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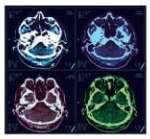
Advancing *Excellence* in *Science* through *Gender* Equality

genSET Workshop Briefing Materials

This Briefing Materials Document provides background information for the genSET Capacity Building Workshop under the theme "**Advancing *Excellence* in *Science* through *Gender* Equality**", held in Linköping on the 28rd & 29th March 2011. genSET is a FP7 Science in Society project funded by the European Commission.

Prepared by genSET partner organisation, The Tema Institute, Linköping University, February 2011

Project Patrons

Advancing Excellence in Science through Gender Equality

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The aim of this genSET Workshop is to examine how excellence in science can be enhanced through greater gender equality. It focuses on:

- excellence and gender equality in science organisations and institutions, especially universities, research institutes, and research councils and funders;
- what research managers, management, leaders and leadership can do to enhance excellence and promote gender equality at the same time;
- policy implementation and practices, using examples of successful interventions on excellence and gender equality.

The Workshop builds on the genSET Consensus Seminars and genSET Valorisation Workshops in defining and integrating the views of the science community into the wider discussion of the role of gender in science. The Science Leaders Consensus Panel, composed of 14 European leaders from across different fields, was tasked with producing a Consensus Report on the gender dimension in science, which includes key recommendations on gender equality in science.

The purpose of these genSET Workshop Briefing Notes is to help spark-off the discussion and provide a starting point for reflection, discussion and action. We include **five Notes** in the text which recommend further specific relevant reading prior to the Workshop.

Location: TEMCAS, The Tema Institute, Linköping University, Sweden
Date: lunchtime Monday 28th and Tuesday 29th March 2011

1. Introduction

These Workshop Briefing Notes provide additional information to that in the Consensus Seminar Briefing Notes and the Supplement. Like the original sets of Briefing Notes, they are meant to foster reflection, discussion and action, rather than give a comprehensive critical review of the field of research into gender questions within the science knowledge production.

In recent years there have been major policy developments and policy debates on both the search for excellence in science (EC, 2006), and the need for more effective gender mainstreaming and gender equality measures (ETAN, 2000). However, these two sets of initiatives have usually been promoted rather separately from each other. This separation has typically applied equally at organisational, national and European levels. This workshop brings together policies and practices on science excellence and gender mainstreaming and gender equality. In particular, it examines how excellence in science can be enhanced through greater gender equality. The focus of the workshop is on:

- excellence and gender equality in science organisations and institutions, especially universities, research institutes, and research councils and funders;
- what research managers, management, leaders and leadership can do to enhance excellence and promote gender equality at the same time;
- policy implementation and practices, using examples of successful interventions on excellence and gender equality.

This workshop is designed for science stakeholder organisations and leaders who wish to develop their policies and practices on excellence, gender mainstreaming and gender equality.

It will be facilitated by international gender experts, including Professor Jeff Hearn (Linköping University, Sweden, genSET partner researcher), Professor Liisa Husu (Örebro University, Sweden, and Guest Professor Linköping University, genSET partner researcher), Professor Simone Buitendijk (TNO, and University of Amsterdam, the Netherlands, member of genSET Science Leaders Consensus Panel), Dr Carl Jacobsson (Swedish Research Council), Professor Martina Schraudner (Fraunhofer Institute, Germany, member of genSET Science Leaders Consensus Panel), and Dr Maya Widmer (Swiss National Science Foundation), and will provide an opportunity for dialogue between leaders of science organisations and gender experts. In addition, a small number of participant genSET stakeholder organisations attending the workshop are offered expert policy mentoring and support, assisted by international gender experts, in order to facilitate the implementation of gender action plans. The workshop brings together policies and practices on science excellence, gender mainstreaming and gender equality: It examines how excellence in science can be enhanced through greater gender equality.

NOTE 1*:** *We strongly* ***recommend *as preparation for the workshop reading the* Consensus Seminar Briefing Notes, Supplement, *and* Recommendations for Action (genSET, 2009/2010, 2010).[1]

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1 http://www.genderinscience.org/downloads/genSET_Consensus_Report_Recommendations_for_Action_on_the_Gender_Dimension_in_Science.pdf ; http://www.genderinscience.org/downloads/Briefing_Notes.pdf ; http://www.genderinscience.org/downloads/Briefing_Notes_Supplement.pdf

2. Excellence

The notion of excellence has become very influential in recent years. This is so not only in research and science policy but also in education, corporate life, sport, and many other fields of human activity and social life, both within and outside academic environments. This has occurred at the same time as the expansion and qualified democratisation of research, Research and Development (R&D), and higher education. Many research councils and other research, scientific and educational bodies have now adopted this language, in relation to evaluation and identification of "excellent" individual researchers, research teams, research centres, research clusters, research networks, and other initiatives, such as supranational and national centres of excellence, networks of excellence, and more local institutional strong or strategic research areas.

