Meta-analysis of gender and science research – Country group report

Eastern countries

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This is one of the thematic reports of the study *Meta-analysis of gender and science research*, a project of the 7th RTD Framework Programme of the European Union (RTD-PP-L4-2007-1), commissioned by DG Research to the consortium led by CIREM (Spain) and made up of Université Libre de Bruxelles (Belgium), Inova Consultancy Ltd. (United Kingdom), Fondazione Giacomo Brodolini (Italy), Bergische Universität Wuppertal (Germany) and Politikatörténeti Intézet KHT (Hungary). The study was carried out between 2008 and 2010.

The purpose of the study was to collect and analyse research on horizontal and vertical gender segregation in research careers, as well as the underlying causes and effects of these two processes.

The objectives of the study were to:

- Provide an exhaustive overview and analysis of research on gender and science carried out at the European, national, and regional levels.
- Make the study results accessible to researchers and policy-makers via an informed bibliography (online database) and a set of reports.
- Steer policy-making on gender and science and define future research priorities within the Framework Programme, in particular through good practice examples and gap analysis in the various research topics.

For the purposes of the study, 'science' was understood in its broadest meaning, including social sciences and humanities as well as research and technological development.

The study covered the research on gender and science produced between 1980 and 2008, in all European languages, in 33 countries: the 27 EU Member States as well as 6 Associated Countries to the Seventh Framework Programme for Research and Technological Development (FP7) (Croatia, Iceland, Israel, Norway, Switzerland, and Turkey).

The study produced five country-group reports, seven topic reports and the final synthesis report:

Country-group reports	**Authors**
Continental countries	Hafsatou Diallo, Danièle Meulders, Síle O'Dorchai & Robert Plasman
Eastern countries	Mária Palasik, Nikolina Sretenova, Robert Takács & Núria Vallès
Nordic countries	Seppo Roivas
Southern countries	Elisabetta Addis & Costanza Pagnini
United Kingdom and Ireland	Cinnamon Bennett, Marina Larios, Louise Norman & Emma Parry
Topic reports	**Authors**
Horizontal and vertical segregation	Danièle Meulders, Robert Plasman, Audrey Rigo & Síle O'Dorchai
Gender wage gap and funding	Danièle Meulders, Síle O'Dorchai, Robert Plasman & Audrey Rigo
Stereotypes and identity	Felizitas Sagebiel & Susana Vázquez-Cupeiro
Science as a labour activity	Maria Caprile & Núria Vallès
Scientific excellence	Elisabetta Addis with the assistance of Costanza Pagnini
Gendered innovations	Londa Schiebinger, Ineke Klinge, Addison Arlow & Sarah Newman
Policies towards gender equity in science and research	Cecilia Castaño, Jörg Müller, Ana Gonzalez & Rachel Palmen
Synthesis report - Authors	
Maria Caprile (coord.), Elisabetta Addis, Cecilia Castaño, Ineke Klinge, Marina Larios, Danièle Meulders, Jörg Müller, Síle O'Dorchai, Mária Palasik, Robert Plasman, Seppo Roivas, Felizitas Sagebiel, Londa Schiebinger, Núria Vallès, Susana Vázquez-Cupeiro	

All the reports and the online database (Gender and Science Database, GSD) are available at the website of the study: **www.genderandscience.org**

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1. Introduction

By Nikolina Sretenova

The objective of this report is to provide an exhaustive overview and analysis of the researches carried out at the national levels of the Eastern country-group of the 'Meta-analysis of gender and science research' project. This group includes eleven countries (in alphabetic order): Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia. Eight countries of the Eastern group: the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia joined the European Union in 2004 while two other countries, Bulgaria and Romania, became members in 2007. Since 2008, Croatia has been in the process of accession to the EU.

The study covers the research carried out in these countries between 1980-2008, structured into eight preliminary defined topics: 1) horizontal segregation; 2) vertical segregation; 3) pay and funding; 4) stereotypes and identity; 5) science as a labour activity; 6) scientific excellence; 7) gender in research contents and 8) policies towards gender equality in research.

The methodological approach of the Report is comparative analysis of the researches done on the above eight topics at the national level of the participating countries aiming at revealing the most relevant findings in terms of strengths and gaps and possible controversies at the regional level of the Eastern country-group.

The report is based on the work carried out by the gender experts (associated to the project) who came from the Eastern countries, the so-called 'Social Science Correspondents' in two lines:

1. Preparation of the so-called 'informed bibliography', whereby each gender expert identifies and collects researches linked to the structure of agreed topics in her/his country and elaborates English abstracts of the surveyed academic publications (books, articles, conference proceedings, and so on) and then enters the documents into the Gender and Science Database (GSD)
2. Preparation of 'national country reports', whereby each gender expert writes a country report which aims at analysing the state-of-the-arts of the collected research bibliography broken down into topics, i.e., highlights the main research questions, research approaches, findings and gaps related with each of the topics in each respective country.

Box 1 – Social Science Correspondents of the Eastern countries (in alphabetic order)

Country	Name	Institution
Bulgaria	Dr. Nikolina Sretenova	Institute for Philosophical Research
Czech Republic	Dr. Alena Krizkova	Institute of Sociology
Croatia	Ms. Aida Bagic	Centre for Women's Studies
Estonia	Prof. Voldemar Kolga	Tallinn University
Hungary	Dr. Mária Palasik	Institute of Political History
Latvia	Dr. Ilze Trapenciere	Institute of Philosophy and Sociology
Lithuania	Dr. Jolanta Reingardé	Vytautas Magnus University
Poland	Ms. Elzbieta Pakszys	Adam Mickiewicz University
Romania	Prof. Doina Balahur	Alexandru Ioan Cuza University of Iasi
Slovak Republic	Dr. Natasa Urbancikova	Technical University of Košice
Slovenia	Prof. Eva D. Bahovec	University of Ljubljana

A brief look at the GSD (see table below) shows that the Eastern-country group has contributed some 10% of the total entries of the GSD, i.e. only 445 inserted publications. Why so few, bearing in mind the size of the group? (In any case, in order to assess the contribution of each of the country-groups we have to consider the total number of research population in head count of the given country-group in proportion with the other country-groups.).

It is also significant that the main body of literature produced at the regional level of Eastern-group countries in the course of time appeared as state-of-the-art studies based on compilation of statistics, general introductions and/or multi-topic issues by content. This seems to contrast with the findings reported from the other country-groups. What is the rationale behind this observation?

Generally speaking, in this literature-mapping exercise we find both quantitative and qualitative differences **in terms of numbers and content** between the publications produced at the regional level of the Eastern-country group and those detected in the other country-groups.

Box 2 – GSD statistics

Publications related with the Eastern countries

	n	% all GSD publications
Published in Eastern Cs	445	9.8
Analysing Eastern Cs	692	15.2

Publications by methodological approach

	Eastern Cs (%)	All Cs (%)	Ratio Ecs/Acs
Conceptual	40.0	39.1	1.0
State-of-the-art	59.7	40.4	1.5
Compilation of statistics	34.1	20.7	1.7
Building gender indicators	4.3	2.8	1.5
Empirical research. Quantitative techniques	21.4	26.7	0.8
Empirical research. Qualitative techniques	32.8	31.5	1.0

Publications by number of topics addressed

	Eastern Cs (%)	All Cs (%)	Ratio Ecs/Acs
1-2 topics	48.3	54.8	0.9
3-4 topics	32.2	33.9	1.0
5 or more topics	19.5	11.3	1.7
Total	100.0	100.0	

Eastern Cs: Publications analysing Eastern countries
All Cs: All GSD publications

This introductory chapter built on the findings of the national country reports seeks to provide some answers to the questions raised and aims at providing **understanding** of the specificity of the literature production on the theme at the regional level of the Eastern country-group through the depiction of its changing context.

The national landscapes of gender and science researches are highly contextualised issues. The context is created on the basis of several constituent/structural factors or ingredients such as:

- The official gender equality politics and policies and it possible change in the course of time.
- The structure of higher education (HE) and research (R&D) sectors as well as their organisational culture and practice.

- The level of funding allocated to R&D sectors, i.e., R&D expenditure as a percentage of GDP; the mechanisms of funding; the gendered access to research funding; the remuneration of academics and researchers.
- The availability of sex-disaggregated statistics at national level.
- The public image of science and scientists in society, and so on.

The challenge faced by the countries of the Eastern group (unlike the case of the other country-groups) is that they have undergone rapid and turbulent changes in their political, economic and social regimes and orders over the last three decades which have affected and in fact re-shaped all the structuring factors of the context under question. This resulted in the respective re-framing of the researches on the defined topics which again was not the case with the other country-groups.

In order to facilitate the understanding of the offered analysis by topics in the Report, we have divided the covered time period (1980-2008) into three decades. We explain the changing context of each decade and try to bridge it with particular topics of gender and science research agendas as they have been reflected in the national country reports. In doing so, we give priority to the third decade because of the explicit and sometimes implicit statements articulated in all country reports that the year 2000 should be considered **a turning point** for the undertaking of truly genuine academic research on gender and science issues. (See the country reports of the Czech Republic [Křížková, 2009], Lithuania [Reingardé, 2009], Romania [Balahur, 2009] and Bulgaria [Sretenova, 2009] for explicit statements about 'the turning point'; the rest of the country reports made implicit statements in this regard).

The division of the time span 1980-2008 in the discourse of this chapter is as follows:

I. 1980-1990 – The decade of formal gender equality and 'socialist-state feminism': top-down driven activities and emergence of some seminal bottom-up driven activities.

II. 1990-2000 – The decade of transformation and of a European perspective: bottom-up driven activities.

III. 2000- 2008 (2010) – The decade of European integration and framing of research activities on the gender and science issue: top-down and bottom-up driven activities

Each of these decades has its own context, its own specific profile of the researches carried out and even its own leadership at the regional level of the Eastern country-group. Therefore, in this introductory chapter we are interested in the question of what kind of literature was produced ***within each decade*** and not in the bulk of publications which appeared later ***about the given decade,*** e.g. some publications of the period 2000-2008 dealing with the communist and/or post-communist past of the Eastern country-group. This distinction is important in order to gain real insight into the specific context of each decade and a follow-up understanding of the 'text' of the decade, i.e. the publications of the time.

In a preliminary plan, we would like to draw attention to two developments in the discourse of this Report:

1. Firstly, during the course of the period between 1980-2008, the regional leadership in terms of research on gender and science among the Eastern country-group also changed. During the first decade (1980-1990), the regional leader was former Yugoslavia, in our case – **Slovenia and Croatia**; during the second decade (1990-2000), the regional leadership was held by **Poland** and during the third decade 2000-2008(2010), the **Czech Republic** took the lead at the regional level of the Eastern country-group.
2. Secondly, the crucial catalyst for the start-up of academic research on the new 'gender and science' agenda in the Eastern country-group was the European Commission policy of mainstreaming gender equality in scientific research as well as the financial support provided to different international research projects during the past ten years from the Fifth, Sixth and the current Seventh Framework Programme of the European Commission, i.e., from 1999 onwards.

In what follows, we briefly discuss the **changing context** of each decade and make an attempt to link the context with the findings of the national country reports. We also provide arguments for and different explanations regarding the observed developments.

I. 1980-1990 – The decade of formal gender equality and 'socialist-state feminism': top-down driven activities and emergence of some seminal bottom-up driven activities

The context of the decade 1980-1990

After the Second World War, when the Soviet Union imposed its rule over the countries of the Eastern group, a particular *Soviet model of equality* was adopted in these countries. Upon the establishment of the new political regime, a separate law for complete equality of rights between sexes was enacted in all of them in addition to the granted equality of rights by their national constitutions.

The impact of the imposed *Soviet model of equality* resulted in a policy of *full employment of women*, which precluded any personal choice, and in a policy of *equal access to education.*

The policy of full employment of women was developed because of the great demand for labour on the one hand, and the increased possibility for state control of women's lives on the other. Furthermore, this policy was supplemented with a well-developed institutional set of childcare facilities like nurseries, kindergartens and the like, which were financially supported by the state. For example, in 1980 Bulgaria offered an average of 92 places for 100 children applying for kindergartens while in 1986/7, the number of places increased to 99 per 100 children. The availability of childcare facilities for working women during the communist regime is mentioned in the other country reports as well. The effect of the policy of *full employment* was that within the decade 1980-1990, the women of the Eastern country-group comprised near parity of the respective national labour force and their rate of employment was much higher in comparison to the Western European countries at that time.

The other specific measure implemented by the 'socialist-state feminism' was the compulsory gender quota system applied during the communist period (1945-1989) in some countries of the Eastern group, though not in all of them, in different areas of public life. It was only one of the numerous quotas operating during this period. For instance, informal interviews with men and women researchers carried out in Slovakia and Estonia revealed that the respondents believe that quotas could be counter-productive: "I do not like quotas… There used to be quotas everywhere, starting with school…enrolment quotas, e.g., for children from working class families…Quotas are very dangerous because they discriminate against women, men or whoever" (EC, 2008, p.31).

At the tertiary level of education, the proportion of female/male enrolment in universities and in equivalent higher education institutions was carefully monitored in the countries of the former Soviet Bloc.

In Bulgaria, for example, the student enrolment in higher education was determined by the results of anonymous competitive examinations and of quotas based on parents' occupation, ethnic background and gender, among other aspects. During the socialist era, a central governmental body decided on the number of students to be admitted to each higher educational institute in each speciality. It also determined a *quota for men* and a *quota for women* for every speciality. Usually the ratio was 50:50 (i.e. half of the student places were assigned to female applicants and the other half to male applicants), but in some technical institutes the proportion was 60:40 (men: women) and in Dramatic Arts, the proportion was 70:30 (men : women). The quotas/proportions were not constant, but changed every year. *In practice, this meant that women competed against women and men competed against men.*

The examination was of course, the same. Because the applications of women were more numerous and they generally scored higher than men in the examinations, *their competition was more severe.* After the demise of communism in 1989, the quota mechanism was eliminated and only a "gender quota" system still operated in students' enrolment to higher education. The quota system based on applicants' gender was initially designed to ensure gender balance among the university undergraduates but as a matter of fact, it was discriminative against women regarding their entrance to higher education, because the system protected men's opportunities to enter higher education. In the prestigious fields of study, e.g. engineering and technology more than half of the places in the technical universities were reserved for male applicants. The situation in Romania and the three Baltic countries (at that time still a part of the USSR) was similar to that of Bulgaria (e.g. in soviet Lithuania at large, 50% of student places in HE were assigned to male applicants).

Critical analysis of this gender quota system as well as arguments for it abolishment as a discriminatory practice relating to female entrance to higher education were presented at the beginning of 1990s (Sretenova, 1994). Fortunately, during the next decade (2000-2010) this gender quota system was removed and it is no longer implemented at the tertiary level of education and the students' enrolment in universities is based nowadays only on merit.

Due to the official policy of *equal access to education,* the number of female students at the tertiary level of education gradually increased and during the decade 1980-1990, in almost all countries of the Eastern group, women students outnumbered male students in higher education institutions. In addition, during the communist regime, female high school graduates were encouraged to study natural sciences and engineering and technology and to enrol in higher engineering schools and technical universities because these fields of science were considered 'key fields' in terms of the then ongoing process of industrialisation in the Eastern country-group. The outcome of these politics and policy was that during the decade 1980-1990, there was a considerable number of graduate women in natural sciences and in engineering and technology in the Eastern country-group. Although on the national scales of the Eastern countries the relative share of women researchers employed in engineering and technology (HES and GOV R&D) seems low in comparison with their relative share in the fields of medical sciences, humanities and social sciences, it still seems high in comparison with the case of other European countries at that time. For example, in 1985 the percentage of women researchers in Croatia was the highest in natural sciences (42.2%) and the lowest in technical sciences (20.2%), according to the country report of Croatia. In Romania, by 1990 the number of female and male students in technological as well as in medical higher education institutions was almost equal, according to the country report of Romania. The same occurred in Bulgaria: women students reached near parity with men students at medical and technical universities, according to the Bulgarian country report. The interest in studying natural sciences and engineering and technology among high school graduates, including female high school graduates, did not vary during the next decade (1990-2000). According to the Lithuanian country report, for example, in 2000 the share of women obtaining a scientific degree in physical and technical science reached 30% in Lithuania. In the same year in Hungary, about 25% of all engineers in the country were women (Palasik, 2009). Therefore we can draw a tentative conclusion that within the decade 1980-1990, the horizontal segregation was **less present** in the Eastern country-group in comparison with the average European case. This was due partly to the high prestige of the engineering profession in the socialist societies of the Eastern countries, and partly to the limited opportunities for building a career outside higher education and research sectors.

What about the vertical segregation during this decade?

Despite the fact, documented in several country reports (e.g. Poland [Pakszys, 2009], Bulgaria [Sretenova, 2009] and ENWISE Report, p.25), that from 1970s onwards the number of women students and graduates exceeded that of men students, they were underrepresented in the higher posts of the higher education sector (HES) and the government R&D sector (GOV R&D). In Bulgaria, for example, in 1987 on average only ***9 per cent of full professors were women*** and 22 per cent were associate professors (see Sretenova, 2009).

Although the percentage of women students in undergraduate and postgraduate education was high in the Eastern country-group, the percentage of women who succeed in obtaining the ranks of associate and full professor was low. It appears that the difficulties Eastern academic women faced in reaching top positions were not dissimilar to those of Western women, although many of the mechanisms differed.

The situation as it was has been well summarised in the Romanian country report: "under the umbrella of the official policy of equality, women have been represented in the top managerial political positions (parliament, ministers and so on), as well as in other different public bodies. However, one of the main fields in which women have been underrepresented (or not at all represented) is science and research bodies (universities, research institutes and the Romanian Academy, among others). The vertical segregation in science/research was the rule before 1989. Top positions in science and research were *'men's empire"* (see Balahur, 2009, p.2). We assume that this claim may have been generalised and referred to the other countries of the Eastern group as well.

Within the decade 1980-1990, the level of funding of HES and GOV R&D sectors was not generous but still sufficient for doing research. However, the system of research funding was not based on ***the principle of competition*** because it supported working places rather than the research system itself. All scientists were appointed on tenure positions and had a secured monthly income (salary). The specificity of the R&D funding system of the Eastern country-group had several positive – but also negative – effects and impacts on the effectiveness of the research activities during this period. The implementation of strict governmental planning and control over higher education and research sectors as well as over the labour market entailed greater funding being allocated to the fields of natural sciences and engineering and technology in comparison with those allocated to the fields of social sciences and humanities. In line with the then planned economy, the state guaranteed working places to almost all graduates from higher education institutions. The public image of science and the prestige of scientists in society were considerable and these images were built up and promoted by the media of the time.

What about the position of a woman in science at that time? According to the Slovenian country report (Bahovec, 2009: 7), "the position of women in science is in direct or indirect relation to the position and role of women in society." In the socialist societies of the Eastern country-group, women's social status improved considerably on the one hand, while on the other, the society remained conservative in terms of traditional gender roles in private life. In practice, the socialist doctrine of egalitarian and collectivist ideology, which de-emphasised the difference between the two sexes, embraced the existing patriarchal mechanisms and, in the long run, upheld the male pattern of behaviour and thought. The women of the Eastern country-group perceived the so-called 'double burden' as a natural state-of-the-art. The service of housemaid/domestic servant did not exist at that time.

Finally, a few words must be said about the availability of sex-disaggregated statistics during 1980-1990. In the majority of the Eastern country-group, these statistics existed throughout the whole socialist era, although in some cases, they were made available to the public, while in others, public access to these data was limited and problematic. In any case, the statistic of that period did not apply international reporting standards and methodology which meant that it was not tailored for international comparisons.

The 'socialist-state feminism', to some degree, was close to that of the Nordic countries' 'state feminism' (it is curious that the same ***metaphor*** of 'state feminism' has been independently introduced in the country group reports of the Nordic and the Eastern countries). The Nordic Country Report also points out the possible negative effects of the 'state feminism' policy. This claim is valid for the Eastern countries as well:

> "The term "state feminism" has been applied in the Nordic countries to refer to the situation in which the state becomes the main driving force towards gender equality, including equality as a goal in laws and regulations for society at large (Gulbrandsen 2001, 1) … However, this proclaimed equality can be a problem too. It is easy to disregard the less visible underlying problems when everyone is believed to be equal

> and treated fairly. In the worst cases, the universal equality orientation of public policies can even lead to the neglect of specific gender equality issues (Kuronen et al. 2004)" (Rf. Roivas, 2010, p. 5).

However there was a ***great difference*** between the Nordic 'state feminism' politics and policies, which originated from the political regime of social democracy, and the Eastern 'socialist-state feminism', which stemmed from an authoritarian political regime.

We focus now on the other side of the coin of these formal gender equality politics and policies of the era of 'socialist state feminism' (which have obviously not been present in the Nordic case):

- The existing pre-communist women's grass-root organisations were abolished, including the university women's associations. In some Eastern countries, they were replaced by the so-called 'Committee for Women' operating under the close control of the communist party.
- Women's NGOs and women networks did not exist.
- There was a lack of any public discussion on women's issues.
- There was also a lack of gender awareness, even among women scientists. For example, if a woman scientist felt discriminated in her professional male-dominated environment, she considered it her own private problem. A recent EC Report argues that the lack of gender awareness is a common problem in the post-communist countries. In this regard, a series of interviews were conducted with women researchers from the Eastern countries. Some typical comments from the interviewed Slovakian women were: "problems of gender equality are marginal when compared to other, more serious problems in science." "Serious and successful researchers do not waste their time talking about non-issues such as gender (in)equality in science. There just isn't a problem" (EC 2008, p.24).
- A lack of female role models, i.e., examples of successful woman scientists, particularly in hard science and engineering and technology (see, Bahovec, 2009; Reingardé, 2009; and Sretenova, 2009).

Linking the context with the 'text': what kinds of topics were discussed in 1980-1990? The regional leadership of Croatia and Slovenia

We begin this section with two important observations which are significant in the discourse of the report:

1. According to the Czech Country Report, "in the period 1948 – 1990, the issue of gender in science and education was not given scientific, civic, institutional or governmental focus. The issue began to develop as a scientific discipline only in the 21st century" (Křížková, 2009:1).
2. The ENWISE report also claims that "in communist countries, the existing *glass ceiling* was not reflected on, named or criticised by women. Neither it was a theme in the social sciences" (EC, 2003, p.26).

Therefore, the expectation regarding the production of literature during 1980-1990 concerning the eight defined topics of the meta-analysis of research on women and science should be modest, as only some sporadic publications appeared during this decade. Indeed, all the national reports of the Eastern country-group are short on and not very instructive about the relevant research carried out during this decade. Some of them consider the year 1990 as a starting point for the initiation of researches on the theme 'women and science', while others state that the beginning should be set in the year 2000. Only in the Romanian country report (Balahur, 2009) was a brief paragraph inserted for this decade:

"For the period 1980-1990, the scientific literature on women's issues, including women in a scientific career, was dominated by the image of the 'heroic woman'. It is comparable with the women portrayed by the first feminist wave as having the same capabilities and performances as men, in no matter what field of activity: industry, research, policy, education, sports and the like" (Balahur, 2009:1).

The image of the 'heroic woman' has also been used in the ENWISE Report: "women in communist countries were often characterised as *superwomen.* Many seemed genuinely to feel that way, as strong enough to solve their problems on their own... They were depicted as strong and with machines and as strong, which created the typical stereotype of a woman under communism" (EC, 2003, p. 29 and p.25)

The country report of Slovakia (Urbancikova, 2009) (which during this decade was a part of Czechoslovakia) briefly mentions that some "research has been done on the work-life balance, childcare and the education of women" (See Urbancikova, 2009:2).

A close look at the item 'main bibliographical references', broken down by topic in the Eastern country-group national report, reveals that only two countries, Croatia and Hungary, had included publications from this decade.

- Croatia: three publications from 1982, 1987 and 1989 respectively referred to the topic *'horizontal and vertical segregation'*; another three publications from 1984, 1985 and 1987 referred to the topic '*science as a labour activity',* and one publication from 1989 referred to the topic '*policies towards gender equality in science'.*
- Hungary: in the Hungarian country report we find two references belonging to this decade. The one referring to the topic *'science as a labour* activity' is a 1981 publication of the Hungarian Central Statistical Office in Budapest. The other Hungarian publication is from 1982 and refers to the topic '*pay and funding'*.

The other country reports do not refer to any publication of the decade 1980-1990 relating to the defined topics. This observation of the item 'main bibliographical references' of the national country reports is neither accidental nor does it come as a surprise.

During the decade 1980-1990, Croatia and Slovenia were parts of the Socialist Federal Republic of Yugoslavia (SFRY). The former Yugoslavia was under the influence of the Soviet Union but unlike the other Eastern countries, was not a part of the Soviet Bloc. The political regime of the SFRY was to some degree liberal, the country was open to the West and the SFRY scholars enjoyed freedom and opportunities to travel to Western universities and research centres. The acquaintance with the Western women's movements as well as the transfer of knowledge regarding women's issues resulted in the emergence of feminist movements as far back as the 1970s in Zagreb, Belgrade and Ljubljana. The first international feminist conference in the communist countries was organised in Belgrade in 1978 (EC, 2003, p.32). Therefore, Croatia and Slovenia were **pioneers** in the initiation of research on women's issues at the regional level of the Eastern-country group.

What about the other countries of the Eastern country-group? What kind of literature on women's issues they have produced during the decade 1980-1990?

During the communist regime these countries as a group suffered collectively from the relative isolation from the rest of the world. However, towards the end of the communist period, in the decade 1980-1990, the regime became more liberal and thus scientific isolation gradually reduced. In this decade, the Hungarian and Polish scholars also had the opportunity to travel and to participate in conferences organised in Western countries, which was not the case for Romania, Bulgaria and the three Baltic states (the last ones being at that time part of the Soviet Union). Nevertheless, even though these countries were less-favoured by the regime, in 1980-1990 publications appeared which put forward ***critical reflections*** on the socialist formal gender equality politics and policies.

For example, in Bulgaria during the decade 1980-1990 two books appeared in the field of social sciences (Domozetov [Домозетов] 1984 and 1985) ***written by a male scholar (!)*** who argued that the current policy of formal/legal gender equality did not entail social gender equality because it did not take into account the specificities of the two sexes or the existing social factors. The books provide real statistical data about the increasing number of Bulgarian female students in the tertiary level of education during the 1970-1981 period, particularly in the study field of engineering and technology, as well as data about the relative share of women researchers in GOV R&D sector for 1982 and an analysis of women building a career in social sciences and humanities. The author underlines the traditional conservative attitude of male researchers towards their female colleagues, the underestimation of women's scientific work and also the lower rate of women's scientific production in comparison to that of male scientists. He assumed that a mixture of psychological and social factors underlie this subtle kind of discrimination. The other publications of this decade are of a similar general and multi-topical nature. The defined topics of the Report have been only mentioned in brief paragraphs without providing any in-depth analysis of each separate topic. As a rule, they turn to the compilation of the available statistical data.

Feminist issues such as theory, movement and practice were not discussed in the publications of the social scientists and humanity scholars due to the lack of information channels and knowledge exchange with Western scholars and due to the unavailability of specialised literature on Western feminism in the national libraries.

In Bulgaria, as far as the information supply and information shortage issue is concerned, the notable exceptions to the common case were women academics working in the English departments of the philology faculties. During this decade, they came into contact with some guest lecturers from the USA specialising in the subject 'American literature' and through them, gained access to the specialised literature on Western feminism. In addition, they were able to benefit from a well-equipped department library which was donated by the British Council in Sofia. We assume that the situation was more or less similar in the other Eastern countries during the 1980-1990 period.

Some conclusions

We draw the following tentative conclusions relating to the literature production on women scientists during the decade 1980-1990:

1. The most extensive research topics at that time were *'Horizontal and vertical segregation'* and '*Science as a labour activity'*, particularly the issue of the work-life balance. However, publications on these matters appeared as introductory state-of-the-art issues and observations based on the compilation of statistics and the studies were not of a conceptual or analytical nature. Moreover, the publications of that period addressed these two topics from the point of view of emancipation and human rights and *not from the contemporary view of the 'loss of human potential'*. As a rule, the profile of the publications was multi-topical, i.e., almost all of the defined topics were only briefly touched on and discussed within short paragraphs and without providing any in-depth analysis.
2. More advanced researches at the regional level of the Eastern countries were carried out in Croatia and Slovenia, e.g. in Croatia, at the beginning of 1980s. Some quantitative and qualitative research was conducted applying different methods like time-budget diary, surveys, interviews, and so on (Bagic, 2009). The case of Croatia and Slovenia is instructive in the discourse of this Report. We assume that the emergence of women's activism – various women's organisations, women's NGOs and networks at the beginning of 1980s in the former Yugoslavia – might be viewed as a catalyst for the origin of research interest in and also for outset of academic research on gender issues. We believe that the other countries of the Eastern country-group could not just skip a similar stage of development and initiate academic research in the field *ex nihilo.* The ground needed to be prepared for the newcomers in the field and the next decade (1990-2000) was dedicated to this task.

3. Within the decade 1980-1990 some publications appeared offering a *critical reflection* on the socialist state politics and policies of formal gender equality in all spheres of public life including higher education and research. At that time, public criticism of the official communist politics and policies was prohibited and a lot of courage and bravery were needed to publish any kind of open criticism of the regime.

II. 1990-2000 – The decade of transformation and of a European perspective: bottom-up driven activities

The context of the decade 1990-2000

For all countries of the Eastern country-group, 1990-2000 was a decade of transition from a centralised planned economy to a market oriented economy and from an authoritarian political regime to democracy. The radical change of regime affected the all structural factors of the context outlined in the previous section. Therefore, the context of women's issues as a background for the possible increasing interest in doing academic research in the field of women and science was completely new in comparison with the interest shown during the decade 1980-1990. We briefly trace the major changes relating to each of the already defined structural factors and identify some new factors which were not present in the context of the previous decade, but can be considered of crucial importance in the discourse of the Report.

The socialist state formal gender equality politics and policies disappeared in all areas of public life. Moreover, during this decade the mere notion of 'gender equality' even took on *a negative connotation*. The larger educated public linked the issue to the former communist regime and because the regime was discredited, each of its politics and policies including the former policy of formal gender equality were also brought into discredit. The social perception of gender equality and gender awareness fell to the same level as in the previous decade. The ideological reason (albeit with a different sign) underlay the unwillingness to open up public discussions on gender equality issues. We believe that in the short, or even the long run, equality measures like 'gender quotas' (currently practiced in some EU countries such as Austria, Belgium, Finland, Greece, Italy, Spain, Sweden and Norway, and under 'hot' discussion in the rest of the 'old' EU countries) will not be welcomed in the Eastern group-country and are unlikely to be implemented and/or re-implemented there. For example, nowadays "in Slovenia there is no problem having a general quota of 1/3 women in expert bodies (except for technical sciences where there is quota of 1/5), but there is no wide acceptance of a quota for women in academic positions" (EC, 2008, p.31). The idea of quotas is generally unpopular in the countries of the Eastern group (Sedova, 2003; Sretenova, 1994). The next chapter 'Analysis by topics' reveals some controversies with regard to the topic of gender quota. The current debate is focused on the following question:

> "whether imposing quotas in different scientific bodies as a form of positive discrimination is a useful way of promoting women's career or whether it is useless and counterproductive, making a concession regarding talent and excellence. In these former socialist countries, there is also the question of whether new forms of quota systems are any better than previously discredited applications (Kolářová et al., 2008; Jenko et al., 1999) … In some countries, there is an intense debate on the question of quotas. The introduction of quotas for women has been strongly opposed both in politics and in science. Their main argument is that any quotas compromise talent and scientific production. This point of view is also accepted by many women who claim they do not want to be "quota professors" who are believed by their colleagues to have advanced because of the quotas rather than on the merit of their scientific achievements (Kolářová & Červinková, 2003). However, the other side still holds quotas as an appropriate tool for gender mainstreaming (Jenko et al., 1999). It is suggested that equal treatment is not the same as treatment that is equal in terms of rights, benefits and opportunities (Мирою, 2008).This debate has another approach in the former socialist countries where some kind of quotas already existed before the change of regime. It did not necessarily set a strictly given percentage but strived towards a fair

> reflection of the scales of society. The formal application of these quotas has played an important part in the discrimination of the quota system itself (Čermáková, 2004; Pető, 2006)". (Rf. pp. 105-106 of the report)

This points once again to the very specific profile of the Eastern country-group as a whole in comparison with the other country-groups. The last ones follow **similar paths,** albeit at a different pace.

It is also worth noting that the market orientation of the Eastern countries' economies affected the previously well-developed institutions of childcare facilities and after the change, creating a shortage of available places in public nurseries and kindergartens. At the same time, a number of private kindergartens and private primary schools appeared. However, the monthly fee for children to attend these new establishments exceeds the average monthly income of an academic couple. The same is true for the care facilities for senior citizens. The quality of services in the public homes for senior citizens is low and the new private homes for the elderly are extremely expensive and unaffordable for an academic couple. These developments are of crucial importance for career building of the early career female researchers but also for experienced female researchers as well. The first group of women is affected as child caregivers and the second group, as caregivers for senior parents and relatives. Therefore, many professional women had to deal with this new situation and find a solution. With regard to the duties of child caregiving and care for senior relatives, Eastern academic women seem to face more difficulties in comparison with their Western counterparts because their share of the research population is high – from 3 percentage points (in Hungary) 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 to provide childcare by 2010 to at least 90% of children between 3 years of age and the mandatory school age and at least 33% of children under the age of 3 years. 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 insight into the provision of childcare services across Europe through a comparative review of 30 European countries. The table below is an extract from this Report:

Table 1. The provision of childcare services in the Eastern country group

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

The communist regime disappeared overnight but the legacy of its formal gender equality politics and policies implemented for over half of century was still in place. What did it mean under the new political and social settings? The policy of *equal access to education* led to the presence of a considerable proportion of highly qualified women active in all public spheres of life including HES and Government R&D sector and especially in the fields of natural sciences and engineering and technology. However, the national industries of the majority of the Eastern countries collapsed during the decade 1990-2000. Engineers faced the most dramatic and severe situation in comparison with other professionals. Two or three decades ago these women (as girls) made a choice to study engineering because of the then existing policy of encouragement to enter this study field and because of the image and the prestige given to this profession during the previous regime. Now this category of professional women found themselves in a dire situation because the labour market did not demand their qualifications and some of them became unemployed. They had to re-qualify and switch to other occupations.

What happened to women academics and researchers employed in R&D sectors? Their situation depended greatly on the structural reforms that began in the research sector of the Eastern country-group at the very beginning of the 1990s. We shall not discuss the multifaceted dimensions of these reforms here (detailed information about the structural reforms of HE and Government R&D sectors can be obtained from the ENWISE Report EC, 2003, p.49-65). The most visible aspect of the reforms during this decade was a drastic reduction in the R&D personnel of approximately 50% in some of the Eastern country-group. For example, the overall staff numbers of the Czech Academy of Sciences (being the main national research centre) dropped from 13,896 to 6,972 employees. Similar figures were reported for the Bulgarian Academy of Sciences. The staff numbers dropped from 12,842 to 6,387. The situation was comparable with the Polish and the Hungarian Academies of Sciences and other research institutions. The main difference was seen in the pace of these processes across the Eastern countries. In the Czech Republic, Poland and Hungary the reforms took place between 1990-1995 while in some of the other Eastern countries (e.g., Bulgaria) they were delayed. The following effects of the structural reforms implemented during this decade could be applied to the majority of the Eastern countries:

- The drastic reduction of staff in the Eastern academies of sciences (being at that time national research centres of the countries in question, such as the CNRS in France or Max Planck in Germany) which occurred within the decade 1990-2000 did not take into account any gender balance but in fact affected both female and male researchers equally.
- All Eastern countries, with the notable exception of the Czech Republic and Slovenia, experienced a sharp decline in their R&D expenditure as a percentage of GDP (see Annex 5 to this Report). In parallel with these developments, some new funding mechanisms for financing research activities *on the basis of competition* were adopted and began to operate through newly launched grant agencies and foundations. They were an additional (albeit modest) source for financing research activities outside the subsidy allocated to the research institutions from the state budget. Unlike the other countries of the Eastern group, a similar grant agency, the *National Science Foundation (NZZ)* was established in Croatia during the next decade, in December 2001. We have no information regarding the success rate of female applicants to these grant agencies because gendered access to research funding did not become a topic of research interest in some Eastern countries (e.g., the Czech Republic) until the next decade. During the observed decade, no reflections have been found on the topic across the Eastern countries.
- The transformation of HE systems took place in all countries of the Eastern group during the decade 1990-2000. It was a multifaceted reform process starting with the adoption of a new legislation on HE, the implementation of university autonomy, an increase in the number of public universities, the establishment of private universities and equivalent higher education institutions as an alternative to public education, accreditation of both public and private HE institutions, and so on. Some details about the structural reforms of the HE sector of the Eastern countries can be found in the ENWISE report (p. 55-60). The most visible consequences of these reforms are:

1. A substantial increase in the numbers of both female and male university students at all levels of tertiary education. In the majority of the Eastern countries during the observed decade, the number of university students doubled.
2. The proportion of women in university staff also increased, albeit at a lower rate/pace compared with the increase in the numbers of university students.

- The perspective of the European integration within the decade 1990-2000 dominated over and underlay the shift in all fields of public and academic activities. This was also true for the statistics enterprise. It adopted the international reporting standards and methodology (the so-called Frascati Manual) and from then onwards, the data provided by the national statistics offices/institutes of the Eastern country-group became reliable for international comparison.

The Country group Reports of the Southern countries (Addis & Pagnini, 2010) and especially of the Nordic countries (Roivas, 2010) depict a common *three-stage pattern* of the initiation of research on gender and science in these regions of Europe.

The *pattern* depicted is as follows: women's movements created in the 1960s and 1970s backed and forged ahead in the establishment of Women's Studies as soon as in the 1970s and 1980s. Women's Studies, and later Gender Studies, were shaped as a distinct academic discipline and were institutionalised as a unit at university level. The research on gender and science began as a part of the already established centres and/or units for Women's/Gender Studies within the university settings. The following paragraph taken from the Nordic Countries Report explain the mentioned *three-stage pattern* of the initiation of research on gender and science in the rest of the European countries:

> "Since the 1970s, the women's movement has not only focused on shaping women's position in society but also on the development of the education and research sector. Collective actions and projects initiated by women's groups inside and outside academia have been the basis for the establishment of women's and, later, gender studies at several Nordic universities. The publication of academic journals focusing on women's and gender issues is a common feature across the Nordic countries … First-wave scientific feminism was related to women's studies by fostering it as a scientific discipline of social sciences often with close connections to the women's movement. Moreover, feminism has affected the institutional and theoretical structure of later Nordic gender studies … In terms of the organization of the field as a distinct discipline and the institutionalization process, women's studies has followed a similar path in all Nordic countries. Since the 1980s, specific women's studies centres or units have been set up in universities all over the Nordic countries as part of the institutionalization of the field (Roivas, 2010, p. 9-23).

In the previous section, we have stressed that the 'socialist-state feminism' forbade the existence of any women's movements and networking for about half century in the Eastern countries of the Soviet Bloc (Bulgaria, Czechoslovakia, Hungary, Poland and Romania). The notable exception was former Yugoslavia, as it was not a part of the Soviet Bloc.

During the decade 1990-2000, a new actor appeared on the social scene in an attempt to fill the existing deficiencies of the previous *context* but also to some degree, to fill the existing gaps in the *'text'* of the previous researches on gender agenda. We are referring to the appearance of numerous women's organisations and women's NGOs in each of the Eastern countries. In terms of the *three-stage pattern* of the initiation of research on gender and science in the other regions of Europe, the decade 1990-2000 was dedicated to the *formation of the first stage* of this pattern. In the next section, we present profiles of several of the most influential women's NGO's and networks acting at the regional level of the Eastern group-country as well as the sources of their funding.

The landscape of some influential women's organisations and networks acting at the regional level of the Eastern country-group: the regional leadership of Poland

A historical background

According to many well documented sources (summarised in the ENWISE Report), at the beginning of the 19th century individual women's organisations were set up in all countries of the region. Towards the end of the 19th century and the very beginning of the 20th century, the first networks of women's organisations appeared as roof organisations, e.g. national unions of women, associations of university women, and so on. Later, the communists took over the existing women's organisations and networks from the pre-communist period were destroyed in almost all Eastern countries. The underlying reason for this occurrence was that any kind of free networking activities (whether male or female) was viewed as a threat to the regime. After the change of the regime, the most visible activity in the broader discourse of this Report was the establishment of many women's organisations. The majority of them could be defined as *activist* networks and a mere few as *professional/academic* networks. An effort was also made to restore and rebuild some pre-communist professional women's organisations like *associations of university women.*

International women's meta-networks which cover all countries of the Eastern group

1. The Network of East-West Women – NEWW

The NEWW was founded in 1991 in Dubrovnik, Croatia. The NEWW began as an international communication and resource network supporting dialogue, informational exchange and activism among those concerned about women's situation in Central and Eastern Europe and the former Soviet Union. Between 1994 and 1997, the NEWW established the first women's electronic communications network, 'NEWW On-Line'. The NEWW was registered as an organisation in 1995. Its headquarters were first located in Washington DC, and later moved to **Gdansk, Poland.** Launched in 1997, the NEWW **Legal Fellowship Program** has supported the advocacy work of 26 women's rights lawyers. The NEWW's first University Chapter was established in 1999 at the American University in Bulgaria, Blagoevgrad, Bulgaria.

