, create and manage new knowledge, processes, methods and systems. The data indicates that women are significantly under-represented in the **business enterprise sector** where the EU's R&D is mostly intensive. A similar situation is noticeable in senior **academic** positions where future professionals are educated. Similarly, women are under represented in **decision making positions** where science and technology strategies are set, ICT policies are developed, and the agenda for the future is determined.
The statistical data presented cover the educational and professional path of women as well as their involvement in R&D ICT activities and their integration in the labour force.

- **GENDER SEGREGATED STATISTICS OF INTERNET USAGE**

Internet use habits of men and women are similar (Figure 3.1). However, depending on the age group rather than on the gender, the use of ICT is involved in their daily activities to a grater or a lesser degree. These differences are minimal in the 16-24 years age group and only moderate in the 25-54 years age group. However, significantly more men than women use the Internet in the 55-74 years age group.



(Source: Eurostat ICT statistics)

Figure 3-1 Individuals who used Internet at least once a week, by age and gender EU 27 (without MT), 2007(%)

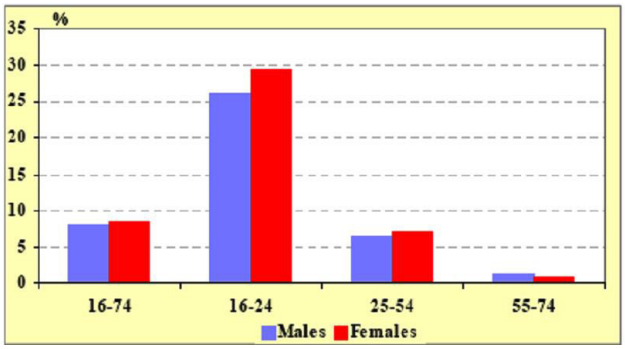
- **METHODS OF OBTAINING IT SKILLS**

Although men and women use the Internet equally frequently, they are likely to use different methods for acquiring ICT skills.

There were no gender differences in the percentage of people acquiring IT skills through formal education or training courses upon the demand of the employer. Females were slightly more likely (by 2%) to obtain IT skills on their own initiative than males. The greatest percentage of females acquired IT skills through informal assistance than by any other method. The biggest percentage of males obtained IT skills through self-study and learning by doing.

- **THE USE OF INTERNET AS TOOL IN EDUCATION ACTIVITIES**

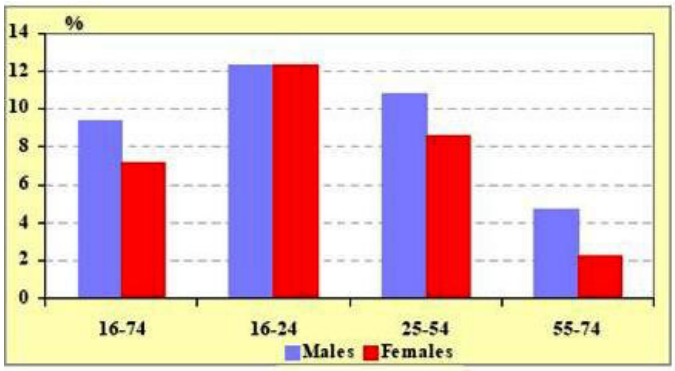
According to the EUROSTAT survey on the use of ICT in households and by individuals (2006), more females than males used the Internet for formalised educational activities (school, university, etc) in the age groups 16 to 24 and 25 to 54 in the EU-27 (Figure 3.4).



(Source: EU-RA from Eurostat)

Figure 3-4 Percentage of individuals (M&F) in the EU-27 who used the Internet, in the last three months for formalised education activities (school, university) (2006) (%)

In contrast, slightly more males than females used the Internet for post educational courses in the EU-27 (Figure 3.5).



(Source: EU-RA from Eurostat)

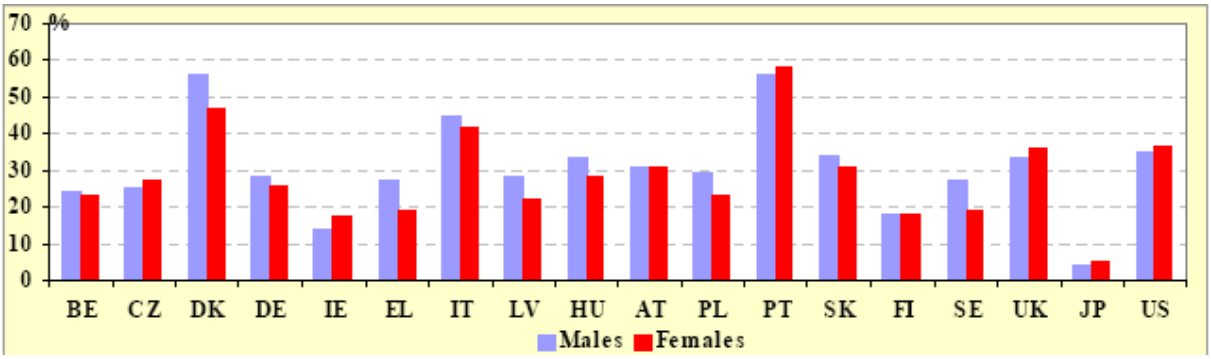
Figure 3.5 Percentage of individuals (M&F) in the EU-27 who used the Internet, in the last three months for post educational courses (2006)

- **THE ATTITUDES OF YOUNG EUROPEAN STUDENTS TOWARDS ICT**

The attitudes of young European students aged 15 confronted with ICT were assessed by the PISA[1] 2003 questionnaire.

Virtually all students aged 15 (99.31%) said that they have already used a computer and the majority (81%) have a computer at home. The aggregated country data reveals some gender specific differences in computer use. The most popular activities[2] are games, looking up information and electronic communication via e-mail or 'chat rooms' while the least frequent are programming and mathematical calculation.

In general, boys use computers more often than girls to **play games,** but also **to look up information** (these differences are significant in all cases except Hungary, Austria and Liechtenstein). Moreover, **programming activities** are far more frequent among boys than among girls (Figure 4.4). As regards the use of the **computer for communication**, however, differences between girls and boys are less clear-cut. There are no significant differences between boys and girls in the use of computers for **obtaining learning material** (Figure 4.2), or in the use of **word processing** (Figure 4.3).

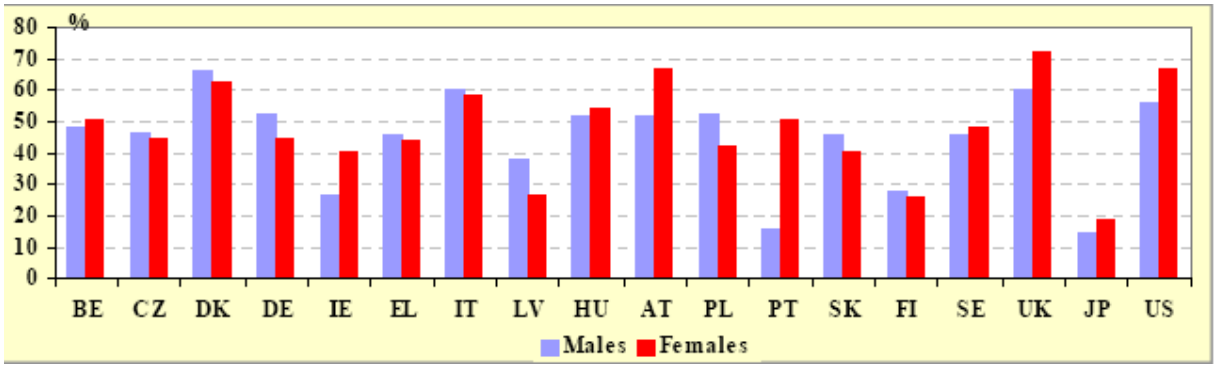


(Source: EU-RA from OECD Pisa 2003 Study)

Figure 4-2 Percentage of male and female 15 years olds (M&F) who use the computer as tool for learning material (2003)

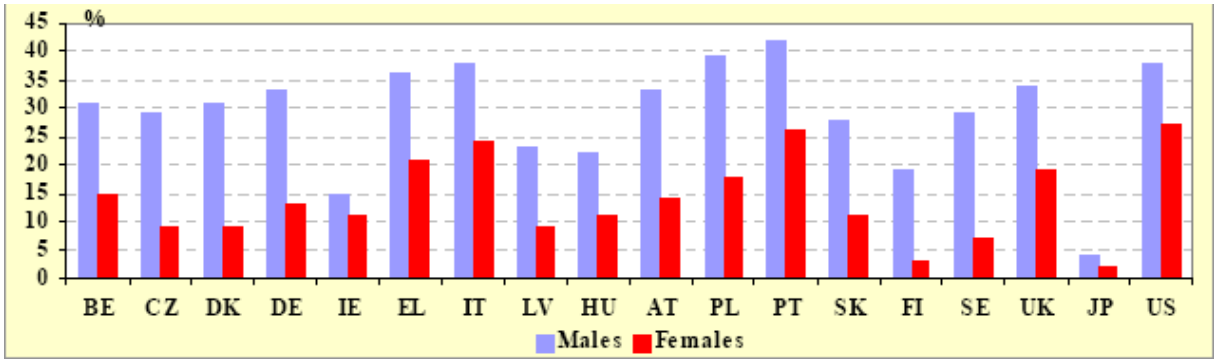
[1] The **Programme for International Student Assessment (PISA)** is an internationally standardised assessment that was jointly developed by participating countries and administered to 15-year-olds in schools.

[2] See "*How boys and girls in Europe are finding their way with Information and Communication Technology*", published by EURIDYCE in October 2005



(Source: EU-RA from OECD Pisa 2003 Study)

Figure 4-3 Percentage of male and female 15 years olds (M&F) who use the computer as tool for word processing (2006)



(Source: EU-RA from OECD Pisa 2003 Study)

Figure 4-4 Percentage of male and female 15 years olds (M&F) who use the computer for programming (2003)

The results of PISA 2003 are in line with the results of the PISA 2006. The latter points out there are no entrenched gender differences in either science performance or attitudes towards science**.** There is also no significant difference in boys' and girls' declared wishes to use science in future studies or jobs. Overall, according to the PISA 2006 Study, boys and girls aged 15 report placing equal value on science.

- **UNIVERSITY EDUCATION**

At university level[3], the discrepancy between the number of men and the number of women opting for science and technology and ICT topics becomes more noticeable.

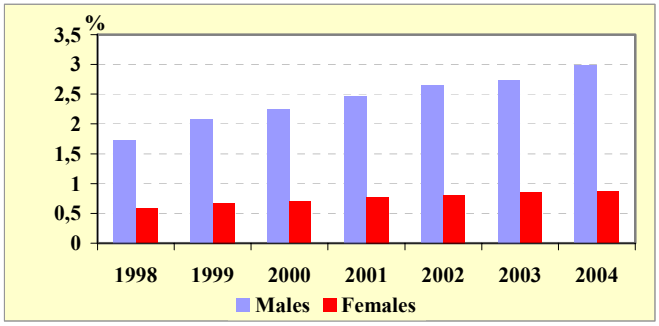
In the majority of countries, women with a level of qualification corresponding to tertiary education outnumber male graduates with respect to the entire reference population**.** Participation rates in tertiary education are generally higher among women than men, except in Liechtenstein and Turkey, in which men outnumber women irrespective of the age group

[3] That is, students at ISCED 5A and 5B level. See Annex 1 for a more detailed definition of "students and graduates" in higher education (tertiary education).

concerned. **Numerical superiority of women is very marked in seven countries, namely Denmark, Estonia, Latvia, Lithuania, Malta, Slovenia and Iceland**.

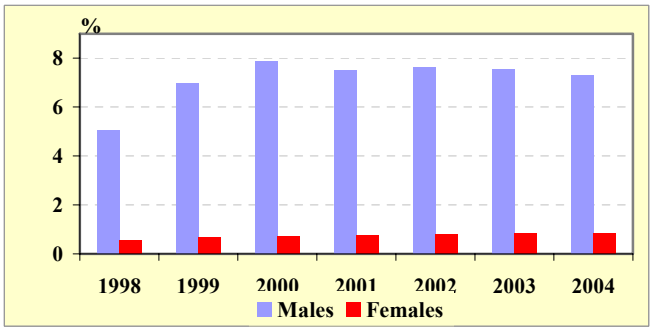
In 8 countries (Bulgaria, the Czech Republic, Germany, Greece, Austria, Slovenia, Finland and Iceland), **there has even been a decrease in the number of men who have studied at a level corresponding to tertiary education**, whereas in the case of women this trend is not apparent anywhere.

Although the trend across tertiary education level shows a general increase in the number of highly educated females, in specific sectors, such as **computing** (Figure 5.1) and **engineering and engineering trades** (Figure 5.2), female graduates are significantly outnumbered by male graduates.



(Source: EU-RA from Eurostat)

Figure 5-1 Percentage of male and female computer science graduates (ISCED 5/6) as a proportion of all graduates, 2007



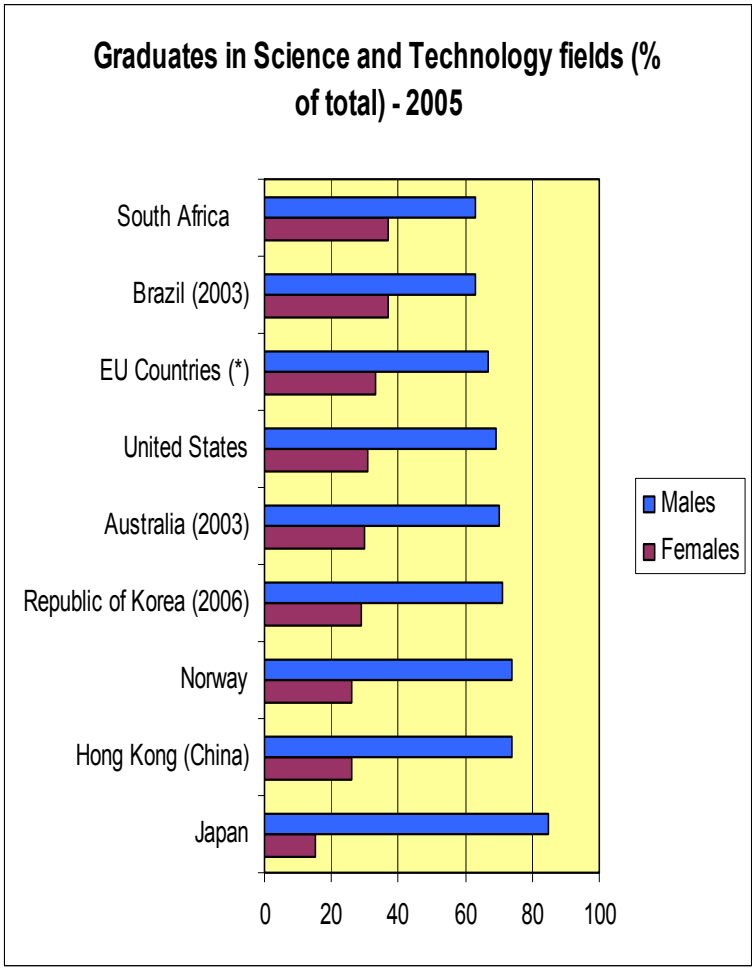
(Source: EU-RA from Eurostat)

Figure 5-2 Percentage of male and female engineering and engineering graduates (ISCED 5/6) as a proportion of all graduates, 2007

In 2004 the percentage of male research graduates decreased to 80% while the percentage of females increased, reaching 20%. In 2004, 78% of computer science graduates were male in the EU 27 as opposed to 22% for females.

The significant imbalance among male and female tertiary education graduates is also underlined by other indicators. A UNESCO study shows that the percentage of female graduates in science and technology in Europe varies from 44% in Estonia to merely 20% in the Netherlands. It is worth noting that in most of the Eastern European countries considered by the UNESCO study (Estonia, Bulgaria, Romania, Poland, Latvia) the percentage of women graduates in science and technology is situated above the EU average, while Austria (23%), Germany (24%) and France (28%) are situated below the EU average of 33%.

At international level, the average percentage of female graduates in the science and technology field in Europe (33%) is third, behind South Africa (37%) and Brazil (37%).



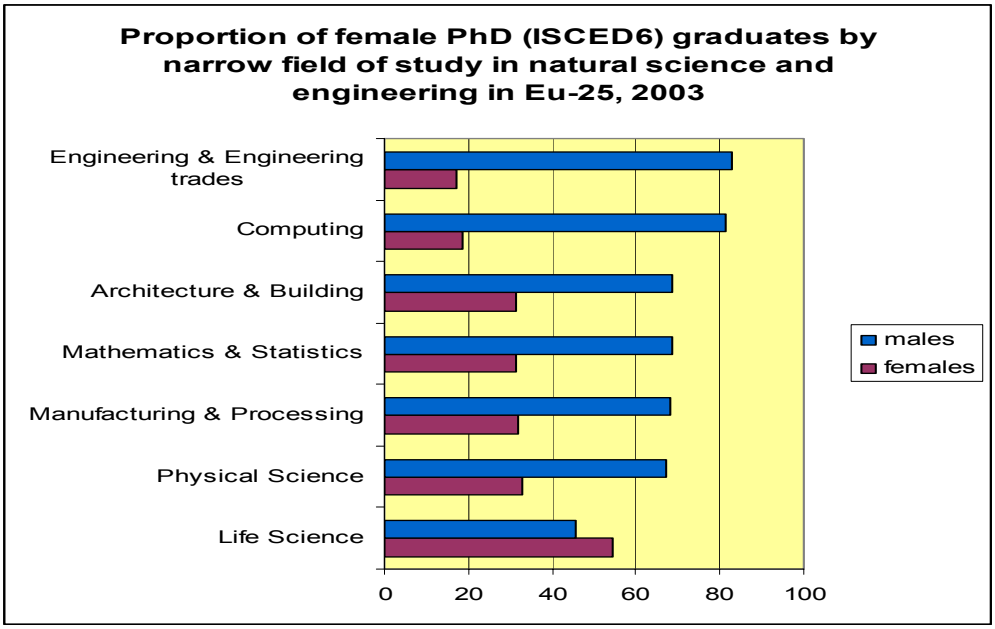
(*) Except Hungary and Luxembourg

Source: UNESCO

Figure 5-6 Percentage of tertiary graduates in the field of engineering and engineering trades broken down by sex, 2005

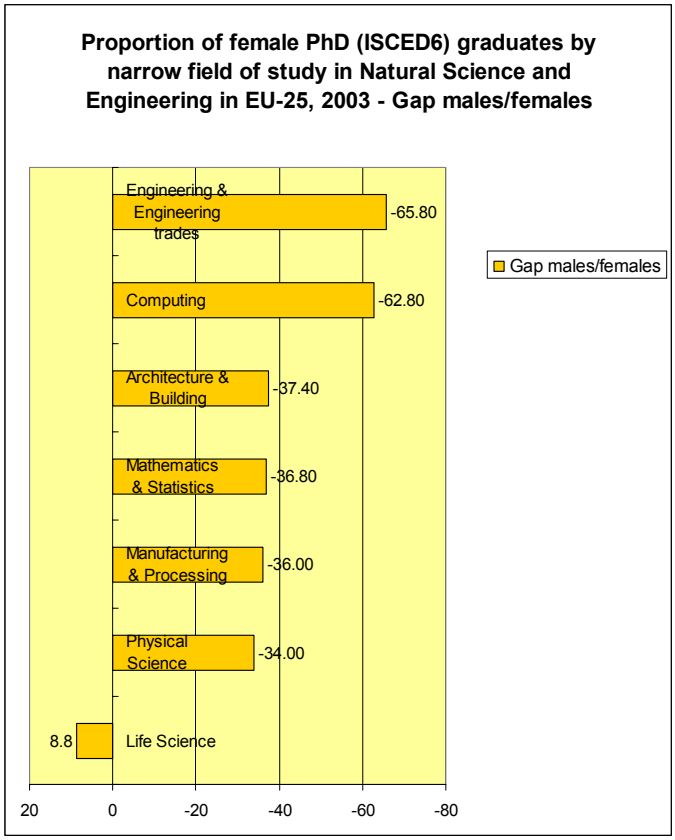
While women are the majority in advanced research degrees (PhD) in natural sciences they are outnumbered by men by more than 60% in engineering and engineering trades (Figure 5.7 and 5.8).

Similarly, a significantly larger percentage of men pursue an advanced research degree in computing (Figure 5.7). The gap between male and female PhD researchers is 65.08% in engineering and 62.8% in computing, while female PhD researchers outnumber men by 8.8% in life sciences.



Source: She Studies 2006

Figure 5-7 Proportion of female PhD (ISCED 6) graduates by narrow field of study in natural sciences and engineering (400& 500 fields) 2003



Source: She Studies 2006

Figure 5-8 Gap males/females PhD (ISCED 6) graduates by narrow field of study in natural sciences and engineering (400& 500 fields) (%) 2003

Country by country analysis of the number of PhD researchers reveals that the gap between male and female PhD researchers in engineering is largest in Germany, where only 6.8% of those involved in PhD research in engineering are women. The gap between male and female PhD researchers in engineering is smallest in Lithuania, where nearly 45% of the PhD researchers are women. However, in Lithuania, all the PhD researchers in computing are men, whereas according to the same data, all PhD researchers in computing in Estonia are women[4]. Women represent the majority of PhD researchers in computing in Latvia as well, outnumbering the men by 33.4%.

- **R&D PERSONNEL**

Women are significantly under represented in RTD activities in the governmental, in the higher education, as well as in the business enterprise sector. Across the various activity sectors, the discrepancy is most significant in engineering and technology research. In Europe, the fewest women work as researchers in the governmental sector in engineering and technology in Malta and the most in Romania. At the international level, figures reveal

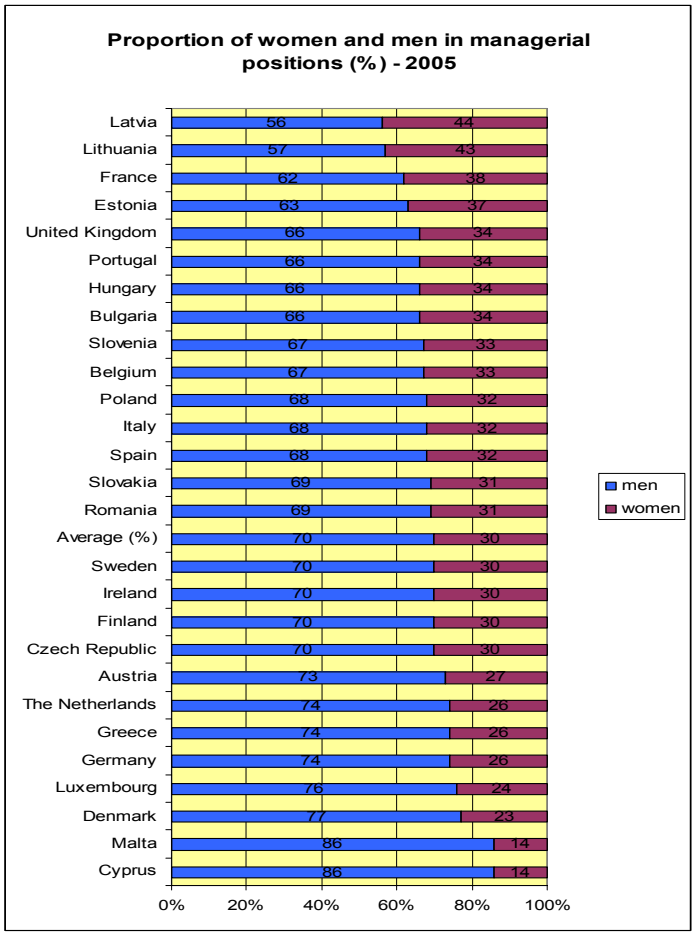
[4] Surprising as these findings may appear to be, they result from the data collected by EUROSTAT. See Table 5.9 in Annex 3 of this Report.

that in the EU-25, the presence of women in RTD (18% in BES[5] and 34% in HES[6]) is much lower than in Russia (42% in BES and 39% in HES), Turkey (25% in BES and 37% in HES) or Norway (19% in BES and 38% in HES).

- **LABOUR FORCE**

In general, the difference between the earnings of women and men earnings was greatest in the high-tech manufacturing sector.

The gender imbalance between men and women in decision making positions is illustrated by the gender distributions of managerial positions (Figure 7.10). On average only 30% of managers in European enterprises are women. Latvia (44%), Lithuania (43%) and France (38%) have the highest percentage of women in managerial positions while Denmark (23%), Malta (14%), and Cyprus (14%) have the lowest percentages of women as managers.



(Source: EURID)

Figure 7-10 Proportion of women and men in managerial positions (2005)

[5] Business Enterprise Sector

[6] High Education Sector

- **CONCLUSIONS**

Despite the increase in the percentage of women in employment in engineering and technology between 1999 and 2003, the gender differences are so persistent that they will most likely not self-correct in the foreseeable future. This report aims to emphasize, in the light of the data presented, the need to design a common policy framework for gender awareness at EU level. The framework should express the commitment of Member States to create the appropriate institutional framework as well as adequate economic incentives to allow and encourage women to pursue a professional career in engineering and technology (and more specifically in ICT) while respecting possible constraints to their professional choices.

2. FORWARD- PURPOSE OF THE REPORT

This report provides an overall picture of the involvement of women in ICT and ICT related fields.

The selected statistical data illustrates the dramatically low participation of women in key **R&D** areas such as engineering and technology as well as in Knowledge Intensive Sectors, areas of crucial importance for the continuing success of Europe as a knowledge economy.

At 15 years old, girls and boys declare similar preferences and show similar competence in science and technology subjects (PISA 2006). However, as adults, a large majority of women choose a professional career sectors other than ICT. This decision is caused by social, economic and personal factors.

The conclusions reached in the report were based on valid statistical evidence collected by prestigious scientific institutions such as OECD and EUROSTAT, as detailed in the Data Sources List (Annex 2). They provide relevant evidence of the extent to which women manifest an interest for an academic and professional career in the computing and engineering fields. Moreover, they show the degree to which they manage to penetrate the higher levels of the professional and decision-making hierarchy in the field.

In selecting the statistics, special attention was dedicated to identifying whether attitudes, skills and interest in pursuing an academic or a professional career in engineering and computer science are gender-determined. To support this gender segregated indicators are presented. Additionally, other socio-economic factors (such as unemployment rates or salary differences) were explored, as they might also justify women's academic and professional choices.

The meaning of the term "ICT sector" is not precisely defined and therefore it can be interpreted in different ways. As a consequence, the available statistics are not specifically targeted at this sector. Data concerning the field of *Computer Science* (commonly recognised as part of ICT) was therefore selected, as well as data regarding broader fields such as *Science and Technology*, *High Tech and Knowledge Intensive Sectors*.

- **The ICT sector** includes the manufacturing and services related to computing and telecommunication equipment and machinery;
- **The Science and technology** field covers natural sciences, engineering and technology, medical sciences, agricultural sciences, social sciences, humanities and other fields;
- **The High tech and knowledge intensive sectors**[7] include high– technology manufacturing, medium level technology manufacturing, knowledge intensive services (KIS) and high technology KIS.