When assessing scientific research, almost all stakeholders tend to agree that "scientific excellence" should be a major, even the main, criterion of resource allocation and research development. Allocation of funding and restructuring of research activities is increasingly geared towards organisations and researchers assessed as "excellent", both at European level and in individual member states. In the attempt to strengthen the European research effort, promoting scientific excellence is seen as a pivotal issue. Excellence and innovation are seen as "the key to European industrial competitiveness", as stated in the European Commission Communication 353 (2004) envisioning the future of European research policy. This has included the creation of European networks and centres of excellence for research and higher education, and as the launch of the European Research Council 2007. The main aim of the ERC is "to stimulate scientific excellence by supporting and encouraging the very best, truly creative scientists, scholars and engineers to be adventurous and take risks in their research".[2] Similar developments can be observed at regional and at national level, such as in the extensive German Federal Excellence Initiative[3] or centres of research excellence funded by the national research councils in the Nordic countries as well as the joint Nordic centres of excellence.[4]

Another such form of development around "excellence" is the establishment of institutes of advanced study. The first Institute of Advanced Study (IAS) was founded in Princeton, in 1930, emphasising its dedication to foundational, curiosity-driven research, and involving researchers at postdoctoral levels from social and natural sciences, as well as humanities.[5] In 1954 a second Centre for Advanced Study (CASBS) was established at Stanford University, with a more limited focus on behavioural science. At the core of CASBS is a fellowship programme; invitees from all around the world come to the centre to spend a year.[6] In Europe, the first institutes of advanced study began to be established in the 1960s and early 1970s. The Netherlands Institute of Advanced Study in the Humanities and Social Sciences (NIAS) has a disciplinary scope similar to CASBS, and a fellowship programme.[7] Since the 1980s new institutes of advanced study have continued to emerge with an intensified frequency (Pernrud, 2011). A further recent example of what might be called 'excellence discourse' is the European Commission's 'HR [Human Resources] excellence in research' badging.[8]

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[2] See: http://erc.europa.eu/ > mission

[3] See: http://www.dfg.de/en/research_funding/programmes/excellence_initiative/index.html

[4] See: http://www.nordforsk.org/ > Nordic centres of Excellence

[5] http://www.ias.edu/ ; http://www.ias.edu/about/mission-and-history

[6] http://www.casbs.org/ ; http://www.casbs.org/index.php?act=page&id=105

[7] http://www.nias.knaw.nl/en/

[8] http://ec.europa.eu/euraxess/index.cfm/rights/strategy4Researcher

To gain the European Commission 'HR excellence in research' badging institutions need to follow the five stage process outlined by the European Commission in the **Human Resources Strategy for Researchers** process:

1. The institution conducts an **internal analysis** to compare practice against the Charter and Code;
2. The institution **publishes an action plan** for aligning more closely with the Charter and Code (what, by when, by whom);
3. The Commission will **acknowledge** the strategy;
4. Through their own internal quality assurance mechanism, institutions will carry out a **self-assessment** at least every two years to test and update their action plans
5. At least every four years an **external evaluation** will take place.

The underlying ethic in highlighting "excellence" is the positive valuation of quality of activity, production and "outputs", rather than or additional to the quantity thereof. In some sense the search for excellence is a truism. It is the quality of quality, the value of value, the good of the good. At the same time, defining, measuring, recognising and awarding excellence are social processes, which means they are subject to numerous social dynamics, including gender dynamics and processes.

Practices and discourses of excellence (or what might be called "excellencing") form social mechanisms with other intended and unintended consequences at different micro and macro levels.

- First, by definition not all can be judged as excellent, so that others are judged as not excellent to their likely disbenefit.
- Second, it may be a means to reduce support and funding for those not deemed as excellent, especially so at a time of budget restraint. Thus "excellence" tends to be hierarchical and anti-universalist, and it may be part of a spiral of enhancing difference.
- Third, "excellence" can encourage specialisation in both researchers and institutions.
- Fourth, research excellence, or excellence in research, can be developed at the expense of other academic activities, for example, teaching, outreach, mentoring and nurturing others' talent, engaging in "invisible" activities that are crucial in academic community-building, such as peer review.
- Fifth, development of "excellence" is done through social processes, including gender dynamics and processes, with their own patterns, biases, and traditions.
- Perhaps, most importantly, excellence discourse can have very different consequences at a time of allocation of increasing resources compared to a time of shrinking resources.

