United Nations Division for the Advancement of Women (DAW, part of UN Women) United Nations Educational, Scientific and Cultural Organization (UNESCO) Expert group meeting Gender, science and technology

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# What has Worked in Europe to Increase Women's Participation in Science and Technology

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In this section we present the profile of the Eastern countries for the time span 2001-2006 with two kind of comparisons of the available data: a) focusing on the differences among the countries of the Eastern group and b) focusing on the differences between the Eastern group as a whole (the 'new' EU member States) and the other (Western) European countries - the 'old' EU Member States, or EU-15.

The share of women students at the level of PhD studies (ISCED 6) is an important indicator in the discourse of this report, because a PhD degree is often required to start an academic career. 'She Figures 2009' tells us that in 2006 the proportion of female PhD graduates in all Eastern countries except Czech Republic stands above the EU-15 average of 44 %. In six Eastern countries – Lithuania (59%), Estonia (57%), Bulgaria (53%), Latvia (51), Slovenia (50%) and Poland (50%) the female PhD graduates either outnumber male PhD graduates or are at the same level. (EC, 2009, p.49)

The table below shows some trends of women ISCED 6 graduates share by broad field of study for the time span 2001-2006.

Table 1. Percentage of ISCED 6 graduates who are women, by broad field of study, 2001 2006



40%; Croatia – 38%; Romania – 35%, Bulgaria – 33%, Slovakia – 33% and Hungary – 29%. Only three Eastern countries – Czech Republic (20%), Poland (24%) and Slovenia (22%) stand below the EU-27 average. One even could say that in Estonia engineering became a feminized field of study.

Within the period 2001-2006 in the majority of Eastern countries, the annual growth rate in the numbers of female PhD graduates has been higher than that of male graduates in all fields of science, i.e. the trend is that in all fields of science the number of female PhD graduates is increasing more rapidly in comparison with the number of their male counterpart. A similar trend was identified within EU-15. A decrease in the annual growth rate of both female and male PhD graduates in the period 2001-2006 was registered in only two Eastern countries – Estonia (-7.5 - women; -5.3 - men) and Latvia (-3.3- women; -5.5- men).

According to the European Commission 'She figures 2009' in 2006 the proportion of female researchers in all Eastern countries except the Czech Republic is above the EU-27 average of 30%. On the top place is Lithuania (49%), followed by Latvia (47%), Bulgaria (45%), Croatia (44%), Estonia (43%), Romania (43%), Slovakia (42%), Poland (39%), Slovenia (35%) and Hungary (33%) (EC, 2009, p.28).

# Horizontal segregation

The analysis of the gender distribution of researchers across R&D sectors shows that in 2006 the research potential of almost all Eastern countries is concentrated in the Higher Education sector (HES). The highest proportion of researchers (women and men) are employed in the HES in Lithuania (76.9%); Poland (73%); Slovak Republic (71.2%); Latvia (70%); Estonia (64.8%) and Croatia (63.2%). The research potential of Bulgaria is still concentrated in the Government R&D sector (GOV R&D). In five Eastern countries one observes a relatively high proportion of researchers in the Business Enterprise sector (BES) — Czech Republic (33,9%); Slovenia (32,3%); Romania (26,8%); Hungary (23,3%) and Estonia (23,0%). This dissimilarity is indicative for the national specificities of the R&D sectors of the Eastern countries. There is to some degree a balance of the distribution of Czech researchers across BES, HES, and GOV R&D, but nevertheless the Czech HES remain the main employment place for both female and male researchers.

Table 2 below shows the distribution of researchers, including women researchers, by main field of science.

Table 2. Number of researchers (and % of women among them) by main field of science of HES + GOV R&D in the Eastern countries in 2006