NEWW connects women's advocates (both NGOs and individuals) in more than ***30 countries*** in the region of CEE/NIS/USA. Its members represent all strata of society - human rights activists, writers, students, journalists, lawyers, parliamentarians, professors, artists, union organisers, health care workers and feminist activists. The network's overarching goal is to support ***the formation of independent women's movements*** and to strengthen the capacities of women and women's NGOs to influence policy regarding women's lives.

2. KARAT Coalition

The idea of a coalition of women's NGOs from CEE/CIS was born at the Beijing Conference in 1995. It was a response to the invisibility of the region at the international forum. The KARAT Coalition was formally established on February 1st, 1997 **in Warsaw, Poland** by representatives of **ten Central Eastern European countries**. Its main goal is monitor the responses of the CEE/CIS governments to the international commitments they made at the Beijing Conference. KARAT is a registered regional NGO governed by an international board with its secretariat in Warsaw, Poland. Currently KARAT members comprise NGOs from **21 countries**.

The main activities of Karat are as follows: advocacy and lobbying at national, regional and international levels (CEE/CIS countries, ECE, EU, UN); capacity-building of women's NGOs; organising regional and international, conferences, meetings and workshops; publications, networking and information dissemination.

3. Balkan Women and Friends Network

This is an electronic e-mail group that was set up in order to enable discussions and exchanges of information between social scientists and others who conduct research on women in the Balkans. It was created in 2000. The Balkan Women Network welcomes the participation of others concerned with the situation of women in Balkan societies and circulates information about ongoing and completed research, publications, journals of interest to list members, forthcoming conferences, calls for papers, jobs and scholarships, researchers seeking collaborators, other resources for researching women in the Balkans, requests for information, development agencies, international organisations and others seeking consultants on women and gender.

Box 3 provides some information about the sources of funding of the newly launched women's NGOs in the Eastern group-country.

Box 3 – Sources of funding of women NGOs

The origin of funding of the newly launched women networks and NGOs in the Eastern country-group came from:

- USA - Network Women's Program of the Open Society Institute, New York; Local branches of Open Society Foundations, in particular their 'Women's Program' in each particular country, US Embassies, etc.
- UN – United Nations Funds for Women (UNIFEM), UNDP, UNESCO Regional Bureau for Science and Culture in Europe, etc.
- European Union's Phare Programme 2001 'Development of civil society', Council of Europe, European Commission Social Programs, etc.
- 'Gender Task Force' (GTF) of the 'Stability Pact for South Eastern Europe' (EU's initiative 1999). Funders: Governments of Norway, Austria, Switzerland, Italy, Germany, FNV Netherlands
- Other funders like Global Fund for Women, Friedrich Ebert Foundation, Ford Foundation, Heinrich Böll Stiftung, British Council, etc.

The important occurrences in the discourse of the report were:

1. Within the decade 1990-2000, the university women's associations were re-established and their membership in the International Federation of University Women (IFUW) was renewed.
2. In 1996, a UNESCO chair on 'Women, Society and Development' was launched at the **Warsaw University in Poland**.
3. The UNESCO-CEPES located in Bucharest, Romania, has been also engaged in the promotion of good practice for gender equality in higher education on the regional level of the Eastern country-group.

The impact of the newly appeared women's movements in the university setting is reflected in the Polish country report:

> "The implantation of women's emancipation / feminist ideas, however, mainly took place in some university units, often generated initially by the clandestine activity of the individuals who obtained developed an early consciousness and raised enough awareness (often informed abroad) to be prepared and determined to proliferate their ideas among others open to this kind of agenda. Another influential aspect was the visible process of the newly liberated movements to launch Polish women's NGOs in the early 1990s. Development through the exchange of ideas was possible thanks to several Polish and international conferences as well as personal contacts and support from different foreign foundations (such as the Fulbright Commission and the Soros Foundation, etc) offering numerous grants for research planned to be conducted in this direction and spirit. As a result, and due to the influence of other circumstances that

occurred during the mid/second half of the 1990s, the first Polish collections of articles and books were published on the subject of women's issues, not only focusing on feminist ideas imported from abroad but also trying to initiate an independent discourse also devoted to women's/gender issues in science" (Pakszys, 2009).

However the impact of the new women's movements on gender agenda of the research setting may differ across the Eastern countries. For example, in Slovakia, even during the following decade (2000 -2010) "of approximately 70 women's organisations, none are devoted to the problem of women in research decision-making. The issue has been addressed only vaguely by several individual women scientists who have been involved in EU activities (either Helsinki Group, ENWISE or some other EU FP projects). Institutional strategies, policies and regulations do not address the issue of gender equality in research. To summarise, ***lack of awareness,*** underestimation or even total denial of the importance of equality agenda in the research and funding system is the main problem that has a major impact on the underrepresentation of women in decision-making" (EC, 2008, p.59).

Linking the context with the 'text': a historical dominance over the topics 'Horizontal and vertical segregation' and 'Science as a labour activity'

If we take the specificities of the decade 1990-2000 as a whole, the following developments are common to the Eastern country-group:

- An endeavour to raise gender awareness, mostly made through the activities of the newly launched women's NGOs and networks.
- The transfer of knowledge from Western European countries and becoming acquainted with the Western gender research agendas; critical reflection on how these agendas could be adopted on the national scenes of the Eastern countries. In this connection, attention must be drawn to the fact that the Eastern women scholars in the fields of *social sciences* and *humanities* were challenged to elaborate ***a new conceptual language and notions in their own native tongues*** in order to facilitate the ongoing processes of knowledge transfer. For example, notions like *leaky pipeline, glass ceiling, sticky floor* and many others which had never before been articulated among the respective academic communities of the Eastern countries needed to have their adequate analogue in the native languages of the Eastern countries. Therefore, within the decade 1990-2000 **a pioneer work** was carried out to create a new conceptual language and notions in the native tongues of the Eastern countries as a tool for discussion on women and science agenda on a national scale. It was a time not only for knowledge transfer and information supply but also a time for the **formation** of a new conceptual language. This process continued in the next decade. A good example is the pioneering book by the Romanian author Mihaela Miroiu, *Guidelines for Promoting Gender Equality in Higher Education in Central and Eastern Europe* (2003) which was later (in 2008) translated into Bulgarian by the Bulgarian Association of University Women. In this publication (which is included in the GSD), the author introduces and highlights different *key terms* and *concepts* of the gender equality agenda and traces their evolution over time.
- Together with the ongoing processes of *information and formation*, we were able to identify some new trends in the researches of this decade which accelerated during the next decade.

    1. A considerable bulk of publications focused on the *historical investigation* of women's access to higher education, accounts of the life stories and career paths of distinguished women scientists in national settings, documentary studies on the history of women's movements and women's cultural contributions at the end of the 19th century, among others. This *historical shift* came to fill the existing knowledge gap on the national level of the Eastern country-group. The country reports of the Czech Republic, Poland, Romania, Hungary, Lithuania and Bulgaria have explicitly noted this new dominance in the literary production of their countries.

       Poland: "In the first decade in liberated Poland, studies on horizontal and vertical sex/gender segregation in science have been undertaken and put forward mainly

analysing **historical and philosophical questions** in order to possibly explain and make a first interpretation of the newly-observed marginal position of women vis-à-vis general and particular human cognition and **issues of the main educational paths** available for women living in Polish territory (then under partitions), starting from the end of 19th century, and recognised as being too narrow for them to practice professions demanding university/tertiary education comparable to those that became available much earlier for men" (Pakszys, 2009).

Romania: "Within the decade 1990-2000, the topics explored by the feminist literature focused on issues considered to be a priority for Romanian post-communist society. Those receiving greatest attention were, among others, the subjects of 'restitution and memoires' (martyr women) and the 'disenchantment' of the idealised communist woman. At the same time, an important body of scientific literature published within this decade was closely connected with the academic developments of Women's Studies and aimed ***at familiarising*** both the researchers and the students with the philosophical, ethical and political aspects of the feminist movements and theories. It was mainly theoretically oriented. Even if to a lesser, and less representative extent, another direction was also taken in this decade which focused on the brief empirical analysis aiming at evaluating the 'gains and losses' of women during the period of transition. The first tentative empirical researches on gender vertical and horizontal segregation date from the decade 1990-2000." "The existing publications and studies in this field [Science as labour activity] mainly mapped the biographies of "successful women" in different fields as well as in science without being focussed on the phenomenon of the development of women's professional career either in science or in other fields. Within the existing literature, the historical and anthropological approaches dealt with women in different periods and cultural regions emphasising the positive role they played in education, civic and philanthropic actions. The publications which developed a feminist historical approach also drew attention to the multiple discrimination women belonging to ethnic minorities and women in rural areas have experienced. Some of the publications also addressed the subject of 'the inspiring woman'. It was a widespread idea, especially under the influence of the European Romanticism, that behind the successful man there is always a woman. Some publications dealt with the portraits of these 'inspiring women', some of whom were creators of art, poetry, theatre and so on, and yet not of science!... The 'dominant' literature, developed especially in the field of feminist history, acknowledges the portraits of particular women, belonging generally to the Romanian royal families, who were poets, writers, painters etc. Carmen Sylva, Martha Bibescu, are only a few examples of 'important' women who made a remarkable contribution to the Romanian arts and culture" (Balahur, 2009).

2. The first small-scale empirical research on women scientists as a specific social group appeared during this decade (Reingardé, 2009 and some other country reports).

3. In some countries of the Eastern group, the issue of unemployment in some categories of professional women, as well as the subjects of young women graduates, unemployment and the 'brain drain' issue received greater attention in research and were reflected in the publications of this decade.

Generally speaking, during the decade 1990-2000, of the literature published, what was produced inside and outside academia was still scarce and sporadic. Despite the fact that Gender Studies were already developing and some centres/units for Gender Studies were established outside and inside academia by the end of the decade/beginning of the next decade, in some Eastern countries (Romania, Bulgaria and others) the bulk of publications that were produced during the time span 1990-2000 appeared more as by-production of some women scholars in the fields of social sciences, economics, population studies, and so on, and/or as a production of the existing women's NGOs. The situation gradually changed during the next decade, i.e., 2000-2008(2010).

III. 2000-2008 (2010) – The decade of European integration and the framing of research activities on the gender and science issue: top-down and bottom-up driven activities

The context of the decade 2000-2008(2010)

Within the previous decade, all countries of the Eastern group except Croatia submitted applications for EU membership and, via this connection, started preliminary negotiations with the European Commission. The preparation for EU membership was determined during the so-called 'accession period' in which the candidate countries had to harmonise their national legislations with that of the EU in order to be able to assume the obligations of membership, i.e. the legal and institutional framework, known as the *acquis communautaire,* by means of which the European Union implements its objectives. In regard to this process, at the beginning of the 2000s, all Eastern countries adopted the Equal Treatment Legislation under the forms of anti-discrimination laws or other relevant legal documents. Therefore, legal and direct discrimination on the basis of sex is prohibited in the 'new' EU member states including Croatia (which is currently in the process of negotiation for EU membership). Furthermore, all Eastern countries have set up the institution of 'Ombudsman' to deal with cases of all kinds of possible discrimination, i.e., on the grounds of sex, ethnicity, religion etc. As a result, national policies for *'non-discrimination by sex'* in all fields of social activities, including teaching and research, have been developed in all countries of the Eastern group and included in the respective normative documents and regulations of their HE and the Government R&D sectors.

However, there is difference across the Eastern Country Group in terms of the stage of implementation of the gender equality policy embedded in the Equal Treatment Legislation in their HE and the Government R&D sectors. We make here an important distinction between the '*policy of non-discrimination by sex'* in higher education and research (which is present in all Eastern countries) and its further development as a *'policy of gender mainstreaming in science'* (which is lacking in almost all of the Eastern countries). The EU policy of gender mainstreaming assumes ***gender balance*** in the organisational structures of higher education and research institutions at all levels, including decision-making bodies, and the definition of set of equality measures and target funding of the measures which, in a long-run, might lead to the achievement of a gender balance in scientific research. In this regard, in some of the Eastern countries (following the recommendation of the Helsinki group on Women and Science) national committees for women and science were established (e.g. Poland, Czech Republic, Slovenia, Bulgaria etc), although not in all of them were allocated specific resources for gender mainstreaming, while 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 any national resources for gender mainstreaming. The governments of the majority of the Eastern Country Group except Bulgaria, Hungary, Poland and Romania have committed to the EU policy of gender mainstreaming in science (by adopting the official strategic policy documents in which the reference to gender mainstreaming is present) but this commitment again has not been backed with the necessary financial resources. If we 'follow the money' it is evident that the implementation of gender mainstreaming in science is not a top priority for the Eastern countries because of the scarcity of financial resources provided to address the issue. One should bear in mind that the implementation of different gender equality measures at the level of higher education and research institutions is ***a costly exercise*** considering the Eastern countries' current frame of severe social problems and the shortage of budget allocations to different spheres of public activities. Nevertheless, the issue of the implementation of gender mainstreaming in science is not a vague endeavour at all, rather it is positively related with the scope of research activities on gender and science in each country of the Eastern group. The case of the Czech Republic is quite indicative in this regard.

In the Czech Republic, along with the appointment of a 'Steering Committee for Women and Science' (similar committees are more or less present in the other countries of the Eastern Group), in 2001 the Czech Ministry of Education, Youth and Sport provided national resources and funded the establishment of the National Contact Centre for Women in Science (NCCWS). The NCCWS was founded and until now has existed on the basis of a project first created by

Marie Čermáková, head of the Gender and Sociology Department at the Institute of Sociology of the Czech Academy of Science at that time, and who is currently the director of the Institute. The National Contact Centre for Women in Science is now led by Marcela Linková who contributed to the shaping of its research profile (Křížková, 2009). This Centre is particularly relevant because it is the only ***institutionalised structure*** dealing with the issues of women and science not only at the national level of the Czech Republic, but also at the regional level of the Eastern country-group. In other words, the field of women and science has not been institutionalised in any other country of the Eastern group. Gradually, in the course of time, the Czech Republic became a regional leader between the Eastern country-group in terms of research activities focused on gender and science. Currently the NCCWS, being in an advanced place for conducting research on women and science, is a source of inspiration among the countries of the Eastern group. In the GSD Czech entries exceed 100 out of the total number of 445 publications published in the Eastern countries, i.e. the Czech Republic contributed to the GSD with about 25% of the total entries of the Eastern country-group. We observe a direct link between the institutionalisation of the 'women and science' field in a country and the respective number of publications on the defined topics of gender and science research agenda. The Czech case is not in line with those of the other Eastern countries: in some of them, fewer than 20 publications have been identified and respectively included in the GSD. The Czech case is also unique/exceptional in all other aspects discussed in this part of the Report, e.g. horizontal and vertical gender segregation and GERD (R&D funding). According to these indicators, the Czech Republic is closer to the cases of the German-speaking countries like Austria, Germany, and the Netherlands and in fact, is an outlier of the Eastern country-group. Similar is the case of Portugal in the Southern country-group. Portugal stands closer to the group of the Eastern countries and appears as an outlier in its regional group. We should bear in mind the cases of the Czech Republic and Portugal when looking for some explanatory patterns for the underrepresentation of women in science.

The other important part of the context of this decade is the beginning of a new move towards neoliberal market values in Higher education institutions and GOV R&D sectors. This orientation has many dimensions. One is connected with the set focus on ***competition*** both at the level of institutions and individuals and their ability to obtain research funding outside of the allocated state budget subsidies. *Scientific excellence* tends to be measured in terms of this ability. The GOV R&D sector has responded to this move by reflecting on strategies for opening *spin-off companies* for its institutes doing research in the fields of engineering and technology and natural sciences, and/or by focussing on public-private partnership, i.e. between the public research institutes and different business enterprises. The Higher education institutions have responded to this move by setting up and offering programmes on *entrepreneurship* to their undergraduates and by establishing the so-called 'business incubators' located in the university environment. In general, the implementation of ambitious reforms in the mechanisms of R&D funding, a process which has differed in pace across the Eastern country-group, do not suggest that any kind of gender equality issues or gender balance have been taken or would be taken into account. Detailed information about the current reforms in the mechanism of R&D funding across Europe can be found in the recent EC Report *'The Gender Challenge in Research Funding: Assessing the European National Scenes'* (EC, 2009a).

As already noted in the previous section, the most visible effect of the structural reforms implemented in HES and GOV R&D during the decade 1990-2000 was the drastic reduction of the research staff (up to 50% in some Eastern countries), which equally affected both female and male researchers, as well as the sharp decline in the majority of Eastern countries of their R&D expenditure as a percentage of GDP. The structural reforms in the Eastern countries during the decade 2000-2010 took a new turn. They aimed at improving the allocation of resources to R&D sectors and at supporting the collaboration between public research and the private sector. The recent reforms are focused on the further development of competitive research funding of 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 the Eastern countries revised their evaluation rules and consulted 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 in gender equality planning or in gender equality monitoring in any aspects of their activities. For

example, gender is not taken into account in the selection and recruitment of either national or international evaluators, the success rate according to the gender of applicants is not monitored and there is a lack of any special positive measures for the promotion of women scientists under the form of specific programmes, calls and target funding.

Generally speaking, in Eastern and Western countries alike, the applications female scientists submit to the respective national grant agencies seem to be less numerous in comparison with those of their male counterparts and they mostly apply for smaller size grants. The share of projects with female coordinators or a female principle investigator obtaining grants is also low.

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

- The age group of young scientists (under the age of 35 years) is a set priority in all Eastern countries' national grant agencies, either announcing specific calls for young scientists only, offering 'bonuses' to the submitted projects that involve young scientists, or using other strategies (EC, 2009a). The *competitive project-based financing* in the majority of the 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 the national grant awarding bodies. However, young women scientists, being a part of the *privileged target group* of young scientists, could benefit from the current states-of-the-arts.
- Eastern researchers working abroad comprise another target group. All Eastern countries' national grant agencies announce specific calls for reintegration grants being awarded to their nationals who have completed a scientific career abroad (EC, 2009a). Young as well as experienced female researchers with excellent scientific records, being a part of the *privileged target group*, could benefit from this policy.
- Some winds of change can be observed in the new practice that has been introduced in some national grant agencies taking parental leave into account in the evaluation of the eligibility of applicants for research grants (EC, 2009a). This new measure has been implemented by the Slovenian, Estonian and the Czech grant awarding bodies since 2006 and in Hungary since 2009. These are examples of good practice for the other Eastern countries.

Box 4 – Competitive grants for frontier research

The journal *Science*, in its issue from 19 March 2010, informs that the Polish parliament this month began voting on legislation creating a new national agency charged with distributing ***competitive grants*** for frontier research. The proposed National Centre for Science (NCN), to be located in Krakow, is meant to be free from political pressures and would use an *international peer-review system* modelled on those of the European Research Council and the U.S. National Science Foundation. NCN would also earmark at least 20% of its budget to grants for scientists under age 35. Michal Kleiber, president of the Polish Academy of Sciences, sees in NCN the type of reform the country's scientific community needs.

Pain, E. 2010, 'Polish Science Reforms Bring Fear and Hope', *Science* 19 March 2010, Vol. 327, p. 1442.

With regard to the current process of ongoing reforms in R&D funding systems in the Eastern Country Group, future studies of the practices of their national grant agencies are needed in order to identify some discriminatory practices (if any), i.e. possible gender bias in the distribution of research grants and eligibility criteria, and a possible lack of transparency in the evaluation process of submitted projects. To this end, the elaboration of a fair concept and

definition of *'scientific excellence'* seems to be of crucial importance, bearing in mind that the current R&D reforms and research assessment in the Eastern countries tend to equate the issue of *'scientific excellence'* with the '*ability to seek research funding'.* This trend might be valid for the other country groups as well.

Towards the end of this period, units for Women's Studies/Gender Studies were established in the university settings of all countries of the Eastern group. Therefore, the second stage of the identified *three-stage pattern* of the initiation of research on gender and science in the Western European countries was completed in the Eastern countries as well. Nevertheless, the newly launched units for Women's Studies/Gender Studies are not necessarily engaged in research in the field of women and science. It is more likely that from beginning of their institutionalisation, activities have been focused on the knowledge transfer from the established Western centres and/or university units for Gender Studies in order to construct their own research profile.

The European Commission as a promoter and catalyst for the framing of research on gender and science agenda across the European Union as a whole, particularly in the countries of the Eastern group. The regional leadership of the Czech Republic

Mainstreaming Gender Equality: what does it mean for scientific research financed by the EC? Initiatives of the European Commission DG for Research for increasing the level of participation of women in the Framework Programmes of the EC

With the launch of the Fifth Framework Programme of the EC (1998-2002), the European Commission undertook concrete measures aiming at encouraging women to take part in European research against the most general background of the European Union policy of equal opportunity.

The European Commission, in cooperation with the European Parliament, on 28-29 April 1998 held the conference "Women and Science", inviting women scientists from all over Europe and political decision-makers at national levels to attend the event. The Conference stressed that ***the promotion of women in science*** goes beyond the issue of equal opportunity because it is also a matter of enriching research as such.

Shortly after, on 19 February 1999, a communication from the Commission appeared: *Women and Science: Mobilising women to enrich European research*. This first and seminal official document announces that the Commission undertakes to make significant efforts to achieve at least 40% representation on average for women in Marie Curie scholarships, advisory groups and assessment/monitoring panels throughout the FP5. This initiative was developed in *Action Plan* following several lines, which are illustrated here under Scheme 1.

In 1999, the DG for Research of the European Commission set up a special ***sector*** – an administrative body of "Women and Science" and a ***working group*** recruited across the relevant Commission departments in charge of coordinating and executing activities in order to achieve the announced objectives – the increase in women's participation in European research financed by the EC and the 40% target of women's participation in some activities of the FP5. In order to achieve a better balance between men and women in European research, a step-by-step approach was adopted.

The Sixth Framework Programme of the EC (2002-2006) was based on the key initiative of building the *European Research Area* (ERA) and implementing several new tools like *Integrated Projects* and *The Networks of Excellence*.

Prior to the launch of the FP6 on 8-9 November 2001, the Commission organised the conference "Gender and Research" and announced ***four new initiatives*** aiming at reinforcing the measures that were already in place. They are included in the *Action Plan* of *Science and Society* programme of the FP6. Scheme 2 presents these new initiatives for increasing women's participation in the *European Research Area*.

Scheme 1. Policy of mainstreaming equal opportunity within FP5 of EU (1998-2002)

1. Policy forum at European level: discussion and sharing experience	2. Development of a coherent approach towards promoting women in research financed by the EC and implementation of a three-dimensional strategy for achieving the target	3. Implementation of the Gender and Science Watch System
▪ Setting up of the ETAN Group of Experts – 1998 ▪ Setting up of Helsinki Group on "Women and Science" (a group of national civil servants) – 1999 ▪ Setting up of the European network of women scientists ("Networking the Networks")	▪ Research **by** women ▪ Research **for** women ▪ Research **on/about** women	Setting up the sector 'Women and Science', 1999 ▪ To develop the "Gender and Science Watch System" ▪ To coordinate the policy of mainstreaming gender equality at all levels, schemes and stages of the FP5 ▪ To collect and disseminate statistics on the sex of participants in all key actions of FP5 ▪ To develop indicators for the measurement of gender equality in FP5

Scheme 2. Policy of mainstreaming equal opportunity within FP6 of EU (2002-2006)

1. A reinforced policy forum at European level: discussion and sharing experience	2. More intensive mainstreaming gender equality strategy	3. An enriched Gender Watch System
▪ Establishing a European platform of women scientists ▪ Monitoring progress towards gender equality in science ▪ Mobilising women scientists in the private sector ▪ (Setting up of the WIR Expert Group) ▪ Promoting gender equality in science in the wider Europe ▪ (Setting up of the ENWISE Expert Group)	▪ Research **by, for and on/about** women ▪ All proposals using the new tools of the FP6 – Integrated Projects and Networks of Excellence – are obliged to develop the Gender Action Plan ▪ Research on Gender and Science ▪ GE = GD + WP GE – Gender equality GD – Gender dimension WP – Women's participation	The sector "Women and Science" becomes a part of the "Science and Society" Programme of the FP6 The "Women and Science" Action Plan becomes an integral part of the action plan of the "Science and Society" programme under actions no. 24, no. 25, no. 26 and no. 27

During the Czech EU Presidency, the European Commission organised 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 on 14-15 May 2009 in Prague, which commemorated the tenth anniversary of Europe's activities in the area of women and science.
To summarise, we focus only on the activities of the European Commission which made an impact on the promotion of the gender equality policy in the Eastern country-group and which serve as a catalyst for the framing of the research agenda of women and science. These landmark activities follow three lines:

1. In November 1999, the Commission set up the Helsinki Group on Women and Science and the subgroup of *statistical correspondents* attached to this group. All countries of the Eastern group except Croatia were represented in the original format of the Helsinki group. Due to the work carried out by this permanent Expert group during the last decade, a stock of important information now exists regarding the national policies and equality measures implemented across Europe as well as statistical data about the vertical and horizontal segregation of women in science. In 2002, the Commission

published the Helsinki Group on Women and Science Report ***'National Policies on Women and Science in Europe'*** (EC, 2002). The updated version of this Report ***'Benchmarking policy measures for gender equality in science'*** appeared in 2008, offering the opportunity to measure of the progress made by each European country in the promotion of gender equality in science. Furthermore, the geographical coverage has been broadened to include ***Croatia***, the countries from the former Yugoslavia (Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Montenegro and Serbia) together with some other countries. The Commission publications '***She Figures 2003'***, ***'She Figures 2006'*** and especially ***'She Figures 2009'*** are indispensable sources for statistical information for any analysis on the presence of women in science across R&D sectors and fields of science and on their underrepresentation in the higher positions in the academic and research hierarchy.

2. During the decade 2000-2008 (2010) the Commission set up several *temporary Expert Groups* which addressed different aspects of women's underrepresentation in scientific research and elaborated recommendations for the improvement the state-of-the-arts. Here we consider only the Expert Groups in which the Eastern country-group were present:

    a. ***ENWISE Expert Group:*** The Group was launched by the Research Directorate-General in 2002 under action no. 27 of the *Action Plan* of the *Science and Society* programme of the FP6. Its objective was to assess the conditions and status of women scientists in the Central and Eastern European countries and the Baltic States. Following the ETAN report on '***Science policies in the European Union: Promoting Excellence through Mainstreaming Gender Equality'***, 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 a public issue. Women and Science in the Enwise countries'*** (EC, 2003). The Enwise (***En***large ***W***omen ***I***n ***S***cience to ***E***ast) 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 includes independent experts from ten post-communist countries (now '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 GDR and one expert for the Balkan region. On 30 January 2004, the ENWISE Group officially presented its Report to the Research Commissioner Philippe Busquin during the press conference organised by the Commission. This Report investigates the situation of women scientists in the ENWISE countries, providing an insight into the situation from a historical, as well as a contemporary perspective. It makes recommendations to a series of stakeholders: the Commission, the European Parliament, the Enwise countries, as well as the current EU Member States and organisations that educate, fund and employ scientists. The ENWISE Report appeared in English as the European Commission's edition and towards the end of 2005, it also appeared in the native languages of the participating countries.

    b. ***WIRDEM*** (**W**omen **I**n **R**esearch **De**cision **M**aking) ***Expert Group***. The geographical coverage of the Eastern countries analysed 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 the Commission's edition in 2008 (EC, 2008).

    c. ***Gender and Excellence Expert Group***, which focused on the gendered access to research funding and the possible gender (im)balance in terms of the success rates of applicants for research funding at the national levels of the involved countries. The Report ***'The Gender Challenge in Research Funding: Assessing the European National Scenes'*** appeared as the Commission's edition in 2009. The geographical coverage of this Report involved thirty-three countries, including all countries of the Eastern country-group: Bulgaria,

Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

3. Last but not least, during the last 10 years (FP5, FP6 and the current FP7) the Commission has supported approximately thirty projects in the field of women and science. Some countries of the Eastern group were members of the respective consortiums of these thirty projects. For the Eastern women scholars, being able to participate in these projects was a learning experience, namely ***'learning by doing'.*** This participation was also an inspiration for the initiation of an academic research in the field on the national scenes of the Eastern countries. Although the process has barely begun, we feel obliged to acknowledge the role of the Commission as a promoter and catalyst for the majority of publications that the countries of the Eastern group have submitted in the GSD. It will be interesting to compare the rate of participation of the Eastern countries within the mentioned thirty supported FP projects and the number of their entries in the GSD and to seek a connection (if any) between the two performances. However, this interesting exercise is out of the scope of this Report.

Horizontal and vertical segregation of women researchers in the Eastern country-group: drawing some similarities and dissimilarities; seeking explanations from the point of view of three frameworks: a) socio-economic setting reflected by the overall gender gap, b) gender equality policy in scientific research and c) R&D financial issues in terms of GERD, researchers' remunerations and gender pay gap

In this section, we present the profile of the Eastern country-group at the beginning of 2000 by making two kinds of comparisons of the available statistics data: a) focusing on the differences between the countries of the Eastern group and b) focusing on the differences between the Eastern group as a whole and the other European countries. We use two sources of statistical data: the EC 'She Figures 2009: Women and Science; Statistics and Indicators' and the 2003 ENWISE Report, besides several EU Reports dealing with different issues. Furthermore, we attempt to provide some explanations regarding the observed national peculiarities from the viewpoint of three frameworks:

1. Socio-economic setting reflected by the overall gender gap;
2. Gender equality policy in scientific research, and
3. R&D financial issues in three aspects: R&D expenditure as a percentage of GDP, researchers' remunerations and gender pay gap.

The 'puzzle' of women in science may be viewed through different optics. One of them is the excellence of national scientific communities. Generally speaking, excellence is measured by the indicator 'number of scientific papers published in referred journals with a high impact factor' and the follow-up number of citations of these articles. The internationally renowned database 'Web of Science' enables cross-national comparisons of this indicator for a period of thirty years – from 1981 to 2009. The two time charts below, calculated by Science-Metrix of the Web of Science, present the trends in the publication rates of Eastern countries, i.e. their visibility on the international science scale during a period of 30 years. The first time chart shows that during the decade 1980-1990, the Eastern countries were stratified into three groups: countries with a high rate of scientific publication (Poland and Historical Czechoslovakia), countries with a comparatively low rate of scientific publication (Romania, Bulgaria and Historical Yugoslavia) and countries with a medium rate of scientific publication, i.e., Hungary. During this decade, the three Baltic countries were part of the USSR. The second time chart provides a cross-national comparison between the trend in scientific publication rates of the Historical USSR, the USA and Japan. The trends displayed in Time Chart 1 are sustained up until 1995. However, during the last decade (2000-2009), the scientific publication rate of Romania has gradually increased and it currently exceeds that of Hungary, while the publication rate of Historical Yugoslavia is drawing closer to that of Historical Czechoslovakia. We assume that the dynamics of scientific publications after the political change in the Eastern countries reflect the legacy of the

communist period but also *the pace of structural reforms* which are ongoing in each country since the political change of 1989.

Figure 1

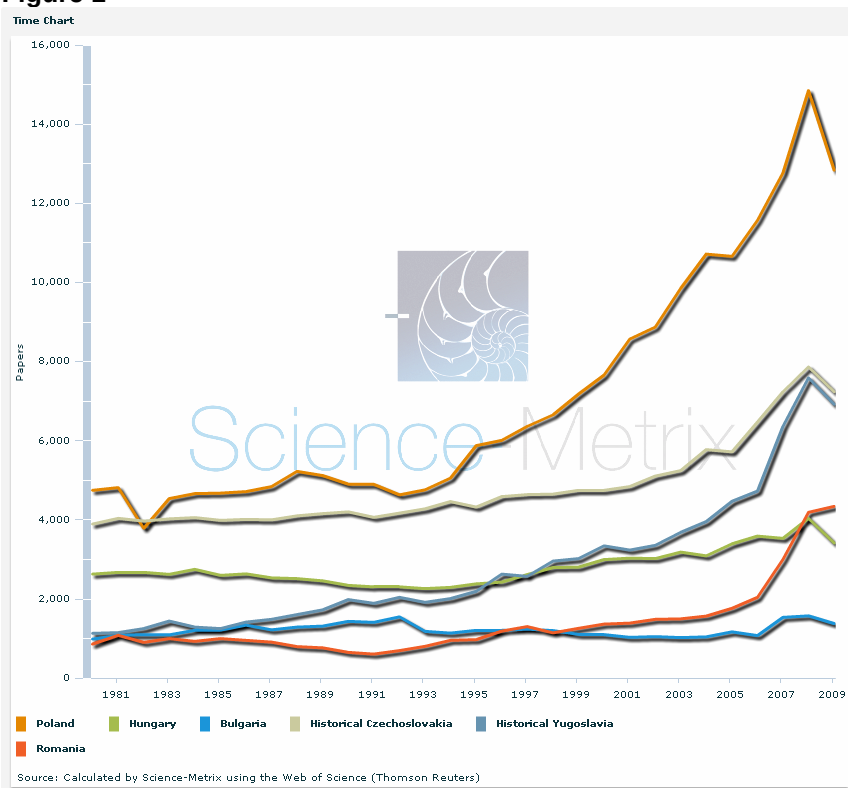
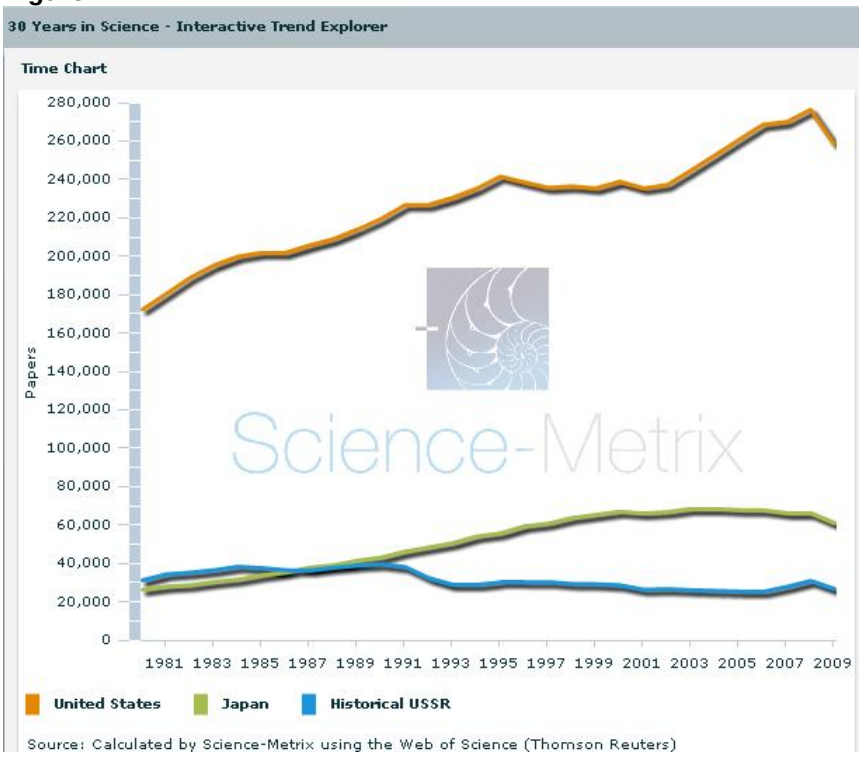


Figure 2



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 often is required in order to embark on an academic career. 'She Figures 2009' indicates that in 2006, the proportion of female PhD graduates in all Eastern countries except the Czech Republic, exceeds 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 period between 2001-2006.

Table 2. Percentage of ISCED 6 graduates who are women, by broad field of study, 2001-2006

	EDUCATION		HUMANITIES & ARTS		HEALTH & SOCIAL SERVICES		AGRICULTURE & VETERINARY		SOCIAL SCIENCES BUSINESS & LAW		SCIENCE, MATHEMATICS & COMPUTING		ENGINEERING, MANUFACTURING & CONSTRUCTION		Total	
	2001	2006	2001	2006	2001	2006	2001	2006	2001	2006	2001	2006	2001	2006	2001	2006
Bulgaria	44	52	44	68	52	56	52	54	40	58	46	56	28	33	42	53
Croatia	-	64	-	48	-	44	-	42	-	54	-	58	-	38	-	49
Czech R.	63	62	50	42	51	43	31	41	42	41	24	39	27	20	35	36
Estonia	-	100	36	77	65	68	50	100	50	39	32	47	0	59	52	57
Latvia	67	67	50	69	-	48	100	50	67	54	44	36	29	43	49	51
Lithuania	:	-	60	50	44	69	100	75	71	68	45	63	30	40	53	59
Hungary	61	61	42	49	38	39	31	45	43	52	26	39	24	29	38	44
Poland	-	:	49	54	47	54	44	54	44	51	45	57	20	24	42	50
Romania	-	30	-	47	-	49	-	46	-	47	-	62	-	35	-	47
Slovenia	45	75	37	66	54	47	39	57	47	54	45	60	29	22	49	50
Slovakia	81	54	51	46	58	65	69	38	63	52	43	44	23	33	40	47
EU-15	55	64	49	52	49	54	47	52	39	47	36	40	21	25	40	44

Source: 2001: Source: She Figures, 2003 - p.23, 43 and 44; Source: She Figures 2009, p. 49 and 51

The identified trends are as follows: in 2006 in the field of science, mathematics and computing, all Eastern countries except Latvia show a substantial increase (sometimes more than 10 percentage points) in the share of women graduates in this field of post-graduate/doctoral study in comparison with the corresponding figures for 2001. This is also true for the Czech female PhD graduates, who in 2006 comprised 39% (versus 24% in 2001) out of the all Czech PhD graduates in this field.

The same trend is valid for the field of engineering, manufacturing and construction: in all Eastern countries except Slovenia and the Czech Republic, an increase is observed in the percentage of women PhD graduates in comparison with the respective data for 2001. For example, in 2006, in the most masculinised field of engineering, manufacturing and construction, eight Eastern countries had a considerable proportion of female PhD graduates which exceeded the **EU-27 average of 25%,** namely Estonia (59%), Latvia (43%), Lithuania (40%), Croatia (38%), Romania (35%), Bulgaria (33%), Slovakia (33%) and Hungary (29%). Only three Eastern countries, the Czech Republic (20%), Poland (24%) and Slovenia (22%) stand below the EU-27 average. It could even be said that in Estonia, engineering became a feminised field of study.

Within the period 2001-2006, in the majority of the Eastern countries, the annual growth rate in the numbers of female PhD graduates was higher than that of male graduates in all fields of science, in other words the trend was that in all fields of science, the number of female PhD graduates increased more rapidly in comparison with the number of their male counterparts. 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 only in two Eastern countries, Estonia (-7.5, women; -5.3, men) and Latvia (-3.3, women; -5.5, men).

Some explanations for the above figures:

- The massive enrolment of women of Eastern countries at the PhD level of education might be due to the relatively good prospect of embarking on a scientific career. Indeed, if we compare the proportion of female PhD graduates in each country (for 2006) with the respective proportion of female academic staff at ***Grade C*** and ***Grade D*** (for 2007), it is evident that in almost all Eastern countries, the female share at Grade C and Grade D of the academic staff is *either higher or equal* to the female share of PhD graduates, which is not the average case of EU-15. This means that female PhDs from the majority of the Eastern countries have a good chance of embarking on an academic career. The opposite is true for Poland, the Czech Republic and Slovenia, which means that in these three Eastern countries the 'sticky floor' factor is more pronounced at the beginning of female academic careers in comparison with the other countries of the Eastern group.
- Another explanation for the same phenomenon could be related to the ability of local labour markets to absorb university graduates. During the last two decades, in the majority of the Eastern countries the number of universities and equivalent higher education institutions sharply increased, leading to a substantial increase in the number of university graduates. At the same time, the labour market did not develop at a similar pace. As a result, many female university graduates encountered employment difficulties. In order to escape unemployment, some female university graduates preferred to do a PhD, which offers them a secure income at least for several years. From this point of view, in some Eastern countries the massive enrolment of women in PhD studies might be viewed as a matter of necessity rather than a matter of choice.

  Another kind of explanation might be put down to issues like: a) students' preferences and b) female and male success in defending PhD theses. As the Rocard Report (EC, 2007b) has revealed, in almost all European countries during recent years, a decline has been observed in young people's interest in key science studies in the fields of physical sciences, life sciences, computer science and technology and mathematics. In the Eastern countries, as well as in the Western countries, the so-called 'hard' sciences became less attractive for the young European generation. There has been a shift in students' preferences towards the study field of social sciences, business and law. For example, in Bulgaria during the 2005/2006 academic year, 23.3% of all students in Bachelor's and Master's degrees were doing business and administration and 13.0% were studying social and behavioural science. On the other extreme are mathematics and statistics (0.5%), life sciences (0.8%), physical sciences (1.5%) and computing (2.4%). A similar shift in students' preferences is observed in the majority of the Eastern countries. Therefore, we can suggest that in the Eastern countries, the high proportion of women students in 'hard' sciences is due to the fact that this study field became less competitive. The same cannot be said of engineering and technology. As a rule, among young people in the Eastern countries there has been a stable interest in this study field and male students outnumber female students at the Bachelor's and Master's level. However, in some Eastern countries (e.g. Estonia, among others), the female students seem more successful in defending their theses than their male colleagues. The local labour market demands that male engineers and some male students quit their Master's or PhD's programmes without defending their theses. Therefore, the considerable increase observed in the percentage of women PhD graduates in the field of engineering might be due to the better chances offered to their male colleagues by the local labour markets.