In the original collection of the statistical data selected for the report, various information resources, specific research methods and different size samples were used. For this reason, the report should not be regarded as an in-depth comprehensive study of women in ICT and ICT related fields.
The report should be used for information purposes only.

[7] According to Eurostat /OECD classification, based itself on the ratio of R&D expenditure to GDP or R&D intensity. Since the EU LFS (Labour Force Survey) and SES only allow reporting of NACE at 2 digit level, the aggregations are made by Eurostat as presented.

3. INTRODUCTION

Information and communication technologies (ICT) play a significant role in the socio-economic development of the European Union (EU) and in the achievement of the Lisbon objectives. ICT is a key contributor to European productivity and competitiveness and it is vital that the technology sectors capitalise on the full potential of the available workforce. To meet continuing growth in ICT more women should consider ICT related careers. Women remain a minority among ICT professionals in the EU. In this context, women's intellectual potential and their contribution to society are not being fully utilised. In particular, their participation is very low in Engineering and Technology in general and ICT in particular.

This report assesses the involvement of women in ICT and ICT related fields. It also suggests policy initiatives that could stimulate the involvement of women in ICT research, manufacturing and services. The selected statistical data presented here illustrate the significantly low participation of women in key **R&D** areas such as engineering and technology as well as in Knowledge Intensive Sectors, areas of crucial importance for the continuing success of Europe as a knowledge economy.

The data indicates that women are significantly under-represented in senior **academic** positions where future professionals are educated. A similar situation is noticeable in the **business enterprise sector** where the EU's R&D is most intense. Similarly, women are under represented in **decision making positions** where science and technology strategies are set, ICT policies are developed, and the agenda for the future is determined.

Women manifest similar preferences and competence as their male colleagues in science and technology subjects at age 15 years old. However, a large majority of women choose a professional career in sectors of activity other than ICT. The decision of women to pursue other education and professional paths can be attributed to several social, economic and personal factors.

This report provides evidence of gender imbalances identified in the main activities that shape, create and manage new knowledge, processes, methods and systems. The educational and professional path of women from the start of the undergraduate studies, to the end of graduate studies is examined. Moreover their involvement in ICT R&D activities as well as their integration in the labour force is assessed based on existing statistical data.

In order to better capitalise on the intellectual potential of women and to stimulate their involvement in ICT, several policy directions are suggested where intervention at EU and/or at Member State level could be appropriate.

The meaning of the term "ICT sector" is in general not precisely defined and various interpretations exist. For the purpose of this report, data concerning the field of Computer Science (as part of ICT) was selected, as well as data regarding broader fields such as Science and Technology, Engineering, High Tech Manufacturing and High Tech Knowledge Intensive Sectors.

- The ICT sector includes manufacturing and services relating to computing and telecommunication equipment and machinery[8];
- The Science and technology field covers natural sciences, engineering and technology, medical sciences, agricultural sciences, social sciences, humanities and other fields;
- The High tech and knowledge intensive sectors include high–technology manufacturing, medium level technology manufacturing, knowledge intensive services (KIS) and high technology KIS.

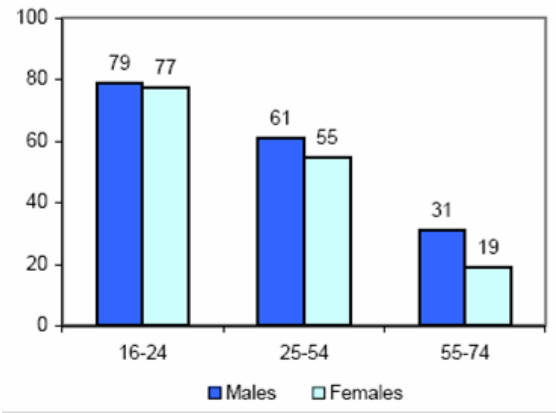
3.1. Gender segregated statistics of Internet usage

The use of ICT has become an essential feature of both economic and social activity across Europe.

The Internet use habits of men and women are similar (Figure 3.1). However, **depending on the age group, rather than on the gender, ICT is used in daily activities to a higher or a lower degree**. These differences are minimal in the 16-24 years age group and only moderate in the 25-54 years age group. However, significantly more men than women use the Internet in the 55-74 years age group.

Furthermore, Figure 3.1 illustrates that most men and women between the ages of 16 to 54 use the Internet at least once a week.

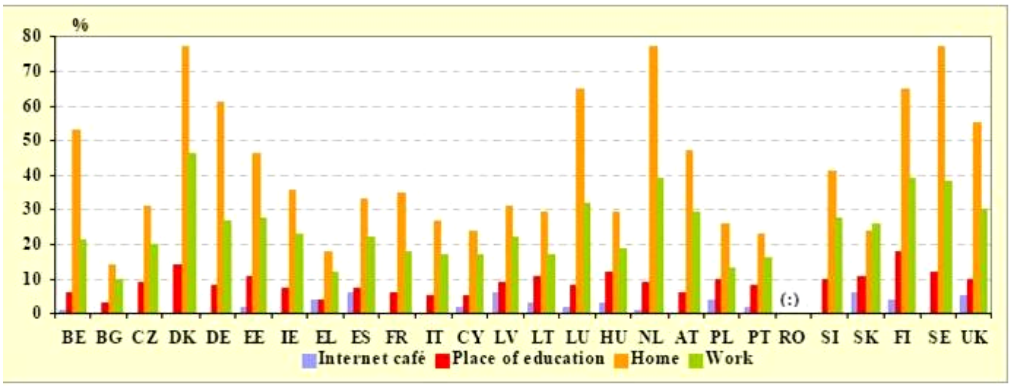
[8] See the Methodology section at the end of the report



(Source: Eurostat ICT statistics)

Figure 3-1 Individuals who used Internet at least once a week, by age and gender EU 27 (without MT), 2007(%)[9]

In 2006, 41% of individuals accessed the internet at home over a period of three months in the EU-27 in contrast to 22% at work and only 8% in a place of education[10] (Figure 3.2). This pattern is repeated at the individual country level. In all EU countries, a greater percentage of individuals accessed the internet at home than in an Internet café, workplace or a place of education.



(Source: EU-RA from Eurostat)

Figure 3-2 Individuals with access to the Internet broken down by place of access (home, workplace of education, Internet café) in the last three months 2006 (%)

Although in different European countries the place of access to the Internet varies, there seem to be only minor gender based differences in the frequency of access in the 16-24 years age group (2%) and moderate differences in the 25-54 years age group (6%).

3.2. Methods of obtaining IT skills

The most frequent method of obtaining IT skills among adult men and women **is by self study (learning by doing) or by the informal assistance** of more experienced peers (Figure 3.3).

[9] "Internet usage in 2007 Households and individuals", 23/2007 EUROSTAT

[10] Segregated statistics, EU-RA (European Research Associates), WP1, 2007

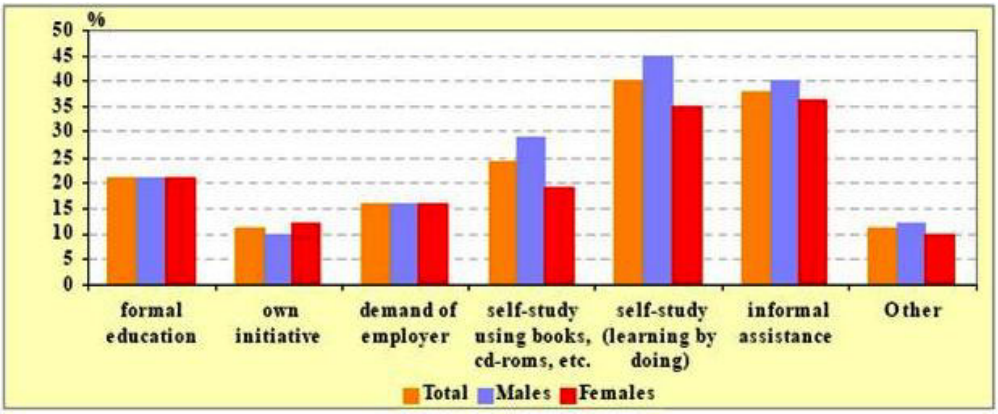
The **least popular method of obtaining IT skills** (Figure 3.3) **was through taking training courses on one's own initiative** (11%)

The biggest percentage of **males** obtained IT skills through self study or learning by doing. In contrast, a greater percentage of **females** acquired IT skills through informal assistance than by any other method.

It is worth noting that there were **no gender differences in the percentage of people choosing to acquire IT skills through formal education or training courses upon the demand of the employer**.

However, for the other types of learning methods there were gender differences to varying degrees. For example, **females were slightly more likely (by 2%) to obtain IT skills on their own initiative than males**.

While these gender differences are very small to be considered significant, more significant gender differences are manifest in the case of self-study.

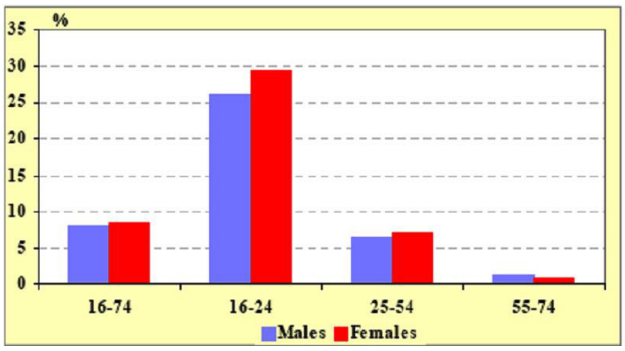


(Source: EU-RA from Eurostat)

Figure 3-3 Percentage of individuals (M&F) in the EU-27 who obtained IT skills by type of methods (2006)

3.3. The use of Internet as tool in education activities

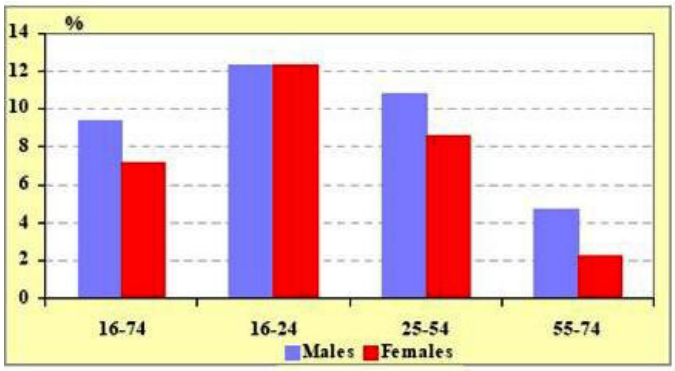
According to the EUROSTAT survey on the use of ICT in households and by individuals (2006), **more females than males used the Internet for formalised educational activities (school, university, etc) in the age groups 16 to 24 and 25 to 54 in the EU-27**. In contrast in the age group 55 to 74 it was the case that slightly more males (0.4%) used the Internet (Figure 3.4).



(Source: EU-RA from Eurostat)

Figure 3-4 Percentage of individuals (M&F) in the EU-27 who used the Internet, in the last three months for formalised education activities (school, university) (2006) (%)

In contrast, slightly more males than females used the Internet for post educational courses in the EU-27 (Figure 3.5). The percentage of individuals who used the Internet to undertake post educational courses was highest for the 16-24 age group and the lowest for the 55-74 age group. There were no gender differences in the age group 16-24 (Figure 3.5). However, in the age groups 25-54, and 55-74 there is a very small gap of respectively 2% and 3% between males and females that used the Internet for post educational courses.



(Source: EU-RA from Eurostat)

Figure 3-5 Percentage of individuals (M&F) in the EU-27 who used the Internet, in the last three months for post educational courses (2006)

The statistics presented above show that in general men and women alike use ICT in their daily life. Although men and women manifest different preferences for acquiring ICT skills, both use the Internet just as frequently. Moreover, women use the Internet to a larger extent for formalised education activities.

4. THE ATTITUDES OF YOUNG EUROPEAN STUDENTS TOWARDS ICT

Assessing women's scientific and technical education as well as their participation in the scientific and technological professions is relevant in order to evaluate women's contribution to the social and economic development of Europe.

As a consequence of the broader use of ICT both at the workplace and in the individual households, it is necessary to assess the development of the ICT skills of young students. Such assessment represents a useful tool to assist the European and national policy makers in designing educational policies. **Future educational policies should integrate technological breakthroughs in the educational curriculum, while taking into account the gender based differences in learning methods or skills**.

The attitudes of young European students aged 15 confronted with ICT[11] were assessed by the PISA[12] 2003 questionnaire. **Gender based differences** became apparent in the **frequency** with **which boys and girls use ICT, the context in which they learn to do so, the types of activity carried out and their self-assessment of their own abilities**.

Virtually all students aged 15 (99.31%) said that they have already used a computer. The majority (81%) stated that they have a computer at home.

The most popular activities[13] are games and looking up information, while the least frequent at this age **are programming and mathematical calculation**. The main activities for which 15-year-olds use computers are games, Internet access to look up information, and electronic communication via e-mail or 'chat rooms'. Over 50% of students say they perform these three activities a few times each week if not almost every day. Next

[11] The ICT skills of 15 years old students were assessed during the PISA study in 2003. A reassessment of the results is scheduled for 2012. Although the results of PISA 2006 are also available, the 2006 assessment regards, among other, the attitudes of male and female 15 years old towards science and technology in general.

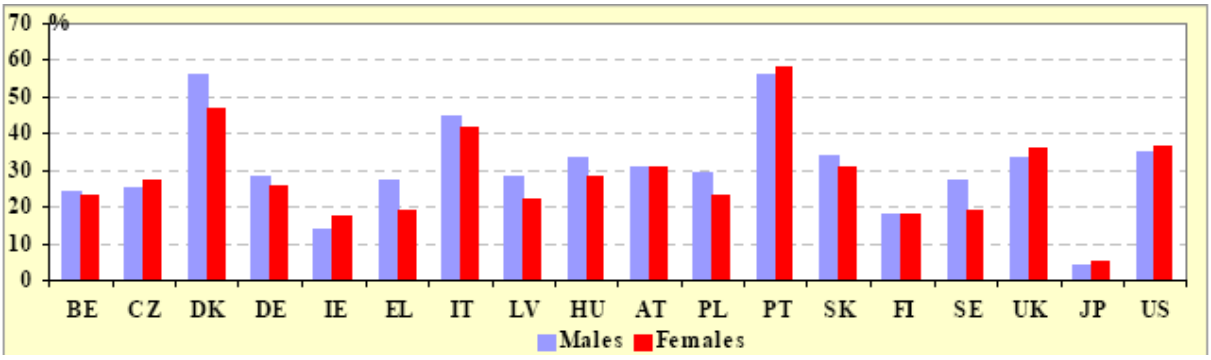
[12] The **Programme for International Student Assessment (PISA)** is an internationally standardised assessment that was jointly developed by participating countries and administered to 15-year-olds in schools. At undergraduate level, PISA is the most comprehensive study assessing how far students near the end of compulsory education have acquired some of the knowledge and skills that are essential for full participation in society. The survey was implemented in 43 countries in the 1st assessment in 2000, in 41 countries in the 2nd assessment in 2003, in 57 countries in the 3rd assessment in 2006 and 62 countries have signed up to participate in the 4th assessment in 2009.

[13] See "*How boys and girls in Europe are finding their way with Information and Communication Technology*", published by EURIDYCE in October 2005

in frequency is the use of software and other Internet applications. Finally, the complex activities of programming and mathematical calculation are far less frequent.

The data for all students from all countries combined reveal a number of gender specific differences. In general, boys use computers more often than girls to play games, but also to look up information (these differences are significant in all cases except Hungary, Austria and Liechtenstein).
As regards the use of the computer for communication, however, differences between girls and boys are less obvious.

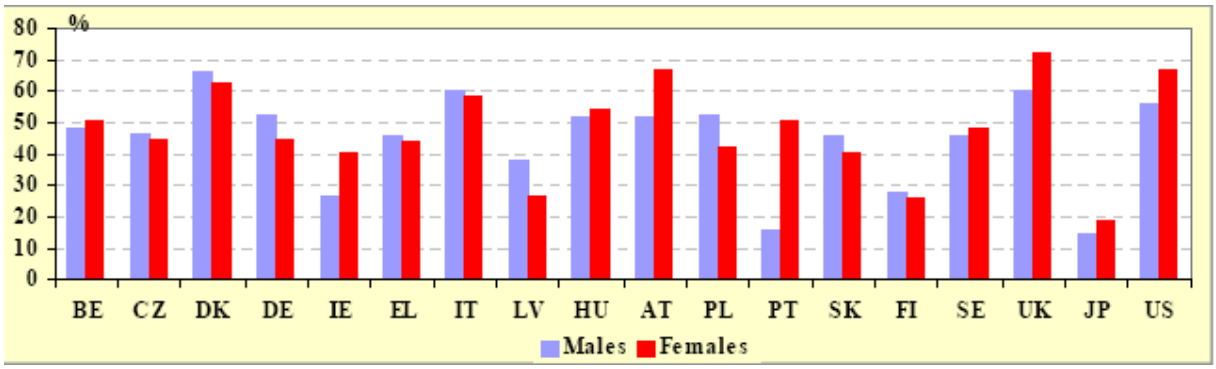
There are no significant differences between boys and girls in the use of computers for obtaining learning material (Figure 4.1).



(Source: EU-RA from OECD Pisa 2003 Study)

Figure 4-1 Percentage of male and female 15 years olds (M&F) who use the computer as tool for learning material (2003)

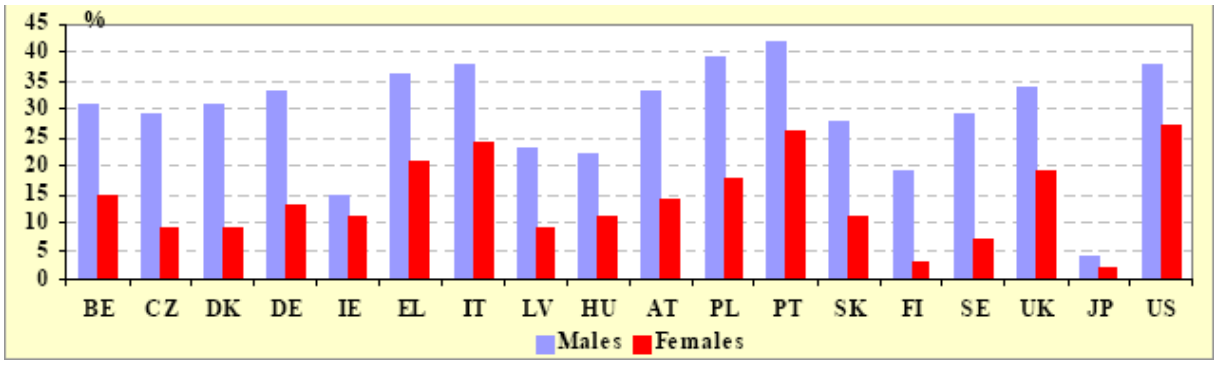
The same observation is valid for the use of **word processing** (Figure 4.2). The use of spreadsheets is slightly more popular among boys although this does not apply to all countries.



(Source: EU-RA from OECD Pisa 2003 Study)

Figure 4-2 Percentage of male and female 15 years olds (M&F) who use the computer as tool for word processing (2006)

Finally, **programming activities** are far more frequent among boys than among girls (Figure 4.3).



(Source: EU-RA from OECD Pisa 2003 Study)

Figure 4-3 Percentage of male and female 15 years olds (M&F) who use the computer for programming (2003)

The results of the PISA 2003 Study, documenting that 15 years olds of both sexes use the computer for educational purposes in similar ways (while relating to it differently for recreational activities), were confirmed by the PISA 2006 study. PISA 2006 also assessed the attitudes of 15 year olds towards science and technology and their school performances in the field.

For a number of countries participating the PISA 2006 study the results suggest **that there are no entrenched gender differences in either science performance or attitudes towards science** In Portugal, Azerbaijan, Israel and Montenegro there are no significant gender differences at all. In Ireland, Mexico, Poland, the Slovak Republic and Spain, as well as in the partner countries Argentina, Brazil, Colombia, Croatia, Estonia, Indonesia, Romania, the Russian Federation, Serbia, Tunisia and Uruguay, there are moderate gender differences, be it performance-related or attitudinal.

When choosing the subject they would like to continue to study in higher education, students' choices are likely to be differently motivated. Subjects may be useful because they open up interesting career opportunities or students may just prefer to study subjects that they enjoy learning. Gender differences on this topic science are most prominent in Germany, Iceland, Japan, Korea, the Netherlands and the United Kingdom, and in the partner countries/economies Chinese Taipei, Hong Kong-China and Macao-China.

There are **no overall differences in males' and females' inclination to use science in future studies or jobs**. Overall, according to the PISA 2006 Study, at age 15, **males and females report placing equal value on science**.

Although in the OECD countries slightly higher percentages of males are more likely to have reported a high general value of science, these differences are only significant in a minority of countries (in Iceland, France, the United Kingdom, Denmark and Sweden). The Czech Republic is the only participating country where females reported higher levels of motivation to learn science.

5. TERTIARY EDUCATION IN ICT- PARTICIPATION RATES OF WOMEN

University graduates provide an indicator of a country's potential for assimilating, developing and diffusing advanced knowledge and supplying the labour market with highly skilled workers.

At 15 years old, both males and females show similar level of interest for science and technology topics. No statistically significant gender differences in either science performance or attitudes towards science can be documented according to the PISA 2006 Study. **However, at under-graduate level, the discrepancy between the number of men and the number of women opting for science and technology and ICT topics becomes more noticeable**.

In the majority of countries, **women with a level of qualification corresponding to tertiary education outnumber male graduates with respect to the entire reference population** (comprising all those aged between 25 and 64)[14]. This trend is especially marked in Bulgaria, Estonia, Latvia, Lithuania, Portugal, Slovenia, Finland and Sweden, in which the ratios of female to male graduates are highest.

Regarding differences between the sexes, **participation rates in tertiary education are generally higher among women than men, except in Liechtenstein and Turkey**, where men outnumber women irrespective of the age group concerned. The **numerical superiority of women is very marked in seven countries, namely Denmark, Estonia, Latvia, Lithuania, Malta, Slovenia and Iceland**. However, in certain countries (Ireland, Greece, Spain, Cyprus and the Netherlands), this female majority becomes a male majority from the age of 24 onwards[15].

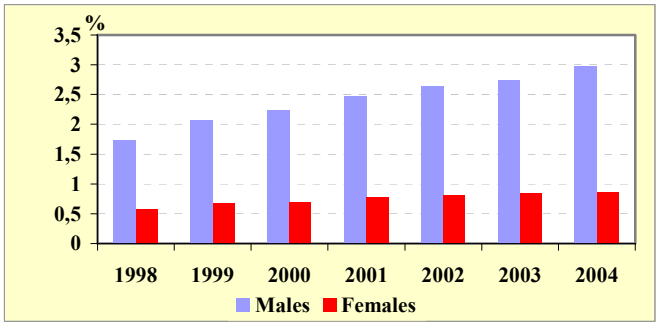
The increase in the percentage of women with a tertiary education qualification comparing the 20-29 age group with the 35-64 one is far higher than the corresponding increase for men, except in Latvia and Sweden. In 8 countries (Bulgaria, the Czech Republic, Germany, Greece, Austria, Slovenia, Finland and Iceland), **there has even been a decrease in the**

[14] **Key Data in Higher Education**, Eurydice& Eurostat 2007, page 156

[15] *See* ***Key Data in Higher Education***, Eurydice& Eurostat 2007

number of men who have studied at a level corresponding to tertiary education, whereas in the case of women this trend is nowhere[16] apparent.

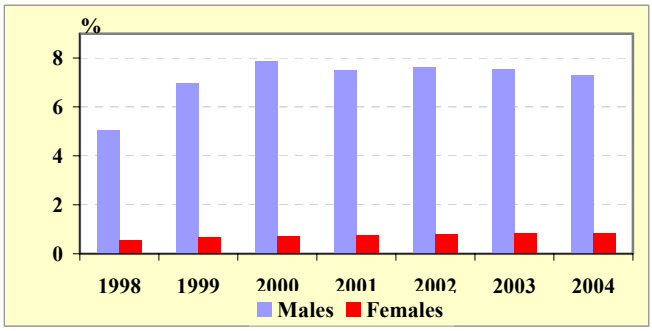
Although the trend across tertiary education level shows a general increase in the number of highly educated females, in specific sectors, such as **computing** (Figure 5.1) and **engineering and engineering trades** (Figure 5.2), female graduates are significantly outnumbered by male graduates.



(Source: EU-RA from Eurostat)

Figure 5-1 Percentage of male and female computer science graduates (ISCED 5/6) as a proportion of all graduates, 2007

In the EU-27, the proportion of male and female **engineering and engineering trades** graduates as a percentage of all higher education graduates increased in the period 1998 to 2004 (Figure 5.2). The increase was greater for males (2.3%) than for females (0.3%). From 1998 to 2004, the gap between males and females increased by 1% reaching 5.5%.



(Source: EU-RA from Eurostat)

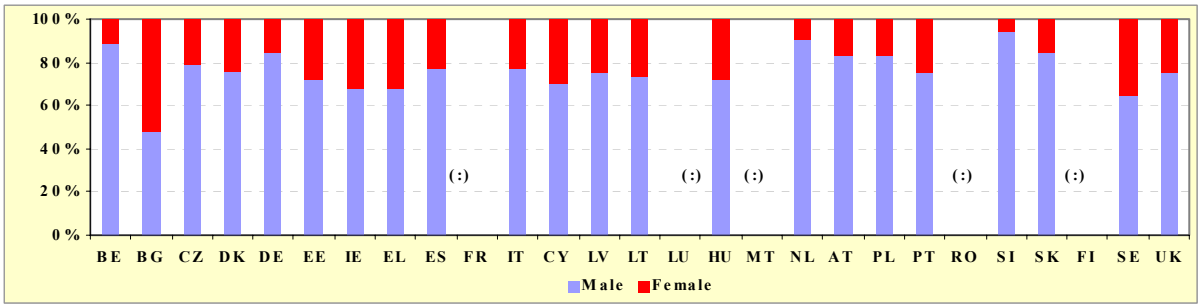
Figure 5-2 Percentage of male and female engineering and engineering graduates (ISCED 5/6) as a proportion of all graduates, 2007

In 2004, **78% of computer science research graduates were male in the EU 27** as opposed to 22% for females. Since the late 1990s the proportion of female computer science graduates in the EU-27 has slightly decreased from 25 percent in 1998 to 22 percent in 2004. In 2004, males made up 81 percent of all engineering and engineering trades

[16] idem

graduates in the EU-27. The proportion of female engineering and engineering trades graduates actually increased from 15 to 19 percent in the EU-27 from 1998 to 2004.