3. Gender and gender relations

There is no single or simple definition of gender, or kindred terms, such as gendered and gendering. In some way, gender refers to the combination of social, cultural, political, economic references, constructions and relations that have or are assumed to have some connection with sex, sexual difference, and/or sexuality. One problem in a simple definition is that what counts as 'sex', 'sexual difference' and/or 'sexuality' themselves is also gendered. Gender is often seen to refer to women and girls both in everyday life and even much academic research, but is just as relevant to men and boys, and to relations between women, men, women and men, girls and boys, and numerous other gender and sexual categories of people and things. In reviewing some of the various ways in which gender can be approached in science, we suggest three contrasting and underlying formulations that inform both policy interventions and theorising around gender and science.[9]

a. *Gender neutral approach:* The basic assumption in this approach is that men and women are equal and should therefore have equal opportunities in the scientific community. The intellectual ability of creating valid scientific knowledge is not determined by gender or sex but by one's scientific training. The influence of social values is not included. Women and men are seen as equally capable of contributing to scientific development. If any sexual bias can be detected in science this is considered as a consequence of insufficient rigour in the scientific methods employed, not because the scientists are males (Sinnes, 2006). This approach is associated with liberal reform

[9] These are also discussed in the Consensus Seminar Briefing Notes: http://www.genderinscience.org/downloads/Briefing_Notes.pdf (see pp. 6-7).

feminism that sees the gender problem as just a need for fairness in equal opportunities, with women "becoming more assertive" and men "not changing," within the context of the current gender order and social structures. This position does not see a basic gender problem in science; bias is seen as a technical mistake. To quote Judith Lorber (2001, p. 13): "Gender reform feminists locate the source of gender inequality in women's and men's status in the social order, arguing that it is structural and not the outcome of personal attributes, individual choices, or unequal interpersonal relationships. … An overall strategy for political action to reform the unequal gendered social structure is *gender balance*." (emphasis in original). This is the dominant position in much of the governmental, NGO and some corporate gender equality policies and politics; the implication is that men can contribute positively to (or can position themselves against) such a programme of change towards the transformation/*abolition of gender imbalance*. Women and scientists are the focus.

b. *Women friendly approach:* Some feminist voices emphasising the differences between men and women have claimed that the qualities of women are superior to those of men. While some feminist critics of science have argued that women or females, due to their underprivileged position in many societies, are capable of undertaking more objective observations of the world, others claim that a feminine/feminist science would be more socially responsible and more capable of advancing a more democratic and environmentally responsible science (Sinnes, 2006). This approach can be related to what is often called standpoint feminism. More fundamental problems are recognised: women "need to trust their own knowledge", men "need to respect women's knowledge" and change in that respect, but not themselves necessarily. Bias is seen as more systemic and linked to undervaluing of women and women's knowledge. In this view "... the gender order cannot be made equal through gender balance because men's dominance is too strong." (Lorber, 2001, p. 14). Gender equality *per se* is not considered a feasible aim; it may end up with women becoming like men. In this approach a more radical transformation of science is necessary, with women's voices and perspectives on science reshaping the gendered social order in a more fundamental way, including the transformation *of* gender social structures (for example, patriarchy) in science. Men's positionings are less certain; the implication is that men need to position themselves, for or against, or in more ambiguous middle ground, in relation to the more radical project of abolishing gender unequal/patriarchal relations. Women and men scientists and science leaders are the focus.

c. *Gender sensitive approach:* In this view, women are not epistemologically privileged compared to men. The reason for recruiting more girls and women to science would thus not be that they would produce better knowledge than men would but because women's perspectives, approaches, and input would be lost without their incorporation (Sinnes, 2006). This position is augmented by intersectional feminism, which views gender as a fundamental and ubiquitous problem, with women and men both "needing to change". Women and men are both problematised in relation to other social categories. Bias is a gendered concept, limited and framed within current gender system. Connections with other social divisions, differences and oppressions become central, as do deconstructions of categories of sex, sexuality and gender, and the dualities often (re)produced through them. Gender categories are themselves open to change. This may appear to be the most radical conceptualisation of gender (in)equality. This may see all matters through gender sensitive lens, seeking to take apart the gendered social order of science, including "... by multiplying genders or doing away with them entirely." (Lorber, 2001, p. 12). The implications for men are less stable. All agents, actors and leaders in scientific organisations, and indeed society more generally, are the focus and subject to gender sensitive analysis without discriminating against their sexual orientation, racial, national or other identities.

4. Consequences of gendering for science and scientific organisations

What are the implications of these debates more specifically for science? In terms of science, gender can be said to operate in several major ways that to some extent parallel the three broad positions on gender outlined. First, there is the question of who does what in science – *who* are the leaders, inventors, who are the followers, who are the workers and agents? In addition, there is the question of how those involved in science are reported, represented, made into heroes, constructed in the history of science, or simply forgotten. Women have made great gains in higher education and nearly half of new European doctorates are currently awarded to women. However, less than third of European researchers are women, which corresponds to the global average. Only

fewer than two out of ten professors in Europe are women, in natural science and technology even less. Men lead nine out of ten European universities (UNESCO, 2010; EC, 2009b).