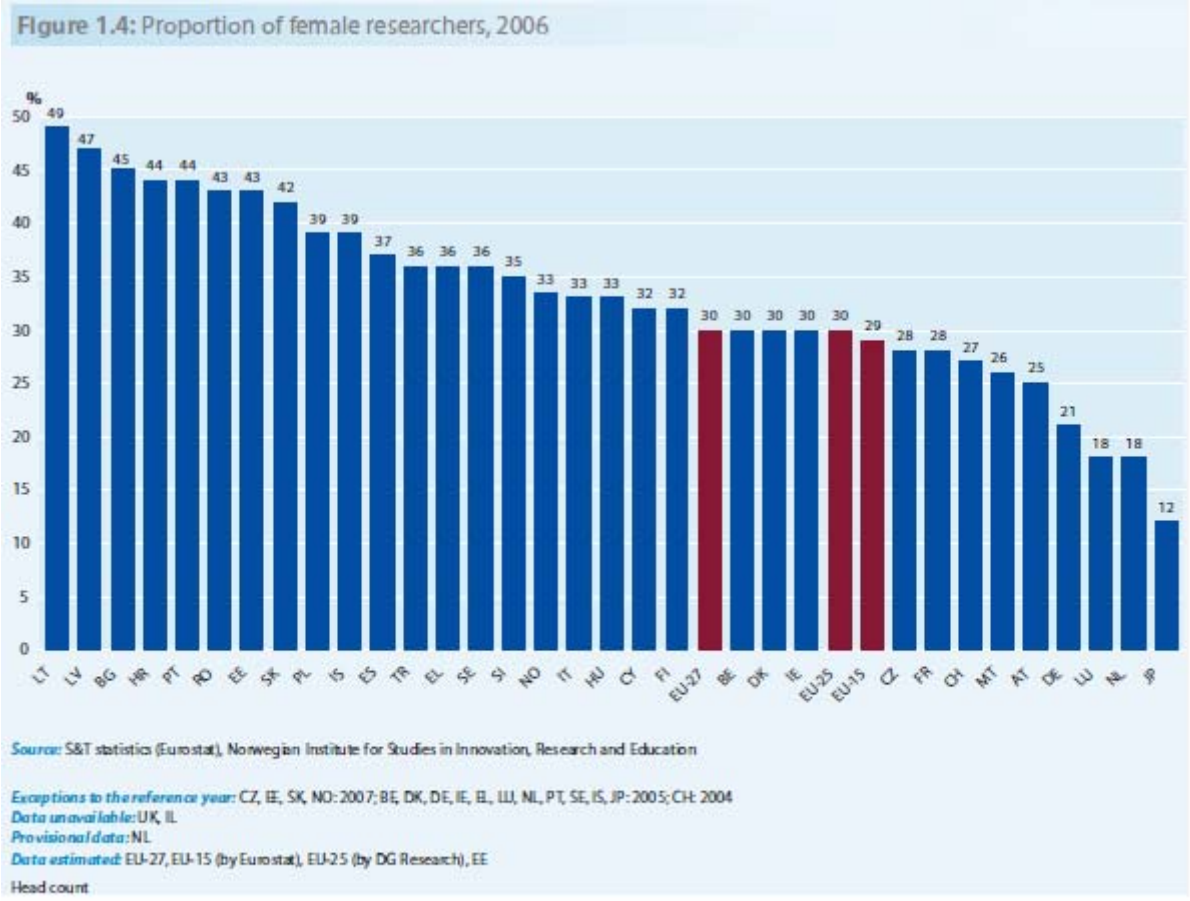
According to the European Commission 'She Figures 2009', in 2006 the proportion of female researchers in all Eastern countries except the Czech Republic is above the EU-27 average (30%). At the top is Lithuania (49%), followed by Latvia (47%), Bulgaria (45%), Croatia (44%), Estonia (43%), Romania (43%), Slovakia (42%), Poland (39%), Slovenia (35%) and Hungary (33%) (EC, 2009, p.28). As already mentioned, the Czech Republic is an outlier of the common case of the Eastern country-group being the only Eastern country in which the proportion of female researchers is below the EU-27 average. As already noted, the situation is similar with Portugal in the Southern country-group. Portugal has a high proportion of women researchers (44%) and therefore stands closer to the Eastern countries than to the Southern countries.

The Southern country report provides the following explanation regarding the Portuguese case:

> *"Portugal stands out because of the relatively high number of women who are employed in research and academia. One of the reasons for this phenomenon is related to the fact that Portugal was for a long time a small country trying to keep the remnants of a colonial empire. Therefore, the dictatorial regime governing the country until 1974, when democracy was established, recruited more and more young men to the colonial war, during the 1960s and the early 1974s. Because of this, there was a shortage of men entering the academic profession, and larger numbers of Portuguese women were able to enter research employment"* (Addis & Pagnini, 2010, pp. 17-18).

Evidently, the prestige and attractiveness of the research profession matter, which is also true for the Eastern countries.

Figure 3. Proportion of female researchers, 2006



Source: EC, 2009a, Figure 1.4, p.28.

Were we able to find any general frame that could explain both extremes: the case of the Czech Republic in the Eastern country-group and the case of Portugal in the Southern country-group?

Horizontal segregation

In order to grasp the national peculiarities of the Eastern countries' research sectors, we have to look at the distribution of researchers from the Eastern group across R&D sectors. Table 3 presents comparative cross-national data about Eastern countries' BES, HES and GOV sectors. The PNP sector is not taken into account, because it is negligible in the majority of the Eastern countries and non-existent in some of the others (e.g. Hungary, Slovakia, Lithuania, Latvia and Croatia). A notable exception is Slovenia with a visible PNP sector. This table is based on our own calculations and is compilation of several 'She Figures 2009' tables. The aim is to present the most recent data (i.e., data for 2006) in a similar format of the ENWISE Report table (See Annex 2 to this Report) in order to identify some trends for the period 2001-2006.

Table 3. Gender distribution of researchers from the Eastern Country Group across R&D sectors, head count and percentage, 2006

Country		Business Enterprise		Higher Education		Government		All three Sectors	
Bulgaria	Women	551	10.4%	1,446	27.3%	3,308	62.4%	5,305	100%
	Men	949	14.4%	2,463	37.3%	3,185	48.2%	6,597	100%
	Total	1,500	12.6%	3,909	32.8%	6,493	54.6%	11,902	100%
Czech Republic	Women	2,064	18.2%	5,949	52.8%	3,252	28.9%	11,265	100%
	Men	11,348	40.1%	11,222	39.6%	5,729	20.2%	28,299	100%
	Total	13,412	33.9%	17,171	43.4%	8,981	22.7%	39,564	100%
Estonia	Women	358	13.9%	1,763	68.7%	443	17.3%	2,564	100%
	Men	1,042	29.6%	2,183	62.0%	293	8.3%	3,518	100%
	Total	1,400	23.0%	3,946	64.8%	736	12.0%	6,082	100%
Hungary	Women	1,678	15.3%	6,928	63.1%	2,367	21.6%	10,973	100%
	Men	5,963	27.3%	12,000	55.0%	3,850	17.6%	21,813	100%
	Total	7,641	23.3%	18,928	57.7%	6,217	19.0%	32,786	100%
Latvia	Women	316	9.2%	2,533	74.1%	569	16.6%	3,418	100%
	Men	676	17.9%	2,412	63.8%	693	18.3%	3,781	100%
	Total	992	16.0%	4,945	70.0%	1,262	13.9%	7,199	100%
Lithuania	Women	360	6.0%	4,632	78.2%	934	15.8%	5,926	100%
	Men	658	10.8%	4,604	75.6%	825	13.5%	6,087	100%
	Total	1,018	8.5%	9,236	76.9%	1,759	14.6%	12,013	100%
Poland	Women	2,830	7.4%	29,171	76.8%	6,002	15.8%	38,003	100%
	Men	8,578	14.7%	41,160	70.7%	8,509	14.6%	58,247	100%
	Total	11,408	11.9%	70,331	73.0%	14,511	15.1%	96,250	100%
Romania	Women	3,269	25.2%	6,789	52.3%	2,923	22.5%	12,981	100%
	Men	4,767	28.0%	9,293	54.7%	2,941	17.3%	17,001	100%
	Total	8,036	26.8%	16,082	53.6%	5,864	19.6%	29,982	100%
Slovak Republic	Women	759	9.7%	5,832	74.3%	1,262	16.1%	7,853	100%
	Men	1,723	15.7%	7,547	68.9%	1,677	15.3%	10,947	100%
	Total	2,482	13.2%	13,379	71.2%	2,939	15.6%	18,800	100%
Slovenia	Women	680	23.4%	1,374	47.2%	858	29.5%	2,912	100%
	Men	1,980	37.1%	2,235	41.9%	1,115	20.9%	5,330	100%
	Total	2,660	32.3%	3,609	43.8%	1,973	23.9%	8,242	100%
Croatia	Women	311	6.8%	2,857	62.2%	1,426	31.0%	4,594	100%
	Men	605	10.4%	3,727	63.9%	1,499	25.7%	5,831	100%
	Total	916	8.8%	6,584	63.2%	2,925	28.0%	10,425	100%
ECG-11	Women	13,176	12.4%	69,280	65.5%	23,344	22.1%	105,800	100%
	Men	62,309	32.5%	98,840	51.6%	30,316	15.8%	191,465	100%
	Total	75,485	25.4%	168,120	56.6%	53,660	18.0%	297,265	100%

Source: Own calculation based on compilation of 'She Figures 2009' Annex1.1; Annex 1.2; Annex 1.3 and Annex 1.4 (EC, 2009a, p.105-108)

Table 3 shows ***the first dissimilarity*** among the countries of the Eastern group: 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%); the 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, a relatively high proportion of researchers are observed in BES: the Czech Republic (33.9%), Slovenia (32.3%), Romania (26.8%), Hungary (23.3%) and Estonia (23.0%). This dissimilarity is indicative of the national specificities of the R&D sectors of the Eastern Country Group. To some degree, there is a balance in the distribution of Czech researchers across BES, HES, and GOV R&D although the Czech HES remains the main employment area for both female and male researchers. Many reasons stand behind these figures, which are better explained by a comparative analysis with the respective data for 2001. In any case, further analyses of the Eastern women researchers' presence should be referred to the 'dominant' HE sector.

With regard to the 'dominant' HE sector, the Eastern countries could be divided into several subgroups. The first subgroup consists of Bulgaria, the Czech Republic and Hungary, which have less than or equal to 37% (EU-27 average) of female researchers in the HE sector; the second subgroup includes Poland , Romania, Croatia, Slovakia, Estonia, Lithuania, Latvia and Slovenia, in which the share of female researchers in HE is above 37% . The Czech Republic holds the bottom place (35%). Latvia is the only Eastern country in which female researchers outnumber male researchers both in HE and in GOV R&D sectors – 51% and 53% respectively (EC, 2009, p. 31).

A comparative analysis of the data presented in Table 3 'Gender distribution of researchers from the Eastern Country Group across R&D sectors, head count and percentage, 2006' and the respective data of the ENWISE Table 'Distribution of researchers from the Enwise countries across R&D sectors, head count and percentage, 2001'.

The aim of the exercise in this section is to identify some trends in the horizontal segregation among BES, HES and GOV R&D during the period 2001-2006 in the countries of the Eastern group.

On the whole, during this five-year period, the most pronounced change or re-distribution of the research potential in the majority of the Eastern countries occurred in BES and HES and to a lesser degree, in GOV R&D. Some of them are as follows:

- In the Czech Republic, Estonia, Hungary and Slovenia during the time period 2001-2006, female researchers (in absolute numbers) definitely increased in all the three sectors (BES, HES and GOV) while male researchers increased in large numbers in BES and HES and in small numbers in GOV. However, the observed growth in numbers of female and male researchers in BES and HES followed a different speed/rate/pace, i.e., the number of male researchers is growing faster in comparison with that of the female researchers. Therefore, despite the identified positive trend in BES and HES, female researchers from the Czech Republic, Estonia, Hungary and Slovenia are still catching up with their male counterparts in BES and HES and they have a more balanced presence in GOV.
- In Poland and Latvia during the observed period, there was a substantial decrease in the numbers of female researchers in BES and a negligible increase in the respective number of male researchers. This might be indicative of the problems met by BES in Poland and Latvia.
- In Lithuania, the numbers of female and male researchers alike dropped in GOV but substantially increased in HES. To some extent, this trend is valid for Estonia too, but the rise in the number of researchers in the Estonian HES is lower in comparison with the Lithuanian case because it occurred in parallel with the rapidly growing number of researchers in the Estonian BES. The decrease in the number of researchers in the Lithuanian and Estonian GOV could be partly explained by the closure of their National Academies of Sciences during the transitional period. The same happened with the Latvian Academy of Sciences but in Latvia, unlike Estonia and Lithuania, the trend is

toward an increase in the number of researchers in the GOV sector. It is probably due to the problems undergone by the Latvian BES during the observed period.

- In Slovakia, the numbers of both female and male researchers doubled and even tripled in HES during 2001-2006, a process which led to a growing imbalance between the two sexes. In absolute numbers, women researchers increased from 2,089 in 2001 to 5,832 in 2006 while the number of men researchers went from 2,081 in 2001 to 7,547 in 2006. Therefore, in Slovakia the gender gap among the academic staff/faculty grew during the observed period: from a balanced gender representation of the two sexes in 2001 to an imbalanced one in 2006. The same trend also applies to the Bulgarian case. In both countries, the growth of male researchers in HES (but also in BES) was more pronounced in comparison with the growth in the number of female researchers.
- Romania is a particular case. During the observed period 2001-2006, the number of both female and male researchers sharply decreased in BES (with some 22.2 percentage points for women and 22.6 points for men). At the same time, there was a sharp increase in the numbers of researchers in HES (with about 28 percentage points for women and 27 points for men). It might be that this massive re-distribution of researchers between BES and HES is due either to the structural reforms implemented in the Romanian R&D sectors during the time period 2001-2006 or to the fact that Romanian statistics adopted the international reporting standards after 2001. In any case, the change/re-distribution of researchers in BES and HES equally affected Romanian female and male researchers in these two sectors.
- In all countries of the Eastern group, a substantial growth is observed in the absolute numbers of both female and male researchers in HES although the pace of this growth differed for the two sexes, being faster for men and slower for women. This trend is probably due to the fact that during the previous decade, in the majority of the Eastern countries, a number of new public and private universities and equivalent higher education institutions were established which provided new employment opportunities for female and male researchers in the observed period 2001-2006.

Table 4 below shows the distribution of researchers, including women researchers by main field of science.

In five Eastern countries, the share of women researchers in the field of natural sciences exceeds the Eastern country average of 39.4%, namely in Bulgaria (53.9%) followed by Romania (50.2%), Croatia (46.2%), Lithuania (45.2%) and Latvia (41.1%). In the field of engineering and technology, Romania and Slovakia rate highest (39.7% and 32.3% respectively) followed by Croatia (30.2%) and Estonia (29.5%). In the majority of the Eastern countries, female researchers outnumber male researchers in the field of medical sciences, while in the fields of social sciences and humanities there is, to some degree, a more balanced representation of the two sexes.

Table 4. Number of researchers (and % of women among them) by main field of science of HES and GOV in the Eastern Country Group in 2006

Country		Natural sciences	Engineering & technology	Medical sciences	Agricultural sciences	Social sciences	Humanities
Bulgaria	Researchers	3,169	2,884	850	1,078	1,369	1,052
	% women	53.9%	26.9%	53.2%	49.8%	46.2%	61.9%
Czech Republic	Researchers	6,230	6,901	5,088	2,458	4,058	2,873
	% women	31.1%	23.4%	46.9%	37.3%	42.0%	41.6%
Estonia	Researchers	1,629	859	423	231	809	1,109
	% women	38.3%	29.5%	60.8%	48.0%	57.4%	65.1%
Hungary	Researchers	4,486	3,881	4,024	1,613	4,708	6,433
	% women	28.3%	18.7%	46.4%	35.3%	37.1%	48.4%
Latvia	Researchers	1,662	1,073	449	588	1,448	987
	% 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%
Poland	Researchers	17,026	18,426	15,537	7,347	16,951	9,555
	% women	39.2%	21.8%	55.1%	40.5%	46.9%	45.3%
Romania	Researchers	3,493	7,911	2,425	2,733	4,653	823
	% women	50.2%	39.7%	55.3%	28.8%	50.6%	41.1%
Slovak Republic	Researchers	4,205	4,143	2,342	1,308	4,201	1,018
	% women	39.2%	32.3%	59.9%	41.7%	53.1%	46.5%
Slovenia	Researchers	1,155	1,269	1,114	546	754	744
	% women	34.7%	22.3%	50.2%	50.5%	45.9%	49.3%
Croatia	Researchers	1,282	1,876	2,435	855	1,814	1,247
	% women	46.2%	30.2%	51.6%	42.3%	46.6%	52.90%
ECG – 11	Researchers	46,867	51,302	35,901	19,228	43,088	28,219
	% women	39.4%	26.5%	52.9%	39.7%	47.8%	49.5%

Source: Own calculation based on compilation of 'She Figures 2009' tables: Annex 2.4 and Annex 2.5 (p. 112-113)

Vertical segregation

As already noted in the previous section (horizontal segregation), the proportion of female researchers in all Eastern countries except the Czech Republic is substantial and is far above the EU-27 average (30%). In addition, in all Eastern countries except Poland, the Czech Republic and Slovenia, female PhD graduates have a relatively good chance of becoming early career researchers (i.e. of obtaining positions at Grade C and Grade D) and of embarking on a scientific career because the 'sticky floor' factor is less pronounced in the countries of the Eastern group. This does not appear to be true for the promotion of female researchers to the higher levels of the academic hierarchy, i.e. Grade B and Grade A, because the so-called 'glass ceiling' is thicker in the Eastern countries and stands above that of EU-15. Indeed, in 2007 (despite the observed decrease in the values of the 'Glass Ceiling Index' for 2004) in the majority of the Eastern countries, the GSI was higher or equal to the ***EU-15 average of 1.9***, e.g. Lithuania (3.0), Estonia (2.6), the Czech Republic (2.2.), Slovakia (2.1.), Slovenia (2.0), Hungary (2.0) and Latvia (1.9). Only in four Eastern countries was the GSI below the EU-15: Poland (1.8), Croatia (1.5), Bulgaria (1.5) and Romania (1.3) (EC, 2009, p.78). This means that the move of Eastern women researchers into higher position is more difficult in the majority of Eastern countries in comparison with their female colleagues in the EU-15.

According to the statistical data about the 'Proportion of the female academic staff in the **GRADE A** level' (Table 5), in 2007 the Eastern country-group could be divided into two subgroups: countries which exceeded the EU-27 average of **19%:** Romania – 32% (in 2004 – 29.1%), Latvia – 29% (in 2004 – 26.5%), Croatia (26%), Bulgaria – 24% (in 2004 – 18%), Slovakia – 20% (in 2004 - -13.5%), Poland – 20% (in 2004 – 19.5%), and Hungary – 19% (in 2004 – 15.4%). Close to this subgroup is Portugal – 21% (in 2004 – 20.9%) and Finland – 23%

(in 2004 – 21.2%). The other subgroup stands below the EU-27 average, either at the level of EU-15 (17%) or below it. This smaller group includes: Estonia – 17% (in 2004 – 17.2%), Slovenia – 17% (in 2004 –12.9%), Lithuania – 14% (in 2004 – 12.1%) and the Czech Republic – 13 % (in 2004 – 10.3%). According to these statistics, the case of the Czech Republic is closer to that of the German speaking countries like Austria, Germany, Denmark and the Netherlands.

Table 5. Proportion of female academic staff by grade and total, 2007

Table 3.1: Proportion of female academic staff by grade and total, 2007

	GRADE A	GRADE B	GRADE C	GRADE D	TOTAL
EU-27	19	36	44	44	38
EU-25	17	35	44	44	38
EU-15	17	35	43	43	38
BE	11	25	31	48	35
BG	24	38	:	54	46
CZ	13	31	31	46	35
DK	12	25	37	44	33
DE	12	18	33	38	33
EE	17	37	57	67	49
IE	10	40	47	46	40
EL	11	23	32	39	29
ES	18	36	48	52	43
FR	19	39	34	42	35
IT	19	34	45	:	33
CY	10	20	46	30	33
LV	29	42	61	:	56
LT	14	42	54	63	53
LU	9	29	31	:	26
HU	19	32	45	39	37
MT	2	32	14	25	27
NL	11	18	32	42	34
AT	14	19	40	41	35
PL	20	28	43	:	37
PT	21	34	43	50	42
RO	32	49	x	55	43
SI	17	30	46	45	35
SK	20	35	50	55	43
FI	23	49	56	45	43
SE	18	47	42	51	44
UK	17	37	47	46	42
HR	26	45	52	53	45
TR	28	34	46	47	40
IS	19	32	53	:	35
NO	18	34	46	54	42
CH	22	24	38	48	34
IL	13	22	36	46	26

Source: WiS database (DG Research); Higher Education Authority for Ireland (Grade A)

Exceptions to the reference year: HR: 2008; UK: 2007/2006; DK, IE (except for grade A: 2002-2003), FR, CY, LU, AT, IL: 2006; EE, MT: 2004; PT: 2003; EL: 2000
Data unavailable: Grade C unavailable: BG, RO (included in B); Grade D unavailable: BE (French-speaking community), IT, LV, LU, PL, IS
Provisional data: ES
Data estimated: EU-27, EU-25, EU-15 (by DG Research), SI

Data for Ireland on Grade A professors does not include the Institutes of Technology
Head count
Some differences exist in coverage and definitions between countries
'x': data included in another cell; ':': not available

Source: EC, 2009a, Table 3.1, p.75

There is some good and some bad news for the Eastern academic women which might be drawn from our analysis for the time period 2001-2006 and the recent statistics.

- The good news is that in all Eastern countries except Estonia, the proportion of female academic staff at Grade A (full professor) level increased during the period 2004-2007, a trend which appears to be stable. In some Eastern countries like Bulgaria and Slovakia, the growth was indeed substantial, with some six percentage points. This could be explained by the fact that during the period 2001-2006, the general number of researchers in the Bulgarian and Slovakian HES substantially increased (see table 3 and the follow-up comparison with the ENWISE data for 2001). Bulgaria and Slovakia also show common trends by other indicators. The case of the Czech Republic and Slovenia is similar and these two countries make up another small subgroup among the Eastern Country Group with similar developments by different indicators. The expectation that the three Baltic countries would form another small subgroup among the Eastern Country Group is not justified because these three countries show different trends with regard to the ongoing processes in the R&D sectors.

- In terms of vertical segregation, the most dramatic situation is observed in Lithuania. In 2006, 78.2% of Lithuanian female researchers were employed in HES and their share in HES was 50%. However, despite these impressive figures, in 2007 the proportion of Lithuanian female academics at Grade A, due to the very thick 'glass ceiling index' was only 14% (in 2004 – 12.1%). Therefore Lithuania is ***an extreme case*** among the group of the Eastern countries. The situation of Lithuanian female academics with regard to their promotion to higher academic positions is more complex, even in comparison with the case of the Czech Republic. Both countries have a comparable proportion of female academics at the Grade A level (14% and 13% respectively) although 52.8% of Czech female researchers are employed in HES (78.2% for Lithuania) and have a share of 35% (compared to 50% for Lithuania) in this sector. It is logical that the European Commission DG for Research is concerned with the Lithuanian and Czech cases and has tried to support women scientists from these two countries in different ways. The 'Central European Centre for Women and Youth in Science (CEC –WYS)' project was supported by the FP6 in the Czech Republic and coordinated by the Czech NCCWS. The Commission envisaged a European Institute for Gender Equality (EIGE) to be set up in Vilnius, Lithuania. The preparatory work took several years and finally the Institute was established in May 2007, initially in Brussels before moving to its office in Vilnius, Lithuania. The European Institute for Gender Equality is a European agency which supports the member states and the European institutions (particularly the Commission) in their efforts to promote gender equality, to fight discrimination based on sex and to raise awareness of gender issues. EIGE opened its doors in Vilnius on 16 December 2009.

  On 8 March 2010, EIGE announced the launch of a new 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 disseminate information regarding positive examples of non-stereotypical roles and to publicise such success stories. Further information about this newly launched Institute can be found on the EIGE web: http://eige.europa.eu

- It seems that the Romanian female academics have not benefitted from the ongoing process in R&D. In spite of the fact that Romania holds the top place by the indicator 'proportion of female academic staff at Grade A', it must be borne in mind that during the period 2001- 2006, the number of Romanian female researchers almost tripled in HES (from 2,470 in 2001 to 6,789 in 2006). This might be indicative of the decline in the GCI in Romania.

We argue that this supposedly 'good news' for Eastern women academics, i.e. the visible positive trend towards the improvement of gender equality in HES, does not originate from the adoption of a new organisational culture and/or from the implementation of a gender equality policy in HES. Rather, this positive shift in the figures of academic women towards the top positions might be interpreted as a result of different underlying causes as well as many particular circumstances, e.g. in the majority of the Eastern countries the number of public universities and equivalent higher education institutions increased and in some of them, a number of private universities emerged offering new employment opportunities in HES; in the majority of the Eastern countries, the BES is growing rapidly and some male scientists are probably leaving universities in order to seek better career and life chances either in BES, in the private sector or abroad. This particular circumstance strongly affects the male/female ratio in the academic ranks.

Generally speaking, the above statistics are more likely to reflect the current economic situation in the Eastern countries and the poor image of science and scientists in the Eastern societies than the emergence of a new organisational culture for gender equality in HES. We assume that whenever a profession becomes low-paid and unattractive, as a rule it tends to become feminised and vice versa, and that working in a feminised labour sector may reduce the payment level of the sector itself. Recently, an EU report by Mark Smith discussed the impact of the 'feminised-sector effect' on earnings in the discourse of the gender pay gap of the European labour market:

> "In feminised sectors, men tend to be overrepresented in top jobs (for example, teaching, Healy and Kraithmen 1996) and sectoral analysis of earnings and employment show that men dominate the higher paying jobs even in female-dominated sectors (EuroFound 2006: figure 4). The impact of the undervaluation of women's work can be seen in the effect on wages of working in a feminised sector. Allen and Sanders (2002) find that, even when other factors are controlled for, working in a sector where women predominate reduces individual pay levels across 12 countries (including six European Member States). They find that this feminised sector effect had the second strongest impact – being a woman had the strongest negative effect on wages. Similarly, Huffman (2004) for the United States finds that female-dominated jobs pay less than comparable male-dominated jobs and also that the wage penalty for women is greater within female-dominated jobs. Even where organisations value the contribution women make, norms and customs may mean that skilled, female employees are not paid as much as their male counterparts (Dex et al 2000). From across Europe there is evidence of this within occupation pay differentials in jobs from painters (Clarke et al 2005:168) to solicitors (Wass and McNabb 2005)" (Smith, 2010).

The bad news is that in 2007, despite the large existing available pool of Eastern academic women at Grade A, in the majority of the Eastern countries (except 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 this high-level decision-making position in Lithuania and Hungary. The case of Romania is also representative. The proportion of academic women at Grade A is impressive in Romania (32%) and by this indicator, Romania ranks the highest in both Eastern and Western countries. However, in 2007 the female share among the heads of the Romanian universities was only 2% (EC, 2009a, p. 98). In this regard, Romania is *an extreme* among the Eastern Country Group. For example, the Czech Republic, with its 13% of academic women at Grade A has a 7% female share among the heads of universities compared to Slovenia (17% against 15% female heads of universities), Estonia (17% against 18% female heads of universities) and Latvia (29% against 20% female heads of universities). These high figures for Slovenia and Estonia are probably due to the small number of universities in both countries. To some degree, it might be valid for the Czech Republic and Latvia as well.

In order to find some clues that explain the patterns of Eastern women's presence in the HE sector, we have made a step-by-step connection of the available statistics on this sector: a) with the figures relating to the socio-economic setting reflected by the overall gender gap; b) with the figures relating to the gender equality policy in scientific research, and c) with the figures relating to the R&D financial issues (in terms of GERD, researchers' remunerations and gender pay gap). The expectation is that some *stable patterns* (if any) might emerge and provide some explanations.

First scenario: connecting the data about female researchers' presence in the Higher Education Sector with the gender dimension of the socio-economic settings

This scenario has been already explored in the Report *'The Gender Challenge in Research Funding: Assessing the European National Scenes'*. The table below links statistics of the overall gender gap in society (measured with a set of quantitative gender indicators with regard to economic activity, educational attainment, political empowerment and health and survival) with the statistics concerning the share of women researchers in HES (EC 2009b, p. 17). As a result, a kind of '***patchwork pattern***' emerges in terms of geographical country grouping, which again illustrates the very complex relationship between the socio-economic and cultural settings of societies codified in the observed 'global gender indicators' and women's faculties. It may be speculated, for example, that most of the countries present in the first group (Norway, Finland, Sweden, Iceland, Latvia, the UK, Lithuania and Belgium) are countries in which a model of *'a dual earner'* is deeply embedded in the settings of their socio-economic and cultural practices. Indeed, all countries belonging to this group, except Spain and Ireland, have high employment rates that exceed the EU-15 average.

Table 6. Overall gender gap in society and share of women researchers in the higher education sector

The majority of the Eastern Country Group and Portugal are listed in the third country grouping of this table, i.e. 'larger gender gap, more women in HES'. We can speculate that the same *'dual earner model'* is socially embedded in these countries (this claim is under question in the case of Greece and Turkey).

Following this hypothesis, we might imagine that the second and the fourth country groups are those in which *'a male breadwinner model'* dominates, being economically, socially and culturally grounded in the respective countries. The gender pay gap in these groups of countries is also significant.

The analysis of this scenario, particularly the emerging '***patchwork pattern***', suggests that further specialised studies on the relationship between the global gender indicators and the share of women researchers in Higher Education Sector are needed in order to confirm or reject the speculation raised. In any case, it cannot provide a common explanatory frame that is valid

for all countries involved. Therefore, its implications are necessary but not sufficient in order to understand gender segregation in HES.

Second scenario: connecting the data about female researchers' presence in Higher Education Sector (HES) with the gender equality policy in scientific research

Basic information regarding the gender equality policy measured by several equality indicators across the countries is included in the EU Report *'Benchmarking policy measures for gender equality in science' and* is summarised in the table below.

With regard to the gender equality policy (and adding to the information provided in this source) we can divide the countries into the following three groups:

I. **Strong gender equality policy** (countries that have completed almost all of the defined equality measures: 1-15). This group includes: Austria, Finland, France, Germany, the Netherlands, Spain, Sweden, the UK, Norway, Ireland and Switzerland. There is no clear relationship between the adoption of a 'strong gender equality policy' in scientific research in a given country and the share of women researchers in HES. Some countries of this group have more (above EU-27 average) women in HE research, e.g., Finland, Norway, Sweden, Spain, the UK and Ireland, while the other countries of the group, e.g., Austria, Germany, France, Switzerland and the Netherlands have fewer (less than EU-27 average).

II. **Medium gender equality policy** (countries that have a gender equality plan in universities, but have still not provided special funding available for women in science): Denmark, Italy, Malta and Iceland.

III. **Weaker (still undeveloped) gender equality policy** (countries below the medium gender equality policy)**.** This group consists of the following countries: Belgium, Bulgaria, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Luxemburg, Poland, Portugal, Romania, Slovakia, Slovenia, Croatia, and Turkey.

All countries of the Eastern country-group are present in this third group. Again, no relationship between the level of elaboration and institutionalisation of gender equality measures and the presence of female researchers in HES can be established within this dominant group because it includes countries with a greater number of women researchers in HES (all Eastern European countries except the Czech Republic, Greece, Portugal and Turkey) and countries with a lower number of women researchers in HES (the Czech Republic, Belgium, Luxemburg and Cyprus).

Legend

X	Yes, already in Rees (2002)
X	Yes (new)
	Partially
	No

Table 7. Summary chart of equality measures

	AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	EL	HU	IE	IT	LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK	AL	BA	HR	MK	IS	IL	ME	NO	RS	CH	TR
1. Equal treatment law	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2. Ministry for Women's Affairs/ Statutory Gender Equality Agency	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3. Commitment to gender mainstreaming	X					X	X	X	X	X			X	X	X	X	X		X		X			X	X	X			X	X		X			X			
4. Women in Science Unit	X				X				X	X			X	X				X							X	X		X					X	X		X			
5. Quotas	X	X						X			X			X											X	X									X				
6. Targets	X							X		X															X	X	X					X			X		X		
7. Sex-disaggregated statistics	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X	X	X	X	X	X			X		X			X		X	
8. Networks for women in science	X	X				X		X	X	X			X						X			X			X		X								X		X	
9. Mentoring for women in science	X							X		X			X						X							X	X	X	X						X		X	
10. Women's Studies	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X	X	X
11. Gender Studies	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X					X	X		X	X	X	X
12. Gender equality plans in universities	X					X		X		X			X					X	X						X	X	X					X			X			
13. Special funding available to women in science	X							X	X	X			X						X						X	X	X						X		X		X	
14. Resources for returnees	X									X									X								X										X	
15. Paternity leave	X	X				X	X	X	X	X	X	X	X		X	X			X		X	X		X	X	X	X					X	X		X	X		

Source: Ruest-Archambault et al. EC, 2008a, p. 42–43.

A ***partial overlapping*** can be identified in the emerging ***'patchwork pattern'*** of the previous case and the one discussed in this section. In particular, the countries that have a lower global gender gap rank and are present in the grouping '*smaller gender gap, more women in HE research',* namely Norway, Finland, Sweden, Spain, Ireland and the UK are also present in the first group of the *'strong gender equality policy'* in scientific research. We can assume that there is ***a positive connection*** between the global gender gap rank of each country and the institutionalisation of gender equality measures in HES. A similar ***partial overlapping*** is observed between the countries listed under the grouping '*larger gender gap, more women in HE'* and the countries listed under *'weaker (still undeveloped) gender equality regime'.*

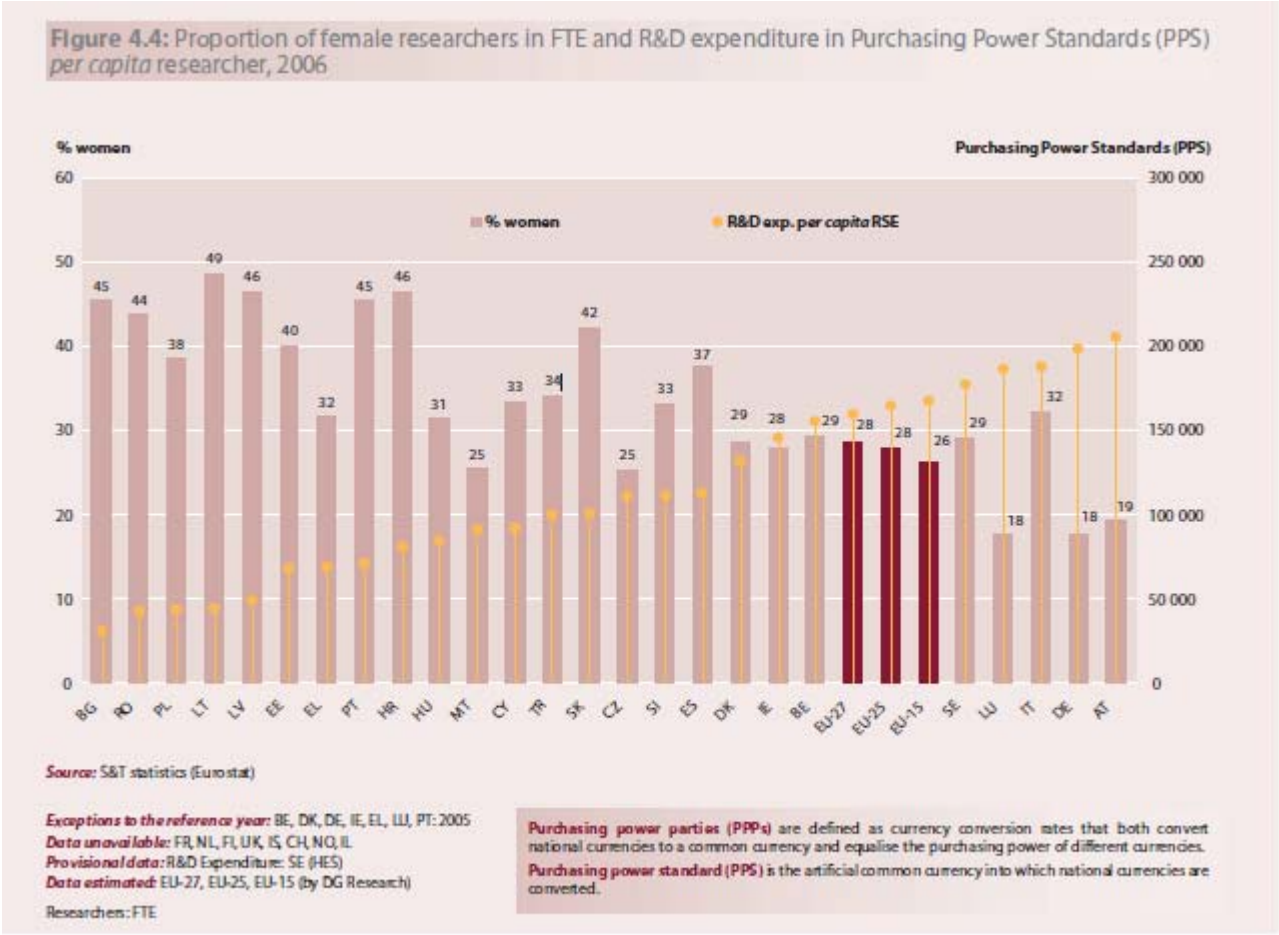
Third scenario: connecting the data about female researchers' presence with R&D financial issues in terms of R&D expenditure as a percentage of GDP (GERD), researchers' remunerations and gender pay gap

In our view, this is the most likely scenario in the search for a general explanatory frame, especially from the point of view of the current move towards market orientation in the R&D sector across the European countries, including Eastern European countries. This scenario connects the statistical data for women in R&D with the statistical data of GERD (R&D expenditure as a percentage of GDP). It was first developed within the ENWISE Report *'Waste of talents: turning private struggles into a public issue. Women and Science in the Enwise countries'* (EC, 2003) and further in the EU Report *'Benchmarking policy measures for gender equality in science'* (EC, 2008a).

The ENWISE Report introduces the concept of '*The Honey Pot Indicator'* defined as a measure of the relationship between horizontal segregation (i.e., the concentration of women and men across R&D sectors and fields of sciences) and R&D expenditure. The study reveals ***a negative correlation*** between the share of women in R&D and its funding. This means that the highest proportion of women researchers is to be found in the countries and sectors with the lowest overall R&D expenditure, in particular *R&D expenditure per capita researcher.* This claim is valid for all countries of the Eastern group except the Czech Republic and Slovenia. It might be even valid for Portugal, which is closer to the Eastern countries, as well as for some other countries. For example, at the beginning of 2000, five of the 'new' EU member states – Bulgaria, Romania, Estonia, Latvia and Lithuania – had the highest relative share of women researchers in their R&D sectors, standing at 40% (EC, She Figures 2006; EC, Enwise Report 2003; EC, Statistics in focus 2003). As the ENWISE report highlights, these "optimistic statistics" regarding women researchers in these countries look very different when linked with other statistics such as *the R&D expenditure per capita researcher*. It appears that the five countries in question, which have the highest proportions of employed women researchers in their R&D sectors, at the same time have the lowest R&D expenditure per capita researcher. Furthermore, if we take into account the concentration of male and female researchers across the scientific fields and R&D sectors then it becomes evident that women are squeezed out of competitive, high-expenditure R&D but absorbed into struggling low-expenditure R&D as a kind of 'back-up' human resource (EC, 2003). Several ENWISE tables which give insight into R&D expenditure across the countries of the Eastern group and across the fields of science are presented in Annex 5 of this Report. In these tables, Croatia is missing because it was not part of the ENWISE exercise.

The newest available data (for 2006) support the ENWISE findings of 2001. According to this fresh data, a positive shift in the figures is observed for Slovakia, which in 2006 was approaching the Czech Republic and Slovenia in terms of R&D expenditure in purchasing power standards (PPS) *per capita researcher.*

Figure 5. Proportion of female researchers in FTE and R&D expenditure in Purchasing Power Standards (PPS) *per capita* researcher, 2006



Source: EC, 2009a, Figure 4.4, p.102.

