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Women and Science: Excellence and Innovation - Gender Equality in Science

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1. INTRODUCTION

This report, submitted at the request of the Research Council of June 2001[1], gives an overview of women and science actions implemented at European level since the Council Resolution and of the results achieved. In particular:

- **Activities of the European Commission** to promote gender equality in science through the Research Framework Programmes and in the context of the Science and Society Action Plan, and

- **Progress made in increasing the participation of women in science** in the EU Member States since 1999, taking into account EU enlargement also.

At the Council's request, attention is paid to the progress made by the Commission in reaching the target of *"40% participation of women at all levels in implementing and managing research programmes*." The report also includes data on the progress of the Women in Industrial Research (WIR) initiative, as requested by the European Council in its Resolution of November 2003[2]

The report should be considered in the light of the Lisbon objectives, the Barcelona target[3] and the Commission's Communication "*Science and technology, the key to Europe's future – guidelines for future European Union policy to support research"*[4]. It demonstrates that although some progress has been achieved since the adoption of the previous reports in 1999[5] and 2001[6], the situation is still far from satisfactory (see annex 1.1). With a view to preparing the Seventh Framework Programme, the following challenges need to be addressed if real progress is to be made in achieving gender equality in science.

2. MAIN CHALLENGES

2.1. Empowering women in decision-making positions in research and technology

Since the 1990s, the majority of university graduates in Europe have been women, but the proportion of women in top positions in European science is still very low, even in the traditionally more 'feminised' fields of science. The scarcity of women in senior positions,

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1 European Council (2001),Resolution on Science and Society and on Women in Science. (2001/C 199/01)

2 European Council (2003 a), Resolution on equal access and participation of women and men in the "knowledge based society for growth and innovation" (2003/C 317/03). The European Council invited the Commission to report on progress of the Women in Industrial Research (WIR) initiative in the context of research, development, innovation and entrepreneurship. WIR-website: http://europa.eu.int/comm/research/wir)

3 In March 2000, at the Lisbon European Council, Heads of State and Government set the Union the goal of becoming by 2010 "*the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion*", and that investment in European research and development (R&D) must be increased with the aim of approaching 3 % of EU GDP by 2010 (up from 1.9 % in 2000).

4 European Commission (2004 a), Science and technology, the key to Europe's future – guidelines for future European Union policy to support research, COM (2004) 353, Brussels 16 June 2004

5 European Commission (1999), Women and science: mobilising women to enrich European research, COM (1999) 76

6 European Commission (2001), Women and Science: the gender dimension as a leverage for reforming science, SEC(2001) 771

and as a result in bodies such as scientific boards, inevitably means that their individual and collective opinions are less likely to be voiced in policy and decision-making processes, which may lead to biased decision-making on topics of future research development. If women scientists are not visible and not seen to be succeeding in their careers, they cannot serve as role models to attract and retain young women in scientific professions.

2.2. Reconciling professional and private life

If research cultures are to be based on excellence, gender diversity, global cooperation and mobility, a redefinition of career development and conditions is required. Career structures based on the traditional family roles are not suitable for shaping Europe's way to the future. Scientists have the longest period of qualification, high levels of career insecurity and international mobility is a key element of their careers[7]. Not surprisingly, significantly more women professors than male professors live alone and do not have children. Women researchers in industry tend to have fewer children than women in academia[8] and return schemes after 'family breaks' are lacking[9]. Inequalities in career advancement and drop-out rates are significantly higher for women with children[10]. The international differences in social security patterns concerning maternity and parental leave, along with the lack of availability of adequate childcare provisions also tend to compound the disadvantages for women researchers with children. A more family-friendly working environment must be established to signal clearly that women are welcome and that it is feasible, and normal, both for women and men scientists, to combine family and work, children and career.

2.3. Gender and scientific excellence

The report "Gender and Excellence in the Making"[11] suggests that existing systems of defining and evaluating scientific excellence are not as gender neutral as they are claimed to be. As the future of European science depends both on an increased participation of women in the scientific community and on excellent research, it is urgent to pursue the debate and to encourage research bodies, funding institutions and the scientific community at large to think, in a more general and systematic way, about promoting a research environment free of gender bias.