Then, second, there is the broader question of how science is organised and practiced within organisations. This includes attention to what issues, problems and questions are studied, and indeed prioritised in science and technology. It is very important to understand that science and technology are conducted for the most part in organisations, research groups, laboratories, networks, institutes and departments, with their own profoundly gendered features. The gendering of science and technology in organisations occurs in distributions of gendered people and in gendered practices, and applies even when science and technology organisations comprise only men or indeed only women. Briefly, typical patterns of gendering in organisations include:

- *The valuing of work organisations and management over work in the private domains.* Men's work is frequently valued over women's. Also, women typically carry the double burden of childcare and unpaid domestic work, and even a triple burden of care for dependents, old people, and people with disabilities.

- *Gendered divisions of labour*, both formal and informal. Women and men may, through inclusion and exclusion, specialise in particular types of labour or work areas, creating vertical and horizontal divisions within organisations.

- *Gendered divisions of authority*, both formal and informal. Women and men may be valued differentially in terms of formal authority, post and position, and informal status and standing in organisations (Kanter, 1977/1993).

- *Gendered processes between the centre and margins*. These may be literally or metaphorically spatial in distributions of power and activity between the centre and margins of organisations. 'Front-line' activities are often staffed by women; 'central' activities more often by men. The 'main aim' of organisations tends to be dominantly defined by men (Cockburn, 1991).

- *Gendered processes in sexuality.* Most organisations reproduce dominant heterosexual norms, ideology and practices. Indeed (hetero)sexual arrangements in private generally provide the base infrastructure for organisations, principally through women's unpaid reproductive labour.

- *Gendered processes in harassment, bullying and physical violence* (Hearn and Parkin, 1987/1995, 2001).

- *Gendered processes in interactions, and individuals' internal mental work*.

- *Gendered symbols, images and forms of consciousness*, for example, in media, decor, and material, technical and scientific objects (Acker, 1992).

Third, there is the question of the relevance of gender, and indeed other social categories and differences, such as sexuality, race and class, for the construction of democratic, non- patriarchal) knowledge in science, and the construction of scientific knowledge itself. How are the theories, concepts, logics, languages and words used in science gendered? This is the most difficult area of investigation, not least as all researchers are themselves embedded and implicated in these very theoretical, conceptual and linguistic worlds. It might also be argued that the relevance of this kind of gendering, of knowledge, varies with different kinds of scientific endeavour. Compare, for example, building a bridge that stays up and does not collapse, with theorising on the very nature of organic/inorganic matter itself, and possible differences, or not, between such organic/inorganic "matters". In cell biology textbooks, the metaphor used for conception up to the 1970s depicted a heroic active sperm pursuing a passive egg, in fight with rivals. Later research has corrected this view with evidence on complex egg and sperm co-operation leading to fertilization (Schiebinger, 1999).

5. Gender equality, gender mainstreaming and gender equality measures

Promoting gender equality and increasing the participation of women have been long-term targets in Europe, especially the European Union, since the late 1990s, and in many member states. Yet, the development towards better gender balance has been rather slow: Europe keeps losing female talents from science and research. Furthermore, within the European Union, as, for example, in new financial policies in Denmark, Sweden and the UK, there is an emerging politics of privileging EU students and researchers over those from outside the EU.

Promoting gender equality in academia and scientific research is currently strongly on the agenda of various major stakeholders, nationally and internationally. This has occurred in universities (see, for example, Fogelberg et al., 1999; MIT, 1999; *Higher Education in Europe*, 2000; Sagaria, 2007), the national research councils (see EC 2009a) and major funding organisations (NSF, 2007), high profile science journals such as *Nature* and *Science* (for example, *Science*, 1994, 2000; Stevenson, 1997; *Nature*, 1999, 2009; Normile 2005; Barres, 2006; Bhattacharjee, 2007), and international intergovernmental organisations, for example, the United Nations (The United Nations, Beijing Declaration and Platform for Action, 1995) and its specialised agencies, such as in UNESCO (Harding and McGregor, 1995; UNESCO Courier, 2007),[10] and the OECD (2006), and since the late 1990s especially in the European Union (ETAN 2000; Rees 2002; EC, 2004, 2005, 2006, 2008a, 2008b, 2009a, 2009b).

In European science policy, mainstreaming gender equality in academic and scientific organisations is currently not only seen as an important goal, which would enhance individual women's opportunities to use their potential. It is also seen more generally as a way to promote excellence. The agendas for and intensity of these activities obviously vary between European countries, as does the broader societal gender context, including importantly in this context the relation of countries to the EU and possible accession.[11] There are countries with decades of gender equality activities in higher education and research, actively backed up by the national governments; countries with relatively recent but dynamic measures in this field; countries where the issue of women in science is only recently been rising on the science policy agenda; and countries which are relatively inactive in this area (Rees, 2002; EC, 2008a, 2009a).