|           | Country     | Natural sciences | Engineering & technology | Medical sciences | Agricultural sciences | Social<br>sciences | Humanities |
|-----------|-------------|------------------|--------------------------|------------------|-----------------------|--------------------|------------|
| Pulgaria  | Researchers | 3,169            | 2,884                    | 850              | 1,078                 | 1,369              | 1,052      |
| Bulgaria  | % women     | 53.9%            | 26.9%                    | 53.2%            | 49.8%                 | 46.2%              | 61.9%      |
| Czech     | Researchers | 6,230            | 6,901                    | 5,088            | 2,458                 | 4,058              | 2,873      |
| Republic  | % women     | 31.1%            | 23.4%                    | 46.9%            | 37.3%                 | 42.0%              | 41.6%      |
| Fotonio.  | Researchers | 1,629            | 859                      | 423              | 231                   | 809                | 1,109      |
| Estonia   | % women     | 38.3%            | 29.5%                    | 60.8%            | 48.0%                 | 57.4%              | 65.1%      |
| Llungon   | Researchers | 4,486            | 3,881                    | 4,024            | 1,613                 | 4,708              | 6,433      |
| Hungary   | % women     | 28.3%            | 18.7%                    | 46.4%            | 35.3%                 | 37.1%              | 48.4%      |
| Latvia    | Researchers | 1,662            | 1,073                    | 449              | 588                   | 1,448              | 987        |
| Latvia    | % women     | 41.1%            | 27.5%                    | 56.3%            | 50.3%                 | 59.5%              | 67.3%      |
| Lithuania | Researchers | 2,530            | 2,079                    | 1,214            | 471                   | 2,323              | 2,378      |

% women 45.2% 28.8% 54.5% 53.1% 62.0% 61.9% Researchers 17,026

The good news is that in all Eastern countries, except Estonia, the proportion of female academic staff at 'Grade A' (Full professor) increased during the period 2004-2007, and it seems to be a stable trend.

The bad news is that in 2007, despite the existing large pool of Eastern academic women at 'Grade A' in the majority of the Eastern countries (except for Latvia, Estonia, Slovenia and Croatia), the proportion of female heads of universities and equivalent higher education institutions was less than 10%. There are no women appointed in such high-level decision-making position in Lithuania and Hungary. In this regard, the case of Romania is indicative. The proportion of academic women at 'Grade A' is impressive in Romania – 32% and by this indicator Romania ranks at the top for both Ea

2. The European policy of mainstreaming gender in scientific research: A decade of initiatives and support for European women academics and researchers (1999-2009)

During the Czech EU Presidency, the European Commission organized a high level EU conference, "Changing research landscapes to make the most of human potential – 10 years of EU activities in 'Women and Science' and beyond", held 14-15 May 2009 in Prague, and aimed at commemorating the tenth anniversary of Europe's activities in the area of women

During the decade (1999-2009), the Commission set up several *temporary Expert Groups* which addressed different aspects of women's under-representation in scientific research and elaborated recommendations for the improvement the situation. They are as follows:

ETAN (European Technology Assessment Network) Expert Group on Women and Science was set up by Directorate-General (DG) for Research of the European Commission in 1998. This working group produced the Report on 'Science policies in the European Union: Promoting Excellence through Mainstreaming Gender Equality' (EC, 2000).

ENWISE (Enlarge Women In Science to East) Expert Group: The Group was launched by the Commission Research Directorate-General in 2002 under action No. 27 of the Action Plan of the Science and Society Programme of Sixth Framework Programme (FP6). Its objective was the assessment of the condition and status of women scientists in the Central and Eastern European countries and the Baltic States. Following the ETAN Report which dealt essentially with the situation of women scientists in the EU-15 Member States, the ENWISE Group produced a similar Report – 'Waste of talents: turning private struggles into public issue. Women and Science in the Enwise countries'. (EC, 2003) The ENWISE Expert Group is chaired by Professor Ene Ergma and its members are senior scientists from different disciplines, representing academies of sciences, universities, research institutes and administration, as well as business. The ENWISE Group involves independent experts from 10 post-communist countries (nowadays 'new' EU Member states): Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic and Slovenia plus one expert from the former German Democratic Republic and one expert for the Balkan region.

WIR Expert Group (Women in Industrial Research): Created in 2002, the group produced the Report: 'Women in industrial research: A wake up call for European industry' (EC, 2003).

WiST Expert Group (Women in Science and Technology:. In 2006, the WiST working group presented its Report entitled "Women in Science and Technology: a Business Perspective" (EC, 2006).

WiST2 Expert Group: This working group produced the Report 'Women in science and technology - Creating sustainable careers' (EC, 2009).

WIRDEM Expert Group (Women In Research Decision Making). The geographic coverage of Eastern countries analyzed by this Expert Group is: Estonia, Romania, Slovakia and Slovenia. The Report 'Mapping the Maze: Getting more women to the top in research' appeared as a Commission's publication in 2008 (EC, 2008).