2.4. Strengthening gender research

EU enlargement and the changing roles and life plans of women and men in Europe present some of the greatest challenges to European societies, and this impacts on the creation of the European Research Area. A systematic analysis of these changes and the interplay between science and society is needed. Gender research can add perspective, stimulate new methodologies and is a driver for innovation. Specific issues exist and should be addressed in

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7 A study funded by the EC based on 3400 interviews with female and male professors in six countries indicated that universities are an unfriendly environment for women who more often report feelings of burn-out, exhaustion and anxiety. Zimmer, Annette (2003), Women in European Universities. Final Report 2000-2003 of the Research and Training Network (contract n° HRPN-CT-1999-0074), www.women-eu.de

8 Meulders, Danièle et al (2003), Women in industrial research. Analysis of statistical data and good practices of companies, European Commission, p. 31, 116

9 Institute of Physics (2004), Career Breaks, London

10 Meulders, Danièle et al (2003), p.116, graph 34

11 European Commission (2004 b), Gender and Excellence in the Making

well focussed research areas[12]. Some countries have accumulated a good stock of gender analysis, whereas in others gender research is practically absent. A better balance in European gender research is thus needed, enabling the specific social and historical contexts of different societies to be taken into account. The European Union has the responsibility to bridge the gap to achieve equal opportunities across Europe[13]. A socio-cultural understanding of gender and multidisciplinary gender research is necessary to move forward towards a more transformative gender approach and integration of gender into research. In the absence of such a development, men and women in the EU will not be able to reap the full benefit of European research.

2.5. Increasing the participation of women in science, technology and innovation

To reach the 3% target agreed in Barcelona, Europe will need more researchers[14]. The Barcelona objective will not be reached if trained women scientists continue to quit scientific careers in disproportionate terms as compared to their male colleagues. This is particularly the case for industrial research and higher education studies in science, engineering and technology (SET). The Education Council adopted in May 2003 a European target to be achieved in the specific area of mathematics, science and technology.[15] Gender balance is an especially important challenge in this area which attainment will require considerable effort.

3. ACTIVITIES OF THE EUROPEAN COMMISSION TO PROMOTE GENDER EQUALITY IN SCIENCE

Since the adoption of the Women and Science Action Plan[16] by the European Commission in February 1999, policies to promote women in science, to integrate the gender dimension into the research content and to close the existing gender gap have become an important part of European research policies, supported both by the European Parliament[17] and the national governments[18] (see also annex 2.1). In the Sixth Framework Programme, a specific budget for funding women and science projects was made available within the Science and Society part of the 'Structuring the ERA' specific programme. The chapters below outline the overall strategy for promoting women and science at European level, this being a coherent, multi-dimensional, long-term approach pursued along three tracks – a reinforced Policy Forum, an improved understanding of "gender and science" and an enriched Gender Watch System – as

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12 One example is the FLOSSPOLS activity (IST-FP6 project http://www.flosspols.org/) on gender issues and software development, in particular Open Source Software. While 25% of proprietary software developers are women, this falls down to only 5% in Open Source Software

13 Art. 23 EU Charter: Equality between men and women must be ensured in all areas, including employment, work and pay. The principle of equality shall not prevent the maintenance or adoption of measures providing for specific advantages in favour of the under-represented sex.

14 Gago, José Mariano et al (2004), Report by the High Level Group on Increasing Human Resources for Science and Technology in Europe, European Commission and European Commission (2004 b), Investing in research: an action plan for Europe, COM(2004) 226 final/2 of 4

15 The target in mathematics, science and technology is as follows: 'The total number of graduates in mathematics, science and technology in the European Union should increase by at least 15% by 2010 while at the same time the level of gender imbalance should decrease.' European Council (2003 b), Conclusions of 5 May 2003 on reference levels of European average performance in education and training (Benchmarks), C 134/ 02, http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/c_134/c_13420030607en00030004.pdf

16 European Commission (1999)

17 European Parliament (2000), Resolution on the communication from the Commission entitled: Women and Science-Mobilising women to enrich European research, 3 February 2000 (PE 284.656)

18 European Council (1999), Resolution on women and science, 20 May 1999 (8565/99)

described in the first activity report to the Council in May 2001 and taken up in the Science and Society Action Plan.

3.1. Synergies between European and national policies

With a view to developing dialogue and exchanging experience and good practice regarding national policies to promote women in science, the Helsinki Group on Women and Science has continued to be a key player. A first report of the Helsinki Group, *National policies on women and science in Europe*[19], based on the situation in 30 countries, was published by the Commission in June 2002. The report, and development since, shows the progress in gender equality policies in the European Union and the role of the Commission as a catalyst. Support by members of the Helsinki Group was instrumental in undertaking the first steps to establish an ERA-NET initiative on Women in Science policies[20]. A specific support action is currently being carried out to this end.

3.2. Strengthening the role and participation of women scientists

As announced in the Science and Society Action Plan, and based on the results of a preparatory study involving consultation with relevant stakeholders, a *European Platform of Women Scientists* will be launched early in 2005 (with Commission start-up funding of approximately €2 mio until 2007), to bring together networks of women scientists and organisations committed to gender equality in scientific research.