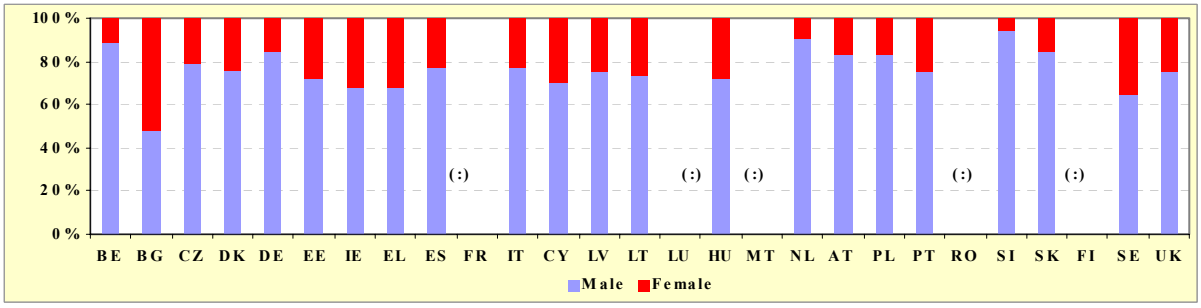
In 2004 the percentage of **male computer science** graduates varied between countries from **6% in Slovenia, to 52% in Bulgaria** (Figure 5.3)



(Source: EU-RA from Eurostat)

Figure 5-3 Percentage of tertiary graduates in the field of computer science broken down by sex, 2004

The percentage of **male engineering** and engineering trades graduates also varied between countries from **97% in Slovak Republic** to **66% in Bulgaria** (figure 5.4)



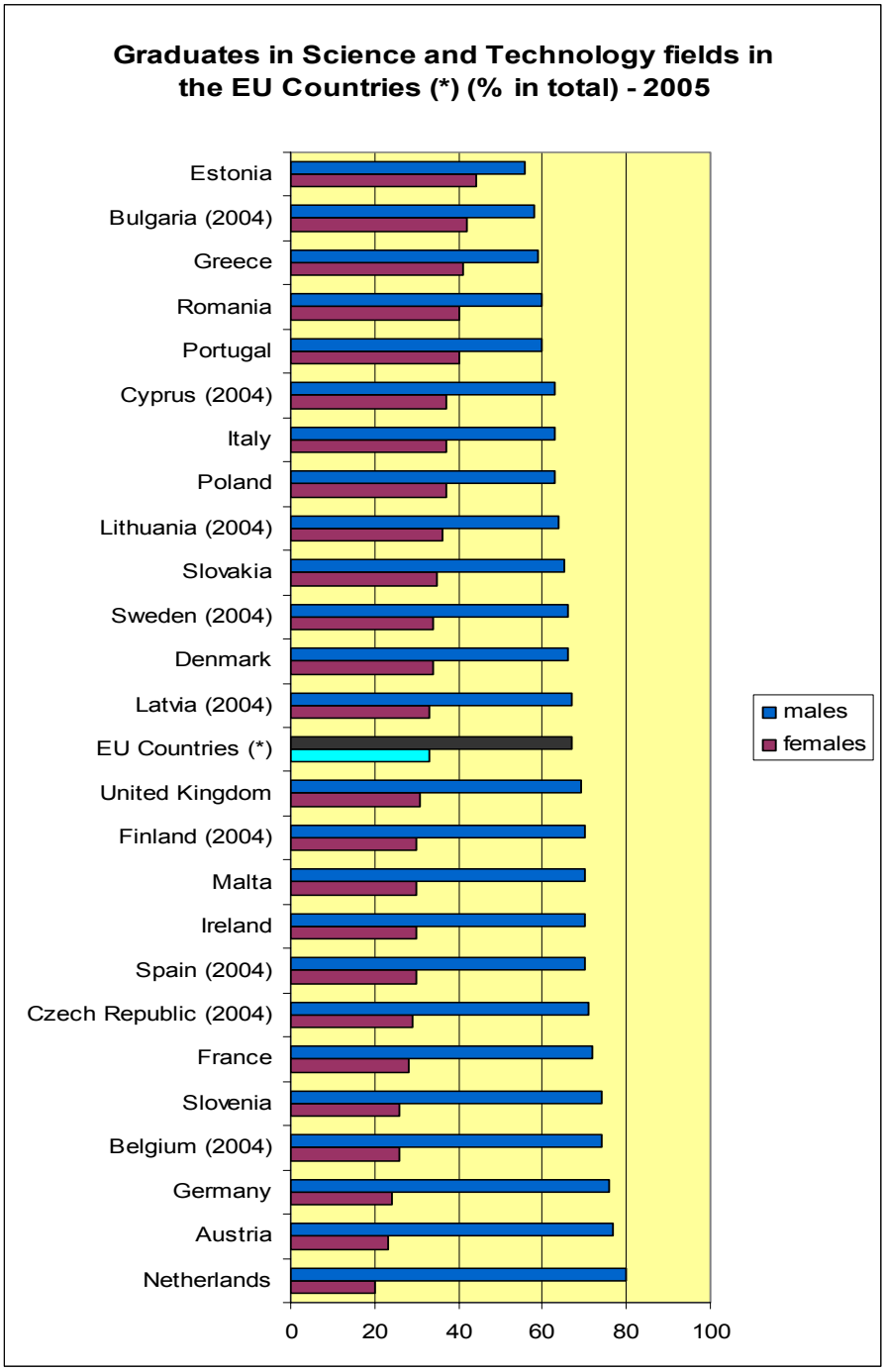
(Source: EU-RA from Eurostat)

Figure 5-4 Percentage of tertiary graduates in the field of engineering and engineering trades broken down by sex, 2004

The significant imbalance among male and female tertiary education graduates is underlined also by other indicators. UNESCO studies[17] show that the **percentage of female graduates in science and technology in Europe** varies from 44% in Estonia to a mere 20% in the Netherlands. It is worth noting that **in most of the Eastern European countries** considered by the UNESCO study (Estonia, Bulgaria, Romania, Poland, Latvia) **the percentage of women graduates in science and technology is above the EU average,** while Austria (23%), Germany (24%) and France (28%) are below **the EU average of 33%.**

17 Global Education Digest 2007, Comparing Education Statistics across the World, UNESCO Institute for Statistics, Montreal, 2007

The average percentage of female graduates in the science and technology field in Europe (33%) is the third at global level[18], with South Africa (37%) and Brazil (37%) in the lead (Figure 5.6). In the United States (31%), Australia (30%), Norway (26%) and Japan (15%) the percentage of female tertiary graduates in science and technology is situated below the European average.

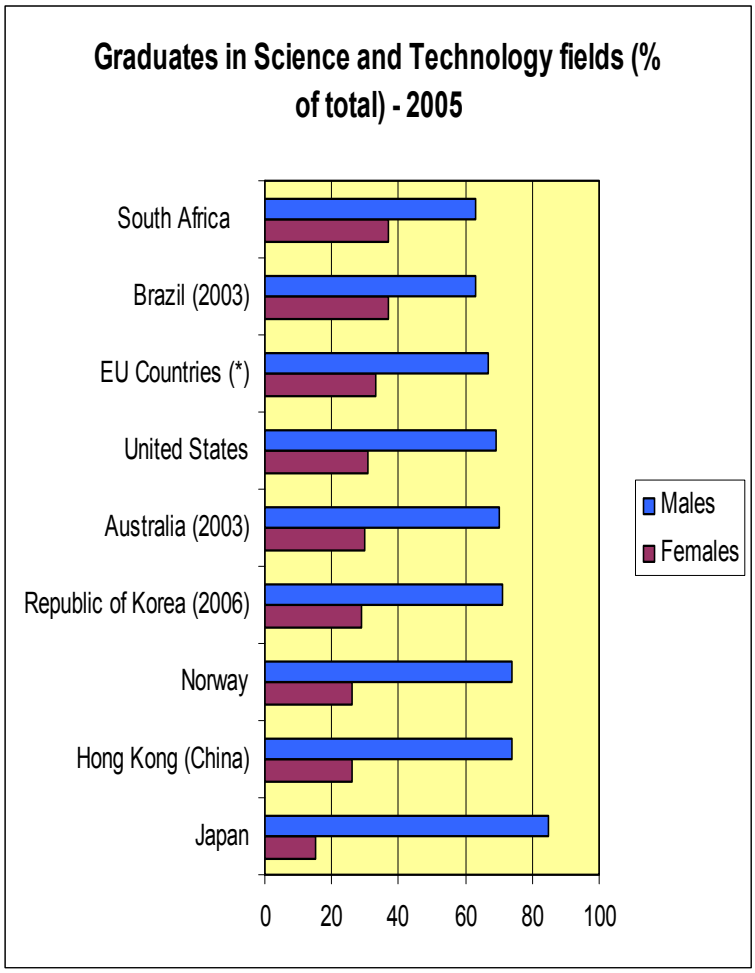


(*) Except Hungary and Luxembourg

Source: UNESCO

18 idem

Figure 5-5 Percentage of total graduates in science and technology trades in the EU countries, 2005



(*) Except Hungary and Luxembourg

Source: UNESCO

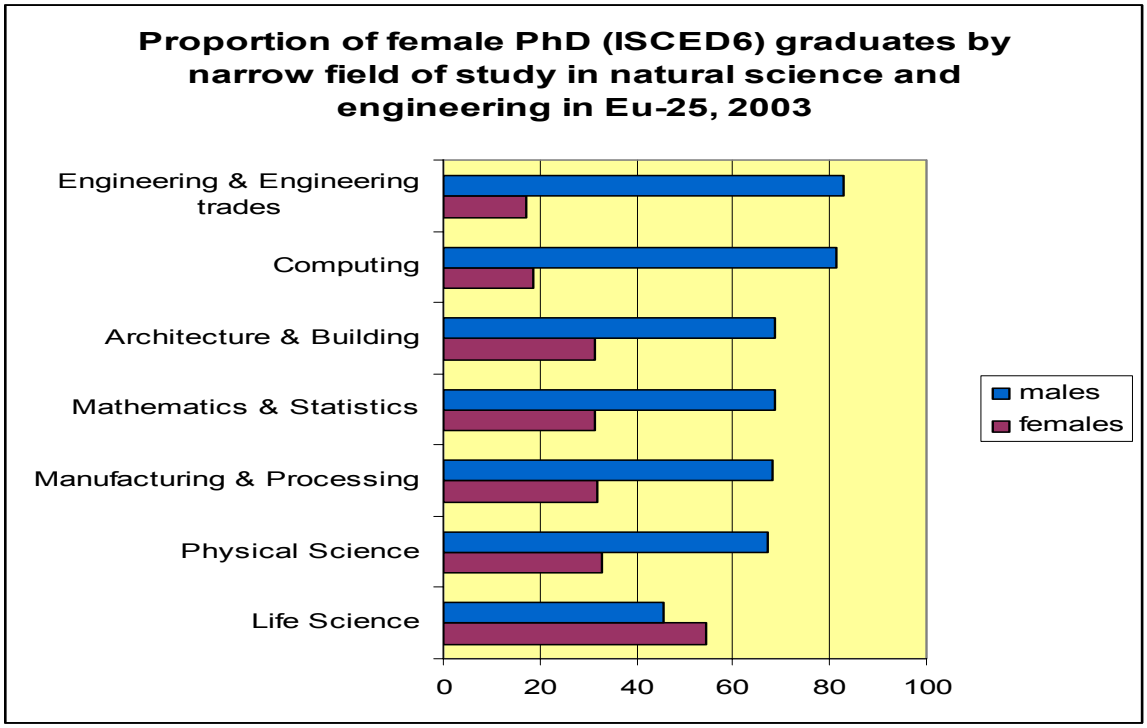
Figure 5-6 Percentage of tertiary graduates in the field of engineering and engineering trades broken down by sex, 2005

While overall the **graduation rates of females equal or exceed those of males in most OECD countries**, **women are still under represented in advanced research programmes**. According to OECD statistics[19], **women are less likely to graduate at doctoral level except in Portugal, Italy and Iceland**; in Japan and Korea, women receive less than a quarter of all doctorates awarded. They are even less likely to obtain degrees in science and engineering. **Women account on average for more than two-thirds of OECD degrees in the humanities, arts, education, health and welfare, but for less than one-third in mathematics and computer science, and less than one-quarter in engineering.**

[19] OECD Science, Technology and Industry Scoreboard 2007. Innovation and performance in the global economy

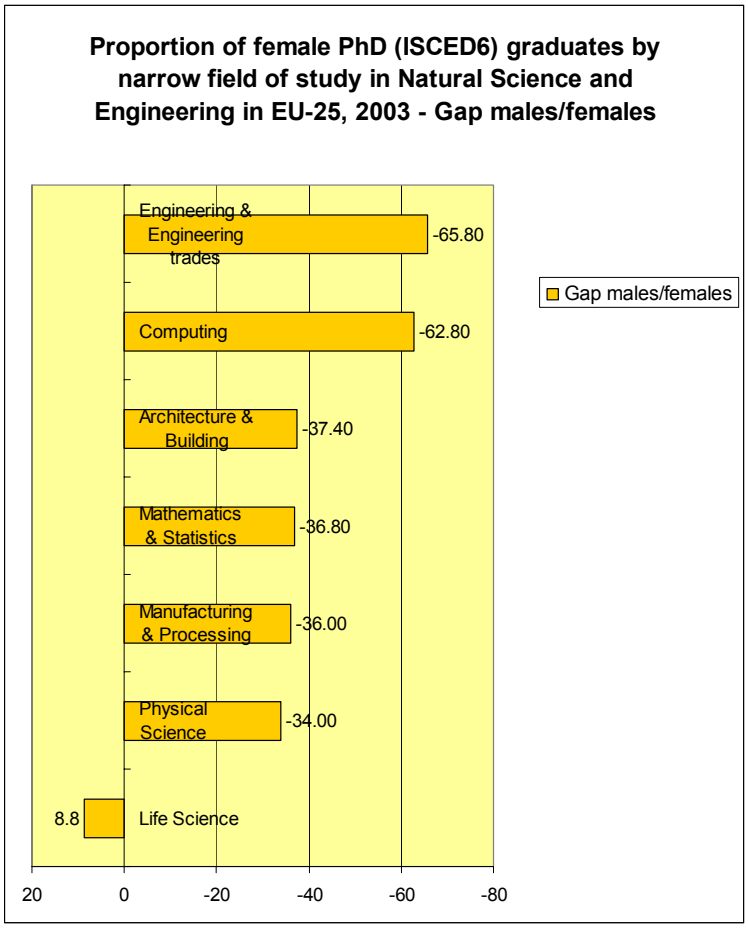
Around 80% of science and engineering university degrees in Japan, the Netherlands and Switzerland are awarded to men.

The same conclusion can be reached by analysing the data provided by EUROSTAT in 2006. While **women are the majority in advanced research degrees (PhD) in natural sciences** they are **outnumbered by men by more than 60% in engineering and engineering trades** (Figure 5.7 and 5.8). Similarly, a significantly larger percentage of men will pursue an advanced research degree in Computing (Figure 5.7). **The gap between male and female PhD researchers is 65.08% in engineering and 62.8% in Computing, while female PhD researchers outnumber men by 8.8% in life sciences.**



Source: She Studies 2006

Figure 5-7 Proportion of female PhD (ISCED 6) graduates by narrow field of study in natural sciences and engineering (400& 500 fields) 2003

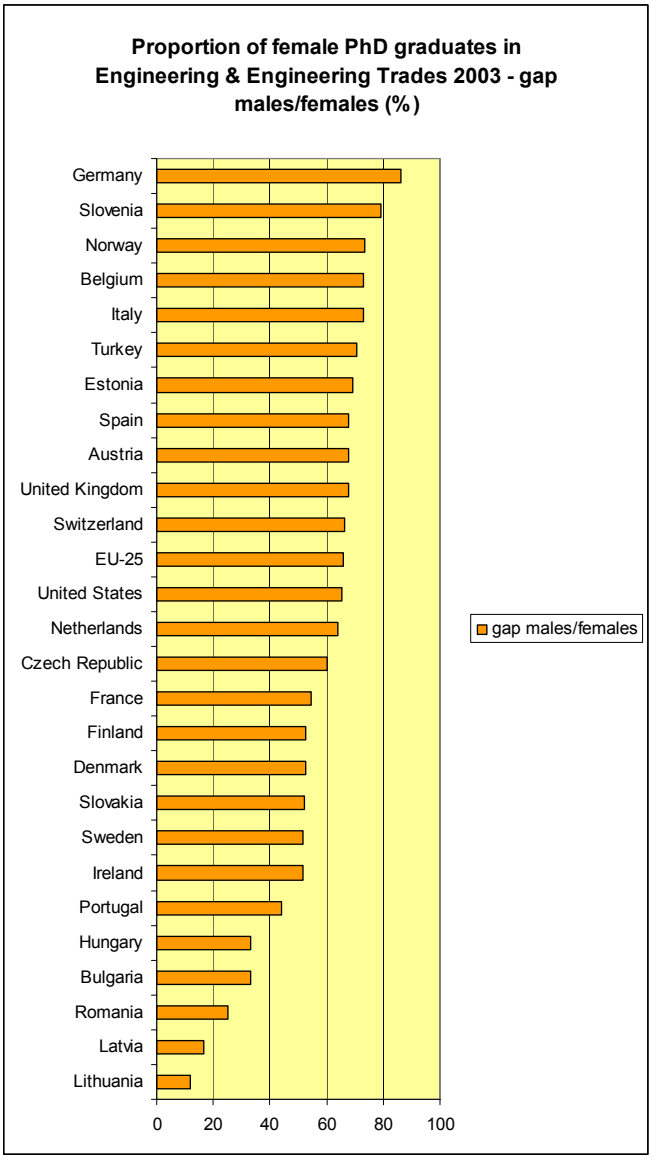


Source: She Studies 2006

Figure 5-8 Gap males/females PhD (ISCED 6) graduates by narrow field of study in natural sciences and engineering (400& 500 fields) (%) 2003

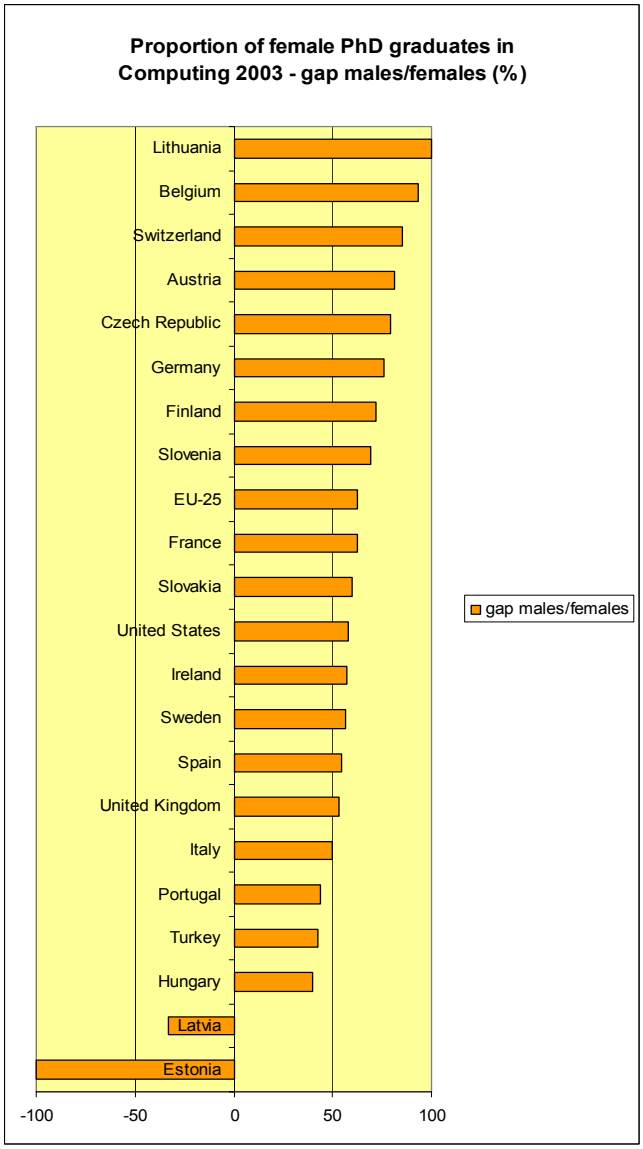
Country analysis of the number of PhD researchers reveals that **the gap between male and female PhD researchers in engineering is largest in Germany**, where only 6.8% of those involved in PhD research in engineering are women. **The gap between male and female PhD researchers in engineering is smallest in Lithuania,** where nearly 45% of the PhD researchers are women. However, in **Lithuania, all the PhD researchers in computing are men**, whereas, **all PhD researchers in computing in Estonia are women[20]. Women represent the majority of PhD researchers in computing in Latvia as well, outnumbering the men by 33.4%.**

[20] Surprising as these findings may appear to be, they result from the data collected by EUROSTAT. See Table 5.9 in Annex 3 of this Report.



Source: She Studies 2006

Figure 5-9 Gap males/females PhD (ISCED 6) graduates in engineering and engineering trades and computing (400& 500 fields) (%) 2003



Source: She Studies 2006

Figure 5-10 Gap males/females PhD (ISCED 6) graduates in engineering and engineering trades and computing (400& 500 fields) (%) 2003

These variations can be better interpreted by looking into general trends in the behaviour of men and women in higher education[21].

In fields such as science, mathematics, computing and engineering, manufacturing and construction, men remain in the majority; the opposite occurs in the humanities and arts, education, and health and welfare[22].

[21] Key Data on Higher Education in Europe 2007 Edition

[22] Key Data on Higher Education in Europe 2007 Edition, Figure B7

The very low number of female graduates at tertiary level may explain why **women staff recruited into the tertiary education teaching force remains lower than that of men**[23]. In general, **they are younger than their male colleagues**.

Certain fields are largely **male dominated**. In the EU, this applies to '**science**[24]**, mathematics and computing**' (almost two-thirds of enrolments are men) and above all '**construction**' (over three-quarters). This majority is apparent in all countries, except in the field of 'science'. Bulgaria, Italy, and Portugal achieve a balanced participation of men and women in 'science, mathematics and computing', while **in Romania women outnumber men in this field**.

[23] Key Data on Higher Education in Europe 2007 Edition, Figure C13

[24] The International Standard Classification of Education (ISCED-97) includes also **natural sciences, medical sciences, agricultural sciences, social sciences** in the broad definition of the Science field**.** See Annex 1 of this Report for a more detailed explanation.

6. R&D PERSONNEL

The EU goals in Research and Development, as set by the Lisbon summit strategy, are to reach by 2010 at least 3% R&D intensity in the EU, and to have two thirds of R&D expenditure financed by the business enterprise sector.

In 2004, 1.49% of the total EU-25's employment was R&D personnel. At the national level, the highest shares of R&D personnel in total employment were observed in Finland (3.24%) followed by Sweden and Iceland with both 2.51%[25].

The number of personnel engaged in R&D in OECD economies is directly linked to their R&D effort. In Finland, Sweden and Denmark, over 15 R&D personnel per 1 000 employees contribute to R&D activities, well above the EU average of 10 per 1 000. Japan, Luxembourg, France and New Zealand also employ a higher than average ratio of R&D personnel (over 14 per 1 000)[26].

In the vast majority of OECD countries, the number of researchers rises at a faster rate than the number of total R&D personnel. This is partly due to the increased number of postgraduate students who perform R&D and are counted as researchers in the higher education sector. Greater use of new information technologies in R&D activities may also explain the need for fewer technicians and support staff per full-time equivalent researcher.

At world level, the number of researchers has increased the most in China (albeit from a small base), Finland and New Zealand, with average annual growth rates of close to 9%, more than double the OECD average of 3.2%.