The figure above shows that the Czech Republic and Slovenia are notable exceptions in the Eastern country-group in terms of this third scenario. Both countries, at the beginning of the 2000s and in 2006, still had a comparatively high level of R&D funding which was moving towards the EU-15 average. At the same time, the share of Czech and Slovenian women researchers was the lowest among the Eastern country-group. Can any explanation be offered apropos of these observations? As argued above, a kind of regulation valid for the Eastern countries and possibly countries outside the group exists: 'lowest overall R&D expenditure in a country - highest proportion of women researchers'. However, the opposite claim 'highest overall R&D expenditure - lowest proportion of women researchers' does not apply. The comparatively high level of R&D expenditure in a country does not necessarily imply more or less women in science. In some countries, e.g., the Nordic countries, it implies a high rate of women's share in R&D while in other countries – in our case, the Czech Republic and Slovenia, but also Austria, Germany and some other countries – it implies a low rate of women's share in R&D. The explanation of the particular cases of the Czech Republic and Slovenia (being exceptions among the Eastern Country Group as a whole) might be found in the intersection between the three outlined scenarios, i.e., the Czech Republic and Slovenia have a comparatively high level of R&D funding accompanied with a larger overall gender gap in society (a low global gender gap rank in comparison with the EU average) and a weaker (still undeveloped) gender equality policy which is below the average EU gender equality policy. In addition, in the Czech Republic, unlike Slovenia, the gender pay gap is marked both in the Czech labour market as a whole and in the scientific labour market in particular.

Last but not least, the ***attractiveness of the research profession*** across the countries has also to be taken into account. It can be measured by three indicators: a) R&D expenditure in euros per annum *per capita* researcher; b) researchers' remuneration and c) overall gender pay gap, in particular gender pay gap in higher education and research.

Gender pay gap and researchers' remuneration

The equal pay legislation built on the principle 'equal pay for the work of equal value' was introduced in the Eastern countries from the very beginning of the communist period, and in the Western countries from 1970s onwards. However, despite the existing equal pay legislation and regardless of the visible increase (in the course of the 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 stable trends, such as the concentration of women and men into different segments of the labour market with different remuneration, the vertical segregation of women and men into different positions in the respective organisational hierarchies, the difference between female and male appointments in part-time and full-time positions, education and training, transparency of the pay systems and finally, an uneven division between women and men in domestic work (EC, 2010). Because any sign of reversing, i.e., narrowing, the existing gap in gender pay inequality across the European countries was not displayed in the course of time, the European Commission (from 2007 onwards) developed 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', harmonising the methodology for calculating the gender pay gap across the European countries in order to make the national data comparable, and the use of 'Structure of Earnings Survey' as a harmonised source of data, and so on. In connection with this scope of activities, two important EU Reports recently appeared. One was prepared by the European Network of Experts on Employment and Gender Equality issues (EGGE) and was commissioned by the European Commission DG for Employment, Social Affairs and Equal Opportunities. It appeared in February 2010 and provided 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 appeared 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 the European countries, associated countries and other countries (EC, 2007a).

The table below shows the difference between men's and women's *average gross hourly earnings* as a percentage of men's average gross hourly earnings for paid employees. Some of the findings of the EGGE Report regarding the Eastern countries are as follows:

- The gender pay gap is slightly higher among the member states that have recently joined the European Union compared to the EU15 grouping of countries; the gap in NMS12 averages at 18.6%, 3.6 percentage points higher than for the EU15.
- The European Foundation's review of pay developments for 2008 notes decreasing gender pay gaps in Austria, Denmark, Latvia, Lithuania, Luxembourg and Malta, but rising gaps in Bulgaria, the Czech Republic and the UK.
- After some gains against male pay, the gender pay gap in Hungary has opened up again with poorer earning conditions in the public sector.
- In Bulgaria, a downward trend in the gender pay gap has resulted in a greater focus on inequalities but there is a continued lack of respect for the laws concerning equal payment, particularly among employers in the private sector and micro and small firms.
- National data for Lithuania show that since 2000, the pay gap between men and women has narrowed. In 2006, the average wage for women in the public sector was 17.9% lower than for men while in the private sector women earned 19.1% less, with the greatest difference occurring in the finance sector (41.8% for 2006).

Table 8. Gender Pay Gap in the European Union

	Structure of Earnings Survey				National sources						
	2002	2006	2007	2008	2000	2001	2002	2003	2004	2005	2006
EU27	:	17.7	17.6	18.0	16.0	16.0	16.0s	15.0	15	15	15s
EU15	:	:	:	:	16.0	16.0	16.0	16.0s	15rs	15s	:
BE	:	9.5	9.1	9.0	13	12	:	:	6b	7	7p
BG	18.9	12.4	12.4	13.6	:	22r	21r	18r	16r	15r	14
CZ	22.1	23.4	23.6	26.2	22	20	19	19	19	19	18
DK	:	17.6	17.7	:	15	15	18b	18	17	18	17
DE	:	22.7	23.0	23.2	21	21	22b	23	23	22	22
EE	:	30.3	30.3	:	25	24	24	24	24	25	:
IE	15.1	17.2	17.1	:	19	17	:	14b	11p	9p	9
EL	25.5	20.7	21.5	22.0	15	18	17	11b	10	9p	10
ES	20.2	17.9	17.1	17.1p	15	17	21b	18	15	13p	13
FR	:	15.4	16.9	19.2p	13	14	13	12b	12	12	11p
IT	:	4.4	5.1	4.9	6	6	:	:	7p	9	:
CY	22.5	21.8	23.1	21.6p	26	26	25	25	25	25	24p
LV	:	15.1	15.4	13.4	20	16	16	16	14br	16r	16
LT	13.2	17.1	20.0	21.6	16	16	16	17	16	15	16
LU	:	10.7	12.5	12.4	15	16	17	15	14	14	14
HU	19.1	14.4	16.3	17.5	21	20	16	12r	14r	11	11
MT	:	5.2	2.4	9.2	11	9	6	4	4	4	3
NL	18.7	23.6	23.6	:	21	19	19	18	19	18	:
AT	:	25.5	25.5	25.5	20	20	:	17b	18	18	20
PL	7.5	7.5	7.5	9.8	:	12	11	11	10	10	12
PT	:	8.4	8.3	9.2	8	10	8	9	5b	9	8p
RO	16.0	7.0	12.7	9.0	17	18	17	18	14b	13	10
SL	6.1	8	8.3	8.5	12	11	9	7p	8	8	8p
SK	27.7	25.8	23.6	20.9	22	23	27	23	24	24	22
FL	:	21.3	20.0	20.0	17	17	20b	20	20	20	20
SE	:	16.5	17.9	17.1	18	18	17	16	17	16	16
UK	27.3	24.3	21.4	21.4	21	21	23b	22	22	16r	21

Note: 1) Difference between men's and women's average gross hourly earnings as a percentage of men's average gross hourly earnings (for paid employees).
2) b=break in series; p=provisional value; r= revised value; s=eurostat estimate; : = not available
Source CEC 2009c; table 18M2; Eurostat 2010
Source: EC, 2010

The second Report on the *remuneration of researchers* argues that the differences between countries are extremely high in most cases and for example, a researcher working in Austria may expect a remuneration level of around 60.530 EUR, while a researcher in France receives 47.550 EUR (21,44% less) and a researcher in Slovakia receives 18.282 EUR (**69,80% less**). As expected, countries with a higher cost of living coincide with those with a higher remuneration level for researchers. The EU25 average (40.126 EUR) is far below the US average (62.793 EUR). Only Austria (60.530 EUR), the Netherlands (56.721 EUR) and Luxembourg (56.268 EUR) have a similar remuneration level to the United States. From the Associate Countries, only Israel (59.580 EUR) and Switzerland (59.902 EUR) have an average remuneration similar or higher to the United States. When the data took into account the cost of living for researchers in the various countries in Europe and worldwide (the so-called 'corrective coefficients') a reliable comparison between the countries was made in terms of PPP (being transformed into PPS).

The following tables, presented in the Report *on the Remuneration of researchers,* show the countries' ***attractiveness*** for researchers.

The authors of the Report argue that by analysing the main study results (remuneration average per country in PPS), all EU25 and associated countries can be grouped into four different categories: low, medium, high and very high remuneration levels. The low and medium remuneration levels correspond to Eastern Europe and the Mediterranean, and the high and very high remuneration levels correspond to Central Europe and the Nordic countries. Within the Eastern country-group, the bottom place of these tables is occupied by Bulgaria and Romania, and the top place, by Slovenia and the Czech Republic.

Table 9 and 10

Country	The average weighted total yearly salary in terms of PPS
Austria	60.530
Belgium	55.998
Bulgaria	9.770
Croatia	27.063
Cyprus	50.549
Czech Republic	36.950
Denmark	43.669
Estonia	21.053
Finland	36.646
France	47.550
Germany	53.358
Greece	30.835
Hungary	27.692
Iceland	33.801
Ireland	49.654
Israel	59.580

Country	The average weighted total yearly salary in terms of PPS
Italy	34.120
Latvia	21.580
Lithuania	29.660
Luxembourg	56.268
Malta	40.342
Netherlands	56.721
Norway	41.813
Poland	21.591
Portugal	33.334
Romania	13.489
Slovakia	18.282
Slovenia	37.970
Spain	38.873
Sweden	47.143
Switzerland	59.902
Turkey	26.250
United Kingdom	52.776

Table 10 – The average weighted total yearly salary of researchers of each country in EU25 and Associated Countries (2006, N=6110, all currencies in PPS)

Country	Net Yearly salary average in terms of PPS
Austria	30.603
Belgium	26.336
Bulgaria	9.801
Croatia	20.254
Cyprus	39.732
Czech Republic	22.252
Denmark	24.917
Estonia	13.777
Finland	22.971
France	26.983
Germany	28.687
Greece	24.326
Hungary	16.723
Iceland	22.354
Ireland	28.193
Israel	37.389

Country	Net Yearly salary average in terms of PPS
Italy	22.372
Latvia	18.828
Lithuania	13.507
Luxembourg	40.942
Malta	28.498
Netherlands	35.573
Norway	26.088
Poland	14.104
Portugal	21.835
Romania	12.500
Slovakia	12.173
Slovenia	18.211
Spain	27.060
Sweden	22.801
Switzerland	46.432
Turkey	23.530
United Kingdom	35.372

Table 11 – Country Net Yearly Salary Averages of researchers in EU25 and Associated Countries (2006, N=6.934, all currencies in PPS)

Table 11

The average weighted total yearly salary of researchers in EU25 and Associated Countries per gender and country (2006, N=6110, all currencies in PPS)			
Country/Gender	**Female**	**Male**	**Diference Male-Female (%)**
Austria	45.689	65.647	30,40%
Belgium	42.161	62.326	32,35%
Bulgaria	5.345	6.270	14,75%
Croatia	16.404	20.274	19,09%
Cyprus	37.661	54.472	30,86%
Czech Republic	25.313	39.831	36,45%
Denmark	39.777	44.740	11,09%
Estonia	12.179	23.070	47,21%
Finland	29.938	41.063	27,09%
France	40.317	52.111	22,63%
Germany	46.134	56.385	18,18%
Greece	27.922	32.568	14,27%
Hungary	22.029	29.386	25,04%
Iceland	33.820	37.592	10,04%
Ireland	39.487	55.051	28,27%
Israel	37.298	59.812	37,64%
Italy	25.652	38.440	33,27%
Latvia	-	-	-
Lithuania	19.033	25.526	25,44%
Luxembourg	45.758	60.093	23,86%
Malta	42.392	40.014	-5,94%
Netherlands	43.317	64.691	33,04%
Norway	38.233	43.395	11,89%
Poland	16.795	23.606	28,85%
Portugal	25.721	40.671	36,76%
Romania	12.429	15.358	19,07%
Slovakia	15.403	19.636	21,56%
Slovenia	34.095	40.249	15,29%
Spain	32.268	43.484	25,79%
Sweden	41.553	50.168	17,17%
Switzerland	48.462	63.334	23,48%
Turkey	20.707	28.939	28,45%
United Kingdom	43.830	58.907	25,59%

Table 13 – The average weighted total yearly salary of researchers in EU25 and Associated Countries, per gender and country (2006, all currencies in terms of PPS, N=6110)

Explanation of the terms:

Purchasing Power Parities (PPP): a rate of exchange that accounts for price differences across countries, allowing international comparisons of real output and income.

Purchasing Power Standard (PPS): it represents the PPP transformed into a standardised form with the EU region as a base (EU = 1). A fictitious "average" currency of all EU members is selected as an artificial unit (currency).

Total Yearly Salary = Net yearly salary received + employers' charges (e.g. social security contribution, pension funds) + employee contribution to social security + holiday pay + personal income tax.

According to the authors of the report, "the difference between the remuneration of a female researcher and a male researcher is significant in most of the countries. Thus, the countries with higher differences (over 35%) are Estonia, the Czech Republic, Israel and Portugal. On the contrary, this gap is significantly reduced (difference below 15%) in Bulgaria, Denmark, Greece, Iceland, Malta and Norway" (EC, 2007a,p.22).

Table 11 (the average weighted total yearly salary of researchers in EU25 and associated countries per gender and country) shows that the extremes between the Eastern-country group in terms of

gendered researchers' income is to be found in Estonia (47.21%), followed by the Czech Republic (36.45%), while at the other end of this scale is Bulgaria (14.75%).

The ENWISE table on the R&D expenditure in Euros per annum *per capita* researcher across the fields of science and countries (see Annex 5 of this Report) is consistent with the above tables of researchers' remuneration and in some sense, mirrors them.

Some tentative conclusions can be drawn from the third scenario which addresses the R&D financial issues of the Eastern country-group. The research profession seems to be most ***attractive*** in Slovenia, followed by the Czech Republic, and less attractive in Bulgaria and Romania (despite the relatively smaller gender pay gap of researchers in these two countries). This suggests that the competition for attaining a research position in Slovenia and the Czech Republic is stronger in comparison with the other Eastern countries. One could even calculate ***the rank of research attractiveness*** for each country of the Eastern group through a compilation of the above presented data. However, this interesting exercise is outside the scope of this Report.

Linking the context with the 'text': Some major gaps of the defined topics of the literature production during the period 2000-2008

The less developed topics seem to be pay and funding and scientific excellence. However, these two topics are relatively new in all European countries and worldwide. Therefore, we cannot imagine that the Eastern country-group as newcomers and beginners in the field of gender and science would be found at the cutting edge of these topics. Nevertheless some studies have been carried out addressing female and male scientific productivity.

Within the numerous publications detected on the topic of 'stereotypes and identity', only few are dedicated to the issues of feminist epistemology of science and feminist criticism of power relations in the process of science construction. Some important work in the field of feminist epistemology of science has been carried out in Slovakia at the Gender Studies Centre, which is a university-based research and educational institution at the Faculty of Philosophy at Comenius University in Bratislava. We can consider Slovakia a regional leader in the research on this topic.

Box 5 The Gender Studies Centre in Bratislava

Established in June 2001 as the first institution in Slovakia of its kind, the Centre focuses on research and teaching activities in the field of feminist theory and Gender Studies. The subjects of its interest specifically relate to issues of gender identity, gender-specific differences and symbols which structure the relationships between women and men in a fundamental way and cause inequality between them, as well as topics on feminist epistemology, methodology of feminist research and women in science.
The Gender Studies Centre has realised some pioneering projects such as:

- research projects on theoretical and epistemological aspects of feminist thinking and feminist research
- transdisciplinary working groups on the methodology of oral history used in the Women´s Memory Project
- international workshops on the application and evaluation of the methods of oral history for educational purposes
- workshops on the results of the research realised by the Gender Studies Centre on the situation and status of women university teachers and researchers at the CU Faculty of Philosophy
- an interdisciplinary educational project on gender issues carried out by Slovak and Austrian students and teachers from the Vienna University and Comenius University, which resulted in the publication of the book The Problems of Gender Identity in Art, Architecture, Film and Literature

The research projects of the Centre have been elaborated with the support of the Slovak Scientific Grant Agency (VEGA), for example the project on feminist philosophy and epistemology.

It must be remembered that these issues were imported to Western Europe from the USA but obviously still have not reached all Eastern European countries.

In short, the Eastern country-group is at the very beginning of the research activities on the defined topics (the main bulk of publications appeared after 2000) and has a long way to go before catching up with the other country-groups.

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Annexes

Annex 1

Description of the academic staff's grades in the Eastern Country Group

BULGARIA
A
Professor
B
Associate Professor
D
Assistant
Lecturer
Research associate

CZECH REPUBLIC
A
Since 2005 Professor – Researcher
Before 2005 Professor
B
Since 2005 Researcher below A & above C
Before 2005 Associate professor
C
Since 2005 newly qualified PhDs
Before 2005 Senior assistant
D
Since 2005 Researcher below C
Before 2005 Assistant and lecture

ESTONIA
A
Full and extraordinary professor
B
Senior lecturer
Senior researcher
C
Lecturer
Senior teacher
Researcher
D
Teacher

HUNGARY
A
Professor
B
Assistant professor
C
Lecturer
D
Researchers

LATVIA
A
Full Professor
B
Associate Professor
C
Assistant Professor
Assistant
Lecturer
Researcher

LITHUANIA
A
Professor
B
Associate professor
C
Assistant professor
D
Other teaching staff

POLAND
A
Full Professor
B
Doctor hab.
Professor of high school
C
Doctor

ROMANIA
A
Professor
B
Lecturer
Assistant professor
Assistant
D
Teaching assistant

Comment: Grade C is included in B

SLOVAKIA
A
Full Professor
B
Associate professor
C
Lecturer
D
Assistant lecturer
Lector

SLOVENIA
A
Full Professor
B
Associate Professor
C
Assistant Professor
D
Young researcher

CROATIA
A
Full professor
Scientific advisor
B
Associate professor
Senior research associate
Assistant professor
Research associate
C
Senior assistant
D
Assistant
Professional Associate
Professional Advisor
Junior Researcher

Annex 2

Distribution of researchers from the Enwise countries across R&D sectors, head count and percentage, 2001 (ENWISE report, Annex 6)

		Business Enterprise	Higher Education	Government	Private Non-profit	All Sectors
Bulgaria	Women	605 12.6%	875 18.2%	3 301 68.8%	16 0.3%	4 797 100.0%
	Men	620 10.8%	1 613 28.2%	3 462 60.4%	35 0.6%	5 730 100.0%
	Total	1 225 11.6%	2 488 23.6%	***6 763*** 64.2%	51 0.5%	**10 527** 100.0%
Czech Republic	Women	1 341 18.8%	3 504 49.1%	2 234 31.3%	54 0.8%	7 133 100.0%
	Men	6 777 34.9%	7 580 39.0%	4 853 25.0%	229 1.2%	19 439 100.0%
	Total	***8 118*** 30.6%	***11 084*** 41.7%	**7 087** 26.7%	283 1.1%	***26 572*** 100.0%
Estonia	Women	164 8.3%	1 434 72.8%	349 17.7%	22 1.1%	1 969 100.0%
	Men	343 13.2%	1 913 73.5%	326 12.5%	19 0.7%	2 601 100.0%
	Total	507 11.1%	3 347 73.2%	675 14.8%	41 0.9%	4 570 100.0%
Hungary	Women	1 208 12.9%	6 313 67.4%	1 842 19.7%	:	9 363 100.0%
	Men	3 700 19.5%	11 958 63.0%	3 330 17.5%	:	18 988 100.0%
	Total	4 908 17.3%	18 271 64.4%	5 172 18.2%	:	28 351 100.0%
Latvia	Women	518 17.3%	2 059 68.6%	419 14.0%	4 0.1%	3 000 100.0%
	Men	405 14.7%	1 974 71.5%	381 13.8%	1 0.0%	2 761 100.0%
	Total	923 16.0%	4 033 70.0%	800 13.9%	5 0.1%	5 761 100.0%
Lithuania	Women	248 5.2%	3 439 71.5%	1 114 23.2%	10 0.2%	4 811 100.0%
	Men	343 6.3%	3 800 70.0%	1 269 23.4%	14 0.3%	5 426 100.0%
	Total	591 5.8%	7 239 70.7%	2 383 23.3%	24 0.2%	10 237 100.0%
Poland	Women	3 332 9.9%	24 925 74.3%	5 307 15.8%	:	33 564 100.0%
	Men	8 464 15.5%	39 072 71.6%	7 054 12.9%	:	54 590 100.0%
	Total	11 796 13.4%	63 997 72.6%	12 361 14.0%	:	88 154 100.0%
Romania	Women	4 835 47.4%	2 470 24.4%	2 802 27.7%	:	10 107 100.0%
	Men	6 821 50.6%	3 707 27.5%	2 962 22.0%	:	13 490 100.0%
	Total	**11 656** 49.4%	6 177 26.2%	5 764 24.4%	:	**23 597** 100.0%
Slovak Republic [1]	Women	644 16.9%	2 089 54.7%	1 083 28.4%	:	3 816 100.0%
	Men	1 612 28.0%	2 801 48.6%	1 355 23.5%	:	5 768 100.0%
	Total	2 256 23.5%	4 890 51.0%	2 438 25.4%	:	9 584 100.0%
Slovenia	Women	471 20.0%	1 007 42.7%	862 36.6%	18 0.8%	2 358 100.0%
	Men	1 114 26.5%	1 947 46.3%	1 057 25.1%	86 2.0%	4 204 100.0%
	Total	1 585 24.2%	2 954 45.0%	1 919 29.2%	104 1.6%	6 562 100.0%
Enwise-10	**Women**	13 366 16.5%	48 115 59.5%	19 313 23.9%	***124 0.2%***	80 918 100.0%
	Men	30 199 22.7%	76 365 57.4%	26 049 19.6%	384 0.3%	132 997 100.0%
	Total	43 565 20.4%	124 480 58.2%	45 362 21.2%	508 0.2%	213 915 100.0%
EU-15 [2]	Women	51 952[3] 17.5%	200 981 67.9%	43 268 14.6%	:	296 201[4] 100.0%
	Men	294 194[3] 37.2%	399 142 50.5%	96 742 12.2%	:	790 078[4] 100.0%
	Total	346 146[3] 31.9%	600 123 55.2%	140 010 12.9%	:	1 086 279[4] 100.0%

Source: ENWISE Report, 2003, Annex 6, (EC, 2003, p.153)
Exceptions to the reference year: BG, EE, LV (HES+GOV), PL, SI: 2000
Notes:
[1] FTE as exception to HC
[2] Reference year: 2000 (exception: AT: 1998)
[3] Excludes BE, NL, LU, SE, UK because no sex-disaggregated data for the BES are available from these countries. This amounts to an additional 150,000 researchers, representing about 30% of the BES

Annex 3

Gender distribution of researchers from the Enwise countries within each country and R&D sectors, head count and percentage, 2001 (ENWISE Report Annex 7)

		Business Enterprise	Higher Education	Government	Private Non-profit	All Sectors
Bulgaria	Women	605 49%	875 35%	3 301 49%	16 31%	4 797 46%
	Men	620 51%	1 613 65%	3 462 51%	35 69%	5 730 54%
	Total	1 225 100%	2 488 100%	6 763 100%	51 100%	10 527 100%
Czech Republic	Women	1 341 17%	3 504 32%	2 234 32%	54 19%	7 133 27%
	Men	6 777 83%	7 580 68%	4 853 68%	229 81%	19 439 73%
	Total	8 118 100%	11 084 100%	7 087 100%	283 100%	26 572 100%
Estonia	Women	164 32%	1 434 43%	349 52%	22 54%	1 969 43%
	Men	343 68%	1 913 57%	326 48%	19 46%	2 601 57%
	Total	507 100%	3 347 100%	675 100%	41 100%	4 570 100%
Hungary	Women	1 208 25%	6 313 35%	1 842 36%	:	9 363 33%
	Men	3 700 75%	11 958 65%	3 330 64%	:	18 988 66%
	Total	4 908 100%	18 271 100%	5 172 100%	:	28 351 100%
Latvia	Women	518 56%	2 059 51%	419 53%	4 80%	3 000 52%
	Men	405 44%	1 974 49%	381 47%	1 20%	2 761 48%
	Total	923 100%	4 033 100%	800 100%	5 100%	5 761 100%
Lithuania	Women	248 42%	3 439 48%	1 114 47%	10 42%	4 811 47%
	Men	343 58%	3 800 52%	1 269 53%	14 58%	5 426 53%
	Total	591 100%	7 239 100%	2 383 100%	24 100%	10 237 100%
Poland	Women	3 332 28%	24 925 39%	5 307 43%	:	33 564 38%
	Men	8 464 72%	39 072 61%	7 054 57%	:	54 590 62%
	Total	11 796 100%	63 997 100%	12 361 100%	:	88 154 100%
Romania	Women	4 835 41%	2 470 40%	2 802 49%	:	10 107 43%
	Men	6 821 59%	3 707 60%	2 962 51%	:	13 490 57%
	Total	11 656 100%	6 177 100%	5 764 100%	:	23 597 100%
Slovak Republic [1]	Women	644 29%	2 089 43%	1 083 44%	:	3 816 40%
	Men	1 612 71%	2 801 57%	1 355 56%	:	5 768 60%
	Total	2 256 100%	4 890 100%	2 438 100%	:	9 584 100%
Slovenia	Women	471 30%	1 007 34%	862 45%	18 17%	2 358 36%
	Men	1 114 70%	1 947 66%	1 057 56%	86 83%	4 204 64%
	Total	1 585 100%	2 954 100%	1 919 100%	104 100%	6 562 100%
Enwise-10	**Women**	13 366 31%	48 115 39%	19 313 43%	124 24%	80 918 38%
	Men	30 199 69%	76 365 61%	26 049 57%	384 76%	132 997 62%
	Total	43 565 100%	124 480 100%	45 362 100%	508 100%	213 915 100%
EU-15 [2]	Women	51 952[3] 15%	200 981 33%	43 268 31%	:	296 201[4] 27%
	Men	294 194[3] 85%	399 142 67%	96 742 69%	:	790 078[4] 73%
	Total	346 146[3] 100%	600 123 100%	140 010 100%	:	1 086 279[4] 100%

Source: ENWISE Report, Annex 7 (EC, 2003, p.154)
Exceptions to the reference year: BG, EE, LV (HES+GOV), PL, SI: 2000
Notes:
[1] FTE as exception to HC
[2] Reference year: 2000 (exception: AT: 1998)
[3] Excludes BE, NL, LU, SE, UK because no sex-disaggregated data for the BES are available from these countries. This amounts to an additional 150,000 researchers, representing about 30% of the BES

Annex 4

Number of researchers (and % of women among them) by main field of science of HES + GOV in the Enwise countries in 2000 (Enwise Report, Table 3.5)

Numbers of researchers (and % of women among them)
by main field of science of HES + GOV in the Enwise countries in 2000

Field	Natural Sciences	Engineering & Technology	Medical Sciences	Agricultural Sciences	Social Sciences	Humanities
Country						
Bulgaria	2 720 (51 %)	2 122 (28 %)	1 063 (50 %)	965 (50 %)	504 (47 %)	934 (57 %)
Czech Republic	3 542 (31 %)	2 202 (22 %)	516 (42 %)	640 (45 %)	279 (40 %)	1 012 (42 %)
Estonia	848 (32 %)	429 (25 %)	213 (62 %)	193 (46 %)	334 (52 %)	348 (66 %)
Latvia	1 082 (47 %)	380 (38 %)	139 (71 %)	240 (57 %)	342 (37 %)	251 (78 %)
Lithuania	2 025 (40 %)	1 540 (26 %)	847 (55 %)	462 (45 %)	146 (58 %)	1 318 (65 %)
Poland(1)	10 282 (34 %)	10 726 (16 %)	7 801 (43 %)	2 523 (33 %)	898 (38 %)	8 677 (33 %)
Romania	2 687 (46 %)	2 667 (38 %)	583 (64 %)	211 (31 %)	101 (47 %)	623 (46 %)
Slovak Republic	2 348 (37 %)	1 883 (33 %)	1 040 (53 %)	249 (49 %)	154 (52 %)	474 (48 %)
Slovenia	719 (34 %)	671 (22 %)	302 (58 %)	252 (47 %)	727 (47 %)	164 (48 %)
Enwise-10	**26 253 (38 %)**	**22 620 (23 %)**	**12 504 (47 %)**	**5 735 (41 %)**	**15 191 (43 %)**	**13 801 (41 %)**

Source: *European Commission, 2003b.*
Notes: Unit: full-time equivalent
Exceptions to the reference year: LT, PL (HES): 2001; LV: 1999
(1) HES only. Field of science unknown for 793 women & 2 396 men

Source: ENWISE Report (EC, 2003, p.78)
Notes: Unit: full-time equivalent
Exceptions to the reference year: LT, PL (HES): 2001; LV: 1999
(1) HES only. Field of science unknown for 793 women and 2,396 men

Annex 5

R&D expenditure as a percentage of GDP, selected years between 1992 and 2001 (ENWISE Report, Table 2.6)

	1992	1995	1996	1997	2000	2001	%age change between		Difference in R&D expenditure as a %age of GDP between	
							1992 1996	1997 2001	1992 1996	1997 2001
Bulgaria [1]							-62%	-8%	-1.12%	-0.04%
Czech Republic	1.72%	1.01%	1.04%	1.16%	1.33%	**1.30%**	-41%	12%	-0.68%	0.14%
Estonia	:	:	:	:	0.66%	0.78%	:	:	:	:
Hungary	1.05%	0.73%	0.65%	0.72%	0.8%	0.95%	-30%	32%	-0.40%	0.23%
Latvia	0.59%	0.53%	0.47%	0.42%	0.48%	0.44%	-10%	5%	-0.12%	0.02%
Lithuania	:	0.46%	0.52%	0.56%	0.6%	0.69%	:	23%	:	0.13%
Poland	0.83%	0.69%	0.71%	0.71%	0.67%	0.68%	-17%	-4%	-0.12%	-0.03%
Romania	0.85%	0.80%	0.71%	0.58%	0.37%	0.39%	-6%	-33%	-0.14%	-0.19%
Slovak Republic	1.80%	0.93%	0.92%	1.09%	0.65%	0.64%	-48%	-41%	-0.88%	-0.45%
Slovenia	1.91%	1.61%	1.36%	1.35%	1.46%	**1.57%**	-16%	16%	-0.55%	0.22%

Source: Enwise report (EC, 2003)

R&D expenditure by sector in thousands of Euros (and percentage distribution of R&D expenditure across sectors) in 2000 (ENWISE Report)

	Business Enterprise	Higher Education	Government	Private Non-profit	Total
Bulgaria	15 276 (*21%)*	7 043 (*10%)*	49 060 (*69%)*	116 (*0%)*	**71 494** (100%)
Czech Republic	446 127 (*60%)*	105 732 (*14%)*	188 402 (*25%)*	3 773 (*1%)*	**744 033** (100%)
Estonia	8 334 (*23%)*	19 410 (*52%)*	8 564 (*23%)*	722 (*2%)*	**37 030** (100%)
Hungary [1]	179 596 (*44%)*	97 331 (*24%)*	105 728 (*26%)*	:	**405 267** (100%)
Latvia	15 117 (*40%*)	14 121 (*38%)*	8 299 (*22%)*	4 (*0%)*	**37 541** (100%)
Lithuania	15 706 (*22%)*	26 698 (*37%)*	30 646 (*42%)*	:	**73 051** (100%)
Poland	431 793 (*36%)*	377 329 (*32%)*	385 862 *(32%)*	1 597 (*0%)*	**1 196 581** (100%)
Romania	103 203 (*69%)*	17 498 (*12%)*	27 977 (*19%)*	:	**148 684** (100%)
Slovak Republic [1]	94 010 (*66%)*	13 591 (*10%)*	35 257 (*25%)*	:	**142 858** (100%)
Slovenia	167 458 (*56%)*	49 387 (*17%)*	77 023 (*26%)*	3 480 (*1%)*	**297 348** (100%)
Enwise-10[1]	**1 476 627(*47%)***	**728 140 (*23%)***	**916 818 (*29%)***	**9 692 (*0%)***	**3 153 887** (100%)

Source: Enwise report, 2003: *E Frank, 2003.*
Note: [1] Total Gross Expenditure on R&D (GERD) does not correspond to the sum of R&D expenditure by sectors;
: = not available

R&D expenditure, in Euros per annum, per capita researcher (women + men combined) and by fields of science in HES and GOV sectors in 2000

	Natural Sciences	Engineering Technology	Medical Sciences	Agricultural Sciences	Social Sciences	Humanities	Total
Bulgaria	5 584	5 700	2 661	20 247	4 264	4 606	**6 753**
Czech Republic	35 333	43 057	42 079	35 052	26 781	22 287	**35 909**
Estonia	11 862	13 543	15 812	16 492	7 539	8 721	**11 828**
Latvia	11 126	7 947	8 388	11 938	6 132	4 916	**9 211**
Lithuania	8 838	9 455	6 569	12 974	4 201	5 441	**7 488**
Poland	21 671	20 788	18 367	37 231	5 246	3 810	**15 578**
Romania	3 975	6 857	7 892	10 194	7 662	3 173	**5 841**
Slovak Republic	8 527	6 258	3 995	24 582	4 112	2 823	**6 483**
Slovenia	55 192	51 191	34 791	40 528	37 142	28 390	**44 589**
Enwise-9	**18 038**	**18 465**	**15 770**	**29 020**	**7 152**	**5 748**	**15 004**

Source: Enwise report, 2003: *Eurostat, S&T statistics.*
Notes: Unit: Data about researchers are in full-time equivalent
Exceptions to reference year: LT, PL (HES): 2001; LV: 1999

2. Analysis by topics

By Mária Palasik, Robert Takács and Núria Vallès

The objective of this chapter is to analyse the main findings and gaps in the literature on gender and science in the Eastern countries. For this purpose, first we will present a statistical overview of the publications analysed and then we will focus on the main research questions, findings and gaps by topic.

The analysis by topics will follow the conceptual organisation that has guided the methodological approach of the 'Meta-analysis of gender and research' project. The structure of these topics has four dimensions:

- A first descriptive dimension, which includes the three topics of Horizontal gender segregation, Vertical gender segregation and the Gender pay gap.
- A second dimension dealing with the analysis of gender bias in structural social dynamics that are reproduced in scientific work. It includes the two topics of Stereotypes and identity and Science as a labour activity.
- A third dimension, dealing with issues related directly to gender bias in the scientific culture and scientific institutional practices. It includes the two topics of Scientific excellence and Gender in research content.
- A fourth and last contextual dimension, dealing with policies towards gender equality in research.

Statistical overview

It is apparent from the number of publications that in spite of the fact that the Eastern Country Group contains the largest number of countries, the number of publications is the smallest among the country groups, as it does not exceed 10 percent of the entries. The 445 entries for the whole country group are unequally divided. In a few countries – beginning with in the Czech Republic and in Hungary – the amount of published materials shows that the topic of gender and science is starting to gain ground, while in the majority of the countries – Bulgaria, Romania, Lithuania, Croatia, Slovakia and Slovenia – the topic has been discovered and the initial publication and research work has been carried out. On the other hand, there are still some countries – namely Estonia and Latvia – where the meagre number of domestic publications shows that research in gender and science still needs to be established in the future. It is also surprising that Poland, the country with the largest population in the region is lagging behind with respect to the number of publications.

If we consider the number of publications where these countries were subjects of analysis, we can state that these numbers represent a greater order of magnitude, with about 200-250 publications more in the case of each country. The total number of 692 such publications for this country group also suggests the same tendency. This is probably due to the fact that many articles and reports deal with these countries as a group or subgroup of countries, as states that joined the European Union during the first decade of the 21st century. This is why Croatia, the only non-EU-member state is lagging behind with only 45 entries.

Table 1. Number of publications

Country of publication	n
Bulgaria	46
Croatia	31
Czech Republic	130
Estonia	2
Hungary	81
Latvia	3
Lithuania	29
Poland	32
Romania	41
Slovakia	27
Slovenia	19
Czechoslovakia	2
Yugoslavia	2
Eastern Cs	**445**

Country analysed	n
Bulgaria	228
Croatia	45
Czech Republic	359
Estonia	248
Hungary	317
Latvia	246
Lithuania	271
Poland	271
Romania	219
Slovakia	352
Slovenia	260
Eastern Cs	**692**
% of all GSD publications	15.2

The turn of the century also saw a change in the publication activity of the Eastern European countries, although a modest growth was also observed from the second half of the 1990s. After the EU accession of these countries, there was another impulse to research the topic but after a few years, a relapse occurred that set the average number of publications back to the 2000-2004 level. Interestingly, the trends of the European publications followed a remarkably similar pattern, albeit in larger numbers. However, the number of all publications began a gradual ascent as early as in the 1980s and after the profusion of the 2000s, a serious decline was seen from 2008. The ratio of the Eastern and all European publications has changed subtly, bearing in mind that before 2000, the Eastern publications remained at under 10 percent of the European entries while in the past few years they have totalled one fifth, and recently one third of them.

At the same time, if we examine the periods analysed in the publications, we see that Eastern countries represent a greater ratio in almost all categories, especially in those before 1970. This suggests that these publications probably cover several time periods, attempting to provide a historical overview, and also represent an important historical feature. The data of the last few decades are much more balanced, although the Eastern countries seem to deal more often with the description of the present-day situation.

Table 2. Time trends

	Average number of publications per year		Ratio ECs/ACs
	Eastern Cs	All Cs	
1980-1984	3,2	33,4	0,1
1985-1989	5,0	53,4	0,1
1990-1994	4,8	91,6	0,1
1995-1999	15,0	162,6	0,1
2000-2004	46,6	310,4	0,2
2005-2007	74,3	338,0	0,2
2008-2009	48,0	139,0	0,3
	Period analysed (%)		**Ratio ECs/ACs**
	Eastern Cs	**All Cs**	
General / Not specified	3,8	4,5	0,8
Before the 18th century	2,9	1,4	2,1
18th century	3,0	1,4	2,1
19th century	12,6	5,0	2,5
1900-1945	21,1	10,1	2,1
1946-1970	28,6	13,6	2,1
1970s	30,6	19,5	1,6
1980s	36,7	33,0	1,1
1990s	56,1	49,5	1,1
2000s / Present-day	60,7	46,4	1,3

Quite surprisingly, the Eastern countries do not seem to have gaps regarding the topics of gender and science research despite the lower number of publications they produce. The slight vantage is obviously due to the fact that one fifth of the publications – double the European average – are 'all-round articles' touching on five or more topics at the same time. This also means that publications of this country group are less focused perhaps due to the initial stage of research.

However, there are some topics which are more often discussed than others. These are horizontal segregation, vertical segregation and stereotypes and identity. In essence it suits the European trends since these are also the three most popular topics on average. Nevertheless, it is a regional characteristic that a significant number of publications also touch on topics such as gender in research contents and pay and funding about which extensive research is not carried out in these countries.

Table 3. Topics

	Topic analysed (%)		Ratio ECs/ACs
	Eastern Cs	All Cs	
Horizontal segregation	48,7	43,2	1,1
Vertical segregation	54,6	44,7	1,2
Pay and funding	19,8	12,6	1,6
Stereotypes and identity	43,1	54,0	0,8
Science as a labour activity	39,3	32,6	1,2
Scientific excellence	26,7	19,8	1,4
Gender in research contents	35,1	31,5	1,1
Policies towards gender equality in research	37,0	28,5	1,3
Number of topics addressed	**Eastern Cs (%)**	**All Cs (%)**	**Ratio Ecs/Acs**
1-2 topics	48.3	54.8	0.9
3-4 topics	32.2	33.9	1.0
5 or more topics	19.5	11.3	1.7
Total	100.0	100.0	

As for the institutional sectors involved in the analysis, the more general nature of the publications of the Eastern Country Group holds true, as well as for the examination of the scientific fields and the life course stages. In all of these regards, the publications from this country group tend to handle the discourse from a general perspective and are less inclined to focus on specific sectors, fields or stages.

The higher education sector enjoys outstanding attention although it is not peculiar to this country group: this is the most examined sector throughout Europe, but in these countries the governmental sector is also – yet to a lesser extent – on the horizon of the researchers, and the rate of the publications dealing with the business enterprise sector and the private non-profit sector is low.

As far as scientific fields as research subjects are concerned, the only main difference in the ranking of fields by the percentage of publications is that health and social services is more rarely a research topic in the Eastern countries but has a prominent place in European research. Otherwise, the most explored fields in gender and science research are the same in the Eastern countries as in Europe: science, mathematics and computing; social sciences; business and law, and engineering, manufacturing and construction. This also shows in which fields gender problems most often arise. Among the least researched fields we find services, agriculture and veterinary and for the Eastern countries, health and social services.

The Eastern countries closely follow the European patterns in research regarding the sequence of life course stages: the number of publications takes a huge leap at the beginning of the university education (ISCED 5) and another at the start of the scientific career. While the Eastern Country Group publications are more interested in these stages than the European average, they are less committed to the gender questions of school career prior to university.