3.3. Benchmarking policies and progress - statistics and strategies

Sex-disaggregated statistics are crucial to monitor the participation of women and men at different seniority levels, sectors and scientific fields in European Research. In 1999 the information need in terms of primary statistics in European research, was identified. At the time, no systematic or centrally co-ordinated collection of sex-disaggregated data on R&D staff existed at European level. A programme of statistical work was therefore initiated and the group of Statistical Correspondents was created as a subgroup of the Helsinki Group on Women and Science in 2001. This activity has stimulated a number of publications, including the *She Figures 2003* which contains the widest collection of European data on women and science ever produced (annex 1.2). Sex-breakdown has now also been integrated into the data collected by Eurostat. Based on these data, a range of gender-sensitive indicators has been developed to measure and compare success rates of women and men to obtain senior positions in research and their access to R&D funding (see annex 1.3).

3.4. Women in industrial research - WIR

At the end of 2001, the European Commission set up an expert group to analyse and make recommendations to improve the situation of women in industrial research. The report intended as a wake-up call for European industry[21] was presented in January 2003 and then discussed at the WIR-conference in Berlin[22]. A study compiling statistical data and describing

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19 Teresa Rees (2002) The Helsinki Group on Women and Science: National Policies on Women and Science in Europe, European Commission

20 ERA-NET scheme: Supporting the Cooperation and Coordination of Research Activities carried out at National or Regional Level. Preparatory project: European Policy Cooperation for Women in Science (EOWIN)

21 Rübsamen-Waigmann, Helga et al (2003), Women in industrial research. A wake-up call for European industry, European Commission. The companies involved represented more than 20 billions € R&D investment/ year

22 European Commission (2004 c) Women in industrial research. Speeding up changes in Europe

best practices in companies[23] and a survey on company level data and good practices[24] complete the analysis. The WIR initiative revealed the low proportion of women researchers in industry in general, with a few striking exceptions of research-based companies. The expert group identified gender diversity as a key element for innovation and economic success for research-based companies in terms of global competition. As only 15% of the researchers in industry in 1999 were women (highest in Ireland with more than 28%), the group called for concerted efforts of companies, governments and universities to mobilise more women for industrial research and to quadruple their number by 2010. It criticised the lack of gender awareness in some companies and argued for a general change of research cultures and modern working conditions, which would allow women and men to have both a research career and family life. A group of CEOs of 7 leading R&D based companies issued a position paper to take concrete actions in five key areas (annex 2.2). Further steps include stimulating actions at European and national level, such as the establishment of an industry-driven expert group to analyse the business perspective of the promotion of women in industrial R&D (WIR Women in Science and Technology Expert Group).

3.5. Women scientists in Central and Eastern Europe and the Baltic States – Enwise[25]

In October 2002, the *Enwise* Expert Group was launched with a view to examining the situation facing women scientists in Central and Eastern European countries and in the Baltic States[26]. The *Enwise* report[27], presented to the Commission on 30 January 2004 and discussed at a follow-up conference in Tallinn in September 2004, acknowledges the legacy of the communist gender policy. The importance of education and access to it, has led to the emergence of a considerable proportion of highly-qualified women active in all public spheres and notably in science. The report showed that although women account for 38% of the scientific workforce in these countries, a large proportion of female scientists are employed in areas where R&D expenditure is lowest. The specific gender policy implemented in these countries was characterised by the availability of childcare facilities, legal protection and state support for the working mother. Today, the prospects for young female scientists are very bleak, due to the unavailability of funding, rigid patterns of promotion and recognition and the lack of appropriate welfare policies, all of which are potential causes of brain-drain. In addition to the specificities encountered in the post communist countries, a number of challenges, such as for example the low number of women in decision-making positions, are common to new and old Member States. It is therefore likely that a number of problems can be tackled for EU-25. The need for continued specific action for the new *Enwise* Member States and Bulgaria and Romania will need to be looked at. As a first follow-up, the

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23 Meulders, Danièle et al (2003)

24 European Commission (2003 a), Women in industrial research. Good practices in companies across Europe

25 Enwise=***En***large ***w***omen ***i***n ***s***cience to ***e***ast. The countries involved are: Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic and Slovenia

26 Three parallel workshops were held: Young scientists (Prague, April 2003), Bioethical issues in the Enwise countries from a gender perspective (Budapest, October 2003), Women scientists in the Balkan region (Brussels, November 2003).

27 European Commission (2004 d) Waste of talents: turning private struggles into a public issue. Women and Science in the Enwise Countries. A report to the European Commission from the Enwise Expert Group on women scientists in the Central and Eastern European countries and in the Baltic States, Luxembourg, Office for Official Publications of the European Commission

Commission is funding the project *"Central European Centre on Women and Youth in Science"*, coordinating women and science activities with partners in seven countries[28].