6.1. Women in research activities

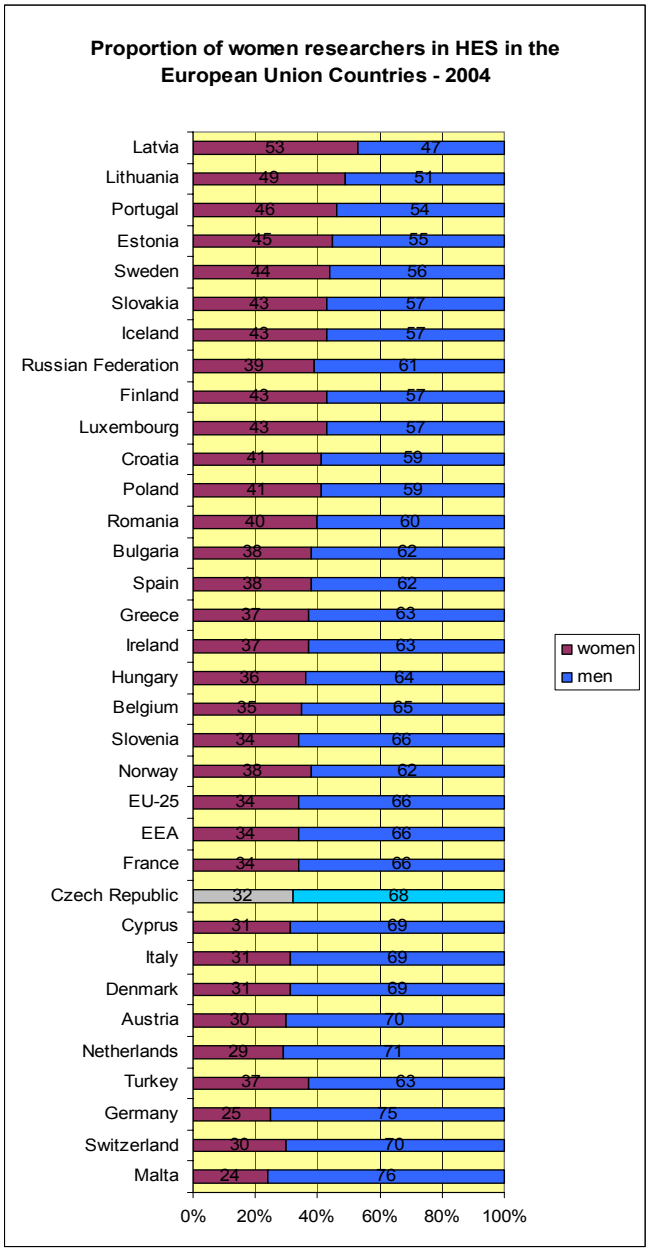
Research appears to be still a predominantly male domain: in 2004, women working in R&D were in minority (28%) in the EU-25. More than half of researchers were women only in Latvia (53%). **The share of women among researchers (18%) was lowest in the business enterprise sector (BES). By contrast, in the governmental (GOV) and high education sector (HES) approximately one researcher in three was a woman.**

[25] Science, Technology and Innovation in Europe, EUROSTAT 2007

[26] OECD Science, Technology and Industry Scoreboard; Innovation and performance in the global economy 2007

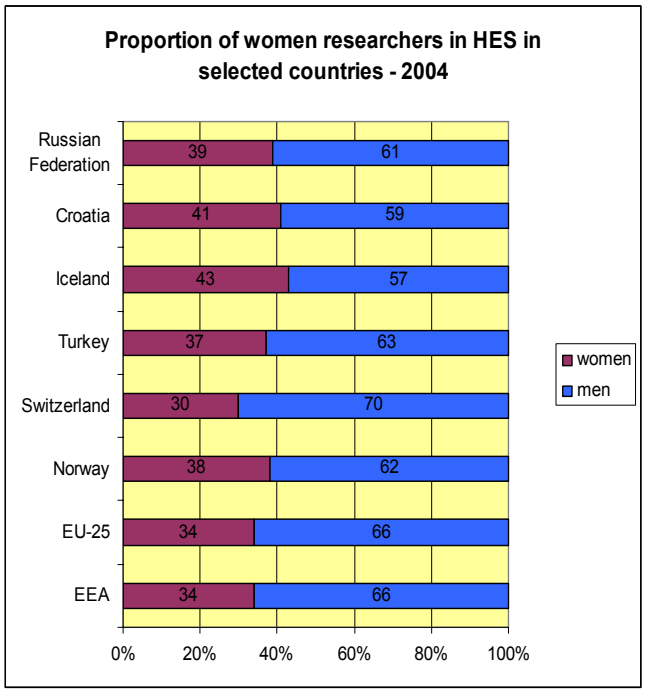
The **under-representation of women in R&D** activities has gained the attention of policy makers. In most OECD countries for which data are available, women represent between 25% and 35% of total researchers. **While women represent over 40% of researchers in the higher education sector, in Portugal, Sweden and the Slovak Republic, they represent less than 30% in the Netherlands and Germany and Malta.**

The low share of women researchers is partly a reflection of the uneven distribution of women among the various sectors of R&D activity. With the exception of Denmark, South Korea, Luxembourg and the Russian Federation, women researchers work mainly in the higher education sector (HES) (Figure 6.1 and 6.2)**; their participation is particularly low in the business enterprise sector (BES)** (Figures 6.3 and 6.4)**.**



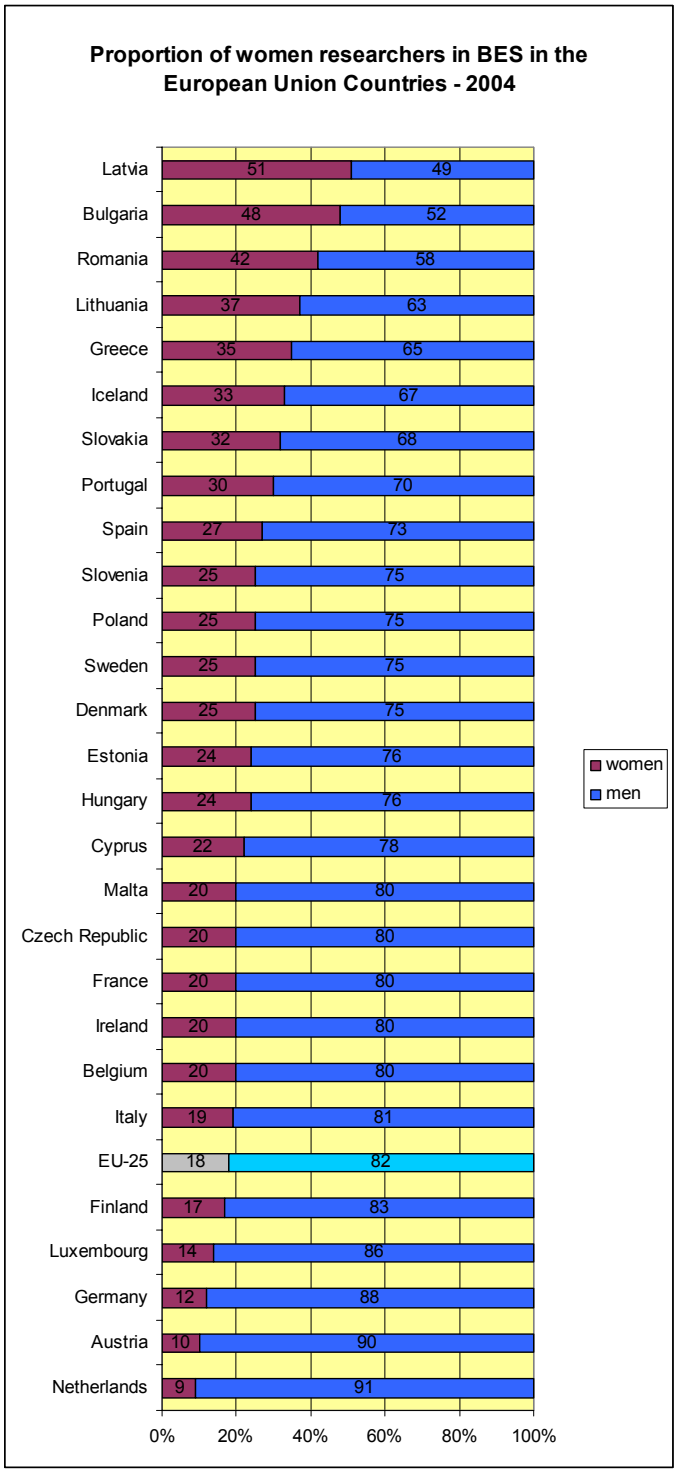
(Source: Eurostat)

Figure 6-1 Percentage of women researchers in the higher education sector in EU 24



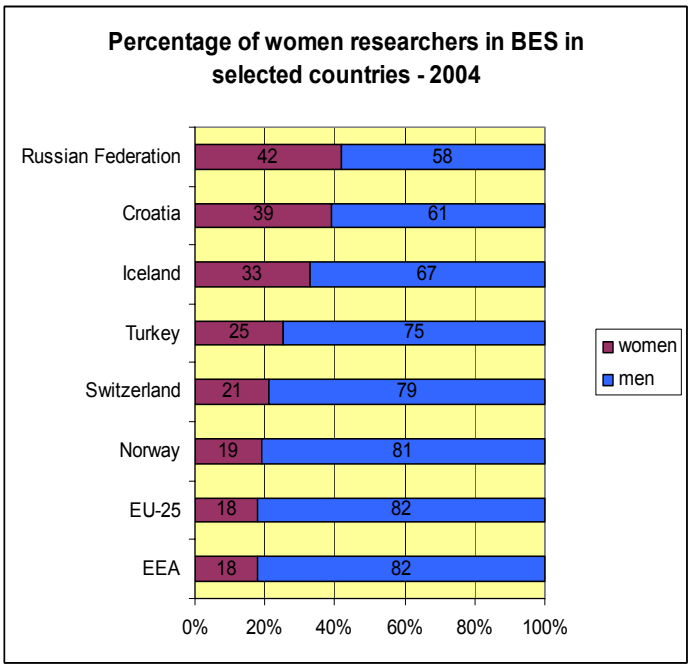
(Source: Eurostat)

Figure 6-2 Percentage of women researchers in the higher education sector in selected countries (2004)



(Source: Eurostat)

Figure 6-3 Percentage of women researchers in the business enterprise sector in EU (2004)



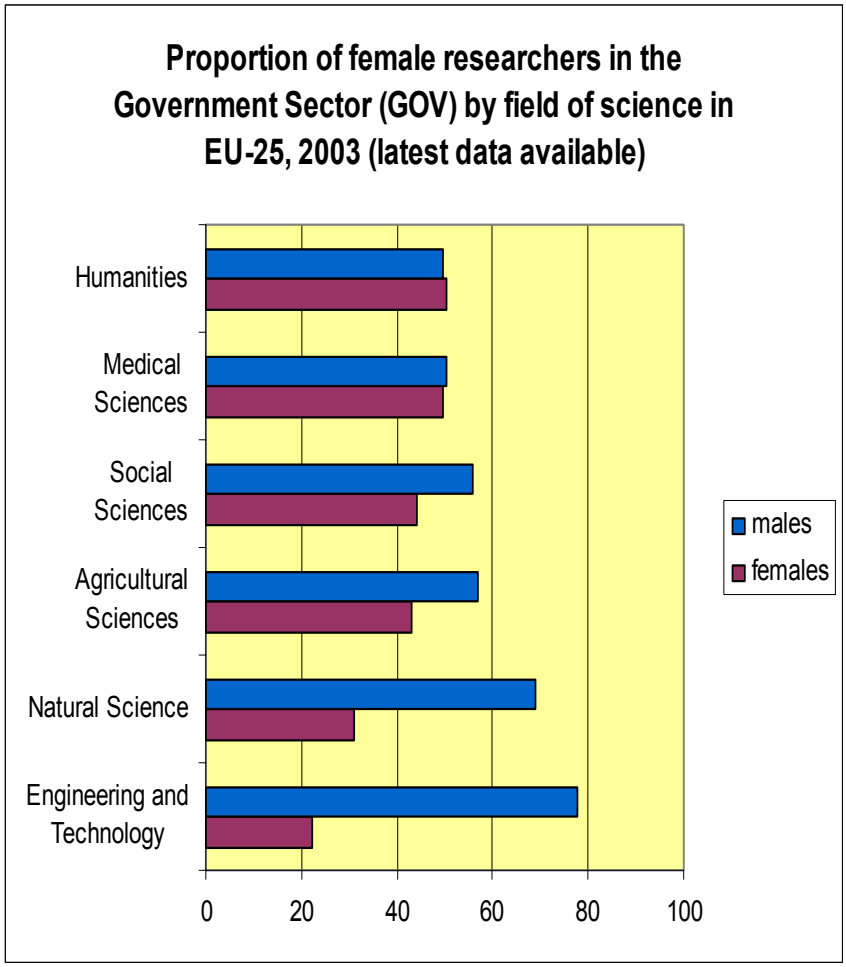
(Source: Eurostat)

Figure 6-4 Percentage of women researchers in the business enterprise sector in selected countries (2004)

6.2. Women in engineering and technology R&D

The data presented above illustrate the discrepancy between the proportion of men and the proportion of women involved in R&D activities by country across sectors of activity.

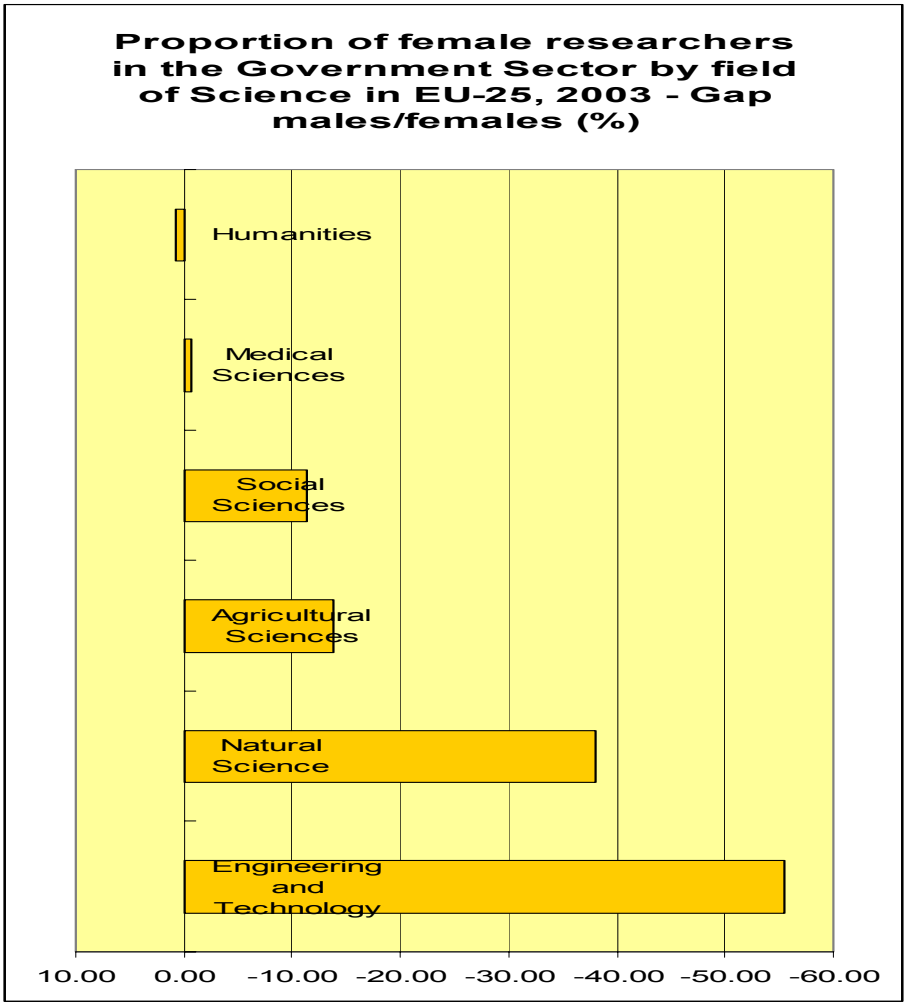
The same discrepancy is revealed when examining the proportion of female researchers in the Government Sector segregated by field of activity (Figure 6.5)[27]. **The largest gap between male and female researchers in Europe is present in the engineering and technology fields (22.3% women) whereas the proportion of women (50.4%) slightly exceeds that of men in humanities research** (Figure 6.6)



(Source: She Figures 2006)

Figure 6-5 Percentage of female researchers in the Government sector by field of science in EU-25 (2003)

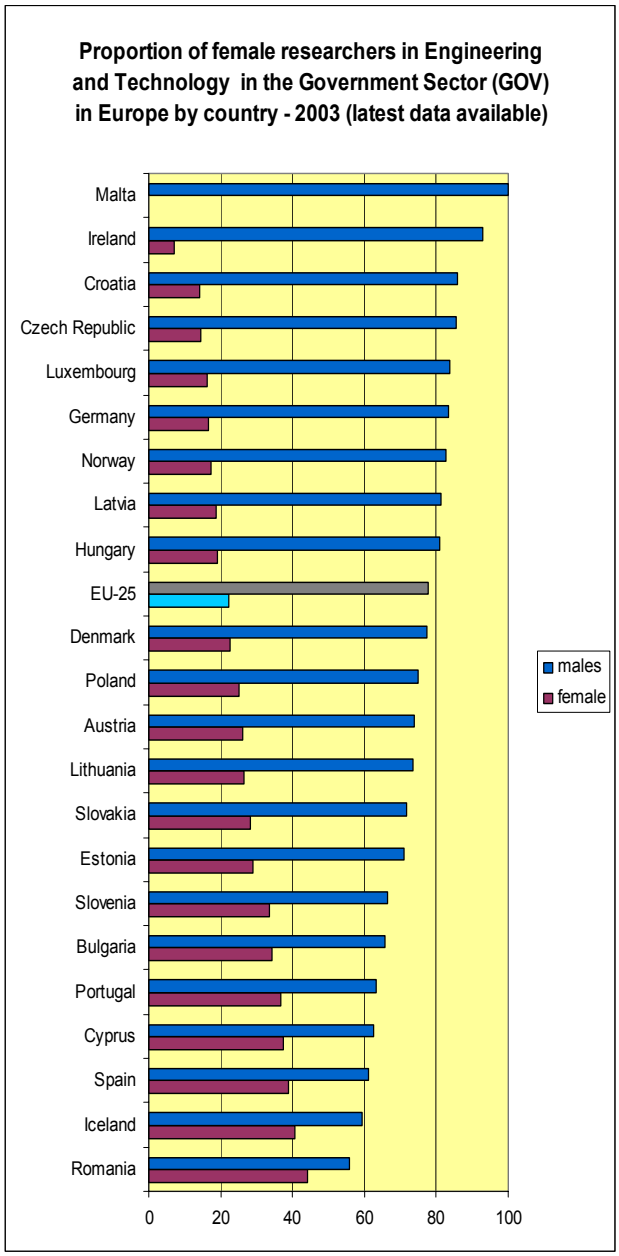
[27] According to the latest data available, published by DG RTD in 2006 "Women and Science. Statistics and Indicators"



(Source: She Figures 2006)

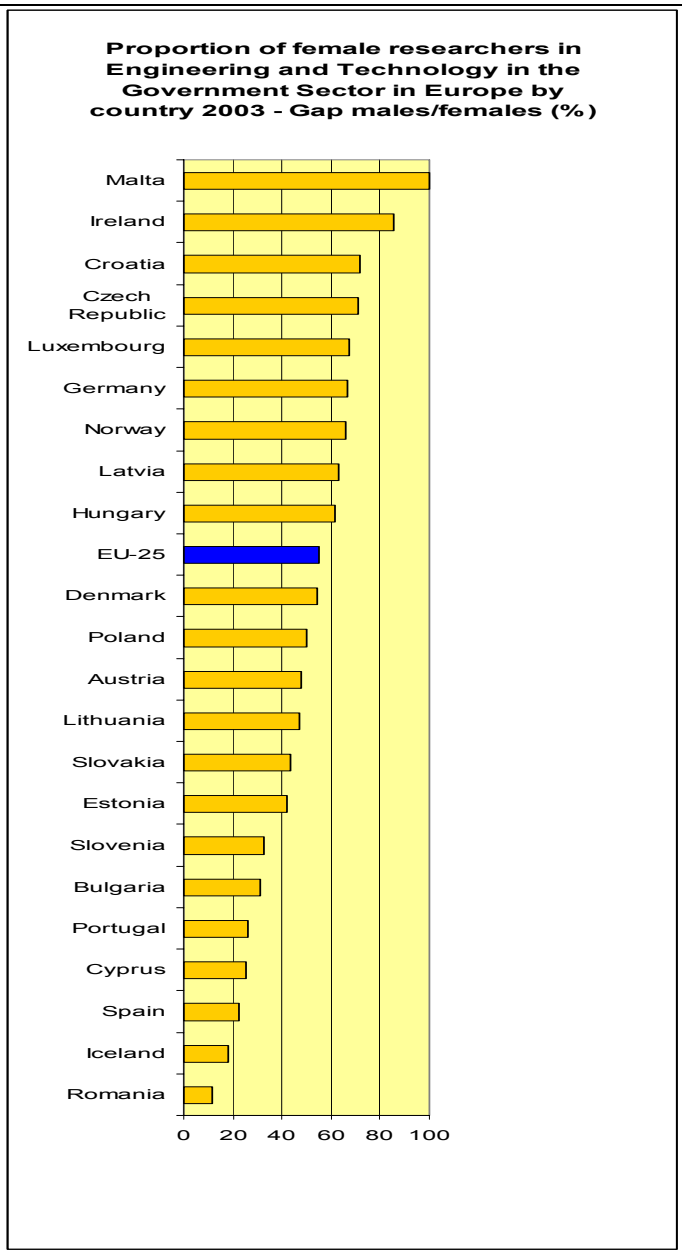
Figure 6-6 Gap between men and women in the percentage researchers in the Government sector by field of science in EU-25 (2003)

Women are under represented also in research activities in engineering and technology in the Governmental sector. **In Malta, according to the latest available data, all the researchers working in the government sector in engineering and technology are men.** Significant gaps exist in Ireland (85.8), Germany (66.8%), Norway (65.6%), countries which have a lower percentage of women working in the respective sector than the **EU-25 average (55.4%). On the other hand, in Poland (50%), Lithuania (47%), the Slovak Republic (43.4%), Estonia (42.2%), Slovenia (32.8%), Bulgaria (31.4%), Romania (11.4%) the gap between men and women in engineering and technology R&D is higher than the EU average.**



(Source: She Figures 2006)

Figure 6-7 Percentage of women researchers in Engineering and technology in the government sector (GOV)



(Source: She Figures 2006)

Figure 6-8 Percentage of women researchers in Engineering and technology in the government sector (GOV)

In conclusion, women are significantly under represented in RTD activities across the government sector, in the higher education sector as well as in the business enterprise sector. Across the various activity sectors, the discrepancy is most significant in engineering and technology research. In Europe, the least women work as researchers in the government sector in engineering and technology in Malta and the most in Romania. At the international level, Figures 6.2 and 6.4 reveal that in the EU-25 the presence of women in RTD (18% in BES and 34% in HES**) is less than in**

Russia (42% in BES and 39% in HES**), Turkey (** 25% in BES and 37% in HES**) or Norway (**19% in BES and 38% in HES**).**

7. LABOUR FORCE

The discrepancy between the number of male and female tertiary graduates in engineering and computer sciences is also reflected in the gender distribution of the labour force in the ICT and ICT related fields. The number of female **graduates** in the engineering and computing fields constrains the number of women that will be present in the ICT labour force. Other factors also influence the gender distribution of the labour force in engineering and computing by diminishing the number of women in the sectors of activity. **The higher proportion of women inactive in the labour force due to family responsibility**, imbalances in **remuneration** between men and women and the limited presence of women in **decision making and managerial positions** are the most relevant.

7.1. Labour Force inactivity rates for European Women

Since 1999 the share of the inactive[28] persons in the labour force as a percentage of the total population aged 15 to 64 has dropped from 31.6% to 29.4% in the EU-25. Almost all of the decrease is **due to the increased participation of women**. The share of inactive women in this age group decreased in that period from 40.5% to 36.7%, while the share of men outside the labour force has remained almost stable, falling slightly from 22.6% in 1999 to 22.0% in 2006[29].

However, across the sectors, the inactivity rate of women aged between 25 and 54 years in the labour force was 23.6% in 2006 in the EU27, compared with 8.1% for men (Figure 7.1). In addition to being the most intense working age, this is the age when families are founded and children are raised. **The main single reason for prime-aged women to be outside the labour force seems to be family responsibilities.**

Among prime-aged women in the **EU27** in 2006, 10.2% stated they were inactive due to family responsibilities, almost half of all inactive women of this age (Figure 7.2). Education and retirement explain the higher inactivity rates observed at either end of the age scale. For women aged 15-24, the inactivity rate was 59.4% in the **EU27**, compared with 52.5% for men.

Apart from personal or family responsibilities, the differences between the genders are minimal[30]. Approximately the same number of men and women in the 25-54 age group are

[28] A person is inactive, according to EUROSTAT when, despite being able to work is neither employed, nor looking for work. Instead, he/she prefers for example to stay at home and care for children or elderly family members.

[29] EUROSTAT Data, Statistics in focus, 122/2007 "People outside the labour force: the downward trend continues";

[30] idem

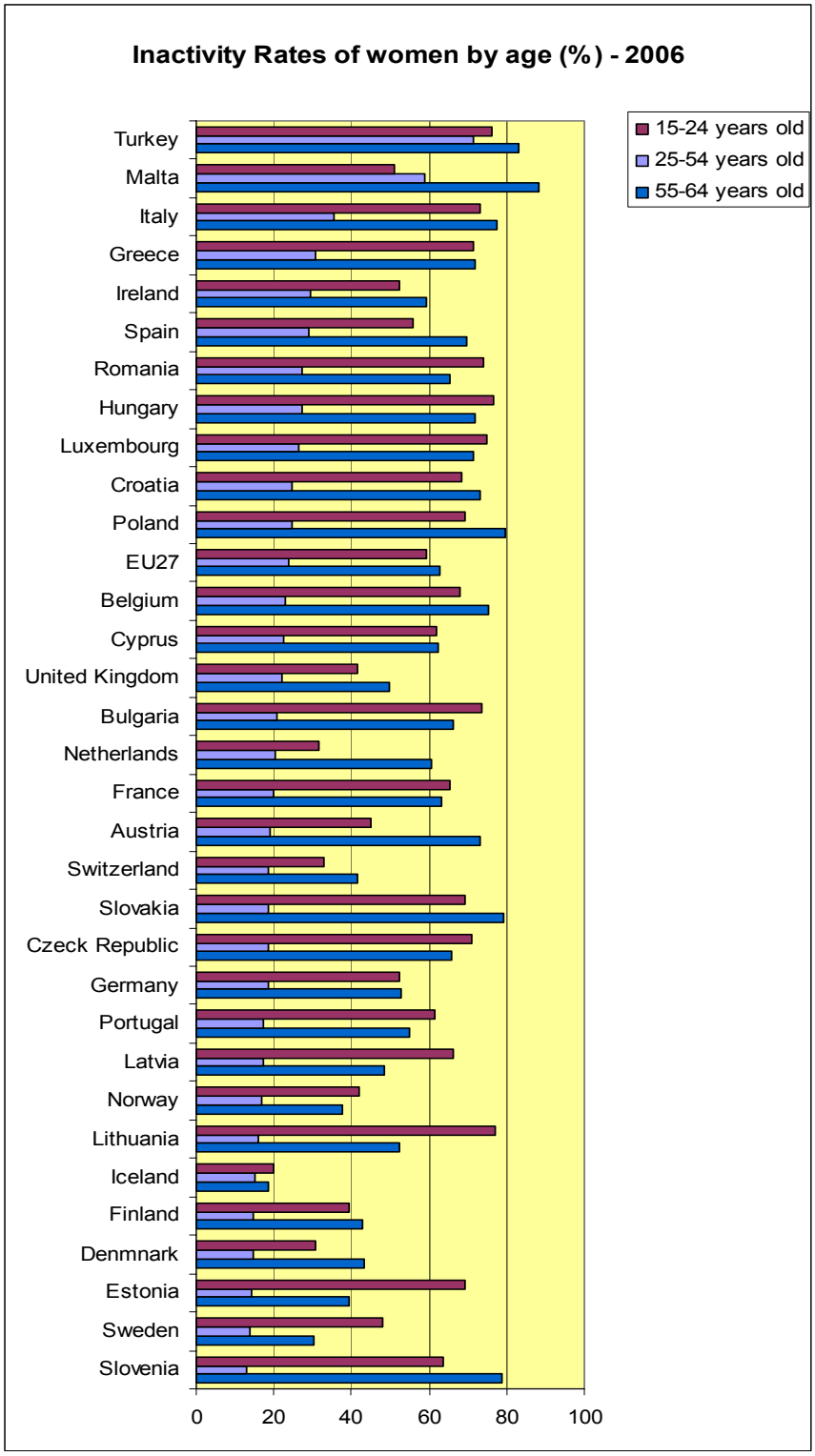
inactive due to sickness/disability, education or retirement: 4.3 million men and 4.5 million women.

Mothers, aged 25-54, of young children, i.e. children less than 7 years of age, **have higher inactivity rates in the labour force than women in this age group who are not mothers of young children; 33.6% compared to 20.7% in the EU-25[31] in 2006**

For men the opposite is true. If they had one or more young children of their own or of their spouse in the household, the inactivity rate in the EU-25 was 3.6%, compared to 9.0% if no such young child was present in the household.