The European Commission Women and Science Unit [later renamed as Scientific Culture and Gender Issues] has from the late 1990s played a vital role in this development by launching the issue of gender equality in science and academia at the European level through large European conferences, numerous thematic and policy reports, targeted calls, support for networking of women scientists and funding the European Platform of Women Scientists,[12] and development of comprehensive European statistics on gender in research.

Comparative European statistics show how academia continues to be gender-segregated both horizontally and vertically. SET [science, engineering and technology] fields are most strikingly male-dominated across the career path, and the lowest share of female professors is found in engineering and technology (7.2%), whereas the highest proportion of women professors are found in humanities (27%) and social sciences (18.6%) (EC, 2009b).

Gender equality measures in Europe comprise a large palette from legislation to gender equality and Gender/Women's Studies infrastructures, gender quotas and targets, and gender equality planning (Rees, 2002,

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[10] Also see: http://www.unesco.org/new/en/unesco/ > Themes > gender equality

[11] The European Union (EU) grew from the European Coal and Steel Community (ECSC), established in the 1951 Treaty of Paris, and founded in 1958 by six member states through the 1957 Treaties of Rome. It now comprises Austria (acceded 1995), Belgium (1958), Bulgaria (2007), Cyprus (2004), Czech Republic (2004), Denmark (1973), Estonia (2004), Finland (1995), France (1958), Germany (1958), Greece (1981), Hungary (2004), Ireland (1973), Italy (1958), Latvia (2004), Lithuania (2004), Luxembourg (1958), Malta (2004), the Netherlands (1958), Poland (2004), Portugal (1986), Romania (2007), Slovakia (2004), Slovenia (2004), Spain (1986), Sweden (1995), and the United Kingdom (1973). The candidate countries are Croatia, Iceland, and Turkey, and the former Yugoslav Republic of Macedonia. The potential candidate countries are: Albania, Bosnia and Herzegovina, Kosovo (under UN Security Council Resolution 1244), Montenegro, and Serbia.

[12] See www.epws.org

EC, 2008b). The main types of measures to promote gender equality in research, applied in EU-27 and associated states, include the following fifteen (EU 2008b):

- Equality law
- Ministries of Women's Affairs/Statutory gender equality agency
- Commitment to gender mainstreaming
- Women in Science unit in Ministries
- Quotas
- Targets
- Sex-disaggregated statistics
- Networks for women in science
- Mentoring for women in science
- Women's studies taught in universities
- Gender studies taught in universities
- Gender equality plans in universities
- Special funding available for women in science
- Resources for returnees
- Paternity leave

According to the Benchmarking report of the EC (2008b), only in Austria out of the EU-27 and the associated countries and West-Balkan countries were all 15 measures applied. In Germany and the UK all fifteen measures but quotas are applied, in Norway all but returnee grants. Finland, Netherlands, Sweden, and recently Spain apply most of the measures. Equality planning in universities is applied in the Nordic countries, Austria, Germany, Ireland, Malta, Netherlands, UK, and recently Spain, but in none of the new EU member states. Quotas (of some kind, though the type and application areas vary) are applied only in the Nordic countries (apart from Denmark), Austria, Belgium, Greece, Italy, Spain, and numerical targets only in the Nordic countries (also apart from Denmark), Austria, Germany, Spain, UK and Switzerland (EC, 2008b, pp. 42-43).

Mapping the existence of measures is rather simple but analysing the impact of the measures is a more complex issue. The Benchmarking report (EC, 2008b) gives a rather crude picture of gender equality measures in Europe. The authors remark how "the analysis of this report is based on the presence or absence of policies and not on their quality, effectiveness or impact. This in turn makes it harder to find clear relationships between policies and outcomes. There remains a strong case for these policies to be evaluated at the national level and the outcomes of these evaluations to be fed into the analysis" (p. 9).

6. Excellence and gender equality in science and science organisations

The first major European Commission-initiated international expert workshop on gender and excellence was held in Florence in 2003, followed by the publication of *Gender and Excellence in the Making* in 2004. This report notes:

> Scientific excellence is essentially difficult to grasp. In his seminal work on the ethos of science, Robert K. Merton (1942) stated that for science to be fertile and productive, scientists must be judged only by their work, and win status and membership within the scientific community on that criterion alone. From this perspective, the scientific forum is the best institution capable of evaluating the results of research. Peers should, therefore, assess the quality of research proposals and products. Because it is based on these principles, the peer review system professionally produces 'certified knowledge'. Disinterestedness and the ability to be objective are cornerstones of the scientific ethos. (p. 16).