3.6. Gender and excellence

The workshop "Minimising gender bias in the definition and measurement of scientific excellence"[29], held at the European University Institute in Florence in October 2003, provided a first opportunity to take forward the recommendations expressed in the report of the ETAN expert group[30] on defining and measuring scientific excellence. Possible gender bias can occur in the characterization of scientific excellence, in the assessment criteria, in the choice of the explicit and implicit indicators for scientific excellence, in the way the criteria are applied to men and women and in the failure to integrate women in scientific networks and in the procedures through which criteria are applied to people.

3.7. Increasing the knowledge base on Women and Science

A call for Science and Society proposals published in December 2002 resulted in the selection of five women and science projects. A call for Women and Science proposals has been published in 2004, targeting subjects such as the empowerment of women scientists, ambassadors for women and science, gender research, comparative research to analyse and assess the efficiency of existing measures, measurement and evaluation of scientific excellence, piloting new areas and enhancing the Gender Watch System. With an additional €5,7 mio earmarked in the Science and Society work programme 2005-2006 for Women and Science, in FP6 a total of around €20 mio will have been dedicated to Women in Science activities.

3.8. Gender mainstreaming across the European Research Framework Programmes

The European Commission seeks to mainstream gender equality in scientific research, by promoting the participation of women scientists in Framework Programme activities and by ensuring that the gender dimension is addressed in European research wherever relevant. The way in which gender was taken into account in the specific programmes of the Fifth Framework Programme (FP5) was evaluated in a series of Gender Impact Assessment Studies, published in November 2001[31]. The results and recommendations were implemented in the Sixth Framework Programme (FP6) and enriched the Gender Watch System. The main aspects are:

- **40% target for women's representation in committees, groups and panels:** from FP5 to FP6 little progress has been achieved in meeting this target[32]:
  - **Evaluation Panels:** In FP5, the percentage of women varied from 22% to 27% (2001), the average percentage of women so far is 26% in FP6 (2003)[33],

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28 Central European Centre on Women and Youth (contract no SAS6-CT-2004-003582), Czech Republic, Hungary, Slovenia, Slovak Republic, Romania, France, Italy, www.cec-wys.org

29 European Commission (2004 b)

30 ETAN: European Technology Assessment Network; Osborn, Mary et al (2000), Science policies in the European Union: Promoting excellence through mainstreaming gender equality. A report from the ETAN Expert Working Group on women and Science, European Commission

31 The synthesis report and the reports of each of the studies: http://www.cordis.lu/science-society/library.htm

32 Statistics on the Framework Programmes – see annex 3

  - **Advisory Groups:** In FP5, the average percentage of women was 28%, it has decreased to 27% in FP6. Four programmes are close to or above the target (see annex 3.5);

  - **Expert database:** In FP5, the percentage of women was only 17%. This has increased to 24% in 2004 (see annexes 3.1-3.3);

  - **Programme Committees:** The proportion of women increased from 22% in FP5 to 26% in FP6;

  - **Project Coordinators:** In FP5, the share of women was 16%[34] - in FP6 only 14% (2003)[35]

- 40% target for women's representation in Marie Curie fellowships

  - The 40% target has not been fully achieved within the **Marie Curie Programme**: around 35% of the accepted MC fellows in individual MC actions in 2003 and 2004 were women[36]

- **"Engendering" work programmes:** FP6 requires that gender aspects be systematically integrated at all stages of the policy and programme implementation process (from calls for proposals through to evaluations and contract negotiations), and wherever relevant as a cross-cutting dimension in research content itself.

- **Gender Monitoring Studies:** a series of studies were launched at the end of 2004 to monitor progress towards gender equality and gender awareness in the thematic priorities and other FP6 activities. They will examine the participation of women and the integration of the gender dimension in the research content, with a view to both evaluating the success of current gender mainstreaming strategies and making recommendations for future action.

- Gender Action Plans: the new instruments of FP6 (networks of excellence and integrated projects) require contractors to develop Gender Action Plans (GAPs) as part of their projects. Tools to monitor and analyse the implementation of the GAPs are in preparation.

  - **First experiences with GAPs in FP6:** In 2003 and 2004, the European Commission assessed the Gender Action Plans of 148 short-listed proposals (102 integrated projects and 46 networks of excellence) across 5 different thematic priorities. The assessment revealed that about 10% of the Gender Action Plans were very good, about 75% were adequate and about 15% were not satisfactory. A good GAP contained 3 steps: (i) a diagnosis of the current situation regarding women's participation and gender aspects in the research field; (ii) proposed

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33 See annex 3.5: Only in the Science and Society programme, parity in the evaluation panels was realised. The 40% objective was also reached in the Innovation programme (41%). In addition, Citizens and Governance with 39%, Food Quality and International Cooperation with 35% each have come close to the target:. On the other hand, four programmes had women participation of less than 25%: EURATOM (6%), Aeronautics (14%), IST (18%) and Life Sciences (24%). For evaluators from EU-25 the percentage of women is 27% - see annex 3.4.