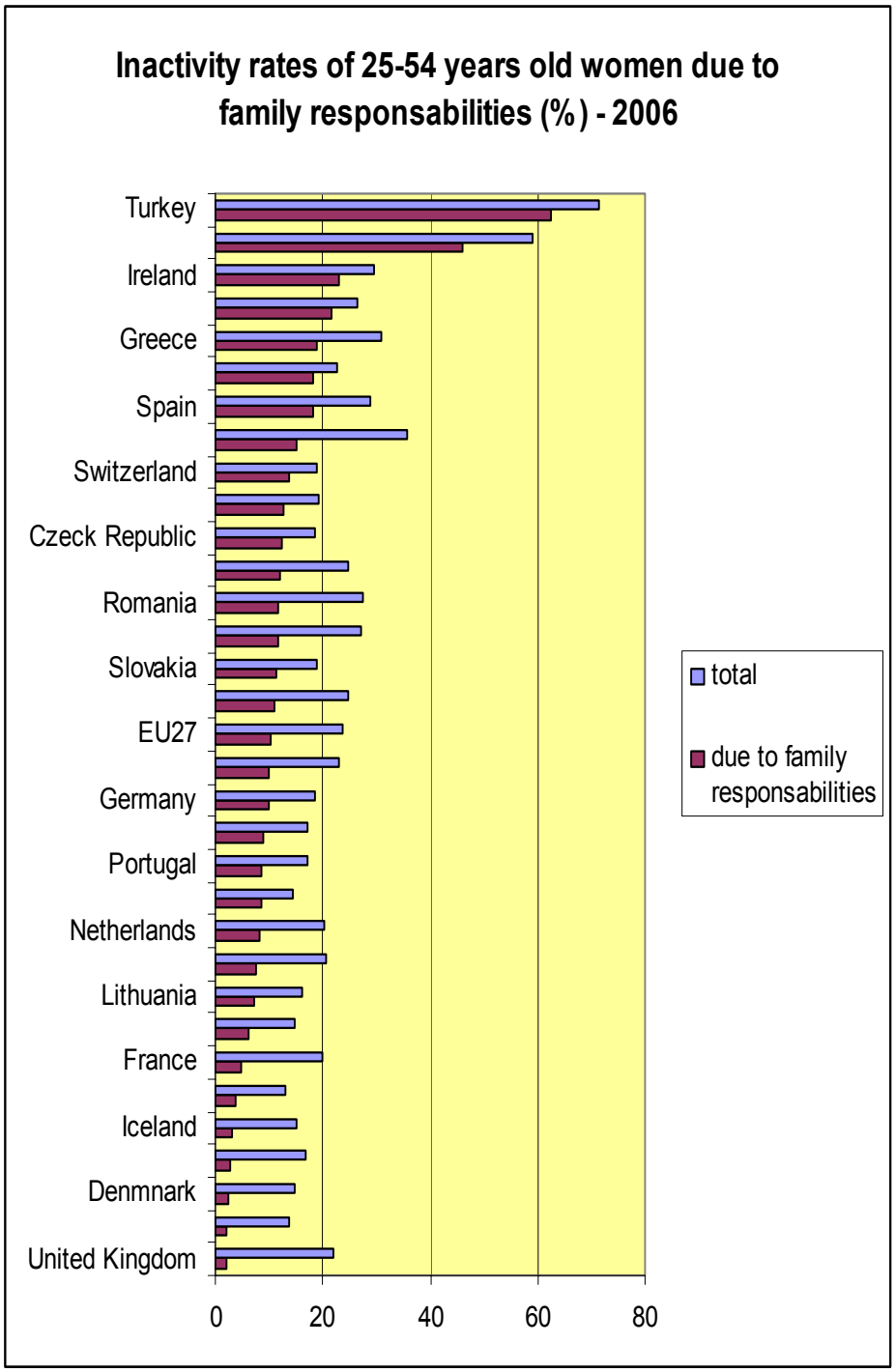
The inactivity rates of women with children increase if there is more than one child, **whereas fathers are hardly affected at all**. **If there are two or more children and the youngest is less than 7 years then the inactivity rate of mothers was 38.7%, compared to 3.8% for fathers in the EU-25 in 2006.**

[31] Excluding Denmark, Ireland and Sweden;



(Source: Eurostat)

Figure 7-1 Inactivity rates of Women in %, 2006 by age



(Source: Eurostat)

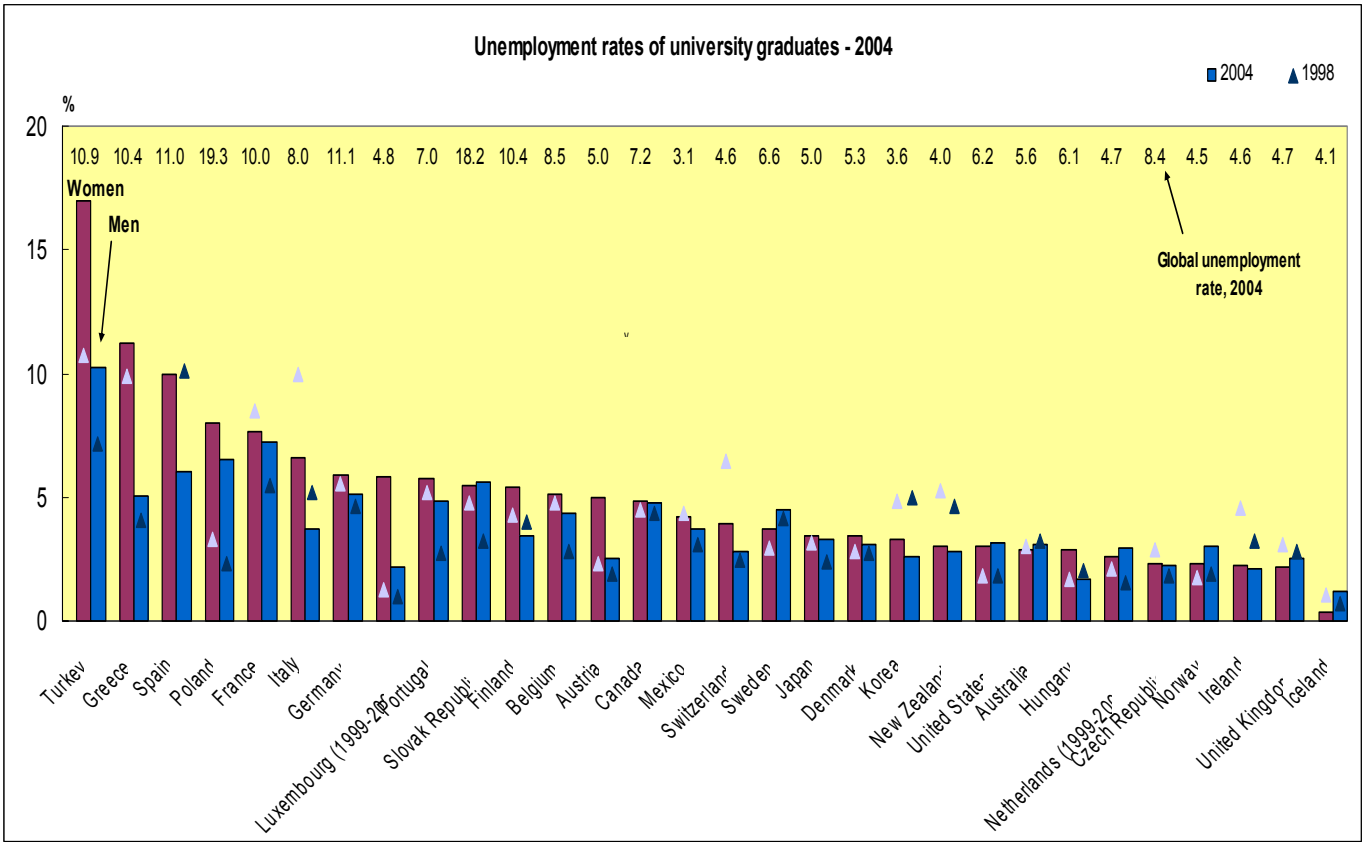
Figure 7-2 Inactivity rates for women aged 25-54 due to family responsibilities

Between 1998 and 2004, employment of tertiary-level graduates grew at an annual pace of about 3.6% in the OECD area[32]. This growth is due in part to the increased presence of women in the labour market. Despite their greater propensity to graduate at tertiary level, there are fewer women working in certain countries. They represent on

[32] OECD Science, Technology and Industry Scoreboard 2007

average 46% of tertiary-level employment, ranging from 60% in Portugal to 31% in Switzerland. Women with a university degree are less likely to be unemployed than women without one, yet their employment rate is higher than that of men with the same level of education (Figure 7.3).

The largest gender gaps in university graduates' unemployment rate are found in Austria and Greece, where unemployment rates are twice as high for women as for men.



Source: OECD

Figure 7-3 Unemployment rates of university graduates (2004)

7.2. Remuneration of women in labour force in ICT

In 2005, there were 6.6 million employed persons (or 3.4% of total employment) [33] working in the EU-25 **in high-tech knowledge-intensive services (KIS),** which include post and telecommunications, computer and related activities, and research and development. **High-tech manufacturing**, which includes manufacture of computers, communication equipment and medical equipment, accounted for 1.1% of EU-25 total employment in 2005 (2.2 million persons employed).

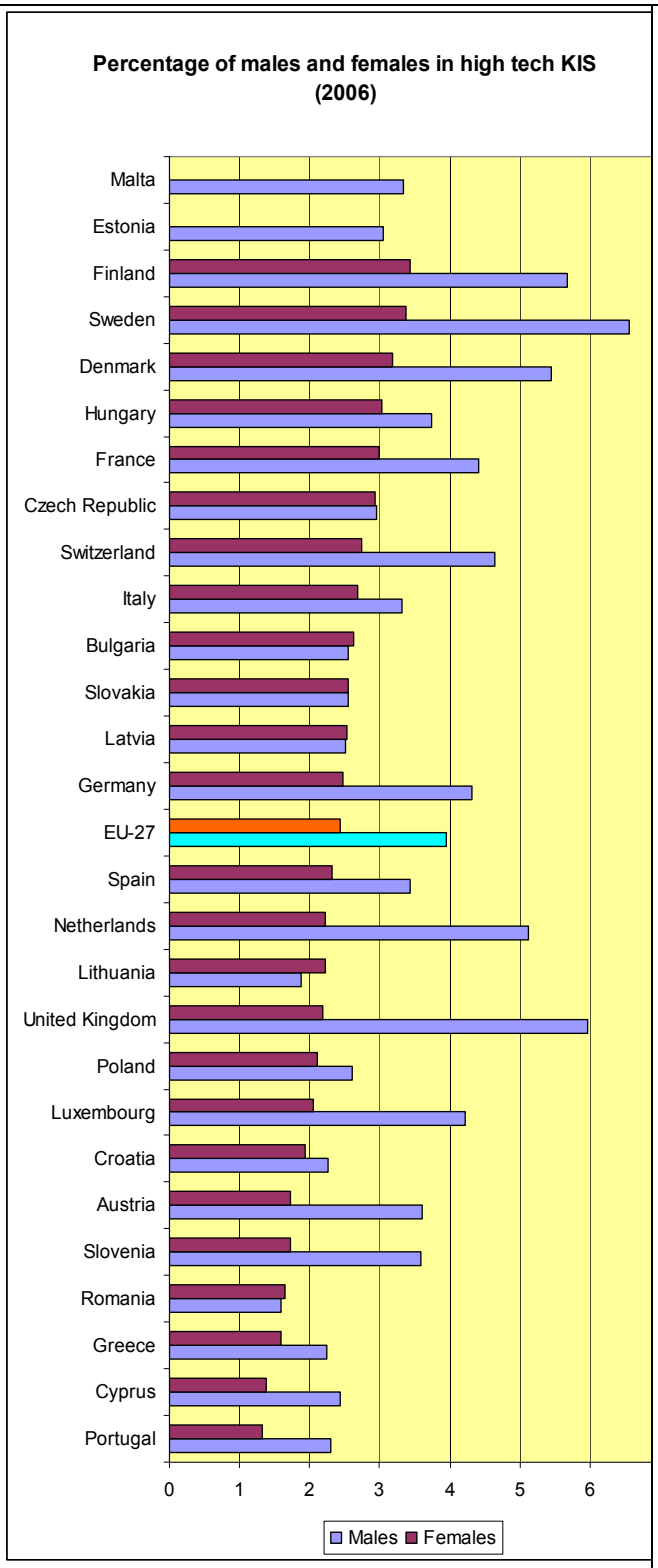
[33] EUROSTAT data, "Employment and earnings in high-tech sectors 32/2007".

Women were, in general, under-represented in high-tech manufacturing (Figure 7.4) and in high-tech KIS sectors in 2005 (Figure 7.5). However, the proportion of women employed in these sectors was higher in the new EU Member States, such as Lithuania (51.8% women in high tech manufacturing and 53,8% women in high tech KIS) and Hungary (52.5% women in high tech manufacturing and 40.5% women in high tech KIS). The lowest percentage of women working in high-tech manufacturing was in Netherlands (26%), Finland (28.4%) and Sweden (29.8%). The lowest percentage of women in the high tech knowledge intensive sectors was in UK (24.6%), the Netherlands (25.5%) and Austria (28.1).

Irrespective of sector and country, women were less well paid than men (Figure 7.6 and Figure 7.7)[34].

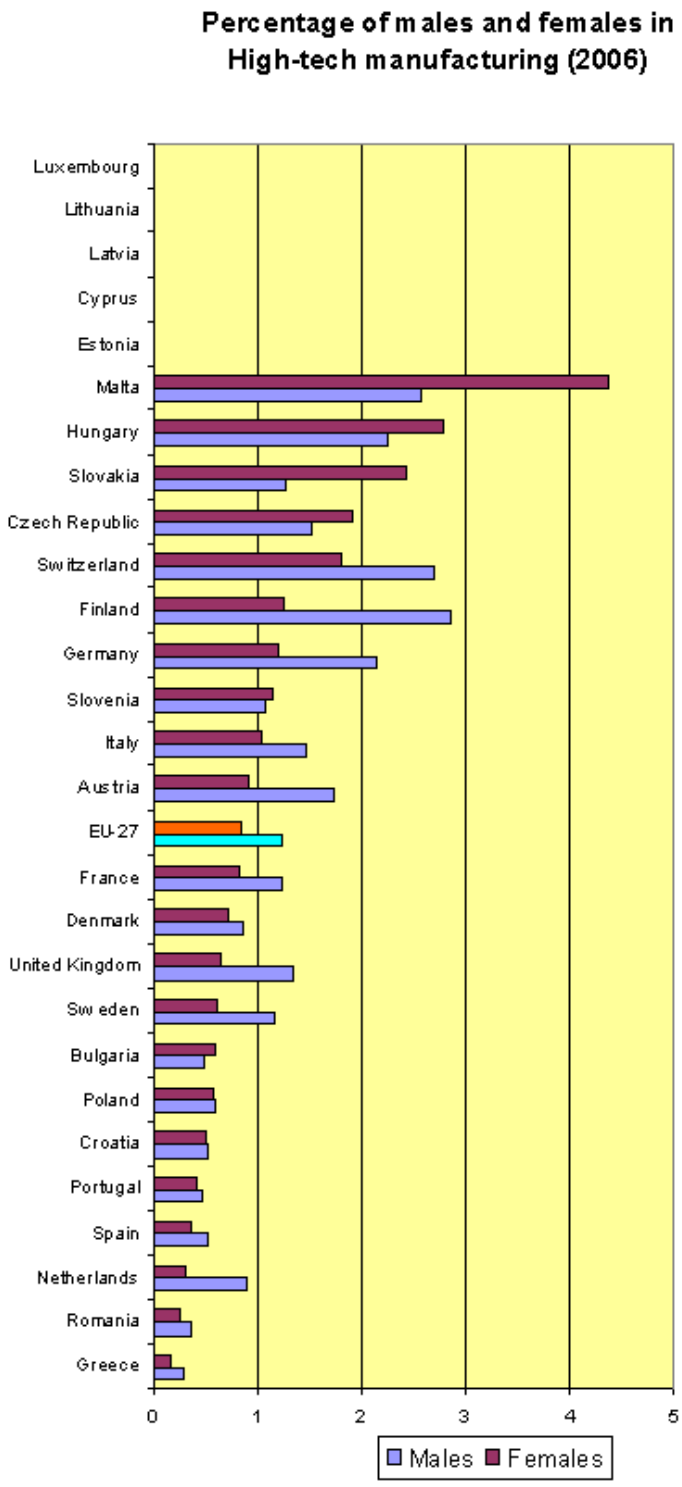
In general, the difference between women's and men's earnings was greatest in the high-tech manufacturing sector (Figure 7.7). Despite the significantly lower level of remuneration in the new Member States, only slight differences exist between the amount of the remuneration of males and females. In Denmark, Luxembourg, Germany, significant discrepancies exist between the way men and women are remunerated in the high tech KIS. Similarly, in Germany, Belgium, France, men working in the high-tech manufacturing sectors are paid significantly more than women (Figure 7.7).

[34] idem



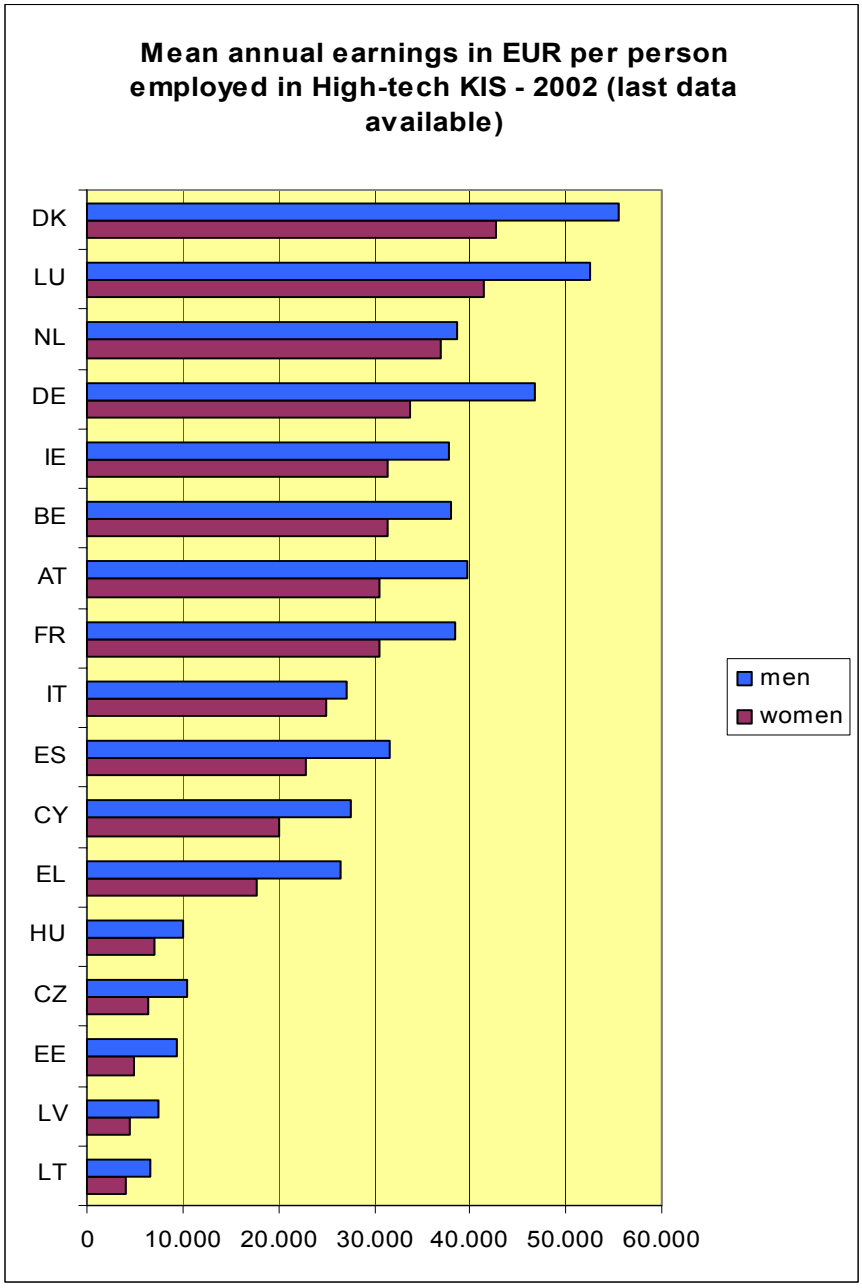
(Source: EUROSTAT)

Figure 7-4 Share of women in total employment in high-tech manufacturing EU-27 -2006



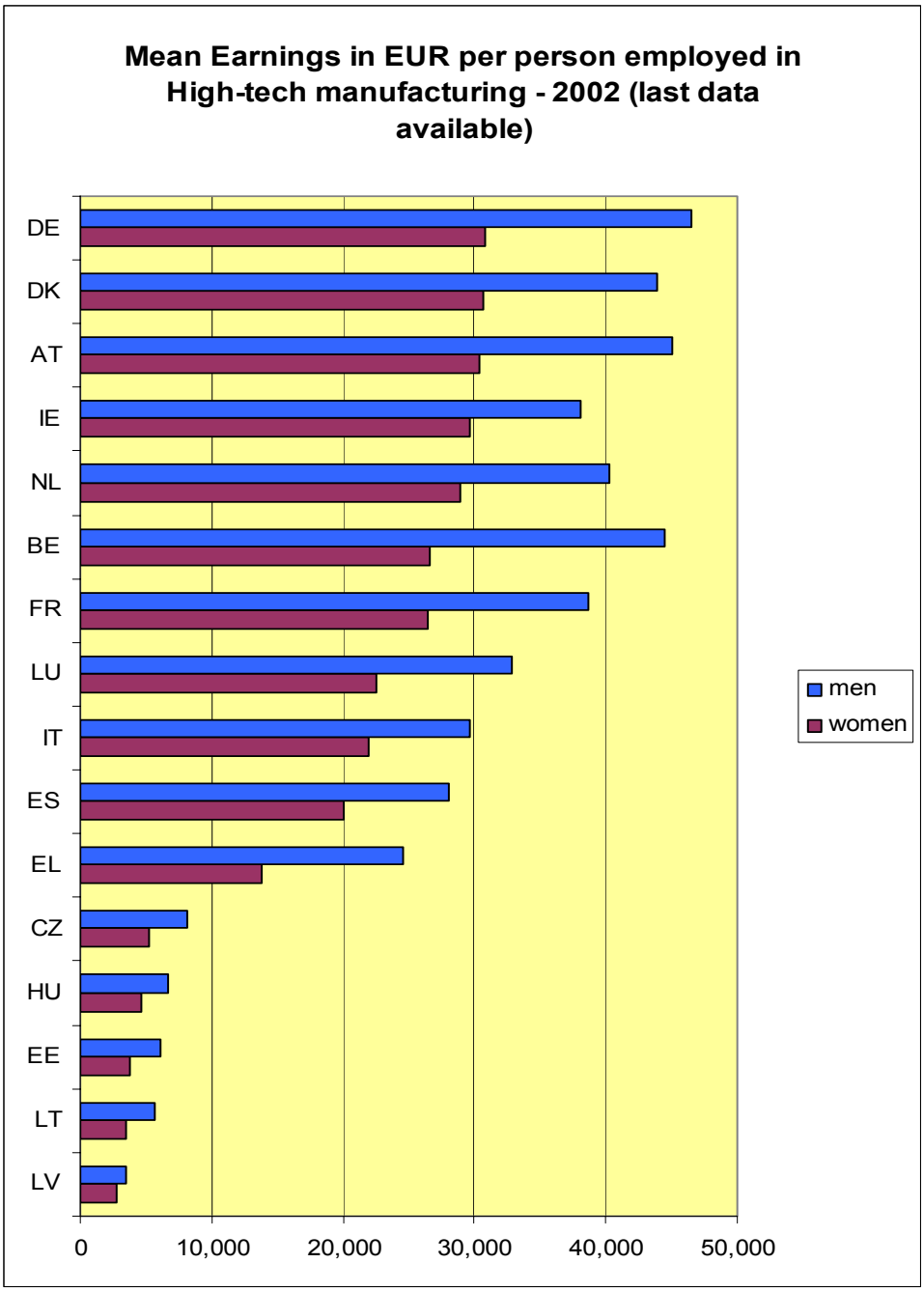
(Source: EUROSTAT)

Figure 7-5 Share of women in total employment in high-tech KIS sector EU-27— 2006



(Source: EUROSTAT 2007)

Figure 7-6 Mean annual earnings in EUR per person employed in high-tech knowledge intensive sectors (High-tech KIS)



(Source: EUROSTAT 2007)

Figure 7-7 Mean annual earnings in EUR per person employed in high-tech manufacturing sectors

7.3. Women in decision making positions

Equal treatment of women and men is a fundamental principle of Community law. The persistent under-representation of women in all areas of decision-making making represents an important obstacle to the democratic development of the European Union, to its cohesion and globally to its competitiveness[35].

[35] European Commission Directorate General for Employment, Social Affairs and Equal Opportunities

A decision-making position is considered to be a position from which it is possible to take or to influence a decision in the political domain, the public and juridical domain or the social and economic domain. Seniority within the employment hierarchy represents a primary indicator of the extent to which women are able to contribute to the development of the research agenda through decision-making and leadership. In addition to being in a position to participate in the decision making process and ensure representation and equal opportunities for both genders, women in leadership positions serve as mentors and as models of professional success for other women.

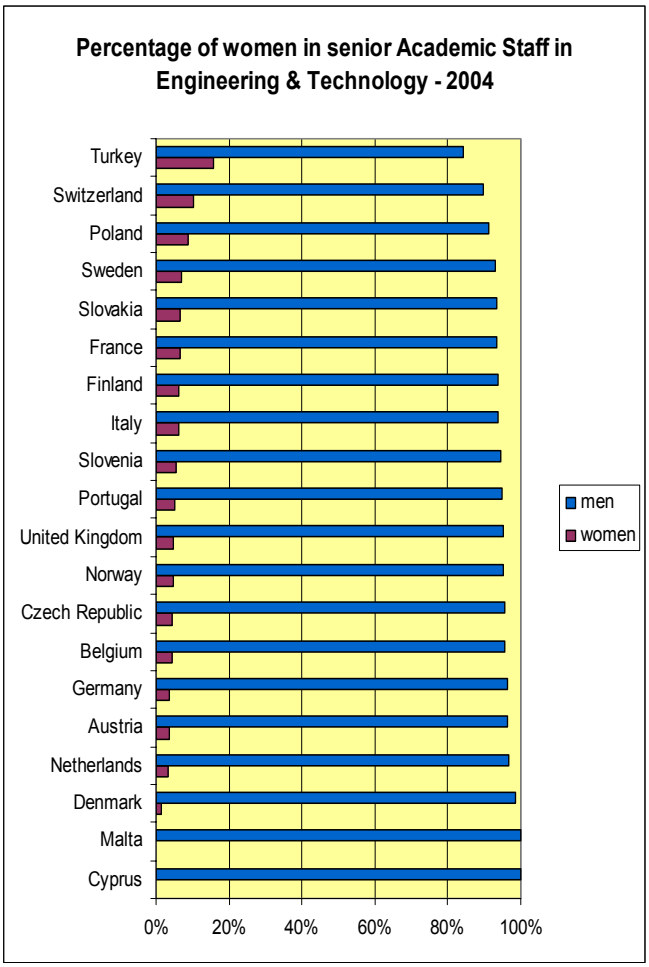
Despite the increase in the percentage of women in employment between 1999 and 2003, the gender differences are still persistent, not only at a lower level of the professional hierarchy, but also at senior level.