In theory the two most important mechanisms for definition, measurement and evaluation of research excellence within mainstream science are bibliometrics and expert/peer review. Bibliometrics seek to measure the quantity and quality of publications of different kinds, but many problems remain, especially in relation to comparability, language use, disciplinary traditions, innovative research, and multi-disciplinary, interdisciplinary and transdisciplinary research. *Gender and Excellence in the Making* (2004) explored the issue of gender bias in measuring scientific excellence, based on research conducted in Europe and USA. The report identifies some of the key social and gender dynamics involved in the construction of scientific excellence in practice. These include:

1. setting the agenda for research;
2. publications and citations;
3. evaluation and assessment processes; and
4. transparency and accountability.

In each case, gender relations operate in these processes. One main conclusion was that scientific excellence is not a "universal fact" but rather a social construction, and as such, opens to many kinds of possible biases, including gender bias.

***NOTE #2*:** *We strongly **recommend** as preparation for the workshop reading* Gender and Excellence in the Making*, especially the introductory 'Synthesis report of the workshop', pp. 11-32. We suggest you also read one other chapter of your choice.*

A key concern for gender-sensitive science and research policy is how to combine the promotion of scientific excellence with the promotion of gender equality. The landmark European Commission report on women and science, the ETAN report (2000) addressed the issue by its very title: *Promoting excellence through mainstreaming gender equality.* Promoting gender equality is increasingly seen as quality assurance ("equality equals quality"). (ETAN, 2000; EC, 2004, 2009a). In this, gender equality is associated with women's participation through mainstreaming and women's presence/visibility is seen enhancing quality.

Women are heavily underrepresented in research decision-making in Europe, and thus have fewer opportunities to shape and influence the research agenda. The issue of research funding in 33 European countries was a focus of an expert group on 'Gender and Excellence' set up by the European Commission, mainly but not exclusively from a gender perspective. The group was to provide recommendations "on the improvement of transparency and accountability of procedures used in selection committees for grants and fellowships award and of access to research funding in general". The expert report, *Gender Challenge in Research Funding* (EU, 2009a), analyses the gender dynamics among applicants, recipients and gatekeepers of research funding, in funding processes, instruments and criteria, and the role of key funding organisations in promoting gender equality in research.

The focus was on national grant awarding procedures and accessibility of gendered data on success rates, amounts awarded and peers taking part in the decision-making and evaluation processes, distinguishing according to disciplinary fields. It centred on the funding of academic and basic research, on key public funding organisations in each country, and on competitive project funding and individual grants.

The European countries under consideration could be roughly divided into two groups: proactive countries, which promote and monitor gender equality in research and research funding with active policies and measures, and countries relatively inactive in this area, with few, if any, initiatives. Within the group of proactive countries, three distinct subgroups emerge. First, the global gender equality leaders**,** Finland, Norway, and Sweden, which have been particularly active in promoting gender equality in research and research funding since the late 1970s - early 1980s, joined later by Denmark and Iceland. More recently, a second proactive subgroup that includes countries with the largest under-representation of women in research in Europe: Austria, Germany, Switzerland, Netherlands and Belgian Flanders. Finally, a third sub-group of proactive countries includes the UK, Ireland and more recently Spain, where, contrary to the countries of the previous subgroup, women have a stronger foothold in research.

The second main group is composed of countries, which are relatively inactive when it comes to gender equality promotion in research. This group, made up of the countries not mentioned above, includes both old and new member states as well as some associated countries. These countries show relatively little, sometimes hardly any, commitment or initiative in this area. The division between the proactive and the relatively inactive countries appears to follow rather well the global gender gap rankings of the World Economic Forum (Lopez-Carlos and Zahidi, 2009), with most proactive countries having relatively small societal gender gaps, and most relatively inactive ones larger societal gender gaps.

A number of innovative national policies, which affect research funding, were highlighted in the report, such as gender balance targets (for example, in Slovenia or Switzerland) and legislation on gender quota of up to 40% of the minority gender in committees (in Finland, Norway and Iceland). In a number of countries, integrated policies increase university funding based on their performance in terms of gender equality (for example, Germany, Netherlands). Some have also set up specific national gender equality structures with strong prerogatives, which actively support their policies.

Several national research councils strongly and actively promote gender equality in research funding. These include the Austrian Science Fund FWF, the Academy of Finland, the German Research Foundation DFG, Science Foundation Ireland, the Netherlands Research Council NWO [Dutch Research Council], the Norwegian Research Council, the Swedish Research Council, the Swiss National Science Foundation SWSF, and the UK Research Councils. Many of these have established permanent infrastructures to monitor and promote gender equality in research, launched ambitious gender equality action plans, set up specific measures to promote women in research and conducted or are planning in-depth studies and monitoring activities on gender and research funding. Policy improvement can also be boosted by active engagement of the scientific community. An example of a bottom-up action is the Czech Republic National Contact Centre on Women and Science, which has succeeded in having funding mechanisms improved.