34 Based on 13.954 FP 5 contracts of which for 7.864 the gender of the scientific coordinator could be identified

35 Based on 11.600 submitted proposals in 2003 – of 106.000 participants/coordinators 15.325 are women

36 For Host-driven actions (Research Training Networks, Host Fellowships for Early Stage Research Training and Transfer of Knowledge Host Fellowships selection of researchers is done by the selected host institutions) data is not available yet. Experience show that women's participation is higher in these early stage actions

actions based on this diagnosis; and (iii) concrete information about how the gender dimension will be integrated in the research content.

– **Good practice example:** A network on gender aspects in food quality and safety research (e.g. gender difference in susceptibility to food-related diseases and perception of disease; gender difference in risk assessment, management, perception, communication and consumer behaviour) is bringing together representatives from the Integrated Projects and Networks of Excellence funded under this priority as well as representatives from the advisory group. The objectives are: - Exchange of information regarding women's participation and gender in the research itself, development of "best practice" to be integrated in the individual project's gender action plan, development of joint activities e.g. workshops, conference, mentorship, etc, development of actions to promote gender in research in an enlarged EU, linking with/ promoting local, regional, national and other international /global initiatives.

- **Database on gender participation in FP6:** is being developed and should be online early 2005. It will contain all available sex-disaggregated statistics on expert evaluators, proposals, programme committees, advisory groups, and monitoring panels.

- **Information and Training:** *A Vademecum on gender mainstreaming in the Sixth Framework Programme* was produced in March 2003 for scientific officers, evaluators etc. It includes the legal basis for the gender mainstreaming actions and provides details of all references to gender mainstreaming in the official documents (Framework Programme, Specific Programmes and Rules for Participation)[37].

- **Women and Science Working Group:** the inter-service working group, established in 2000, has continued its work of supporting the implementation of the Gender Watch System.

4. PROGRESS IN THE MEMBER STATES

4.1. Policies and strategies at national level

Gender equality policies in science have become an important issue in all EU Member States (see table 1), being mainly embedded in Equal Treatment Legislation. To mainstream policies to promote gender equality in science, many countries have established structures such as national committees and units dedicated to women in science in relevant government departments. Some countries have recently established national resource and coordination centres for women in science activities[38]. Universities and research institutions are increasingly requested to develop gender equality plans and in the Netherlands and Germany,

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37 This document can be downloaded at: ftp://ftp.cordis.lu/pub/science-society/docs/gendervademecum.pdf

38 CEWS – Centre of Excellence Women in Science, and Kompetenzzentrum Women in Information Society and Technolgy were established in Germany in 2000, the National Contact Centre – Women and Science was established in Czech Republic in 2002 and the National Resource Centre for Women in SET launched in United Kingdom in 2004. Other countries (eg. Austria) have established regional centres at all universities. Overview and links to national activities see also: http://europa.eu.int/comm/research/science-society/links_en.html#WomenandScience

universities are ranked according to the number and proportion of women in decision-making positions, or in Science, Engineering and Technology, and this information is published[39].

Table 1: National policies to promote gender equality in science (2004)

	EU-Member States (25)																								
Equality Measures in Science	BE	CY	CZ	DK	DE	EE	EL	ES	FR	IE	IT	LV	LT	LU	HU	MT	NL	AT	PL	PT	SI	SK	FI	SE	UK
Equal treatment legislation (general)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Commitment to gender mainstreaming	X	X	X	X	X		X	X	X	X	X		X	X			X	X	X	X	X		X	X	X
National Committee on Women & Science	X	X	X	xx	X	X	xx	X	X	X	X		X		X	X		X	X	X	X	X	X	X	
Women & Science Unit in Research Ministry					X		X5	X	X		X							X							X
Publication of Sex-disaggregated Statistics	X	X	X	X	X	X	X	X	X	X		X	X	xx	X	X	X	X		X	X	X	X	X	X3
Development of Gender equality indicators	X4			X	X		X		X	X	X	X			X	X		X		X	X		X	X	X
Gender balance targets: public committees	X2			X	X		X		X	X													X	X	X
Gender balance targets on university ctees		X		X	X				X								X4	X					X	X	X4
Gender Equality Plans in Univ.& Research I.	X4			X	X				X	X	X			xx			X4	X					X	X	
Gender² Studies & Research at Universities	X	X	X	X	X	X	X	X	X	X	X	X	X	xx	X	X	X	X		X	X	X	X	X	X
Programmes on W&S, special funding available					X		X		X	xx	X	xx	xx			X	X	X			X				X
Nationwide Centres on Women & Science			X		X																				X