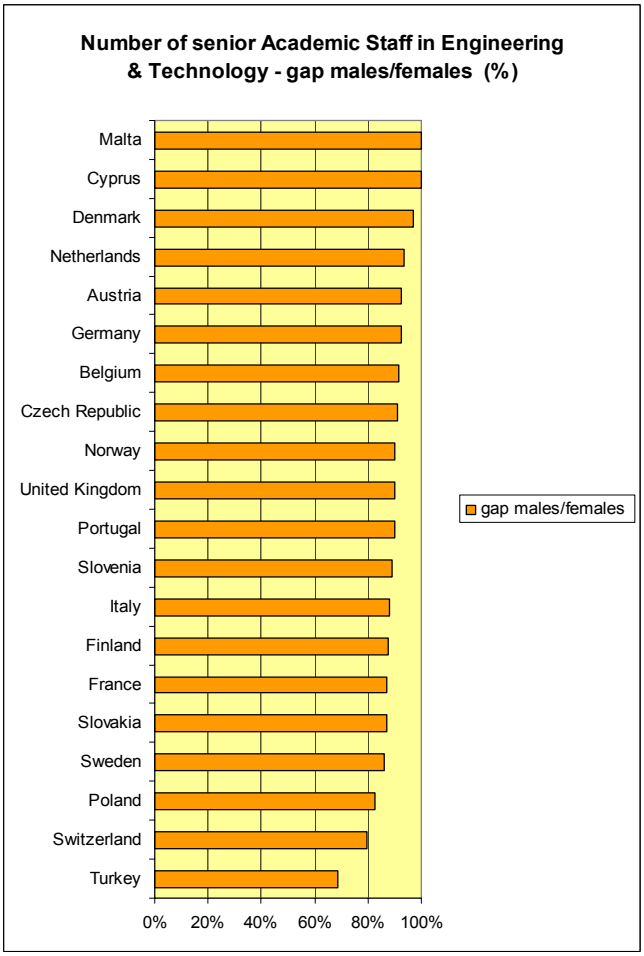
Available statistics show a huge under representation of women in senior academic staff positions in engineering and technology[36]. In Europe, **the discrepancy is more accentuated in the engineering and technology fields (only 5.8% women in senior academic positions) than in natural sciences (11.3%), agricultural sciences (14.9%), medical sciences (15,6%), social sciences (16,6%) or humanities (23.9%).**

In Malta and Cyprus, the existing data (Figure 7.8) shows that no woman occupies a senior academic staff position in engineering and technology fields. **The largest percentage of women in senior academic staff positions is in Turkey (15.6%) followed by Switzerland (10.1%), Poland (8.7%), Sweden (7.1%) and Slovak Republic (6.6%).**

This pattern of presence (or absence) creates the impression of a male-norm for seniority, The apparent male dominance in decision making and leadership may affect women's progress throughout the hierarchy, creating the so called "glass ceiling".

[36] She Figures, 2006





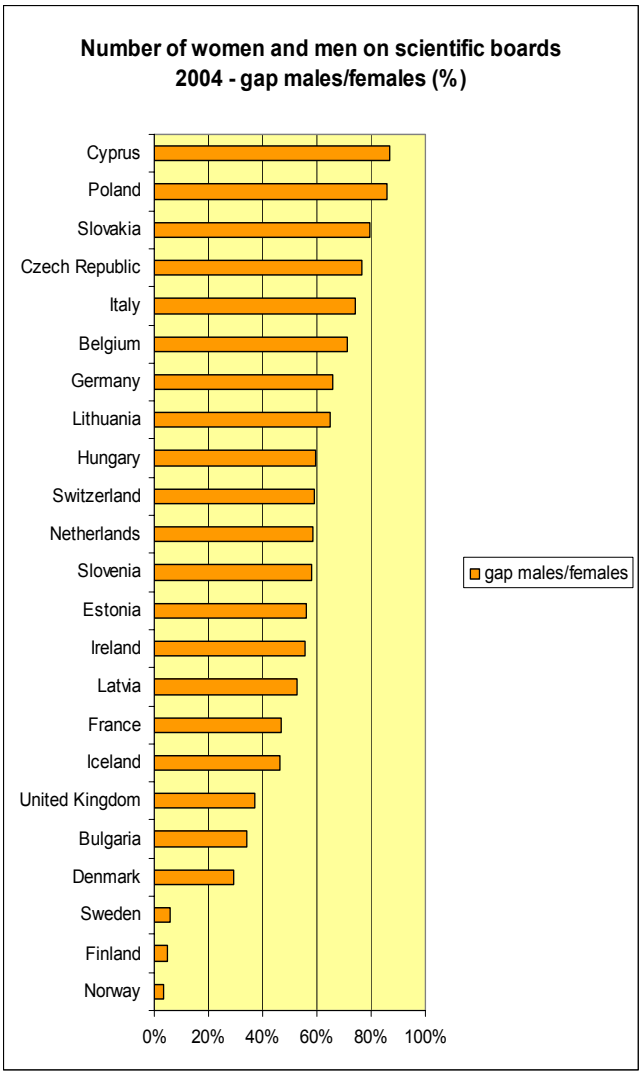
Source: EUROSTAT

Source: EUROSTAT

Figure 7-8 Proportion of senior academic staff (Grade A) by fields of science and by sex (2004) (engineering and technology)

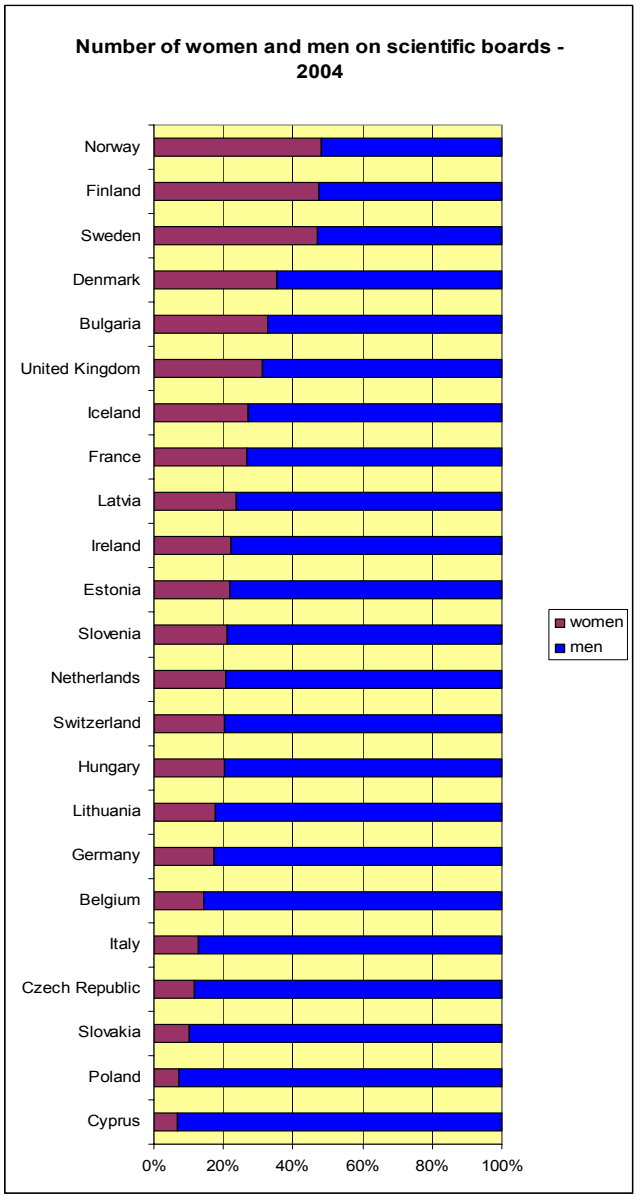
A complementary measure to women's participation in developing the research agenda is their presence on **scientific boards**, shown in Figure 7.9. The information presented covers all disciplines, humanities and social sciences, as well as the S & T fields.

It is clear that women are seriously underrepresented on scientific boards in a majority of EU countries. In the Member States, **women constitute more than 40% of board members only in Finland and Sweden; and otherwise only Denmark and Bulgaria are above 30%. Norway has a better gender-balance than most of the EU in this respect (48.3%)**. For the majority of EU countries, by contrast, the presence of women on scientific boards varies from between 20%, to rather less than 10%, which is a striking imbalance.



Source: EUROSTAT

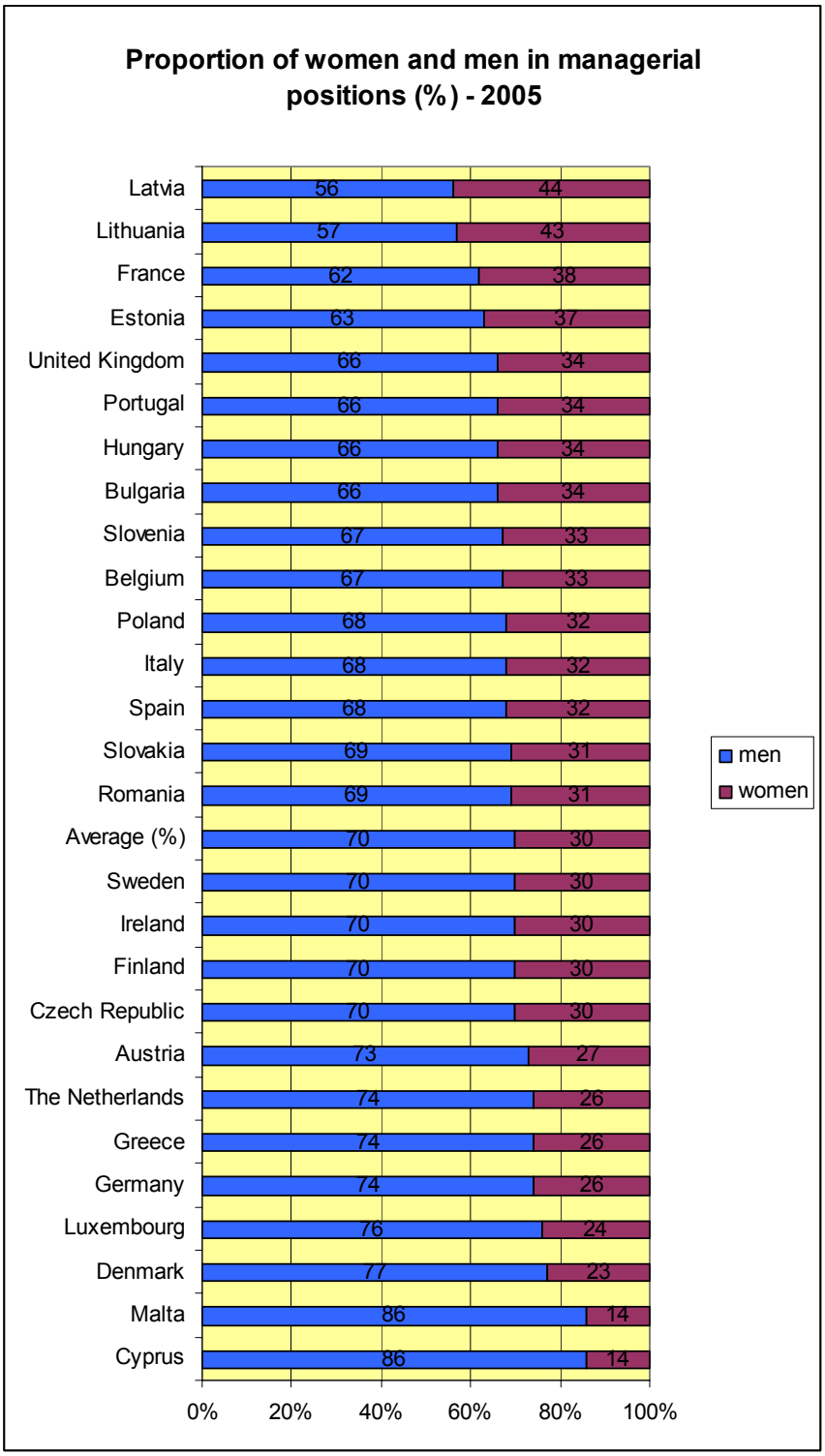
Figure 7-9 Number of women and men in scientific boards engineering and technology, 2004



Source: EUROSTAT

Finally, the gender imbalance between men and women in decision making positions is illustrated by the gender distributions of managerial positions (Figure 7.10)[37]. On average only 30% women on average work in European enterprises as managers. Latvia (44%), Lithuania (43%) and France (38%) have the highest percentage of women in managerial positions while Denmark (23%), Malta (14%), and Cyprus (14%) have the lowest percentages of women as managers.

[37] Managers are persons classified as Directors and chief executives, Production and operating managers, Other specialist managers and Managers of small enterprises (ISCO (International Standard Classification of Occupations) category 12 and 13). According to EUROSTAT , Labour Force Survey (LFS)



(Source: EURID)

Figure 7-10 Proportion of women and men in managerial positions (2005)

8. CONCLUSION

Despite the increase in the percentage of women in employment between 1999 and 2003, the gender differences in the ICT professions are so persistent that they will most likely not self-correct in the foreseeable future. This report aims at emphasizing, in the light of the data presented, the importance of designing a common policy framework for gender awareness at EU level. This framework should express the commitment of the Member States to create the appropriate institutional framework as well as adequate economic incentives to allow and encourage women to pursue a professional career in engineering and technology (and more specifically in ICT) while not denying the constraints influencing their professional choices.

Some ideas to encourage persons in general and women in particular into new ICT occupations are listed below[38]:

Improving equality and integration

- Employment organisations should be supported in the implementation of coherent equality /diversity policies;
- Any persistent culture of discrimination and sexism in employing organisations should be addressed;
- Flexible working arrangements which support parents should be implemented more extensively;
- Women returning to work after maternity leave should receive training in order to maintain and update their professional skills and competencies;
- Universities should improve their equality practices;
- Women undertaking postgraduate research should be supported by Research Councils and Academic Institutions during maternity;
- Universities as well as private companies should be supported in creating child care facilities for employees in the close vicinity of the working places.

[38] Partially based on "Equalitech and the UK Department of Trade and Industry ITEC Skills Team : Widening of Employment Opportunities in ITEC-Professional advancement through ITEC Skills , September 2006"

Enhancing visibility and attractiveness:

- The entry routes, job functions and progression pathways in ICT should be clarified ;
- Professional Associations, Research Councils and Academic Institutions should be supported in launching awareness campaigns about the social value of the engineering professions in general and ICT in particular;
- National and European campaigns should be launched in order to improve the image of the engineering profession through role-modelling and targeted career counselling amongst high school students;
- Stronger mechanisms for the recognition and financial reward of new engineering talents (within academia, within companies and by governments) should be developed;
- Companies should be encouraged to utilise fully the intellectual potential of women in decision making positions;
- A European Guide of Best Practices on ICT Gender issues should be developed.

Stimulate student interest:

- The familiarity of high school students with new ICT applications and products as well with the technology behind them should be increased;
- Initiatives stimulating the involvement of students in ICT RTD activities, student competitions and fairs should be promoted;
- The intellectual property of junior researchers need to be better acknowledged, promoted, protected and rewarded during their period of study;

ANNEX 1: DEFINITIONS AND ACRONYMS

- **ICT sector**[39] includes ICT Manufacturing and ICT Service sectors**:**
  - ***ICT Manufacturing***
    - Manufacture of office, accounting and computing machinery;
    - Manufacture of insulated wire and cable;
    - Manufacture of electronic valves and tubes and other electronic components;
    - Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy;
    - Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods;
    - Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment;
    - Manufacture of industrial process control equipment
  - ***ICT Services***
    - Wholesale of computers, computer peripheral equipment and software;
    - Wholesale of electronic and telecommunications parts and equipment;
    - Telecommunications;
    - Renting of office machinery and equipment (including computers);
    - Computer and related activities;

- **ICT professionals**[40]**:**
  - Computing services managers (1236);
  - Computer systems designers, analysts and programmers (2131);
  - Computing professionals not elsewhere classified (2139);
  - Electronics and telecommunications engineers (2144);
  - Electronics and telecommunications engineering technicians (3114);
  - Computer assistants (3121);
  - Computer equipment operators (3122);
  - Broadcasting and telecommunications equipment operators (3132)

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[39] According to the 2002 revised OECD definition in '*Working Party on Indicators for the Information Society - Guide to Measuring the Information Society*', 2005

[40] According to the "*Eurostat Methodological manual for Information Society Statistics*" The numbers in the brackets are in accordance to the ISCO Unit Groups (Unit Groups correspond to the 4-digit level)

- **Science and technology (S&T)**[41]**:** The International Standard Classification of Education (ISCED-97) distinguishes twenty-one main fields of study. For macro-measurement of HRST (human resources in science and technology), it is recommended that they are regrouped into the following seven broad fields of study in S&T: **natural sciences; engineering and technology; medical sciences; agricultural sciences; social sciences; humanities; other fields**.

- **High tech and knowledge intensive sectors**[42] includes high tech manufacturing sectors and high tech Knowledge Intensive Sectors (KIS):
  - ***High tech manufacturing sector (Nace Rev.1.1 codes):***
    - Manufacture of office machinery and computers 30
    - Manufacture of radio, television and communication equipment and apparatus 32
    - Manufacture of medical, precision and optical instruments, watches and clocks 33

  - ***High tech KIS (Nace Rev.1.1 codes):***
    - Post and telecommunications 64;
    - Computer and related activities 72;
    - Research and development 73

- **Students and Graduates:** The International Standard Classification of Education (ISCED-97) categorises education programmes by level. **Tertiary Education or Higher Education** involves 2 stages:

  The first includes largely theoretically-based programmes to provide sufficient qualifications for gaining entry to advanced research programmes and professions with high skills requirements **(ISCED 5A)** and programmes generally more practical/ technical/ occupationally specific than ISCED 5A **(ISCED 5B).**

  The second is for programmes leading to the award of an advanced research qualification (e.g. PhD, Doctorate…). The programmes are devoted to advanced study and original research **(ISCED 6).**

[41] according the Canberra manual, § 71

[42] According to Eurostat /OECD classification – itself based on the ratio of R&D expenditure to GDP or R&D intensity. Since the EU LFS (Labour Force Survey) and SES only allow reporting of NACE at 2 digit level, the aggregations are made by Eurostat as presented.

The number of graduates refers to those graduating in the reference year and not to the number of graduates in the population. The number of graduates also refers to non-nationals graduating in the country, but does not include nationals graduating abroad. In some countries, France and Portugal, for example, non-PhD programmes with an advanced research component are included in ISCED 6

- **The business enterprise sector (BES)** 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 institutes mainly serving them. (Frascati Manual, § 163)

- **The government sector (GOV)** 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) and PNP controlled and mainly financed by government but not administrated by the higher education sector(Frascati Manual, § 184).

- **The higher education sector (HES)** includes 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 institutions(Frascati Manual, § 206).

- **Researchers:** Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned". Frascati Manual (OECD, 2002)

- **The economically active population** comprises employed and unemployed persons. **Employed** persons are persons aged 15 and over (Spain, United Kingdom: 16 and over; Denmark, Estonia, Hungary, Latvia, Sweden, Finland and Norway: 15-74; Iceland: 16- 74) who during the reference week performed work, even for just one hour per week, for pay, profit or family gain or were not at work but had a job or business from which they were temporarily absent because of, e.g., illness, holidays,

industrial dispute, education or training. **Unemployed** persons are persons aged 15-74 (in Spain, United Kingdom, Iceland: 16-74) who were without work during the reference week, were currently available for work and were either actively seeking work in the past four weeks or had already found a job to start within the next three months. (EUROSTAT)

- **Inactive persons** are persons who are neither employed nor unemployed. Inactivity rate is the share (in %) of the inactive population of the total population living in private households in the same age group.(EUROSTAT)

ANNEX 2: DATA SOURCES[43]

Introduction

- EU-RA (European Research Associates), "Segregated Statistics relating to Gender and ICT in the EU 1998 -2007, WP1"2007
- EUROSTAT Data in focus "Internet usage in 2007. Households and individuals" Nr. 23/2007
- EUROSTAT Data in focus "Gender differences in the use of computers and the Internet" Nr.119/2007

The attitudes of young European students towards ICT

- OECD PISA (Programme for International Student Assessment) 2003 Study
- OECD PISA (Programme for International Student Assessment) 2006 Study and Data
- EURIDYCE "How boys and girls in Europe are finding their way with Information and Communication Technology"

Tertiary education in ICT- Participation rates of women

- Eurydice& EUROSTAT "Key Data in Higher Education", 2007
- UNESCO Institute for Statistics "Global Education Digest 2007, Comparing Education Statistics across the World", Montreal, 2007
- OECD "Science, Technology and Industry Scoreboard Innovation and performance in the global economy", 2007.
- EUROSTAT " Science, Technology and Innovation in Europe" 2007

R&D personnel

- DG RTD "Women and Science. Statistics and Indicators" 2006

Labour force

- EUROSTAT, Statistics in focus, "People outside the labour force: the downward trend continues", Nr.122/2007
- EUROSTAT, Statistics in focus , "Employment and earnings in high-tech sectors " Nr.32/2007

[43] The data sources used in more than one Chapter are mentioned only with reference to the Chapter in which they first appear in order to avoid repetitions.

- EUROSTAT, Statistics in focus, "Employment in High Technology; Highest increase of employment in the high tech knowledge-intensive services " Nr.1/2006
- EUROSTAT, Statistics in focus "High tech industries and knowledge based services The importance of R&D and Human Resources in Science and Technology" Nr.13/2006
- EUROSTAT, Statistics in focus "Highly qualified workers in science and technology. National employment characteristics" Nr.103/2007

ANNEX 3: TABLES

	Males			Females		
	16-24	25-54	55-74	16-24	25-54	55-74
EU27	79	61	31	77	55	19
BE	89	74	41	87	69	26
BG	55	32	7	61	33	5
CZ	73	49	21	74	44	11
DK	94	87	58	96	84	47
DE	90	78	44	87	69	26
EE	89	64	19	92	71	22
IE	71	59	24	61	54	17
EL	60	39	7	53	27	2
ES	77	54	17	77	46	9
FR	84	67	34	84	63	23
IT	61	45	17	57	34	6
CY	58	41	14	57	37	6
LV	90	57	15	93	58	14
LT	87	45	10	86	51	9
LU	92	86	60	88	71	29
HU	81	54	21	79	57	16
MT	:	:	:	:	:	:
NL	95	92	64	98	87	46
AT	79	76	41	80	63	24
PL	77	41	12	77	40	8
PT	77	41	13	77	33	6
RO	50	23	4	48	21	2
SI	83	56	16	82	58	9
SK	86	56	14	73	59	10
FI	98	86	48	98	87	40
SE	95	84	61	86	82	49
UK	83	76	50	83	68	33
IS	99	91	70	99	90	60
NO	95	90	61	88	86	54

Note: EU27 without MT

Source: Eurostat, ICT statistics

Table 3-1 Individuals who used Internet at least once a week, by age and gender EU 27 (without MT), 2007(%)

Percentage of individuals with access to the Internet broken down by place of access (home, workplace, place of education, Internet cafe, PIAP etc) (2006)

	Internet café	Place of education	Home	Work
BE	1	6	53	21
BG	:	3	14	10
CZ	:	9	31	20
DK	:	14	77	46
DE	:	8	61	27
EE	2	11	46	28
IE	:	7	36	23
EL	4	4	18	12
ES	6	7	33	22
FR	:	6	35	18
IT	:	5	27	17
CY	2	5	24	17
LV	6	9	31	22
LT	3	11	29	17
LU	2	8	65	32
HU	3	12	29	19
NL	1	9	77	39
AT	:	6	47	29
PL	4	10	26	13
PT	2	8	23	16
RO	:	:	:	:
SI	:	10	41	28
SK	6	11	24	26
FI	4	18	65	39
SE	0	12	77	38
UK	5	10	55	30

Source: Eurostat

Table 3-2 Individuals with access to the Internet broken down by place of access (home, workplace of education, Internet café) in the last three months 2006 (%)

Percentage of individuals who have obtained IT skills by type of methods in the EU-27 (2006)

Indicator	Total	Males	Females
Percentage of individuals who have obtained IT skills through formalised educational institution (school, college, university, etc.)	21	21	21
Percentage of individuals who have obtained IT skills through training courses and adult education centres, on own initiative	11	10	12
Percentage of individuals who have obtained IT skills through training courses and adult education centres, on demand of employer	16	16	16
Percentage of individuals who have obtained IT skills through self-study using books, cd-roms, etc.	24	29	19
Percentage of individuals who have obtained IT skills through self-study (learning by doing)	40	45	35
Percentage of individuals who have obtained IT skills through informal assistance from colleagues, relatives in friends and some other ways	38	40	36
Percentage of individuals who have obtained IT skills through some other way	11	12	10

Source: Eurostat

Table 3-3 Percentage of individuals (M&F) in the EU-27 who obtained IT skills by type of methods (2006)

Percentage of individuals aged 16 –74 who used Internet, in the last 3 months, for formalised educational activities (school, university, etc) (2006)

	2003		2004		2005		2006	
	Male	Female	Male	Female	Male	Female	Male	Female
EU-27	:	:	9.2	9.4	8.5	9.1	8.1	8.5
EU-25	:	:	10	10.2	8.5	9.1	8.4	8.9
BE	:	:	:	:	12.2	13.8	11.2	12.9
BG	:	:	3.2	3.4	:	:	3.8	4.8
CZ	:	:	1.6	1.2	1.4	1.3	7.4	8.2
DK	11.7	12.1	12.6	15.6	13.6	13.7	14.5	14.2
DE	:	:	12.7	11.8	:	:	12.3	12
EE	:	:	21	20.3	6.2	5.7	4.9	6.5
IE	:	:	6.5	7.4	6.3	6.1	8.6	9.6
EL	7.4	6.7	8.1	7.5	3.5	3.4	7.5	7.3
ES	7.2	7.8	6.7	7.2	5.6	5.4	4	4.4
FR	:	:	:	:	:	:	:	:
IT	:	:	:	:	5.6	6.8	6.2	7.3
CY	:	:	11.2	8.2	9.1	9	11	12.1
LV	:	:	7.8	9.4	7.5	9.8	7.1	8.9
LT	:	:	18.1	20.9	13.6	14.1	13.5	15.2
LU	24.5	19.9	15.7	11.5	15.5	13.6	13.2	11.5
HU	:	:	9.9	10.1	9.6	12.3	9.9	10.6
MT	:	:	:	:	:	:	:	:
NL	:	:	:	:	17	16.1	17.1	16.5
AT	7.4	7	8.3	8.4	8.3	9.3	10.2	10.8
PL	:	:	3.6	3.5	4.5	4.6	3.7	3.6
PT	:	:	5.9	6	5.6	6.5	6.1	6.4
RO	:	:	0.7	0.7	:	:	2.5	2.2
SI	:	:	10.1	9.7	13.8	18.1	15.6	17.2
SK	:	:	8.5	7.7	4.9	6.1	4.6	5
FI	17.4	21	17.7	23	19.6	25.2	21.2	26.6
SE	:	:	3.7	4.7	4.9	5.8	4.6	5.8
UK	16.1	18.4	15.7	17.5	14.5	17.9	17.3	18.2

Source: Eurostat

Table 3-4 Percentage of individuals (M&F) in the EU-27 who used the Internet, in the last three months for formalised education activities (school, university) (2006) (%)

Percentage of individuals aged 16 –74 who used Internet, in the last 3 months, for post educational courses (EU-27) (2006)