Table 4. Institutional sector, scientific field and life course stage

Institutional sector	Eastern Cs (%)	All Cs (%)	Ratio Ecs/Acs
All/General	64,5	48,8	1,3
Other	35,5	51,2	0,7
Total	100,0	100,0	1,0
Institutional sector – Other			
Business enterprise sector	13,4	10,6	1,3
Government sector	38,6	26,0	1,5
Higher education sector	90,7	86,7	1,0
Private non-profit sector	5,3	3,4	1,5
Scientific field	**Eastern Cs (%)**	**All Cs (%)**	**Ratio Ecs/Acs**
All/General	47,3	38,7	1,2
Other	52,7	61,3	0,9
Total	100,0	100,0	1,0
Scientific field – Other			
Education	23,3	20,6	1,1
Humanities and arts	21,4	18,3	1,2
Science, mathematics and computing	45,2	46,6	1,0
Agriculture and veterinary	6,6	8,5	0,8
Health and social services	15,3	21,9	0,7
Engineering, manufacturing and construction	25,5	25,1	1,0
Social sciences, business and law	30,7	34,1	0,9
Services	1,4	0,7	2,0
Specific scientific discipline			
No	78,1	72,8	1,1
Yes	21,9	27,2	0,8
Total	100,0	100,0	1,0
Life course stage	**Eastern Cs (%)**	**All Cs (%)**	**Ratio Ecs/Acs**
All/General	33,2	23,8	1,4
Other	66,8	76,2	0,9
Total	100,0	100,0	1,0
Life course stage – Other			
ISCED 0	1,3	2,0	0,7
ISCED 1	5,0	6,8	0,7
ISCED 2	7,8	11,0	0,7
ISCED 3	11,0	13,8	0,8
ISCED 4	7,8	6,4	1,2
ISCED 5	41,6	36,2	1,1
ISCED 6	53,5	38,4	1,4
Early-career scientists	82,9	67,6	1,2
Mid-career scientists	74,7	62,8	1,2
Late-career scientists	68,6	59,4	1,2
Other	4,8	6,5	0,7

There are clear tendencies according to the research methodology used in the countries of the Eastern Country Group. The most preferred method is state-of-the art, which is typical in 3 out of 5 publications. The rate of conceptual studies is also high, but it does not differ from the European average, while the compilations of statistics – representing a third of the publications – are much more frequent than the European average. On the other hand, these countries have produced less empirical research than the average, and the studies are more likely to relate to quantitative techniques.

Within quantitative analysis, longitudinal/cohort analysis is completely absent from the spectrum of Eastern countries due to the late start of gender and science research in the region, and it is less regular to use micro-data for analysis. Most of the quantitative analysis is done on a representative sample.

Qualitative analysis – the same as in Europe on average – is mainly based on interviews, although in this country group there is a strong tendency towards biographical research. While the rate of case studies also exceeds the European average, fewer observations are made.

Table 5. Methodological approach

Approach	Eastern Cs (%)	All Cs (%)	Ratio Ecs/Acs
Conceptual	40,0	39,1	1,0
State-of-the-art	59,7	40,4	1,5
Compilation of statistics	34,1	20,7	1,7
Building gender indicators	4,3	2,8	1,5
Empirical research. Quantitative techniques	21,4	26,7	0,8
Empirical research. Qualitative techniques	32,8	31,5	1,0
Empirical research	**Eastern Cs (%)**	**All Cs (%)**	**Ratio Ecs/Acs**
Non-empirical research	54,3	50,6	1,1
Empirical research. Quantitative techniques	12,9	17,9	0,7
Empirical research. Qualitative techniques	24,3	22,7	1,1
Empirical research. Quali-quantitative techniques	8,5	8,8	1,0
Total	100,0	100,0	1,0
Quantitative techniques	**Eastern Cs (%)**	**All Cs (%)**	**Ratio Ecs/Acs**
Representative sample	54,1	57,0	0,9
Micro-data	29,7	48,6	0,6
Longitudinal/cohort	0,7	8,2	0,1
Multivariate analysis	25,0	30,8	0,8
Qualitative techniques	**Eastern Cs (%)**	**All Cs (%)**	**Ratio Ecs/Acs**
Biographical research	44,1	17,6	2,5
Case studies	21,1	15,4	1,4
Content analysis	19,4	15,4	1,3
Interviews	64,8	64,8	1,0
Observations	11,0	15,2	0,7

2.1. Horizontal and vertical segregation

Gender segregation refers to the tendency of women and men to work in different sectors and occupations. Horizontal segregation is understood as the under- (or over-) representation of a certain group in occupations or sectors not ordered by any criterion. Vertical segregation refers to the under- (or over-) representation of a clearly identifiable group of workers in occupations or sectors at the top of a classification based on 'desirable' attributes – income, prestige, job stability and so on (Bettio & Verashchagina, 2009).

A considerable proportion of the publications in the Eastern Country Group have something to say on the topic of horizontal and vertical segregation. Almost the half of the entries touch on the questions of horizontal segregation, and nearly 55 percent of the entries are engaged in issues relating to vertical segregation.

Most of the publications that deal with either of these topics are very likely to be concerned with the other one as well. Nevertheless, every second or third of these publications also discusses some other topics, especially stereotypes and identity, policies towards gender equality in research and science as a labour activity.

The majority of the publications do not reveal any kind of empirical research, although more than the fifth of the entries indicate some kind of qualitative research methods and 13-15 percent of them apply quantitative methods. Among the empirical techniques, the most widespread are representative samples and interviews.

Table 6. Publications dealing with horizontal and vertical segregation in the Eastern countries

Number and percentage of publications	n	%
Horizontal segregation (HS)	337	48.7
Vertical segregation (VS)	378	54.6
Relation with other topics	**HS %**	**VS %**
Horizontal segregation	100.0	72.2
Vertical segregation	81.0	100.0
Pay and funding	31.8	33.1
Stereotypes and identity	54.0	41.5
Science as a labour activity	42.4	47.4
Scientific excellence	34.7	37.0
Gender in research contents	32.3	32.8
Policies towards gender equality in research	45.1	47.1
Methodological approach	**HS %**	**VS %**
Non-empirical research	55.8	54.5
Empirical research. Quantitative techniques	15.1	13.0
Empirical research. Qualitative techniques	21.4	21.7
Empirical research. Quali-quantitative techniques	7.7	10.8
Total	100.0	100.0
Quantitative techniques	**HS %**	**VS %**
Representative sample	53.2	60.0
Micro-data	20.8	26.7
Longitudinal/cohort	1.3	0.0
Multivariate analysis	22.1	22.2
Qualitative techniques	**HS %**	**VS %**
Biographical research	33.7	30.9
Case studies	27.6	26.0
Content analysis	25.5	22.8
Interviews	57.1	60.2
Observations	18.4	10.6

Research questions

During the socialist period, some research was carried out on women's access to university and highly-skilled professions, especially in order to compare women's presence in socialist and capitalist countries. However, the concept of 'vertical segregation', or the glass ceiling is completely absent, and the issue of gender discrimination is not openly addressed. This line of historical analysis has been further developed since the change of regime.

Research on horizontal and vertical segregation has mainly developed during democracy, and especially from 2000 onwards. There are many studies that attempt to provide a statistical overview (basic indicators and trends of horizontal and vertical segregation), although there are also other studies that try to address the main roots and explanatory factors.

Research approaches

The access of women to higher education has been widely analysed using historical techniques. The compilation of statistical data about the current situation of women in science has developed especially from 2000 onwards. Several studies combine interviews and surveys

of academic staff of universities and research institutions, mostly within the frame of EU FP6 or FP7 projects, and we can also find PhD dissertations using surveys of academic staff.

From a methodological point of view, the most relevant trends in recent literature about horizontal and vertical segregation are as follows:

- Many publications are state-of-the-art studies, based on the compilation of statistical data – analysis and interpretation of available statistics in order to identify some trends.
- The majority of the empirical studies combine both quantitative and qualitative methods.
- A predominance of small-scale quantitative empirical studies with questionnaires. As a rule, the respective inquiries involve about 200-300 recipients, i.e. they work with non-representative samples.
- Qualitative empirical studies aim to complement the non-representative quantitative studies, which often apply techniques like interviews, observations and case studies.

Findings

Main trends

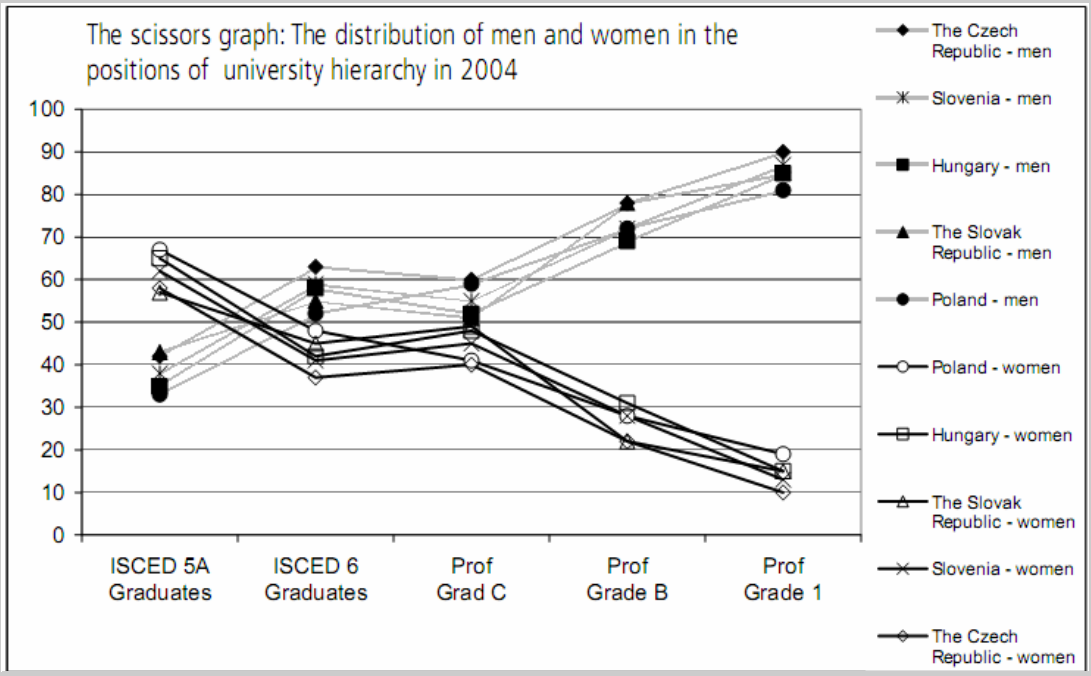
In most Eastern European countries, women were allowed to enter university at the end of 19th century. In the Austro-Hungarian Monarchy (the Czech Republic, part of Slovakia, Croatia, Hungary, part of Poland, part of Romania and Slovenia), the access of women to arts, medicine and chemistry was granted in 1884-97, while law and engineering were still denied to them. In Bulgaria, the issue of women's admission to higher education was already settled by legislation in 1897 and the first women students enrolled in Sofia State University in 1901. In the Baltic countries, women first accessed university in 1922. Over the following years, women slowly gained access to university studies and after WWII they had full access in all countries.

The proportion of women among university graduates increased very quickly during the second half of the 20th century, notably faster than in Western countries. In the context of intensive industrialisation, women were encouraged to enter SET professions. Horizontal segregation by field of study was less pronounced than in Western countries. However, the variation was relevant: in some countries (Romania and Bulgaria) at the end of the period there were similar proportions of women and men in fields such as natural sciences or engineering, while in other countries (former Czechoslovakia and Hungary) horizontal segregation was much more pronounced and followed the 'western' pattern. In spite of the comparatively high number of women in scientific positions, vertical segregation was very pronounced and women were almost completely absent in the highest scientific positions.

The first years after the change of regime were marked by the restructuring of the R&D system and the drastic reduction in R&D personnel in most Eastern countries, which equally affected female and male scientists. The situation from 2000 onwards can be summarised as follows: 1) a comparatively high proportion of women in natural sciences and engineering, despite a relevant variation between countries and divergent trends in recent years; 2) a comparatively high proportion of women researchers, although most are found in the less competitive sectors or the lowest positions, and 3) a modest increase in women in high positions, albeit with huge variation among countries.

The introduction gives a comprehensive overview of the main data and most relevant trends. The ENWISE report (EC, 2004) and some other publications such as Linková et al. (2008) have thoroughly analysed these trends.

Box 1 – Vertical segregation in Eastern countries



While the number of students has steadily increased since the beginning of the 1990s, PhD studies still represent a critical point for women and the realisation of their ambitions. The proportion of women and men is equal among university graduates but their paths begin to diverge after graduation. This shift is well illustrated by the scissors diagram. As the proportion of women decreases at every step of the academic hierarchy, the proportion of men increases. Despite the fact the over half of university students in the 1990s were women, when it comes to the question of a scientific career, women constitute approximately only one third of university teachers and 10-18% of full professors.

The gender gap in the teaching profession in higher education is well documented by the Hungarian data. In 1990, the proportion of women among academic staff at universities was 33% and it increased to 37.7% by 1999 and 38.65% in 2005. At the same time, this growth was not reflected in the distribution of university and college positions and scientific grades: in 1999, women constituted only 13.4% of professors, 29.5% of university and college associate professors, 40.9% of assistant professors and 46.6% of assistant lecturers. Compared to these figures, the situation had worsened by 2005 when female employees constituted only 11.94% of professors, 26.83% of associate professors, 35.73% of assistant professors and 43.89% of assistant lecturers.

If we compare the situation in all ENWISE countries, the scissors are most closely together in Poland and in contrast, are most open in the Czech Republic.

Linková, M., Mladenić, D., H. Oleksy, E., Palasik, M., Papp, E., Piscová, M. & Velichová, D. 2008, *Re-claiming a political voice: women and science in central Europe,* Downloaded on 23/09/2009. Available at: http://wsdebate.tetalap.hu/images/stories/fruit/re-claiming%20a%20political%20voice.pdf.

Research during socialism

During the socialist period, research was mainly focused on horizontal segregation. It is an issue that was frequently analysed in the historical context, i.e. in relation with the first generation of women academics (Dinkova [Динкова], 1980; Šolcová, 1984; Vámos, 1985).

However, there are also some studies that address both horizontal and vertical segregation and take a more critical view of women's situation. Sporer (1987) addresses the feminisation of professions as an indicator of women's status, analysing the situation in the Soviet Union, the US and Yugoslavia at the beginning of 1970s. The proportion of women among professionals is substantially lower in the US than in the socialist countries. However, the author states that socialist ideology is not sufficient to counteract women's inequality as professionals: the analysis shows that the feminisation of professions leads to lower income and prestige. In a similar vein, Cerjan-Letica (1987) analyses the feminisation of medicine in the Socialist Federal Republic of Yugoslavia.

Tamás (1984) analyses the working conditions of researchers in Hungary and offers an analysis of the role played by the power relations that have evolved in research positions and scientific bodies, determining the status and opportunities for the advancement of women and leading to the underrepresentation of women in the highest positions. Also in Hungary, Tarnóczy (1984) examines the situation of women in the field of the social sciences from the end of WWII to the beginning of the 1980s. A sharp increase in the proportion of women began in the 1960s. Among the most plausible reasons for the rapid increase in the proportion of women from the 1960s is the fact that women are less discouraged by the relatively low incomes that are typical of social science research positions. However, men still dominate the so-called "hard" social sciences such as law, economics and demography, while women are widely present in psychology, communication, linguistics, literature and the arts.

In Bulgaria, Domozetov [Домозетов] (1984, 1985) provides rich statistical data about women's presence in the labour market and professional fields for the 1970s and argues that equality between men and women only exists formally. The policy of formal/legal equality has not led to social equality between women and men. In the field of research, the author considers that women's involvement in research activities is quite often unseen because of the traditional conservative attitude of male colleagues and the women's 'double burden' (professional and domestic work). He analyses some examples of social behaviour and the opinions of different groups of Bulgarian society and he concludes that the issue of woman's emancipation raises ambiguous answers and is not widely-accepted in the country.

Box 2 – Reflections on women's equality

This is one of the few relatively complete researches carried out in the 1980s, with particular emphasis on women's issues and on reflections regarding women's emancipation in Bulgarian society. The author argues that legal equality between men and women only exists formally and does not reflect the real social inequality between the two sexes. In this connection, he analyses some examples of social behaviour and opinions of different groups of Bulgarian society and he concludes that the issue of woman's emancipation raises ambiguous answers and is not widely-accepted in the country. The author analyses statistical data related to the increasing number of women scientists in the R&D sector during the period between 1970 and 1981. This data related to the relative proportion of women involved in innovation and invention activities, as well as to women's participation in other professions and public organisations. Particular attention is paid to women's participation in science. In relation to this, an empirical study on 'Woman's participation in research activities' at the Bulgarian Academy of Sciences was carried out. One of the main conclusions of this study is that the increase in the number of women researchers, technicians and heads of scientific departments does not always coincide with the share and quality of their scientific production. In addition, evaluation is not always fair and it does not stimulate the development of women's scientific work. According to the author, the reasons for these phenomena are psychologically and socially based, and perhaps a much greater effort needs to be made for women scientists to be valued not only because they have been approved of as professors, but also because they have indeed turned into excellent specialists.

Домозетов, Х. 1985, *Отражения на равноправието [на жената],* Профиздат, София.

Research after 1990

Drawing a comparison between post-communist countries, the Czech Republic finds itself at the extremes in terms of most indicators: in terms of funding and research structure, the Czech Republic (following Slovenia) at best approximates to the situation in the EU 15, yet the conditions of Czech women researchers are the worst. Although the average number of women researchers in the EU 15 is similar in the Czech Republic, the equality indicators are much better in the EU 15 (lower vertical segregation). One of the causes identified is the very low degree of gender awareness in the Czech Republic. Segregation is very often connected with other issues. A science career is portrayed as a labyrinth (this metaphor has been developed by NCCWS and H. Havelkova, 2007; see http://czso.cz/eng/redakce.nsf/i/science_and_research_veda), where it is very easy for young scientists and especially women to get lost (Šaldová, K. ed. 2007).

In many Eastern countries we can find studies dealing with the historical trends in women's access to university studies and horizontal segregation (i.e., Mazurczak, D. 1995; Bunio, P. 2007). However the main research interest in the democratic period is centred on horizontal and vertical segregation after 1990 in Eastern Europe.

The main topic is horizontal segregation by scientific fields, specifically the low percentage of women studying technical sciences in almost all countries. Several studies explore the situation of female students in engineering and natural sciences as well as the underrepresentation of women in these research fields (Čermáková, 2001; Piscová, 2004; Pivec, 2004; Sobczyńska, 2006; Palasik & Papp, 2007). Research also acknowledges that the proportion of female students in IT and engineering is decreasing in some of the countries in which an equal proportion was achieved during the socialist period. In Romania, during the years 1990-2000, the number of the students in science and technological education dropped and, within this downward trend, females became underrepresented in these educational fields and careers. Female students' educational choices were oriented toward disciplines of social science and humanities and less and less towards science / technology / engineering (Balahur, 2008). In Slovakia, even though the percentage of the female and male students in engineering faculties was almost equal before 1989, the present situation is becoming more and more similar to other European countries and the number of female students in engineering studies has dropped significantly (Hudec et al, 2004). In the Czech Republic, Cermáková, (2001, 2002) carried out a comprehensive analysis of the patterns of students' admission to university, showing that in most fields of study, men have a better chance of being admitted than women. If the percentage of successful applicants is very low in general, the situation for women is even more complex. Women face discrimination when they apply to study technical or natural sciences as they are assumed to lack the necessary cognitive abilities. On the other hand, the "feminised" fields of study give men the invisible advantage of "token" status.

Box 3 – Women in Informatics

Women experience similar problems when pursuing careers in informatics as they do in the fields of science and engineering. Stereotypes discourage them from choosing a career in this field from an early age. Additionally, conditions in computer science education are rather unfavourable for them. Gender segregation patterns in informatics can be observed; sometimes they are less conspicuous but no less consequential. In societies where informatization development is rather behind, this field is somehow more open to women. However, systematic support offered to women in this field is required everywhere. It is to be based on the realization that the transition into an information society is not possible with the participation of one gender only. In this respect, IZUM (Institute of information Science Maribor), one of the biggest computational organisations in Slovenia, is taking into account the gender equality policy. The equal representation of men and women has been achieved and can also be detected on the level of leading positions (50% of leading positions are occupied by women). IZUM is a positive example showing that "equality" also means "e-quality".

Source: Pivec, F. 2004, *Ženske v informatiki, Slovensko društvo Informatika,* Ljubljana, Slovenia, pp. 514-521.

Other studies focus on vertical segregation and the gradual “disappearance” of women from the scientific career ladder (Гурова, Е. 2005; Satkovskiene, 2007; Stöckelová & Linková, 2008; Linková et al 2008). The overall conclusion is that the extent of vertical segregation in academia seems to have declined during the 2000s in Eastern countries, yet it is uncertain whether this trend will continue, cease or change. It can be expected that if there is more money coming into research, providing better perspectives for research careers, men will return to this field and a part of the women in this profession will be supplanted by men once again. This effect is underlined by the fact that the process of the infiltration of women into decision-making spheres advances very slowly. The members of the executive bodies of science policy are almost exclusively men.

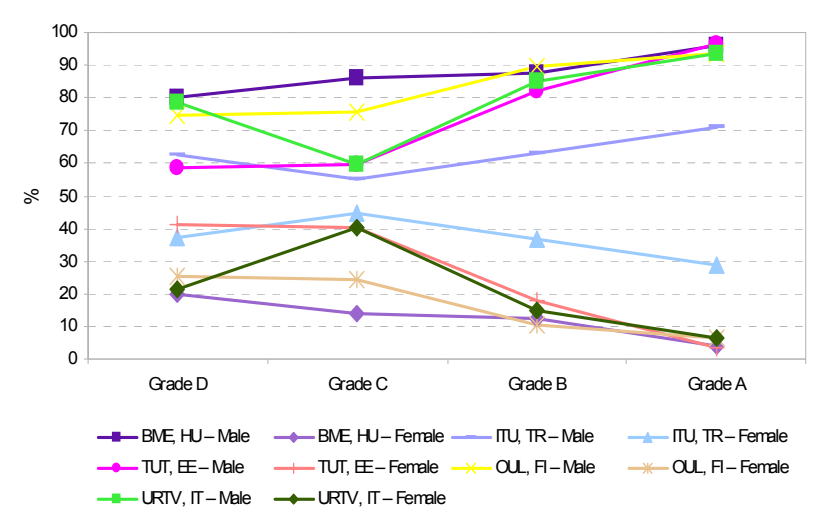
Bulgaria provides a good example: in 1987 (just before the country’s political change), on average only 9% of full professors and 22% of associate professors were women academics. These figures almost doubled in 2004 and nowadays, the Bulgarian case is close to that of the EU-27 average. However, the context of these statistics differs: the current visible trend towards the improvement of gender equality in higher education in Bulgaria reflects the difficult economic situation in Bulgarian society as well as the poor image of science careers, rather than the emergence of a new organisational culture for gender equality in higher education. In addition, as in the other EU countries, the model for scientific career building in Bulgaria is a “male career model”. The current situation is also maintained by a widespread lack of gender awareness and sensitivity to gender related discrimination, also among women (Sretenova, 2009).

The lack of gender awareness is also a salient trend in the Czech Republic, the Eastern country in which vertical segregation is most pronounced. As Křížková (2009) states, the Czech Republic finds itself at the extremes in terms of most indicators in comparison with other Eastern countries: in terms of funding and research it is one of the best placed Eastern countries, with similar indicators to the EU15. But even if the average proportion of women researchers is also similar to the EU15, the extent of vertical segregation is much greater. One of the causes identified is the degree of gender awareness in the Czech Republic, which is still very low, and there is a general conviction that equality of the sexes in Czech science is at a satisfactory level.

Some studies aimed at comparing segregation trends in Eastern and Western countries. This is the case of the EU-funded project UNICAFE, which compared data about university staff in engineering and medicine in several universities from different countries (Palasik & Papp, 2008). The data gathered show that a variety of the so-called scissors diagram is valid for each of the institutions involved in the study and both scientific fields, without any clear East/West divide.

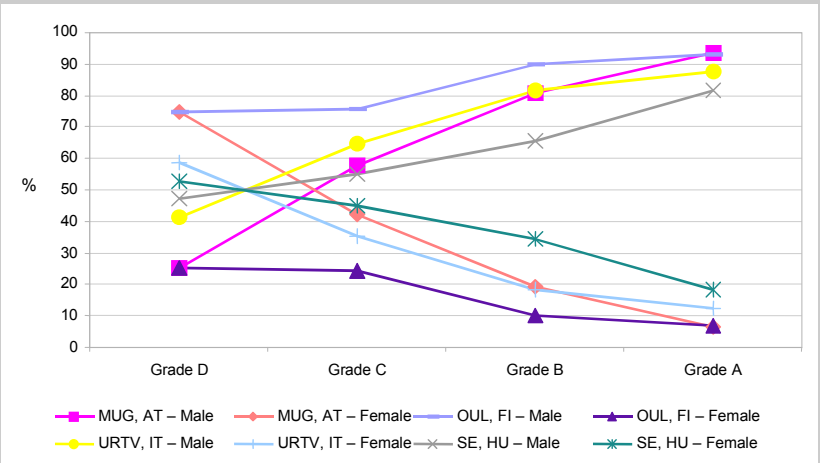
Box 4 – Vertical segregation in engineering and medicine

Careers at the faculties of engineering, 2004/2005



Budapest University of Technology and Economics (BME) – Hungary;
Istanbul Technical University (ITU) – Turkey;
University of Oulu (OUL) – Finland;
Tallinn University of Technology (TUT) – Estonia;
University of 'Tor Vergata' (URTV) – Italy

Careers at the faculties of medical sciences, 2004/2005



Graz Medical University (MUG) – Austria;
Semmelweis University (SE) – Hungary;
University of Oulu (OUL) – Finland;
University of 'Tor Vergata' (URTV) – Italy

The EU-funded project UNICAFE compared data regarding university staff in engineering and medicine in several universities of different countries. The data show that a variety of the so-called scissors diagram is valid for each of the institutions involved in the study and both scientific fields, without any clear East/West divide. The phenomenon of the leaky pipeline is apparent in both fields included in the study. Remarkably, among the engineering faculties, the institution showing the highest level of gender equality reflected in the hierarchy of staff is the Istanbul Technical University, despite the fact, on the one hand, that it is a 'newcomer' on the list of associated states to the EU research programmes and, on the other, the fact that a clause on gender equality as the basis of the law prohibiting gender-based discrimination was only introduced in Turkey's constitution in 2004. At the engineering faculties in general, the biggest gap between the careers of women and men occurs at BME (Hungary). In contrast, the Hungarian Semmelweis University is the institution with the smallest gap in the field of medicine.

Source: Palasik, M. & Papp, E. (eds.) 2008, *Beyond the Glass Ceiling. University Career of Female Academics in Engineering, Technology and Life Sciences* , Hungarian Science and Technology Foundation, Budapest

Gaps

The analysis is hindered by a shortage of statistical information. Sex-disaggregated data are not available for the staff of universities and academic institutions or the private sector, namely:

- staff by category and age; hierarchical position; highest academic qualification;
- pay and hierarchal position;
- members of decision-making boards/panels;
- citation index and number of publications;
- number of international projects; number of national projects;
- recruitment and promotion procedures (who decides, applications and actual promotions).

The analysis in the majority of cases is focused on academia, and especially on the public higher education sector; there is a lack of knowledge regarding the business enterprise sector and/or the private non-profit sector.

Representative quantitative empirical studies on the topic as well as longitudinal studies on gender and scientific careers are lacking in the Eastern countries. There is a need for qualitative studies reflecting the gender segregation more comprehensively and not merely as an introduction to the "women and science" issue.

There is also a lack of analytical research and more elaborated methodological tools.

One arising question that social scientists have not yet asked is the following: why do fewer men than women study in higher education at the turn of the 21st century?

2.2. Pay and funding

This topic refers to wage differences between male and female scientists, as well as differences in research funding. Pay gap describes the phenomenon whereby a significant difference exists in men's and women's salaries and incomes to the benefit of men. It is typical both for the whole labour market and for all the branches of science where men earn more than women on average. Gap in funding refers to the fact that male applicants seem to receive more research funding than female applicants.

Two trends of the socialist period are of special relevance for this topic. First, the notion of full employment and extensive industrialisation gave way to the employment of women and thus the dominant model of the dual-earner families. Second, the wage scales were compressed, so the wages of the highest and lowest tenth were relatively closer to each other. However, the pay gap between men and women still existed. The gender pay gap persists nowadays, in spite of the fact that the principle of the same wage for the same work is applied in the current laws. When the whole labour market is analysed, the Eastern countries show a colourful picture, with Poland and Hungary being closest to equality and the Czech Republic and Estonia being furthest from it (Meulders et al, 2010).

The small number of studies that deal with pay and funding underline the fact that this topic does not belong to the main line of research in the Eastern countries. However, research in the field, although scarce, shows that awareness of the problem is growing, mainly in the so-called 'Visegrad States' (Poland, the Czech Republic, Slovakia and Hungary) and to a lesser extent, in Slovenia, Romania, Bulgaria and Lithuania.

Pay and funding is one of the least researched topics and is rarely the sole focus of a publication in the Eastern Country Group. This topic can seldom be discussed without raising the questions of horizontal and vertical segregation. It is closely linked to the latter in these

publications. But two out of three entries in this category also touch on the problems of science as a labour activity and policies towards gender equality in research.

The research methods of this topic do not differ from the main trend typical of this country group; however, the predominance of non-empirical research and the techniques of representative samples and interviews within empirical research are slightly more obvious.

Table 7. Publications dealing with pay and funding in the Eastern countries

Number and percentage of publications	n	%
Pay and funding	137	19.8
Relation with other topics		**%**
Horizontal segregation		78.1
Vertical segregation		91.2
Pay and funding		100.0
Stereotypes and identity		48.9
Science as a labour activity		65.0
Scientific excellence		48.9
Gender in research contents		38.7
Policies towards gender equality in research		62.0
Methodological approach		**%**
Non-empirical research		57.7
Empirical research. Quantitative techniques		16.8
Empirical research. Qualitative techniques		17.5
Empirical research. Quali-quantitative techniques		8.0
Total		100.0
Quantitative techniques		**%**
Representative sample		61.8
Micro-data		26.5
Longitudinal/cohort		0.0
Multivariate analysis		23.5
Qualitative techniques		**%**
Biographical research		22.9
Case studies		28.6
Content analysis		17.1
Interviews		68.6
Observations		14.3

Research questions

Very few publications are dedicated exclusively to this topic. The vast majority address the issues of gender pay gap and unequal research funding as part of a broader context. Pay and funding appears as one important aspect to be explored within the whole system of inequalities and primarily, factors of horizontal and vertical segregation.

The main concern is to find empirical or statistical evidence of the existing differences between the wages and incomes of male and female researchers. It is not always an easy question to answer, because in many cases there are no easily available data concerning the income of the academic staff by sex:

- In the public institutions, there is a strict scale of wages that determines salaries according to position and term of office. Therefore, the pay gap must be approached by examining the indirect effects and the more concealed forms of income such as allowances, bonuses and other benefits.

- Official information is very scarce on the income conditions in the private sphere where wages are a matter of bargaining between the employer and the employee.

Only a few publications address the issue of funding, although this is an important line of research in the Czech Republic.

Research approaches

As the research on pay and funding is at an early stage, most of the publications are of a descriptive nature. In general, pay and funding is analysed through already published data of statistical yearbooks or other freely accessible databases such as grant decisions. Current publications offer a descriptive picture of the existing conditions rather than an in-depth analysis of the matter and in some cases, attempt to trace the trend lines comparing evolution across time.

In most cases, it is a kind of a pioneering work to map the existing pay gap and women's disadvantaged situation in funding. In most of the countries, the official statistics provided by national agencies are scarce, cover all the labour market and do not allow for a detailed analysis in the field of the R&D sector. For example, in Bulgaria, the first official publication that contained aggregated statistical data concerning gender pay gap was released only in 2002. Its time span covered the previous five years, from 1997 to 2002, but it only displayed one single indicator, the ratio between females' and males' average monthly wage and salary (Stoyanova [Стоянова] 2007). In Romania, where the National Institute of Statistics has a special gender division, official statistics exist on the gender pay gap.

Box 5 – Basic factors determining the gender pay gap

In 2002, the first publication of the National Statistical Institute of Bulgaria appeared, providing aggregate data on the gender wage gap in the country. However, these statistics were built on a single indicator: the 'ratio between women's and men's average monthly wage and salary'.
The objective of this paper is to develop a system of indicators/factors for a better understanding of gender pay gap. The author suggests three groups of such factors classified as: objective factors, human capital factors and discrimination factors. The author provides multi-profile analyses and an assessment of the influence of objective factors on the formation of gender differences in wages at several levels. The human capital factor is further analyzed from the point of view of its subjective characteristics, divided into three subgroups:
- Education and qualification
- Experience, skill and level of competence
- Leadership qualities, e.g. ability for decision-making
The analysis of the factor 'direct and indirect discrimination' reveals some widespread forms of discriminatory practices in the formation of wages by gender. On the basis of the analysis carried out, the author assesses the 'weight' of each group of factors on the determination of wages by gender as follows: objective factors – relative share 40%; human capital factors – relative share 30% and discrimination factors – relative share 30%.

Source: Stoyanova [Стоянова] 2007, 'Основни фактори детерминиращи различията между жените и мъжете в заплащането на труда ', *Икономически изследвания*, vol. XVI, no. 2.

Findings

In general, the studies provide empirical evidence of the gender pay gap, although it is not easy to outline a clear trend since they diverge in terms of methodology and results. Some conclude that the pay gap is widening, while other studies state that the ratio between male and female wages are quite constant.

Evidence of wage gap among the highly-qualified population can be found in most countries. In Bulgaria, for example, data for education level show that the average monthly salary of a graduate woman is slightly above 75% of that of her male counterpart. Among holders of PhD degrees, which are taken by many professionals in scientific positions, women earn 11.3% less than men (Stoyanova [Стоянова], 2007). In Slovenia, women scientists (all education levels) earn 90.5% of the basic salaries earned by men (Novak, 2006).

The main conclusion of the studies concerning the gender pay gap is that it cannot primarily derive from direct discrimination in pay policies. It is rather a consequence of other factors and specifically horizontal and vertical segregation (Linková, 2004; Gramatová et al 2007).

Vertical segregation

Women constitute a small minority in the top-level managerial positions in scientific institutions. The better paying jobs and positions are mostly occupied by men. Since appointment decisions are also made at this level, men are mostly in charge of distributing these positions. 'Homosocial' practices in gate-keeping procedures are a strong barrier that women have to overcome in order to access and then advance within the institutes (Linková et al. 2007).

The ENWISE report touched on the widespread practice at universities whereby most women are employed as lecturers and assistant professors. After the change of regime, the number of students kept increasing in higher education, which emphasised the role of universities in education rather than in research. The increasing burdens of education are thus borne by female-dominated lecturing staff and leave little leeway for women to carry out research. This results in a vicious circle combined with the relatively low remuneration paid to teachers. However, the situation is a kind of necessity for universities given that these institutions have to deal with the conflict of the growing social demand for higher education on the one hand, and the stagnant state funding on the other (EC, 2004; Červinková et al, 2006).

Box 6 – Average wage by position and sex, Budapest University of Technology and Economic (BME) in 2005, Euros

	Men		Women	
	Average wage	Number	Average wage	Number
Lecturers	738	184	899	46
Assistant professors	722	420	819	67
Associate professors	1,093	270	1,082	38
Professors	1,611	153	1,633	6
Head of department	1,601	74	1,537	3
Deputy deans	2,187	24	1,986	3
Deans of faculty	3,751	6	4,033	1
Vice rectors	4,133	2	0	0
Rector	5,729	1	0	0

The data show that there seems to be no significant gender pay gap between women and men in the same position. The average salary of men is higher than women's because most of the executive and highest positions are held by men.

Source: Palasik, M. (ed.) 2008, *Survey of the University Career of Female Scientists at Life Sciences versus Technical Universities. Report of the Budapest University of Technology and Economics*, pp. 1-111.
http://www.unicafe.ee/Failid/report_bme_eng.pdf

Horizontal segregation

The gender pay gap is also linked to horizontal segregation. Early research already showed that feminisation closely correlates with a loss of prestige and the worsening of the relative pay situation of a field (Tarnóczy, 1984; Šporer, 1987).

The male-dominated fields of natural sciences and engineering receive the greatest amount of public funding. For example, in the Czech Republic, more than 80% of the R&D budget is allocated to SET fields, where the proportion of women is only around 15-25% of the scientists. Meanwhile, less than 10% is allocated to the social sciences where women represent between one third and half of the personnel (Stöckelová & Linková, 2008).

Another important factor is seen from a historical perspective. The emergence of the private R&D sector after the change of regime provided new opportunities that were primarily taken up by men. The underrepresentation of women in the private sector contributes to the prevalence of the gander pay gap (Papp, E. 2003; Gabryelak, E. 2007).

Additional sources of income

In public institutions, it is established by law that people in the same position and with the same seniority should receive the same salary. However, the system of allowances, premiums and supplements may entail substantial differences. For example, in Hungary, the salaries of men with the same seniority exceed women's salaries because they receive a greater share of executive allowances and other additional bonuses (Haraszthy, 2002). In Slovenia, there is a 50-60% pay gap in stimulation and additional incomes among scientists (Kontler, 2006).

Scientific grants

The allocation of scientific grants is another source of inequality. In the Czech Republic, the analysis of the two main grant agencies evidences that they award significantly fewer grants to women than their proportion among scientists would justify. The reasons for this are very similar to those mentioned regarding horizontal and vertical segregation. Men occupy the higher scales of the hierarchy ladders and most of the funding is awarded to those in leading positions (Říhová, 2006; Šaldová et al., 2002b). Furthermore, grant call schemes apply the same age limits for women and men without taking into account the time taken for maternity/parental leave (Linková, 2002).

Wages and prestige of scientific career

Several studies point out that science is becoming less attractive to young people in the Eastern countries since a scientific career demands a huge investment of time and effort while offering relatively low salaries compared to other highly-qualified professions. For example, in Slovakia, a survey conducted among secondary school students showed that teenagers are not inclined to choose a scientific career, one of the main reasons in their negative answers being the low salaries earned by researchers. This can be connected with the feminisation of the scientific activity. In Slovakia, scientific research is the third most feminised group of occupations and it is seen in direct proportionality with its low prestige (Sedová et al., 2006). The increasing proportion of women in science after the change of regime is considered proof that men will leave the least prestigious scientific jobs with the lowest salaries to women (Papp, & Groó, 2005).

Box 7 – Mapping vertical segregation and pay gap at universities

A useful example for mapping vertical segregation and pay gap at universities or research institutes.

	semester yyyy/yyyy								
	Female				Male				Total
	≤40	41-50	≥51	*Total*	≤40	41-50	≥51	*Total*	
Positions									
Grade A									
Grade B									
Grade C									
Grade D									
Head of department									
Deputy dean									
Dean of faculty									
Vice rector									
Rector									
TOTAL									
in %									
Degrees									
Master degree									
MD									
PhD degree/over									
Member of the Academy of Sciences									
TOTAL									
Councils									
Members of the University Council / University Board									
Members of the Senate									
Members of the Faculty Council									
Members of the Department Councils									
Board members deciding on employment									
Projects									
Leaders of national projects									
in %									
Leaders of international projects									
in %									
Project budgets – national, €									
Project budgets – international, €									
Wages (EUR, gross)									
Grade A									
Grade B									
Grade C									
Grade D									
Head of department									
Deputy dean									
Dean of faculty									
Vice rector									
Rector									

Source: Palasik, M. & Papp, E. (eds.) 2008, *Beyond the Glass Ceiling. University Career of Female Academics in Engineering, Technology and Life Sciences*, Hungarian Science and Technology Foundation, Budapest, p. 119.

Gaps

Research in this field is underdeveloped. The most essential gap to fill is the analysis of the extent of the pay gap on the basis of reliable statistics. A greater effort must be made to compile official statistical data and collect primary information.

Furthermore, systematic examination should be encouraged in order to explore and analyse the structure and dynamics of the scientific labour market and thus learn more about the occurrence of pay gap when it cannot be explained only by factors relating to horizontal or vertical segregation.

Further analysis needs to be conducted in the Eastern countries on the changes occurring as a result of the transition to democracy and market economy. Although some initial results suggest that the market economy opened up new opportunities, mostly for men, and some studies refer

to the fact that the pay gap has increased since 1989, more research is needed in order to establish the measures and details of these changes.

Access to research funding has been even less analysed. In general, research in this field is hindered by the lack of data. This is the case even in the Czech Republic, the only country in which substantial research has been carried out on this issue. The Czech Research Council does not publish sex disaggregated data on applicants and awards, despite a motion from the NCCWS calling on the Research Council to do so.

2.3. Stereotypes and identity

Gender stereotypes are simplistic universalisations of the attributes, differences and roles of women and men. Stereotypes can be positive or negative but they rarely communicate accurate information about others. A large bulk of the literature on gender and science refers to gender stereotypes. The aim of this section is to provide an overview of this literature in the Eastern countries, focusing on three main issues:

- Cognitive abilities: in-born cognitive abilities and the lack of evidence of any differences between the sexes in this regard
- The social construction of identity: gender stereotypes and career choices in adolescence and the role played by the school in these processes
- The social construction of science: gender stereotypes in science itself (patterns of persistence and change, the link with the masculinisation/feminisation of scientific fields, and so on) and their impact on the professional choices of women and men

The topic of stereotypes and identity is not homogenous from the standpoint of research in the Eastern Country Group. There are some countries where research is very extensive on these issues – the Czech Republic, Lithuania and Slovenia – while in other countries they have barely been researched at all.