***Source:** Information provided by the members of the Helsinki group & EOWIN, Summer 2004, DG RTD, UNIT C4* xx = in preparation

²)or women studies/research X1= only BE French-spreaking X2= only BE Dutch-speaking X3= not for industrial R&D

x = yes blanc cell = no X4= set by certain universities X5= person only responsible for W&S

Gender studies and gender research are emerging in many countries (see table 1)[40], but there are great differences among EU Member States. Resources and infrastructures for gender research are lacking especially in many of the new EU Member States.

4.2. Is the gender gap closing in research and development?

Data at European level show that the gender gap at the highest stages of the academic career is beginning to close, but at a very slow pace. Although the total number of women full professors in Europe increased by 23% from 1999 to 2002, their proportion is still only 14% compared to 13% 3 years before (see Graph 1, below). Only in Latvia, Portugal and Finland, 20% or more of the full professors are women. Data also show that a high number of women in certain areas of science does not preclude vertical segregation.

The changes that have been achieved in terms of the numbers of women graduating from university, completing PhD studies and starting a career in science, first noticed in the late nineties, have been confirmed.

- Women now constitute 58% of graduates across Europe (1999:56%); the percentage of doctorate degrees earned by women has reached about 41% (1999:39% - see Fig.1);

- The number of women and men in science and engineering graduates has sharply increased. In two thirds of the EU Member States, women graduates in science,

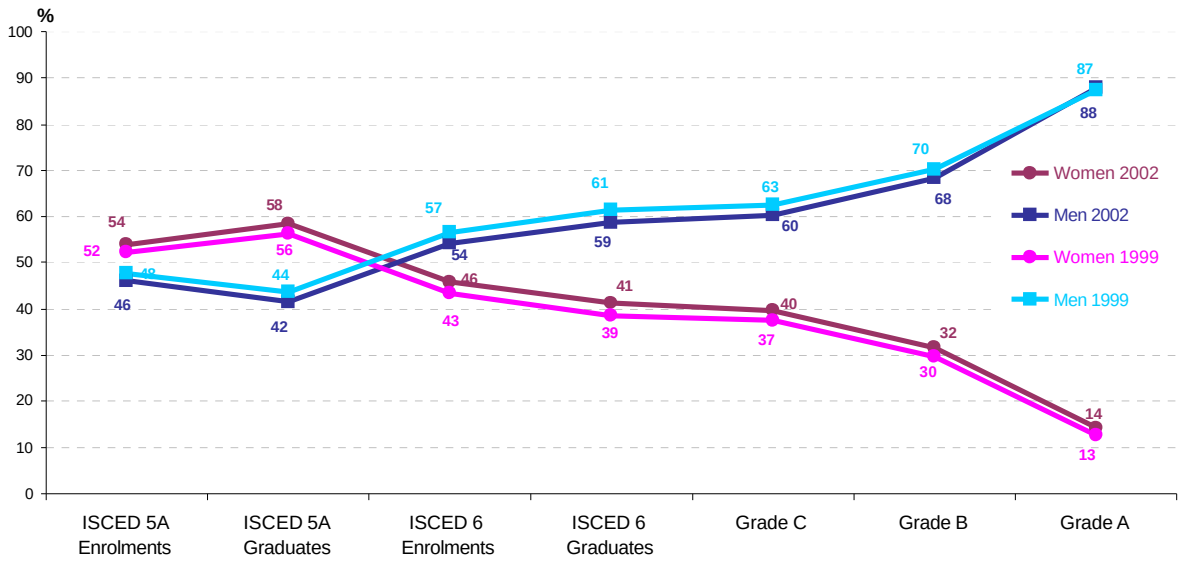
39 EU-Equal Project: Bridging the Gender gap at Universities (NL) and http://www.ranking-kompetenzz.de/ (DE)

40 Gender studies are now taught at universities in almost all EU Member States. For example Germany has established more than 100 professorships on gender issues in different disciplines. http://www.fu-berlin.de/zefrauen/doku/doku_prof_daten_uebersicht.htm. Many Member States have established special funding programmes dedicated to promote women in science, including funding for PhD studies, tenure track, fast track programmes to senior positions, returner schemes, funding of projects or conferences, grants, and/or gender research.

mathematics and computing are above the 40% mark (annex 1.5)[41]. On a European average, women constitute 44% of the graduates in this field and this has remained constant from 1998 to 2002.