Gender and Excellence Expert Group which focused on the gendered access to research

All Reports are available and can be downloaded as pdf from the home page: <a href="http://ec.europa.eu/research/science-society/">http://ec.europa.eu/research/science-society/</a>

# B) Setting a number of fixed targets

On 19 February 1999 the DG for Research of the European Commission issued a Communication on the subject: Women and Science: Mobilizing women to enrich European research in which it proposed a series of measures to be taken so as to stimulate discussion and the sharing of experience in this field among Member States, and to develop a coherent approach towards promoting women in research financed by the Community. This first and seminal official document announced that the Commission intended to make significant efforts to achieve at least a 40% representation of women on average in Marie Curie Fellowships, advisory groups and assessment/monitoring panels and consultative Committees throughout FP5. This Communication was presented to the Council of the EU, which with its Resolution of 20 May 1999 on women and science approved the set target of 40%.

Following a request from the Council of the EU, in 2004 the European Commission proposed to set targets for women's representation in decision-making positions in science: to increase the number of women in leading positions in public research to 25 % by 2010, and the proportion of female new recruitments to at least 33 % by 2010. EU Member States were also asked to develop specific indicators to track progress on the following: (1) the gender pay gap for researchers, work-life balance, dual careers, and mobility issues; (2) the attrition of women in research and academia, career progression and promotion, women as patent originators, and women in innovation; and (3) appointment procedures and recruitment strategies for composition of scientific boards. (Rf: Science in Society home page of FP7:

http://eadpgehttpn://eac.euirto/palyepubrseiseEarch/scTent/enotety/m1(cruit Tc 0.02025 -1.123n9 Thttp://e)5(aiage of FP ca)4im

During the last decade, the DG for Research of the European Commission has supported about 35 projects in the field of women and science.

European Union-funded projects (Rf: research\* eu SPECIAL ISSUE | APRIL 2009)

# 1. Gender and research

**UPGEM** (Understanding Puzzles in the Gendered European Map, Brain Drain in Physics, Through the Cultural Looking Glass). <a href="https://www.dpu.dk/site.aspx?p=8581">www.dpu.dk/site.aspx?p=8581</a>

**KNOWING** (Knowledge, Institutions and Gender: an East-West comparative study) www.knowing.soc.cas.cz

**PROMETEA** (Empowering Women Engineers' Careers in Industrial and Academic Research). www.prometea.info

GenderBasic (Promoting attention to sex and gender in life sciences researchin Europe). www.genderbasic.nl

ELSA (Excellence in the Life Science Area – adding the gender dimension). <a href="http://ki.se">http://ki.se</a>
TRANSGEN (Gender Mainstreaming European Transport Research and Policy. Building the Knowledge Base and Mapping Good Practices). <a href="https://www.sociology.ku.dk/koordinationen/transgen">www.sociology.ku.dk/koordinationen/transgen</a>

**WOSISTER** (Women Scientists in Gender-Specific Technological R&D). www.fpi.lu.se/en/research/wosister

On 8th March 2010, EIGE announced the launch of an ongoing activity, the creation of its future "Women of Europe" database. EIGE encourages nominations from and about the successful 'Women of Europe'. The activity aims to highlight their achievements and success stories, as part of its efforts to disseminat

mainstreaming The other countries set up units for 'women and science' at the institutional level of their Ministries of Education and Research, again without allocation of national resources for gender mainstreaming.

A synoptic vision for achieving gender balance in scientific research and leadership (women's representations in decision-making position in science)

We argue that the issue of *organizational culture* of scientific institutions (universities and research centers) is at the center of the observed situation of women and science; it needs a deep structural change and much modernization. This claim implies a shift in the lens through which the 'puzzle' of women in science could be viewed. Instead of encouraging women

breaks (resources for returnees) as well as the necessary financial and administrative provisions for governing such arrangements.

**Dual careers** (and mobility) mean scientist couples, in which both partners, who usually have an academic education, show a high commitment to their professional career, and at the same time attach importance to the care of their partnership and/or family. It is a very sensitive issue especially for early stage researchers in their thirties. At this stage of their lives, they tend to have 'a nomadic' lifestyle, switching from one post-doc fellowship to another across different European countries. Studies show that women are more likely than men to move for their partners' career. The consequences are a decrease in women's science production rates, a delay in their career promotions, etc. The presence of adequate Dual Career services in scientific organizations (e.g. nurseries and kindergarten for R&D staff) and support for mobile scientist couples are preconditions for equal opportunities in careers' building.