	2003		2004		2005		2006	
	Male	Female	Male	Female	Male	Female	Male	Female
EU-27	:	:	10.9	8.1	6.2	4.7	9.3	7.1
EU-25	:	:	:	:	6.2	4.7	9.9	7.5
BE	:	:	:	:	3.5	3.1	3.3	3
BG	:	:	0.5	0.4	:	:	0.6	0.8
CZ	0.5	0.5	0.4	0.7	0.7	0.4	9.1	8.8
DK	6	6	5	5.4	5.5	6.2	7.7	6.4
DE	:	:	24.1	18.3	:	:	31.8	24.3
EE	:	:	:	:	:	:	2	2.9
IE	:	:	2.2	2.2	3.3	3	3.9	4
EL	4.8	4.8	5.9	4.5	4.1	3.5	3.4	3.4
ES	4.8	4.8	:	:	3.2	3	3.3	3
FR	:	:	:	:	:	:	:	:
IT	:	:	:	:	5.7	3.9	6	4
CY	:	:	5.4	4.5	4.7	3.5	7.1	8.9
LV	:	:	1.9	2.4	2.5	3.7	2.2	4
LT	:	:	:	:	12.3	14	15.1	17.2
LU	11.8	11.8	5.8	3	5.4	2.9	3.6	2.5
HU	:	:	4.5	4.4	5.3	7.2	4	5
MT	:	:	:	:	6	5.2	4.9	4.3
NL	2.6	2.6	2.9	3.1	2.8	2.4	3.4	3.5
AT	:	:	0.7	0.7	0.5	0.6	0.5	0.8
PL	:	:	1.5	0.9	1.5	1.2	1.6	0.9
PT	:	:	0.1	0.2	:	:	0.3	0.4
RO	:	:	4.1	3.4	:	:	8.8	8.4
SI	:	:	0.9	0.8	0.5	0.7	0.6	0.8
SK	4.2	4.2	4.1	6.9	5.2	8.8	4	4.3
FI	:	:	2	1.2	2.7	2.8	2.6	2.7
SE	18.6	18.6	15.6	11	:	:	14.5	9.8
UK	26.2	20.5	27.2	13.9	:	:	16.7	12.8

Source: Eurostat

Table 3-5 Percentage of individuals (M&F) in the EU-27 who used the Internet, in the last three months for post educational courses (2006)

Percentage of males and females frequently using ICT for programs and software

Country	Computer for programming		Drawing, Painting or graphics program on a computer		Spreadsheets		Comp to help learn school material		Educational software		Word processing	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
BE	**31.0**	**15.0**	25.0	13.0	20.0	14.0	24.0	23.0	9.0	4.0	48.0	51.0
CZ	**29.0**	**9.0**	35.0	20.0	27.0	17.0	25.0	27.0	15.0	15.0	47.0	45.0
DK	**31.0**	**9.0**	32.0	11.0	24.0	12.0	56.0	47.0	23.0	7.0	66.0	63.0
DE	**33.0**	**13.0**	30.0	18.0	24.0	14.0	28.0	26.0	13.0	10.0	53.0	45.0
IE	**15.0**	**11.0**	26.0	27.0	13.0	16.0	14.0	17.0	8.0	9.0	27.0	41.0
EL	36.0	21.0	44.0	45.0	31.0	23.0	27.0	19.0	26.0	18.0	46.0	44.0
IT	38.0	24.0	45.0	38.0	36.0	26.0	**45.0**	42.0	24.0	16.0	60.0	59.0
LV	23.0	9.0	36.0	22.0	25.0	15.0	**28.0**	22.0	18.0	10.0	38.0	27.0
HU	22.0	11.0	32.0	28.0	33.0	31.0	**33.0**	28.0	13.0	7.0	52.0	54.0
AT	33.0	14.0	33.0	22.0	26.0	24.0	**31.0**	31.0	12.0	6.0	52.0	67.0
PL	39.0	18.0	46.0	33.0	38.0	27.0	**29.0**	23.0	29.0	22.0	53.0	42.0
PT	42.0	26.0	33.0	24.0	33.0	23.0	**56.0**	58.0	17.0	13.0	16.0	51.0
SK	28.0	11.0	38.0	27.0	29.0	16.0	**34.0**	31.0	21.0	15.0	46.0	41.0
FI	19.0	3.0	27.0	10.0	9.0	3.0	18.0	18.0	4.0	2.0	28.0	26.0
SE	29.0	7.0	34.0	15.0	11.0	5.0	27.0	19.0	7.0	3.0	46.0	48.0
UK[1]	34.0	19.0	41.0	32.0	28.0	34.0	33.0	36.0	18.0	21.0	60.0	72.0
JP	4.0	2.0	7.0	10.0	7.0	9.0	4	5.0	2.0	1.0	15.0	19.0
US	38	27	43	39	24	20	**35**	37.0	19.0	16.0	56.0	67.0

Source: OECD

Notes

1. Response rate too low to ensure comparability

Table 4-1 Percentage of male and female 15 years olds (M&F) who use the computer as tool for learning material (2003)

Percentage of males and females frequently using ICT for programs and software

Country	Computer for programming		Drawing, Painting or graphics program on a computer		Spreadsheets		Comp to help learn school material		Educational software		Word processing	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
BE	**31.0**	**15.0**	25.0	13.0	20.0	14.0	24.0	23.0	9.0	4.0	48.0	51.0
CZ	**29.0**	**9.0**	35.0	20.0	27.0	17.0	25.0	27.0	15.0	15.0	47.0	45.0
DK	**31.0**	**9.0**	32.0	11.0	24.0	12.0	56.0	47.0	23.0	7.0	66.0	63.0
DE	**33.0**	**13.0**	30.0	18.0	24.0	14.0	28.0	26.0	13.0	10.0	53.0	45.0
IE	**15.0**	**11.0**	26.0	27.0	13.0	16.0	14.0	17.0	8.0	9.0	27.0	41.0
EL	36.0	21.0	44.0	45.0	31.0	23.0	27.0	19.0	26.0	18.0	46.0	44.0
IT	38.0	24.0	45.0	38.0	36.0	26.0	**45.0**	42.0	24.0	16.0	60.0	59.0
LV	23.0	9.0	36.0	22.0	25.0	15.0	**28.0**	22.0	18.0	10.0	38.0	27.0
HU	22.0	11.0	32.0	28.0	33.0	31.0	**33.0**	28.0	13.0	7.0	52.0	54.0
AT	33.0	14.0	33.0	22.0	26.0	24.0	**31.0**	31.0	12.0	6.0	52.0	67.0
PL	39.0	18.0	46.0	33.0	38.0	27.0	**29.0**	23.0	29.0	22.0	53.0	42.0
PT	42.0	26.0	33.0	24.0	33.0	23.0	**56.0**	58.0	17.0	13.0	16.0	51.0
SK	28.0	11.0	38.0	27.0	29.0	16.0	**34.0**	31.0	21.0	15.0	46.0	41.0
FI	19.0	3.0	27.0	10.0	9.0	3.0	18.0	18.0	4.0	2.0	28.0	26.0
SE	29.0	7.0	34.0	15.0	11.0	5.0	27.0	19.0	7.0	3.0	46.0	48.0
UK[1]	34.0	19.0	41.0	32.0	28.0	34.0	33.0	36.0	18.0	21.0	60.0	72.0
JP	4.0	2.0	7.0	10.0	7.0	9.0	4	5.0	2.0	1.0	15.0	19.0
US	38	27	43	39	24	20	**35**	37.0	19.0	16.0	56.0	67.0

Source: OECD

Notes

1. Response rate too low to ensure comparability

Table 4-2 Percentage of male and female 15 years olds (M&F) who use the computer as tool for word processing (2006)

Percentage of males and females frequently using ICT for programs and software

Country	Computer for programming		Drawing, Painting or graphics program on a computer		Spreadsheets		Comp to help learn school material		Educational software		Word processing	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
BE	**31.0**	**15.0**	25.0	13.0	20.0	14.0	24.0	23.0	9.0	4.0	48.0	51.0
CZ	**29.0**	**9.0**	35.0	20.0	27.0	17.0	25.0	27.0	15.0	15.0	47.0	45.0
DK	**31.0**	**9.0**	32.0	11.0	24.0	12.0	56.0	47.0	23.0	7.0	66.0	63.0
DE	**33.0**	**13.0**	30.0	18.0	24.0	14.0	28.0	26.0	13.0	10.0	53.0	45.0
IE	**15.0**	**11.0**	26.0	27.0	13.0	16.0	14.0	17.0	8.0	9.0	27.0	41.0
EL	36.0	21.0	44.0	45.0	31.0	23.0	27.0	19.0	26.0	18.0	46.0	44.0
IT	38.0	24.0	45.0	38.0	36.0	26.0	**45.0**	42.0	24.0	16.0	60.0	59.0
LV	23.0	9.0	36.0	22.0	25.0	15.0	**28.0**	22.0	18.0	10.0	38.0	27.0
HU	22.0	11.0	32.0	28.0	33.0	31.0	**33.0**	28.0	13.0	7.0	52.0	54.0
AT	33.0	14.0	33.0	22.0	26.0	24.0	**31.0**	31.0	12.0	6.0	52.0	67.0
PL	39.0	18.0	46.0	33.0	38.0	27.0	**29.0**	23.0	29.0	22.0	53.0	42.0
PT	42.0	26.0	33.0	24.0	33.0	23.0	**56.0**	58.0	17.0	13.0	16.0	51.0
SK	28.0	11.0	38.0	27.0	29.0	16.0	**34.0**	31.0	21.0	15.0	46.0	41.0
FI	19.0	3.0	27.0	10.0	9.0	3.0	18.0	18.0	4.0	2.0	28.0	26.0
SE	29.0	7.0	34.0	15.0	11.0	5.0	27.0	19.0	7.0	3.0	46.0	48.0
UK[1]	34.0	19.0	41.0	32.0	28.0	34.0	33.0	36.0	18.0	21.0	60.0	72.0
JP	4.0	2.0	7.0	10.0	7.0	9.0	4	5.0	2.0	1.0	15.0	19.0
US	38	27	43	39	24	20	**35**	37.0	19.0	16.0	56.0	67.0

Source: OECD

Notes

1. Response rate too low to ensure comparability

Table 4-3 Percentage of male and female 15 years olds (M&F) who use the computer for programming (2003)

	1998	1999	2000	2001	2002	2003	2004
Males	1.7	2.1	2.2	2.5	2.6	2.7	3.0
Females	0.6	0.7	0.7	0.8	0.8	0.9	0.9

Source: Calculated by EU-RA based on data from Eurostat

Table 5-1 Percentage of male and female computer science graduates (ISCED 5/6) as a proportion of all graduates, 2007

	1998	1999	2000	2001	2002	2003	2004
Males	5.0	7.0	7.9	7.5	7.6	7.5	7.3
Females	0.9	1.3	1.5	1.5	1.6	1.6	1.7

Source: Calculated by EU-RA based on data from Eurostat

Table 5-2 Percentage of male and female engineering and engineering graduates (ISCED 5/6) as a proportion of all graduates, 2007

Proportion of tertiary graduates in ICT related fields broken down by field and sex (ISCED 6) (2004)

Country	Computer science		Engineering and engineering trades	
	Male	Female	Male	Female
BE	88.5	11.5	82.6	17.4
BG	48.1	51.9	87.5	12.5
CZ	78.7	21.3	65.5	34.5
DK	76.3	23.7	84.5	15.5
DE	84.0	16.0	78.8	21.2
EE	71.8	28.2	92.1	7.9
IE	67.4	32.6	83.6	16.4
EL	67.8	32.2	86.1	13.9
ES	77.2	22.8	68.0	32.0
FR	:	:	80.3	19.7
IT	76.7	23.3	:	:
CY	70.5	29.5	81.0	19.0
LV	75.0	25.0	90.1	9.9
LT	73.1	26.9	79.2	20.8
LU			81.9	18.1
HU	71.8	28.2	:	:
MT	:	:	87.7	12.3
NL	91.1	8.9	:	:
AT	83.1	16.9	91.3	8.7
PL	83.7	16.3	88.5	11.5
PT	75.1	24.9	80.8	19.2
RO	:	:	75.9	24.1
SI	94.0	6.0	68.0	32.0
SK	84.2	15.8	96.6	3.4
FI	:	:	72.4	27.6
SE	64.7	35.3	:	:
UK	75.4	24.6	74.5	25.5

Source: Calculated by EU-RA base on data from Eurostat

Table 5-3 Percentage of tertiary graduates in the field of computer science broken down by sex, 2004

Proportion of tertiary graduates in ICT related fields broken down by field and sex (ISCED 6) (2004)

Country	Computer science		Engineering and engineering trades	
	Male	Female	Male	Female
BE	88.5	11.5	82.6	17.4
BG	48.1	51.9	87.5	12.5
CZ	78.7	21.3	65.5	34.5
DK	76.3	23.7	84.5	15.5
DE	84.0	16.0	78.8	21.2
EE	71.8	28.2	92.1	7.9
IE	67.4	32.6	83.6	16.4
EL	67.8	32.2	86.1	13.9
ES	77.2	22.8	68.0	32.0
FR	:	:	80.3	19.7
IT	76.7	23.3	:	:
CY	70.5	29.5	81.0	19.0
LV	75.0	25.0	90.1	9.9
LT	73.1	26.9	79.2	20.8
LU			81.9	18.1
HU	71.8	28.2	:	:
MT	:	:	87.7	12.3
NL	91.1	8.9	:	:
AT	83.1	16.9	91.3	8.7
PL	83.7	16.3	88.5	11.5
PT	75.1	24.9	80.8	19.2
RO	:	:	75.9	24.1
SI	94.0	6.0	68.0	32.0
SK	84.2	15.8	96.6	3.4
FI	:	:	72.4	27.6
SE	64.7	35.3	:	:
UK	75.4	24.6	74.5	25.5

Source: Calculated by EU-RA base on data from Eurostat

Table 5-4 Percentage of tertiary graduates in the field of engineering and engineering trades broken down by sex, 2004

Female Graduates Students by Field of education (2005) in the EU Countries (*)					
	Total number of graduates		Graduates in Science and Technology fields as a % of total		
Country	MF	% F	MF	% M	% F
Netherlands	106.684	56	16	80	20
Austria	32.925	52	30	77	23
Germany	343.874	53	27	76	24
Belgium (2004)	44.922	57	20	74	26
Slovenia	15.787	62	18	74	26
France	664.711	56	27	72	28
Czech Republic (2004)	54.341	58	22	71	29
Spain (2004)	298.448	58	28	70	30
Ireland	59.650	56	28	70	30
Malta	2.741	61	8	70	30
Finland (2004)	39.270	62	30	70	30
United Kingdom	633.042	58	22	69	31
EU Countries (*)				67	33
Latvia (2004)	23.852	69	13	67	33
Denmark	49.704	59	19	66	34
Sweden (2004)	59.359	61	29	66	34
Slovakia	36.337	57	26	65	35
Lithuania (2004)	38.095	66	22	64	36
Poland	501.393	66	14	63	37
Italy	379.933	59	22	63	37
Cyprus (2004)	3.547	60	13	63	37
Portugal	70.023	65	23	60	40
Romania	156.565	57	23	60	40
Greece	59.872	61	27	59	41
Bulgaria (2004)	45.957	58	21	58	42
Estonia	11.793	70	20	56	44
Source: Global Education Digest 2007, Comparing Education Statistics Across the World, UNESCO					
* except Hungary and Luxembourg					

Table 5-5 Percentage of total graduates in science and technology trades in the EU countries, 2005

Female Graduates Students by Field of education (2005)					
	Total number of graduates		Graduates in Science and Technology fields as a % of total		
Country	MF	% F	MF	% M	% F
Japan	1.059.386	49	21	85	15
Hong Kong (China)	41.513	52	36	74	26
Norway	31.929	62	16	74	26
Republic of Korea (2006)	607.982	49	37	71	29
Australia (2003)	250.479	56	21	70	30
United States	2.557.595	58	17	69	31
EU Countries (*)				67	33
Brazil (2003)	563.965	62	13	63	37
South Africa	120.385	59	17	63	37
Source: Global Education Digest 2007, Comparing Education Statistics Across the World, UNESCO					
(*) Except Hungary and Luxembourg					

Table 5-6 Percentage of tertiary graduates in the field of engineering and engineering trades broken down by sex, 2004

Proportion of female PhD (ISCED6) graduates by narrow field of study in natural science and engineering in EU-25, 2003		
Fields	F	M
Engineering & Engineering trades	17,1	82,9
Computing	18,6	81,4
Architecture & Building	31,3	68,7
Mathematics & Statistics	31,6	68,4
Manufacturing & Processing	32	68
Physical Science	33	67
Life Science	54,4	45,6
Source: She Studies 2006		

Table 5-7 Proportion of female PhD (ISCED 6) graduates by narrow field of study in natural sciences and engineering (400& 500 fields) 2003

Proportion of female PhD (ISCED6) graduates by narrow field of study in natural science and engineering in EU-25, 2003	
Fields	**GAP**
Life Science	8,8
Physical Science	-34,00
Manufacturing & Processing	-36,00
Mathematics & Statistics	-36,80
Architecture & Building	-37,40
Computing	-62,80
Engineering & Engineering trades	-65,80
Source: She Studies 2006	

Table 5-8 Gap males/females PhD (ISCED 6) graduates by narrow field of study in natural sciences and engineering (400& 500 fields) (%) 2003

Proportion of female PhD (ISCED6) graduates by narrow field of study in natural science and engineering, 2003 (%)						
Contries	**Computing**			**Engineering & Engineering trades**		
	women	**men**	**gap**	**women**	**men**	**gap**
Lithuania	0	100	100	44,1	55,9	11,8
Latvia	66,7	33,3	-33,4	41,7	58,3	16,6
Romania	(:)	(:)	(:)	37,5	62,5	25
Cyprus	(:)	(:)	(:)	(:)	(:)	(:)
Bulgaria	(:)	(:)	(:)	33,3	66,7	33,4
Hungary	30	70	40	33,3	66,7	33,4
Portugal	28	72	44	28	72	44
Ireland	21,4	78,6	57,2	24,1	75,9	51,8
Sweden	21,6	78,4	56,8	24,1	75,9	51,8
Slovakia	20	80	60	23,9	76,1	52,2
Denmark	(:)	(:)	(:)	23,8	76,2	52,4
Finland	13,9	86,1	72,2	23,6	76,4	52,8
France	18,8	81,2	62,4	22,8	77,2	54,4
Czech Republic	10,3	89,7	79,4	19,9	80,1	60,2
Netherlands	(:)	(:)	(:)	18	82	64
United States	21	79	58	17,2	82,8	65,6
EU-25	18,6	81,4	62,8	17,1	82,9	65,8
Switzerland	7,5	92,5	85	16,9	83,1	66,2
United Kingdom	23,3	76,7	53,4	16,2	83,8	67,6
Austria	9,5	90,5	81	16,1	83,9	67,8
Spain	22,8	77,2	54,4	16	84	68
Estonia	100	0	-100	15,4	84,6	69,2
Turkey	28,6	71,4	42,8	14,7	85,3	70,6
Italy	25	75	50	13,5	86,5	73
Belgium	3,2	96,8	93,6	13,4	86,6	73,2
Norway	(:)	(:)	(:)	13,3	86,7	73,4
Slovenia	15,4	84,6	69,2	10,4	89,6	79,2
Germany	11,9	88,1	76,2	6,8	93,2	86,4
Source: She Studies 2006						

Table 5-9 Gap males/females PhD (ISCED 6) graduates in engineering and engineering trades and computing (400& 500 fields) (%) 2003

Proportion of female PhD (ISCED6) graduates by narrow field of study in natural science and engineering, 2003 (%)						
Contries	**Computing**			**Engineering & Engineering trades**		
	women	**men**	**gap**	**women**	**men**	**gap**
Lithuania	0	100	100	44,1	55,9	11,8
Latvia	66,7	33,3	-33,4	41,7	58,3	16,6
Romania	(:)	(:)	(:)	37,5	62,5	25
Cyprus	(:)	(:)	(:)	(:)	(:)	(:)
Bulgaria	(:)	(:)	(:)	33,3	66,7	33,4
Hungary	30	70	40	33,3	66,7	33,4
Portugal	28	72	44	28	72	44
Ireland	21,4	78,6	57,2	24,1	75,9	51,8
Sweden	21,6	78,4	56,8	24,1	75,9	51,8
Slovakia	20	80	60	23,9	76,1	52,2
Denmark	(:)	(:)	(:)	23,8	76,2	52,4
Finland	13,9	86,1	72,2	23,6	76,4	52,8
France	18,8	81,2	62,4	22,8	77,2	54,4
Czech Republic	10,3	89,7	79,4	19,9	80,1	60,2
Netherlands	(:)	(:)	(:)	18	82	64
United States	21	79	58	17,2	82,8	65,6
EU-25	18,6	81,4	62,8	17,1	82,9	65,8
Switzerland	7,5	92,5	85	16,9	83,1	66,2
United Kingdom	23,3	76,7	53,4	16,2	83,8	67,6
Austria	9,5	90,5	81	16,1	83,9	67,8
Spain	22,8	77,2	54,4	16	84	68
Estonia	100	0	-100	15,4	84,6	69,2
Turkey	28,6	71,4	42,8	14,7	85,3	70,6
Italy	25	75	50	13,5	86,5	73
Belgium	3,2	96,8	93,6	13,4	86,6	73,2
Norway	(:)	(:)	(:)	13,3	86,7	73,4
Slovenia	15,4	84,6	69,2	10,4	89,6	79,2
Germany	11,9	88,1	76,2	6,8	93,2	86,4
Source: She Studies 2006						

Table 5-10 Gap males/females PhD (ISCED 6) graduates in engineering and engineering trades and computing (400& 500 fields) (%) 2003

Percentage of women on total researchers in BES in selected countries - 2004						
Countries	**total**	**BES W**	**BES M**	**GOV**	**HES W**	**HES M**
Malta	24	20	80	50	24	76
Switzerland	27	21	79	26	30	70
Germany	19	12	88	27	25	75
Turkey	36	25	75	28	37	63
Netherlands	17	9	91	25	29	71
Austria	21	10	90	35	30	70
Denmark	28	25	75	35	31	69
Italy	29	19	81	39	31	69
Cyprus	31	22	78	40	31	69
Czech Republic	29	20	80	35	32	68
France	28	20	80	32	34	66
EEA	28	18	82	36	34	66
EU-25	28	18	82	36	34	66
Norway	29	19	81	36	38	62
Slovenia	33	25	75	41	34	66
Belgium	28	20	80	30	35	65
Hungary	35	24	76	39	36	64
Ireland	30	20	80	31	37	63
Greece	37	35	65	39	37	63
Spain	36	27	73	46	38	62
Bulgaria	47	48	52	51	38	62
Romania	43	42	58	49	40	60
Poland	39	25	75	41	41	59
Croatia	41	39	61	42	41	59
Luxembourg	17	14	86	29	43	57
Finland	29	17	83	40	43	57
Russian Federation	43	42	58	46	39	61
Iceland	39	33	67	42	43	57
Slovakia	41	32	68	43	43	57
Sweden	36	25	75	36	44	56
Estonia	43	24	76	60	45	55
Portugal	44	30	70	58	46	54
Lithuania	48	37	63	50	49	51
Latvia	53	51	49	53	53	47
Source: EUROSTAT						

Table 6-1 Percentage of women researchers in the higher education sector

Percentage of women on total researchers in HES in selected countries - 2004						
Countries	**total**	**BES W**	**BES M**	**GOV**	**HES W**	**HES M**
Netherlands	17	9	91	25	29	71
EEA	28	18	82	36	34	66
Germany	19	12	88	27	25	75
EU-25	28	18	82	36	34	66
Luxembourg	17	14	86	29	43	57
Belgium	28	20	80	30	35	65
Ireland	30	20	80	31	37	63
France	28	20	80	32	34	66
Austria	21	10	90	35	30	70
Czech Republic	29	20	80	35	32	68
Denmark	28	25	75	35	31	69
Norway	29	19	81	36	38	62
Switzerland	27	21	79	26	30	70
Turkey	36	25	75	28	37	63
Sweden	36	25	75	36	44	56
Italy	29	19	81	39	31	69
Hungary	35	24	76	39	36	64
Greece	37	35	65	39	37	63
Finland	29	17	83	40	43	57
Cyprus	31	22	78	40	31	69
Poland	39	25	75	41	41	59
Slovenia	33	25	75	41	34	66
Iceland	39	33	67	42	43	57
Croatia	41	39	61	42	41	59
Slovakia	41	32	68	43	43	57
Spain	36	27	73	46	38	62
Russian Federation	43	42	58	46	39	61
Romania	43	42	58	49	40	60
Malta	24	20	80	50	24	76
Lithuania	48	37	63	50	49	51
Bulgaria	47	48	52	51	38	62
Latvia	53	51	49	53	53	47
Portugal	44	30	70	58	46	54
Estonia	43	24	76	60	45	55
Source: EUROSTAT						

Table 6-2 Percentage of women researchers in the higher education sector in selected countries (2004)

Percentage of women researchers in BES in the European Union - 2004						
Countries	**total**	**BES W**	**BES M**	**GOV**	**HES W**	**HES M**
Netherlands	17	9	91	25	29	71
Switzerland	27	21	79	26	30	70
Austria	21	10	90	35	30	70
Turkey	36	25	75	28	37	63
Germany	19	12	88	27	25	75
Luxembourg	17	14	86	29	43	57
Finland	29	17	83	40	43	57
EU-25	28	18	82	36	34	66
Italy	29	19	81	39	31	69
Belgium	28	20	80	30	35	65
Ireland	30	20	80	31	37	63
EEA	28	18	82	36	34	66
France	28	20	80	32	34	66
Norway	29	19	81	36	38	62
Czech Republic	29	20	80	35	32	68
Malta	24	20	80	50	24	76
Cyprus	31	22	78	40	31	69
Hungary	35	24	76	39	36	64
Estonia	43	24	76	60	45	55
Denmark	28	25	75	35	31	69
Sweden	36	25	75	36	44	56
Poland	39	25	75	41	41	59
Slovenia	33	25	75	41	34	66
Croatia	41	39	61	42	41	59
Spain	36	27	73	46	38	62
Portugal	44	30	70	58	46	54
Russian Federation	43	42	58	46	39	61
Slovakia	41	32	68	43	43	57
Iceland	39	33	67	42	43	57
Greece	37	35	65	39	37	63
Lithuania	48	37	63	50	49	51
Romania	43	42	58	49	40	60
Bulgaria	47	48	52	51	38	62
Latvia	53	51	49	53	53	47
Source: EUROSTAT						