A number of actions specifically targeted at women, to promote gender equality, are implemented by many funding organisations. They range from actively encouraging women to apply, or setting targets for proportions of women funded, to specific programmes for women, supporting them at the start of their career, aid them to return to research after a career break or provide additional assistance for mobility. Various measures facilitating work-life balance in research for both women and men have been built into some funding schemes. Eligibility rules for applying for funding concern age or academic age, degrees completed, place of residence or citizenship, and present position. Age limits are in many cases waived for children, for duration up to three years. Rules requiring that applicants have a permanent position and forbidding them to fund themselves within their project are particularly penalising for women.

The existence of an efficient system for monitoring the outcomes of research funding is an essential element of transparency. Success rates by gender and discipline, concerning the main funding organisation(s) and general research project funding were obtained from 27 of the 33 countries under consideration, generally for 2007. No very systematic patterns appear in the data obtained. No clear relation could be observed between the proportion of women in a field and their chances of success in obtaining funding. For instance, in some funding schemes and organisations women had higher success rates than men in engineering and technology or in natural sciences, the most male-dominated fields across Europe, and in other fields less success. Nor was any large and universal imbalance observed in favour of men. However, some cases of imbalance were observed, with various degrees of statistical significance. In a number of cases, on the contrary, women have significantly higher success rates than men.

Various "excellence initiatives" aimed at rewarding the very best researchers and including substantial amounts of research funding were also examined. These instruments generally showed particularly strong gender imbalance. This was also the case with the European Research Council Starting Grants.

The gendered patterns in application behaviour are a very serious problem: women are less likely to apply for funding than men and they request smaller amounts of money. Again, further research is needed to explore this phenomenon, to understand the dynamics and reasons behind it, and to elaborate counter-strategies.

The EC expert group on Gender and Excellence gave the following recommendations (EC 2009a):

- Taking the gender challenge seriously, backing specific actions, supporting structures to monitor gender equality, and encouraging research on this area, all with strong political will. The denial of or lack of interest in gender equality appeared to be one of the main sources of imbalance in a large number of European countries.
- Increasing applications from women researchers. This implies encouraging and training women to apply and to request more funding. Measures for better work-life balance are essential.
- Improving gender balance among the gatekeepers of research funding, including committee or panel members and reviewers, and organising gender training, for all involved in the funding process. Allowing women more equal access to the inner mechanisms of research funding could also have major impact on improving their application rates.
- Gender monitoring and publishing of funding statistics on a regular basis, differentiated by discipline and research instrument. In-depth monitoring exercises, both quantitative and qualitative, should be carried out and should include an analysis of the pool of potential applicants, the study of team composition in proposals and generally of the gender impact of funding actions.
- Generally improving accountability and transparency in research funding, publishing procedures and criteria, using international evaluators, effectively avoiding conflicts of interest, providing feedback and instituting grievance procedures

NOTE #3 *We strongly **recommend** as preparation for the workshop reading* The Gender Challenge in Research Funding. *Brussels: Office for the Official Publications of the European Communities 2009, and see especially: 'Executive summary', pp. 5-7; and 'Conclusion and recommendations', pp. 69-74.* http://ec.europa.eu/research/science-society/document_library/pdf_06/the-gender-challenge-in-research-funding-report_en.pdf

7. Research management, leadership, policy implementation, and research practices

Research management, management, leaders and leadership can do much to enhance excellence and promote and implement gender equality at the same time. This suggests the need for excellence in research management and leadership itself. Men lead most European higher education sector institutions, with only 13% being led by women. Thus, Europe cannot be said to be leading the world in this respect. Of European universities only 9% have a female Rector or equivalent. It is only in Nordic countries that a substantial proportion of women has reached top positions of universities: 43% of Swedish, 33% of Icelandic, 29% of Norwegian and 25% of Finnish University Rectors and equivalent are women (EC, 2009b). Women are heavily underrepresented in research decision-making in Europe, and thus have fewer opportunities to influence the research agenda. Access to resources is a major key to success. This suggests the need for excellence in research management and leadership itself, for both women and men in research management and leadership (Collinson and Hearn, 1996; Hearn, 2004).

Research funding decision-making involves numerous gatekeepers: members of national science and technology councils, funding organisation directors, managers, board members and staff members, members of evaluation committees and panels, and external reviewers. In most European countries decision-making and other gatekeeping activities in research funding, including peer review, continue to be dominated by men, in some cases overwhelmingly so (EC, 2009a). All-male committees and evaluation panels still exist in many countries, even in those where the proportion of women in research is relatively high. The recruitment procedures, in particular for peer reviewers, whose choice may be crucial, are often not clear. The *Gender Challenge in Research Funding* report summarises the importance of this issue:

> Increasing the proportion of women among gatekeepers of research funding does not, according to the current empirical evidence, necessarily or automatically lead to better success rates of women applicants. However, in addition to providing more equal access to shaping the research agenda on all levels, better gender balance among gatekeepers demonstrates that women are full members of the system. It provides women researchers more opportunities to learn how the funding and evaluation system works and to become integrated into important networks, and allows them a valuable overview of current frontline research. (EC, 2009a: 6)

More specifically, more detailed accounts and examples on how to practice gender sensitive research leadership in research organisations have been collected by the Norwegian Committee for Gender Balance in the publication *Talent at Stake* (2010).