Child-care facilities in the Eastern countries: The market orientation of the Eastern countries' economies affected the previous well-developed institutions of childcare facilities, and after the political change there was a shortage of available places in the public nurseries and kindergartens. At the same time appeared a number of private kindergartens as well as private primary schools. However, the monthly fees for children's enrolment in these new establishments exceed the average monthly income of an academic couple. The same is true for the care facilities for senior people. The quality of services in the public 'homes for senior people' is low and the newly emerged private homes for older people are extremely expensive and unaffordable for an academic couple. These developments are of crucial importance for the career building for early career female researchers, but also for experienced female researchers as well. The first group of women is concerned as caregivers for children and the second group as care givers for senior parents and relatives. Therefore, many professional women had to cope with this new situation and had to find a solution. In regard to the duties of childcare and care for senior relatives, the Eastern academic women seem to face more difficulties than their Western counterparts, because their share of the research population is high - from 3 percentage points (in Hungary) up to 19 percentage points (in Latvia) above the EU-27 average of 30%. (EC, She Figures 2009).

At the Barcelona Summit in 2002, some explicit conclusions and targets were defined with regard to the provision of childcare services. Confirming the goal of full employment, the European Council agreed that Member States should remove disincentives to female participation in the labour market and strive by 2010 to provide childcare to at least 90 % of children between 3 years old and the mandatory school age, and at least 33 % of children under 3 years of age. The importance of these targets has been reaffirmed as recently as 2008 in the employment guidelines (2008–10) adopted by the Council. (EC, 2009b) A recent EU Report gives some insight on the provision of childcare services across Europe through a comparative review of 30 European countries. The Table below, which sheds light on the situation in the Eastern countries, is extracted from this Report.

Table 3. The provision of childcare services in the Eastern countries

| BG | Limited supply of (and demand for) childcare services for the youngest children.                            |  |  |  |  |
|----|---|--|--|--|--|
| CZ | The demand for childcare facilities far exceeds supply, especially for the youngest age category. There is  |  |  |  |  |
|    | also a shortage of pre school facilities for children below 5 years.  |  |  |  |  |
| EE | There is a shortage of childcare places for almost all age categories, but especially for children under 3. |  |  |  |  |
|    | years.  |  |  |  |  |
| LV | There is a severe shortage of places in public kindergartens. On average, about 60 % of children attend     |  |  |  |  |

|    | kindergartens.   |
|----|--|
| LT | The availability of childcare services is limited. In addition, there is an insufficient number of places in |
|    | public kindergartens in most urban and rural areas.  |
| HU | Coverage of nurseries is small and falls far short of meeting the demand of working parents. Supply of       |
|    | kindergarten facilities is more or less adequate, except for smaller rural settlements.                      |
| PL | Coverage of nurseries and pre school arrangements is small and falls far short of meeting the demand of      |
|    | working parents.   |
| RO | Very low coverage. In addition the quality of the services causes problems.                                  |
| SL | There is a growing inclusion of young children in childcare services. There are, however, large differences  |
|    | between towns and between urban and rural areas.   |
| SK | Limited provision of (and demand for) childcare facilities for the youngest children. After a period of      |
|    | decline, the coverage rate for pre school arrangements is increasing and is more or less at the level of     |
|    | 1989.  |

Source: The provision of childcare services. A comparative review of 30 European countries, European Communities, 2009, p.40

# Gender pay gap and researchers' remuneration

The equal pay legislation, built on the principle of 'equal pay for work of equal value', was introduced in the Eastern countries since the very beginning of the communist period, and in the Western countries since the 1970s. However, despite the existing equal pay legislation and despite a visible increase (over time) of the overall rate of female employment, the gender pay gap was and still is present in all European countries (Eastern and Western). It is determined by multifaceted, underlying factors, which seem to shape a stable trends such as: concentration of women and men into different segments of the labour market with different remuneration, vertical segregation of women and men into different positions in respective organizational hierarchies, difference between female and male appointments on part-time and full-time positions, education and training, transparency of the pay systems, and last but not least, an uneven division between women and men of domestic work (EC, 2010). Because the existing trend of gender pay inequality across European countries has not appeared to narrow over time, the European Commission (from 2007 onwards) initiated multiple initiatives at the European level, aiming to address the issue of the gender pay gap, e.g. the Commission's Communication on 'Tackling the pay gap between men and women', harmonization of the methodology for calculation the gender pay gap across European countries in order to make national data comparable, the use of 'Structure of Earnings Survey' as a harmonized source of data, etc.

In connection with this scope of activities, two important EU Reports were recently released. One, prepared by the European Network of Experts on Employment and Gender Equality issues (EGGE), was commissioned by the European Commission DG for Employment, Social Affairs and Equal opportunities. It was published in February 2010 and provides an insight into the gender pay gap across the labour markets of the European countries. The other was commissioned by the European Commission DG for Research and was produced in 2007. The *Study on the Remuneration of Researchers in the Public and Private Commercial Sectors* addresses the issue of researchers' remuneration and the gender pay gap across European countries, associated countries and other countries (EC, 2007).