- The numbers of women and men graduating in engineering, manufacturing and construction, also increased from 1998 to 2002. Women are increasing at a faster rate, with their proportion in 2002 reaching 25% as compared to 21% in 1998. However, there are big national differences: around 35 % of engineering graduates in Lithuania and Portugal are women, compared to only 13% in the Netherlands (annex 1.5)[42].

Fig. 1: Relative share of women & men in a typical academic career for EU-25, headcount, 1999 and 2002[43]



Definition of grades: A-The single highest grade/post at which research is normally conducted within the institutional or corporate system, B -Researchers working in positions not as senior as top position (A) but more senior than the newly qualified PhD holders, C -The first grade/post into which a newly qualified PhD (ISCED6) graduate would normally be recruited within the institutional or corporate system.

At present, 28% of all researchers in the EU-25 are women, but the number and proportion varies widely between Member States and sectors. The proportion of women in the higher education sector is 35% in the EU, which is more than twice as much as in industrial research where the corresponding figure is 18%[44] (annex 1.6). Growth rates during the period 1999-

41 EU 25 average is 45%. Since 1998 the increase has been highest in Sweden with 12.4 pp (followed by Estonia + 8.8pp, Slovakia +7.4pp, Slovenia +7.1, Germany + 3.7, United Kingdom+ 2.9). Trends were negative in Hungary (-13.8pp), Poland, France, Ireland, and Italy.

42 The increase since 1998 was highest in Sweden with 5.3pp, HU and EE with 4.8 and DE with 4.2pp

43 ISCED 5A Tertiary programmes to provide sufficient qualifications to enter into advanced research programmes & professions with high skills requirements, ISCED 6-Tertiary programmes which lead to an advanced research qualification (PhD), 2002: PhD enrolments: Exceptions to the reference year: NL:2001, ISCED 5a & PhD graduates: Exceptions: CY, DK, FR, IT, MT:2001, C, B, A: Exceptions: AT: 1998; EL: 2000; CY, DK, FR, IT, PT: 2001, FTE NL, Data estimated SI,1999 ISCED 6 graduates: Exceptions to the reference year: CY: 2000; FR, SE: 2001, ISCED 5A and 6 graduates: Exceptions: DK, IE: 1998; BE: 2000, Isced5A enrolments: Exceptions: PT: 2000, ISCED 6 enrollments: Exceptions: CY: 2001; C &B: Exceptions: AT: 1998; PL: 2000; FTE: NL, PT; BE (FR) only, A: Exceptions: AT:1998; FR, PL: 2000; FTE: NL, PT, EU-25 for graduates calculated by DG Research. Source: Eurostat, Education (Graduates & Enrolments); DG Research, WiS database (Academic Staff)

44 The proportion of women researchers for all sectors 2002 was highest in Latvia with 52% and lowest in Germany with 16%

2002 were usually higher for women than for men, particularly in industrial research (see annex 1.7)[45].

5. FUTURE PRIORITIES

On the basis of the knowledge gained through the collection and analysis of sex-disaggregated statistics and in the light of the progress already achieved in policy terms, as outlined in this report, a number of new and continuing priorities can now be identified for future action both at Commission and member state levels. In terms of the participation of women in science, the objectives need now to be more narrowly focused, to concentrate essentially on certain disciplines or fields (engineering, entrepreneurship, innovation and technology) or levels (senior and decision-making positions). New areas of action will include gender issues in the definition and measurement of scientific excellence and the strengthening of gender research, as an interdisciplinary field of study allowing a better understanding of social relations between men and women. Furthermore, the role of men in ensuring or hampering progress towards gender equality in science will be examined more closely with a view to better understanding the mechanisms involved, and measures to encourage men to participate actively in promoting gender equality in science will be envisaged. Benchmarking and monitoring will continue to underpin the whole range of actions undertaken.

5.1. Improving scientific excellence by promoting gender awareness and fairness

"Scientific excellence" is the only criterion to assess science-driven research. Based on the needs defined in the workshop "Minimising gender bias in the definition and measurement of scientific excellence" research projects will be funded in 2005 and 2006, the first results of which will be presented and discussed during a European conference to be organised in 2006. It is further proposed:

- To increase gender awareness of scientists in charge of evaluating research, special training programmes on potential areas of gender bias need to be developed and implemented.

- To increase transparency of screening and selection procedures. To that end, guidelines for scientific institutions should be developed and implemented. These may include recommendations such as ensuring accountability of panel members, public advertising of positions, developing explicit standards of promotion or appointment and using appropriate indicators of performance

5.2. Boosting the numbers of women in leading positions

To increase the proportion of women in leading positions, quantitative and qualitative targets should be adopted at European, national and institutional level:

- The proportion of women in leading positions[46] should increase to at least 25% by 2010; for new recruitments the proportion of women should be at least 33%.