Almost all publications on stereotypes and identity are related to other topics such as horizontal and vertical segregation, science as a labour activity, gender equality policies, and so on.

Stereotypes and identity belongs to the frequently explored topics which, despite there being plenty of cases in which other topics could be included in the publications, cannot be associated unambiguously with any of these research topics. The fact that horizontal and vertical segregation are often mentioned is due to the high rate of publications dealing with these issues.

As far as the methods are concerned, studies using non-empirical methods outnumber those that use empirical methods although the inner proportions of the latter vary slightly from the average since the predominance of the representative sample for quantitative techniques is not that clear and micro-data and multivariate analysis techniques are also quite widely used. However, among the quantitative approaches, interview techniques are most common.

Table 8. Publications dealing with stereotypes and identity in the Eastern countries

Number and percentage of publications	n	%
Stereotypes and identity	298	43.1
Relation with other topics		**%**
Horizontal segregation		61.1
Vertical segregation		52.7
Pay and funding		22.5
Stereotypes and identity		100.0
Science as a labour activity		37.9

Scientific excellence	33.6
Gender in research contents	43.3
Policies towards gender equality in research	39.6
Methodological approach	**%**
Non-empirical research	54.4
Empirical research. Quantitative techniques	13.8
Empirical research. Qualitative techniques	23.2
Empirical research. Quali-quantitative techniques	8.7
Total	100.0
Quantitative techniques	**%**
Representative sample	50.7
Micro-data	34.3
Longitudinal/cohort	0.0
Multivariate analysis	29.9
Qualitative techniques	**%**
Biographical research	31.6
Case studies	28.4
Content analysis	23.2
Interviews	66.3
Observations	16.8

Research questions

A significant number of studies focus on the role of the gendered socialisation process and how it affects the professional choices of women and men, reproducing the traditional gender roles. In this respect, taking into account the evidence that girls and boys differ in their study choice, the main questions are:

- What is the effect of school practices, organisation of the teaching bodies, content of curricula and the educational system as a whole on the transmission and reproduction of gendered stereotypes?
- What is the influence of the family in the reproduction of stereotypes that affect the study choice of adolescents?

Another group of studies deals with the analysis of gender stereotypes in science itself, mainly from the perspective of the social construction of science. In this sense, the main research questions are:

- From a conceptual debate, why are certain areas in science treated as masculine or feminine and why is science (its branches, specialisation, research, and scientific excellence) a highly gendered institution with clear hierarchical divisions between women and men?
- What are the main features of the ideal scientist in the Eastern countries and how are they linked to traditional male characteristics?

There are no relevant studies on cognitive abilities.

Research approaches

Studies about the social construction of identity use both quantitative and qualitative methodologies: surveys on the social image of women and men scientists, state-of-the-art studies in the education system – teaching staff, textbooks, curricula, study paths of girls and boys, semi-structural interviews, focus group studies, and so on.

The social construction of science has been largely approached from a conceptual point of view, although qualitative studies have also been carried using biographical interviews.

Findings

One of the main factors that has a negative influence on women's self-perception and their educational and academic careers is the influence of stereotypes (Stiger, 2002; Palasik et al., 2006; Ziliukaite, 2006), prevailing attitudes that efficient leadership is to a high degree determined by personality traits such as keeping emotions under control and a sense of determination that are usually attributed to men's nature. Women are not considered potentially good leaders, because they are associated with other characteristics such as being overemotional, unable to defend the interests of the department or research team, and so on. Researchers from the Eastern countries agreed that the main reason for the reproduction of stereotypes is male-dominated workplaces, while teachers at schools and the family roles also strengthen the reproduction of stereotypes (Kusiak, 1997; Havelková, 2001).

Social construction of identity

No differences for girls in educational achievement

Some research studies in Hungary (OKI, 2000) show that there are no relevant differences in the ability of girls and boys in kindergarten and primary school. Although the dropout rate (pupils not finishing the eighth grade of elementary school) is approximately 1.5 times higher for boys than for girls, the rate of pupils who do not go on to further education is almost the same for both sexes. Gender differences are more conspicuous in secondary school. One of the most relevant differences is the rate of pupils who drop out of secondary school without achieving graduation: in 1998, 52% of the boys and 41% of the girls belonged to this group. Remarkable differences also exist as regards the type of diploma. There are two types of diplomas in secondary school: the certificate of secondary grammar school and the certificate of technical college (trade-school), which are needed in order to apply for university. Almost twice as many girls as boys finish secondary grammar school with a graduation certificate. The opposite occurs in technical college (trade-school): there are twice as many boys as girls.

In other countries, pupil's attitudes towards mathematics have been analysed. This is the case of a Croatian study which analyses pupils' attitudes and beliefs regarding inborn abilities and stereotypes, showing that students of both sexes do not believe that maths abilities are inborn nor that maths is a male domain (Arambašić et al., 2005).

Box 8 – Is Maths Something Scary? Attitudes and Beliefs toward Maths and Maths Anxiety in Secondary School Students"

The Croatian authors investigated the general attitudes secondary school students take toward mathematics, whether they see it as a male domain, whether they think that mathematical abilities are inborn and whether they experience maths anxiety. The participants of the study were students from all four classes of two language-oriented and one science-oriented secondary school (N=510). Two scales were used in the study: a scale for measuring attitudes and beliefs toward maths and a scale for measuring maths anxiety. Examining the sample as a whole, the results show that participants have neutral attitudes toward mathematics, that they mostly do not believe that mathematical abilities are inborn and that they do not agree that maths is more a male than female domain. The results show that science-oriented students, in comparison to language-oriented ones, have somewhat more positive attitudes toward maths and that they are less inclined to believe that mathematical ability is inborn. With respect to the belief that maths is more a male domain, the results show that students at large do not agree with this belief. Such discrepancy is more pronounced in girls and science-oriented students than in boys and language-oriented students. In the whole sample, maths anxiety is relatively low in intensity, being somewhat more marked in language-oriented students and girls.

Source: Arambašić, L., Vlahović-Štetić, V. & Severinac, A. 2005, 'Je li matematika bauk? Stavovi, uvjerenja i strah od matematike kod gimnazijalaca ', *Društvena istraživanja*, vol. 14, no. 6, pp. 1081-1102.

School mechanisms that contribute to reproduce gendered stereotyped career choice

In Eastern European countries, boys and girls are taught in mixed schools. Several studies explore the way in which school transmits and reproduces gendered stereotypes and roles.

School is considered an institution with a key meaning as it is crucial for personal and social development and because it affects the emergence of gender identity and thus, is the main means of gender socialisation. School is investigated as a gendered space together with the gendering of the teachers' board, curriculum and textbooks, teaching methods and pedagogical evaluation, communication between teachers and pupils, classroom, parents and other actors in the school activities (Jarkovská & Smetáčková, 2006). The gender segregation of the teaching body, experienced daily and throughout the educational system by pupils, must extensively appear to those pupils as validating gender stereotypes (Smetáčková & Valdrova, 2006).

The findings on the strong gendering of the education system are contrasted with the aim of fostering a social change through the youngest generation. One of the objectives is to lead pupils towards gender openness and equality. The school has the potential to do that as it has the space for creating emancipatory conditions, despite the existence of structurally given obstacles. The literature highlights the need for policies of equal opportunities in the educational system.

The role of the educational system in the construction and reproduction of gendered roles, stereotypes and career choices

Over and above the analysis of school mechanisms themselves, a wider dimension analysed to explain educational inequalities between boys and girls is the educational system as a social institution and its role in the construction and reproduction of gendered roles, stereotypes and career choices.

This dimension consists of the role the school plays in transmitting attitudes relating to gender on the one hand, and the effects on the future positions and life opportunities of boys and girls in society on the other. All the pedagogical and educational politics of the developed countries deal with this issue as a problem linked to the quality of the educational system. To tackle this question, further analysis is needed of the school syllabuses and school books used in the educational systems (Liukineviciene & Gudzineviciute, 2000; Pavlík, 2005; Smetáčková, 2006). From this approach, the handbook of Smetáčková and Valdrova (2006) suggests what and how to present certain matters to pupils in order to make them realise how different the position of men and women is in contemporary society and to be aware of stereotypes which are associated with these facts.

In Romania, the empirical analysis undertaken within the frame of FP6 UPDATE project (Balahur, 2008) demonstrated that there are important gender biased educational strategies – starting with early childhood education and continuing through all educational cycles – that prevent women from choosing an educational path in science/technology/ICT. They range from early gender stereotypes (“la vie en rose – la vie en bleu” - Chodorow, 1978) and continue through the formal educational cycles. They include:

- A theoretical, non-experimental teaching style
- Few or no connections with real life
- Teachers’ gender biased attitudes
- Transforming performances at one discipline (math, generally) in standards of general evaluation of the pupils (“if you are not good at math, you are not good at all”)
- Unsuccessful experiences and failure; the pressure of competition and so on

The influence of the family on the educational choices of girls

Looking at the outcomes of the audit from the standpoint of the qualifications of parents provides an interesting view of the situation in Hungary (OKI, 2000). The results show more differences between the efficiency of boys and girls. The interaction between the social effects of the family and school is clearly represented: due to the increasing number of parents with

educational qualifications, the difference between boys and girls is decreasing (except in case of computing and natural sciences). This means that parents' habits during the process of bringing their children up have a notable effect on gender differences in educational performance. Parents with a lower educational level are more influenced by stereotypes than parents with a higher educational level. In these cases, the schools are unable to compensate for all the effects of this social attitude.

Social representation of women and men scientists

Several articles deal with the stereotypical representations of women and men in science. It is, for example, the case of a study developed in the Czech Republic by Vinopal (2006) exploring the social image of women and men scientists. It shows that both male and the female scientists were associated with words such as "devoted", having "special skills" and "talent" but men were perceived as more dominant in these characteristics. In contrast, in the case of female scientists, the stereotypes were connected with family relations and physical attributes. Women scientists were associated with characteristics such as "single", "putting work first" or "alone". In contrast, male scientists were seen as "unpractical", "living out of reality" or "introverted".

Social construction of science

Epistemological debate around the social construction of science

There is abundant literature in the Eastern countries about the social construction of science from a conceptual and epistemological point of view.

The journal *Kontext* has played a pioneering role in gender and science theory. It addresses, among others topics, the relation between gender, objectivity and science. The first volume (Šaldová et al., 2002b) explores four main theoretical perspectives on women in science, based on Nicky LeFeuvre's work: feminitude, virilitude, patriarchal perspective and gender subversion. Feminitude is based on essentialist views on gender, as there is a typical female and male nature. The more women in science, the more stereotypically female the science will become – empathic, altruistic, and less individualistic. The concept of virilitude is based on the idea that women are forced to adopt dominant – typically male by social expectation – modes of behaviour when achieving success in a masculine culture in scientific institutions. The patriarchal approach explains the exclusion of women from science through the symbolic hegemony of men. Gender subversion offers the solution of how to break the vicious circle by deconstructing bipolar sexual differences.

An article by Szapuová (2005) shows that in the second half of the 20th century, the concept of science informed by the ideas of the Enlightenment increasingly became the critical focus of philosophy and other specialised fields of thought devoted to science. This investigation has brought to the foreground questions of how science is conditioned by historical context, by social and cultural values and by an individual and collective interest in its proponents. The new approach focuses on the social context and cultural dimension of knowledge; it is anchored in networks of social relations and cultural meaning – science being conditioned by social context – as well as in the relationship between knowledge and power, among other issues. The feminist critique of science has its origins in the critique to which some women scientists (biologists, anthropologists, psychologists, and sociologists) subjected their own fields. Feminist epistemology and theory of science have developed gradually from such feminist reflection. The autonomy of science is an unreachable ideal, and therefore a superfluous one; science, as well as other forms of human activity, is interwoven into a network of social, cultural as well as political meanings. The author suggests through feminist critique that we now recognise that social and cultural factors, as well as everyday consciousness, common belief, and stereotypes enter the processes of scientific research through manifold ways, and thus influence their status.

Box 9 – Knowledge and awareness about gender equality issues

The interviewees considered the issue of women in science in two dominant framings of *science as discovering* and *science as an enterprise* and recognized it as a relevant issue within these framings. The interviewees refer mostly to the four following contexts: first, a low relative number of researchers in society, which impedes R&D. Women, as a result, are conceived as a potential source of labour force that is needed to increase the numbers. Second, women are considered a factor in stimulating and cultivating male communities and thus increasing the quality of social and communicational interaction and practice. The third context, gender equality, was mentioned as an issue of justice that should be defended on moral and not only instrumental grounds. The fourth factor, in a few cases, emphasizes differences in female practices and style of researching. These were, however, defined only in terms of a lack or abundance of characteristics traditionally related to science (rationality, diligence and focus on detail). None of these contexts touches upon the epistemological dimension or contains the potential for reflection on, or an alternative to, the present framings of science. In some cases, women would even seem ideal workers within those framings, e.g., when a female interviewee highlights rational thinking, dedication and responsibility for achievement as features of women's working style. There was little space in the interviews for the issue of women in science to become a source of new reflection on science and its framings.

Source: Červinková, A., Čada, K., Linková, M., Řeháčková, D. & Stöckelová , T. 2006, *Zpráva o činnosti navazující na projekt Enwise v České republice*, Institute of Sociology, Academy of Sciences of the Czech Republic, pp. 18-19. Downloaded on 24/08/2009, Available at: http://www.cec-wys.org/prilohy/96c16d3c/WP8_CZ_English.pdf.

Stereotypes in scientific activity

Theoretical literature on the reproduction of stereotypes through scientific activity itself is particularly relevant in the Czech Republic, although some publications on this topic can be found in Croatia, Poland and Slovenia.

From an epistemological point of view, it is argued that if location and position are formative from the view of epistemology, then research practice that systematically takes into account ways in which power relationships and the emotional engagement of researcher contribute to discursive structuring of their science claims will lead to more adequate knowledge. "Politics of location" is closely related to further feminist epistemological questions, particularly epistemologies supporting socially responsible epistemic behaviour (Linková, 2008). The analysis of the gendered order in scientific institutions uses the theories of "gate keeping" and "homosocial reproduction" as explanations. In the academic institutions which are environments based on masculine values, women are facing discrimination (Linková, 2004; Linková et al 2007).

Several studies address gendered stereotypes in SET, both in academia and in industrial research, showing that the engineering profession is still thought to be a typical male profession in our days (Palasik, 2006).

Change of gender stereotypes in science, from socialism to democracy

Eastern countries have a common historical heritage of the socialist period. The socialist doctrine and its follow-up, which de-emphasised the difference between the genders, actually concealed the existing patriarchal mechanisms and in the long run, preserved the male patterns of behaviour and thought (Kusiak, 1997; Pushkariova [Пушкарьова], 2007). In almost in all countries there is the problem of the personal equation of the older female generation: many female scientists deny their own barriers in their scientific career. That explains the scarcity of female "role models" for young women academics and researchers. Several empirical studies on women show that more and more women are sensitive to the existing prejudices against them, but they frequently view these as their own problems, not as barriers erected by others or as issues which should be brought to the attention of the public. The studies that analyse

women's self-identification and their own subjective feelings (based on in-depth interviews with women) observe that women are always "the other" in science (the male world), must adapt to it and employ various strategies for this. Women do not feel free to express their feelings, ideas and experiences; they speak about themselves as if referring to some abstract professional. Women are able to "become something" (i.e., to have successful professional career) only with the help of men or by adopting masculine strategies. Women acknowledge their otherness and obediently fall silent or gingerly try to expose their femininity (sexuality).

Box 10 – Research project *Knowledge, Institutions and Gender: an East-West Comparative Study* (KNOWING, funded under the Sixth Research Framework Programme)

Research has been simultaneously carried out in five partner countries: the Czech Republic and Slovakia from the East, and Austria, Finland and the United Kingdom from the West. The *Knowing* applies a multi-method approach that aims to build theory and to develop appropriate conceptual tools. It encompasses the analysis of existing statistical data on two selected research institutions per country that are situated in national contexts, and the analysis of a life-course questionnaire distributed to the members of these institutions requesting demographic and career-related information. Subsequent stages included: critical discourse analysis of relevant science policy documents, and institutional policies and procedures; targeted participant observation of research practices in the selected institutions; in-depth interviews with scientists in the institutions under study, and repeated focus groups. The research culminated in a comparative cross-national analysis.

The background of the project is that science today, perhaps more than ever, is the site of multiple negotiations. Market values increasingly drive scientific research and higher education, yet the traditional emphasis upon rational knowledge remains. The range of actors with a claim to "have a say" in science has also grown to include a range of voices beyond academia, from industry and the public. These new actors may play different roles in different contexts and geopolitical spaces. All these processes also have a gender dimension – from recruitment and retention of students and employees to work-life balance and the gendering of knowledge production processes and practices. This provides a unique opportunity for interactions between social sciences and natural sciences, to discuss the relations between the disciplines, different epistemic approaches and practices in the disciplines.

Source: http://www.knowing.soc.cas.cz/?page=materials 20 April 2009.

Box 11 – Tackling Stereotypes

A very useful research was carried out in Hungary and Estonia – within the framework of a European research – about stereotypes in SET. Two focus groups were established: one including people in academia (HES and GOV alike), and the other comprising those from private sphere (BES). During the focus group meeting, the following questions were put to the participants:

- What is your personal overview of a stereotype?
- How do you think stereotypes may affect women or men in SET?
- How do you envisage the situation of women in SET?
- What is your opinion on tackling stereotypes?
- What could be done? Which strategies do you think could help to break stereotypes in SET?

The answers given by the Hungarian focus groups were very interesting. To the question "what is your personal overview of a stereotype?", the BES group gave the following answers:

- All the participants named the most common stereotypes: women's role is maternity; they are suited for family roles and child rearing.
- Women are not suited to technique at all, especially not to managing technical equipment; they fare worse than men in lectures on natural sciences and especially in mathematics.
- Some of the participants challenged these statements immediately. These members referred to several secondary-school methodologies where mathematics and information technology were taught to girls and boys in separate classes. The girls were shy and dared not utter a word in a mixed class, while in a separated-class they felt free to express themselves.

The answers given by the group in academia were:

- One part of the participants confirmed the results of the research: "Women are considered responsible for performing family tasks and bringing up children." Or: "Feminine traits include irrationality, passivity, emotionality and subjectivity. Masculine traits include rationality, dominance, independence, coldness, objectivity and abstract thinking. Group work is more typical of women."
- There was a participant who drew attention to the difference between stereotypes and prejudice: prejudice always carries some negative connotation, while stereotypes might well be positive. Another participant underlined two factors of stereotypical thinking: constant repetition and partial reference to the truth.
- Another emphasized that a more subtle wording of stereotypes could be even more noxious. The stereotypes listed might be formulated less categorically for greater efficiency.
- An interesting question was raised: are there figures that reflect whether women or men are most likely to think in stereotypes?

How do you think stereotypes may affect women or men in SET? Participants from the academia group stated that there is a false, widespread belief that:

- Women are more suited to "social or arts" studies than to scientific studies.
- Women are not capable of scientific work or objective, rational and abstract thinking.
- Another argument against women in SET is that these workplaces are dirtier than the average.
- Women lack a sense of technology.
- Girls should not continue their education at universities of technology because there are so many boys and therefore they would be oppressed.
- Regarding the stereotype that girls are worse at mathematics, one of the participants claimed that in a male-dominated class, during the first lesson, their teacher had said that it was a pleasure to see so many boys, because although they could not understand as well, at least they did not ask questions all the time.
- According to one male participant, "my personal experience at university was that the male lecturers usually expected more of me than female lecturers for the same mark. The inverse occurred with female lecturers. They appreciated my motivation and extra work and I was thus able to compensate my results in fundamentals. They were more open to let me try and achieve better marks."
- There are stereotypes about managers' abilities. Managers are expected to possess characteristics such as aggressiveness and firmness, which are often identified as male characters; as a result, when a woman becomes a manager, she adopts these masculine characteristics.
- Another argument was that a woman should not become a manager in SET given that due to the large number of men in the field, she will only be able to deal with them if she is able to swear like one.

The views of participants from BES were the following:

- The roots of the problem are located in the secondary (public) education system. Teachers are not active enough to arouse girls' interest in the technical, engineering career possibilities (or fair enough to arouse the interest of boys). It was believed that the stereotype that women are not suited to deal with technical applications is no longer true. Most women are able to manage technical accessories fairly well, can carry out electrical repairs or fix taps if necessary and also know their way around a personal computer.
- Most women incorporate self-related stereotypes into their character. Thus, they end up believing them to be true and are wary of technical applications.
- Over the last years, some stereotypes and schemata which always used to be a part of society have been produced. Young women claim that they do not aspire to a career. They feel they have to live up to certain expectations, with family roles occupying the first place. The requirement, thus, is to have a degree but not to act as a career-motivated person.
- Women have been almost indoctrinated – as a social aspect – by this belief. They do not feel it to be an external expectation.
- It is hard to achieve the right balance between family and career and most companies force women to choose between these aspects.

Source: WiTEC 2006, *Tackling stereotypes: maximising the potential of women in SET*, European Association for Women in Science, Engineering and Technology, Barcelona.

Gaps

With the exception of three countries – the Czech Republic, Croatia and Slovenia – the main gap is the lack of studies in the field of feminist epistemology of science and feminist theory of science which are assumed to back the specific studies on the relation of gender and power in science.

But even in the Czech Republic, where the theoretical background is comparatively strong, research published until now is rather descriptive. There have been only two relevant quantitative surveys and the results have been presented rather descriptively from the mainstream science position. The only qualitative research technique used has been biographical interviews. The interviews have been published as edited texts. There is a lack of in-depth analysis of the qualitative data that would bring more theory grounded in the data which could lead to a discussion on the findings and further development in the field.

Bulgaria seems to be at the opposite extreme. In this country, there is no study in the field of feminist epistemology of science and/or feminist theory of science, although Bulgarian feminist scholars have published on the issue of the "social construction of identity".

For most scholars of both sexes, gender equality in science is a new issue in Eastern countries, so there is a need for more research and knowledge production about the gendered construction of identity and its influence on the educational choices of adolescents, and also the gender stereotypes in science and its changes from socialism to democracy.

In general, there appears to be a need for more research on stereotypes and identity construction in the Eastern countries, especially with regard to:

a) the consequences of gender stereotypes in educational achievements;
b) the influence of school processes and the family role in the gendered study choice;
c) conceptual reflections on the epistemology of science from the gender perspective;
d) changes in stereotypes, patterns of gendered choices of fields of study and so on from socialism to democracy.

2.4. Science as a labour activity

In most European countries, the number of female graduates is proportionately higher to that of male graduates. However, the scientific labour market remains male-dominated and women are significantly underrepresented in scientific and engineering disciplines. Statistics show that women have great difficulty in finding employment in science and technology, receive lower salaries, fewer promotions and have less access to management positions and decision-making bodies. Gender differences in the scientific career are mainly analysed from the point of view of the 'work-life balance' and the structural barriers − time and mobility constraints − which place women at a disadvantage because the gender division of labour in society is large. The question is constant: how can a female scientist organise her work, how can she reconcile motherhood and career advancement? Although the academic institutions and universities deny any type of discrimination, female scientists also encounter invisible barriers during their career. Gender stereotypes act as barriers through their negative impact on recruitment, retention and promotion of women in science and technology sectors and occupations.

During the socialist period, the political will was to achieve total employment in the labour force. Women's employment was comparatively high, which can mainly be put down to the promotion of the dual-earner model during the socialist regime. In this period, it was an ideological issue that women should earn equal pay for equal work with equal education. But it never came to fruition; it is still typical in Eastern European countries – as in other European and OECD countries – that women earn significantly lower wages than men. This problem also exists in science as a labour market.

In Eastern Europe, the political, economic and structural changes after 1990 entailed significant changes for working conditions in science from a gender point of view: from a general, societal change in the work/life conflict to a general change in the HE and R&D system, which includes changes in the characteristics of scientific/research careers, loss of scientific positions, and so on. However, research in this field is still scarce, even from 2000 onwards, and there is little research comparing the situation of women before and after democracy.

Science as a labour activity occupies a median place among the prevailing statistics of the topics in the Eastern Country Group. It is often discussed in the publications together with vertical and horizontal segregation – especially the first – and is rarely examined without touching on other research topics.

Regarding the methodological approach of the entries, this topic has a special character as it is commonly based on empirical approach. More than 60 percent of all publications are concerned with one of the empirical methods, mostly using qualitative techniques. Among the latter, it is also noteworthy that biographical research is at a similar level to the widely used interviews, and almost two-thirds of the entries use them both. The rate of publications with quantitative methods is not outstanding and most often use representative sample techniques.

Table 9. Publications dealing with science as a labour activity in the Eastern countries

Number and percentage of publications	n	%
Science as a labour activity	272	39.3
Relation with other topics		**%**
Horizontal segregation		52.6
Vertical segregation		65.8
Pay and funding		32.7
Stereotypes and identity		41.5
Science as a labour activity		100.0
Scientific excellence		39.0
Gender in research contents		33.1
Policies towards gender equality in research		40.4
Methodological approach		**%**
Non-empirical research		39.3
Empirical research. Quantitative techniques		12.1
Empirical research. Qualitative techniques		42.3
Empirical research. Quali-quantitative techniques		6.3
Total		100.0
Quantitative techniques		**%**
Representative sample		60.0
Micro-data		32.0
Longitudinal/cohort		0.0
Multivariate analysis		14.0
Qualitative techniques		**%**
Biographical research		62.1
Case studies		16.7
Content analysis		8.3
Interviews		65.2
Observations		8.3

Research questions

The literature in the Eastern countries addresses the following issues:

1. Historical analysis of the situation and the scientific career of women in science from the 19th century to the present. Some of these studies address women's access to higher education, while others aim at offering biographical portraits of women scientists.

2. Analysis of the current working conditions of women in science (1990 onwards), focusing on the following questions:

- What are the main characteristics and trends that define the situation of women in science?
- What are the identified factors that explain a successful scientific career?
- What is the relation and main conflicts between personal life and professional life for women scientists?
- What are the main obstacles and barriers that young female scientists have to overcome in the early stage of a research career?

Research approaches

Historical analysis of women's access to higher education is well developed in all countries through research of the archive documents of the end of 19th and the beginning of 20th century. The analysis of the current working conditions of scientists is developed through different techniques. Qualitative studies prevail, particularly biographical interviews, although there are also studies based on small-scale surveys.

Findings

From socialism to democracy

Studies during socialism

Very few studies about the working conditions of women and men in science were carried out during socialism. One of them is the study of Golub (1985), dealing with time distribution in professional and domestic work.

Box 12 – Comparative analysis of male and female researchers' time-budgets from 1983

A research on scientific researchers' use of time was part of a research on the social characteristics, work and life conditions of researchers in the Socialist Republic of Croatia in 1983. The sample comprised 609 respondents, of which 33.3% were women (which was representative of the gender structure of the research population at the time). Data were collected by using time-budget diary method over a three-day period (Sunday and two working days). The research revealed that men spent more time on professional activities and on social activities relevant for their research careers. The most significant differences between women and men researchers were found in time spent on domestic work (preparing food, cleaning, small house repairs, and so on). On average, on work days women spent 1.53 hours more on domestic work than men, and on Sundays up to 2 hours more. Although the difference was not as significant as in the case of domestic work, it was also found that women spent more time than men on communication within primary groups (spending time with children, communicating with other family members, visiting friends and relatives, and so on). The findings point to the traditional gender roles in private life among professional scientists which potentially may have an impact on their professional career.

Source: Golub, B. 1985, 'Komparativna analiza budžeta vremena istraživaèa-istraživaèica', *Žena. Znanstveni èasopis za društvena i kulturna pitanja o mjestu i ulozi žene i porodice u društvu*, vol. 43, no. 5-6, pp. 44-51.

Another is the pioneering sturdy of Tamás (1984) in Hungary. This sociological study based on empirical data examines the social working conditions of women researchers between 1945 and 1980 and provides an analysis of the determining role of the evolved power relations in research places and scientific bodies in the status and advancement opportunities of women. It also deals with the effect of the traditional male-female roles on the differences in the scales of values of the researchers. The success parameters of Hungarian research work are male-oriented, which makes women feel less comfortable in this research system. Due to the historical premises of research work, women form a “late coming” group that experiences a disadvantaged situation. On average, women are also younger than men, which is a further disadvantage in advancement and in occupying management positions. This results in a greater effect of unequal opportunities between men and women within the social group of researchers. These drawbacks result in a loss of capacity in terms of the scientific potential of female researchers. The figures of five successive years clearly demonstrate that due to the above-mentioned problems, the performance of women researchers is below the performance of men in the fields of scientific publications, patents, innovations, research reports, et cetera.

Comparative studies between socialism and democracy

Comparative studies about the situation of women in science during socialism and democracy are still very scarce. There are, however, two relevant studies that focus on the socio/historical context of the Czech Republic and discuss the wider issues of women’s discrimination and emancipation after 1989 as a state-socialist project that was rather unsuccessful in practice. They also describe the difficult situation for the re-establishment of Women’s Studies and women’s movements after 1989 in the Czech Republic.

One of them compares the conditions of women in the scientific field during and after the year 1989 from the perspective of gender equality. This is a qualitative interview-based research depicting the differences between the experiences of young women scientists who built their career in the 1990s and older women scientists who built their career under the state-socialist regime (Marikova, 2004). The author makes a comparison of the conditions in the scientific field during and after the year 1989 from the viewpoint of gender equality. The analysis is based on interviews with older and younger generations of Czech female scientists from the mid-fifties until the end of the millennium. The data were collected as an outcome of the project "Women in Academy of Sciences – position of women in the structures of the Academy of Science between the years 1953 to 2000", funded by the Czech Academy of Sciences. Parts of interviews with famous female scientists published in the media were also used in the analysis. The author discusses the barriers young female scientists face when entering the academic field and also the problems they encounter when they have a family and children. From the life trajectories of the older scientists, it is obvious that they did not strictly set out to build a career, as can be seen in the stories of the young scientists. Many of them had children first and then they returned to the academic field. Because competition was weaker and chances fewer, especially for scientists who were not communist-party members, there was no rush for the older scientists. On the other hand, vertical discrimination barely varied over the fifty years.

The other is a qualitative interview-based research on the self-reflection, work conditions and the research and pedagogical work of female and male academics who teach and research gender in the Czech Republic (Václavíková-Helšusová, 2006). The study is based on an analysis of interviews with female and male academics who teach and research gender. The analysis first concentrates on the academics’ experiences of promoting gender topics in research. The research focuses on academic activities in the field of Gender Studies, which emerged mostly after the year 1989. Furthermore, the text explores the research and pedagogical work of these academics. The paper concentrates on the basic problems academics face directly in their work; these topics arose from the academics’ reflections on their work and the position of those involved in gender research and pedagogy. The aim of the analysis is not to evaluate and thoroughly describe the situation in the field of Gender Studies in the Czech Republic, but rather an attempt to reveal the motivations for working in gender research and pedagogy, which are linked on the one hand to personal experience and on the other hand, to the perception of current social issues and the need to study or address them.

Box 13 – The 'leaky pipeline'

The metaphor of the 'leaky pipeline' is used to describe the circumstance whereby women scientists leave science academia at a much greater ratio than their male counterparts. Lone Svinth addresses the problem of perceiving the expression 'leaky pipeline' as a model, framework or a metaphor (hence she sets the expression in quotation marks). According to Svinth, the bridge between praxis and actual policy-making (e.g., gender-mainstreaming) is actually complicated by the use of 'leaky pipeline'. The problem, she states, is that the image of a pipeline is used to illustrate a set of educational and employment stages that comprise a career in science. The implication of the metaphor is that, to increase women's representation in science, policies must be devised to 'patch' the leakage at those points where the pipeline loses more women than men. Svinth points to many weakness in this otherwise popular metaphor and questions the usefulness of the metaphor when it comes to understanding why women at a disproportional rate leave science academia. First, a patching of the leak would lead to a flood of PhDs at universities to no purpose (i.e., the 'leaky pipeline' suggests that PhDs is a means to an end); second it overlooks the 'pull'-effect (i.e., that women physicists can be pulled out of science in pursuit of other careers); third, that a career does not always follow a straight line, as the 'leaky pipeline'-perspective suggests, and fourth, that the term 'leaky' does not address the problem of getting women *into* the pipeline. Svinth argues that the 'leaky pipeline' neither addresses nor communicates the problem of underrepresentation of women in science.

Source: Svinth, L. 2006, *'Leaky Pipeline' – to Be or Not to Be a Useful Metaphor in Understanding Why Women to a Disproportional Degree Exit from Scientific Careers*, University of Lodz, Poland.

The current situation of women in science

Since 2000, more and more studies have been carried out on the current situation of women in science in all Eastern countries, focusing mainly on universities and research institutes. The overall picture for all Eastern countries points to an unfavourable social environment, insufficient appreciation of female scientists' work in academia, low possibilities of career development as well as family care, which often lead women to abandon their professional ambitions and adapt themselves to the status quo, refusing to compete in a male environment and settling for the chance to do research work and not striving for higher career positions (Kornhauser, 1997; Saldova et al., 2007).

Workplaces and working conditions

In almost all countries, we found some surveys conducted after 1990 on the current scientific career of both genders. Most of these researches were linked with the working conditions and the barriers of scientists.

A scientific career is largely influenced by support received at the workplace. Greater support provides better job promotion opportunities for researchers. Scientific career was measured in seven European universities in 2007 according to the following factors: flexibility at the research institute (flexible working hours, working from home, isolation from family, isolation from colleagues); satisfaction with work (infrastructure, intellectual support, time for research, financial support for research), supportive work place (Palasik, M. & Papp, E. (eds.) 2008).

The most interesting findings are:

- The share of administrative tasks in the working schedule is a widely discussed topic in academia. The majority of respondents have less than 25% administrative tasks in their workload. Surprisingly, male respondents seem to spend more time on administrative work than female ones.

- Younger respondents take days off more regularly than older ones, especially men. In general, the majority of female and male respondents alike can take days off sometimes or regularly.
- In general, women and men have similar access to flexible working hours. The highest percentage of regular flexible hours is found at the University of Oulu in Finland, with 70% for men and 56% for women. This option is mostly used by the younger generation, regularly by 67% of male and 56% of female respondents under 30, and it decreases as the age of the respondents advances.
- In total, only 29% of both genders never work from home, ranging from 54% at Istanbul Technical University (ITU) to 15% at University of Oulu for men and from 44% at the University of Tor Vergata (URTV) to 5% at Tallinn University of Technology (TUT) for women. The most regular home workers are of more advanced ages in both sexes, with 20% for both men and women over 50. More men than women under the age of 30 work from home (18% against 10%).
- Female respondents are less satisfied with the infrastructure than the males. Satisfaction with the infrastructure among respondents decreases as their age advances, in the case of women from 59% for respondents under 30 to 49% for those over 50, and in the case of men from 76% for respondents under 30 to 61% for those over 41. Respondents from the Semmelweis University are the least satisfied compared to the other universities.
- Most of the respondents are not satisfied with the time they have for research, although the level of dissatisfaction varies considerably from one university to the next. The most satisfied male respondents were found in TUT (76% positive answers) and at MUG (52%). The most satisfied female respondents were found in URTV (61%) and in the Budapest University of Technology and Economics (57%). Respondents under 30 are more satisfied with the time they have for research than the other age groups.

Factors of success

In Lithuania, Novelskaite (2006a) raises the question of how some women succeed in reaching the highest echelons in male-dominated organisations. The answer, she suggests, is found in the analysis of in-depth interviews with rather successful Lithuanian women scientists. The identification of women's strategies enabling them to develop successful academic careers also sheds some light on the question why there are so few women at the highest levels of academic hierarchies. The author summarises her conclusions regarding what female scientists need to succeed as follows:

- Networking: the establishment of active network(s) of Lithuanian women scientists with the aim to support young (and indeed older) women scientists; competition among women scientists would be one of main obstacles for the expansion of networking activities.
- Collaboration: systematic involvement of younger and academically weaker women scientists in collaborative works and networks; one of main problems here would be that this collaboration would be more strongly associated with the less powerful woman instead of identifying it with the (usually) more powerful man.
- Mentoring: to develop women-friendly and/or feminist consciousness-based mentoring styles; different issues such as workload, lack of feminist consciousness, traditional dominant attitudes towards men and women, among others, should also be considered here.

Work/life conflict among scientists

In all aspects, women scientists are facing double or multiple disadvantages compared to their male colleagues. The scientific career of women is mainly restricted by traditional female roles: maternity, household duties and related obligations that they cannot offload onto the other members of the family to the extent that men do. Keeping the family together has always been a women's duty, and the management of the household is also a challenging task.

A scientific career is greatly influenced by the researchers' family background, which tends to be much more protective and supportive in the case of men, while in the case of women, the

family represents a risk factor, i.e. it impedes women's scientific careers. In all countries, the family is a formidable barrier for female scientists, along with the strong pressure from their environment and society suggesting that women should take care of the family and men should take care of the income. In fact, the whole long traditional stereotypical way of thinking would have to be changed. Furthermore, the salaries of researchers and teachers do not allow them to contract services that would ease household duties. This seems to be the problem of society as a whole, and not of women alone.

In Romania, some recent empirical research using the meta-analysis of the data collected revealed that the perceived difficulties regarding the possibility of reconciling career and child rearing, professional obligations and private life, the reconciliation of both partners' professional and private obligations and so on, are important de-motivators that drive women away from a career in science and technology (Balahur 2008).

The studies of the Hungarian Statistical Office are relevant for highlighting differences in personal/family choices between female and male scientists. 15% of women in scientific areas are unmarried, a rate which increases in younger generations: almost one quarter of women younger than 40 are still unmarried (Hungarian Central Statistical Office, 1995 and 1998). This rate within the overall population is 5% and 9%, so this fact is can clearly be attributed to the scientific career. Female researchers have fewer babies: 34.5% of women with academic degrees do not have any children, while in the case of female researchers, this figure reaches 40.6%. At the same time, the marriages of female scientists undergo more conflicts: above the age of 50, the rate of divorce is higher compared to women outside the field of science. Although these are just figures, even the idea of the prospective social tendencies marked by these figures is daunting. If this tendency does not change, an even smaller proportion of graduates will create a family in the decades to come, fewer of those living in a family will decide to have children and the proportion divorcees will continue to rise. There have never been so many single women in society than in recent years. The question is: is there a trend towards being single/divorced, or not having children?

Purvaneckiene (2006) confirms the analysis of the Hungarian Statistical Office. Her article was written in the frame of the Baltic State Network (BASNET) project (research of four countries: Estonia, Latvia, Lithuania and Romania). The author examines the work-family balance on the topic "Women in science" in Estonia, Latvia and Lithuania. The study analyses the data of the qualitative research which aimed to reveal the factors determining the underrepresentation of women in sciences and high technologies in the Baltic States as well as women's success strategies in balancing professional and family life. The interviews with women and men in science were carried out in three Baltic States between March and October 2006 within the framework of the FP6 project BASNET. The study is based on the comparative approach. The majority of respondents in all countries are of opinion that child-care is one of the most important reasons why women are not as successful as men in carving out a scientific career. Women deal with the tensions of the work-family conflict because of the widespread belief that women are primarily responsible for raising children and that it is up to the individual woman to work out strategies of reconciliation. The only acceptable time for women in science to be promoted is when they return from child-care leave.

Young scientists and early stages of the scientific career

In the Czech Republic, science as a labour activity, as part of the work carried out by the National Centre for Women and Science (NCCWS), is presented through a metaphor: the science career as a labyrinth, where it is very easy for young scientists, especially women, to get lost (Šaldová et al., 2007).

Many studies have sought to establish the types of obstacles, deficiencies and gaps young women scientists face in the advancement of their academic careers (Sretenova, 2008). Some studies in the database conducted after 2000 clearly show the problems women face in science, especially at the beginning of their research career. One study highlights the fact that the early stages of a career coincide with a period of time in which young female scientists begin their own families. It is very difficult to reconcile a scientific career and private life, especially at the beginning, during the doctoral studies and right after, when the actual base of academic

prestige is built. Scientific work makes great demands on time, not only in everyday terms, but also because of the need for study mobility. Childcare is a stereotypically female burden which is not recognised in the grant schemes (Linková, 2002). There is an age limit for doctoral and postdoctoral grants which is the time most couples begin creating a family. This is crucial for a successful scientific career. This may mean setting limits for both women and men who interrupt their careers for whatever reason.

As stated in the country report of Bulgaria (Sretenova, 2009), the current generation of young women scientists in Bulgaria (PhD students and early career researchers before habilitation) are aware of the work-life balance but give priority to career building over their social role as mother and wife. It is also worth noting that according to many recent national and international demographic inquiries, the age of women getting married and bearing their first child has risen. This is true for Bulgaria as well as for most of European countries.