The recognition dimension refers to issues such as: career path, leadership, support for mobility, scientific excellence, peer review system, access to research funding, etc.

#### Scientific excellence

The EU Report 'Gender and Excellence in the Making' suggests that existing systems of defining and evaluating scientific excellence are not as gender neutral as they are claimed to be. The scientific community seems to act as if it were obvious and agreed by all participants of the scientific enterprise what scientific excellence means. It behaves as if scientific

excellence were an uncontested terrain, and the procedures and criteria that lead to the selection of the top layer of scientists who are considered excellent were given, known, and unproblematic. (EC, 2004) From a critical view, excellence is a set of practices that are functional to the governance of the scientific community, i.e. to the allocation within the scientific community of resources and decision power. Therefore excellence is procedural, not substantive. Excellence does not exist per se, independently from the practices that create it. What we need is a *critical reflection on procedures and criteria leading to recognized excellence*.

# Access to research funding

Gender differences are clearly visible in the process of finding research funding. For example recruitment procedures for peer reviewers are not always transparent. Sometimes the eligibility criteria fail to take into account the constraints of family demands (maternity and child care). The recent EU Report 'The Gender Challenge in Research Funding: Assessing the European National Scenes' sheds light on the gendered access to research funding across Europe.

# The case of the Eastern countries

The recent reforms of R&D in Eastern countries are focused on the further development of competitive research funding in the already established national grant agencies and relevant grant-awarding bodies. The vision is that all R&D funding should become entirely competitive. The move is towards the internationalisation of the evaluation/review procedure. The national grant agencies in the majority of Eastern countries revised their evaluation rules and practice to associate foreign experts in the peer reviews of the submitted projects. In the recent EU Report (EC, 2009a), all Eastern experts claimed that their national agencies are not engaged either with gender equality planning or with gender equality monitoring in all aspects of their activities. For example gender is not taken into account in the selection and recruitment of evaluators, both national and international, the success rate by gender of applicants is not monitored, and any special positive measures for the promotion of women scientists through specific programmes, calls and target funding are lacking.

Generally speaking, in Eastern but also Western countries, female scientists' applications to national grant agencies seem to be less numerous in comparison with those of their male counterparts, and they tend to apply for smaller size grants. The share of projects with female coordinators/principal investigators among the awarded grants is also low.

What might be the impact of the current process of ongoing reforms in R&D funding systems on the future prospects of Eastern women scientists? In spite of the fact that gender is not taken on board and that any explicit positive measures for achieving gender balance among the grants' beneficiaries were not applied in the recent reforms of national grant agencies, women scientists could still profit from the following developments in this area:

The 'young scientists' age group (under 35 years old) is a priority for all Eastern countries' national grant agencies, which direct e specific call for projects for young scientists, or offer 'bonuses' to submitted projects that involve young scientists, or target them in many other ways. (EC, 2009a). Competitive project-based financing, in the majority of Eastern countries, is based on a kind of 'young scientists mainstreaming' policy. The current aim is to reach a balance by age and not a balance by gender in the research projects supported by national grant-awarding

- bodies. However, young women scientists, being a part of the privileged target group of young scientists, could profit from the current state of affairs.

  Eastern researchers working abroad form another target group. All Eastern countries' national grant agencies make specific calls for reintegration grants addressed to their

difficult to imagine who will return, when the elder members of the family who have stayed in the country of origin need help.)

How are problems related to the so-called 'dual academic career' (i.e. both partners are scientists) managed within the academic migration process?

# **Some conclusions:**

- ➤ Neoliberal market values and orientations have affected HES and GOV R&D sectors in both Western and Eastern countries. The focus is set on *competition* both at the level of institutions and individuals and their ability for attracting research funding outside of the allocated state budget subsidies. *Scientific excellence* tends to be measured in terms of this ability. The prospect is for future challenges with regard to gender equality in scientific research. For example current reforms in the mechanisms of R&D funding that are ongoing at a different pace across the Eastern countries do not suggest that the issue of gender equality or gender balance has or will been taken into account.
- There is an urgent need to extend the current 'policy of non-discrimination by sex' in HES and GOV R&D and in the business enterprise and private non-profit sectors to a 'policy of gender mainstreaming in scientific research' through a modernization of organizational culture in national-level scientific organizations.
- Not only women, but also men scientists should participate in all levels of the debate on gender equality in science..

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