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[45] The increases have been highest in Spain with 4.194 additional women researchers working in industry (+ 150%), Germany with 3.936 more women researchers (+27%), France with 1.227 (+7%), Portugal with 487 (+ 61%), and Cyprus with 39 (+ 61%)

[46] Full professors or Grade A as described above in fig.1. The target is calculated based on a yearly rate of 5% newly recruited professors taking into regard a fair representation of women in the recruitment procedures of about 1/3

To analyse recent developments and avoid gender bias in selection procedures, Member States are encouraged to develop yearly recruitment statistics. Good practice in this respect can be found in Denmark and Germany[47]. Programmes, procedures, mentoring and training schemes need to be established to reach this target.

5.3. Strengthening gender research and the gender dimension in research

There is a wide-spread call from the Helsinki Group on Women and Science and the scientific community for more systematic and structured support for gender research, which is not addressed appropriately by the current European research programmes. It is proposed:

- To establish gender research as a recognised item in European research funding;
- To launch a European award on excellence in gender research,
- To reflect on integrating the gender dimension in new and emerging areas of scientific research (foresight, nanotechnologies, security, technological platforms, innovation);
- To continue to promote the integration of the gender dimension effectively into the different research programmes including a dedicated budget (gender budgeting);

5.4. Enhancing the role of women in engineering and innovation

The role of women in the areas of innovation, entrepreneurship, patent creation, technology and ICT development, needs to be enhanced and requires more in-depth analysis. Policies and processes need to be stimulated in order to mobilise all available talents and resources. There is a need to

- Mobilise more women for industrial research. By 2010 their proportion in Europe should reach at least one third, as it is now in higher education. The total number of female researchers in industry should be doubled by 2010.
- Increase both the number of women graduating from engineering and their proportion. A target of one third of women for all engineering graduates[48] by 2010 - as it is now in Lithuania and Portugal - is proposed.
- Identify good practices in companies and universities and develop adequate information strategies and coordination structures to support these changes.

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adequate to the female proportion at the level below. In 2002 the proportion of Grade B/associate professors was 32%, see fig 1 and annex 1.4

47 Denmark has systematically surveyed the new appointments to scientific positions since the 1990s. The 2004 report documented that an equal proportion of both sexes has been reached for associate professors (Grade B), whereas five years earlier an equal proportion was reached for assistant professors only (Grade C). http://www.cfa.au.dk/Publikationer/Notater/Notat_2004_1.pdf. Since 1997 the German Bund Länder Kommission für Bildungsplanung und Forschungsförderung is collecting yearly sex-disaggregated statistics on the applications and the selection procedures for professorships and top positions in research institutions. The yearly progress reports are presented to the Heads of Governments for their information and approval. http://www.blk-bonn.de/papers/heft109.pdf

48 ISCED level 5: first degree. See also European Council (2003 b) – footnote 15.

5.5. Research careers which allow for a reconciliation of professional and private life

Human resource development strategies should aim to provide a working environment, which allows both women and men scientists, to combine family and work, children and career. To this end, it is proposed that:

- Good practices need to be developed, which also mobilise men to share family responsibilities.

- Research institutions and programmes should be stimulated to develop standards to ensure a healthy work/life balance in research.

- All publicly funded programmes, especially grants and fellowship programmes for young scientists should include information on the issues of combining scientific work and responsibilities for children. The handling of maternity and parental leave should be addressed within all mobility and research programmes. Provisions should be made to encourage male researchers to take parental leave.

- Age limitations which de facto constitute a disadvantage for the careers of women with children should be abolished.

- Dual career issues should be addressed at European, national and institutional level.

5.6. Gender monitoring in the member states

Despite very good progress (see chapter 3.3), there is still information lacking for certain policy measures. These are the gender pay gap for scientists and researchers, work-life balance including the questions of dual careers and mobility, the attrition of women from research and academia; career progression and promotion, women as patent originators and in innovative research enterprises and appointment procedures and recruitment strategies for the composition of scientific boards. A concerted effort is required to satisfy the need for information on these topics.

5.7. More efficient monitoring of the Research Framework Programme

The *Gender Watch System* monitors the progress towards a more balanced participation of women and men in the Framework Programme. To that end it uses the 40% targets (see chapter 3.8.). To broaden and further develop the system, the following items need to be addressed in particular

- The gender data base and monitoring system needs to be technically improved to allow for more rapid update

- Regular progress reports, including the gender action plans, need to be established

- The system should include also the use of financial resources for gender related activities (gender-budgeting).