Women in Industrial Research

Introduction

A wake up call

Science, engineering and technology are vital to developments in most industrial sectors. However, social, economic and demographic changes in Europe mean that skill shortages in industrial research are likely to worsen, unless there is active intervention. Significantly more investment will be needed in research and development (R&D) in future years. Considerable effort will have to be expended in attracting and retaining additional researchers. Europe needs to address the chronic shortage of industrial researchers[1] and mobilise that most neglected reservoir of talents – women – in particular. Companies especially will need to take an active role in expanding a highly qualified workforce; other stakeholders will need to ensure that there are suitable framework conditions in place for this growth to occur.

[1] By industrial researchers we mean qualified people working in Science, Engineering and Technology Development in the business enterprises. OECD (1993) *Proposed Standard Practice for Surveys of Research and Experimental Development: The Frascati Manual,* Paris: OECD: 'Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and in the management of the projects concerned.'

Box 1.1: R&D financing by main sources of funds, latest available year (%)

Source: DG Research Key Figures (2002)

Data: OECD.

Notes:
[1] 2001;
[2] 2000;
[3] 1996;
[4] EU average does not include Liechtenstein;
[5] excludes most or all capital expenditure.

	Business Enterprise	Government	Other national sources	Abroad	Total
Belgium	66.2	23.2	3.3	7.3	100
Denmark	58.0	32.6	3.5	5.3	100
Germany[1]	66.9	30.7	0.4	2.1	100
Greece	24.2	48.7	2.5	24.7	100
Spain[2]	49.7	38.6	6.8	4.9	100
France	54.1	36.9	1.9	7.0	100
Ireland	64.1	21.8	1.6	12.4	100
Italy[3]	43.0	50.8	–	6.2	100
Netherlands	49.7	35.8	3.4	11.2	100
Austria	40.1	40.3	0.3	19.3	100
Portugal	21.3	69.7	3.7	5.3	100
Finland[2]	70.3	26.2	0.9	2.7	100
Sweden	67.8	24.5	4.2	3.5	100
UK[2]	49.3	28.9	5.5	16.3	100
EU[4]	56.3	34.2	2.1	7.4	100
US[2,5]	66.8	27.3	4.4	–	100
Japan[2]	72.4	19.6	7.6	0.4	100

Box 1.2: The European Union goal set at the Lisbon Summit, March 2000

'To make the European Union by 2010 the most competitive knowledge-based economy, capable of sustainable economic growth with more and better jobs and greater social cohesion.'

Box 1.3: Presidency conclusions: Barcelona Summit, March 2002

'In order to close the gap between the EU and its major competitors, there must be a significant boost of the overall R&D and innovation effort in the Union, with a particular emphasis on frontier technologies. The European Council therefore: agrees that overall spending on R&D and innovation in the Union should be increased with the aim of approaching 3% of GDP by 2010. Two-thirds of this new investment should come from the private sector.'

Women are the most obvious source for increasing the numbers of highly trained scientists, engineers and technologists because this talent pool already exists and can be expanded. Currently, women represent over 50% of university graduates but they remain under-represented in the natural sciences, engineering, technology and computer sciences: indeed, in 2000, women graduates doing those subjects comprised of fewer than 20% of all women graduates in all the European Union (EU) Member States, except Ireland. By comparison, men taking science, engineering and computing subjects range from 29% to 55% of all new male graduates across the EU (EC, 2002a, p 70). In 2000, 166,734 women graduated in natural and computing sciences and engineering in the EU (see Table 3.1 in Chapter 3).

Europe has not really been successful in attracting women into industrial research. Too many bright young women avoid natural sciences and computing or engineering, but more importantly, those who begin careers in these fields are all too often prematurely lost to the profession. Precious few women scientists, technologists and engineers manage to reach the upper echelons of careers in industrial research. Europe is in effect, trying to run a marathon without two working lungs! In turn, however, this situation means that there are exciting opportunities for tapping into women's potential for industrial research in Europe.

So, for Europe to achieve the necessary increase in highly qualified research personnel, women must be a major part of the enlarged band of industrial researchers. This will be crucial to the promotion of excellence and quality and for ensuring competitiveness. However, at the moment (based on the first official data from ten EU Member States (see Chapter 3, Table 3.3), less than 15% of industrial researchers (50,789) in the EU are women. For the Barcelona goal to be achieved, this number would have to be quadrupled by 2010.