NOTE #4 *We strongly* ***recommend*** *as preparation for the workshop reading* Talent at Stake: Changing the Culture of Research, Gender-sensitive Leadership, *Committee for Gender Balance, Norway, 2010. Please read as much of the report as possible, especially pp. 8-10, 14-16, 18-21, 24-27, 38-40.*

Gender issues also recur throughout the more specific parts of the research process(es), and at all stages. These include:

- the identification of research problems, topics and priorities;
- recruitment and hiring of staff;
- work-life balance, including motherhood, parenthood, care responsibilities;
- formation and power relations within research teams and groups;
- devising of appropriate methods and methodologies;
- definition of research samples, populations, informants;
- publication and dissemination; definition of stakeholders;
- place of research activities within the context of gender relations in host science organisations; and
- assessing societal impact of research.

Similarly, more relevant laboratory models and research design methods are needed to help avoid consequences of gender approaches in which women and men are incorrectly accepted to be similar/different.

***NOTE*#5:** We particularly **draw your attention** to the section on 'Concerns and challenges in research methods and processes' in the Consensus Seminar Briefing Notes, pages 10-11, of which parts are reproduced below.

Most gender bias can be found in the context of discovery (development of hypotheses), but it has also been found in the context of justification (methodological process and publication). One of the main effects of gender bias in research is partial or incorrect knowledge in the results (Ruiz-Cantero, 2007). For example, in the field of pain research, at least 79% of animal studies published in the journal *Pain* over the preceding 10 years included male subjects only, with a mere 8% of studies on females only, and another 4% explicitly designed to test for sex differences (the rest did not specify) (Greenspan, 2007).

Comprehensive surveys find that research on cognitive development in human infants, preschool children, and students at all levels, fails to support common male 'intellectual' superiority claims. Mathematical and scientific reasoning develop from a set of biologically based cognitive capacities that males and females share. There is no scientific evidence to support the claims that:

- males are more focused on objects from the beginning of life and therefore are predisposed to learning about mechanical systems;
- males have a profile of spatial and numerical abilities producing greater aptitude for mathematics;
- males are more variable in their cognitive abilities and therefore predominate at the upper reaches of mathematical talent (Spelke, 2006).

This needs to be known at all levels of science, including by those leading research teams. However, analyses and comparisons of the *quantity of research output* between men and women in science have shown that despite many examples to the contrary, men still tend to publish more papers than women, a trend consistent across scientific disciplines, even after accounting for obvious mitigating factors (Ding et al., 2006). Similarly, *Gender and Excellence in the Making* (2004) noted:

> According to Schiebinger [1999] and Valian[1998], there is some evidence that women tend to publish fewer papers, with each paper being more substantive. On average, papers published by female scholars are cited more frequently than papers by more 'productive' male scientists (Schiebinger 1999, Sonnert & Holton 1996, Long 1992, Zuckerman 1987, Nilsson 1997; Feller 2004). Palomba (2004) reflects on this issue: differences are not so much caused by numbers of articles but by other aspects, such as type of publication, language or type of specialisation (p. 3). However, Palomba found no difference in impact factor: her data show that publications by women are as influential as those by men. (p. 17)

A study of the publication records of 168 life scientists in ecology and evolutionary biology showed clear discrepancies in publication rate between men and women appearing very early in their careers. This has consequences for subsequent citation. Consequently, the use of *h index* as a measure of research performance, which is the number of papers published, *h*, by a scientist where each paper has received *h* or more citations (ideally excluding self-citations) favours men. The *h* is highly correlated with quantity of research output; thus women scientists assessed in this way are likely to suffer in comparison with men (Symonds, 2006).

On the other hand, despite a considerable literature, there is surprisingly little sound peer-review research examining these criteria or strategies for improving the process. In the area of grant applications, an extensive study, involving 10,023 grant reviews by 6,233 external assessors of 2,331 proposals from social science, humanities, and science disciplines, and utilising multilevel cross-classified models, showed that researcher gender had no significant effect on proposal outcomes (Marsh et al., 2011). This of course does not change the presence of major gender structurings in and between the fields and hierarchies of science, and the effect of gender relations on the researchers' positions, the research application process, and the conduct of research.

We also note the question of the formation and power relations within research teams and groups, and how these can be strongly affected by gender relations. This includes attention to everyday ways of being men and women, and interpersonal gender relations between men and women, women and women, and men and men in research communications, meetings and teams, along with the impact of intersections with other social divisions, such as ethnicity, sexuality and nationality.

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