In the framework of the 6th FP-funded project EUMENT-NET, a comparative empirical research was done in Switzerland, Germany, Austria and Bulgaria. One topic identified was the planning of scientific mobility and career in the mid-term (3-4 years). Young (women) scientists in Bulgaria, as well as their colleagues in the Western countries, take into account the significance of scientific mobility and, particularly, of the postdoctoral specialisations for their career development. It is quite disturbing that all respondents view the post-doc not only as a necessary stage of their career development, but mainly as the only opportunity they will have of ensuring a satisfying future for themselves and their families. Some of the representatives of the exact sciences do not plan to return Bulgaria due to the lack of money, modern equipment and stimulating working environment necessary if one wants to do good science. Another topic in the interviews is connected with the question: *what are the deficiencies and difficulties encountered by young (women) scientists in Bulgaria?* Among these difficulties, some interviewees mentioned the ageing of the scientific community in Bulgaria and the slow working habilitation system which has left PhD students with the wrong impression that the Law for Scientific Degrees has a set age limit – 45 years (Sretenova et al., 2008).

Box 14 – Young scientists in Bulgaria

What are the deficiencies and difficulties that the young (women) scientists come across in Bulgaria in their career development? (Postdoctoral specializations abroad – the only perspective for survival of young Bulgarian scientists). Answers of interviewees:
"*I can say that when I go abroad to carry out a postdoctoral specialization, I do not intend to stay there for life. I will do this in order to provide myself a future when I come back here.*" (Early career researcher, chemistry)
"*In Bulgaria, the situation is like this: one cannot miss such an opportunity as specialization abroad. It simply cannot be passed up, especially, when a family and children are involved, for whom a good start must be provided*". (Early career researcher, biophysics)

What are the deficiencies and difficulties encountered by young (women) scientists in Bulgaria? The factor of age, not gender, conditions discrimination (are there clear rules and criteria for a successful career?) Answers of interviewees:
P4 (PhD student, social sciences, FG1): *"Everything connected with career development depends on ambition and on chance. Personally, I do not intend to engage in such, since I have come across chaos in things happening. Simply, things do not happen easily. So, I want to finish my dissertation, to defend it and then, I hope, I will go back to real practice. I think it is very difficult to do science in Bulgaria. Young ambitious researchers are impeded on their way to habilitation. The age limit is absurd!"*
P10 (PhD student, humanities, FG1): *"At the institute, we have a too traditional community. Whatever you do, unless you have reached the set age, you cannot become a senior researcher. No one is inclined to help or support you. There are some people who are very active and ambitious, with specializations and 3-4 books. But they are young, as young as 30 years old. And yet they will only become senior at 45, for example. There are people who are 45 and do nothing, but their procedures have already begun. I suppose that this is not the only place with such respect towards age."*

Source: Sretenova, N., Obreshkov, N., Ambareva, H. & Angelova, D. 2008, *Shorthand minutes of a focus group survey,* EUMENT-NET.

A Hungarian research also proves how easy it is for a PhD student to miss out on scientific research (Tornyi, 2007). The author conducted a sociological research in the University of Debrecen. The results made it clear that the moment of having the first child is set back because either the career or the family life is postponed, and that the number of singles is increasing. In terms of the opinions on gender roles, there is a combination of traditional and emancipatory ideas. Most interviewees consider that the establishment of a life-work balance is not the responsibility of one person alone. Women can achieve a lot in the family if they put their foot down. The motivations of the female students were different, and were strengthened either by an excellent tutor or a prolonged university life. Most of them intend to stay at the university as a lecturer, and only one in ten believes that she could provide more to society with her writings than by raising her own children. On the whole, they have no intention of being the 'contestants' of men. The conclusion of the author is that a kind of confusion arises upon attempting to conciliate gender, social and personal expectations and to reconcile tradition with career. She also states, however, that the growing percentage of women in higher education and PhD training might bring a change in this field.

Historical analysis and portraits of distinguished women

Several historical studies deal with women's admission to higher education from the end of 19th century, focusing on one university (institute) or a specific scientific field. For example, in the case of the Sofia State University (the oldest in the country), several publications have been identified (Daskalova, 2005; Nazarska, 2005c Sretenova 1994, among others). An article by Kissné Novák (2002) explores the history of female scientists at the University of Szeged in Hungary from 1895 to the 1980s, and so does the author of the history of Budapest University of Technology and Economics (Palasik, 2004b). These studies also present organisational practices for building up the scientific careers of female scientists.

Many studies focus on prestigious female scientists, in most cases the first women to gain recognition in a specific field. It is the case of Elizaveta Karamihailova (1897-1968), a Bulgarian pioneer of radioactivity, the founder of experimental nuclear physics research in Bulgaria and the first chair of the department of atomic physics at "St. Kliment Ohridski" University of Sofia (Sretenova, 2003).
A very popular topic among the historians of science is women in the history of astronomy. The author of a Hungarian article explores the life stories of women scientists who pursued careers in a traditionally male field of science, astronomy. The scope of her research covers the 4th to the 19th century, from the Roman Empire to Europe and America. (Kéri, 1998). A Polish author also deals with this topic (Targosz, 2000).

One study examines the life of Mária Telkes (1900-1995), a scientist who carried out research in solar energy. She built her career abroad. The first building in the world that was heated with solar energy was built in Dover on the basis of her plans (Pap, 2000). Another article describes the life and work of an early researcher of radioactivity: Irén Götz (1889-1941), who carried out her scientific activity in Paris as a researcher at the institute led by Marie Curie (Palló, 2000). An article presents the life and work of the physician and welfare worker Bronisawa Duska, the elder sister of Maria Sklodowska-Curie (Kabzińska, 1997). The mentioned scientists are very decisive in the history of science. Their life stories can be considered an example for contemporary female scientists.

In most Eastern European Countries, there are not many concrete contemporary examples of successful women scientists, although biographies of contemporary women have been recently published in some countries. For example, Tupa et al. (2004) and Tupa (2007) in the Czech Republic and Balogh and Palasik (2010) in Hungary.

Box 15 – A room of one's own

The book is a collection of interviews with leading female scientists in the Czech Republic. The title of the collections is inspired by Virginia Woolf's essay 'A Room of One's Own' (1929) and it serves as a metaphor for the space that every woman needs in order to grow intellectually and personally. The collection covers a wide range of disciplines from natural sciences and medicine through to technical and mathematical sciences to art history and sociology. The individual chapters consist of biographical interviews that touch on such gender-sensitive themes as professional self-fulfilment and the harmonization of professional and private life. For the interviewers and editors of the book, it was crucial to see how these female scientists reflected upon their own success and involvement in science and the extent to which they learned to perceive problems that we see as being structural and inherent to how science has historically been set up as something they had to deal with themselves, on a personal level.

Tupa, B., Červinková, A., Linková, M., Řeháčková, D. & Šaldová, K. (eds.) 2004, *Vlastní pokoj: 10 pohledů*, Institute of Sociology, Academy of Sciences of the Czech Republic, Prague.

English edition: Tupa, B., Červinková, A., Linková, M., Řeháčková, D. & Šaldová, K. (eds.) 2006, *A Room of One's Own: 10 Views*, Institute of Sociology, Academy of Sciences of the Czech Republic, Prague.

Gaps

Summarising the gaps connected to the sciences as labour activities of the Eastern group, we can say that future analysis should be oriented towards:

- Large-scale empirical studies addressing the institutional practices of research organisations and universities in terms of work organisation, working conditions and working time and their impact on work-life balance and gender differences in scientific careers. Small-scale studies prevail, but are limited in order to grasp the whole picture.
- Comparison of the conditions of women in different scientific fields during the socialist period and the period of democracy from 1990.
- Evolution/trends in scientific careers from the socialist period to the present time. Gender differences in the patterns of attrition and attraction, retention and promotion, work-life conflict, unemployment and brain drain.
- Identification of good practices: mobility, dual careers, work organisation and family-friendly policies (including child care, elderly care).
- Analysis of the industrial sector.

2.5. Scientific excellence

The literature on gender and scientific excellence addresses why women scientists appear to encounter more problems than their male counterparts 1) in achieving the excellence that they are potentially capable of achieving, if their results are compared with those of their male colleagues in the early stages of their careers, and 2) in having the excellence they achieve recognised by their colleagues of both sexes.

Box 16 – Women who reached scientific excellence, but did not establish a reputation in their time

The Polish author, in a part of her paper, examines the research achievements of Rosalind Franklin, a chemist and crystallographer who made a vast contribution to the discovery of DNA. Franklin is an example of a woman for whom the role of invisible assistant was simply unacceptable. Rosalind Franklin sadly lost the battle. Her defeat, however, was not so much in the struggle with her male colleagues as with the patriarchal atmosphere of the scientific institutions of her time. The example of the British Society of Women Engineers (1919-1940) shows, however, that the professional dominance of men can be overcome in an environment were female circles are sufficiently strong and active. In conclusion, the author analyses some of the difficulties women in sciences faced if they wished to be involved in sciences such as physics or chemistry.

Source: Sobczyńska, D. 1997, 'Miejsce kobiet w naukach fizyko-chemicznych i technice. Historia i współczesność' in E. Pakszys & D. Sobczyńska, eds. *Humanistyka i Płeć (II): Kobiety w poznaniu naukowym wczoraj i dziś*, Adam Mickiewicz University Press, Poznań, pp. 87-113.

There are no detached studies on scientific excellence in research in any Eastern country. The issue of scientific excellence is only addressed within comprehensive analysis, and it appears related with other topics in the following ways:

- In connection with the topic of science as a labour activity focusing on or mentioning the high rungs of the career ladder, scientific productivity, achievements and requirements to reach excellence within the scientific career of women. Work/life balance issues are also very much integrated into this topic.
- In connection with the topic of stereotypes and identity, particularly the issue of the gendering of scientific institutions.
- In connection with the issue of science funding.
- And finally, many biographical studies examine the topic of scientific excellence from the viewpoint of the personal career of female scientists.

The fact is that statistical indicators on women's and men's scientific productivity are also very scarce and do not enable any evaluation.

Scientific excellence is not included in the frequently discussed topics in the country group; it is mentioned in slightly more than a quarter of the publications. Additionally, the rate of other topics mentioned in these entries is especially high: five out of the seven other topics are mentioned in more than the half of these publications, which means that scientific excellence is rarely discussed as a separate question of study.

This is the second topic where empirical methods are more popular than non-empirical methods, within which qualitative approaches have a definite – yet far from outstanding – vantage compared with quantitative approaches. Within the latter category, the representative samples play a decisive role, and while the use of qualitative techniques is more balanced, biographical research and interviews are applied in half of the entries and a quarter of the publications also use case studies and content analysis.

Table 10. Publications dealing with scientific excellence in the Eastern countries

Number and percentage of publications	n	%
Scientific excellence	185	26.7
Relation with other topics		**%**
Horizontal segregation		63.2
Vertical segregation		75.7
Pay and funding		36.2
Stereotypes and identity		54.1
Science as a labour activity		57.3
Scientific excellence		100.0
Gender in research contents		45.4
Policies towards gender equality in research		53.5
Methodological approach		**%**
Non-empirical research		45.4
Empirical research. Quantitative techniques		15.1
Empirical research. Qualitative techniques		30.3
Empirical research. Quali-quantitative techniques		9.2
Total		100.0
Quantitative techniques		**%**
Representative sample		71.1
Micro-data		24.4
Longitudinal/cohort		2.2
Multivariate analysis		17.8
Qualitative techniques		**%**
Biographical research		47.9
Case studies		24.7
Content analysis		20.5
Interviews		50.7
Observations		9.6

Research questions

When addressed, scientific excellence is explored through the following research questions:

- What are the criteria for defining scientific excellence?
- Are there productivity differences in the rate of scientific publications of female and male researchers?
- Are there differences by sex in the final results of evaluation processes?
- What are the views of male and female scientists on scientific excellence?

Research approaches

Most of the studies of Eastern countries are conceptual or state-of-the-art publications introducing the issue of gender into the general debate on scientific excellence. Among them we can find analyses and descriptions of successful women's biographies.

There are also several studies that use empirical research methods for analysing productivity differences by sex. Some of them are qualitative, although in the last five years there has been an increase in bibliometrical studies.

Findings

Gender and scientific excellence

Several publications deal with the debate on gender and scientific excellence, especially in the Czech Republic. Linková (2002, 2007) addresses this topic using the key concepts of 'homosocial reproduction' and 'gate keeping'. Men have easier access to academic positions and research jobs. Gender segregation in the research fields creates a difficult situation for women in the dominantly male research teams. In the academic institutions, which are environments based on masculine values, women are facing discrimination. The problem of values in science is discussed and it is suggested that even though science should be objective and rational, it is not, in fact, value-free. The characteristics of science are stereotypically considered as masculine. Therefore, women are often seen as less equipped to be scientists. The language used in science is gendered. Also, duty to care is a stereotypically female burden and is not recognised in the grant schemes or evaluations of scientific production. There is an age limit for doctoral and postdoctoral grants which coincides with the age at which people start their family. As shown in the ETAN report, for example, gender is also crucial when scientific impact is evaluated. The political power of science is conceptualised and it is found that the institutions funding research are influencing not just the topics covered by scientists but also society at large and therefore, the funding institutions hold considerable power over society. In this context, the Framework programme, as a tool of the European science policy, is discussed and criticised for its focus on competitiveness and on basic research so that the research results are more comprehensive for the public. On the one hand, the discussion in science is open to the public while on the other, the public is excluded from the discussion on the topics researched.

Scientific productivity

The paper of Prpić (1992) deals with the identification of patterns of scientific productivity, which have been considered as a starting point for more complex analyses of publication productivity determinants. Different socio-professional subgroups of researchers publish a significantly different average number of scientific publications. In accordance with the results of her empirical investigation, the socio-professional profile of the most productive Croatian scientists appears as follows: they are men; they are aged sixty and over; they occupy the high(est) organisational positions in their scientific institutions; they have leading roles within various research programs/projects; they are employed at universities/faculties, and finally, they are found among social scientists. Taking into account that leading organisational and research roles, certain scientific fields and institutional contexts are associated with a significantly higher average publication productivity, and considering that even gender and age patterns of scientific productivity depend on research roles, it may be assumed that the division of labour in science might powerfully influence the publication productivity of researchers.

Various studies scrutinise the scientific productivity of female and male researchers through the analysis of bibliometric indicators. Different studies from the Eastern countries analyse the number of publications, projects, grants and so on.

A Hungarian case study examines the scientific publications of the members of two scientific societies, the Hungarian Society of Textile Technology and Science and the Hungarian Chemical Society, in which the proportion of women reaches nearly 50%. Both cases enumerate the scientific production of more than four and a half decades (1948-1995) based on publications in scientific and technical periodicals. The author prepared a new indicator to show female productivity in publications with diagrams and graphics demonstrating the annual number of scientific publications and the proportion of women's authorship and co-authorship. The author prepared a detailed chart in thematic division of the publications in the Journal of Hungarian Chemists showing the number of publications written by women alone and in co-authorship (Vámos, 2005). The proportion of female authors or co-authors is between 2% and 20% during the period 1948-1995.

A Bulgarian empirical study (Караманска, 2003) shows that women academics in engineering have produced more textbooks, practical methodological guides and scientific articles in comparison with their male colleagues. However, the men academics have a larger number of published monographs in their field. In general, women in engineering are less productive than their male colleagues. According to the indicators "number of citations" and "principal investigator" and/or "participant of research project", men academics in engineering also dominate over their female colleagues.

In Poland, there is a good bibliometrical analysis of scientific publications by gender. Webster (2001) summarises the disciplines, determining the favoured types of research carried out by women and measuring the levels of international and national cooperation.

In Croatia, until 2003 gender differences in the scientific productivity of young researchers increased, which may be the result of introducing a more competitive scientific system. Young female researchers publish an average of two scientific papers less than their male counterparts in five years, and their publications reach 71% of men's publication productivity in the same period. In the case of both sexes, about 15% of researchers publish approximately half of all research papers, but even the most productive women publish less than their male counterparts (Polašek et al., 2007). Female scientists' publication productivity seems to be more strongly influenced by their position in the social organisation of science (Prpić, 1992). The survey of the UNICAFE project shows the same results in every partner country (Palasik & Papp, 2008).

Definition of scientific excellence

Some studies on what male and female scientists consider to be scientific excellence show some similarities and differences between men and women. A Hungarian survey on this issue (Palasik et al., 2008) finds that there are no differences between the opinion of male and female scientists in the following items:

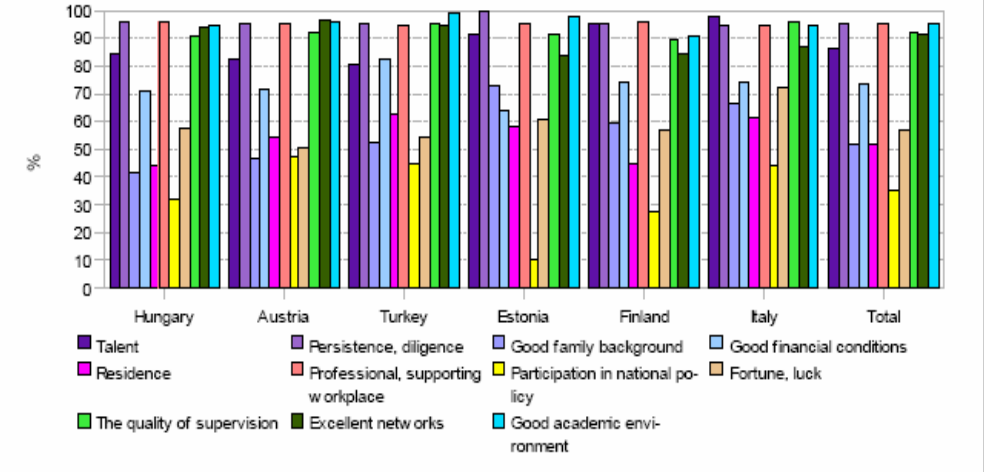
- Publications are good indicators to determine how valuable a scientist's achievements are.
- The best indicator of true success is when his/her name is well known in his/her field.
- In technological sciences, business application is an important manifestation of scientific success.

Palasik and Papp (2008) also found some differences by sex in the definition of the "ideal excellent scientist". In women's opinion the qualities of an excellent researcher are enthusiasm, interest, creativity, persistence, flexibility, determination, versatile acquaintance, solid educational base and research, ambition, thoroughness, vision and hard work. As for the qualities of an excellent researcher, men considered them to be richness of ideas, persistence, thorough acquaintance of one's subject, patience, the will to learn new things, good social skills, flexibility, good networks and the know-how to apply for funding.

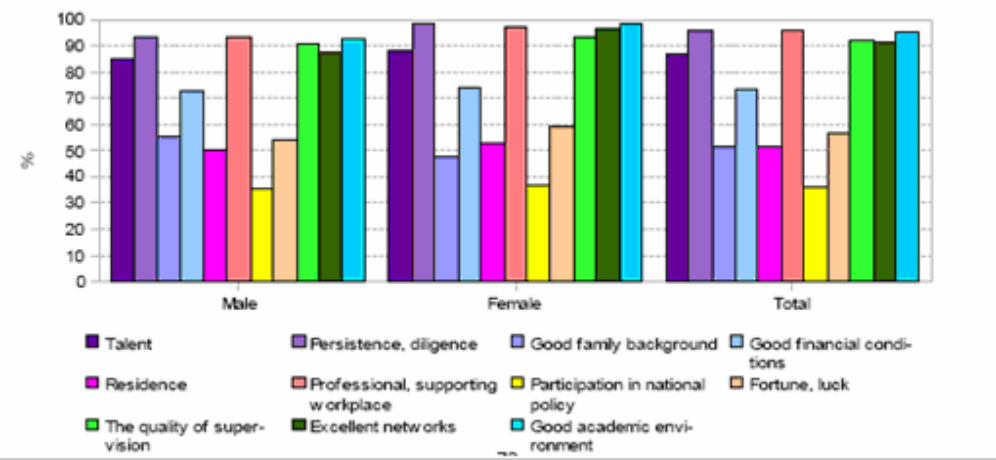
Linková (2009) looks into how female and male researchers in natural sciences define success. The author analyses the notions of success among individuals variously posited in the academic hierarchy. The author argues that the normativity of the concept of excellence has an impact on which notions of success result in a visible progress up the career path and that such a notion of success is not interesting or acceptable for all researchers. In conclusion, the author explores the issue of whether and how the concept of excellence is gendered and the impact this may have on science and society.

Box 17 – Success factors in science

Success factors in science by country



Success factors in science by gender



Source: Palasik, M. & Papp, E. (eds.) 2008, *Beyond the Glass Ceiling. University Career of Female Academics in Engineering, Technology and Life Sciences*, Hungarian Science and Technology Foundation, Budapest, p.72.

Gender mainstreaming in scientific projects

Apart from bibliometrical analysis, some research analyses how women are successful in projects. New research is being conducted in Hungary connected with scientific excellence in this country (Palasik & Schadt, 2008). In the National Development Plan of Hungary, in the research and development priority applied in the Economic Competitiveness Operative Programme (GVOP), the establishment of gender equal opportunity was listed as a horizontal aspect. The goal of the study was to traverse how equal opportunity was presented in the 2004-3.1.1. project applications and to show how equal opportunities for men and women as a horizontal aspect were realised in these research and development projects – which were financed by the Structural Funds – and which difficulties and factors might have hindered this realisation. The scientific examination considered the applicants that came from inside and outside the non-profit public finance, and also the large companies. As a part of the survey, the data of the applications were statistically examined, their content analysed, the questionnaires researched, the co-ordinators interviewed and these interviews analysed. Out of the 168 relevant applications, some 45 had women co-ordinators. The majority of the applications came

from the Central Hungarian region, while the fewest, 5 in all, came from Western Hungary. From the former, 27 were co-ordinated by women, whereas from the latter, none were managed by women co-ordinators. Taking all the projects into consideration, it was obvious that 53 (32%) failed to indicate the gender equal opportunity aspect which would have been necessary in order to win the competition. Only 38 projects showed a genuine equal opportunity approach

Gaps

All countries lack institutional evaluation practices. The institutional evaluation practice is an issue that is practically absent and that would be very important to develop. Furthermore, there is a lack of empirical quantitative research that could start the debate on the creation of gender specific and gender sensitive indicators of scientific excellence.

There is also a need for either theoretical or empirical studies addressing the definition of excellence and/or peer-review practices of evaluation across all institutional sectors and fields of science in general, and from gender perspective in particular. The “masculine” model of success in science and the development of a scientific career were only mentioned in some publications but did not appear as a specific subject of study.

The above-mentioned thoughts are very interesting from the point of view of encouraging research in the field, namely scientific publications, the grant winners, business applications, the numbers of PhD degree holders of male and female supervisors.

2.6 Gender in research contents

In the Synthesis Report of *Monitoring Progress Towards Gender Equality in the 6th Framework Programme* (EC, 2009), the editors drew attention to the lack of understanding of what addressing gender in the research content meant, and what its practical implications were. There was a general lack of understanding as to what was meant by “integrating gender into the content of the research”, which was often interpreted as “participation” only. There were also some indications that it was assumed that the research topics were gender neutral and there was no need for the ‘special treatment’ of women. Another important finding of this synthesis report was that when gender in the research content was considered, biological differences tended to be explored without due regard to the socio-economic aspects which were often just as important. This viewpoint takes a key role in the recommendations of the report. It is said that effective integration of gender in the content of research should consider the biological sex differences and socio-cultural gender differences that highlight the need for differentiated research both from physiological and user perspectives.

In the Eastern group, the main body of publications deal with this topic from three different perspectives:

- From the process of visibility and recognition of women and gender related aspects.
- From an epistemological perspective, which aims to show the conceptual contributions on gender bias in scientific knowledge.
- From the inclusion of gender related aspects and/or gender dimension in the research contents.

In spite of being one of the most ‘mysterious’ topics in the Eastern Country Group, gender in research content is represented by a modest rate of entries in the statistics. It is often discussed together with other issues such as stereotypes, vertical segregation, horizontal segregation and policies towards gender equality in research.

The topic is mostly addressed using non-empirical methods although 40 percent of the publications use empirical methods, particularly the techniques – representative sample and interviews – that are generally most frequent. However, other empirical methods like micro data,

case studies, content analysis and observations are used more often in this topic than on average.

Table 11. Publications dealing with gender in research contents in the Eastern countries

Number and percentage of publications	n	%
Gender in research contents	243	35.1
Relation with other topics		**%**
Horizontal segregation		44.9
Vertical segregation		51.0
Pay and funding		21.8
Stereotypes and identity		53.1
Science as a labour activity		37.0
Scientific excellence		34.6
Gender in research contents		100.0
Policies towards gender equality in research		47.7
Methodological approach		**%**
Non-empirical research		59.7
Empirical research. Quantitative techniques		9.1
Empirical research. Qualitative techniques		18.5
Empirical research. Quali-quantitative techniques		12.8
Total		100.0
Quantitative techniques		**%**
Representative sample		62.3
Micro-data		37.7
Longitudinal/cohort		0.0
Multivariate analysis		30.2
Qualitative techniques		**%**
Biographical research		36.8
Case studies		38.2
Content analysis		26.3
Interviews		56.6
Observations		19.7

Research questions

The process of visibility and recognition of women scientists centres on questions such as:

- What are the main contributions made by women scientists?
- What kind of added value can women give to their own research fields or specialities?
- Are there specificities or differences in the way men and women do science?

From an epistemological perspective, the main research questions are:

- How is the production of scientific knowledge male-biased?
- How do power patriarchal relationships operate in scientific production?
- Who is scientific knowledge addressed to?

Finally, in the context of including the gender perspective in the research contents, the question arises of how to include gender and sex in research, and the socio-cultural gender specificities in the research contents of different scientific fields of study.

Research approaches

The first group of questions relating to the process of visibility of women scientists are basically approached from a historical perspective, identifying and highlighting the main scientific contributions made by women. Their goal is to make women's achievements more visible.

Regarding the epistemological point of view, on the one hand some very good conceptual studies dealing with a general discussion on the gender dimension in scientific knowledge are included. On the other hand, analysis of the institutionalisation of Women's Studies in the Eastern countries is also included.

The inclusion of the gender perspective in the research contents has hardly been developed in the Eastern countries. The social sciences are the disciplines in which this approach began to be developed and where more studies are found, while engineering and technological disciplines are newcomers to this approach and the debate on how to include the gender dimension in the research content has not yet moved beyond a conceptual level.

The Slovak Centre for Gender Studies at Comenius University is the most advanced in this topic.

Findings

Visibility

The position of women in science is in direct or indirect relation to the position and role of women in society. The relationship between male scientists and female scientists has been overburdened with the patriarchal tradition prevailing in global society for too long. The unequal position of women in science is due to the many disadvantages originating from the unequal opportunities offered to women by the system. A greater number of women committed to science, on the basis of the opportunities and conditions for education and further personal scientific development being provided equally to men and women, might have encouraged different concepts of nature, of human beings and of society, and raised different questions and problems, might have highlighted different priorities and, consequently, might have led to a different way of living. The contributions of women in the fields of research and development have proved to be an important challenge to the existing valid intellectual approaches that have been deeply rooted in the andocentric paradigm.

Box 18 – "Forgotten" female achivements

There is an interesting article by Imre Hronszky about 'Women in the History of Science and Technology'. The starting point of the author is a statement made by Caroll Pursell in 1995, claiming that research of the history of technology would still not eliminate men's bias. This is the basis of his examination of male domination that continues to be a subsistent, spontaneously operating aspect in this field. The author underlines that a demarcationist orientation was once the typical attitude seen in the history of science and technology. As in the production-orientated concept of the history of technology, the role of consumption was neglected, much the same as the examination of household technology. The reaction of female historians was to strive to prove the existence of female scientists and engineers. Notable changes in this approach began in the sixties thanks to researchers working in the periodical "Technology and Culture". Their merit is the manifestation of the "forgotten" female achievements in the history of technology, and the demonstration of the disadvantages affecting women in this field in a wider cultural context. The feminist movements had differing relations in this topic. Some extremist voices demanded a history of technology from a gender viewpoint, which contradicts the elemental scientific norms. The appropriate solution might be to explore ways of contextualizing science and technology and locating gender roles within it.

Source: Hronszky, I. 2000, 'Nők a tudomány és a technika történetében' in *Asszonysorsok a 20. században*, Balogh, M. & Nagy, K.S. (eds.) BME Department of Sociology and Communication and the Secretariat for the Representation of Women of the Ministry of Social and Family Affairs, Budapest, pp. 11-23.

Gender and epistemology of science

Box 19 – Feminist Epistemology

The view of science as neutral and not subject to the influence of class, race, gender nationality and politics, was largely rejected during the 1960s and 1970s. Certain movements that focused on the social use of science had recognized science as a vehicle of the capitalist movement and as a means of exploitation, pronouncing science an extended accomplice to the subordination of women, minorities, and underdeveloped countries. One of these movements was the feminist movement. Prior to the criticism of these movements, science was thought of as objective and value-neutral. Modern feminist theory in the 1970s submitted a critical and theoretical concept of gender presented as a way of differentiating between the social construction of masculinity and femininity and the biological categories of male and female. Using this concept as a starting point and incorporating social constructivism, the feminists have articulated the feminist standpoint theory which attempts to construct knowledge from the perspective of women's lives. They stated key moments that have prevented the impartiality of science. The key concept of the standpoint epistemology incorporates the thesis that there exists a need to replace the epistemology of the neutral, disinterested observer of the world with the epistemology sensitive to all specificities of the social context. The feminist version of the theory states that the way women experience social life gives them a unique view to the way society functions, and that the women's, or feminists' standpoint is less biased and distorted, for which they offer a number of arguments.

Source: Bokan, N. 2005, 'Feministièka epistemologija*', Filozofska istraživanja*, vol. 25, no. 99, pp. 865-875.

At the heart of feminist criticism of the traditional concept of reason is the effort to overcome the dichotomous conceptualisations of traditional philosophy and to articulate and redefine the concepts of reason, rationality, objectivity, the subject / object of knowledge, and the cognitive process as such (Haukanes, 2001). Critical approaches are heterogeneous as a result of diverse theoretical foundations that serve as a source of argument. The heterogeneity of the underlying arguments in feminist theory is intertwined with its interdisciplinary nature, where the stress is on co-operation between various branches of knowledge – between epistemology, theory, history and sociology of science, as well as other disciplines concerned with knowledge and knowledge production. The changing character of objectivity here is crucial and is described as "perspectival objectivity". This is important for the notions of academic reasoning and academic objectivity (Farkašová, 2005).

The Czech Republic and Slovakia are the Eastern countries where this issue has been most thoroughly developed. It started as a philosophical question and has been further applied in research projects in social sciences. The Czech National Contact Centre for Women in Science (Prague) and the Slovak Centre for Gender Studies at Comenius University have played a prominent role, together with the Journal for Science and Gender, *Kontext*, which was established in 2002 and discontinued in 2009.

Box 20 – Gender aspects in science: introduction to the main concepts

The first volume of the magazine *Kontext* introduces the basic concepts related to the position of women in science. The cover topics are gender socialization, the relation between women, objectivity and science, parental responsibilities, language and communication, measuring of scientific value, appearance and academic environment and sexual discrimination and harassment. The volume also covers four main theoretical perspectives on women in science. The typology is based on the work of Nicky LeFeuvre. She distinguishes between feminitude, virilitude, patriarchal perspective and gender subversion. Feminitude is based on essentialist views on gender, as there is some typical female and male nature. The more women in science, the more stereotypically female the science will become – empathic, altruistic, and less individualistic. The concept of virilitude is based on the idea that women are forced to adopt dominant –typically male by social expectation– modes of behaviour when gaining success in the masculine culture of scientific institutions. The patriarchal approach explains the exclusion of women from science by symbolic hegemony of men. Gender subversion solves the problem of how to break this vicious circle by deconstructing bipolar sexual differences. The volume concludes with a brief outlook on the history of support for women in science in the context of the EU and the Czech Republic.

Source: Šaldová, K. (ed.), Červinková, A. & Linková, M. 2002, 'Genderové aspekty ve vede: predstavení základních konceptů', *Kontext,* vol. 1 (2002).

Women's Studies

Due to the development of Women's and Gender Studies in the Eastern countries since 1990, gender has become a subject of research in all Eastern countries, particularly from the contemporary feminist epistemology.

An example of the institutionalisation of Women's Studies in an Eastern country is the Slovak Centre for Gender Studies at Comenius University. This organisation provides important knowledge, theoretical conceptions and reflections on problems concerning Gender Studies and it supports gender sensitivity for the existing structural inequalities between genders, which will lead to the cultivation of critical thinking and the ability to develop gender argumentation. The studies conducted by the Centre concentrate on relations between genders in different areas of life and theory, such as philosophy and science.

Box 21 – Institutionalisation of Women's Studies

The project *Women's Employment, Women's Studies, and Equal Opportunities 1945-2001 (*EWSI*)* was carried out in nine European countries (Finland, France, Germany, Hungary, Italy, the Netherlands, Slovenia, Spain, and the United Kingdom). The project shows the developments in women's employment, equal opportunities and Women's Studies in the countries analysed. The aim is to show similarities and specificities through a contrastive method. One part of this research is focused on how each country established and institutionalised Women's Studies. Women's Studies, as a field of knowledge, shows a remarkably similar history. Production of knowledge in the movement soon led to feminist research and later to a scientific endeavour everywhere without the influence of the state. Today, feminist research is established in all nine countries. Feminist research, as a field, is broader, bigger and has been conducted over a longer time than Women's Studies as a field of learning. As a field of knowledge, Women's Studies are more transitional, internationalised and interdisciplinary than many other disciplines. The institutionalisation of Women's Studies is favoured by a modular structure of university degrees, possibilities for interdisciplinarity and funding or support from state feminism (equal opportunities and/or women politicians). Women's Studies is probably the only subject in higher education that was instituted solely by women, meaning that women academics fought to have the subject developed, and feminist scholars established the first courses in the discipline. In all countries, 95% or more of the staff are female

Source: Silius, H. 2002, 'Comparative Summary' in Griffin, Gabriele, (ed.) *Women's Employment, Women's Studies, and Equal Opportunities 1945-2001*, Reports from nine European Countries, University of Hull, Kingston upon Hull, pp. 470-514.

Gender dimension in the research contents

The paragraphs below include some examples of how the gender perspective is introduced in the research contents in different disciplines. Due to the difficulties in identifying research on the inclusion of gender in research contents in Eastern countries, this section does not follow a representative or systematic approach to this issue, but offers some illustrative examples or reflections for each discipline.

The inclusion of the gender perspective in the research contents has been particularly developed in social sciences, with different contributions from the fields of sociology, anthropology and geography.

The main focus and breakdown of the sociological research is the debate on the gendered division of labour and domestic and care work. The issue of the gender distribution of paid and unpaid work in the modern Eastern European family has been studied. Gender evaluation of the extent of equal treatment under gender divisions in the household and family related to three main spheres of unpaid work: domestic, care work and subsistence production in the family. In this connection, the defined problem areas can be summarised as follows: practical application of the different forms of flexible male and female employment; encouraging fathers to assist mothers after birth and in child-rearing; the implementation of schemes for a flexible use of different kinds of parental leave; providing legal rights to those who take a long family leave such as a "career break leave"; improving the current services infrastructure and child care facilities; developing a system for the deinstitutionalised care of the elderly (Šaldová et al., 2007).

Kapusta-Pofahl (2006), an American scholar of socio-cultural anthropology, reflects on her experience of studying and conducting ethnographical research in the Czech Republic. She takes the opportunity to reflect on some of the ins and outs of doing feminist research of science, and more specifically, ethnographic inquiry into the production of knowledge on gender and the practices of Gender Studies experts in the Czech Republic. She focuses not so much on the details of the research but more on the process of conducting the research, particularly the ways in which she has come face to face with the issue of researcher – reflexivity and the situatedness of knowledge in the relations between the researcher and those whose lives she is researching. She faces the problem of objectivity in research, as she finds it necessary to become part of the networks she is analysing. The author hopes to stimulate the discussion among experts and the ways in which personal experience intersects with academic inquiry in ethnographic research.

Some studies have been carried out in the field of geography. According to author's geographical location and gender, an analysis can be conducted of the differences between men and women in terms of space and more precisely, the ways in which they produce, create and use space. In this respect, interesting and important differences can be seen both in the correlations of town–village and men–women (Tímár & Jelenszkyné, 2004).

There are also some studies that analyse the gender dimension in humanities from the study of literature. Some theoretical studies point out that the literature history, from a feminist point of view, is lacking in Hungarian literary science (Kádár, 1994, 1997). Some of the identified aspects are the following:

- The exclusive use of the feminist point of view is as one-dimensional, simplistic and dismissive as the men's point of view was. The author points out that in writing the history of Hungarian literature, the dominating approach excluded women.
- The main challenge now is to re-evaluate the literature written by women. Oddly enough, literature science did not treat the female writers of the second half of the 20th century unfavourably; the researchers' approach, however, was biased by the traditional prejudices relating to the previous times, despite the fact that in the literary environment of the 19th century and the first half of the 20th century, women played an important role.

- The problem is that the literary critics of those times pushed women into the background. The author takes the work of some female writers as examples of women with a significant writing, translating and editing activity.

In the fields of medicine and life sciences there are also interesting contributions dealing with the inclusion of gender perspective in the research contents.

Sobczyńska and Bilska (1997) carried out research from the perspective of eco-feminism, natural maternity and the in vitro method (1997). In their quest for a satisfactory interpretation of the philosophy of the phenomenon of maternity, both authors turn to the eco-feminist programme. A brief history, the principle theses and directions of eco-feminism are provided. Claiming that eco-feminism is conducive to the development of woman's self-consciousness and the dignity of maternity, the authors analyse a more controversial phenomenon, namely in vitro fertilisation and embryo transfer (IVT-ET). The advancement of science and technology during the seventies and eighties broke the powerful religious and cultural taboo with regard to the mystery of the conception of human life. Feminist writers have frequently expressed their critical views on the mental and social coercion of women with reproductive “duties” imposed on them. However, the in vitro techniques used in rich western countries have led to a number of unexpected consequences which have had a negative impact on women coming from economically and socially less privileged classes of society (commercialisation of maternity, trading in women and children). Certain observations made by eco-feminists may help in the attempt to evaluate the phenomena from an ethical point of view. The authors are also of the opinion that the new reproductive technologies which have become available nowadays lead to an instrumental treatment of children.

Box 22 – The House of Birth. Cultural Anatomy of Birth-Giving

A critical analysis of basic gynaecological concepts, institutional practices and professional education for birth-giving represents the framework of the cultural sociologist Zalka Drglin (2003). Research in the monopoly of the medical sciences over birth-giving is carried out in two contexts. The first examines images of science and images of women in history and in the present-day health care system in Slovenia. The second one deals with the division of labour between medical doctors and midwives as a typically female job. The analysis of the everyday routine in Slovene child-birth clinics indicates that gender bias and discrimination of medical staff seem to be a good indicator of gender discrimination. During the last decade, new practices have been implemented on top of the old gender-biased institutional routines and disciplinary practices. For example, The National Committee for Encouraging Breast-Feeding of the Slovene UNICEF was organised, promoting and implementing rather than imposing campaigns related to breast-feeding infants and young children. Indirectly, this may affect women’s professional careers and life/work balance. Despite important contributions of women in the history of birth-giving, women’s contribution to the history of gynaecology has not been properly recognized. The professional organisation of midwives, with a long tradition of professional societies, scientific journals, professional education of good quality, and so on, has not been positively evaluated. Also, professional changes over the years have not been favourable. Today, the professional status of midwives seems to be even worse than before. Being a midwife means having a typically female job with a comparatively low wage, unfavourable working conditions and long working hours. The general conclusion is made that in Slovene gynaecology, gender has been considered in a value-biased way. In the conclusion, some suggestions for good practices are put forward.

Source: Drglin, Z. 2003, *Rojstna hiša. Kulturna anatomija poroda*, Delta, Society for Cultural Studies, Ljubljana, Ljubljana.

Finally, from the scientific disciplines related with engineering and technology, the inclusion of the gender dimension in research contents is scarcely developed and few studies are identified.

Box 23 – World of Nature and World of Technology

This book, edited by Danuta Sobczyńska and Antoni Szczuciński, focuses on gender issues in a technological context. It reflects on the odd, albeit challenging, relationship between women and technology and is followed by eight examples characterising the complexity of these issues: *'Women and femininity in the tradition of Western thought*' ponders on close links between women and nature rather than technology; *'Do masculine versus feminine technologies exist?*' considers a possibility of en-gendered types of technology; *'The negative experiences of women in their contact with technology*' considers the 'horror towards technology' traditionally ascribed to women; *'An optimistic picture. Augusta Ada King is writing the first computer program'* describes the almost unknown history of female creative mathematicians; *'The cautiously optimistic one, e.g., feminine inventiveness. Women's education in the domain of natural sciences and technology*' enumerates discoveries and patents which unquestionably belong to women and reflects on the conditions necessary to obtain such results; *'Presenting what women manage, when they have to. On English women technicians during WWI'* describes well-known processes of 'female replacement in the work force' especially during the wars; *'Feminist critique of technology. Eco-feminism - women's covenant with nature*' returns to the very old connection in its new embodiment; *'Feminist alliance with technology. Cyber-feminism?*' is an attempt to find a new spirit in women and a nature bond through ICT. Towards the end, the author explores the possible future of the problems undertaken and recognised connections between gender and technology.