This report was requested by the European Commission

The subject of this report is at the core of the European Commission's concept of building a 'European Research Area' (ERA). It is also crucial to the European Commission Directorate-General for Research's (DG RTD) Sixth Framework Programme (FP6). Its Science and Society Action Plan (2001)[2] has a focus on developing a science policy for the EU that is 'closer to the citizens': this includes promoting gender equality in science.

Action 26, Women in industrial research, is a new topic of European Commission research policy. However, the issue of women and science has been a live one in the EU for some years. The Commission's Communication Women and Science: Mobilising women in order to enrich European research (CEC, 1999) was followed by a Resolution from the Council of European Union (1999). The Council invited Member States to gather statistics and information, to collect data, produce indicators and take part in a dialogue on women and science. It asked the Commission to provide EU-level indicators, promote the participation of women in the Fifth Framework Programme, suggest initiatives to promote women in research and report on progress[3].

[2] See http://www.cordis.lu/rtd2002/science –society/home.html

[3] Hence, the Women and Science Unit in DG Research commissioned the influential European Technology Assessment Network (ETAN) report on women and science (Osborn et al, 2000). It co-ordinates the Helsinki Group of national delegates from countries associated with the Fifth Framework Programme to exchange information about national policies (Rees, 2002), and national statistical correspondents to work towards the harmonisation of sex-disaggregated statistics and development of equality indicators. It commissioned reports on the gender dimension in research projects funded by the Fifth Framework Programme (Laurila and Young, 2001). It has also has organised a series of conferences drawing attention to the chronic under-representation of women in science, engineering and technology (Logue and Talapessy, 1994; EC, 1999, 2001, 2002). See http://www.cordis.lu/science-society.

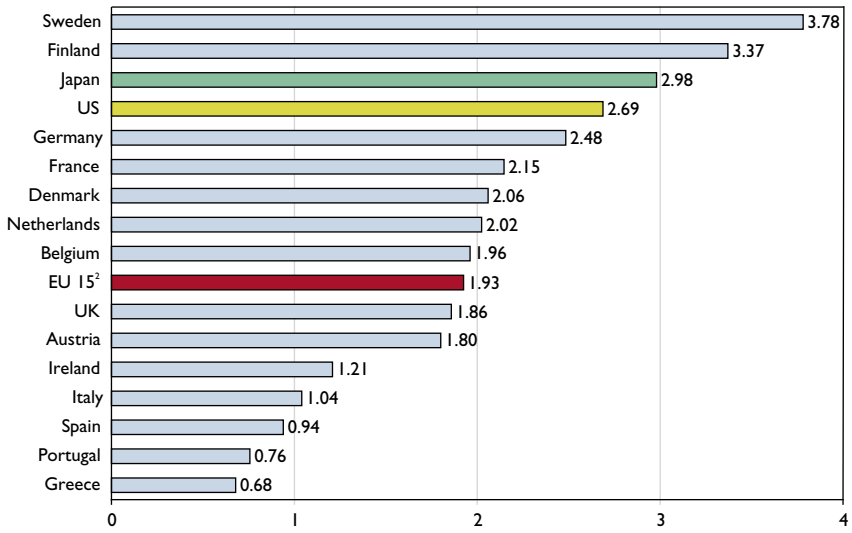
Box 1.4:
R&D intensity (GERD as % of GDP), latest available year[1]

Source: DG Research Key Figures (2002)

Data: Eurostat, Member States

Notes: [1] Figures for Greece, Ireland, Italy, Belgium, Netherlands, Denmark and Spain are 1999; all other countries and EU are 2000.

[2] EU average is estimated and does not include Luxembourg.