Table 6-3 Percentage of women researchers in the business enterprise sector

Percentage of women on total researchers in BES in selected countries - 2004						
Countries	total	BES W	BES M	GOV	HES W	HES M
Netherlands	17	9	91	25	29	71
Austria	21	10	90	35	30	70
Germany	19	12	88	27	25	75
EEA	28	18	82	36	34	66
Luxembourg	17	14	86	29	43	57
Belgium	28	20	80	30	35	65
Ireland	30	20	80	31	37	63
France	28	20	80	32	34	66
EU-25	28	18	82	36	34	66
Czech Republic	29	20	80	35	32	68
Denmark	28	25	75	35	31	69
Norway	29	19	81	36	38	62
Switzerland	27	21	79	26	30	70
Turkey	36	25	75	28	37	63
Sweden	36	25	75	36	44	56
Italy	29	19	81	39	31	69
Hungary	35	24	76	39	36	64
Greece	37	35	65	39	37	63
Finland	29	17	83	40	43	57
Cyprus	31	22	78	40	31	69
Poland	39	25	75	41	41	59
Slovenia	33	25	75	41	34	66
Slovakia	41	32	68	43	43	57
Iceland	39	33	67	42	43	57
Croatia	41	39	61	42	41	59
Spain	36	27	73	46	38	62
Russian Federation	43	42	58	46	39	61
Romania	43	42	58	49	40	60
Malta	24	20	80	50	24	76
Lithuania	48	37	63	50	49	51
Bulgaria	47	48	52	51	38	62
Latvia	53	51	49	53	53	47
Portugal	44	30	70	58	46	54
Estonia	43	24	76	60	45	55
Source: EUROSTAT						

Table 6-4 Percentage of women researchers in the business enterprise sector in selected countries (2004)

Proportion of female researchers in the Government Sector (GOV) by field of science in EU-25, 2003		
Fields	F	M
Engineering and Technology	22,3	77,7
Natural Science	31	69
Agricultural Sciences	43,1	56,9
Social Sciences	44,3	55,7
Medical Sciences	49,7	50,3
Humanities	50,4	49,6
Source: She Studies 2006		

Table 6-5 Percentage of female researchers in the Government sector by field of science in EU-25 (2003)

Proportion of female researchers in the Government Sector (GOV) by field of science in EU-25, 2003 - Gap males/females	
Fields	**Gap**
Engineering and Technology	-55,40
Natural Science	-38,00
Agricultural Sciences	-13,80
Social Sciences	-11,40
Medical Sciences	-0,60
Humanities	0,80

Table 6-6 Gap between men and women in the percentage researchers in the Government sector by field of science in EU-25 (2003)

Proportion of female researchers in Engineering and Technology in the Government Sector (GOV) by country, 2003		
Countries	**Engineering and Technology**	**M**
Romania	44,3	55,7
Iceland	40,8	59,2
Spain	38,8	61,2
Cyprus	37,5	62,5
Portugal	36,9	63,1
Bulgaria	34,3	65,7
Slovenia	33,6	66,4
Estonia	28,9	71,1
Slovakia	28,3	71,7
Lithuania	26,5	73,5
Austria	26	74
Poland	25	75
Denmark	22,7	77,3
EU-25	22,3	77,7
Hungary	19,1	80,9
Latvia	18,6	81,4
Norway	17,2	82,8
Germany	16,6	83,4
Luxembourg	16,2	83,8
Czech Republic	14,5	85,5
Croatia	14,3	85,7
Ireland	7,1	92,9
Malta	0	100
Source: She Studies 2006		

Table 6-7 Percentage of women researchers in Engineering and technology in the government sector (GOV)

Proportion of female researchers in Engineering and Technology in the Government Sector (GOV) by country, 2003 -Gap males/females (%)	
Countries	**Gap**
Romania	11,4
Iceland	18,4
Spain	22,4
Cyprus	25
Portugal	26,2
Bulgaria	31,4
Slovenia	32,8
Estonia	42,2
Slovakia	43,4
Lithuania	47
Austria	48
Poland	50
Denmark	54,6
EU-25	55,4
Hungary	61,8
Latvia	62,8
Norway	65,6
Germany	66,8
Luxembourg	67,6
Czech Republic	71
Croatia	71,4
Ireland	85,8
Malta	100

Table 6-8 Percentage of women researchers in Engineering and technology in the government sector (GOV)-Gap males/females (%)

Inactivity rates of women (%) 2006					
			25-54 years old		
Country	15-64 years old	15-24 years old	total	due to family responsabilities	55-64 years old
Slovenia	33,2	63,6	13	3,9	78,6
Sweden	23,7	48,1	13,7	2,1	30,4
Estonia	30,7	69,4	14,3	8,5	39,5
Denmnark	23	30,7	14,6	2,3	43,3
Finland	25	39,2	14,6	6,2	42,8
Iceland	16,6	19,7	15,2	3,2	18,8
Lithuania	35,4	76,9	16,2	7,1	52,4
Norway	25,2	42,1	16,7	2,7	37,8
Latvia	33,4	66,4	17,1	8,8	48,4
Portugal	31,6	61,3	17,3	8,7	54,9
Germany	30,5	52,2	18,6	9,9	52,7
Czeck Republic	37,7	70,8	18,7	12,4	66
Slovakia	39,1	69,1	18,8	11,4	79,1
Switzerland	25,3	32,9	18,8	13,7	41,4
Austria	33	44,9	19,1	12,8	73,1
France	35,9	65,4	19,8	4,9	63
Netherlands	29,7	31,6	20,4	8,3	60,7
Bulgaria	39,8	73,6	20,6	7,7	66,1
United Kingdom	30,8	41,6	22,1	1,9	49,9
Cyprus	36,2	61,7	22,6	18,3	62,2
Belgium	40,5	68,1	23	10,1	75,4
EU27	37,1	59,4	23,6	10,2	62,9
Poland	43,2	69,3	24,6	12	79,7
Croatia	43,1	68,4	24,8	11	73,1
Luxembourg	41,8	75	26,3	21,7	71,5
Hungary	44,5	76,6	27,1	11,6	71,8
Romania	43,4	74,1	27,4	11,7	65,2
Spain	40	55,9	28,8	18,2	69,6
Ireland	38,7	52,2	29,5	23,1	59,2
Greece	45	71,3	30,9	18,8	72
Italy	49,2	73,1	35,7	15,2	77,5
Malta	61,7	50,9	58,9	45,9	88,4
Turkey	73,9	76,3	71,5	62,6	83,2
Source: EUROSTAT					

Table 7-1 Inactivity rates of Women in %, 2006 by age

Inactivity rates of women (%) 2006					
			25-54 years old		
Country	15-64 years old	15-24 years old	total	due to family responsabilities	55-64 years old
United Kingdom	30,8	41,6	22,1	1,9	49,9
Sweden	23,7	48,1	13,7	2,1	30,4
Denmnark	23	30,7	14,6	2,3	43,3
Norway	25,2	42,1	16,7	2,7	37,8
Iceland	16,6	19,7	15,2	3,2	18,8
Slovenia	33,2	63,6	13	3,9	78,6
France	35,9	65,4	19,8	4,9	63
Finland	25	39,2	14,6	6,2	42,8
Lithuania	35,4	76,9	16,2	7,1	52,4
Bulgaria	39,8	73,6	20,6	7,7	66,1
Netherlands	29,7	31,6	20,4	8,3	60,7
Estonia	30,7	69,4	14,3	8,5	39,5
Portugal	31,6	61,3	17,3	8,7	54,9
Latvia	33,4	66,4	17,1	8,8	48,4
Germany	30,5	52,2	18,6	9,9	52,7
Belgium	40,5	68,1	23	10,1	75,4
EU27	37,1	59,4	23,6	10,2	62,9
Croatia	43,1	68,4	24,8	11	73,1
Slovakia	39,1	69,1	18,8	11,4	79,1
Hungary	44,5	76,6	27,1	11,6	71,8
Romania	43,4	74,1	27,4	11,7	65,2
Poland	43,2	69,3	24,6	12	79,7
Czeck Republic	37,7	70,8	18,7	12,4	66
Austria	33	44,9	19,1	12,8	73,1
Switzerland	25,3	32,9	18,8	13,7	41,4
Italy	49,2	73,1	35,7	15,2	77,5
Spain	40	55,9	28,8	18,2	69,6
Cyprus	36,2	61,7	22,6	18,3	62,2
Greece	45	71,3	30,9	18,8	72
Luxembourg	41,8	75	26,3	21,7	71,5
Ireland	38,7	52,2	29,5	23,1	59,2
Malta	61,7	50,9	58,9	45,9	88,4
Turkey	73,9	76,3	71,5	62,6	83,2
Source: EUROSTAT					

Table 7-2 Inactivity rates for women aged 25-54 due to family responsibilities

		Unemployment rates		
		University graduates		Total populatic
		1998	2004	2004
Turkey	UR Women	10,8	17,0	10,9
	UR Men	7,1	10,2	
Greece	UR Women	9,9	11,2	10,4
	UR Men	4,0	5,0	
Spain	UR Women	20,1	10,0	11,0
	UR Men	10,1	6,0	
Poland	UR Women	3,3	8,0	19,3
	UR Men	2,3	6,6	
France	UR Women	8,5	7,7	10,0
	UR Men	5,4	7,2	
Italy	UR Women	10,0	6,6	8,0
	UR Men	5,2	3,7	
Germany	UR Women	5,6	5,9	11,1
	UR Men	4,6	5,2	
Luxembourg (1999-2004)	UR Women	1,3	5,8	4,8
	UR Men	1,0	2,2	
Portugal	UR Women	5,2	5,7	7,0
	UR Men	2,7	4,9	
Slovak Republic	UR Women	4,8	5,5	18,2
	UR Men	3,2	5,6	
Finland	UR Women	4,3	5,4	10,4
	UR Men	4,0	3,4	
Belgium	UR Women	4,8	5,1	8,5
	UR Men	2,8	4,3	
Austria	UR Women	2,3	5,0	5,0
	UR Men	1,9	2,5	
Canada	UR Women	4,5	4,8	7,2
	UR Men	4,4	4,7	
Mexico	UR Women	4,3	4,2	3,1
	UR Men	3,1	3,7	
Switzerland	UR Women	6,4	3,9	4,6
	UR Men	2,4	2,8	
Sweden	UR Women	3,0	3,7	6,6
	UR Men	4,2	4,5	
Japan	UR Women	3,1	3,5	5,0
	UR Men	2,4	3,3	
Denmark	UR Women	2,8	3,5	5,3
	UR Men	2,8	3,1	
Korea	UR Women	4,8	3,3	3,6
	UR Men	5,0	2,6	
New Zealand	UR Women	5,3	3,0	4,0
	UR Men	4,6	2,8	
United States	UR Women	1,8	3,0	6,2
	UR Men	1,8	3,1	
Australia	UR Women	3,0	2,9	5,6
	UR Men	3,2	3,1	
Hungary	UR Women	1,7	2,9	6,1
	UR Men	2,0	1,7	
Netherlands (1999-2004)	UR Women	2,1	2,6	4,7
	UR Men	1,5	2,9	
Czech Republic	UR Women	2,9	2,3	8,4
	UR Men	1,8	2,2	
Norway	UR Women	1,8	2,3	4,5
	UR Men	1,9	3,0	
Ireland	UR Women	4,5	2,2	4,6
	UR Men	3,2	2,1	
United Kingdom	UR Women	3,1	2,2	4,7
	UR Men	2,8	2,6	
Iceland	UR Women	1,0	0,4	4,1
	UR Men	0,7	1,2	
SOURCE	OECD, Educational Attainment database, 2007			

Table 7-3 Unemployment rates of university graduates (2004)

High-tech manufacturing		
	Males	Females
Greece	0,29	0,15
Romania	0,35	0,25
Netherlands	0,89	0,3
Spain	0,5	0,36
Portugal	0,45	0,41
Croatia	0,51	0,49
Poland	0,59	0,57
Bulgaria	0,47	0,6
Sweden	1,16	0,61
United Kingdom	1,34	0,65
Denmark	0,85	0,72
France	1,23	0,81
EU-27	1,24	0,83
Austria	1,73	0,92
Italy	1,45	1,03
Slovenia	1,06	1,14
Germany	2,14	1,19
Finland	2,85	1,25
Switzerland	2,69	1,79
Czech Republic	1,5	1,9
Slovakia	1,27	2,43
Hungary	2,23	2,78
Malta	2,56	4,37
Estonia	:	:
Cyprus	:	:
Latvia	:	:
Lithuania	:	:
Luxembourg	:	:

Table 7-4 Share of women in total employment in high-tech manufacturing in EU-27 — 2006

High-tech KIS		
	Males	Females
Portugal	2,31	1,32
Cyprus	2,43	1,39
Greece	2,24	1,59
Romania	1,59	1,64
Slovenia	3,59	1,72
Austria	3,6	1,73
Croatia	2,26	1,93
Luxembourg	4,21	2,05
Poland	2,6	2,1
United Kingdom	5,97	2,19
Lithuania	1,87	2,23
Netherlands	5,12	2,23
Spain	3,43	2,33
EU-27	3,96	2,43
Germany	4,31	2,47
Latvia	2,52	2,53
Slovakia	2,56	2,55
Bulgaria	2,56	2,62
Italy	3,31	2,68
Switzerland	4,65	2,75
Czech Republic	2,95	2,93
France	4,42	2,99
Hungary	3,74	3,03
Denmark	5,44	3,19
Sweden	6,56	3,38
Finland	5,67	3,43
Estonia	3,05	:
Malta	3,34	:

Table 7-5 Share of women in total employment in high-tech KIS sector EU-27— 2006

Mean annual earnings in EUR per person employed, in manufactoring sectors, by gender, EU-25 and selected countries - 2002 (last data available)				
	High-tech KIS		High-tech manufacturing	
Country	Women	Men	Women	Men
LT	4.117	6.655	3.486	5.699
LV	4.389	7.570	2.793	3.438
EE	5.010	9.335	3.838	6.082
CZ	6.341	10.428	5.183	8.078
HU	6.954	10.069	4.658	6.735
EL	17.661	26.486	13.795	24.566
CY	20.039	27.519		
ES	22.897	31.585	20.006	27.990
IT	25.047	27.211	21.933	29.659
FR	30.429	38.424	26.462	38.604
AT	30.442	39.815	30.333	45.060
BE	31.454	38.062	26.614	44.518
IE	31.464	37.708	29.630	38.081
DE	33.668	46.663	30.745	46.473
NL	36.983	38.566	28.970	40.314
LU	41.471	52.609	22.458	32.808
DK	42.619	55.443	30.657	43.904
Source: OECD				

Table 7-6 Mean annual earnings in EUR per person employed in high-tech knowledge intensive sectors (High-tech KIS)

Mean annual earnings in EUR per person employed, in manufactoring sectors, by gender, EU-25 and selected countries - 2002 (last data available)				
	High-tech KIS		High-tech manufacturing	
Country	Women	Men	Women	Men
LV	4.389	7.570	2.793	3.438
LT	4.117	6.655	3.486	5.699
EE	5.010	9.335	3.838	6.082
HU	6.954	10.069	4.658	6.735
CZ	6.341	10.428	5.183	8.078
EL	17.661	26.486	13.795	24.566
ES	22.897	31.585	20.006	27.990
IT	25.047	27.211	21.933	29.659
LU	41.471	52.609	22.458	32.808
FR	30.429	38.424	26.462	38.604
BE	31.454	38.062	26.614	44.518
NL	36.983	38.566	28.970	40.314
IE	31.464	37.708	29.630	38.081
AT	30.442	39.815	30.333	45.060
DK	42.619	55.443	30.657	43.904
DE	33.668	46.663	30.745	46.473
Source: OECD				

Table 7-7 Mean annual earnings in EUR per person employed in high-tech manufacturing sectors

Percentage in women in senior Academic Staff - 2004						
Country	women	men	women (%	men (%)	gap (%)	total M+F
Cyprus	0	3	0,00%	100,00%	100,00%	3
Malta	0	2	0,00%	100,00%	100,00%	2
Denmark	2	143	1,38%	98,62%	97,24%	145
Netherlands	12	372	3,13%	96,88%	93,75%	384
Austria	10	262	3,68%	96,32%	92,65%	272
Germany	57	1463	3,75%	96,25%	92,50%	1520
Belgium	13	295	4,22%	95,78%	91,56%	308
Czech Republic	26	555	4,48%	95,52%	91,05%	581
Norway	15	292	4,89%	95,11%	90,23%	307
United Kingdom	83	1596	4,94%	95,06%	90,11%	1679
Portugal	12	230	4,96%	95,04%	90,08%	242
Slovenia	12	212	5,36%	94,64%	89,29%	224
Italy	165	2547	6,08%	93,92%	87,83%	2712
Finland	22	328	6,29%	93,71%	87,43%	350
France	158	2278	6,49%	93,51%	87,03%	2436
Slovakia	27	383	6,59%	93,41%	86,83%	410
Sweden	62	814	7,08%	92,92%	85,84%	876
Poland	141	1474	8,73%	91,27%	82,54%	1615
Switzerland	114	1014	10,11%	89,89%	79,79%	1128
Turkey	226	1224	15,59%	84,41%	68,83%	1450
Source: EUROSTAT						

Number of senior Academic Staff 2004 - gap males/females (%)						
Country	women	men	women (%	men (%)	gap (%)	total M+F
Turkey	226	1224	15,59%	84,41%	68,83%	1450
Switzerland	114	1014	10,11%	89,89%	79,79%	1128
Poland	141	1474	8,73%	91,27%	82,54%	1615
Sweden	62	814	7,08%	92,92%	85,84%	876
Slovakia	27	383	6,59%	93,41%	86,83%	410
France	158	2278	6,49%	93,51%	87,03%	2436
Finland	22	328	6,29%	93,71%	87,43%	350
Italy	165	2547	6,08%	93,92%	87,83%	2712
Slovenia	12	212	5,36%	94,64%	89,29%	224
Portugal	12	230	4,96%	95,04%	90,08%	242
United Kingdom	83	1596	4,94%	95,06%	90,11%	1679
Norway	15	292	4,89%	95,11%	90,23%	307
Czech Republic	26	555	4,48%	95,52%	91,05%	581
Belgium	13	295	4,22%	95,78%	91,56%	308
Germany	57	1463	3,75%	96,25%	92,50%	1520
Austria	10	262	3,68%	96,32%	92,65%	272
Netherlands	12	372	3,13%	96,88%	93,75%	384
Denmark	2	143	1,38%	98,62%	97,24%	145
Cyprus	0	3	0,00%	100,00%	100,00%	3
Malta	0	2	0,00%	100,00%	100,00%	2

Table 7-8 Proportion of senior academic staff (Grade A) by fields of science and by sex (2004) (engineering and technology)

Number of women and men on scientific boards - 2004				
Country	**women (%)**	**men (%)**	**gap (%)**	**Total (W+M)**
Norway	48,28%	51,72%	3,45%	29
Finland	47,54%	52,46%	4,92%	61
Sweden	46,99%	53,01%	6,02%	83
Denmark	35,25%	64,75%	29,50%	139
Bulgaria	32,81%	67,19%	34,38%	128
United Kingdom	31,38%	68,62%	37,25%	443
Iceland	26,94%	73,06%	46,13%	271
France	26,70%	73,30%	46,60%	427
Latvia	23,57%	76,43%	52,86%	140
Ireland	22,26%	77,74%	55,48%	292
Estonia	21,90%	78,10%	56,20%	694
Slovenia	20,99%	79,01%	58,02%	81
Netherlands	20,77%	79,23%	58,45%	207
Switzerland	20,39%	79,61%	59,22%	103
Hungary	20,27%	79,73%	59,46%	370
Lithuania	17,67%	82,33%	64,66%	232
Germany	17,14%	82,86%	65,72%	3518
Belgium	14,41%	85,59%	71,19%	354
Italy	12,83%	87,17%	74,34%	795
Czech Republic	11,82%	88,18%	76,36%	313
Slovakia	10,19%	89,81%	79,62%	157
Poland	7,19%	92,81%	85,61%	139
Cyprus	6,67%	93,33%	86,67%	75
Source: EUROSTAT				

Number of women and men on scientific boards - 2004				
Country	**women (%)**	**men (%)**	**gap (%)**	Total (W+M)
Cyprus	6,67%	93,33%	86,67%	75
Poland	7,19%	92,81%	85,61%	139
Slovakia	10,19%	89,81%	79,62%	157
Czech Republic	11,82%	88,18%	76,36%	313
Italy	12,83%	87,17%	74,34%	795
Belgium	14,41%	85,59%	71,19%	354
Germany	17,14%	82,86%	65,72%	3518
Lithuania	17,67%	82,33%	64,66%	232
Hungary	20,27%	79,73%	59,46%	370
Switzerland	20,39%	79,61%	59,22%	103
Netherlands	20,77%	79,23%	58,45%	207
Slovenia	20,99%	79,01%	58,02%	81
Estonia	21,90%	78,10%	56,20%	694
Ireland	22,26%	77,74%	55,48%	292
Latvia	23,57%	76,43%	52,86%	140
France	26,70%	73,30%	46,60%	427
Iceland	26,94%	73,06%	46,13%	271
United Kingdom	31,38%	68,62%	37,25%	443
Bulgaria	32,81%	67,19%	34,38%	128
Denmark	35,25%	64,75%	29,50%	139
Sweden	46,99%	53,01%	6,02%	83
Finland	47,54%	52,46%	4,92%	61
Norway	48,28%	51,72%	3,45%	29
Source: EUROSTAT				

Table 7-9 Number of women and men in scientific boards engineering and technology, 2004

Country	Women in managerial positions	Men in managerial positions		
Cyprus	14	86		
Malta	14	86		
Denmark	23	77		
Luxembourg	24	76		
Germany	26	74		
Greece	26	74		
The Netherlands	26	74		
Austria	27	73		
Czech Republic	30	70		
Finland	30	70		
Ireland	30	70		
Sweden	30	70		
Average (%)	30	70		
Romania	31	69		
Slovakia	31	69		
Spain	32	68		
Italy	32	68		
Poland	32	68		
Belgium	33	67		
Slovenia	33	67		
Bulgaria	34	66		
Hungary	34	66		
Portugal	34	66		
United Kingdom	34	66		
Estonia	37	63		
France	38	62		
Lithuania	43	57		
Latvia	44	56		
Source: European Commission, DG EMPL, Database on women and men in decision-making				

Table 7-10 Proportion of women and men in managerial positions (2005)

ANNEX 4: METHODOLOGY

The individual conclusions reached in the report were based on valid statistical evidence collected by prestigious scientific institutions such as OECD and EUROSTAT, as detailed in the Data Sources List (Annex 2). They provide relevant evidence of the extent to which women manifest an interest for an academic and professional career in computing and engineering fields. Moreover, they show the degree to which they manage to penetrate nowadays the higher levels of the professional and decision-making hierarchy in the field.

In the original collection the statistical data selected for the report, various information resources, specific research methods and different size samples were used. For this reason, the report should not be regarded as an in-depth comprehensive analysis of the presence of women in ICT and ICT related fields. The report should be used for information purposes only.

In selecting the statistical data, a special attention was dedicated to identifying whether one's attitudes, skills and interest in pursuing an academic or a professional career in engineering and computer science is determined by inherent gender differences. To that aim, several gender segregated indicators were presented and additionally broader socio-economic factors (such as unemployment rates or salary differences) were analysed.

The report wishes to emphasize, in the light of the data presented, the importance of designing a common policy framework for gender awareness at EU level. This framework should express the commitment of the Member States to create the appropriate institutional framework as well as the adequate economic incentives to allow and encourage women to pursue a professional career in engineering and technology (and more specifically in ICT) while respecting possible biological constraints to their professional choices.

Methodological considerations in the original resources used:

OECD PISA (Programme for International Student Assessment) 2003 Study was the second three-yearly survey of student knowledge and skills. PISA is the most comprehensive and rigorous international programme that assesses student performance and collects data on characteristics of students and the institutions where they study.

PISA is policy driven and aims to provide participating governments with information on how well young adults are prepared to meet the challenges of today's knowledge societies.
PISA 2003 was conducted in 41 countries, including all 30 OECD countries.
Students participating in PISA 2003 were aged between 15 years 3 months and 16 years 2 months at the time of the assessment. All students of this age were included in the target population regardless of the grade or type of institution they were enrolled in and of whether they were in full-time or part-time education. As a result, the 15-year-olds assessed in PISA 2003 have had different educational experiences, both within and outside school.
The students answered, amongst others, a 5 minutes questionnaire about their access to and familiarity with ICT. Students provided information on whether or not ICT was available to them and how they used it, as well as how confident they felt performing certain tasks on a computer and their general attitudes to using computers. Students also provided information on how they learned to use computers and the Internet.
Three years later, PISA 2006 focused on science performance and examined students' attitudes towards science, their awareness of the life opportunities that possessing science competencies may bring, and the science learning opportunities and environments offered by their school. Students received scores for their capacity in each of the three science competencies (identifying scientific issues, explaining phenomena scientifically and using scientific evidence).

OECD Science, Technology and Industry (STI) Scoreboard brings together over 200 internationally comparable quality indicators to explore the progress of national innovation strategies and recent developments in science, technology and industry. OECD used specific internal databases such as:

- The **R&D database** (R&D) contains the full results of the OECD surveys on R&D expenditure and personnel.
- **The Main Science and Technology Indicators database (MSTI)** provides a selection of the most frequently used annual data on the scientific and technological performance of OECD member countries and nine non-member economies (Argentina, China, Israel, Romania, Russian Federation, Singapore, Slovenia, South Africa, Chinese Taipei). The indicators, expressed in the form of ratios, percentages, growth rates, cover resources devoted to R&D, patent families, technology balance of payments and international trade in highly R&D-intensive industries.

EUROSTAT - The data from EUROSTAT all originate from a variety of different surveys conducted at national level:

Researchers and R&D Expenditure data are collected through the R&D Survey which is since 2004 a joint data collection between Eurostat and the OECD.

- Human Resources in Science and Technology data are collected through Eurostat's Labour Force Survey.
- Education data are collected through the UOE (UNESCO-UIS, OECD, Eurostat) questionnaire.
- Gender Pay Gap data have been collected through SES2002 (Structure of Earnings survey 2002). Annual earnings indicators are extracted and built up using data from the Structure Earnings Survey — SES. Data are only available at national level. It includes remuneration in cash paid directly by the employer, before deductions of tax and social security contributions. It also includes allowances and bonuses which are not paid in each pay period, such as 13th month payments or holiday bonuses. Severance payments and payment in kind are not included. The data does not necessarily indicate differences in rates of pay for comparable jobs. Pay medians are affected by the different work patterns of men and women, such as the proportions in different occupations and their length of time in jobs.

ANNEX 5: ABBREVIATIONS

BES	Business Enterprise Sector
EU-RA	European Research Associates
GOV	Governmental Sector
HES	High Education Sector
HRST	Human Resources in Science and Technology
ICT	Information and Communication Technologies
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
KIS	Knowledge Intensive Sectors
LFS	Labour Force Survey
M&F	Males and Females
NACE	Nomenclature des Activités économiques dans la Communauté Européenne
PhD	Postgraduate research degree
PISA	Programme for International Student Assessment
R&D	Research and Development
S&E	Scientists and Engineers
S&T	Science and Technology
SES	Structures of Earnings Survey

Member States:

AT Austria	LT Lithuania
BE Belgium	LV Latvia
CY Cyprus	LU Luxembourg
CZ Czech Republic	MT Malta
DE Germany	NL The Netherlands
DK Denmark	PL Poland
EL Greece	PT Portugal
EE Estonia	SE Sweden
ES Spain	SI Slovenia
FI Finland	SK Slovak Republic
FR France	UK United Kingdom
HU Hungary	
IE Ireland	
IT Italy	