Source: Sobczyńska, D. 2006, 'Kobiety i mężczyźni, nauka i technika.Osiem obrazków z kalejdoskopu' in Sobczyńska, D. & Szczuciński, A. (eds.) *Świat natury i świat techniki*, Wydawnictwo Naukowe Instytutu Filozofii Uniwersytetu Adama Mickiewicza, Poznań, pp. 27-53.

Gaps

The Slovak Centre for Gender Studies at Comenius University is the most advanced in this topic. However, this topic is one of the least researched topics in all European countries, which is also the situation in Eastern countries. Taking this into account and acknowledging the recent development of Women's Studies in Eastern countries, one of the main gaps identified is the lack of studies on epistemology of science from a gender perspective and the debate on gender bias in the production of scientific knowledge.

There is also an important research gap with regard to the introduction of the gender dimension in research contents in health and life sciences, and especially in engineering and technology.

2.7 Policies towards gender equality in science

The topic of policies towards gender equality in science covers the research on the different measures taken by actors at several levels – European, national and regional companies and institutes – to promote equal opportunities for men and women in science.

A common trend of the Eastern countries is that gender equality policies are initiated and driven from the European level. Gender mainstreaming became part of the political discourse on science during the EU accession process. Not only research, but also policy making and even the establishment of national institutions were fostered by the European Union.

The recent implementation or the scarcity of gender equality measures explains why this topic has not yet drawn much attention in the literature on gender and science.

However small the topic of policies towards gender equality in research may be in the Eastern Country Group, more than a third of the publications refer to it. Nevertheless, it is usually discussed in the same publications along with some other topics, most frequently vertical and horizontal segregation.

The majority of the entries stick to a non-empirical approach, although more than two out of three publications use some empirical techniques as well. Not surprisingly, qualitative techniques are frequently used, mainly interviews, but the rate of the occurrence of content analysis and case studies is relatively high. The main quantitative technique, as usual, is representative sample.

Table 12. Publications dealing with policies towards gender equality in science in the Eastern countries

Number and percentage of publications	n	%
Policies towards gender equality in science	256	37.0
Relation with other topics		**%**
Horizontal segregation		59.4
Vertical segregation		69.5
Pay and funding		33.2
Stereotypes and identity		46.1
Science as a labour activity		43.0
Scientific excellence		38.7
Gender in research contents		45.3
Policies towards gender equality in research		100.0
Methodological approach		**%**
Non-empirical research		58.6
Empirical research. Quantitative techniques		9.8
Empirical research. Qualitative techniques		20.3
Empirical research. Quali-quantitative techniques		11.3
Total		100.0
Quantitative techniques		**%**
Representative sample		66.7
Micro-data		29.6
Longitudinal/cohort		0.0
Multivariate analysis		29.6
Qualitative techniques		**%**
Biographical research		25.9
Case studies		32.1
Content analysis		35.8
Interviews		59.3
Observations		12.3

Research questions

Since gender policies are an important feature of the European Union policies, a large part of the research questions raised in this country group are related to European or EU policies. There is also a temporary coincidence of the emergence of such research questions and the EU accession process of these countries. One of the main research questions asks what is to be adapted from existing European policies and practices. Some studies also address the possibility of adapting successful examples of measures like targets, role models, mentoring and funding schemes already existing in Europe.

Another part of the literature deals with the national level. Among the studies that went beyond simply mentioning the deficits of the national policies, we can find comparative studies that address the situation in Eastern and Western countries

Finally, there are also studies that deal with the best ways of implementing gender mainstreaming in the national context. Much of the relevant literature deals with the problem of increasing the proportion of female researchers. These seek the ways in which women could be initially encouraged to engage in a scientific career, how they could be attracted to traditionally male dominated territories, how stereotypes hindering women could be fought, and how the gradual attrition of women after graduation could be stopped. Another aspect of the same question is how to enable women to reach the higher rungs of the hierarchy ladder and occupy more positions in the decision making bodies, funding bodies, academic committees and panels in the R&D sector. A strong feature of the Czech and Slovakian research is that the question of quotas is quite centred in this regard. The main research question here is whether imposing quotas in different scientific bodies as a form of positive discrimination is a useful way of promoting women's career or whether it is useless and counterproductive, making a concession regarding talent and excellence. In these former socialist countries, there is also the question of whether new forms of quota systems are any better than previously discredited applications (Kolářová, & Červinková, 2008, Jenko et al., 1999).

These publications often discuss a broader topic, the situation of women in general from vertical and horizontal segregation to stereotypes, work-life balance or pay and funding, but the authors make suggestions to policy makers in decision making positions as to what measures should be taken or at least what problems are relevant and where something urgently needs to be done regarding equal opportunities.

Research approaches

Under this topic there are a lot of entries regarding gender policies in science that use a descriptive approach or develop policy recommendations on the basis of the analysis of the situation of women in science.

There are also some entries that carry out qualitative research on policies. In some cases, it is based on the content analysis of documents, analysis of legal frameworks, institutions and affirmative action plans in different countries (e.g. the BASNET project of the Baltic States in Satkovskiene, 2007). Sometimes this qualitative approach is also supported by the evidence drawn from recorded interviews with female scientists discussing the disadvantages they have encountered in their careers so far. Although very little data of this kind is available at present, this seems to be a viable approach to map the local implementation of national and European level policies and the existence and efficacy of corporate gender policies.

What is still a black sheep mong the rare number of relevant publications is the examination and analysis of the implementation of gender policies. Although these measures were only introduced towards the beginning of the millennium, there are some projects that have attempted to explore the effects of existing regulations. Hopefully, the number of such publications will rise as more and more gender-related data become available and make progress visible:

- A Hungarian survey used combined methods at the Budapest University of Technology and Economics to ascertain the situation at the university after the Plan for Equal Opportunities was introduced in 2005. These included a collection and analysis of statistical data, questionnaires and interviews with both male and female professors and content analysis (Palasik & Schadt, 2008).
- A similar Romanian study examined whether public and private companies were committed to policies of equal opportunities (Balahur, 2006).

Findings

All the country reports highlight the lack of a satisfactory gender-sensitive legislation and measures. It can be stated that a large part of the introduced regulation was initiated by the European Union institutions partly during the period of the accession process and partly after the EU admission of these countries. In many cases, therefore, we can speak of the application and accommodation of European measures and policies which lift the "burden" from the shoulders of national policy-makers (Jogan, 2004). It also means that in some countries, gender-related national policies and measures are exceptional since the policy makers are not devoted to the problem of gender equality and they are satisfied with the existing level of measures and attention which mainly arrives from the European level (Linková, 2006; Palasik et al., 2008). Another feature which can be linked to the above is that some of these measures are more decorative than operational, which means that governments are easily satisfied with the establishment of an institute for gender affairs or research but they pay much less attention to the implementation of its proposals (Novelskaite, 2008a). It is also common that even those concerned have relatively poor knowledge of political orientations as well as practical measures (Linková et al., 2007). In addition to the low level of cooperation and exchange of information between various important state and research institutions, as well as the media, there is an absence of appointed individuals and bodies responsible for integrating the principle of gender equality in all levels and domains of scientific activities.

Some reports point out that one of the main reasons why gender measures are insufficient is the lack of basic research that would enable an assessment of the situation. The lack of consistent data on the distribution of men and women in science at all levels of the hierarchy together with the lack of research on women in science issues in the Eastern countries pose a fundamental obstacle in gender mainstreaming. There is much to do with regard to the availability of sex-disaggregated data and monitoring of the position of women in science at the national level. It needs to be systematised in order to promote gender equality in all private and public research institutions in the region (Piscová, 2003).

Despite the fact that measures have been taken, it is still unsure whether they are generally accepted or meet the agreement of female scientists. In some countries, there is an intense debate on the question of quotas. The introduction of quotas for women has been strongly opposed both in politics and in science. Their main argument is that any quotas compromise talent and scientific production. This point of view is also accepted by many women who claim they do not want to be "quota professors" who are believed by their colleagues to have advanced because of the quotas rather than on the merit of their scientific achievements (Kolářová & Červinková, 2003). However, the other side still holds quotas as an appropriate tool for gender mainstreaming (Jenko et al., 1999). It is suggested that equal treatment is not the same as treatment that is equal in terms of rights, benefits and opportunities (Miroiu [Мирою], 2008).This debate has another approach in the former socialist countries where some kind of quotas already existed before the change of regime. It did not necessarily set a strictly given percentage but strived towards a fair reflection of the scales of society. The formal application of these quotas has played an important part in the discrimination of the quota system itself (Čermáková, 2004; Pető, 2006).

Box 24 – About quotas

Applying and questioning quotas for the representation of women and men.
This article discusses quotas, which have become a very controversial topic in the Czech Republic. The public have debated the introduction of quotas in Czech politics over the last several decades despite the fact that quotas are successfully used in some countries in Western Europe. The article examines the experiences from the countries where quotas are applied, it discusses the changes in arguments in the enforcement of quotas and also how certain litigations concerning positive discrimination ended. Quotas are part of the so-called positive action, which is used when formal equality or the application of equal treatment between men and women is not sufficient to factual equality for men and women. A comprehensive approach to gender equality has led to legislative changes in several countries. Positive action measures vary greatly - they include, for example, projects that seek to make science and research more attractive for young girls, encouraging women to apply for a job or a grant, the creation of research jobs, especially for women [Science European Union policies in 2000] and last but not least, the targets of percentage shares of women and men in public bodies.

Source: Kolářová, M. & Červinková, A. 2003, 'Uplatňování a zpochybňování kvót pro zastoupení mužů a žen', *Kontext*, vol. (2)2003, no. 1-2.

One of the most common methods of helping women scientists through their first years and enabling them to gain ground and advance in their early careers is mentoring. Mentoring programmes have been carefully analysed in Bulgaria by means of a comparative research covering Austria, Germany and Switzerland. The main results that have already been achieved are the following: a) the preparation of a guideline manual 'Establishing Mentoring in Europe' which appeared in 2008 in English and Bulgarian and serves as a practical tool for the launch of mentoring programmes for the early stages of female researchers in the Eastern countries; b) the outcomes of an empirical study carried out to investigate local receptivity towards the planned knowledge transfer on academic mentoring and the potential initiation of a pilot mentoring programme in Bulgaria, and c) the elaboration of the first on-line database of female researchers at the Bulgarian Academy of Sciences is available on the Internet (Eument-net, 2008; Sretenova [Сретенова] et al., 2008; Sretenova [Сретенова], 2008).

Another relevant question refers to grant policies and work-life balance. In the Eastern countries, the regulation is mostly blind to the fact that young female scientists have to assume family duties – especially child bearing and maternity leave – in their early careers. The situation remains the same, despite the fact that many have spoken out, asking for some of these years to be taken into account in grant schemes and other scientific proposals, and for different age limits to be established for women with children (Tenglerová, 2007).

Box 25 – What Do Young Women Scientists Expect from the Introduction of the Academic Mentoring Programme in Bulgaria?

This study is part of the 6FP project "Building a European Network of Mentoring Programmes for Women in Academy and Research" (EUMENT-NET). The objectives of the two focus group sessions with highly potential junior women scientists in Bulgaria were as follows:
-To collect information and obtain feedback regarding the deficiencies and gaps related to the advancement of their academic career. The implication was that the instrument of 'academic mentoring', if introduced in Bulgaria, might fill the existing gaps.
-To estimate what kind of mentoring programmes, i.e., face-to-face mentoring, group-mentoring, peer-mentoring, cross-mentoring, and so on, seem relevant to the specificity of the Bulgarian case.
-To identify the potential supporting and hindering context-factors which might either facilitate or impede the implementation of academic mentoring programmes in Bulgaria.

Source: Sretenova, N., Obreshkov, N., Ambareva , H. & Angelova, D. 2008 [Сретенова, Н., Обрешков, Н. & Амб, Х.], 'Kakvo ochakvat mladite zheni v naukata ot vavezhdaneto na programi za akademichno nastavnichestvo v Balgariya?', NAUKA, vol. 18, no. 5, pp. 43-47.

['Какво очакват младите жени в науката от въвеждането на програма за академично наставничество в България? ', Наука, vol. 18, no. 5, pp. 43-47.]

During the socialist era it was quite common for the larger workplaces themselves to offer childcare facilities as they were a part of the state welfare system (Šolcová, 1984). After the change of regime, most of these institutions were closed due to lack of financing. Nevertheless, some companies – even private companies – offer the benefits of nursery schools to their employees. On the other hand, given that gender sensitivity is not generally a factor that enhances the image of workplaces, they are not spurred by the pressure of the public opinion to develop gender policies.

Moreover, having children is not generally accepted as something that would deserve any kind of positive discrimination. These claims are often rejected on the argument that children have two parents. The opponents of positive discrimination overlook the fact that it is not only during the first few years when women are largely responsible for the child care duties in the family but continue to assume this role in later years, which is a deeply rooted form of hidden discrimination (Piscová, 2004). This illustrates the point that it is not only official measures that are necessary, but that awareness needs to be raised regarding issues that intend to change public opinion and social habits. This desirable change requires a much longer period than other solutions like quotas where results are produced immediately. For example, in these countries the institution of parental leave was introduced but a father who takes paternity leave is still considered an oddity (Kornhauser, A. 1997).

Some studies touch on the evaluation of gender policies on European, national and local levels. As a rule, these studies do not centre on the evaluation of the effects the measures had, but rather compile and compare statistical data that show whether gender mainstreaming measures were successful. The answer is usually negative because despite the fact that more and more women enter universities, to such an extent that since the regime change they constitute the majority of university students, they still come up against different discriminatory obstacles in their careers and many of them are compelled to give up their scientific advancement. The evaluation of gender policies in science rarely surpasses the level of the comparison of statistical data. That is why the study by Palasik and Schadt (2008) deserves attention. The study aimed to map the application of gender equality guidelines to a given call for proposals in Hungary (see next box). This example also reveals that formal requirements are not satisfactory given that applicants are sometimes even unaware of the meaning of gender equality.

Box 26 –Suggestions on what to do at national level

This article takes a stand on the need to explicitly include gender mainstreaming in the calls for research and development applications at the national level. Additionally, it make suggestions on how gender equality could be further enforced in the application process and awarding procedures.

Suggestions for the call for applications

- The invitation for applications ought to explicitly include gender equality.
- The invitation for applications should unambiguously state what is expected of the applicant in phrasing the aspect of horizontally enforcing equal opportunity. If the invitation for applications and the guide to applicants state that without substantially demonstrating this aspect the application will not be successful, those inviting applications ought to adhere to this, otherwise the representation of this aspect in the application becomes a formal necessity, obstructing any real change in this field.
- During the evaluation of the applications, equal opportunity aspects should be enforced more powerfully. Should the applicant not devote enough thought to this aspect, the grant ought to be withheld. In the case of a good application, a correction and a supplementation might be requested.
- The reviewers and the evaluators need to be prepared regarding the appreciable content elements, the possible versions and the significance of the equal opportunity aspects.
- The research basis that can assist the applicants in formulating the equal opportunity goals needs to be gauged and activated.
- A competition reference book needs to be put together including suggestions on how to create and realise a successful application regarding gender equal opportunity.
- The society of researchers needs to be made aware of the significance of social gender in the research process and in the application of the research results. They should be made to realise that it represents an additional value in all disciplines, as well as in research topics and in the actual research. The researchers should be convinced that this is a social as well as an economic goal. It should be brought to their attention that this issue does not constitute a problem merely for women; therefore, both sexes should be equally interested in its realisation.
- The researchers ought to be encouraged to integrate gender-sensitive examination in their researches. The applicants should be taught how they can horizontally integrate into their applications the aspect of social genders, i.e. they should consider this on all levels of research, wherever possible.
- The participation of women in scientific research should be increased. More and more women with high academic degrees should be included in the application process, or should partake as evaluators.
- The applicants' attention should be brought to the fact that it is not sufficient to prohibit the contravention of equal opportunity, but that equal opportunity ought to be planned with a factual project.
- In realising the applications, special attention should be paid in the phase report as well as the final ones to the practical realisation of the equal opportunity aspects.
- At the same time, in the consistent employment and institutionalisation of gender equal opportunity, even the appearance of measures "benefiting only one of the genders", has to be avoided to prevent stigmatisation.
- It needs to be emphasised that the realisation of equal opportunities between the genders is important due to the enforcement of democracy as well. The related principles should be asserted in outlining and accomplishing the projects, as well as in distributing the resources that are available or have been acquired during the application process.
- Simultaneously, the issue of "what has happened so far is not enough" needs to be emphasised as well, since many are not even aware of this fact – as the researches indicated. The institutions, as well as the actual benefactors of the successful applications, do not feel that they themselves are the victims of gender discrimination.
- It should be resolutely stressed that the problem of reconciling one's working and one's private life ought to be as much of a burden to women as to men, and they ought to distribute responsibility equally.
- Although this was not the prime focus of this current research, it is highly likely that there are several people who, although being aware of the importance of establishing equal opportunity, do not wish to discuss this or demonstrate this in an application, and out of fear of being stigmatised, they avoid mentioning or outlining the "non-special" topics. (It is also possible that there are some people who would be willing to do so, but they are too few.) As this does not disqualify anyone from winning the competition, they might see their negligent behaviour justified.

Suggestions for the applicants

- The applicant should use the theoretical assistance of those inviting applications in order to realise the programme of equal opportunity.
- The applicant should enumerate the statistical data of those participating in the research, such as their age, sex, and working phase.
- The applicants should take advantage of the possibility of telework.
- The applicants should take advantage of the possibility of part-time employment.
- The applicants should take advantage of the possibility of employing researchers with small children.
- The applicants should take advantage of the possibility of flexible working hours.
- The applicants should take advantage of the possibility of establishing a family-friendly workplace which might help women as well as men in reconciling their working and their private lives.
- The applicants should take advantage of the possibility of supporting those who wish to return to work after some hiatus.
- The applicants should take advantage of the possibility of improving the institutional conditions of the workplace relating to child-care.
- The applicants should take advantage of the possibility of supporting young people working on their PhDs.
- The applicants should take advantage of the possibility of a dual career, i.e. the programme of realising a parallel career for scholar spouses.

Source: Palasik, M. & Schadt, M. 2008, *Férfiak és nők esélyegyenlősége mint horizontális szempont az alkalmazott kutatás-fejlesztési projektekben* , National Office for Research and Technology, Downloaded on 31/10/2008, Available at: www.nkth.gov.hu/nemzetkozi-tevekenyseg/nok-tudomanyban/hirek-aktualitasok/ferfiak-nok.

Gaps

It seems to be easier to speak about the gaps than the findings since this area requires major development in the future. On the one hand, the gender topic gained ground somewhat later in the Eastern countries at large. On the other hand, gender policies were established in the first years of the new millennium and the time that has passed since then has not been enough to make a systematic evaluation of the outcome. Better cooperation, joint action, data and research are needed in order to progress and achieve a critical mass in gender policies

Most of the reports stress the pressing need for research and publications that explore the practical side of gender policies. This means that the time has come to draw attention to the evaluation of those that already exist, some measures that were introduced a few years ago:

- Even the periodic annual monitoring of gender related data is missing. It is highly uncommon to have easy access to data that shows the trends of women's presence in the higher levels of scientific hierarchy. Such statistics would be a key element in raising the awareness of the scientific public opinion to the importance of the question. They would also reveal if rules were a mere formality and the promotion of women's advancement was accepted in words but neglected in practice.
- Most publications use a general approach, they are theoretically founded and they are based on descriptions of rules and desired situations without further concretion of the everyday practices of scientific institutions and research places.
- We have examples of some good practices – most of the cases from Northern or Western countries – but no positive illustration of how these initiatives can be successfully followed in these Eastern countries. More could be done regarding the promotion of these best practices as well.
- Given that at present, an evaluation of this kind would only be able to explore scientific institutions and universities, decision-making bodies of grants and funding have not committed themselves to a gender-sensitive evaluation system.
- It would be useful to know more about the activity of the institutes and committees that were designed to support equal opportunities for women in science. It is time to explore the efforts they made to promote gender equality in science and the obstacles they met.
- The evaluation of gender mainstreaming measures on an empirical basis is non-existent. Case studies should be conducted with the aim to explore the situation in the workplaces and spotlight the reasons behind the prevalence of gender inequalities in everyday practice.

Finally, we can confirm the need for further gender-sensitive legislation and measures and at the same time, the importance of assertive government support (Sretenova, N. 2006; Jogan, M. 2004). Systematic evaluation of the implementation of gender policy measures is essential in the form of empirical data collection from the different levels and institutions. This would not only prove the government's commitment to the problem, but would also attract greater attention to the topic, thus enforcing the advancement of gender equality in the practice of scientific institutions and bodies.

Box 27 – Example of a new measure

In March 2009, the Hungarian Academy of Sciences (HAS) implemented a new measure for young mothers – and fathers too, if they stayed at home for maternity leave. The parents are given an extra two years after the birth of every child, in the case of grants which contemplate the age limit HAS has examined a career model for scientists, how the Academy can become a family-friendly workplace and how it can support the progress of scholars in similar stages of their career.

Source: Palasik, M. 2009, *Country report of Hungary*.

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3. Conclusions

By Nikolina Sretenova

The experiences of the other countries across Europe and worldwide reveal that all of them have passed through a similar *three-stage pattern* in the initiation stage of academic research on gender and science. The *pattern* is depicted as:

First stage**:* women's movements from the 1960s and 1970s; ***Second stage**:* institutionalisation of Women's Studies as a distinct academic discipline within the university setting, accompanied by the establishment of feminist periodicals (in the early 1980s); ***Third stage: academic research on gender and science as part of the already established Women's Studies/Gender Studies university units and/or centres (the period covered by this project: 1980-2008).

In the Eastern country-group, a kind of '*socialist state feminism*' was at work for half a century, this proclaiming the universal equality of rights between the two sexes in all fields of public affairs. Accordingly, the gender equality question was not perceived to be an issue at all, either within society at large or the academic communities. In the fields of higher education and research, in particular, it was believed that the matter of gender equality was treated fairly. But was this really the case? In practical terms, many women scientists from the Eastern countries never thought about gender issues as a problem. Some of them still believe that it is a non-existent problem that is being imported from the Western countries. Careful analysis of horizontal and vertical segregation reveals that some similarities between the underrepresentation of Eastern and Western female academics and researchers do exist in the senior positions in Higher Education (HE) and research (Government R&D), and in the respective decision-making bodies. However, a specific kind of *gender blindness* (deeply ingrained in minds for a half century) precludes reflection on the issue. Hence, the Eastern countries faced a difficult start and still have a long way to go in terms of 'mainstreaming gender equality in scientific research'. The same is true for their production of literature in the field of gender and science.

Nevertheless, due to the formation of women's movements and NGOs from the beginning of 1990s to the turn of the century, units for Women's Studies/Gender Studies were established in the university settings of all countries of the Eastern group. Thus, the second stage of the identified *three-stage pattern* of the initiation stage of research on gender and science in the Western European countries was completed in the Eastern countries in 2000, i.e. lagging behind the other countries by twenty years. It is also noteworthy that the newly launched units for Women's Studies/Gender Studies are not necessary engaged with research in the field of women and science. It is more likely that, at the very beginning of their institutionalisation, activities have been focused on knowledge transfer from the established Western Centres and/or university units for Gender Studies, as well as the quest for shaping their own research profiles.

The process of shaping the distinctive academic discipline of 'Women's Studies', along with its institutionalisation, occurred at different paces across the Eastern countries. In this regard, it should be acknowledged that European Commission policy of mainstreaming gender equality in scientific research, as well as the financial support provided from the FP5, FP6 and the current FP7 programmes for different activities in the field of gender and science were a driver and catalyst both for the institutionalisation of the discipline and for the framing of research in gender and science agendas in the countries of the Eastern group. The case of the Czech Republic is very instructive here. In 2001, the Czech Ministry of Education, Youth and Sport, in response to the Commission policy of gender mainstreaming in scientific research, provided a national resource by funding the establishment of the National Contact Centre for Women in Science (NCCWS). The NCCWS was founded and has existed to the present day on the basis of a project at the Gender and Sociology Department at the Institute of Sociology of the Czech Academy of Science. In 2002, *Kontext*, a journal on science and gender was launched.

The journal was discontinued in 2009 due to the fact that there is growing pressure on publication in peer-reviewed, impact-factored journals, especially in the Anglo-American context.

We focus attention on this Centre because it is the sole ***institutionalised structure*** dealing with the issues of women and science, not only at the national level in the Czech Republic but also at the regional level of the Eastern country-group, which is to say that the field of women and science has not been institutionalised in any other country of the Eastern group. In the course of time, the Czech Republic gradually became a regional leader within the countries of the Eastern group in terms of research activities focused on gender and science. The NCCWS, in being an advanced locus of research on women and science, is presently a source of inspiration among the countries of the Eastern group. In the GSD Czech entries exceed 100 out of the total number of 445 publications published in the Eastern countries, i.e. the Czech Republic contributed to the GSD with about 25% of the total entries of the Eastern country-group. We identify a direct connection and positive correlation between the institutionalisation of the 'women and science' field in a given country and the respective number of publications on the topics defined in gender and science research agendas. This claim is empirically verified by the GSD. The bulk of publications produced in the countries of the Eastern group are from the period under discussion (2000 -2008) and the greatest share among them belongs to the Czech NCCWS. A similar positive link could be identified between the rate of the Eastern countries' participation in the FP-supported projects on women and science and the numbers of their entries in the GSD. For the Eastern women scholars, participation in these projects was a learning experience, namely ***'learning by doing'.*** This participation was also the inspiration for initiating academic research in the field, within the national scenes of the Eastern countries. The process is still at the very beginning but we feel obliged to acknowledge the role of the Commission as a driver and catalyst for the bulk of publications identified for the countries of the Eastern group as entries in the GSD.

Some of the most important preliminary and pioneering work in the start-up of academic research on the theme was carried out by Eastern European women scholars in the fields of *'Social sciences'* and '*Humanities'*. They invested time and effort in creating ***a new conceptual language and notions in their own native languages*** in order to facilitate the ongoing processes of knowledge transfer. For example, notions like *leaky pipeline, glass ceiling, sticky floor* and many others which had never before been articulated among the respective academic communities of the Eastern countries need to find adequate analogues in the native languages of the Eastern countries. This was indeed a challenging and creative formative activity which set the scene for meaningful debate on women and science issues.

The developments outlined above suggest that the year 2000 should be considered as ***a turning point*** for the countries of the Eastern group with regard to undertaking academic research on gender and science issues.

During the days of 'socialist-state feminism', some sporadic literature produced inside and outside academia appeared on the defined topics. It had the character of a general introduction in which all issues were discussed within the framework of a single publication. The most prominent research topics at the time were *'Horizontal and vertical segregation'* and '*Science as a labour activity'* and, in particular, the issue of ***work-life balance***. The issue of scientific excellence was discussed only in terms of female and male scientific production. The majority of these publications were imbued with ideological rationale rather than academic arguments. For example, some of them, within the framework of directives issued from the ruling communist party, discussed the role of women in the building of a fully-fledged socialist society and the advantages that women in the socialist societies have in comparison with women in capitalist societies, in the fields of higher education and the socialist economy (e.g. the labour market). The publications of this period approached topics such as *'Horizontal and vertical segregation'* and '*Science as a labour activity'* from the point of view of emancipation and human rights and not from the contemporary standpoint of the 'loss of human potential'. More advanced research at the regional level of the Eastern countries at the time was done in Croatia and Slovenia. For example, in Croatia, at the beginning of 1980s, some quantitative and qualitative research was conducted, applying different methods like the time-budget diary, surveys, interviews, and so on. One should also note that, in the mid-1980s, publications appeared inside academia,

offering ***critical reflections*** on the formal gender equality politics and policies under socialism. It is no accident, therefore, that very few entries from the socialist period are present in the GSD.

Concluding lines on analysis, by topic:

Horizontal and vertical segregation:

After the change of the regime, a new *historical trend* shaped the production of literature on this topic (as well as that on some other topics).This *historical shift* in research interest in gender and science came to fill the existing knowledge gap on the national scenes of the Eastern country-group. A considerable number of publications focused on the period between the end of the 19th century and 1940, carrying out a *historical investigation* of women's access to higher education, narratives of the life stories and career building of distinguished women scientists in the different national settings and documentary studies on the history of women's movements and women's cultural contributions.

In some countries, during the period 2000-2008 (e.g. Croatia and Lithuania), the research focus was a single scientific field – medical science – while in others (e.g. Romania and Bulgaria) research interest was more drawn to the Natural Sciences, Engineering and Technology and Agricultural sciences. In Slovakia some research has been done on women in decision-making positions.

The main lacuna related with this topic seems to be a lack of representative, quantitative empirical studies along with an absence of longitudinal studies on gender and scientific careers in terms of horizontal and vertical segregation in the research of the Eastern country-group.

Pay and funding:

This topic is under-researched in the countries of the Eastern group. In general, it has been discussed either in the broader framework of the gender pay gap existing in all public spheres of activities (i.e. without any particular focus on higher education and research), or connecting the topic with vertical and horizontal segregation, stereotypes, and so on. The notable exception is the Czech Republic. Research on gendered access to research funding is currently one of the priorities of the Czech NCCWS. The practice of the two national grant agencies was studied in order to address the possible gender bias of research grant distribution and eligibility criteria, and the possible non-transparency of evaluation processes for the projects submitted (if any). On the basis of these assessments, the NCCWS has been working to change some of the discriminatory practices operating within the Czech grant system.

In Hungary, a single publication was detected, this directly addressing the issue of 'pay and funding' while, in the rest of the Eastern countries, no publications focusing on this topic as a separate issue have been identified. However, one has to bear in mind that this matter is at the cutting edge of research in all the country-groups, i.e. throughout the regions of Europe and Europe +. Hence, we do not believe that the production of literature on this topic in the Eastern countries is lagging in comparison with the other country-groups.

Stereotypes and identity:

Within the topic of 'Stereotypes and identity', despite the numerous publications detected, the issues of *feminist epistemology of science* and feminist criticism of power relations in the process of science construction are still rather scantly covered. Some important work in the field has been done in Slovakia at the Gender Studies Centre, which is university-based research, and at the educational institution at the Faculty of Philosophy at Comenius University in Bratislava. One might consider that Slovakia is a regional leader in research on this topic.

In this connection, we should like to remind readers that these issues were imported into Western Europe from the USA, but it would seem obvious that they have not yet reached the Eastern European countries.

Science as a labour activity:

The same ***historical trend*** (as in the case with the theme of *Horizontal and vertical segregation)* could be identified in research on this topic as well. A large amount of the literature addresses the life stories of known female scientists, as well as historical analysis of women's admission to higher education and the research profession, the obstacles they met in their career building, and so on. In every country one can find documentary analysis of different sources of historical studies, exhaustive research of documents in national or private archives from the end of 19th century and the beginning of the 20th century, as well as documents in university archives, data from annals of statistics and reports from institutions of higher education, documents from parliamentary archives (on legislative decisions taken during the particular historical period), surveys of public discussions in the printed media and specialist journals from the end of the 19th century in support of women's access to higher education and the scientific profession, and so on.

Some gaps:

- Most biographical research in the Eastern countries appeared in the form of qualitative, empirical studies applying techniques such as interviews, observation and case studies. However, the use of software for analysis of qualitative studies is relatively new in this region of Europe.
- Lack of large-scale empirical studies addressing the institutional practices of research organisations and universities in terms of work organisation, working conditions and working time, and their impact on work-life balance and female scientific careers; no in-depth case studies on work-life balance in relation to childcare facilities; lack of analysis on provision of facilities for elderly people, in the case of those female scientists who have to take care of parents and relatives.

Scientific excellence:

This is one of the least researched topics in the literature surveyed from the countries of the Eastern group (together with the issue of '*Pay and funding'*). Some studies addressing female and male scientific productivity have been identified in Croatia, Hungary, Poland and Bulgaria. An attempt to look back in history and to estimate female and male literary production has even been made.

This topic has gained recent prominence (as of 2008) at the NCCWS due to the gendered outcomes of the Czech R&D reform and research assessment (see Linková 2009).

Gaps: Lack of either theoretical or empirical studies which address the definition of excellence and/or peer-review practices of evaluation across all institutional sectors and fields of science in general, and from the gender perspective, in particular. The 'masculine' model of success in science and the building of a scientific career have only recently appeared as specific subjects for study.

Gender in research contents:

This topic appeared only as a by-product of scholars in the field of the social sciences and humanities, in particular in sociology, economics, population studies, philosophy, ethnography, and so on. Some of the researchers in these fields (both female and male) tend to include and consider ***the gender dimension*** of their particular research topic. These publications could be considered as 'examples of good practice' in the fields of Economics (labour market) and Sociology, Cultural studies, Medicine, and so on. The topic is non-existent as a separate subject of academic research.

Policies towards gender equality in science:

The introductory studies aimed at acquainting the national academic communities with the Commission's policy of mainstreaming gender in scientific research. Some studies discuss the applicability of the specific gender equality measure in the national scenes of their countries. In this regard, some controversial stands are identified in relation with the possible re-implementation of the 'gender quota' equality measure within the Eastern country-group.

In short, the countries of the Eastern group are still at the threshold of research activities on the topics defined (the bulk of publications has appeared after 2000) and have a long way to go in order to catch up the other country-groups.

By Mária Palasik

The countries of Eastern group – except the EU associate member, Croatia – are member states of the European Union. After the Second World War they became socialist countries. In 1989-1990, radical socio-political and ideological changes occurred in all these countries. From the beginning of the 1990s onwards, all these Eastern states became independent democratic republics.

As the Enwise Report describes, the transition period after 1990 has led to the restructuring of research systems in the Eastern countries and can generally be characterised by a sharp decline in funding allocated to science, a dwindling of the research population, and the disappearance of the military and associated industries. Even though this change affected male and female scientists equally, the consequences of the process have left women scientists in a more vulnerable situation. The prospects of young female scientists are very bleak due to the unavailability of funding, the rigid patterns of promotion and recognition, and the lack of appropriate welfare policies, all of which are potential causes of brain drain.

Although there are higher proportions of women among researchers in the Eastern countries than there are among the former EU-15 countries, deeper analysis of the economic situation reveals that women tend to be better represented in the countries with the smallest research populations; that they have constituted the majority of the highly-qualified workforce for a long time; and that there is therefore greater likelihood that they will be employed in knowledge-intensive domains. However, demographics are not the only explanation. In these countries where the overall presence of women and men as researchers is fairly balanced, there are gender differences in concentrations across the various R&D sectors and fields of science, whereby women are squeezed out of competitive, high-expenditure R&D systems and absorbed into struggling, low-expenditure systems as a kind of back-up human resource.

In Eastern countries, women are still underrepresented in the top positions in science academies and in universities. Women constitute the majority of teaching staff (54%), but tend to be concentrated in lower-level academic positions. Furthermore, despite the fact that women's participation among university staff is similar to their presence as researchers, men are three times more likely to reach senior academic positions than women (Blagojević et al, 2004, p. 7.). Comparing per capita expenditures and the proportion of female researchers, it is evident that for almost all the Eastern countries, in all fields, the proportion of women is highest where per capita expenditures are lowest (Glover, J. 2005). However, this is not true, for example, for Hungary where, in case of GOV, the proportion of women is highest in the field of medical sciences, and expenditure is the lowest in the natural sciences (Palasik, M. & Papp, E., 2008).

Generally speaking, gender questions are not perceived in Eastern European societies as an issue that should be addressed and redressed. Even if some legal and institutional measures have been taken under the pressure of European integration, feminist and gender issues are still perceived as an "exotic" topic, sometimes by the women themselves. The "stability" and persistence of gender stereotypes suggest that education, manuals, the media and so on, contribute towards re-enforcing prejudices and not towards removing them.

Even if during socialist times women's issues, especially formal equality between women and men, were priorities implemented through a compulsory quota system of proportional representation, the topic of gender and women became a research theme in the educational field only after 1990.

From approximately 2000 onwards one can register a turning point in the question of gender in scientific research in the Eastern countries. This is thanks to European Union policy. From 2004-2005, increasing numbers of publications on the situation began to appear, country by country. As a result of European research policy, there are more and more research consortiums on common topics among countries, among universities, between East and West, North and South, and between member state countries and associated countries. European projects play a very important role in producing state-of-the art work, in helping to provide real knowledge about gender in matters of science. Coming projects include *Baltic States Network: Women in Sciences and High Technology*, *Tackling Stereotypes: Maximising the Potential of Women in SET* (TS project), *Stimulating Policy Debate on Women and Science Issues in Central Europe* (WS Debate), *Survey of the University Career of Female Scientists at Life Sciences versus Technical Universities* (UNICAFE), *Central European Centre for Women and Youth in Science* (CEC-WYS), *Women in Sciences and High Technology* (BASNET), *Knowledge, Institutions and Gender: an East-West Comparative Study* (KNOWING). The titles of these projects suggest that interdisciplinary collaboration and teamwork at the European level is most successful in research topics connected with engineering, technology and the natural sciences.

The main publications which are partly related with the topics of the Gender & Science Database have been produced by the Eastern group scholars in the field of social sciences and humanities, in particular in sociology, economics, population studies, philosophy, ethnography, and so on. Some of the researchers in these fields (both female and male) tend to include and consider the gender dimension of their particular research topic.

Due to the late entry of the issue of women in science in the Czech Republic in 2001, most of the existing studies are conceptual and state-of-the-art introductions to the issue of women and science on the European Union level. Moreover, since the only locus of the institutionalisation of this field is the National Contact Centre for Women in Science (NCCWS), in the Gender and Sociology Department at the Institute of Sociology of the Czech Academy of Science, the meta-project database shows how it is almost exclusively developing within the framework of the social sciences. Linked to this is the fact that the most prominently emerging topics are stereotypes and identity, and science as a labour activity.

Among the Eastern countries, the Czech Republic is also where the conceptual approach is mostly used in the existing studies. However, epistemological questions have been developing only very recently, even in the Czech Republic. The researchers in NCCWS and their associates are building mainly on Western (European) scholarship in feminist philosophy and social studies of science. Due to a critical lack of statistical data until very recently, the conditions for developing certain issues (e.g. segregation, pay and funding) are extremely difficult. The exploratory nature of the approach shows in the use of qualitative research methods. There is a very little quantitative survey data.

In all Eastern countries one can find very interesting research. However, this type of scientific work should not be overstated. Again, in the Czech Republic, in Hungary and in Poland there are a few more studies in the field than in other countries. To summarise, it might be said that only the topic "Horizontal and Vertical Segregation" has been studied to a sufficient degree – both at the historical and contemporary levels. Analysis in the majority of cases is focused on the public higher education sector, while knowledge is lacking about such institutional sectors as the business or enterprise sector and the private non-profit sector. The other GSD topics are very poorly researched indeed and, in fact, are only partly relevant to the descriptions provided regarding topics for the GSD database.

In general, gender problems have not yet found their appropriate place in either public debate or scientific research. Although all Eastern countries show a high presence of women in science, there is absolutely no tradition in studies on gender and science. There is a lack of specialised

research centres and, in fact, the problem is not presented in university teaching programmes in most countries. Research activities in the area of women and science issues are at their very beginnings in Bulgaria, Croatia, Estonia, Latvia, Lithuania, Romania and Slovenia.

Scientists of all Eastern countries show a lack of gender-sensitiveness. Among younger generations one finds more gender-sensitive scientists (males and females alike).

Research shows that the position of women in the Eastern group is marked by gender inequalities and their proportion is significantly lower compared with men. The sociological approach links the position of women scientists with the position of women in the labour market, generally applying similar theoretical conceptualisations. The common gaps in the case of Eastern group are represented in:

- Use of the conceptual approach;
- Use of empirical research methods in order to formulate new theory;
- Development of these topics in the fields of life and technical sciences as well;
- The issue of gender bias in scientific knowledge production;
- The available and desegregated statistics according to sex;
- The development of debate on new measures for the promotion of gender equality in science and their evaluation;
- There are very few studies that analyse the gender pay gap or gender inequalities in decision-making over funding distribution, access to funding and outcomes of certain distributions for women and men;
- There are few empirical studies on the organisation of scientific work and how gender inequalities in science are related to organisation of scientific activity;
- There are only a few pieces of literature on scientific excellence, principally presenting a compilation of ideas of different foreign authors, and these are not even discussed in relation with the national context;
- Contributions to the field of gender by research content from the epistemological perspective are absent in most countries;
- Other social characteristics of female scientists (age or ethnicity) are not taken into account at all (intersectional approach);
- The reasons for the “brain drain”, and policies against it. Connection between unemployment and “brain waste”. Policies for “brain exchange” and “brain circulation”.

Eastern countries need fundamental changes in policy-making to prove that promoting women’s scientific careers is a serious economic and labour-market concern. Securing equality of opportunity is crucial for the operability of society and the economy and it would assure the realisation of equal treatment of men and women in the field of scientific and educational policy, in harmony with similar measures in other policy areas. Women represent a mentality in leadership that society cannot do without. In spite of the fact that there are no legal obstacles in the way of the realisation of gender equality, international comparative studies (ENWISE report, ETAN report) and domestic status reports have revealed that, in practice, female researchers are underrepresented in research and development in general, and in some fields, types of occupation, sectors and executive positions in particular. That is why harmonised support of the scientific careers of women is a priority objective.

The Eastern countries also need ongoing help from the European Commission. They need the EU to make significant contributions towards improving policies for gender equality.