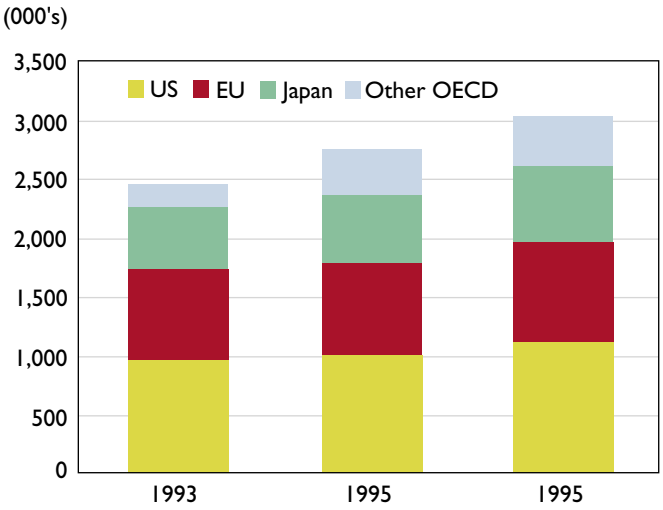
This report calls for action on women in industrial research (WIR). It is a wake up call to industry in Europe, designed to alert companies of the need to focus on recruiting, promoting and expanding the potential of women in industrial research as a matter of urgency. It has been prepared by a group of senior individuals from leading research-based companies from numerous EU Member States and associated countries, and from North America, where similar challenges pertain. While the report is aimed primarily at all those stakeholders engaged in industrial research, it also concerns those involved in generating and providing the necessary supporting structures and policies. They include the European Commission (especially concerning ERA and FP6), national governments, universities, venture capital, employers' organisations, trade unions and professional associations, the media and of course women scientists, engineers and technologists themselves. The report also addresses schools, colleges and universities.

Most of the initiatives of the Commission and the Member States on women in science have so far focused on the public sector where statistics are more readily available. For the industrial sector, statistics are much more difficult to find and there is no institutional focal point (especially at a trans-national level) to examine the issue. This report tries to fill that gap through an analysis by the expert group, supported by the Women and Science Unit of DG RTD and the ideas and experiences of leading companies.

Box 1.5:
Total researchers in OECD countries

Note the stronger increase in all areas compared to EU!

Source: OECD Main S&E Indicators (2002)



Box 1.6: What's in it for women?

The implications of the recommendations of this report for women are more and better career opportunities in industrial research, the excitement of working in research at a level more commensurate with competence, and the satisfaction of realising personal potential. It should also lead to opportunities to take part in high-level decision-making that affects what products and services are developed.

We present what is available on the participation of women in industrial research, including some new statistics. Promising ideas and good practices in companies as well as the public sector, governments, the EC, and women themselves are showcased.

The need for concerted action to speed up changes

Employing women in research in the private sector enlarges the population of researchers and is likely to offer a greater pool of excellence which, in turn, will translate into supporting the development of an economic competitive edge. Policies that will allow women to develop careers in industrial research must be implemented and monitored, They involve both cultural and organisational change. Women in the child-bearing years need to be retained or reintegrated after a career break, developed, promoted and matured as researchers and leaders.

Box 1.7

'Member States should remove disincentives to female labour force participation and strive, taking into account the demand for childcare facilities and in line with national patterns of provision, to provide childcare by 2010 to at least 90% of children between 3 years old and the mandatory school age and at least 33% of children under 3 years of age'

Source: Presidency conclusions – Barcelona, 15 and 16 March, 2002-10

The report outlines a vision for creating organisations and cultures where women and men in all their diversity flourish in scientific careers. Changes necessary to allow European research-based companies to make the most of women as a talent pool are defined. The report calls for concerted actions and an action plan for industry, national governments and the European Union (EU).

Chapter 2 makes a case for developing women as a talent pool. An overview of the present situation, drawing upon available statistics and research follows in Chapter 3. The need for better data on the use of women's talent in industrial research cannot be overemphasised. In Chapter 4, a vision is described to open companies up to women. A strategic approach to enable this vision to become reality is outlined: one that fosters an exciting, diverse culture, enabling companies to become employers and suppliers of choice. The next chapter focuses on entrepreneurs, so essential to the development of innovation in Europe. Chapter 6 presents ideas for delivering the vision in an action plan: it is a catalogue of recommendations drawing upon initiatives and good practice in organisational and cultural change from numerous countries and industries.

Concerted action is needed. A wide range of partners is called upon to deliver the action plan. Observations about delivering the vision and its vital role in assisting the EU to achieve its goal for science and society to become a highly competitive internationally leading force, conclude the report. The aim is to inform, to persuade, to change. We have to start now…